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# OPERATING AND INSTRUCTION MANUAL

## ZANTINGH GAS BURNER TR/RKB AUTOFLAME MK8



YOU CAN COUNT ON OUR EXPERTISE



## **IMPORTANT read this first!**

The operating instructions are an integral part of the product. The instructions contain important information on the commissioning, usage and operation of the product.

Please read the operating instructions carefully.

The guarantee becomes null and void if the operating instructions are not followed.

Zantingh B.V. cannot be held liable for these damages.

Store this manual carefully near the system!

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## 1. INTRODUCTION

Dear Customer,

We would like to thank you for purchasing our product.

We provide this manual to ensure the distribution of all important information for your safety, optimal profit and product lifetime.

Please read the instructions carefully before installing or operating the product.

The safety and instructions in this manual must be followed to ensure that installation, commissioning, operation and maintenance are safe and in accordance to (local) standards and regulations..

Our technical department can provide additional information and support.

If you have any questions, please contact us.

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**Phone service:** +31(0)297 – 219 125

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## 2. REGULATION



### **IMPORTANT:**

A certified heating or electrical installer should instal the product. The instructions meet the applicable (local) standards and regulations. Please contact your Zantingh representative or local service department in case of doubt.

## 3. IMPORTANT NOTES

- Commissioning a Zantingh burner ought to be performed with the utmost precision and by Zantingh authorized personnel.
- Any commissioning work or change of settings of the burner system by somebody other than by the people mentioned above, can lead to a dangerous situation and have consequences on product liability and warranty.
- Changes to the burner system may only be implemented conform instructions after receiving confirmation in writing from Zantingh.
- A burner system is a combination of:
  - **Electrical engineering**
  - **Gas engineering**
  - **Central heating engineering**
  - **Measurement and control engineering**
- Take care of your burner system as if it is the heart of your company. Restrict authorization to trained personnel only.

Always switch off the main switch and make sure that it cannot be switched on when performing any activity on the system!

In case of fire or any other emergency:

- **When accessible close the gas valve (A1) of the gas train and switch off the main switch on the burner panel.**
- **When there's a fire in the boiler room you need to switch off the electric power using the "fire switch" mounted on the wall outside the boiler room.**

### 3.1 Maintenance

To assure the safe and proper operation of the burner, it is recommended that the burner be inspected and serviced at least once a year by a qualified service engineer.

Never perform any maintenance or any other activity on the burner (system) without adequate knowledge and understanding of the system.

#### **Remarks:**

- De burner system is supplied according to applicable safety regulations, but it is the end user's responsibility to ensure safety through annual maintenance work on the system, according to applicable regulations.
- To ensure the good operation of the heating system, the boiler room has to be kept clean. It may not be used for storage purposes. The parts which may need maintenance work need to be accessible at all times.
- Keep the air supply grille and air extraction openings free and clean. Inadequate air ventilation can lead to hazardous situations.
- The boiler room has to be illuminated using mounted electrical lighting, to make sure that all parts of the system can be properly maintained even without daylight.
- Any water leaks have to be repaired immediately.
- If you have any doubts concerning the control or operation of the system, please contact your burner technician or supplier.

### 3.2 Instruction manual instructions

To understand this manual better you need to know which type of burner has been installed (TR or RKB) and which type of system it controls. This information is provided on the nameplate on the right-hand side of the burner.

## **4. SYSTEM COMPONENTS**

### **4.1 Burner component**

The burner component is in welded steel-plated housing. Under the burner housing there's an air valve section, it controls the air supply to the burner. A servomotor drives the valves. The load controller or burner controller controls the servomotor. The combustion air level is measured and monitored using air-pressure switches (LD2). If you have a burner type TR the pressure switches are located on the upper side of the burner. If you have a burner type RKB the switches are mounted under the burner housing. The primary and secondary burner combustion devices are situated in the cylindrical part of the burner. The flame monitoring device is mounted on the side of the cylindrical part. The pilot burner is positioned at the centre of the burner head. The pilot burner includes an electrical ignition. A high-voltage transformer is included in the burner housing for electrical ignition. The gas supply connection to a servomotor-driven gas quantity control valve is located under the cylindrical part of the burners.

### **4.2 Air fan component**

The air fan is positioned under the burner. The air fan supplies the required combustion air. This air fan has a directly coupled and balanced fan wheel. The fan wheel is driven by an electromotor. The air fan of a TR burner is directly connected to the air-valve section. The air fan of an RKB burner is separate and stands on the floor.

The connection is made using a flexible sleeve. Vibration isolators are used when mounting the air fan on the floor. An electrical circuit in the burner control panel and the frequency controller provide the variable speed of the electromotor. The air fan can, therefore, provide the required air quantity based on the measured air quantity. The standard air fan includes an inlet grid to prevent coming into contact with moving parts. A plate silencer is provided on the air fan inlet for noise reduction purposes. Cylindrical noise silencers are available as an option.

### **4.3 Gas train**

The gas train controls the gas supply from the distribution network. Several monitor and control units are mounted on the gas train to control the burner gas supply.

**The maximum supply pressure for the system is indicated on the burner nameplate.**

#### **Shut-off valve (pos. A1)**

The shut-off valve (A1) shuts off the gas supply to the burner system in case of:

- Fire or other emergencies.
- Maintenance work on the gas train equipment.
- Leakage of or between parts after the valve.
- Shutting down the burner system for a long period of time.

### **Filter (pos. F1)**

The filter (F1) prevents dirt and welding globules from the gas supply line from getting into the equipment of the gas train. This protects the equipment from damage caused by contamination.

### **Safety valves (pos. VA1 and VA2)**

These safety valves automatically open/close the gas supply to the burner. Two gas safety valves (VA1 + VA2) are used for safety reasons.

The second safety valve (VA2) has an integrated gas pressure regulator that makes sure the gas pressure on the burner head is constant.

### **Valve proving system (pos. VPS/VDK/TC)**

The gas train has a pressure sensor between the two safety valves. The valve proving system checks the safety valves before and during the burner start. When a leak is detected the burner is shut off and the system goes into lockout mode. An error message is displayed on the electronic module.

