Vitotherm

Instruction manual

Automatic forced draught burner

MONO-block | LowNOx

Lamtec

EN (English) original instructions

Burner type

VGI-sXXXX MONO-block for gaseous fuels

VGOI-sXXXX MONO-block for gaseous and liquid fuels

VOI-sXXXX MONO-block for liquid fuels

Original instructions

The original manual is written in UK English. All other language versions are translations of the original manual.

Copyright

Disclaimer of liability

The manufacturer cannot be held responsible for personal injury, damage to the burner or property damage caused by incorrect use, foreseeable misuse or failure to follow the instructions in this manual. This also applies to unauthorised modifications of the burner and the use of non-approved spare parts, tools or accessories.

The manufacturer reserves the right to modify this manual without notification beforehand.

Customer service

Our customer service department is available 24 hours a day to provide any required technical information and support.

Please have the burner plate information of the burner available when you contact our customer service department (see §3.9).

+31 (0) 15 369 47 57

Warranty

The equipment supplied by Vitotherm has a one-year warranty covering materials from date of commissioning against defective parts, limited to the delivery of parts only. Warranty is only valid when the installation has been realised in accordance with our instructions and commissioning is executed by a Vitotherm engineer or by Vitotherm authorised personnel.

During the period of the warranty any failures to Vitotherm equipment will be repaired within 10-14 days. Our local service expert for future regular maintenance will be at our daily rate.

Vitotherm

Table of Contents


Vitotherm
Firing technology
becomes standard

1 Introduction

1.1 About this document

This manual contains instructions and safety information for operation, installation, commissioning and maintenance of the Vitotherm Automatic forced draught burner.

This manual is intended for:

- the owner of the burner system;
- the worker that operates the burner system;
- the qualified technician that performs the installation of the burner system;
- the engineer that is authorized by Vitotherm to perform (re)commissioning, adjustments, troubleshooting,maintenance and repairs of the burner system.

1.2 Relevant documentation

This manual contains references to external documents that are part of the burner's technical file:

NOTICE	The technical file is provided on a USB-drive, located inside the control panel.

- Order confirmation; a document that contains essential information about your specific burner system configuration
- Electrical wiring diagram
- OEM manuals & documentation
- Commissioning report
- Installation overview; a 3D drawing of the setup of your specific burner system configuration

1.3 Symbols and labels

1.3.1 Safety warnings

This manual contains safety warnings that may result in injury when ignored. Each safety warning is indicated with a signal word. The signal word corresponds with the level of risk of the described hazardous situation:

Signal word	Level of risk	If not avoided
⚠DANGER	High	Will result in death or serious injury
⚠WARNING	Medium	Could result in death or serious injury
⚠CAUTION	Low	Could result in moderate or minor injury

Safety warnings given at the start of a section apply to the entire section.

Format example of a safety warning:

⚠WARNING Contact with live parts can cause electric shocks, burns or even death.

- ▶ Only perform work on electrical equipment if you are an authorised electrician.
- ▶ Before you start working on electrical equipment: Switch off and lock out the power supply isolator and verify that no voltage is present.

Safety warnings at the start of a section, apply to the entire section.

1.3.2 Notices

Messages that are not hazard-related are indicated with the signal word **NOTICE**. These messages do not have a safety alert symbol.

Format example of a message that is not hazard-related:

NOTICE Operating the engine at an oil level below the minimum limit value can damage the engine.

- ▶ Regularly check the oil level and refill when necessary.

1.3.3 Other symbols

This symbol identifies a reference to an external document, such as an OEM manual.

1.4 Used terms and definitions

Term	Definition
Burner	MONO-block burner unit, which includes the fan and combustor.
Burner system	Complete burner assembly as delivered, including gas train and control panel.
Boiler	The heating appliance to which the burner system is connected. A water boiler is the most common type of heating appliance and will be used as the main example in this document.
Boiler house	The building in which the burner system and boiler are installed.
OEM manual	User manual of the original equipment manufacturer.

1.5 Conformity

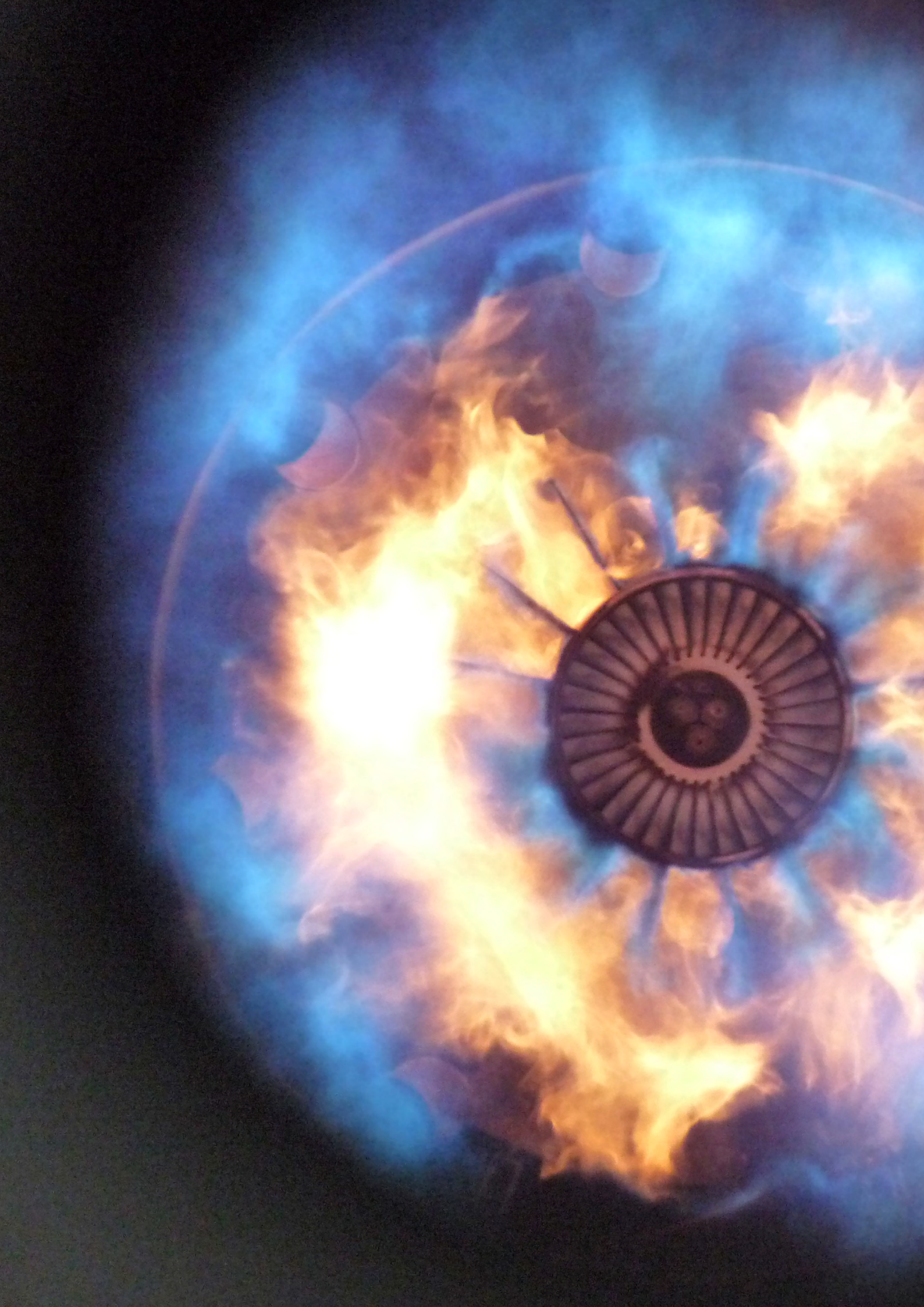
Vitotherm gas burners carry the CE and EAC marks as a proof of compliance to the following EU directives:

1. GAR 2016-426-EU
2. MD 2006-42-EG
3. PED 2014-68-EU
4. EMC 2014-30-EU
5. LVD 2014-35-EU
6. CE-PIN: 2009/142/EC

See Appendix B for the full declaration of conformity.

Vitotherm

Notes



2 Safety

2.1 Introduction

Observe the instructions in this manual before you start working with the burner. If you fail to follow the instructions from this manual you can put persons, surroundings, the environment and the burner at risk. Store this manual in an accessible place near the burner for future reference.

- ▶ Always comply with the information, such as labels and the burner plate, attached directly to the burner and keep the information in a legible condition.
- ▶ Always comply with applicable local laws and regulations.

The burner is equipped with several safety components that ensure safe working with the burner.

2.2 Intended use

The Vitotherm Automatic forced draught burner is a burner for intermittent firing and continuous firing of a boiler or other heating appliance.

The range of applications and type of fuels that the delivered burner type can handle are explained in the Declaration of Conformity. Other fuels must be confirmed by Vitotherm BV.

- The burner must only be operated with the type of fuel as indicated on the burner plate and in the order confirmation.
- The fuel supply pressure must not exceed the pressure given on the burner plate.
- The burner must not be operated outside its operating range (see load values on the burner plate).
- The burner must only be used for an application in compliance with the requirements in the order confirmation.
- The burner must only be used under ambient conditions in compliance with the requirements in the order confirmation.
- The burner must only be used in compliance with applicable local laws and regulations.

Safe use of the burner is only guaranteed if it is used as intended.

2.3 Reasonably foreseeable misuse

The following is considered foreseeable misuse:

- Operation and use of the burner that deviates from the intended use as described in the previous section.
- Failure to comply with the instructions in this manual.
- Failure to eliminate faults, malfunctions or defects of the burner that impose safety risks.
- Failure to carry out the inspections and maintenance operations as described in this manual.
- Unauthorized removal or modification of parts or safety components of the burner.
- Use of spare parts or accessories that have not been approved by the manufacturer.
- Operation in a closed-off or poorly ventilated room.

2.4 Qualification of personnel

Only authorised personnel is allowed to operate and clean the burner. They must possess the following qualifications:

- are legal of age;
- are familiar with and abide by the safety instructions and sections of this manual related to operating the burner;
- are familiar with and abide by the applicable local, national and international laws and regulations;
- are officially trained and certified by Vitotherm B.V.
- have received adequate training to operate and clean the burner;
- have obtained authorisation to access the burner.

Only authorised technicians are allowed to perform installation and maintenance of the burner. They must possess the following qualifications:

- are legal of age;
- are familiar and abide by the safety instructions and sections of this manual related to installation and maintenance of the burner;
- are familiar with and abide by the applicable local, national and international laws and regulations;
- are able to recognize the possible dangers of the burner and take the necessary measures to protect persons and property;
- have received adequate training in the safe maintenance of the burner;
- have obtained authorisation to access the burner.

2.5 Protective measures

2.5.1 Personal protective equipment (PPE)

Personnel that operates the burner must equip themselves with the following:		Technicians that install or perform maintenance on the burner must equip themselves with the following:	
	Wear foot protection		Wear foot protection
	Wear eye protection		Wear eye protection
	Wear ear protection (above 80 dB).		Wear protective gloves
			Wear head protection (during lifting work)

2.5.2 Organizational measures

The owner is responsible for carrying out the necessary organizational measures to ensure safe use. Amongst other measures this is achieved by, but not limited to:

- Training and authorising personnel. Vitotherm is responsible for distributing passwords to authorised personnel only.
- Performing hazard assessments of the complete system that incorporates the burner and informing personnel of the possible dangers and protective measures.
- Performing good housekeeping in the facility that houses the burner.
- Running a preventive maintenance program.

2.6 Residual risks

Despite the safe design and construction of the burner and the prescribed protective measures, the burner poses residual risks. This manual provides safety messages to indicate these risks. The formatting and appearance of safety messages that are dedicated to a particular section or sentence are explained in chapter 1. Overall safety messages are grouped in the following sections.

2.6.1 Combustible materials

⚠WARNING The burner system contains pressurized components and piping containing combustible fuels.

- ▶ Install pipework in accordance with the applicable rules and standards.
- ▶ Protect pipework against corrosion and mechanical forces.
- ▶ Take fire prevention and control measures in accordance with governmental rules and regulations.
- ▶ Provide proper means of emergency escape.
- ▶ Store the fuel in accordance with governmental rules and regulations.
- ▶ Always consider your own safety, that of others and the risks for the environment that may arise due to fuel escaping.

2.6.2 Combustion process

⚠WARNING An incomplete combustion process can produce toxic gases.

- ▶ Equip the boiler house with properly sized vents. The boiler must have a gas-tight gas flue to the outside in accordance with locally applicable standards.
- ▶ Make sure that the burner is always supplied with sufficient clean combustion air.
- ▶ Do not store or process anything near the air intake vents.
- ▶ Make sure that fan opening is never blocked (e.g. by a loose object such as pieces of paper).
- ▶ Provide proper means of emergency escape.

2.6.3 Electricity

⚠WARNING Contact with live parts can cause electric shocks, burns or even death.

- Only perform work on electrical equipment if you are an authorised electrician.
- Perform the work on electrical equipment in accordance with the local safety standards.
- Do not make changes to the burner system if you are not qualified to do so.
- Before you start working on electrical equipment: Switch off and lock out the power supply and verify that no voltage is present.
- Use fuses that correspond with the installed power of the burner.
- Regularly check the electrical wiring for loose connections and damage and repair them without delay.

2.6.4 Mechanical

⚠WARNING The burner system contains moving, pressurized and sharp parts that can crush, cut or hit.

- Do not operate the burner with covers or guards removed.
- Do not operate the burner with missing pipework or components.
- Never touch the air damper box during operation.
- Be aware of sharp edges.

2.6.5 Temperature

⚠CAUTION The interior parts and surfaces of the burner that reach high temperatures cannot be reached under normal operating conditions.

- Do not expose and/or touch interior parts and surfaces of the burner during operation or shortly after operation.
- Properly isolate hot surfaces of the burner system.

2.7 Warning labels

Always comply with warning labels and information signs on the burner. The warning labels and information signs must be kept legible and must be replaced if necessary. For this purpose, contact the manufacturer.

2.8 Emergency measures

The following emergency situations require special measures to be taken:

2.8.1 Gas leak

For VGI or VGOI

The smell of gas nearby the burner can indicate a leak in the gas supply of the burner system.

⚠WARNING Gas leaking from the burner system is highly flammable.

- ▶ Switch off or remove any potential sources of ignition when a potential gas leak is detected.
- ▶ No smoking! Avoid open flames and sparks.
- ▶ Open doors and windows of the boiler house.
- ▶ Close the gas shut-off valve.
- ▶ Shut down the burner system.

To fix a gas leak:

1. Use gas leak spray or a gas detection device to trace/detect the leak.

NOTICE Gas leaks usually occur at the gaskets or couplings of the gas train.

If the leak occurs at a gasket or coupling:

1. Switch off the gas supply.
2. Replace the gasket or coupling.
3. Tighten all nuts, bolts and flanges.
4. Apply a soap solution to the new gasket or coupling.
5. Pressurize the gas train.
6. Check for any soap bubbles.

2.8.2 Oil leak

For VOI or VGOI

Oil leaks can be dealt with similarly to gas leaks. The main difference is that oil leaks can be visually detected.

⚠CAUTION Oil flows through the installation at pressures of up to 30 bar.

- ▶ Always keep a safe distance from an oil leak.

2.8.3 Fire

When fire is detected on or around the burner, take the following measures:

⚠WARNING Fires on or around a burner system can lead to a gas explosion.

- ▶ Always store a fire extinguisher close to the burner.

1. Call the emergency number.
2. Use the control switch on the control panel to close the fuel supply to the burner.
3. Use the manual emergency shut-off switch outside the boiler house to close the gas supply to the boiler house.
4. Use the fire switch outside the boiler house to cut off the power to the burner.

2.9 Safety precautions

A burner system is equipped with several safety components that help prevent dangerous situations.

For more information about safe use of the burner, see chapter 4.

For more information about the integration of the safety components into the system, please refer to the electrical wiring diagram.

2.9.1 Flame sensor

The flame sensor monitors the intensity of the flame. In case the flame intensity does not correspond with the control mode and sequence, the system is switched off and an alarm is activated.

2.9.2 Gas safety valve

The gas safety valve is an integrated hydraulic component that automatically closes the fuel supply when a low intensity or absent flame is detected.

2.9.3 Gas leak detection system

The gas leak detector is an integrated system that checks the gas safety valves for internal leaks via a 2-fase test.

2.9.4 Low water level cut-off system

The low water cut-off system consists of a low water sensor in the boiler and a cut-off relay in the control panel. The sensor is part of the boiler thermostat set (see §3.5).

The cut-off system shuts down the burner when the water level in the boiler is too low.

2.9.5 Max. thermostat

The maximum temperature thermostat (fail safe) boiler shuts down the burner if the water temperature exceeds the boiler design temperature.

The thermostat is part of the boiler thermostat set (see §3.5).

2.9.6 Min. air pressure switch

The minimum air pressure switch shuts down the burner if the produced pressure by the combustion air fan is too low.

The air pressure switch is part of the burner (see §3.1).

2.9.7 Proximity sensor

The proximity sensor shuts down the burner if the combustion air fan motor is out of range concerning its rpm. The proximity sensor is located on the fan motor (see §3.1).

2.9.8 Min. & Max. gas pressure switches

The minimum gas pressure switch shuts down the burner if the gas supply pressure is too low. The maximum gas pressure switch shuts down the burner if the gas supply pressure is too high.

The gas pressure switches are part of the gas train (see §3.3).

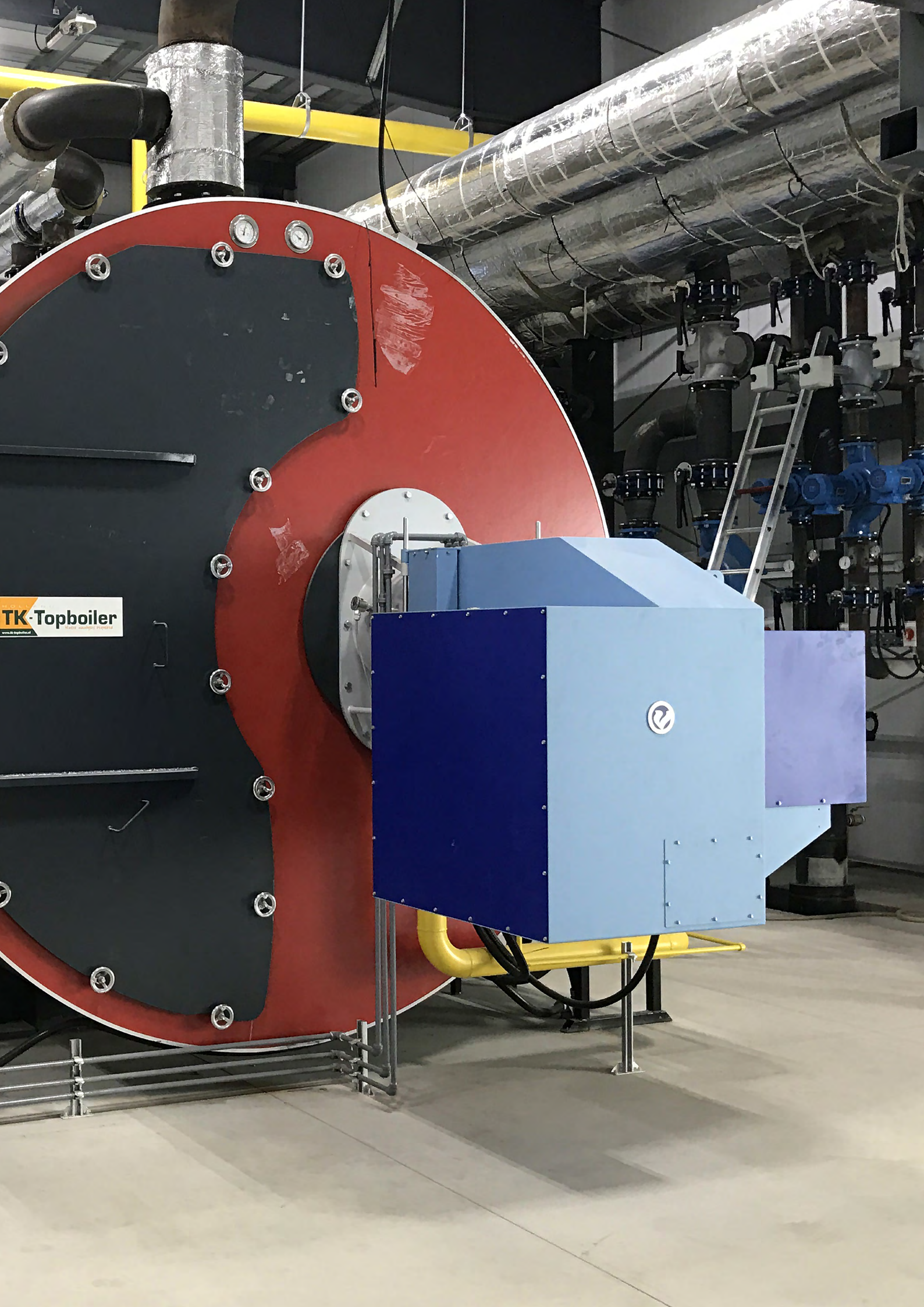
2.9.9 Gas relief valve

A relief valve is located on the gas train (see §3.3). The valve can be opened with a wrench to reduce the pressure inside the gas train.