### **Minimum gas pressure safety device (pos. LD1)**

The pressure switch (LD1) is activated when the main gas pressure reaches the minimum limit value. This limit value is set by the burner engineer when commissioning the burner system.

### **Maximum gas pressure safety device (pos. HD and HD1)**

Both are mounted on the burner head to control the burner load by means of air pressure.

- The HD pressure switch monitors the maximum burner/boiler capacity.
- The HD1 pressure switch monitors the start load of the burner.

The settings of the pressure switches is determined when commissioning the burner system.

### **Manometer (pos. M) and push button valve (pos. K2)**

Press the push button valve to read the supplied inlet pressure on the manometer.

## 4.4 Pilot gas line

### **Shut-off valve (pos. K1)**

The ball valve (K1) is used to bleed the gas supply line. The bleed line has to include a separate pipe through the roof to the outside air. The opening has to be protected against contamination, dirt and rain.

Plug off the ball valve if there is no bleeding line.

### **Pilot gas solenoid valves (pos. MK1/MK2)**

The pilot gas solenoid valves automatically open or close the gas supply to the pilot burner (pos. AB).

#### 4.5 Control panel

The control panel includes all electrically controlled operation, monitoring and control units of the burner, air fan, gas train, boiler and other secondary connected devices. The electric circuits of all devices and units are connected to the control panel in such a way that the total system can operate safely.

These circuits can be classified into the following main groups:

- Boiler/safety circuit.
- Thermostat (start) circuit.
- Burner control.
- Load control.
- External control (Fiduface).
- Failure indicator lights.
- Motor groups/fuses.
- Control switches and reset buttons.
- Optional CO<sub>2</sub>-circuit and CO-detector circuit.

#### 4.6 Control switches and reset buttons on the control panel

The control panel includes a few switches and press button valves:

- Fire on/off switch.
- Selector switch for load control with the following four options:
  - 1 = Automatic, modulated by load controller.
  - 2 = Low flame.
  - 3 = Manual, the burner load for the Autoflame module can only be changed manually.
  - 4 = External, the burner load and on/off status is controlled by the climate or process computer.
- Reset MM, used to reset an Autoflame system failure.
- Reset, resets all failures.
- Reset alarm, resets the external alarm signal.

The following control panel switches are optional:

- Selector switch gas/oil.
- Selector switch heat/steam.
- CO<sub>2</sub> dosing on/off.
- Flue gas valve open/closed.

#### 4.7 Frequency control

A circuit in the control panel controls the air fan electromotor. A frequency control unit, not included on the control panel, controls the air fan rotational speed based on the burner load. The speed is controlled directly from the burner control unit by sending a 0-10 V/4-20 mA signal to the frequency control unit.

#### **Common settings:**

Frequency for low flame approx. 25 Hz (= ± 1400 cycles).  
Frequency for high flame approx. 50 Hz (= ± 2800 cycles).

## **5. START SEQUENCE**

When the gas pressure is nominal, the correct power is supplied to the control panel, the safety valves are closed, the on/off thermostat emits an "on" signal and all other boiler values are within the limits, the burner will start when the burner on/off switch is set to 1.

The start-up sequence is as follows:

- A.** After switching the system on, the air fan starts at low speed, sometimes after a short delay.
- B.** Once the air fan is at nominal speed, the servomotor of the air quantity control valve (pos. HR2) opens fully. When the servomotor that controls the air quantity control valve doesn't make the complete pre-set stroke, the air quantity control valve will not be sufficiently opened. The burner will be shut off and the system goes into lockout. An error message is displayed. The air fan will be set to maximum speed (50 Hz) approximately linear to the air valves to ventilate the system.
- C.** If the air quantity control valve is opened the pre-purge cycle starts. During the 30 seconds pre-purge cycle the boiler furnace is ventilated, to clear any remaining flue gas. During the pre-purge cycle the position of the air quantity control valve and of the air pressure are checked continuously.
- D.** At the end of the pre-purge cycle the air fan is set to low speed (+/- 25 Hz) and the air quantity control valve is positioned to the start/low flame position. The gas quantity control valve (pos. HR1) controlled by a servomotor is also positioned to the start/low flame position. The minimum air pressure is checked during operation by a second air pressure switch (pos. LD2 low).
- E.** All the air and gas controls are in now in the start position. The next step is to light the pilot flame. A few seconds after reaching the start position the ignition transformer is switched on. It make an electrical spark between the ignition electrodes.
- F.** After three (3) seconds the pilot gas valve (pos. MK) opens and the spark lights the gas. After another five (5) seconds the flame monitoring device checks whether the UV scanner detects a pilot flame. The 5 seconds period during which the pilot flame is lighted is called the first safety time. At the end of the first safety time the pilot flame should be burning stable and the electrical spark is switched off. The flame monitoring unit checks the flame continuously during operation. If the flame is not formed in the first safety time the flame monitoring unit goes into lockout and an error message is displayed on the electronic module.
- G.** If the flame monitoring unit detects the pilot flame, the system continues the ignition procedure after a short time period. The main safety valves (pos. VA1 and VA2) open to ignite the main flame. The pneumatic gas pressure regulator, which is mounted on the second safety valve (pos. VA2), makes sure the correct output gas pressure for the burner load is obtained.



Five (5) seconds after opening the safety valves the pilot gas is shut off. The main flame has to be stable, it is checked by the flame monitoring unit continuously.

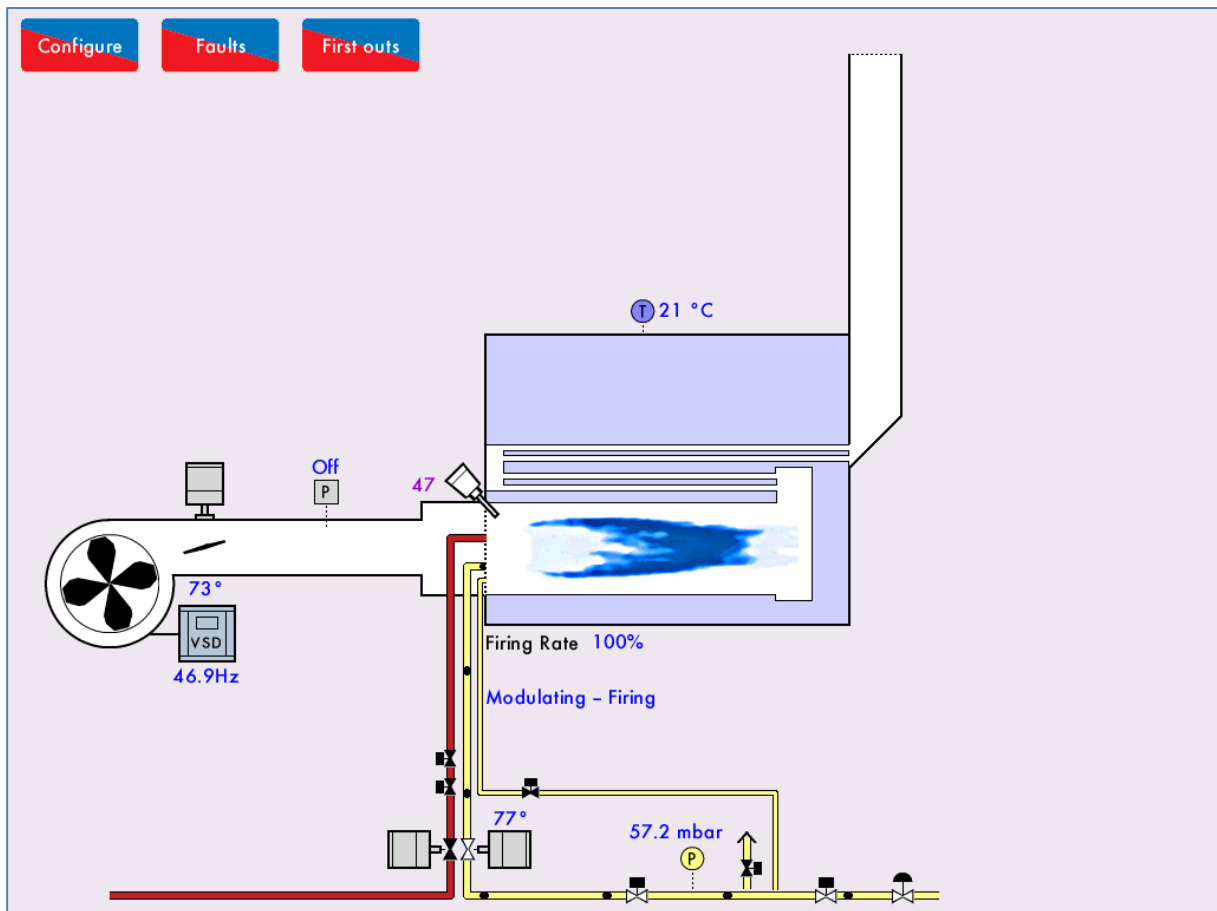
The 5 seconds during which the pilot valve (pos. MK) and the main valves (pos. VA1 and VA2) are in the open position is called the second safety time. If the flame is not formed within this time the flame guard goes into lockout and an error message is displayed on the electronic module.

The maximum gas pressure switch (pos. HD1) ensures an easy steady start of the main flame. It is only active when starting the flame. The minimum gas pressure switch (pos. LD1) monitors the supply gas pressure continuously at the lowest applicable level.

- H.** After the main flame has formed and the start sequence of the burner control panel is successfully gone through, the burner is “in operation” on low flame. Approx. 35 seconds after opening the main valves the load controller starts setting the load.
- I.** If the load control switch on the control panel is set to 1 Auto, the burner load and switching on and off will be controlled by the load control unit. The maximum gas pressure switch (pos. HD) monitors the maximum burner load by measuring the gas pressure.