2.9.10 Manual deaeration valves

For VOI or VGOI

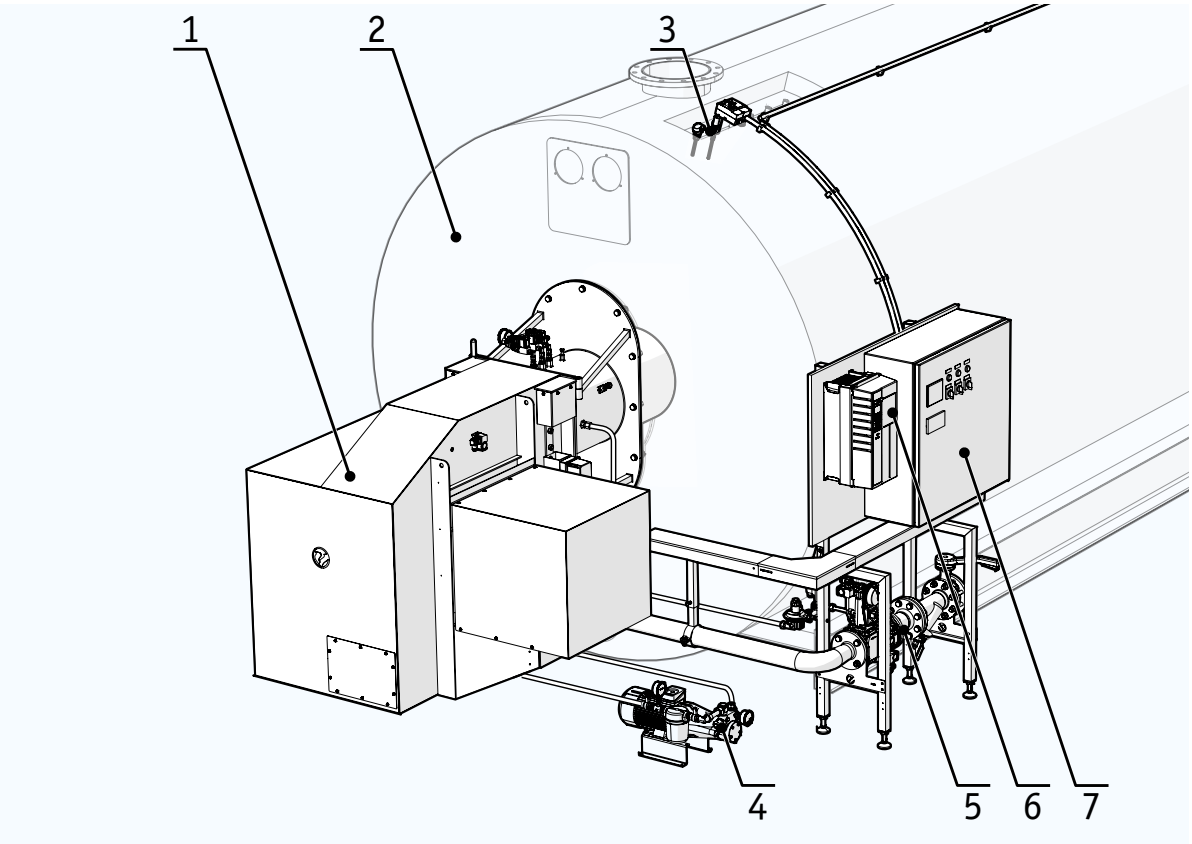
A manual deaeration valve is located on the oil buffer of the modulating oil firing set (see §3.7) and the back-up oil firing set (see §3.8.1). The valve can be opened by hand to reduce the pressure inside the oil buffer.


TK-Topboiler

3 Design and function

The Vitotherm Automatic forced draught burner consists of a MONO-block burner unit and a low NOx burner head. The standard burner system consists of the following components:

NOTICE The illustrations shown in this manual show a VGOI burner system configuration with a Vitopack and a Lamtec Etamatic control system. Your specific burner system configuration may differ from these illustrations.



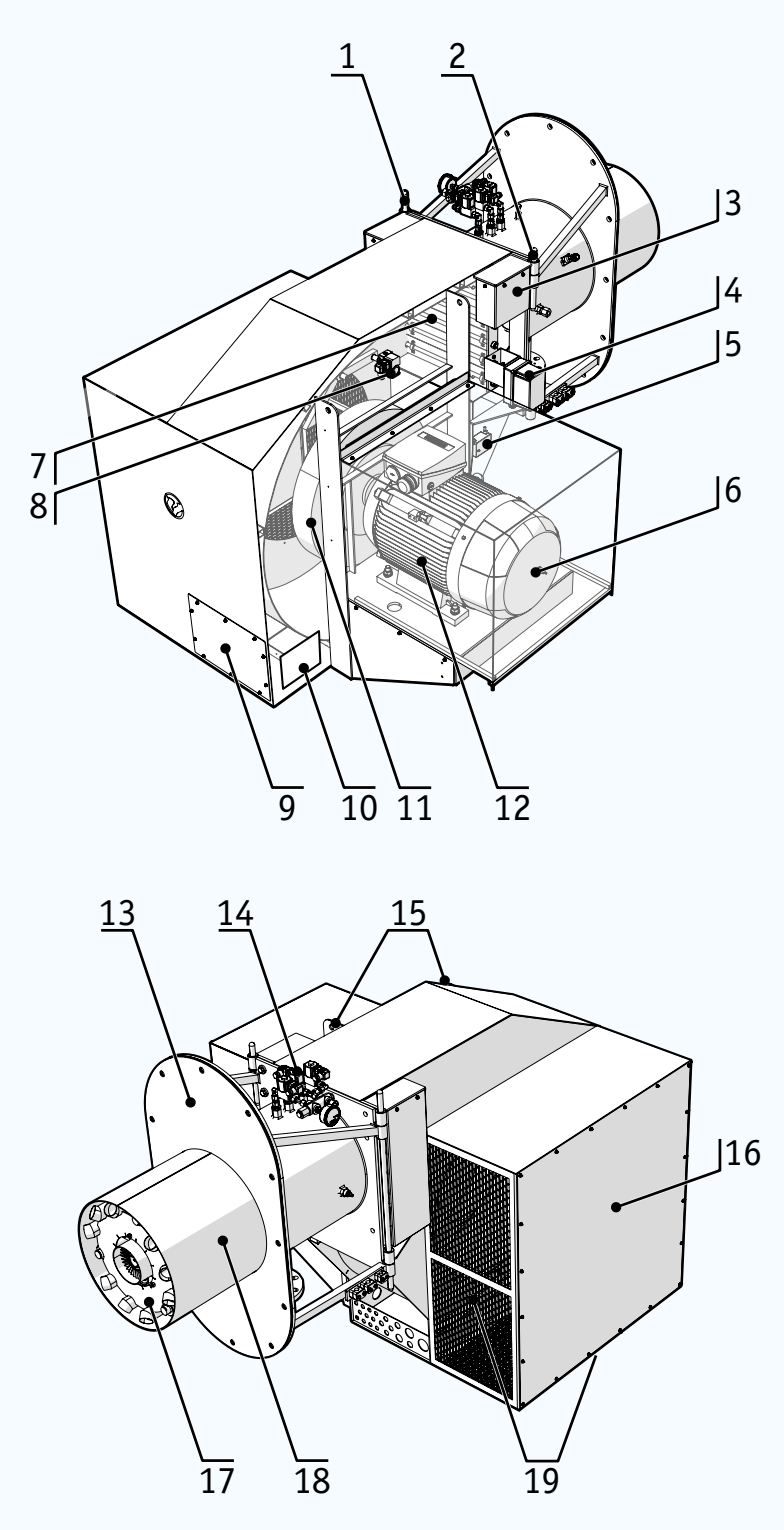
1. Burner
2. Boiler
3. Boiler thermostat set
4. Oil pump (for V(G)OI)
5. Gas train
6. Frequency drive
7. Control panel

The exact configuration of the burner depends on the following factors:

Control system	Autoflame	**Fuel type(s)**	VGI (gas)
	Siemens		VOI (oil)
	▶ Lamtec		▶ VGOI (gas & oil)

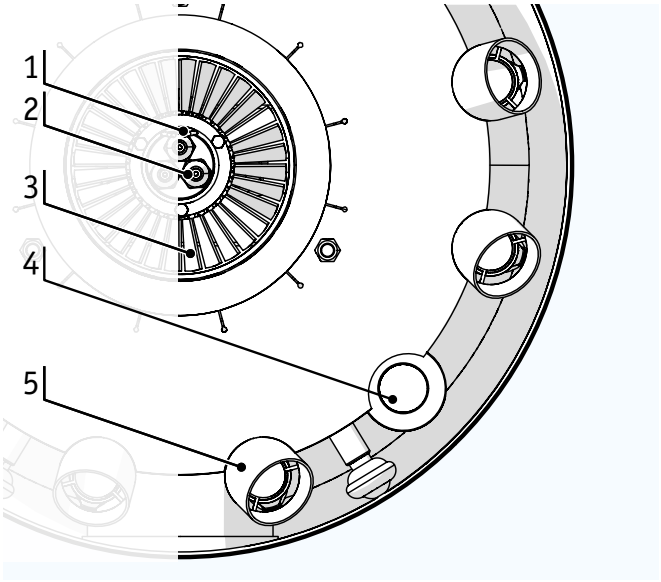
Optional components	See §3.8

3.1 Burner overview



1. Hinge pin
2. Locking pin
3. Air damper position switches
4. Air damper servomotor
5. Ignition transformer
6. Proximity switch
7. Air valves
8. Air pressure switch
9. Junction box
10. Burner plate
11. Burner fan
12. Blower motor
13. Combustor mounting flange
14. Oil supply valves (VGOI only)
15. Hoisting holes
16. Fan housing
17. Low-NOx burner head
18. Combustor housing
19. Air inlets

3.2 Combustor



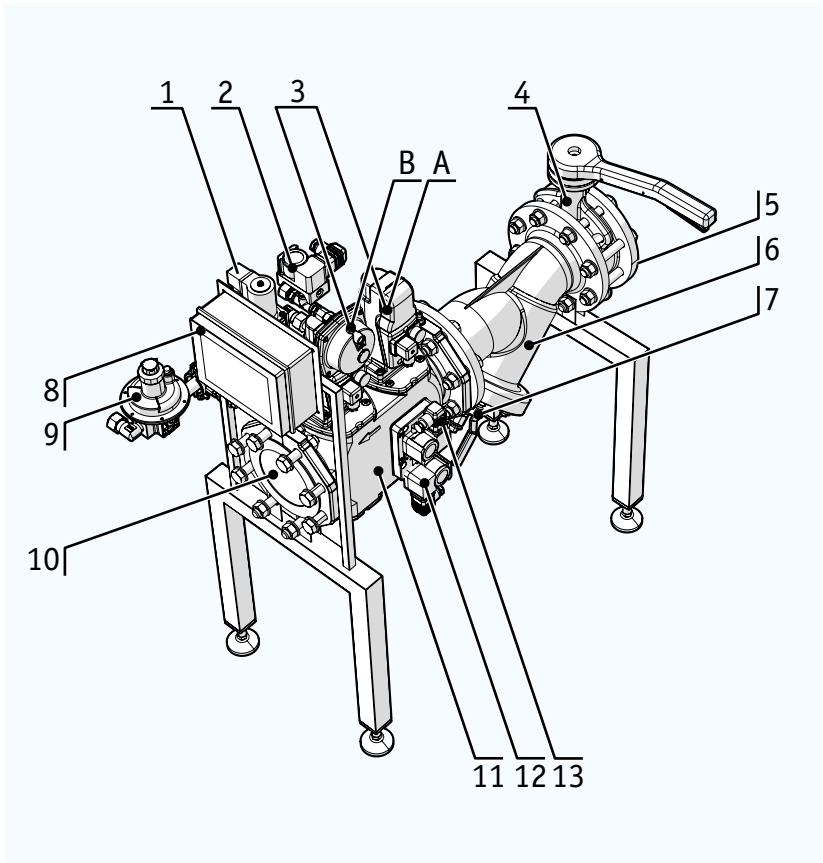
1. Ignition pin
2. Oil nozzle(s):

burner	nozzles		
	1	2	3
VGOI 100-400		●	
VGOI 450-1250			●
VGOI & VOI (modulating)	●		

3. Air swirler pilot flame
4. Stabilising gas nozzle
5. Gas firing nozzle

NOTICE For the spacing between the ignition pins, see Appendix E.

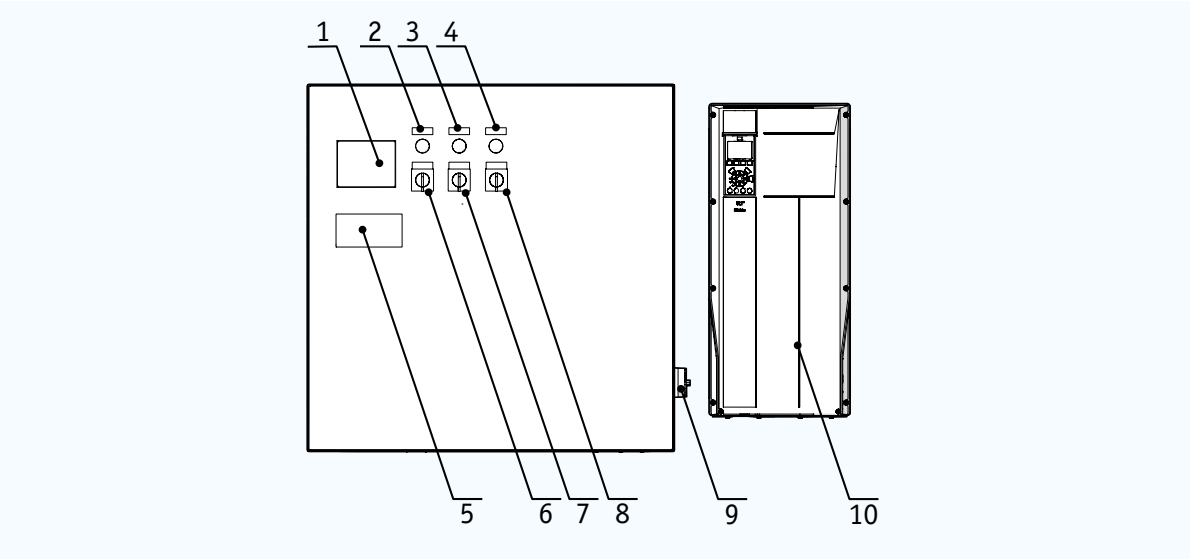
3.3 Gas train (<500 mbar)



1. Pilot gas valve (MK1)
2. Gas pressure switch: high (HD)
3. Actuators:
   A. VA1 – Open/close
   B. VA2– Regulator + open/close
4. Butterfly valve
5. Gas supply line connection
6. Gas filter
7. Relief valve
8. Junction box
9. Gas pilot pressure regulator (DR2)
10. Gas line adapter connection
11. Safety shut-off valves (double valve block)
12. Gas pressure switch: low (LD)
13. Gas pressure switch: leak test (LT)

3.4 Control panel

The burner is supplied with a control panel. The control panel is equipped with two displays, operation switches and indicator lights.



The following switches and lights are available on a standard control panel:

No.	Description		Function
1	Vitotherm display		Displays system failures and manufacturer information
2	Computer functional light		Lights green when the external computer is active
3	Failure light		Lights red when a system failure is active
4	Reset button		Resets the complete burner system
5	Burner management display		Manual burner controls
6	Control switch	Computer	Switches control to external computer
		Off	Switches control off
		Manual	Switches control to burner management system
7	Mode switch	Automatic	Switches to automatic burner control
		Low	Sets the burner to low flame state
8	Fuel switch (VGOI only)	Gas	Selects gas as the fuel supply
		Oil	Selects (modulating) oil as an additional fuel supply.
9	Main power switch		Activates the control panel
10	Frequency drive		Controls the speed of the burner fan

Depending on the configuration of the burner system, the control panel may have additional buttons, lights and displays. For more information, please refer to the electrical wiring diagram.

For more information about the burner management display, please refer to the OEM manual.

3.4.1 Frequency drive

The fan motor is frequency driven. A separate frequency controller is mounted next to the control panel.

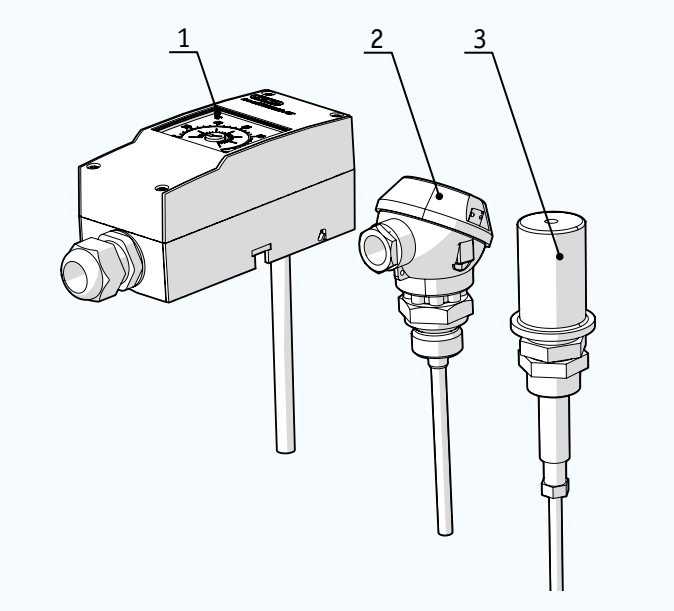
For more information and instructions, please refer to the OEM manual or §6.2 of this manual.

3.4.2 Servomotors

The combined control of the gas supply valve and the air damper by servomotors regulate the gas and air flow for the burner. The servomotors have limit switches, which can be used to adjust the stroke rate. If a servomotor reaches the cam limit, it switches off electronically.

3.5 Boiler thermostat set

The boiler thermostat set consists of three components:



1. Max. boiler temperature thermostat
2. Temperature sensor (pt100)
3. Low water level sensor

The low water level sensor is connected to a cut-off relay in the control panel to form a low water cut-off system (see §2.9).

The boiler thermostat set is not yet installed upon delivery. For installation instructions, see §4.4.

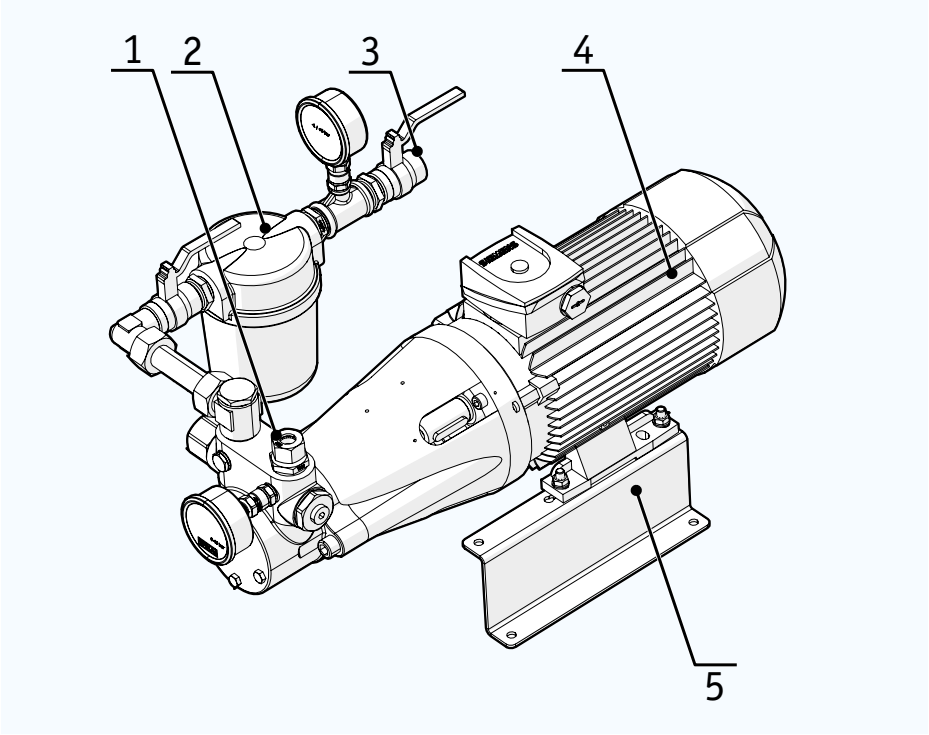
For more information, please refer to the OEM manuals (JUMO).

3.6 Oil pump

For VOI or VGOI

An oil pump can be mounted next to the burner to enable the burner to run on oil for short periods of time. The oil pump is equipped with a mounting frame.

When this option is present in the system, a fuel control switch is added to the control panel.



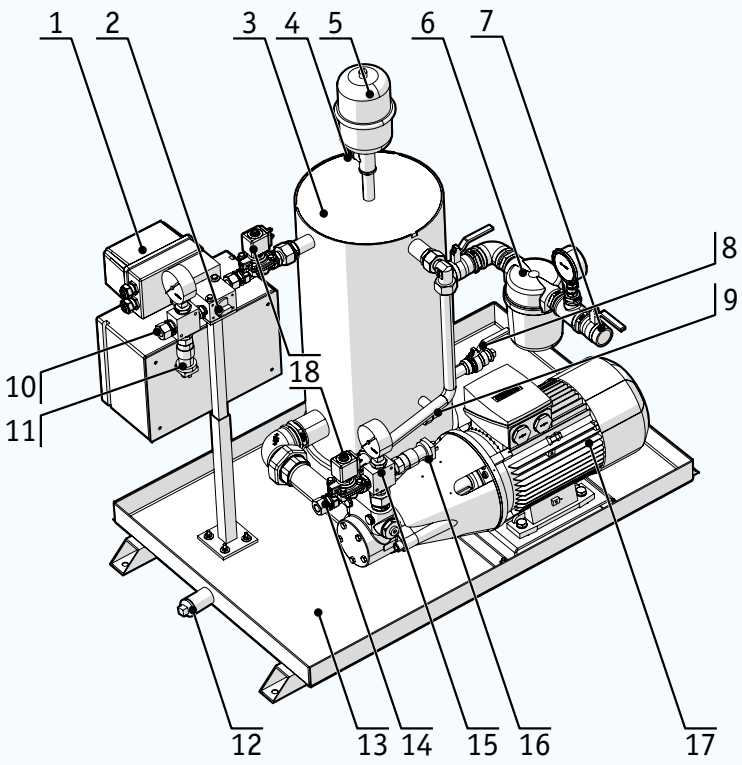
1. Burner oil supply connection
2. Oil filter
3. Oil supply line connection
4. Oil pump
5. Mounting frame

3.7 Modulating oil firing set

For VOI or VGOI

The modulating oil firing set enables the burner to run partially or completely on oil for long periods of time. The oil supply is automatically controlled based on the return pressure.

When this option is present in the system, a fuel control switch is added to the control panel.



1. Return pressure regulator servomotor
2. Return pressure regulator valve
3. Oil buffer
4. Manual deaeration valve
5. Expansion vessel
6. Oil filter
7. Oil supply line connection
8. Oil buffer tap
9. Burner oil return piston
10. Burner oil return connection
11. Pressure sensor (max.)
12. Leak tray tap
13. Leak tray
14. Burner oil supply connection
15. Pressure/vacuum gauge
16. Pressure sensor (min.)
17. Oil pump motor
18. Solenoid valves

3.8 Optional components

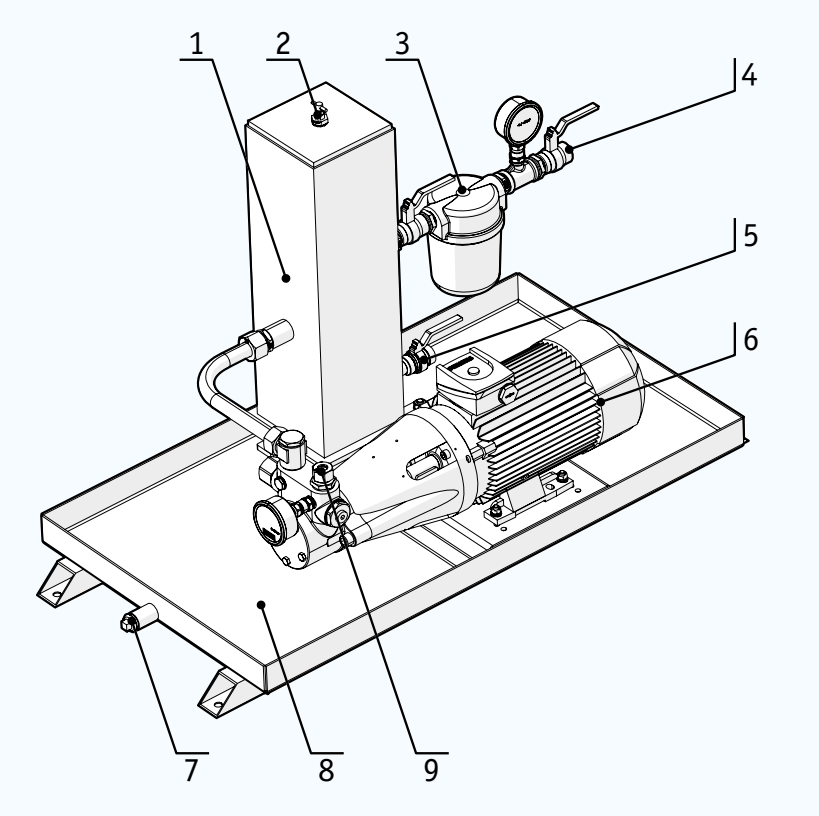
Optional components can be added to the burner to adapt it to special circumstances or add new functions. For an overview of a burner system with all optional components, see Appendix A.

3.8.1 Backup two-stage oil firing set (80%)

For VGOI

The back-up two-stage oil firing set enables the burner to run on oil for short periods of time (max. 48 hours) in emergency situations (e.g. a gas supply malfunction). The back-up set can provide 80% of the burner's regular power.

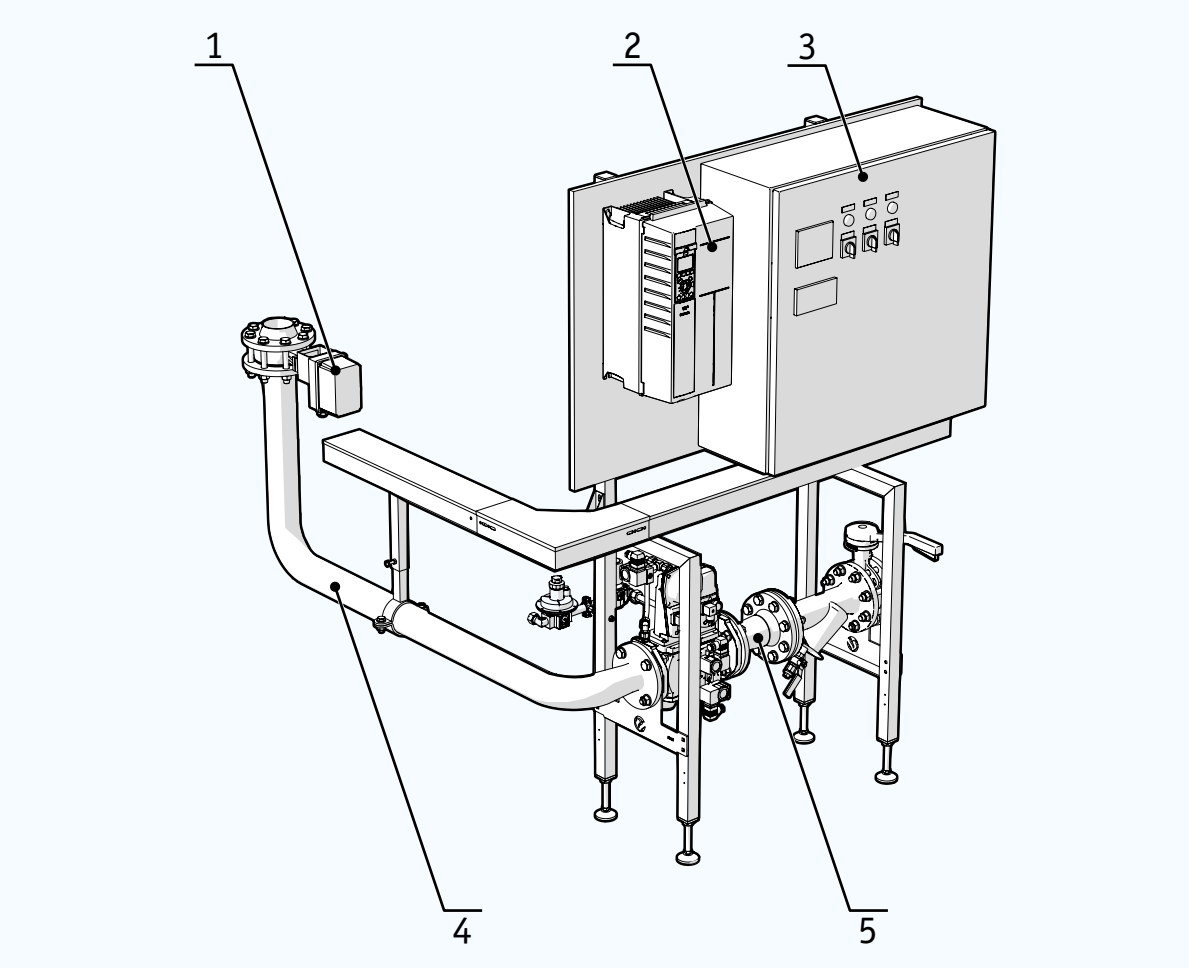
When this option is present in the system, a fuel control switch is added to the control panel.



1. Oil buffer
2. Manual deaeration valve
3. Oil filter
4. Oil supply line connection
5. Oil buffer tap
6. Oil pump motor
7. Leak tray tap
8. Leak tray
9. Burner oil supply connection

3.8.2 Vitopack

The Vitopack is a premade installation that integrates a gas train, a gas line adapter with butterfly valve,a control panel and a frequency drive.



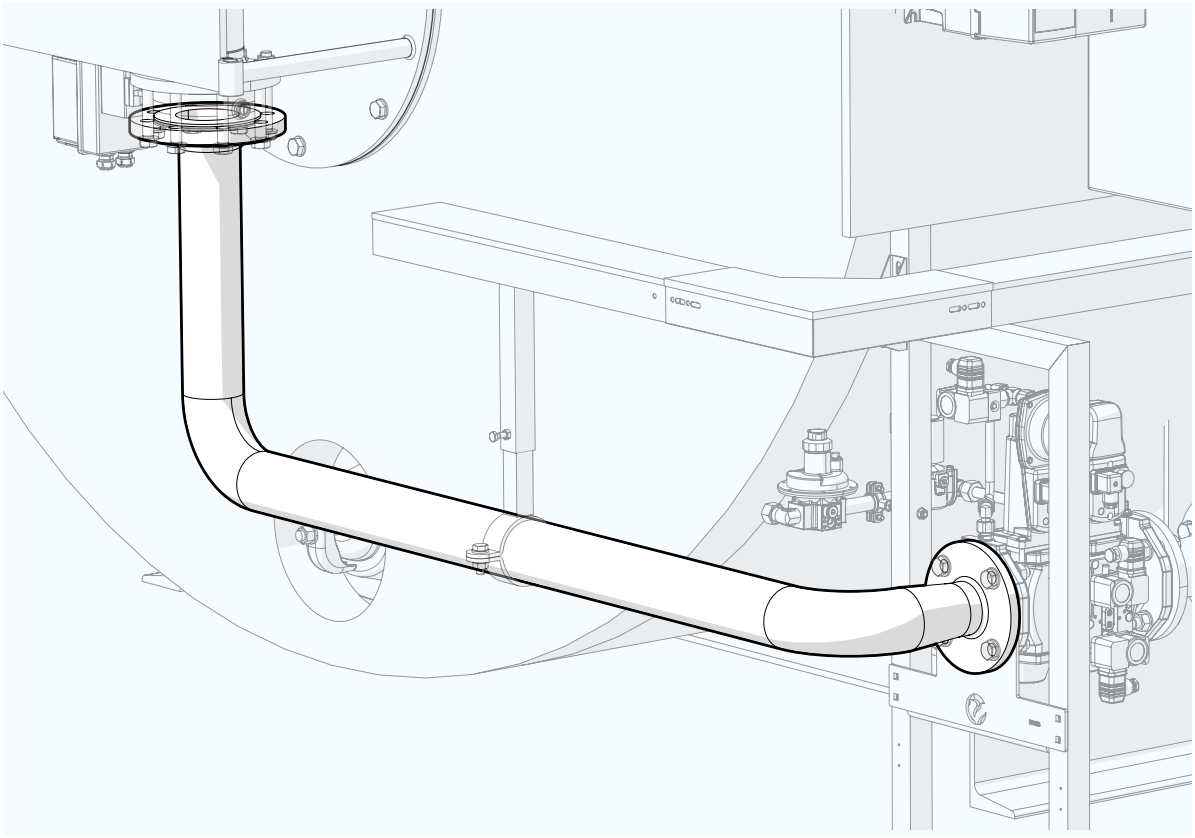
1. Butterfly valve
2. Frequency drive
3. Control panel
4. Gas line adapter
5. Gas train (<500 mbar)

Vitopack 1 is the standard configuration. Vitopack 2 is also available, and includes a blast tube mounting with refractory and pre-wiring of the boiler. Both configurations come with the option of being fully pre-wired, with connections to all parts of the burner system.

3.8.3 Vitotherm gas line adapter

A Vitotherm gas line adapter connects the gas train to the burner head. Vitotherm offers the option of a custom design that fits your installation.

The gas line adapter is made of powder-coated steel. A standard delivery includes all components necessary for installation (bolts, nuts, rings, gaskets). For instructions on how to install this component, see §4.6.

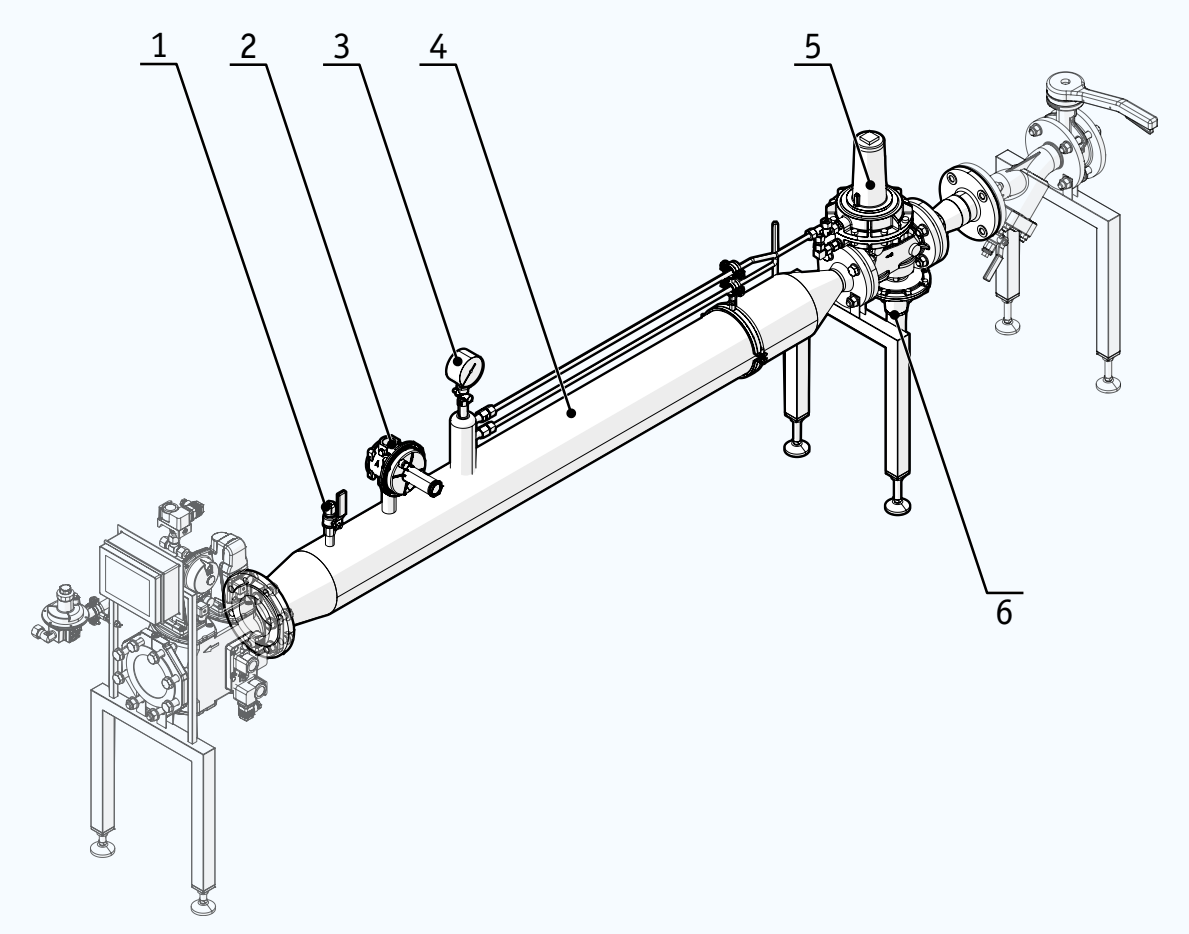


NOTICE A flexible section can be mounted between the gas line adapter and burner to allow for some movement.

3.8.4 High pressure gas regulator set

4-8 bar to 200-300 mbar

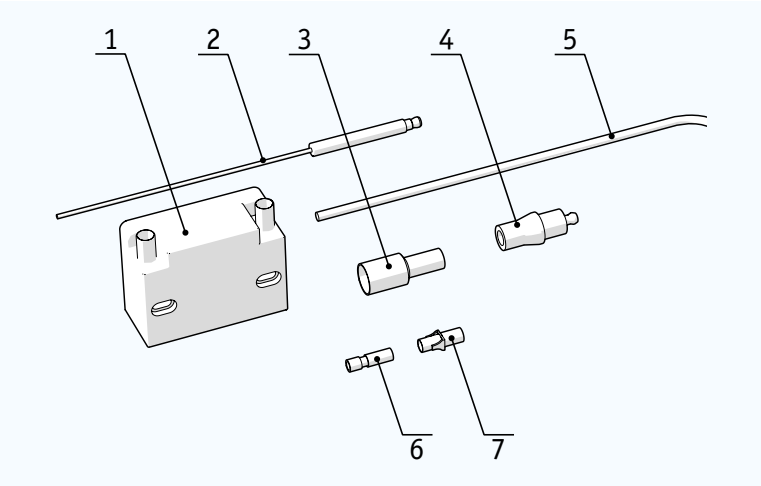
A high pressure gas regulator set can be added to a standard gas train to adapt it to higher gas supply pressures. The set can reduce supply pressures of 4-8 bar to 200-300 mbar.



1. Relief valve
2. Safety pressure relief valve
3. Pressure gauge
4. Pressure stabilising section (outflow tube)
5. Pressure regulator
6. Safety shut-off valve

3.8.5 Spareparts set

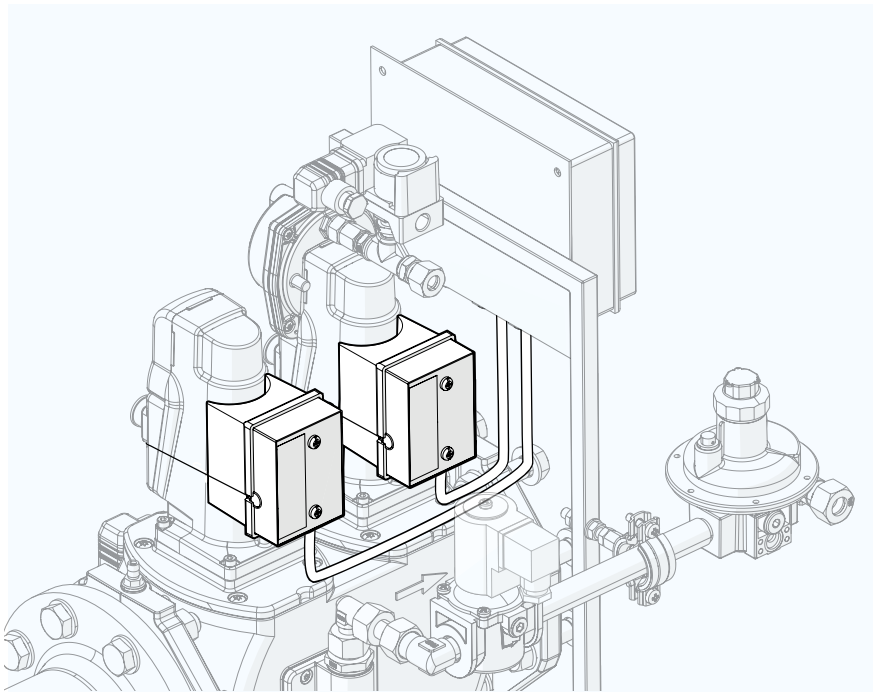
A set of spare parts is available. This set contains parts of the burner that are to be replaced within 1 or 2 years (see §8.1).



1. Ignition transformer
2. Ignition electrode
3. Cable connector (female)
4. Cable connector (male)
5. Ignition cable
6. Ignition cable connector
7. Rajah clamp

3.8.6 Gas train actuator heating elements

Heating elements can be placed on the actuator of the gas train. The heating elements keep the hydraulic oil in the actuator up to temperature in cold environments. Vitotherm recommends to include this option in an outdoor burner system or in a cold boiler house.



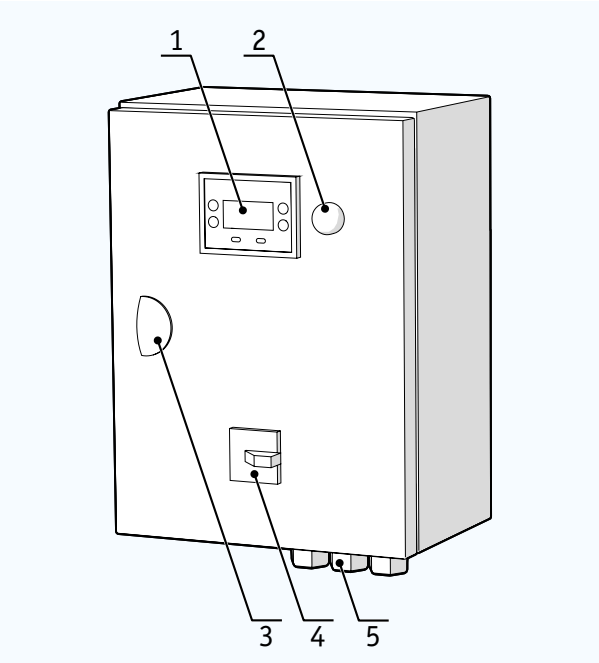
3.8.7 Flue gas valve circuit

A flue gas valve circuit controls the flue gas valve of CO_2 systems equipped with a CO_2 collector with multiple CO_2 sources. The circuit closes the flue gas valve in the flue gas outlet to the CO_2 collector when CO is detected in the flue gas of the system (e.g. when the burner is activated). This prevents CO from entering the CO_2 collector.

3.8.8 Vitotherm CO detector

type VCD2 with sampling pump

A Vitotherm CO detector checks the flue gas that is transported from the burner to external applications (e.g. greenhouses) for carbon monoxide. The CO detector is mounted near the flue gas exhaust.



1. Interface & display
2. Failure feedback light
3. Key lock
4. Control switch
5. Cable connectors

For more information, please refer to the Vitotherm CO detector user manual.

3.8.9 O_2 controller

LT3-F

An O_2 controller regulates the amount of O_2 that is added to the fuel mixture. This compensates for differences in gas quality (caloric value) and improves the efficiency of the burner.

The O_2 controller can be expanded with a CO controller. This allows the O_2 controller to recognize the O_2 breaking point after which CO is created and adjust the O_2 percentage accordingly.