## 6. AUTOFLAME MODULE OPERATION

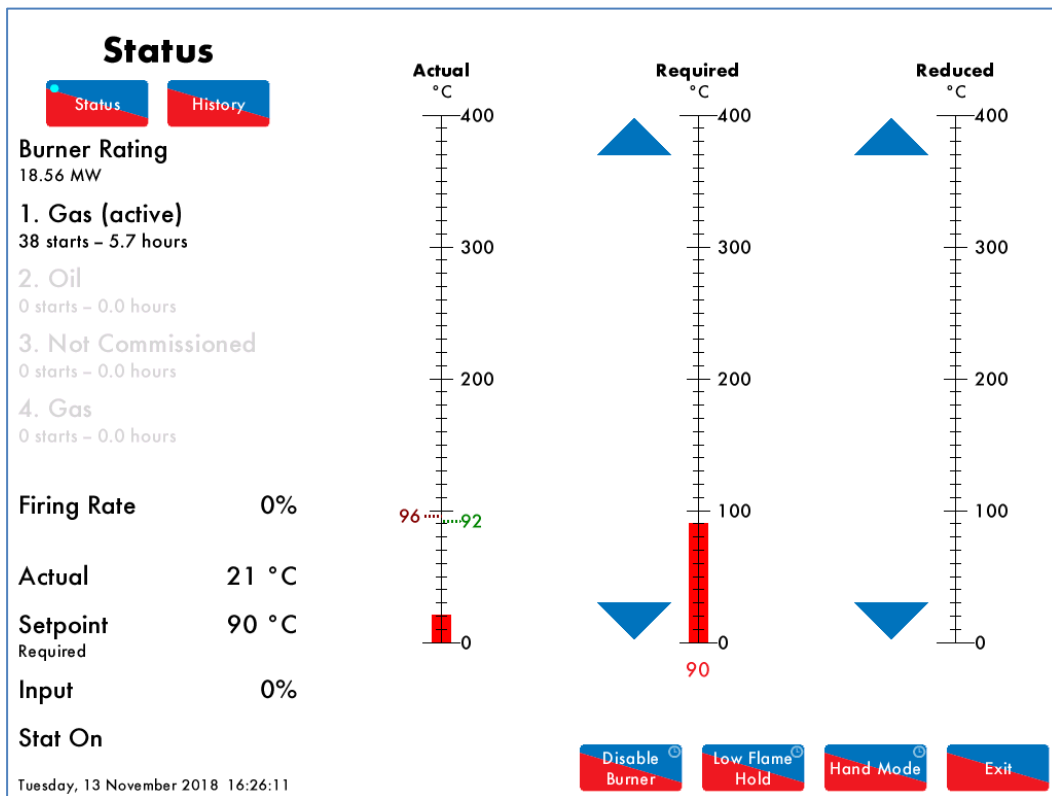
### 6.1 Status



The Home screen displays the current boiler setup. It provides operation information for each component of the burner/boiler in real time. Pressing on a component triggers the display of further information.

Note: If an error has occurred the Autoflame module automatically shows the Faults screen. Press Exit to return to the Home screen.

Press on the boiler image (not the furnace) in the Home screen to display the Status screen (next page).



Press the up and down arrows to change the required or reduced setpoints (temperature for hot water boilers and pressure for steam boilers). If these arrows are not displayed, then either the user setpoint change has been disabled and/or an external setpoint is enabled by a climate computer (Fiduface).

Before changing the setpoints, please verify the maximum allowed system temperature or pressure. If for whatever reason the temperature or pressure in the boiler exceeds the maximum allowed temperature or pressure, the system will go into lockout as a result.

### Standard Settings:

- Setpoint plus 6 °C: burner stops.
- Setpoint minus 2 °C: burner starts.
- Actual value drops 10 °C under setpoint: burner goes to high flame.
- Between 10 °C and 0 °C under setpoint: burner modulates.

Note: Only the burner engineer can change these settings.

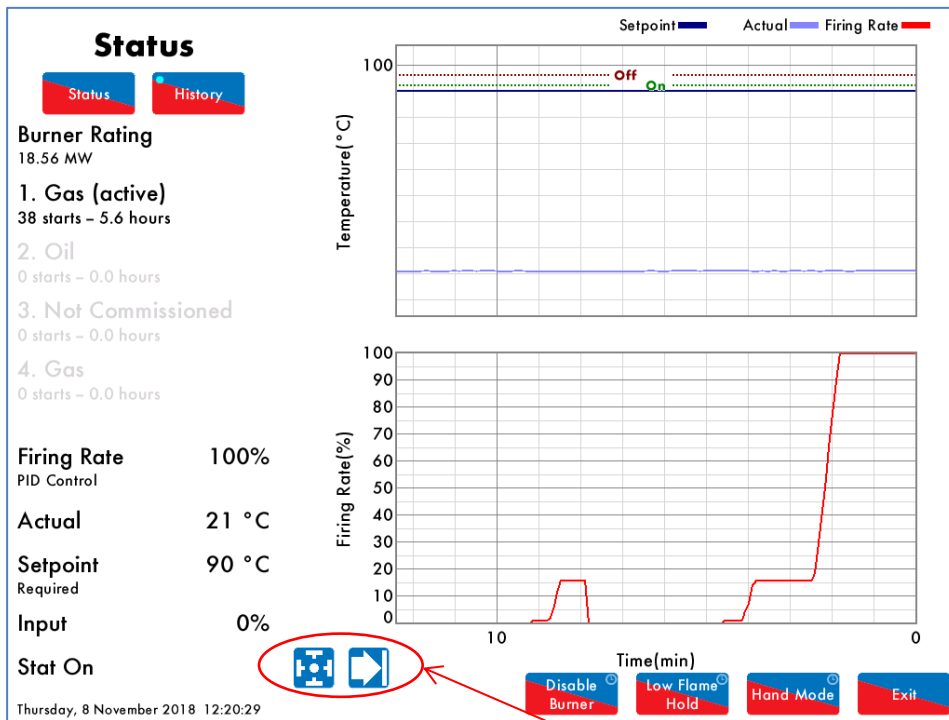


### IMPORTANT:

The setpoint for boiler temperature when oil firing should never be below 70°C.

## History

Press the History button to display the status history. The setpoint, actual temperature/pressure and firing rate are also displayed in a graph.



This data is logged for 24 hours on the MM. Use the scroll buttons to change the timescale of the data displayed, and press and drag on the axis to zoom in/out on the graph.

Note: Power cycling the MM or changing fuel will reset the 24-hour history data log on the MM.

### Disable burner

Press and hold the Disable Burner button for 3 seconds in the Status screen to disable the burner. Press and hold this same button to enable the burner.

### Low Flame Hold

Press and hold the Low Flame Hold button for 3 seconds in the Status screen to enable low flame hold. Press and hold this button again to return to normal modulation.

Note: If low flame hold and hand mode are both selected, then hand mode takes priority.

### Hand Mode

Press and hold the Hand Mode button for 3 seconds in the status screen to enable the hand mode, the firing rate can be driven up or down using the up and down arrows. The Hand Mode overrides control by the climate computer.