For more information, please refer to the OEM manual.

3.8.10 Remote access monitoring

Visio Control

A server solution is available that enables remote access to information about the burner (e.g. measurement data, logs, error codes). This enables Vitotherm to monitor the burner and provide improved technical support.

Remote access monitoring is recommended for burners in remote locations.

For more information, please refer to the OEM manual.

3.8.11 Facilities for a one-pass boiler

A one-pass boiler must be equipped with a safety circuit that prevents the flue gases and return water from becoming too cold. This can cause condensation to form in the flue gas pipes, causing corrosion damage.

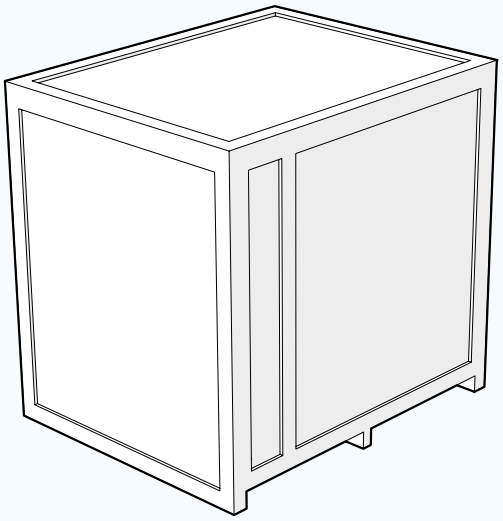
The safety circuit consists of:

- Minimum flue gas temperature monitor
- An extra max. boiler temperature thermostat
- An extra low water level sensor

When this option is present in the system, a fuel control switch is added to the control panel.

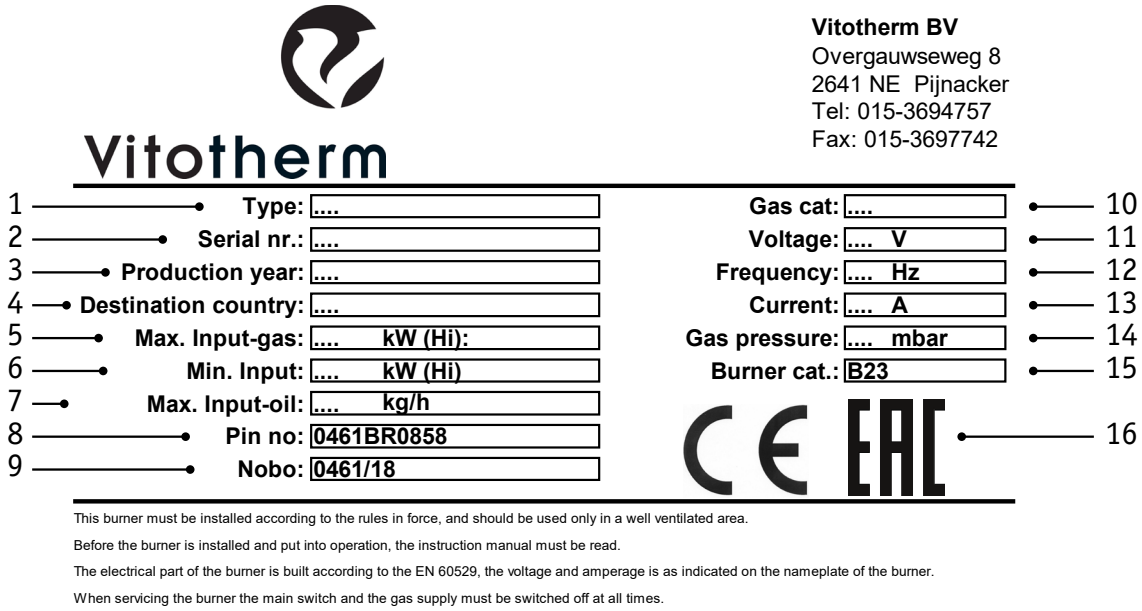
3.8.12 Seaworthy packaging

If the burner needs to be well protected or shipped overseas, it can be packed in wooden crates treated according to ISPM 15.



3.9 Burner plate

The burner is marked in accordance with the applicable legislation requirements. The location of the burner plate is indicated in §3.1.



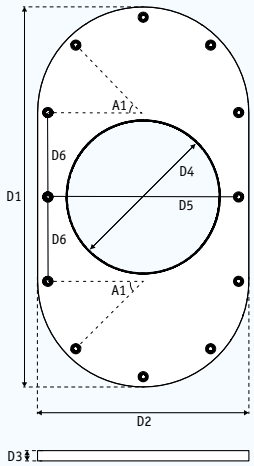
1. Burner type
2. Serial number
3. Year of manufacture
4. Country of destination
5. Maximum load (kW)
6. Minimum load (kW)
7. Maximum oil consumption (kg/h)
8. Pin number
9. Notified body
10. Gas category
11. Voltage (V)
12. Frequency (Hz)
13. Current (A)
14. Gas pressure (mbar)
15. Burner category
16. CE and EAC markings

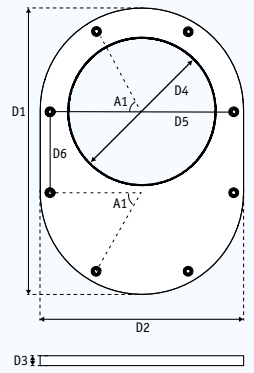
3.10 Dimensions

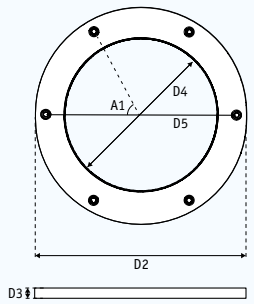
This section contains the standard dimensions of a MONO-block burner. For technical data regarding your specific burner system configuration, please refer to the burner plate (see §3.9) or the order confirmation.

3.10.1 Combustor mounting flange

The combustor must be mounted on a boiler by using a mounting flange. The design and dimensioning of this mounting flange depends on the heating capacity of the burner:

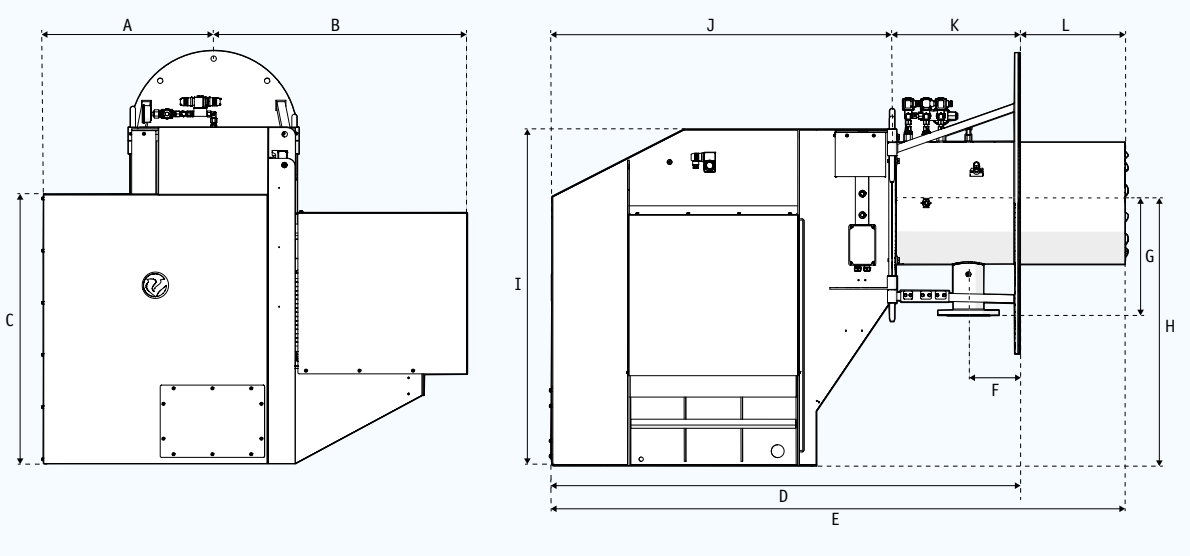






Art.Nr.	Burner type	D1 (mm)	D2 (mm)	D3 (mm)	D4 (mm)	D5 (mm)	D6 (mm)	A1 (deg)	Thread (ISO)
100168	VG(0) Is-1250	1125	625	12	515	565	250	45	M16
100167	VG(0) Is-1000	1125	625	12	465	565	250	45	M16
100166	VG(0) Is-700-800	825	575	12	415	515	250	60	M16
100165	VG(0) Is-450-500-600	675	475	12	360	415	200	60	M16
100164	VG(0) Is-350-400	675	475	12	315	415	200	60	M16
100163	VG(0) Is-200-250-300	-	350	12	275	315	-	60	M12
100162	VG(0) Is-150	-	350	12	240	315	-	60	M12
100161	VG(0) Is-100	-	350	12	210	315	-	60	M12

3.10.2 MONO-block

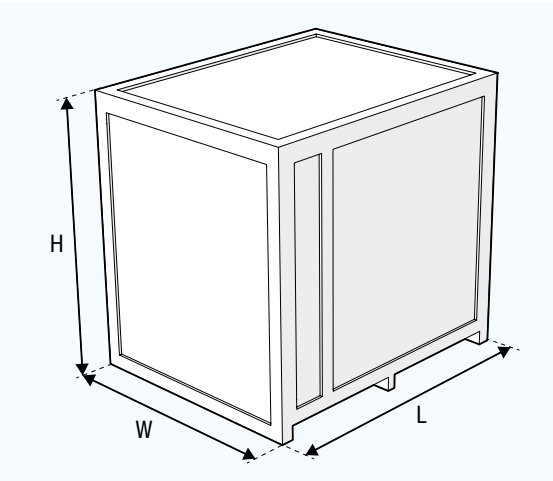


Burner type	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	H (mm)
V...Is-100	375	540	676	1275	1675	135	287	616
V...Is-150	375	540	676	1275	1675	135	300	616
V...Is-200	375	540	676	1275	1675	135	340	616
V...Is-250-300	410	615	716	1335	1735	135	340	667
V...Is-350	442	633	836	1443	1843	135	360	770
V...Is-400	442	793	836	1443	1843	135	360	770
V...Is-450-500	442	793	836	1443	1843	135	380	770
V...Is-600	560	857	956	1530	1930	135	380	890
V...Is-700	560	857	956	1530	1930	135	410	890
V...Is-800	560	926	956	1530	1930	135	410	890
V...Is-1000	633	948	1006	1740	2140	185	420	980
V...Is-1250	633	948	1006	1740	2140	185	445	980

Burner type	I (mm)	J (mm)	K (mm)	L (mm)	M (DN/ANSI)	N (Ø mm)	O* (mm)	Weight (kg)
V...Is-100	782	855	420	400	50	201	2000	205
V...Is-150	782	855	420	400	50	231	2000	215
V...Is-200	782	855	420	400	65/80	267	2000	230
V...Is-250-300	857	915	420	400	65/80	267	2000	300
V...Is-350	1007	1023	420	400	65/80	306	2000	310
V...Is-400	1007	1023	420	400	65/80	306	2000	420
V...Is-450-500	1007	1023	420	400	65/80	351	2000	425
V...Is-600	1167	1110	420	400	65/80	351	2000	510
V...Is-700	1167	1110	420	400	65/80	406	2000	570
V...Is-800	1167	1110	420	400	65/80	406	2000	585
V...Is-1000	1257	1270	470	400	100	456	2000	745
V...Is-1250	1257	1270	470	400	100	506	2000	865

*O (mm) is the required minimal free distance around the burner in all directions.

3.10.3 Seaworthy packaging



Burner type	L (mm)*	W (mm)*	H (mm)*
VG(0)Is-100-500	2160	1610	1600
VG(0)Is-600-1250	2160	2060	1600
Vitopack configuration	t.b.d.	t.b.d.	t.b.d.

*Actual sizes may vary.

NOTICE When optional features are included in the burner system (e.g. Vitopack, high pressure gas regulator set), the packaging is put together specifically for this project.

3.11 Performance data

This section contains the standard performance data of a MONO-block burner in metric units.

For technical data regarding your specific burner system configuration, please refer to the burner plate (see §3.9) or the order confirmation. For performance data in imperial units, please refer to Appendix C of this manual.

3.11.1 MONO-block low NOx gas burner

Type	Boiler capacity (n = 93%)		Burner input	Control	Gas pressure	Max. boiler backpressure	Motor/drive power	Turn down	Consumption	Max. height
	MCal	kW	kW	Gas	Mbar	Mbar	kW	Gas	Gas (m^3)	m
VGIs-100	1,000	1163	1250	Modulating	100-300	10	2,2	1:5	142	500
VGIs-150	1,500	1745	1875	Modulating	100-300	10	4,0	1:5	213	500
VGIs-200	2,000	2326	2500	Modulating	100-300	10	4,0	1:5	284	500
VGIs-250	2,500	2908	3125	Modulating	100-300	10	5,5	1:5	355	500
VGIs-300	3,000	3489	3750	Modulating	100-300	12	7,5	1:6	426	500
VGIs-350	3,500	4071	4375	Modulating	100-300	12	7,5	1:6	487	500
VGIs-400	4,000	4652	5000	Modulating	100-300	12	11,0	1:6	568	500
VGIs-450	4,500	5234	5625	Modulating	100-300	12	11,0	1:6	639	500
VGIs-500	5,000	5815	6250	Modulating	100-300	12	15,0	1:7	710	500
VGIs-600	6,000	6978	7500	Modulating	100-300	13	18,5	1:7	852	500
VGIs-700	7,000	8141	8750	Modulating	200-300	14	22	1:8	994	500
VGIs-800	8,000	9304	10000	Modulating	300	15	30	1:8	1136	500
VGIs-1000	10,000	11630	12500	Modulating	300	17	37	1:10	1420	500
VGIs-1250	12,000	13956	15000	Modulating	300	17	45	1:10	1704	500

3.11.2 MONO-block low NOx gas & emergency back-up oil burner

Type	Boiler capacity (n = 93%)		Burner input	Control		Gas pressure	Max. boiler backpressure	Motor / drive power	Turn down		Con-sumption		Max. height
	MCal	kW	kW	Gas	Oil	Mbar	Mbar	kW	Gas	Oil	Gas (m^3)	Oil (kg/h)	mtr
V(G)OIs-100	1,000	1163	1250	Modul.	2-stage	100-300	10	2,2	1:5	1:2	142	84	500
V(G)OIs-150	1,500	1745	1875	Modul.	2-stage	100-300	10	4,0	1:5	1:2	213	126	500
V(G)OIs-200	2,000	2326	2500	Modul.	2-stage	100-300	10	4,0	1:5	1:2	284	168	500
V(G)OIs-250	2,500	2908	3125	Modul.	2-stage	100-300	10	5,5	1:5	1:2	355	210	500
V(G)OIs-300	3,000	3489	3750	Modul.	2-stage	100-300	12	7,5	1:6	1:2	426	252	500
V(G)OIs-350	3,500	4071	4375	Modul.	2-stage	100-300	12	7,5	1:6	1:2	487	294	500
V(G)OIs-400	4,000	4652	5000	Modul.	2-stage	100-300	12	11,0	1:6	1:2	568	336	500
V(G)OIs-450	4,500	5234	5625	Modul.	2-stage	100-300	12	11,0	1:6	1:2	639	378	500
V(G)OIs-500	5,000	5815	6250	Modul.	2-stage	100-300	12	15,0	1:7	1:2	710	420	500
V(G)OIs-600	6,000	6978	7500	Modul.	2-stage	100-300	13	18,5	1:7	1:2	852	504	500
V(G)OIs-700	7,000	8141	8750	Modul.	2-stage	200-300	14	22	1:8	1:2	994	588	500
V(G)OIs-800	8,000	9304	10000	Modul.	2-stage	300	15	30	1:8	1:2	1136	672	500
V(G)OIs-1000	10,000	11630	12500	Modul.	2-stage	300	17	37	1:10	1:2	1420	840	500
V(G)OIs-1250	12,000	13956	15000	Modul.	2-stage	300	17	45	1:10	1:2	1704	1008	500

3.11.3 MONO-block low NOx gas & long term oil dual fuel burner

Type	Boiler capacity (n = 93%)		Burner input	Control		Gas pressure	Max. boiler backpressure	Motor / drive power	Turn down		Consumption		Max. height
	MCal	kW	kW	Gas	Oil	Mbar	Mbar	kW	Gas	Oil	Gas (m^3)	Oil (kg/h)	m
V(G)OIs-100	1,000	1163	1250	Modulating		100-300	10	2,2	1:5	1:5	142	84	500
V(G)OIs-150	1,500	1745	1875	Modulating		100-300	10	4,0	1:5	1:5	213	126	500
V(G)OIs-200	2,000	2326	2500	Modulating		100-300	10	4,0	1:5	1:5	284	168	500
V(G)OIs-250	2,500	2908	3125	Modulating		100-300	10	5,5	1:5	1:5	355	210	500
V(G)OIs-300	3,000	3489	3750	Modulating		100-300	12	7,5	1:6	1:5	426	252	500
V(G)OIs-350	3,500	4071	4375	Modulating		100-300	12	7,5	1:6	1:5	487	294	500
V(G)OIs-400	4,000	4652	5000	Modulating		100-300	12	11,0	1:6	1:5	568	336	500
V(G)OIs-450	4,500	5234	5625	Modulating		100-300	12	11,0	1:6	1:5	639	378	500
V(G)OIs-500	5,000	5815	6250	Modulating		100-300	12	15,0	1:7	1:5	710	420	500
V(G)OIs-600	6,000	6978	7500	Modulating		100-300	13	18,5	1:7	1:5	852	504	500
V(G)OIs-700	7,000	8141	8750	Modulating		200-300	14	22	1:8	1:5	994	588	500
V(G)OIs-800	8,000	9304	10000	Modulating		300	15	30	1:8	1:5	1136	672	500
V(G)OIs-1000	10,000	11630	12500	Modulating		300	17	37	1:10	1:5	1420	840	500
V(G)OIs-1250	12,000	13956	15000	Modulating		300	17	45	1:10	1:5	1704	1008	500

4 Installation

This chapter provides instructions for the basic installation of a burner system onto a boiler or other heating appliance. For information about custom set-ups, please contact Vitotherm.

⚠CAUTION	The burner system may only be installed by qualified personnel. Handling the burner unit and supporting components without the required knowledge and experience may damage the burner system or cause hazardous situations during installation and use.
⚠WARNING	The burner system may only be installed in a sufficiently ventilated boiler house.
NOTICE	The burner system must always be installed according to national and local laws and regulations.
NOTICE	The components shown in this chapter may differ from your specific burner system configuration.

4.1 Checking the delivery

Required tools:

- Forklift truck with adequate lifting capacity.

To check the delivery:

1. Transport the crate(s) to an accessible place near the boiler.
2. Remove the lid of the crate(s).
3. Remove the sides of the crate(s).
4. Remove the lashing straps and packaging materials.
5. Remove any screws that connect parts to the bottom of the crate(s).
6. Check if all parts have been delivered according to the agreed scope.
   If a part is missing, contact Vitotherm immediately.
7. Check all delivered parts for damage.

⚠WARNING	Damaged parts can affect the correct and safe functioning of the burner system. ▶ Do not install damaged parts. ▶ If any parts are damaged upon delivery, please contact Vitotherm.

8. Check if the minimum and maximum load of the burner is within the operating range of the boiler. The load values are found on the burner plate of the burner.
9. Check if the delivered burner will fit in the designated area of the room. For the dimensions of the burner, see §3.10.

4.2 Installing the combustor

Connection materials:

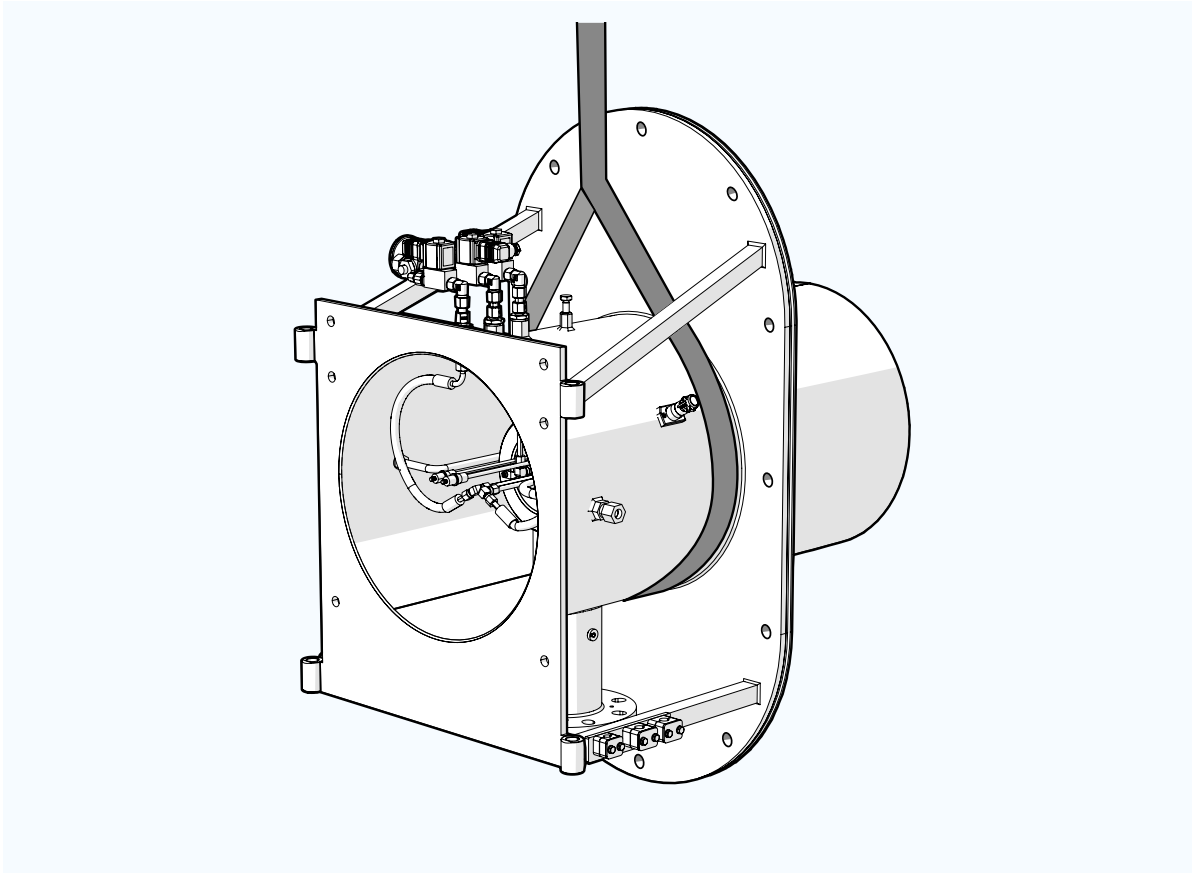
- Nuts and bolts (19 or 24 mm)
- Gaskets

Required tools:

- Mobile crane with adequate lifting capacity.
- Suitable hoisting sling.
- Ring wrench (19 or 24 mm) or adjustable spanners

To install the combustor:

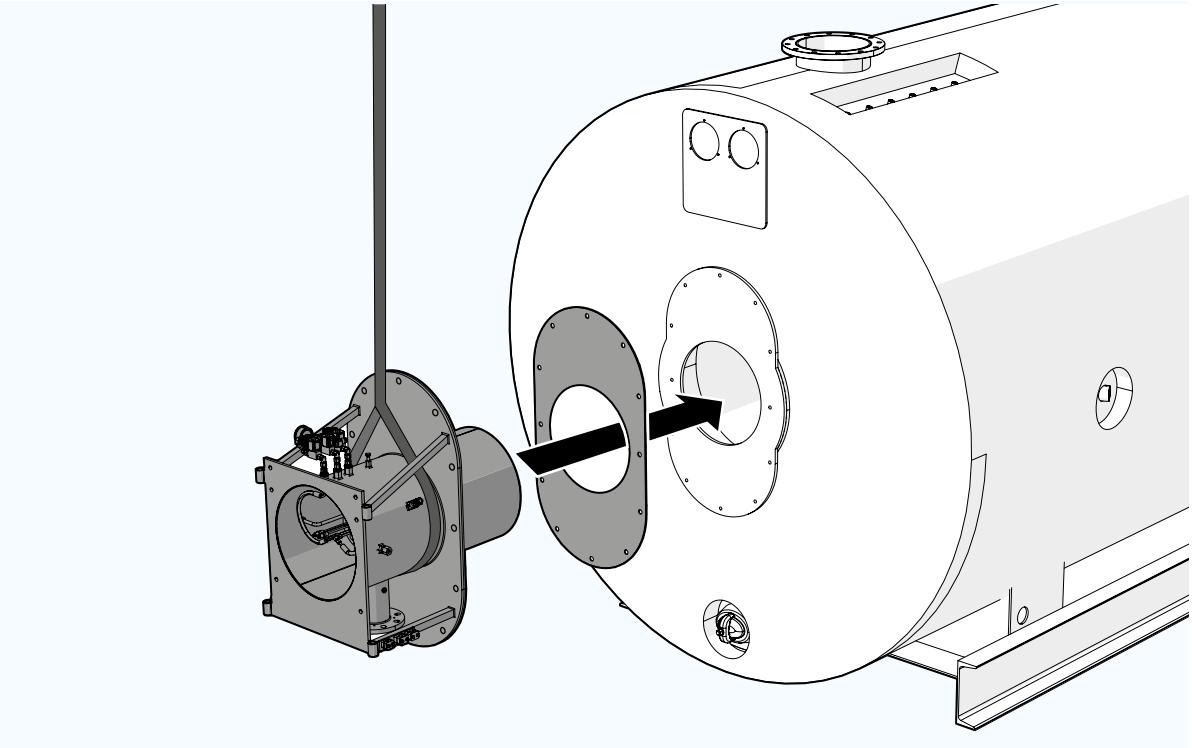
1. Collect the bag with fastener materials that is taped to the combustor.
2. Attach a hoisting sling around the combustor pipe section between the connection plates.



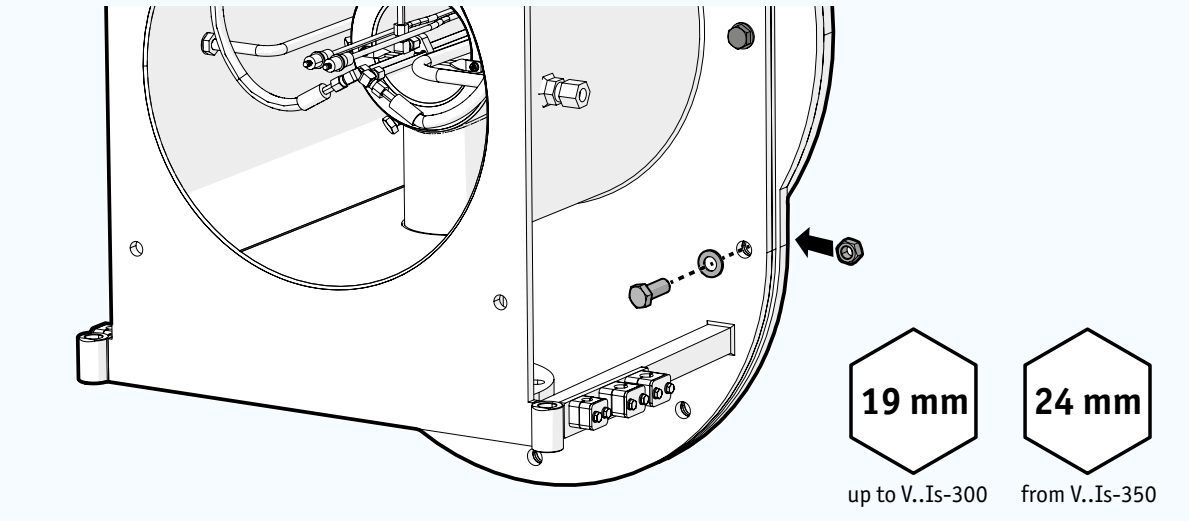
⚠WARNING Slings might shift due to hoisting movements, causing unforeseen movement or toppling of the combustor.

- ▶ Make sure that the sling is trapped in the combustor construction and cannot slide off.
- ▶ Do not attach slings to the open front section of the combustor, where the sling might slide off, or to the reinforcement bars.

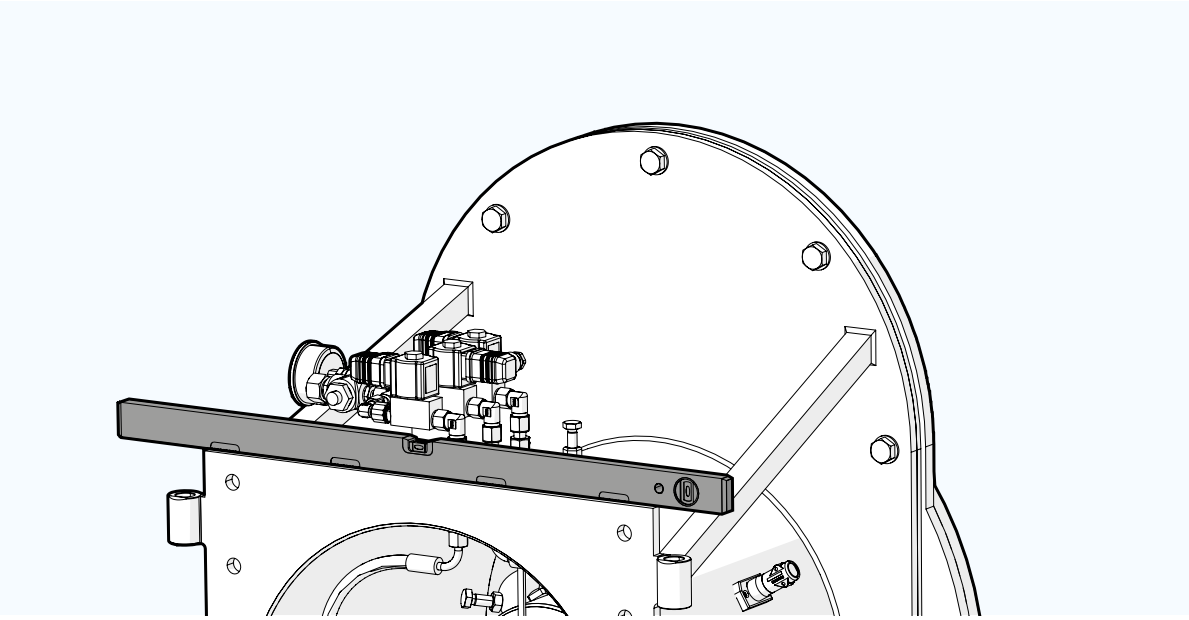
3. Carefully lift the combustor.
4. Place the silicon gasket.
5. Carefully place the combustor into the boiler entrance.



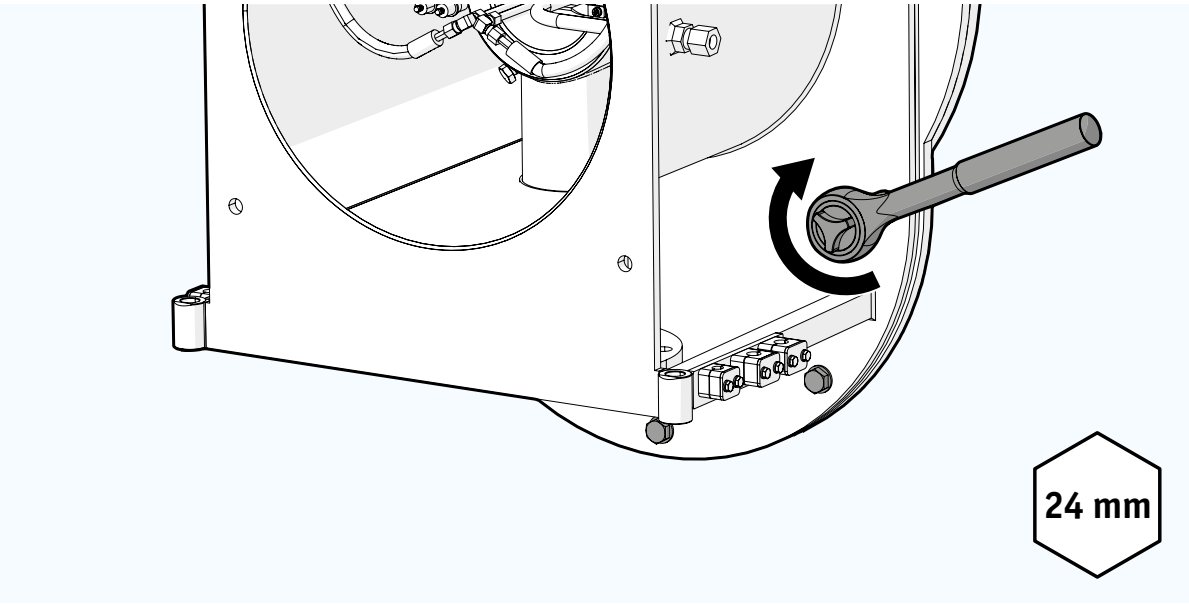
6. Place the provided bolts and loosely tighten them. Use the provided nuts if the flange holes of the boiler are not threaded.



7. Level the combustor.



8. Tighten the bolts. Work in a crosswise pattern to make sure the gasket is compressed evenly.

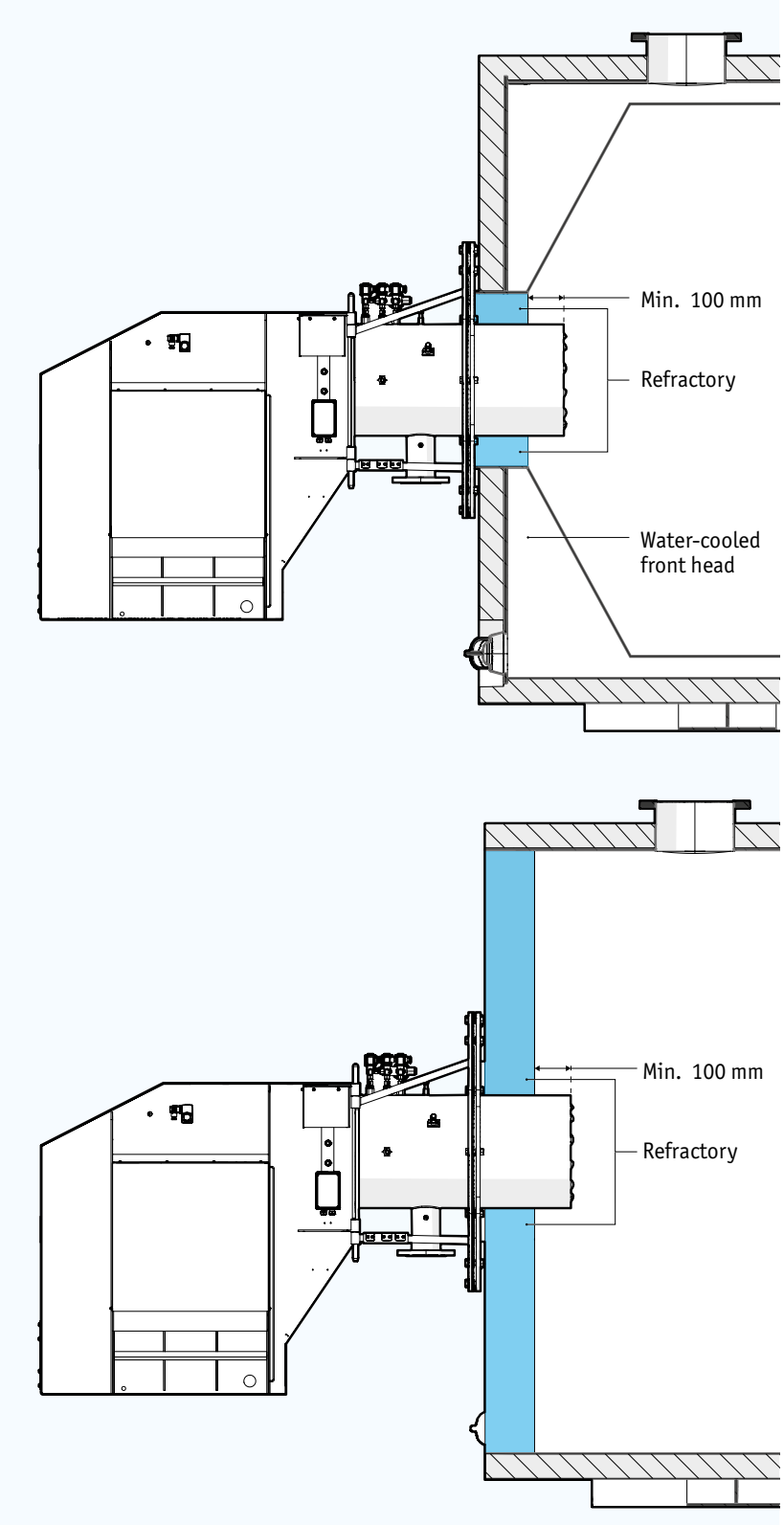


9. Remove the hoisting sling.

10. Inside the boiler, fill the ring-shaped gap between the combustor pipe and the chamber front head with refractory bricks.

NOTICE

Make sure that the refractory does not protrude the end of the combustor pipe. Keep the refractory at a distance of 10 cm inwards.



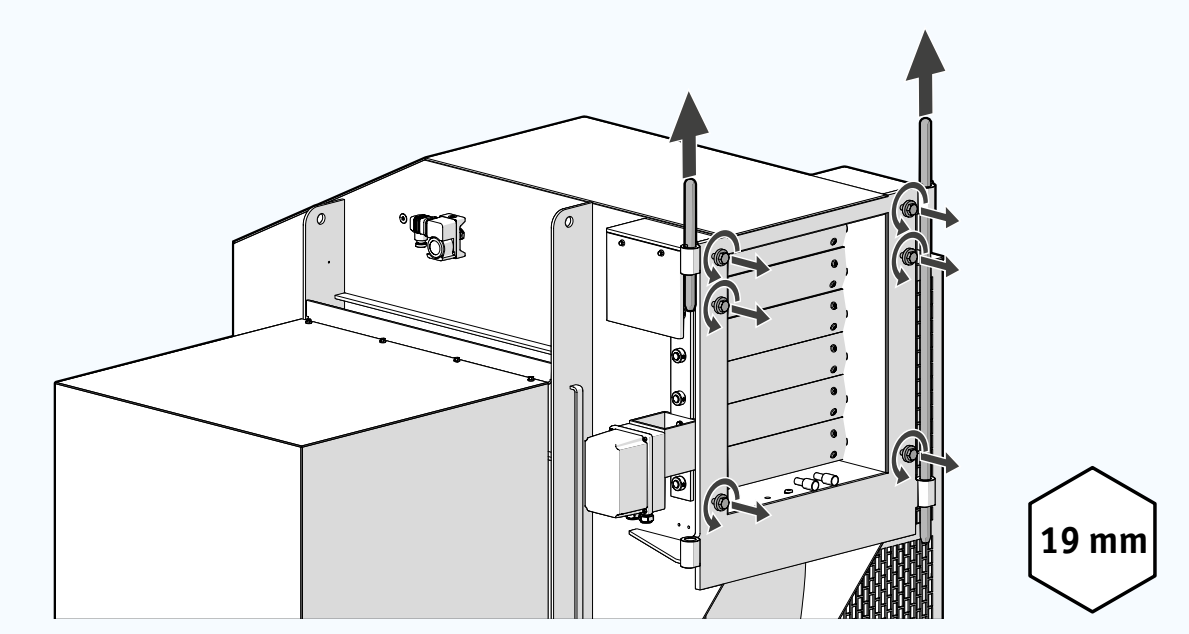
4.3 Installing the fan housing

Required tools:

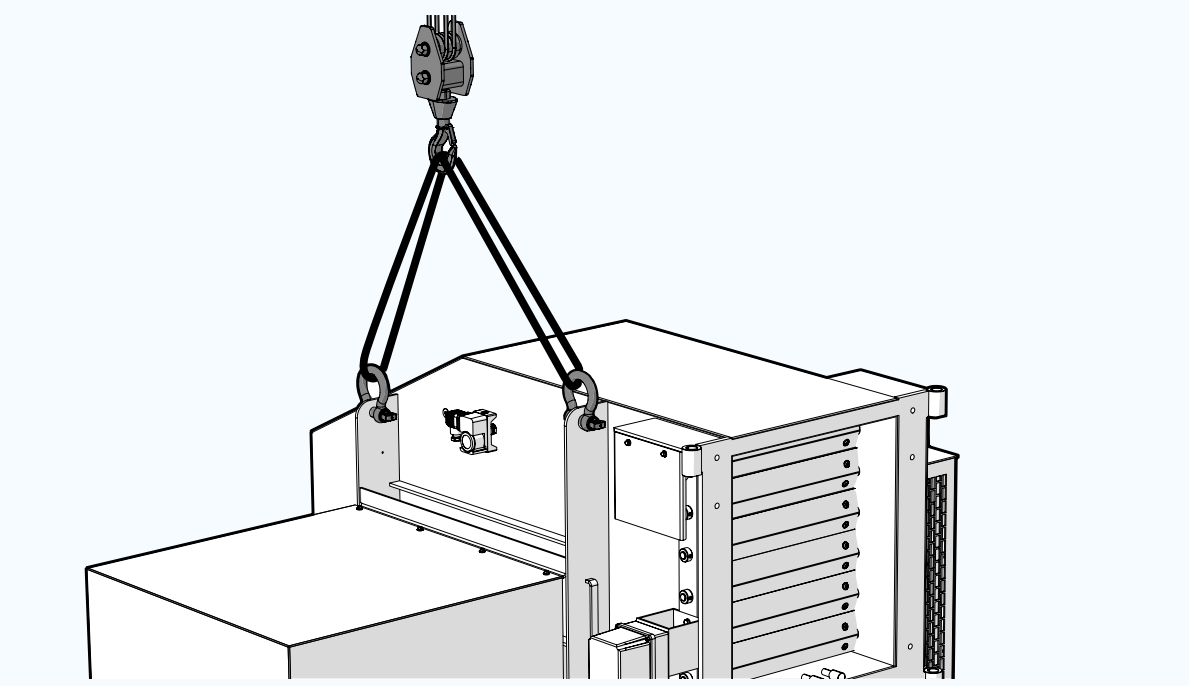
- Mobile crane with adequate lifting capacity
- Ring wrench (19 mm) or adjustable spanners
- Suitable hoisting equipment:
  - D-shackles
  - Round sling

To install the fan housing:

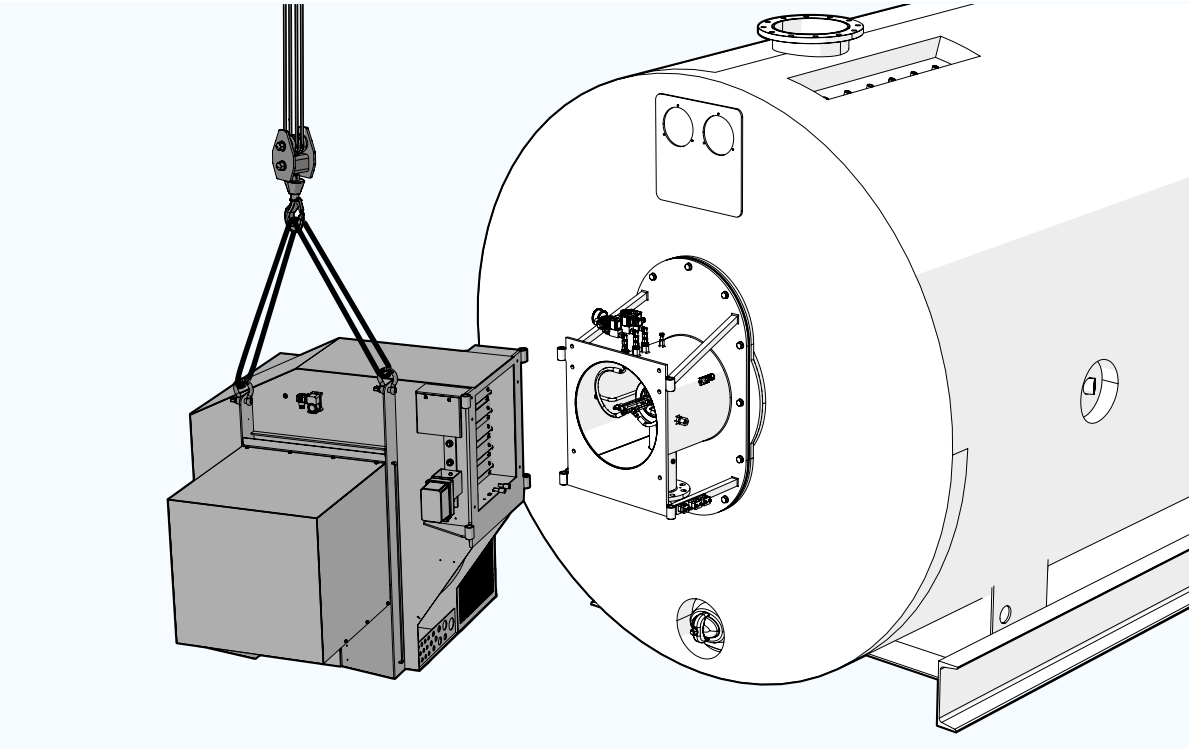
1. Remove the hinge pin, the locking pin and the bolts.