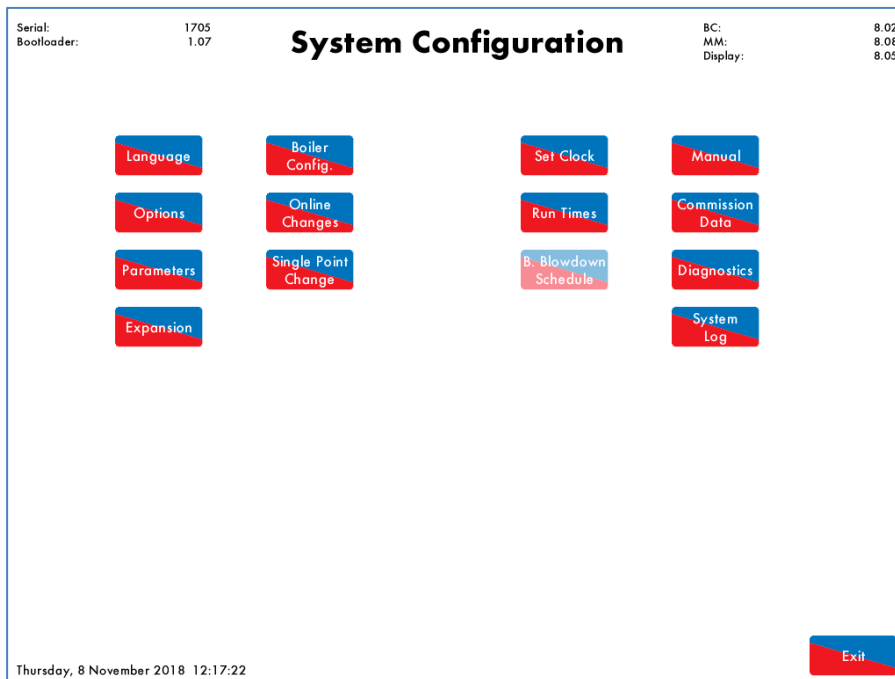
Note: If low flame hold and hand mode are both selected, then hand mode takes priority.

Note: If a firing rate limit is set, then the firing cannot be driven past this in hand mode.

## 6.2 System configuration

In the Home screen, press the Configure button to access the System Configuration screen.

Note: Parts of the system configuration are only accessible by entering the Online Password and are exclusively available to the burner engineer.



### Language

Press Language to access the Language Selection Screen. You will be prompted to enter the Online Changes Password. Please contact your local Zantingh support centre for this password.

### Options, parameters and expansion

These are in read-only mode, no changes can be implemented in the parameters on this screen. Parameters highlighted in blue have been changed and are not the default values.

### Clock

Press the Set Clock button to access the Set Clock screen. You will be prompted to enter the password. (10 > Enter, 10> Enter, then Continue). Set the time and date using the up and down arrows and press Set and then Exit.

### Manual

Press Manual in the System Configuration screen to view the Manual screen. Press on the section headings to navigate through the operating manual.

## System Log

Press System Log in the System Configuration screen to view the System Log Screen which stores 1000 entries of the following information: Stat on/off, Setting changes, Commission/single point change, Fuel flow commission, MM restart and Setpoint changes.

System Log	Detail	Occurred
1. Stat Turn On	Running Interlock	13 Nov 18 16:24
2. MM Started	Fuel 1	13 Nov 18 16:21
3. Stat Turn Off	Running Interlock	8 Nov 18 12:26
4. Stat Turn On	First out stops burner	8 Nov 18 12:12
5. Lockout	Proving Circuit Fail T52	8 Nov 18 12:12
6. Stat Turn Off	Running Interlock	8 Nov 18 12:12
7. Stat Turn On		8 Nov 18 12:08
8. Stat Turn Off		8 Nov 18 12:08
9. Stat Turn On		8 Nov 18 12:08
10. Stat Turn Off		8 Nov 18 12:08
11. Stat Turn On		8 Nov 18 12:08
12. Stat Turn Off		8 Nov 18 12:08
13. Stat Turn On		8 Nov 18 12:08
14. MM Started	Fuel 1	8 Nov 18 12:08
15. Stat Turn Off	Running Interlock	8 Nov 18 12:06
16. Stat Turn On	Running Interlock	8 Nov 18 12:05
17. MM Started	Fuel 1	8 Nov 18 12:04
18. Lockout	Gas Sensor Comms	8 Nov 18 12:02
19. Lockout	Gas Sensor Comms	8 Nov 18 12:02
20. Lockout	Gas Sensor Comms	8 Nov 18 12:02
21. Lockout	Gas Sensor Comms	8 Nov 18 11:58
22. Lockout	Gas Sensor Comms	8 Nov 18 11:58
23. Lockout	Gas Sensor Comms	8 Nov 18 11:57

All   Faults   MM   Water   Config

Tuesday, 13 November 2018 16:25:15

## Diagnostics

Press the Diagnostics button in the System Configuration to view the real-time diagnostics, with information on MM module voltages and temperature.

Diagnostics		
#	Description	Value
1	System: Processor temperature (Now)	42.5 °C
2	System: Processor temperature (Min)	19.4 °C
3	System: Processor temperature (Max)	53.2 °C
4	System: Mains frequency (Now)	50.010 Hz
5	System: Mains frequency (Min)	45.000 Hz
6	System: Mains frequency (Max)	50.746 Hz
7	System: Digital supply voltage (Now)	3.307 V
8	System: Digital supply voltage (Min)	3.299 V
9	System: Digital supply voltage (Max)	3.313 V
10	System: Analogue supply voltage (Now)	12.000 V
11	System: Analogue supply voltage (Min)	11.957 V
12	System: Analogue supply voltage (Max)	12.174 V
13	System: Expansion analogue supply voltage (Now)	12.000 V
14	System: Expansion analogue supply voltage (Min)	11.696 V
15	System: Expansion analogue supply voltage (Max)	12.142 V
16	System: Mains RMS voltage (Now)	232.3 V
17	System: Mains RMS voltage (Min)	225.4 V
18	System: Mains RMS voltage (Max)	239.0 V
19	System: Mains RMS current (Now)	0.267 A
20	System: Mains RMS current (Min)	0.083 A

All   System   PID   Trim   Water





Thursday, 8 November 2018 12:22:16

### 6.3 Faults

Press the Faults button in the Home screen to view the faults, which are categorised into lockouts, errors, alarms, warning and first out alarms, and are accessed by pressing on the corresponding tabs.

Lockouts	Phase	Occurred	Reset
1. VPS air proving fail	VPS Air Proving	14 Dec 15 12:21	14 Dec 15 12:21
2. VPS air zeroing	VPS Air Proving	14 Dec 15 12:21	14 Dec 15 12:21
3. Gas pressure low limit	VPS Gas Proving	14 Dec 15 12:19	14 Dec 15 12:19
4. VPS air zeroing	VPS Air Proving	14 Dec 15 11:43	14 Dec 15 11:43
5. Air Sensor Comms	Recycle	14 Dec 15 11:35	14 Dec 15 11:37
6. Air Sensor Comms	Recycle	14 Dec 15 09:49	14 Dec 15 11:18
7. Air Sensor Comms	Recycle	14 Dec 15 09:49	14 Dec 15 09:49
8. Air Sensor Comms	Recycle	11 Dec 15 11:52	11 Dec 15 12:18
9. Air Sensor Comms	Recycle	11 Dec 15 11:51	11 Dec 15 11:52
10. Air Sensor Comms	Recycle	11 Dec 15 11:51	11 Dec 15 11:51
11. Air Sensor Comms	Recycle	11 Dec 15 11:42	11 Dec 15 11:48
12. Air Sensor Comms	Recycle	11 Dec 15 11:40	11 Dec 15 11:42
13. Air Sensor Comms	Recycle	11 Dec 15 11:40	11 Dec 15 11:40
14. Air Sensor Comms	Recycle	11 Dec 15 11:40	11 Dec 15 11:40
15. Air Sensor Comms	Recycle	11 Dec 15 09:33	11 Dec 15 10:06
16. Air Sensor Comms	Recycle	11 Dec 15 09:33	11 Dec 15 09:33
17. Air Sensor Comms	Recycle	10 Dec 15 16:21	10 Dec 15 16:22
18. Wait Air Switch timeout	Wait Air Switch	10 Dec 15 12:07	10 Dec 15 12:54
19. No air proving	Purge	10 Dec 15 10:04	10 Dec 15 10:04
20. VPS air zeroing	VPS Air Proving	10 Dec 15 09:53	10 Dec 15 10:03
21. VPS air zeroing	VPS Air Proving	10 Dec 15 09:51	10 Dec 15 09:53
22. VPS air zeroing	VPS Air Proving	10 Dec 15 09:39	10 Dec 15 09:51

Lockouts   Errors   Alarms   **Warnings**   First outs

Fault	Type	Shuts Down Burner	Reset By
Lockout	Burner control fault	Yes	Reset button or input on T56
Error	Internal or hardware fault	Yes	Power cycle
Alarm	Critical system fault	Yes	Reset button or input
Warning	Non-critical fault	No	Reset button
First out	Configurable fault	Optional	Reset button/ auto

Please refer to the separately provided Autoflame End User manual for more detailed information on the meaning of errors and lockouts.



#### ATTENTION:

Before resetting a fault in order to start up the system please write down the error/fault and the phase in which it occurred. If the fault re-occurs, please contact your local Zantingh service point.


**Refer to Section 8. TROUBLESHOOTING.**

## First Outs

Press the First Out button in the Home screen to view the first outs (signals from external devices).

First Out Label	Function	Active State	Status
1. Maximum Boiler Temperature	Non-recycle	Active High	Inactive
2. Low Water Expansion tank	Non-recycle	Active High	Inactive
3. Boiler Low Water	Non-recycle	Active High	Inactive
4. HD Eco	Non-recycle	Active High	Inactive
5. Maximum Temperature Eco	Non-recycle	Active High	Inactive
6. Minimum Gas pressure	Non-recycle	Active High	Inactive
7. HD High Gas pressure	Non-recycle	Active High	Inactive
8. HD1 High Gas pressure Pilot	Non-recycle	Active High	Inactive
9. Frequency Driver Error	Non-recycle	Active High	Inactive
10. Thermal Off	Non-recycle	Active High	Inactive
11. Spare	Non-recycle	Active High	Inactive
12. Spare	Disabled	Active High	Inactive
13. Spare	Disabled	Active High	Inactive
14. CO2 Valve	Disabled	Active High	Inactive
15. Spare	Disabled	Active High	Inactive

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The function of a first out is summarised below:

Function When Active	Description
Disabled	Does not function.
Monitor	Burner continues firing, but the events will be logged.
Non-recycle	Burner stops firing and the first out must be reset for the burner to restart.
Recycle	Burner stops firing and restarts automatically when the input status changes.



## **7. BURNER FAILURE REPORT**

### **Gas valves/leak test**

Before and during every burner start the safety valves (pos. VA1 en VA2) and pilot valve (pos. MK1) are checked for leaks.

Possible causes:

- Failure of the “leak test” can indicate that one of the safety valves or the pilot valve was not closed during standstill/start period.

Check:

- If bleed valve K1 is closed/gas-tight.
- External gas leakage visible (smell/“leak finder”/soap and water solutiony).
- Write down the diagnostic code of the burner display.

### **Gas pressure too low**

The minimum gas pressure switch (pos. LD1) mounted before the safety valves ensures the supplied minimum gas pressure is continuously checked. If the gas supply pressure drops lower than 20% of the standard pressure (or another setpoint which is considered to be a safe setting by the authorized burner engineer), the safety device triggers a system lockout.

Check:

- If manual gas valve (A1) is fully opened.
- The gas supply pressure before the gas train, by pressing the press-button valve (pos. K2) under the manometer to read the current pressure on the manometer (pos. M). Or check the manometer on the gas supply gas train. This pressure has to be approximately the same as indicated in the contract.
- If the gas supply pressure is ok, check the gas filter (pos. F1) for dirt (close gas valve A1 manually first).

### **Maximum gas pressure**

The maximum gas pressure switch (pos. HD1) mounted on the gas inlet of the burner, ensures a nice and smooth start of the main burner by measuring the start pressure. When the pressure is higher than the setpoint value the system locks out. The maximum gas pressure switch (pos. HD), also mounted on the burner gas inlet, protects the boiler against overloading. The gas pressure on the burner head is measures for this purpose. If the pressure is higher than the setpoint value the system is locked out.

Possible causes:

- Abnormal outlet pressure of pressure regulator.
- Dirty condenser.
- Abnormal gas supply pressure.

Check:

- The position of the burner control box (if applicable) were the failure occurs.
- The condensate drain of the condenser.