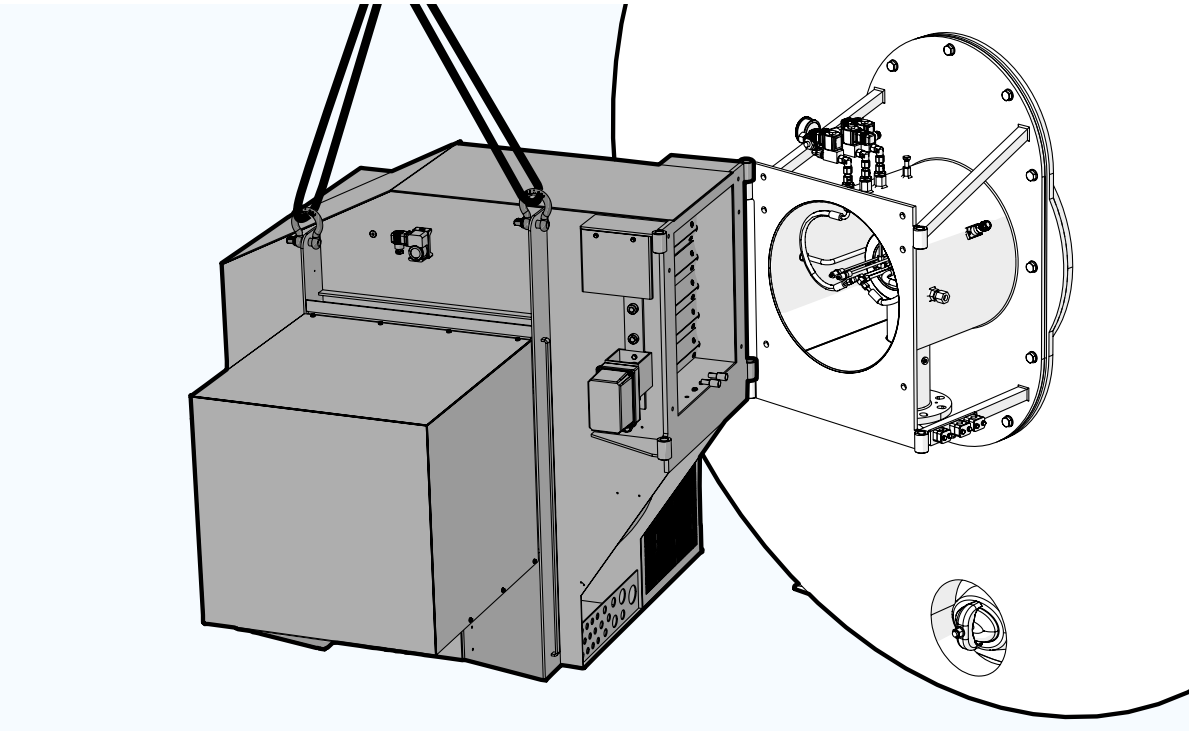
2. Connect your hoisting equipment to the hoisting eyes.



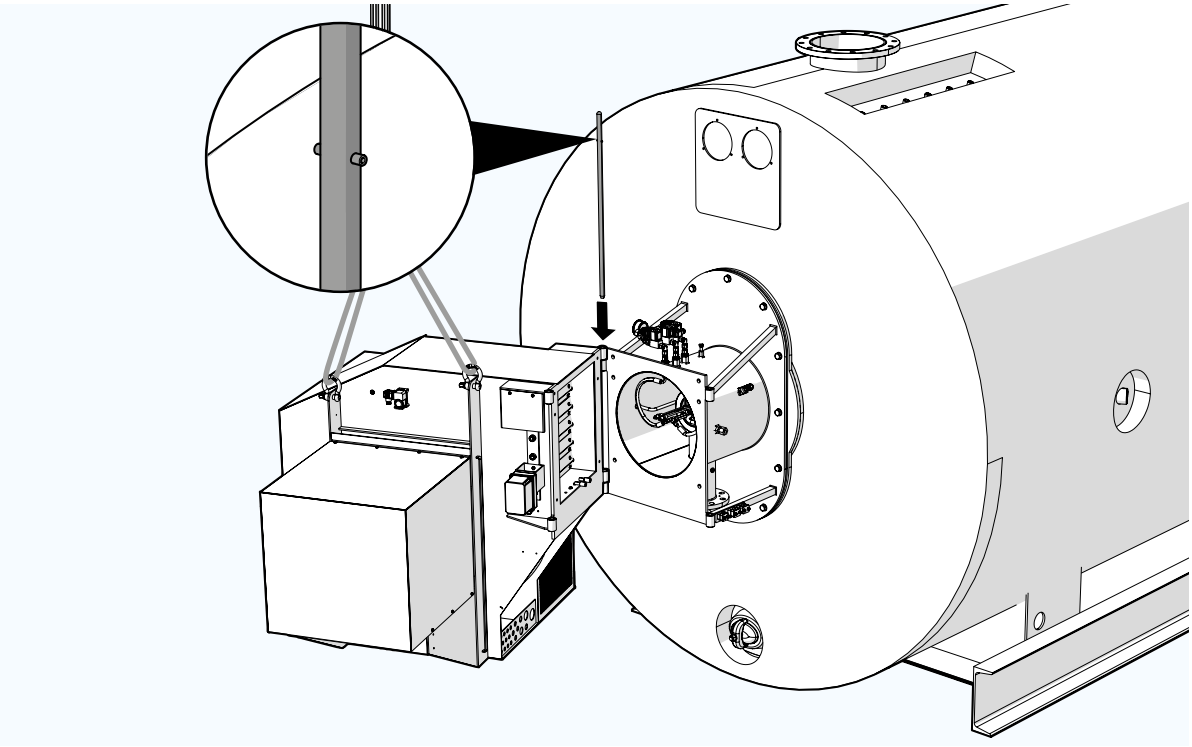
3. Carefully lift the fan housing close to the boiler.



4. Check the designated hinge position (left or right hand) of the fan housing (see the installation overview).
5. Carefully align the fan housing pivot holes with the pivot holes of the combustor.

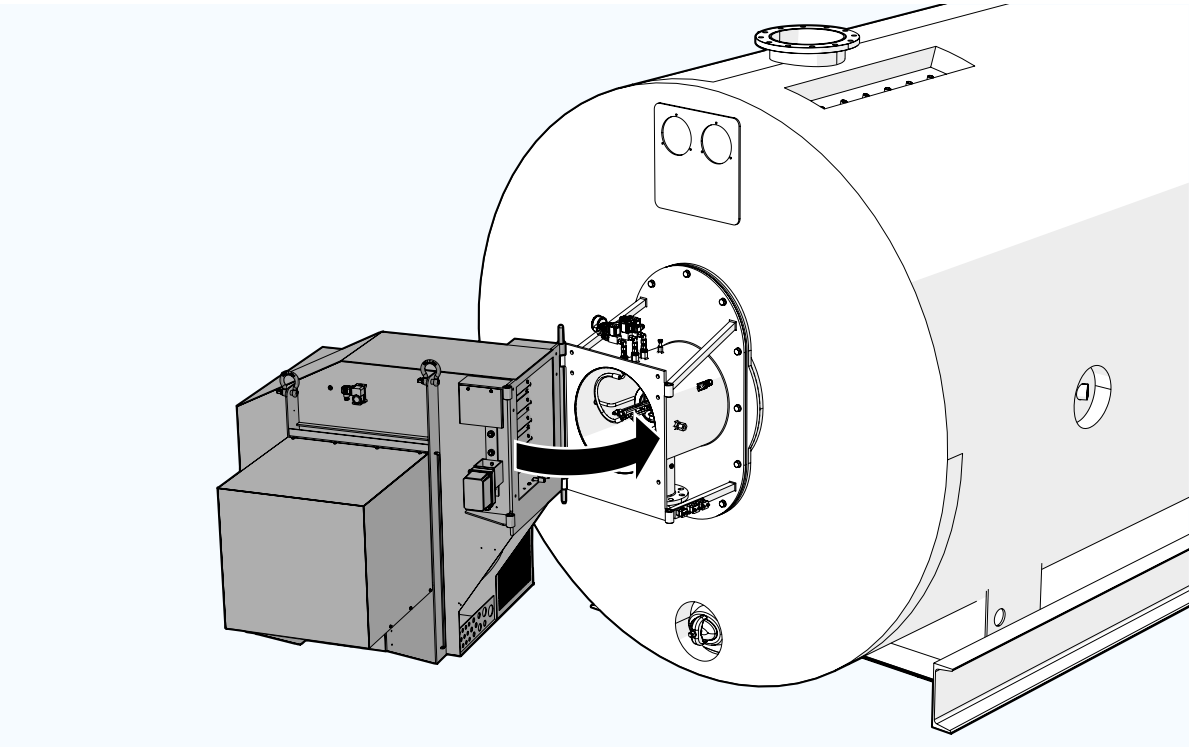


6. Insert the hinge pin through both pivot holes until the locking pin rests on the top of the combustor.

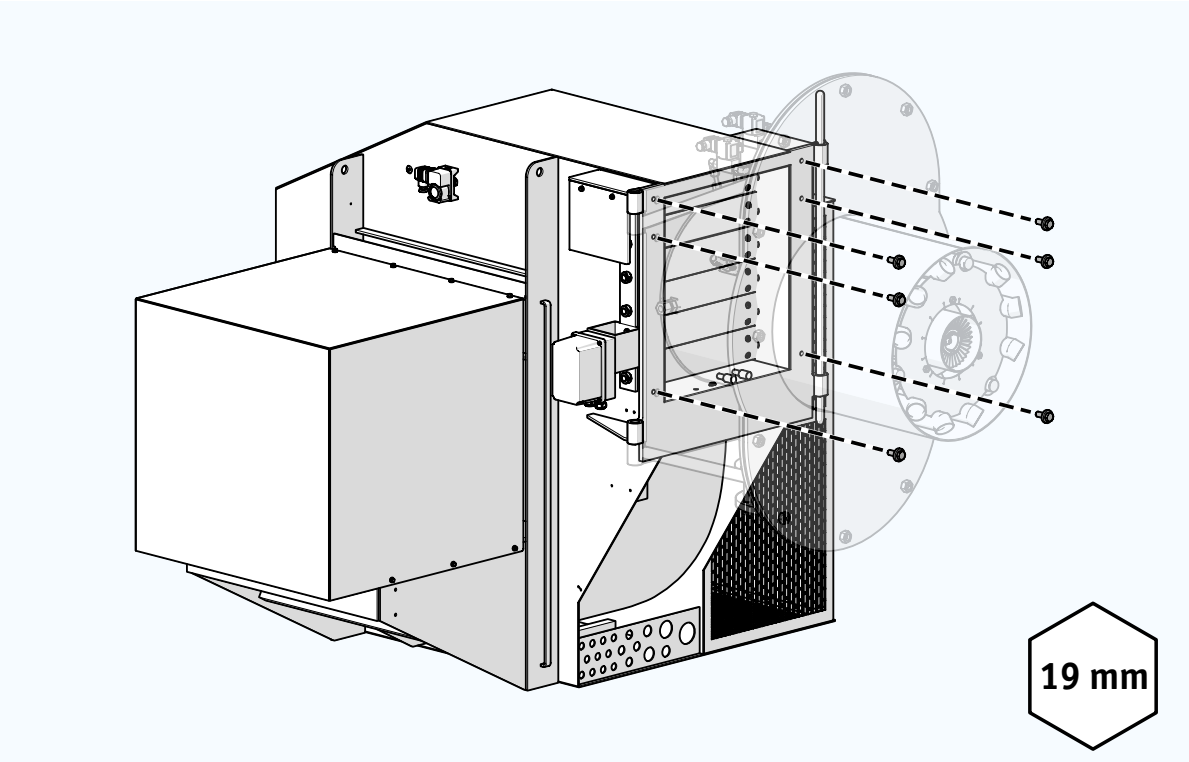


7. Connect the ignition cables of the combustor to the fan housing.
8. Remove the hoisting cables.
9. Close the fan housing.

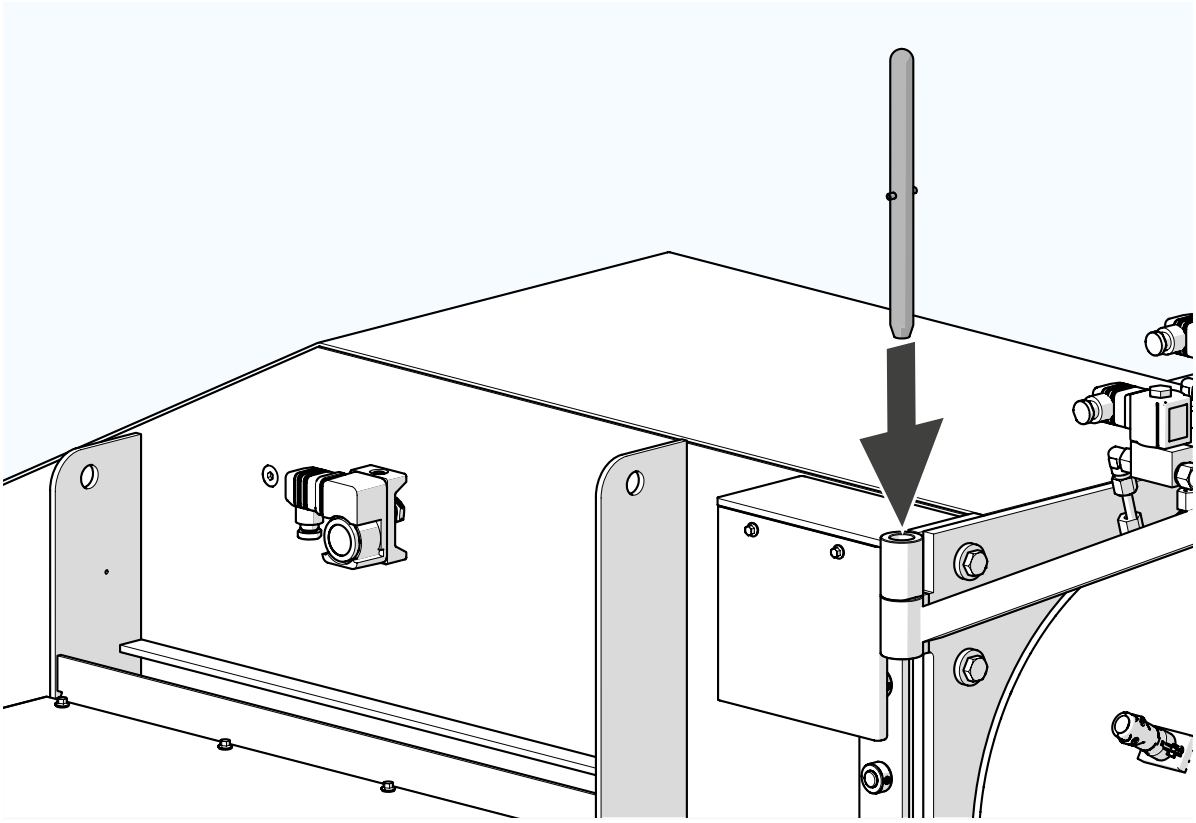
NOTICE Make sure the ignition cable is not trapped between the combustor and the fan housing.



10. Place and loosely tighten the bolts.



11. Carefully tighten the bolts more until the pivot holes of both the fan housing and the combustor are aligned.
12. Insert the locking pin.

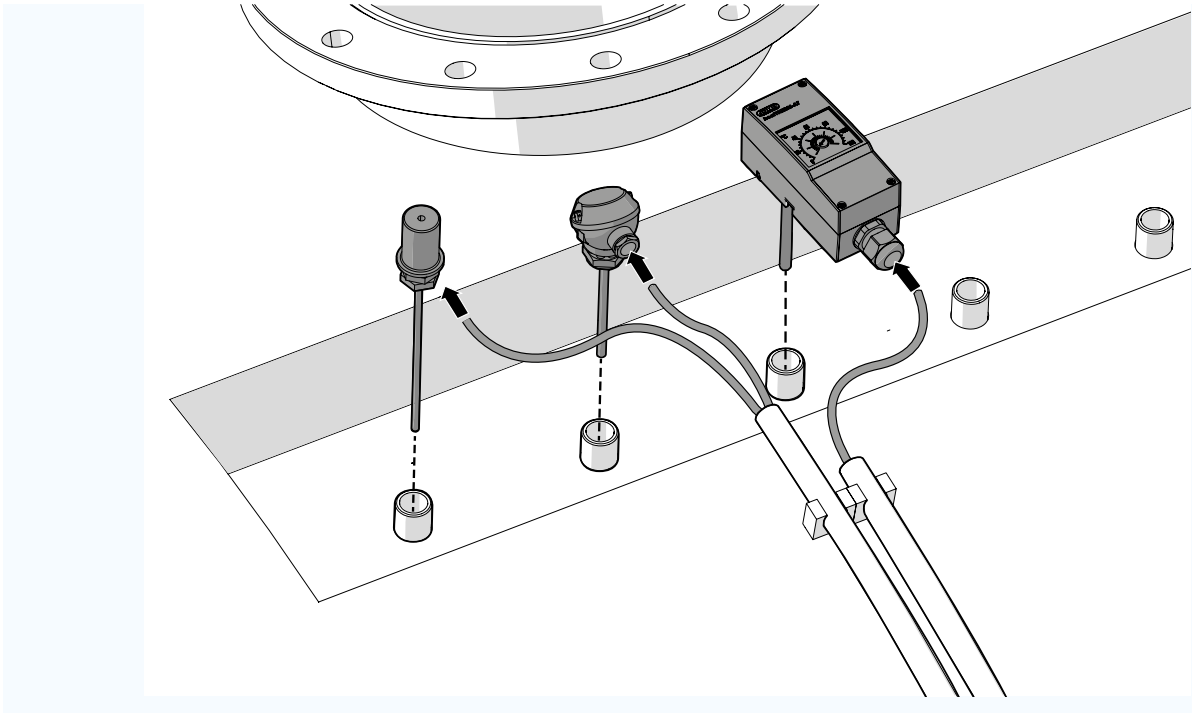


4.4 Installing the boiler thermostat set

The components of the boiler thermostat are installed directly onto the boiler.

To install the boiler thermostat set:

1. Connect cabling to each of the components.
2. Insert the components into the connection points of the boiler.



3. Connect the cabling to a junction box. For more information, please refer to the electrical wiring diagram.

For more information, please refer to the OEM manual of each component.

4.5 Electrical connections

All electric cabling is pre-wired to a junction box in the control panel. During installation, this cabling must be connected to the following components:

- Junction box in the fan housing (see §3.1)
- Boiler thermostat set (see §4.5)
- Junction box on the gas train (see §3.3)

NOTICE For all electrical connections, the applicable local standards and the connection requirements must be taken into account.

For more information about the electrical connections and integrated circuits, please refer to the electrical wiring diagram.

4.6 Installing the gas line adapter

Optional

The gas line adapter can be installed to connect the gas train to the burner.