### **Motor overload**

The control panel includes overload relays to protect the electromotors. In case of failure the overload relays have to be reset manually. The overload relay types included on our panels, are combined thermal and maximum current protection relays.

Check:

- If all three phases (L1, L2 and L3) still have normal loads.
- If all fuses are intact Replace the fuses when required (we recommend replacing all three fuses at the same time).
- Write down which overload relay triggers a lockout, if after resetting the motor makes a sound similar to an animal growl and doesn't run smoothly one phase may still not be working properly.

### **Air pressure too low**

The air pressure is monitored using air pressure switches (pos. LD2 low and LD2 high) mounted on the burner. The pressure is checked 30 seconds after the air fan is started.

Possible causes:

- The air inlet of the air fan is blocked (plastic bag).
- The air fan is very dirty.
- The air valves are very dirty.
- The flexible measuring hose to the pressure switch is broken or blocked.
- The overload relay is locked out (see previous item).

Check:

- The air fan inlet.

### **Maximum temperature and/or pressure**

The boiler is protected against high temperatures and/or pressure. A maximum thermostat or maximum pressostat device forms the basis for the protection. When the temperature or pressure exceeds the maximum value setting of the device the burner locks out. The maximum thermostat supplied by Zantingh is locked mechanically and has to be reset both on the thermostat itself and on the burner control panel.

Possible causes:

- Configured setpoint may be too high.
- Too little water and/or air bubbles in the boiler, fill it up and bleed it.

### **Low water**

The water level in the boiler is monitored to protect the boiler against serious damage caused by overheating when the water level in the boiler is too low.

This safety device is supplied as one of two options:

- One or two electrodes mounted in the boiler.
- Mechanical float switch.

Possible causes:

- Water level too low (for example due to a system leak).

- Feed water pump malfunction.
- Expansion system low pressure.

#### **Max. temp. condenser (when applicable)**

This failure occurs when the water temperature in the flue gas condenser is too high.

Check:

- Condenser water flow: Check whether the circulation pump is operating properly and whether the manual shut-off valves are closed.
- That the condenser and the connected system do not have air in them.

**WARNING!! Watch out for hot parts and spraying hot water in case of leaks!**

#### **Max. pressure condenser (when applicable)**

The condenser is checked for contamination using a pressure switch which measures the condenser backpressure. If the backpressure measured at the switch is too high, the burner is locked out. The pressure switch is mounted on the flue gas duct between the boiler and the condenser.

Possible causes:

- Condenser is dirty.
- Flue gas valve(s) is/are not in the correct position.
- Condensate drain is blocked.

Check:

- Open the inspection cover to check for contamination.
- The position of the flue gas valves.
- The condensate drain and syphon under the condenser.

#### **Autoflame system failure (MM error)**

If the Autoflame module display displays the Lock Out screen, the MM has been triggered by an internal error in the system.

Before pressing the reset button write down the Error code. If after resetting the Autoflame module the error re-occurs, contact your local service support service.

#### **Frequency control code F**

When an internal or external frequency control error is triggered the frequency control is switched off and the "F" symbol error code is displayed followed by a number including a brief description.

Warning! If you contact our service department because of a failure, please write down the error code and description. Once the cause of the failure is removed the error can be reset by pressing the "reset/enter" button.

Under normal conditions the frequency control unit does not require maintenance work. The frequency control unit includes a cooling fan to blow the surrounding air over the cooling body. Take care that the air openings are not blocked. If the cooling body becomes too hot the control will trigger an "F14" error.

## **Flame failure**

Flame failure is the most difficult burner system error to trace.

If the flame monitor does not locate a flame, depending on the start sequence phase, a flame failure may be triggered.

A flame failure can occur because the gas flame does not ignite. The problem can be the electric spark does not light the pilot flame or the pilot flame doesn't ignite the main flame.

The combustion may also be unstable causing the flame to go out during operation. Because of the many potential causes it is very hard to determine why the flame failure occurs. The start sequence phase when the failure occurs may provide additional information. **Write down the error code indicated in the faults section on the display of the electronic burner controller.**

### **Potential causes**

No ignition spark:

- Defect ignition transformer.
- Defect or incorrectly adjusted ignition electrodes.
- Loose ignition cables.
- Spark not in the correct position (Refer to information on Earth/mass).

No pilot flame:

- Defect gas solenoid (pos. MK).
- No combustible gas mixture, does not ignite.
- Pilot valve isn't detected by flame monitoring unit or flame signal is too low.

No main flame:

- Defect safety valve(s) (pos. VA1 and VA2).
- The air-gas ratio is not appropriate, because of which the air-gas mixture does not ignite, or even goes out during operation.
- Main flame is not detected by the flame monitoring unit because the flame is too low.

Flame failure before gas valves have opened:

- Defect UV scanner.  
Inappropriate lighting, for example, through sight glass.

## 8. TROUBLESHOOTING



### WARNING:

Set the main switch on the burner panel to “OFF” before performing any maintenance work. Lock the switch to ensure nobody can set the main switch to “ON” when performing the maintenance work. Never work on the system if the control panel is live (energized).

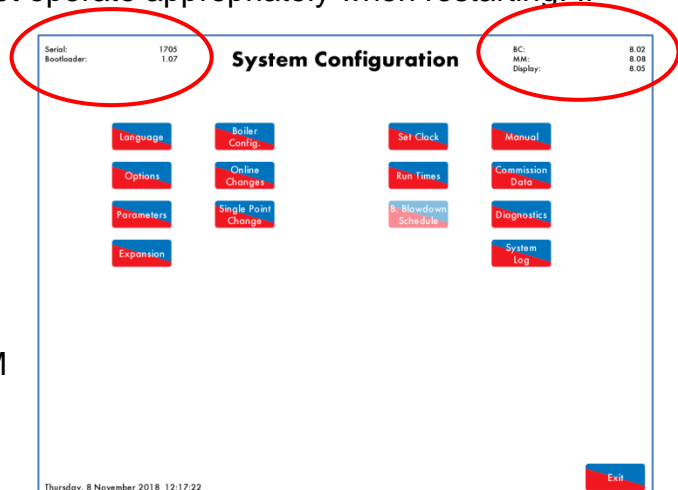
When switching off the main burner control panel switch also switch off the power of any connected CO<sub>2</sub>dosing unit control panel.