Connection materials:

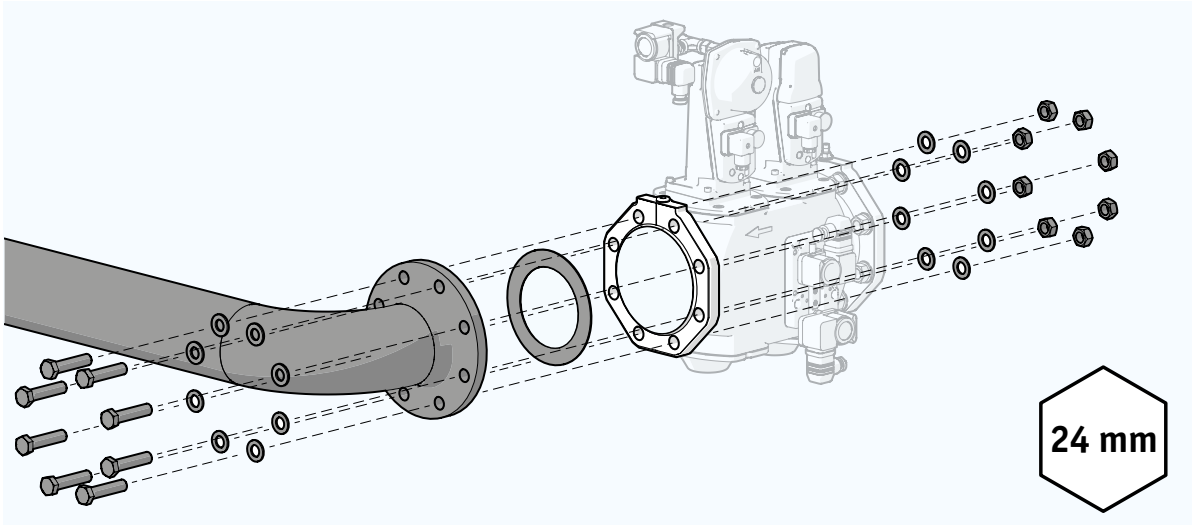
- Nuts and bolts (24 mm)
- Gaskets

Required tools:

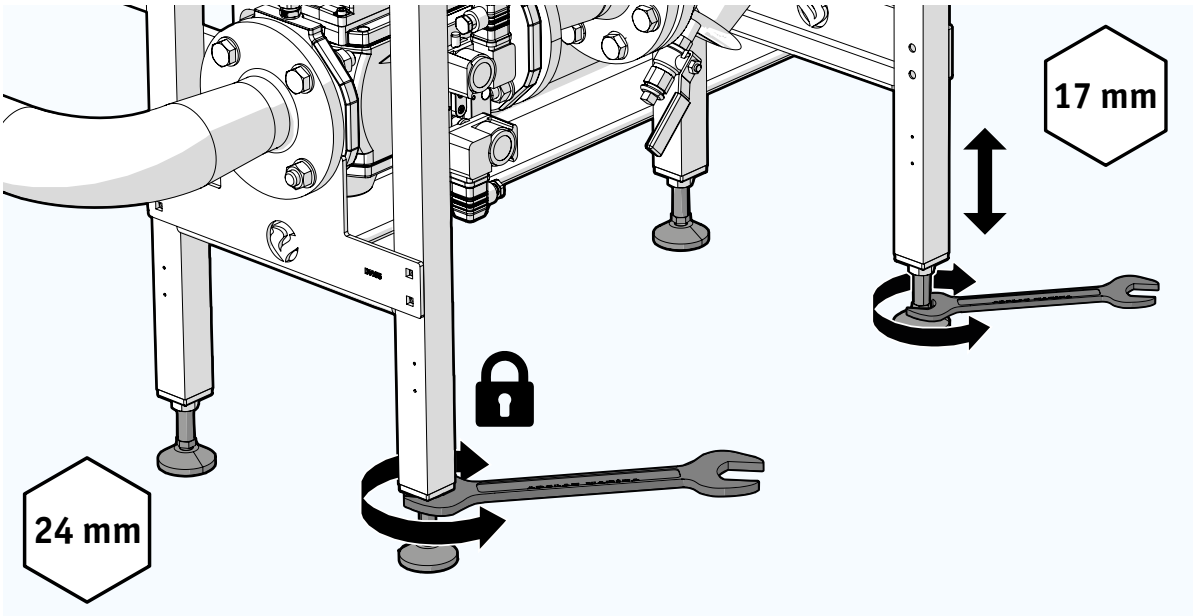
- Ring wrench (24 mm) or adjustable spanners

To install the gas line adapter:

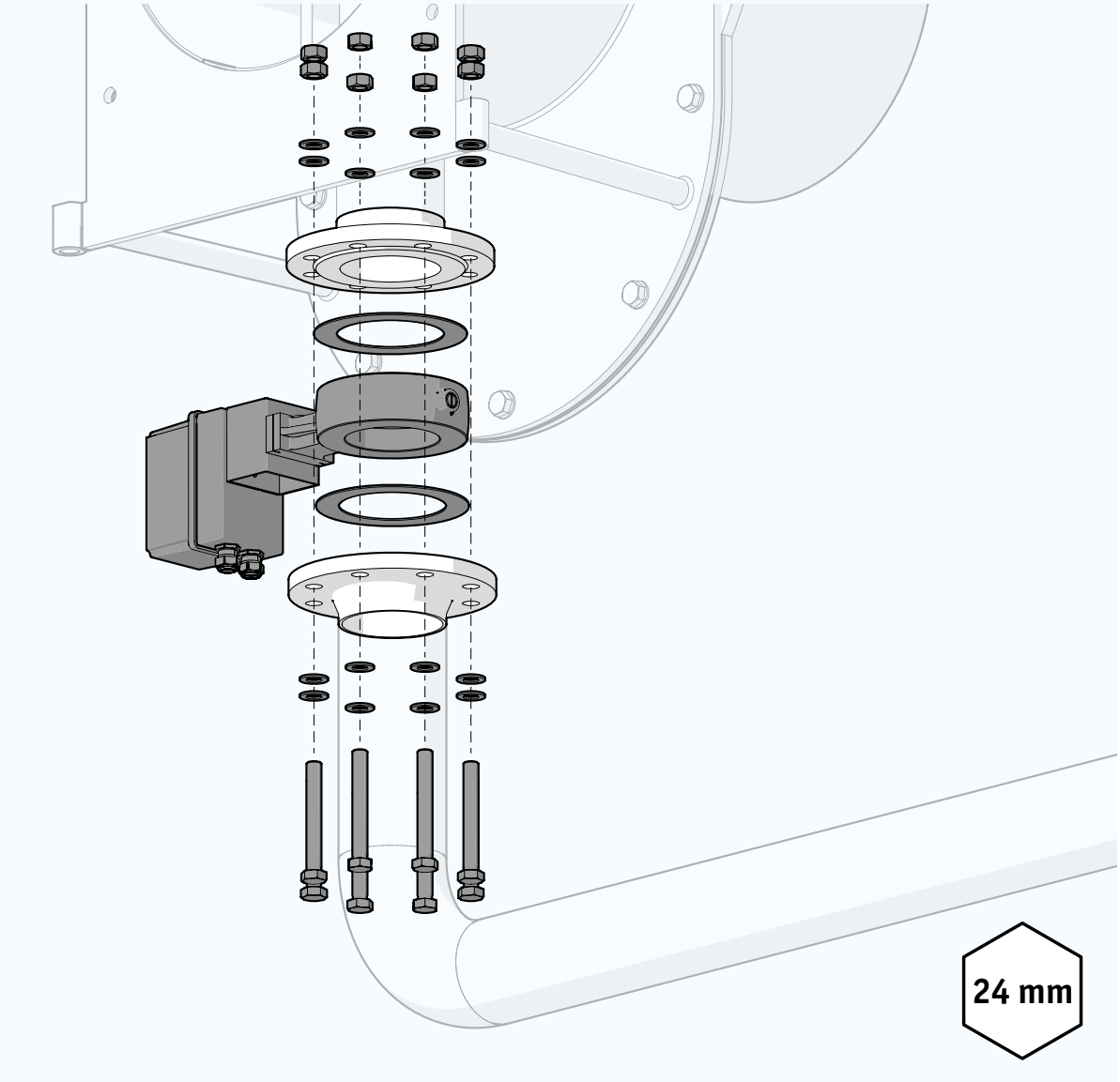
1. Place a gasket and connect one end of the gas line adapter to the double valve block of the gas train.



2. If necessary, adjust the height and location of the gas train to align the gas line adapter with the gas inlet on the combustor.



3. Disassemble the flange on the gas inlet of the combustor.
4. Place two gaskets and connect the other end of the gas line adapter to the combustor.



4.7 Installing the Vitopack

Optional

Connection materials:

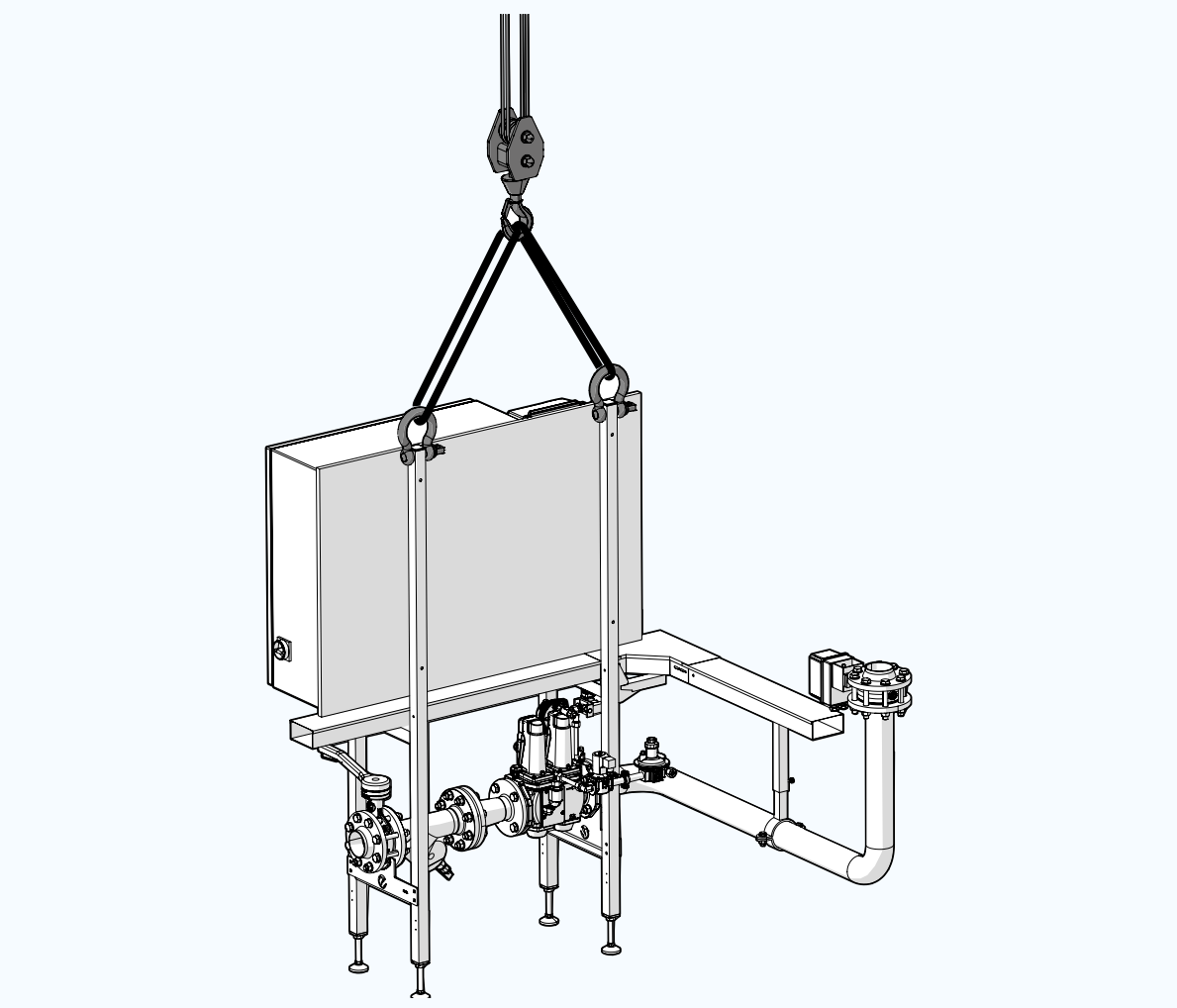
- Nuts and bolts (24 mm)
- Gaskets
- Gas line (15 mm) and connector pieces

Required tools:

- Mobile crane with adequate lifting capacity
- Suitable hoisting equipment:
  - D-shackles
  - Round sling
- Ring wrench (24 mm) or adjustable spanners

To install the Vitopack:

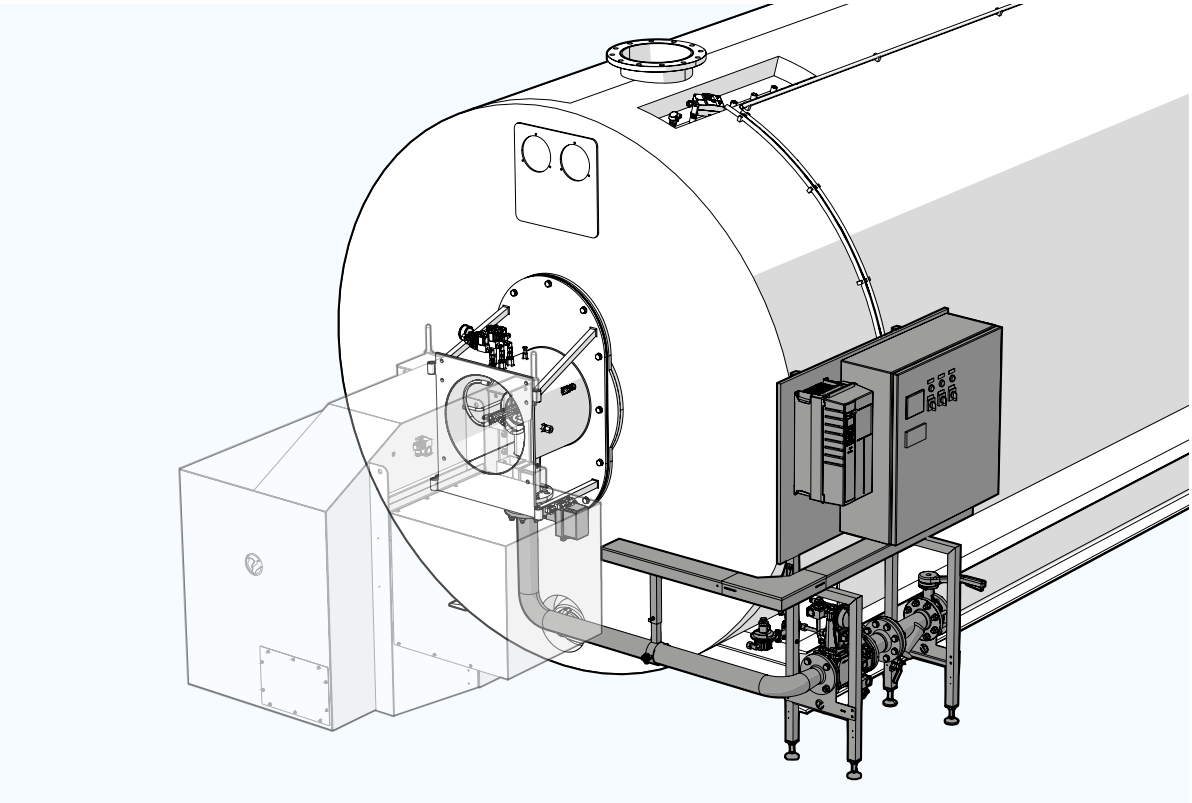
1. Attach hoisting cables to the hoisting rings on top of the frame.



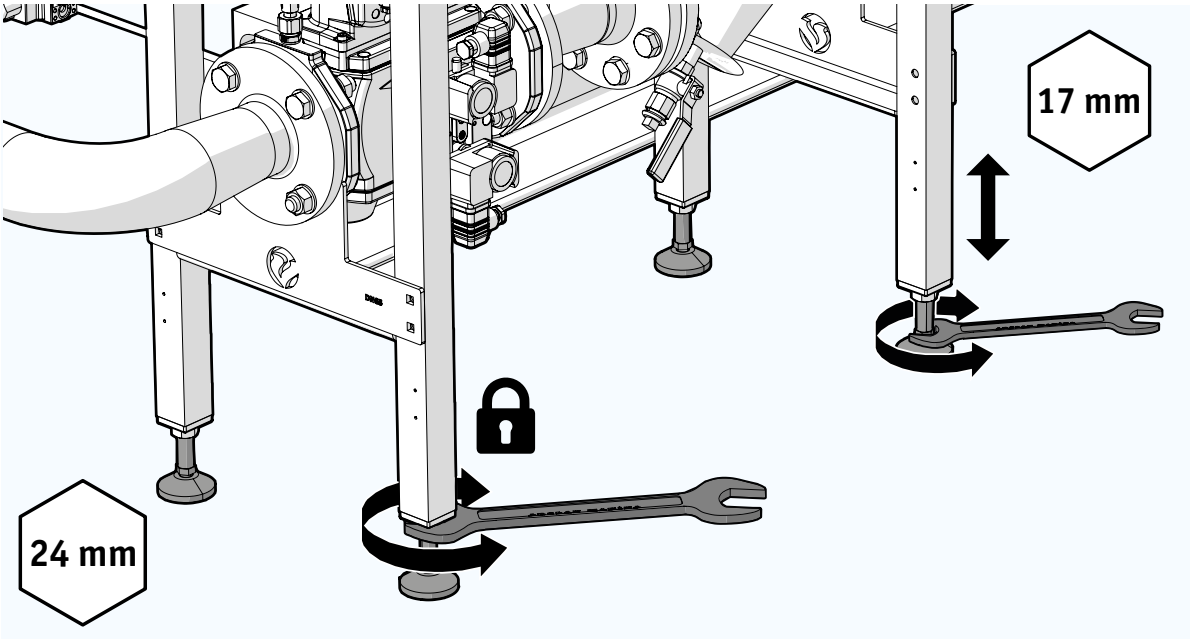
2. Carefully lift the Vitopack.

3. Place the Vitopack at the designated location,on either side of the boiler.

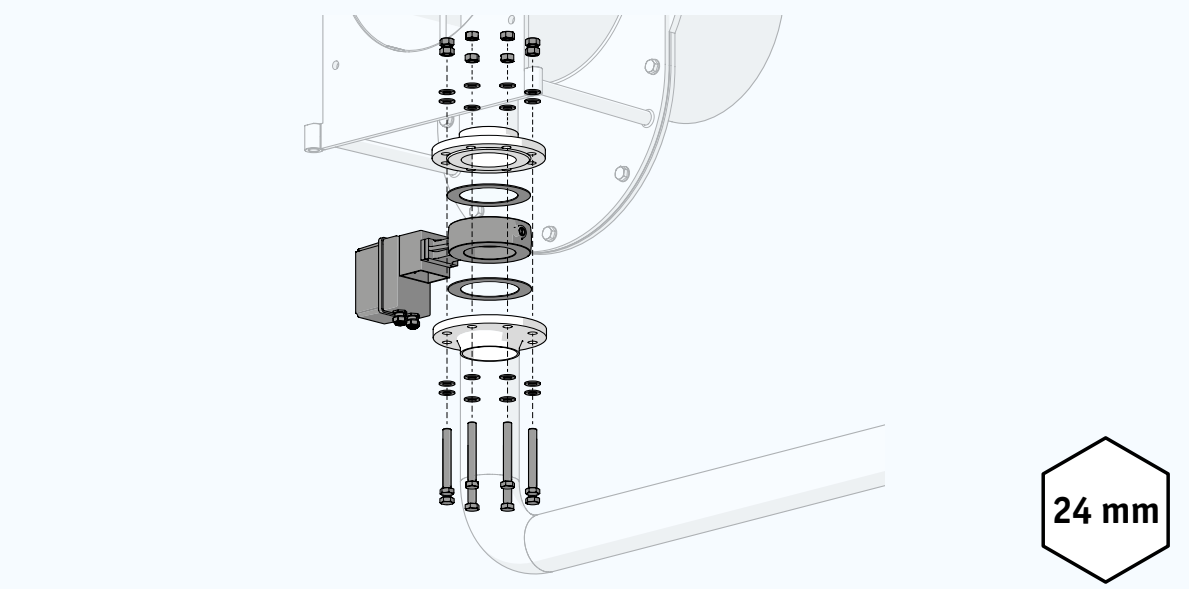
NOTICE Make sure the gas line adapter aligns with the gas inlet on the combustor.



4. Level the Vitopack by adjusting the feet.



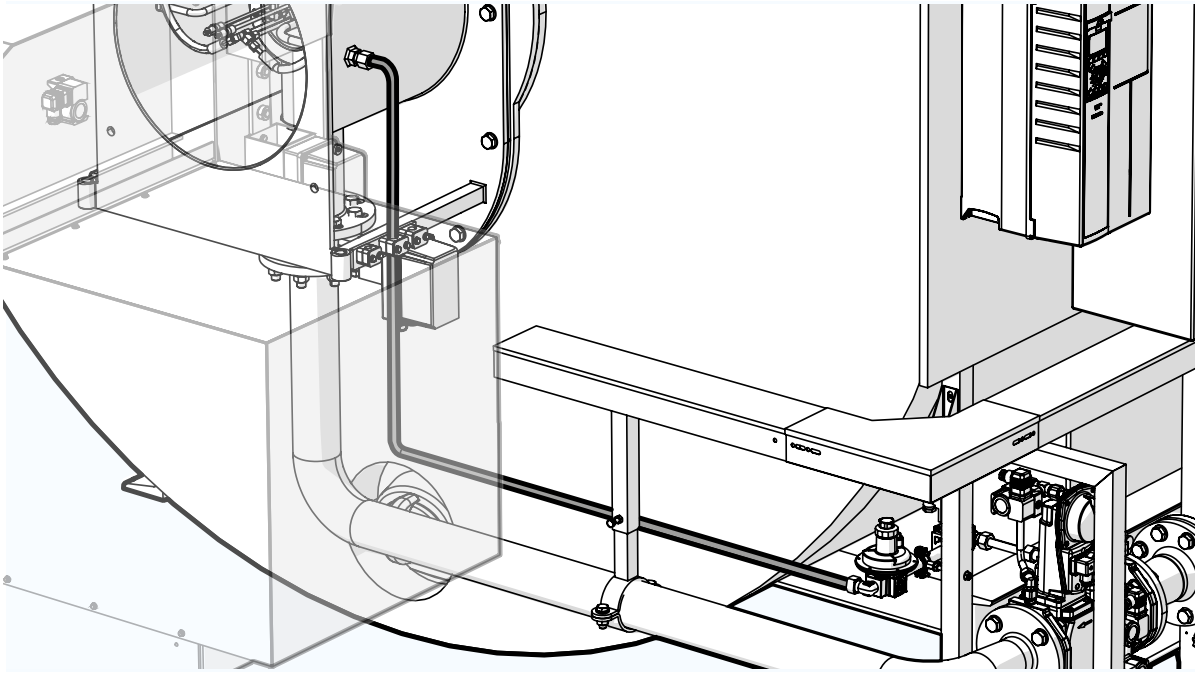
5. Remove the placeholder flange from the end of the gas line adapter.
6. Connect the gas line adapter to the gas inlet of the combustor. Place gaskets between this connection.