In case of an error or lockout the Autoflame module automatically switches to the Fault screen. To reset the system press the reset button on the switch panel door. The burner will attempt to restart.

Note: The maximum thermostat and the low water protection device may be mechanically locked. The reset button on the safety device itself should be pressed first, before resetting the whole system. If the burner does not start a failure of the CO<sub>2</sub>-dosing unit and/or CO-detector may have been triggered.

Keep a close eye on parts which may not operate appropriately when restarting. If the same error occurs again:

- Write down the error description displayed on the Autoflame unit before resetting the error.
- If it is a lockout failure also write down the phase during which the error occurred.
- Write down the serial number and software version of the MM module. You can find this information on the System Configuration Screen (refer to the image).
- Write down the system number, burner type and manufacturing year (refer to the label on the burner control panel).
- Contact our local service department. They will first attempt to solve the problem via the telephone call.



**NOTE: Please refer to the separately provided Autoflame End User Manual for more detailed information on the meaning of error and lockout messages.**

## **9. SWITCH FROM GAS TO OIL AND BACK (If applicable)**

The burner is provided with a gas valve and air valves for fuel air ratio control (1:7). When gas firing, the burner capacity is controlled by the stand alone modulating PID controller in the Autoflame module or by the climate computer through Fiduface.

For oil firing, the burner is provided with a 2- or 3-stage oil combustion system (depending on the capacity) with oil valves for fuel air ratio control (1:3). The combustion capacity is controlled by the stand alone modulating PID controller in the Autoflame module.

### **From gas to oil:**

1. Before switching from gas to oil firing, set the burner load switch to “LOW” and wait until the burner flame is low. Now set the main switch on the burner panel to “OFF”.
2. Check that the boiler temperature setpoint is not below 70°C to prevent oil condensation. See chapter 6 on how to change setpoint.
3. Close shut off valve A1.
4. Set the flue gas inlet valve of the condenser on bypass.
5. Check that every valve to the oil pump is open and whether the oil pump is filled with oil. The complete system has to be filled with oil without any air. If this is not the case it may cause major defects. The oil pump is not a self-suction pump.
6. Set the selector switch from “GAS” to “OIL”.
7. Set the burner load switch to “AUTO” and switch the burner on.



### **WARNING:**

When not specifically stated otherwise, the burner is made for oil as emergency fuel only. After more than 24 hours on oil firing the burner system may be dirty. Reliable and clean combustion can no longer be guaranteed.

If a flame failure occurs more than 3 times during start-up, check the furnace for oil. When the boiler temperature is higher than 65 °C the oil in the furnace may gasify. At the next attempt to start, the ignition may ignite the gasified oil and may cause an **explosion**.

The annual maintenance work should include running the burner on oil!

Make sure you have enough oil on stock.

Note: installing, checking and filling the oil tank and oil piping from the oil tank to the oil pump is not within the scope of our service engineer. This is the responsibility of the user.

### From oil to gas:

1. Set the main switch on the burner control panel to “OFF”.
2. Close all oil valves in the oil line.
3. Set the selector switch from “OIL” to “GAS”.
4. Switch the load switch to the required setting.
5. Set the flue gas inlet valve of the condenser to standard operation.
6. Open shut off valve A1.
7. Set the main switch on the burner control panel to “ON”.



#### **WARNING:**

Before starting the system, check the furnace for oil. If the boiler temperature is higher than 65 °C the oil in the furnace may gasify. At the next attempt to start, the ignition may ignite the gasified oil and may cause an **explosion**.

*Ask the burner engineer to demonstrate the switch from gas to oil and back.*





## **10. WARRANTY CONDITIONS**

Zantingh B.V. guarantees this Zantingh product for the installer under the following conditions. The installer guarantees this product to the user under the same conditions which are provided below.

1. The period of guarantee is valid as from the day of delivery on location. The guarantee has a fixed period of 12 months, based on the agreed sales price.
2. A recognized installer should install the system according to the applicable general and local standards and regulations based on the assembly and operation instructions provided by Zantingh.
3. The system may not be moved from the original location.
4. The guarantee becomes null and void if and when:
  - Defects of the system are not reported in writing to the installer and/or Zantingh B.V. immediately after having been discovered or these could reasonably be expected to have been discovered.
  - Defects are caused by errors, improper use or neglect by the installer and/or the user who has placed the order or his/her legal successor or caused by external causes.
  - During the period of guarantee a third party is requested to or implements changes to the system or when the user has done so without prior written consent by the authorized installer and/or Zantingh B.V.
  - During the period of guarantee the expert inspections and/or maintenance work are periodically not performed even though the equipment requires it.
  - Corrosion has been caused by polluted flue gas, to be determined by Zantingh B.V.
  - If after research is carried out, one or more of the above conditions were not taken into account and are the reason for any guarantee claim, the costs for the required research by Zantingh B.V. or third parties will be charged to the user.
5. The initial request based on the guarantee obligations described in this article should be submitted in writing to the installer within five working days after the error or defect has been observed or could reasonably have been observed.
6. The stipulations included in our general guarantee, sales and payment conditions, issued by the ORGALIME S 2012 "General conditions for the supply of mechanical, electrical and electronic products" are also applicable. Zantingh B.V. will not be liable for any consequential damage to the Zantingh system other than a defect covered by the guarantee as described above. Moreover, Zantingh B.V. will not be liable for any damage to income and/or loss of profit to the user of any nature whatsoever.
7. Any costs incurred by assembly or disassembly, travelling or accommodation expenses, constructional costs and such required to execute the terms of the guarantee are excluded from the terms of the guarantee.

Any dispute between Zantingh B.V. and the buyer regarding a claim based on the guarantee will be resolved by an expert and independent authority if so desired. The parties agree to abide by the binding decision of said authority.



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