7. Attach the supply pipe to the gas train. Place gaskets between this connection.

NOTICE Check that the supply line is clean so that the gas filter will not become blocked and that damage to the gas train cannot occur.

8. Install the ignition gas line.



NOTICE The gas line connection on the combustor can be changed by swapping around the air measure pipe and the pilot gas pipe inside the combustor housing.

4.8 Installing the oil pump or firing set

Only for VOI or VGOI

This section provides instructions for installing an oil pump or oil firing set (modulating or two-stage back-up).

⚠CAUTION The use of unsuitable oil may damage the burner and reduce the quality of the combustion process.

- ▶ Do not supply a V(G)OI burner with gasoline, crankcase oil or any oil containing gasoline.

Connection materials:

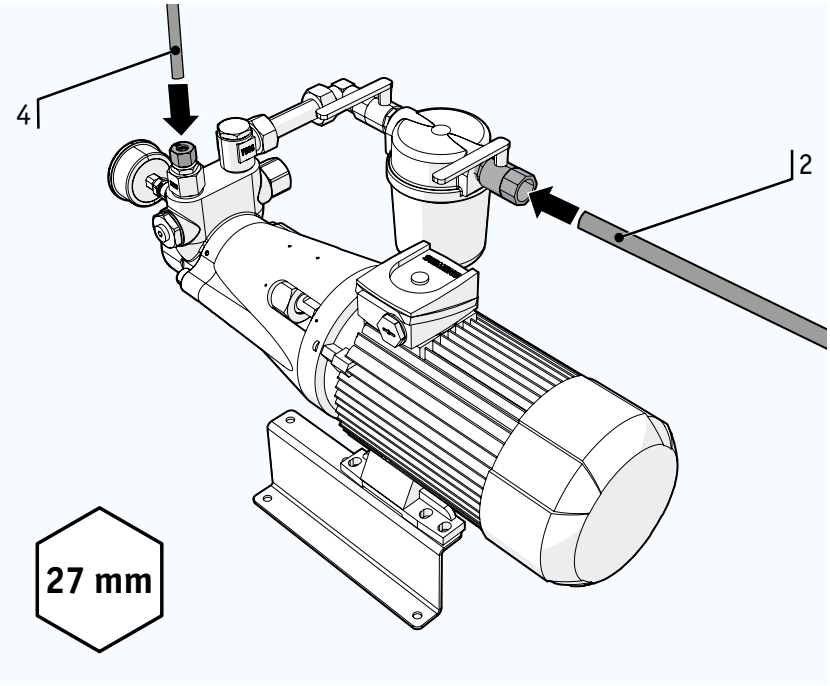
- Oil line (15 mm + 1/2" or 3/4")
- Connector pieces

Required tools:

- Ring wrenches or adjustable spanners

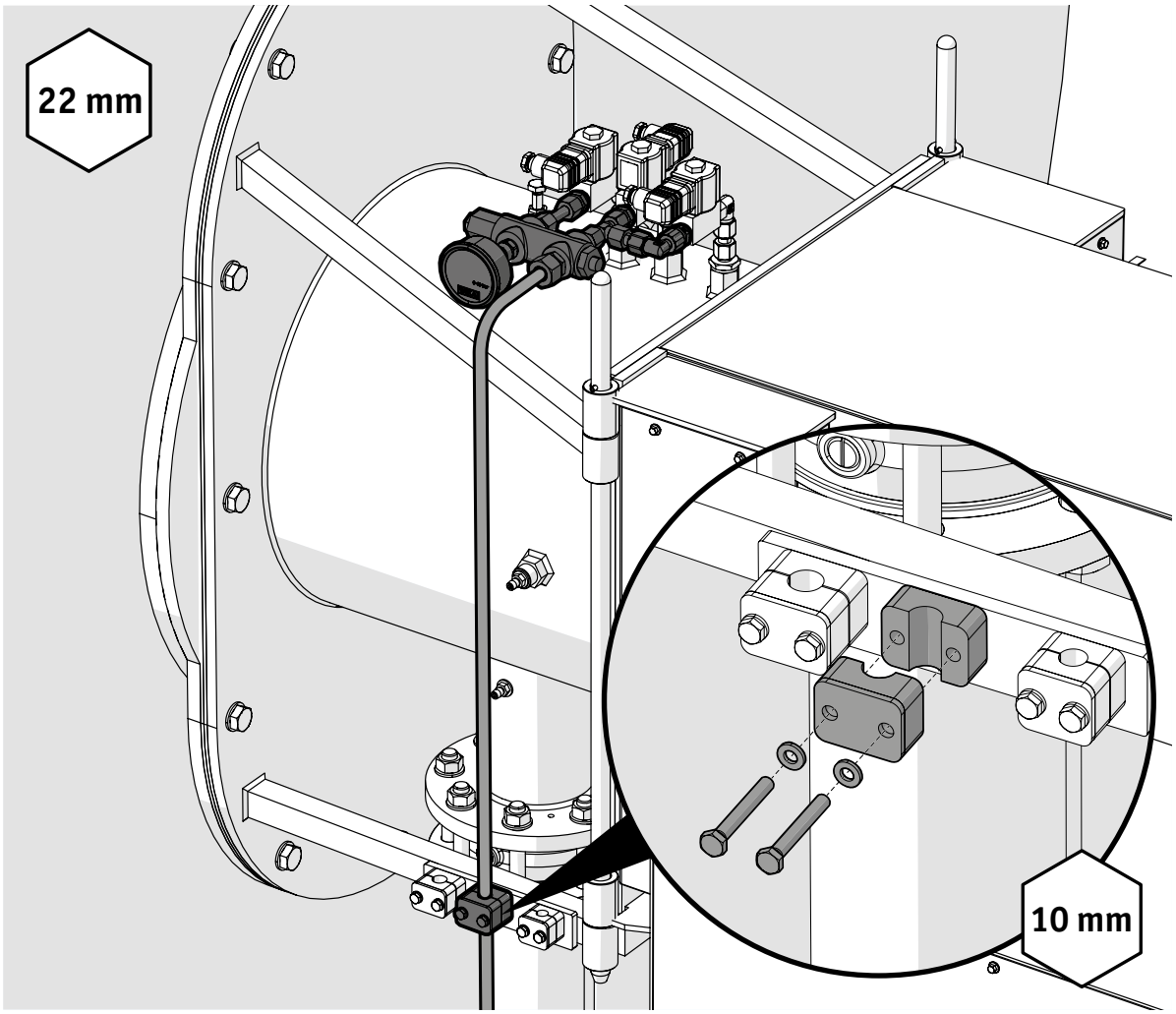
To install the **oil pump** or **backup two-stage oil firing set**:

1. Place the oil pump or firing set next to the boiler, within range of the burner.
2. Connect the oil line to the oil supply line connection of the oil pump.
   The width of the oil line depends on the size of the oil filter (1/2" or 3/4").
3. Connect the other end of the oil line to an external oil supply.
4. Connect the 15 mm oil line to the burner oil supply connection of the oil pump.



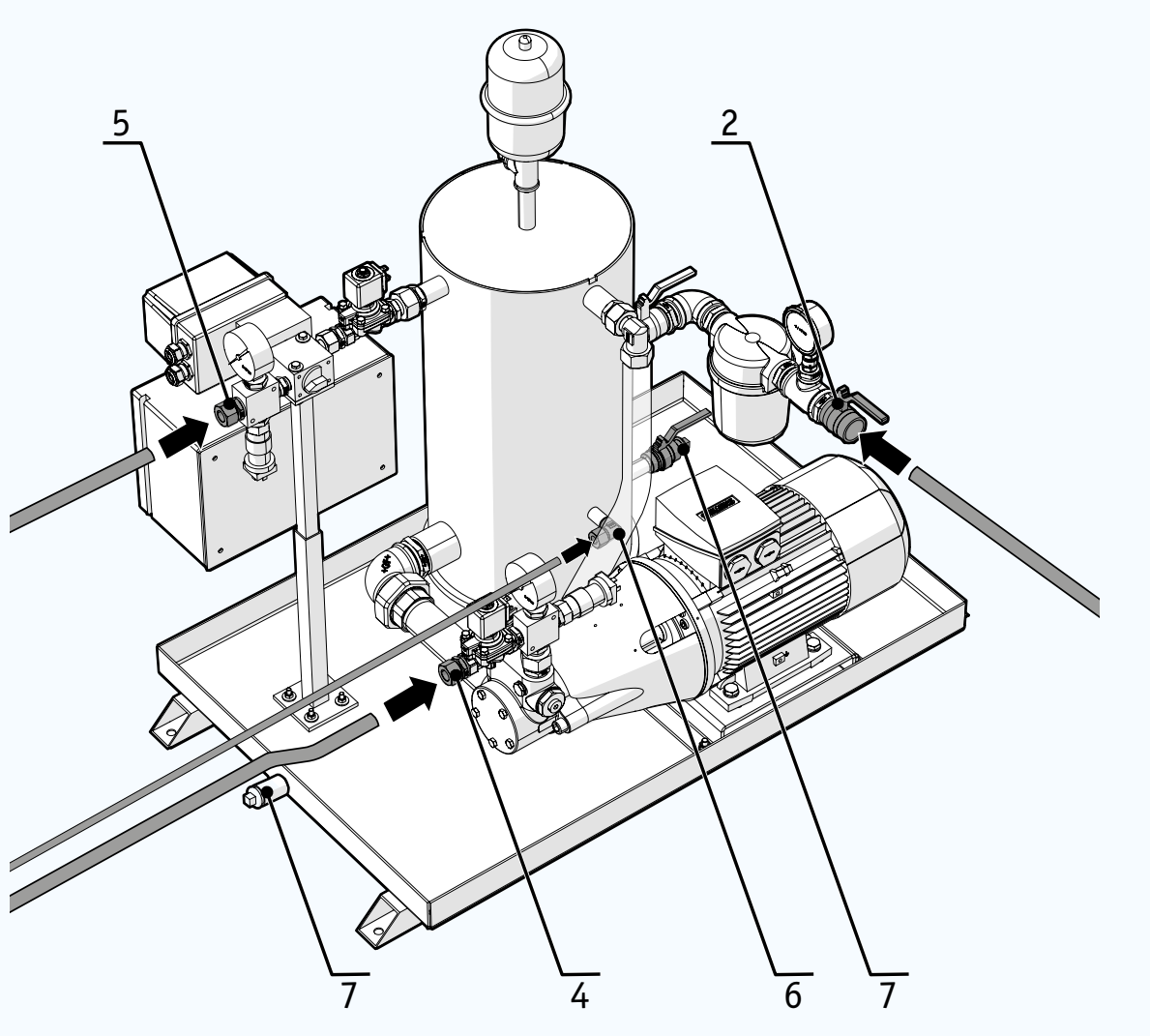
Oil line		Inner diameter	
No.	Name	V..Is 100-500	V..Is 600-1250
2	Oil supply	1/2"	3/4"
4	Oil supply to the burner	15 mm	

5. Connect the other end of the oil line to the combustor.



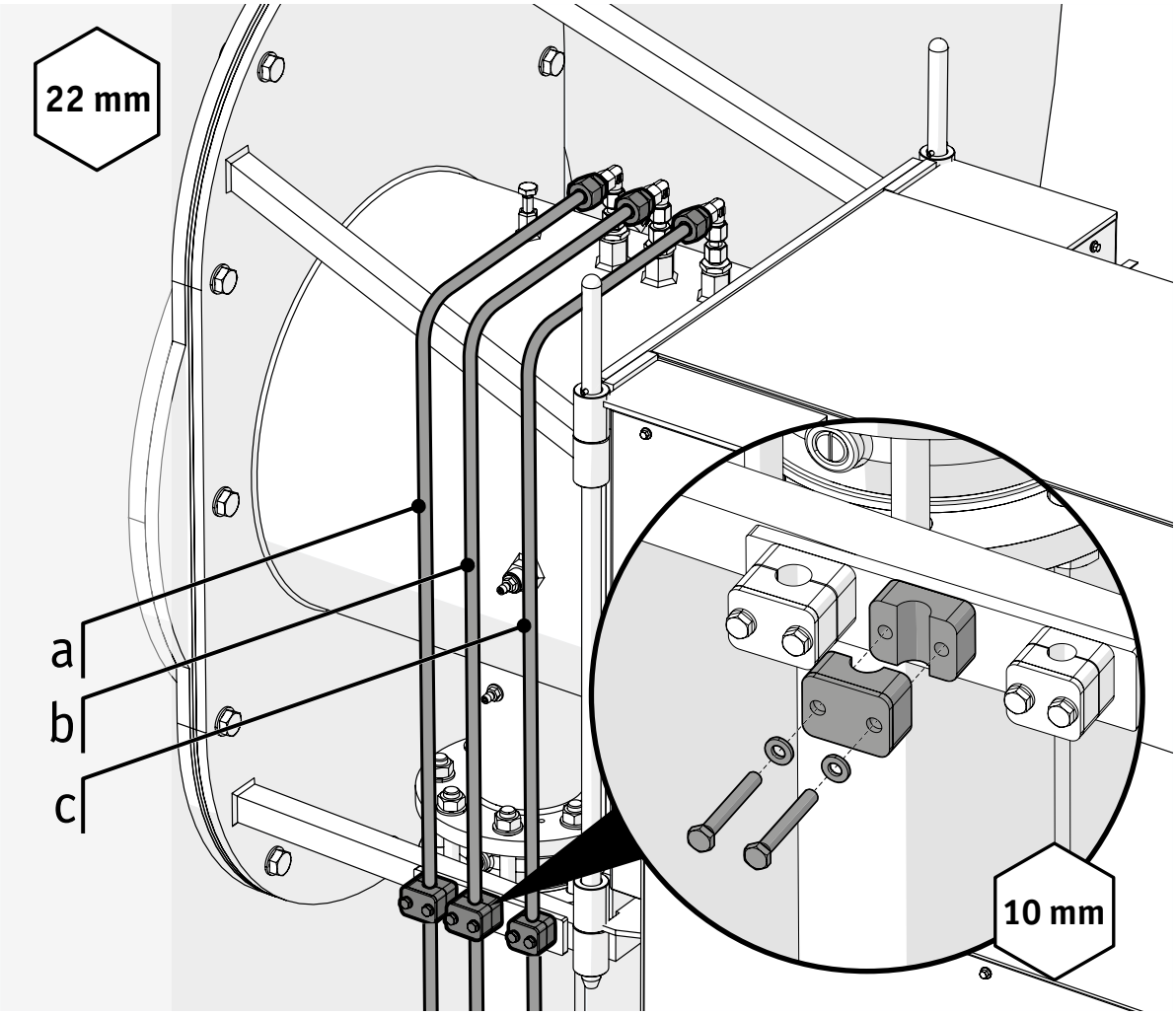
To install the **modulating oil firing set**:

1. Place the firing set next to the boiler, within range of the burner.
2. Connect the oil line to the oil supply line connection of the oil pump.
3. Connect the other end of the oil line to an external oil supply.
4. Connect the oil supply line to the burner to the burner oil supply connection of the oil pump.
5. Connect the oil return line from the burner to the burner oil return connection.
6. Connect the oil return piston line to the burner oil return piston connection.
7. Connect a tap line to the oil buffer tap connection.



Oil line		Inner diameter	
No.	Name	V..Is-100-500	V..Is-600-1500
2	Oil supply	$^1/_2$"	$^3/_4$"
4	Oil supply to the burner	15 mm	
5	Oil return from the burner	15 mm	
6	Oil return piston	12 mm	
7	Buffer tap	$^1/_2$"	

8. Connect the modulating oil firing set to the combustor:
    a. Connect the oil supply line.
    b. Connect the oil return line.
    c. Connect the oil return piston line.
9. Fix the oil lines in the oil line supports on the frame of the combustor.




Monobloc

5 Commissioning

Before commissioning the burner system, make sure it meets the requirements below.

⚠WARNING	All mechanical screw connections (e.g. gas/oil line, flange connections, oil valves, electrical terminals) must be retightened prior to commissioning.
⚠WARNING	All components must be sealed with an appropriate sealant prior to commissioning.
NOTICE	Commissioning of a Vitotherm installation may only be performed by certified personnel.
NOTICE	A commissioning report is created after the burner system has been successfully commissioned. Keep this report near the burner for future reference.

- ☐ The burner system is completely installed according to the instructions in this manual, including:
  - ☐ Gas- and front pipes
  - ☐ Relief valve discharge tubes
  - ☐ Regulating pressure pipes
  - ☐ Explosion hatch
  - ☐ Refractory
  - ☐ Pilot gas tube
  - ☐ Oil pipe lines to pump and burner
- ☐ Electrical wiring is completed according to the provided electrical wiring diagram, free of errors, so that the electrical pre-start condition circuit (safety chain) is closed. Completion of electrical field wiring to the:
  - ☐ Burner
  - ☐ Gas train
  - ☐ Control panel
  - ☐ Boiler thermostat set
  - ☐ Control and safety equipment
- ☐ Electrical power is available on the boiler, burner, buffer and pumps (if applicable).
- ☐ The boiler is completely assembled, filled with a sufficient amount of heating medium, vented and ready for use.
- ☐ The water circuit to the boiler is tested and approved.
- ☐ Fuel inlet and outlet valves are closed.
- ☐ Fuel lines are purged free of air.
- ☐ Gas and/or oil pressure is available up to the burner A1 gas/oil valve.
- ☐ The gas supply pressure does not exceed the maximum permitted gas pressure as indicated on the burner plate (see §3.9).
- ☐ Safety components are functioning correctly and ready for operation (see §2.9).
- ☐ Equipment supplied by third parties that is present in the electrical burner panel (not related to burner control such as the pressure vessel) must be adjusted and programmed.
- ☐ Sufficient fresh air is available.
- ☐ Flue outlets are not obstructed.
- ☐ A blow-off facility is present and adjusted to the maximum boiler capacity.
- ☐ A demand for heat is present in the system.
- ☐ Possibility of heat release is present and controlled/supervised by local site supervisor.
- ☐ The necessary local work permits are available.
- ☐ Qualified personnel is available for instructions, system transfer and site acceptance test.
- ☐ A safe workspace is available, according to health and safety regulations and realistic common sense.


SIEMENS

6 Operation

This chapter describes the main operational procedures of the burner system.

6.1 Control panel

The burner is controlled via the control panel. This panel has several standard control switches and feedback LEDs, as well as controls that can be added to control optional features (e.g. an oil firing set). See §3.4 for an overview of the standard components of the control panel.

6.1.1 Main power switch

The control panel is activated by using the main power switch on the right side of the panel.

6.1.2 Internal components

The control panel can be opened with a key to gain access to:

- Relays and fuses
- A power outlet and modbus connection for a service laptop
- The USB drive with the technical file of the burner system
- This instruction manual

⚠WARNING Contact with live parts can cause electric shocks, burns or even death.

- ▶ Only perform work on electrical equipment if you are an authorised electrician.
- ▶ Before you start working on electrical equipment, switch off and lock out the power supply isolator and verify that no voltage is present.

6.1.3 Switching the burner on or off

The burner is switched on or off with the main switch. This switch has three options:

- 1 = Computer: ON - automatic controls.
- 0 = Off.
- 2 = Lamtec: ON - manual controls.

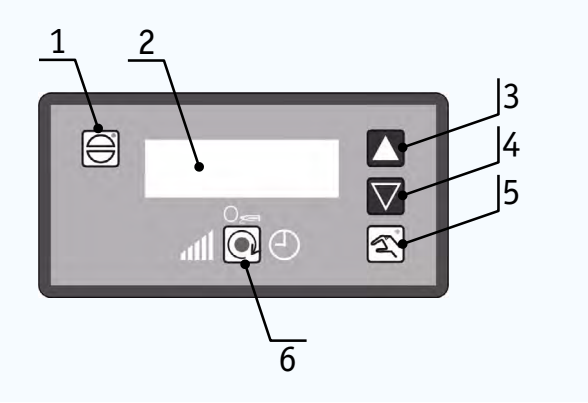
To operate the main switch:

- Set the main switch to 1 to cue the burner system to modulate based on the computer.
- Set the main switch to 2 to enable manual operation via the Lamtec interface.
- Set the main switch to 0 to shut the burner system down.

6.1.4 Manually operating the burner

The burner system can be manually operated via the Lamtec interface on the control panel.

For more information, please refer to the OEM manual.



1. Reset
2. Display
3. Load / Fault history up
4. Load / Fault history down
5. Manual operation on/off
6. Display options

6.1.5 Performing a system reset

A system reset must be performed after a failure in the burner or external boiler system has been resolved. This procedure allows the burner system to be put back into operation.

To reset the burner system:

- Press the reset button on the control panel.

6.1.6 Controlling the flame

The burner flame can be set to two different modes with the mode switch:

- 1 = Automatic -modulating flame
- 2 = Low flame - flame at lowest capacity (e.g. during inspection/maintenance)

6.1.7 Switch between gas and oil

Only for VGOI

Burner systems that are equipped with an oil pump or oil firing set can switch between gas and oil. For these systems, a fuel switch is added on the control panel.

To switch from gas to oil supply:

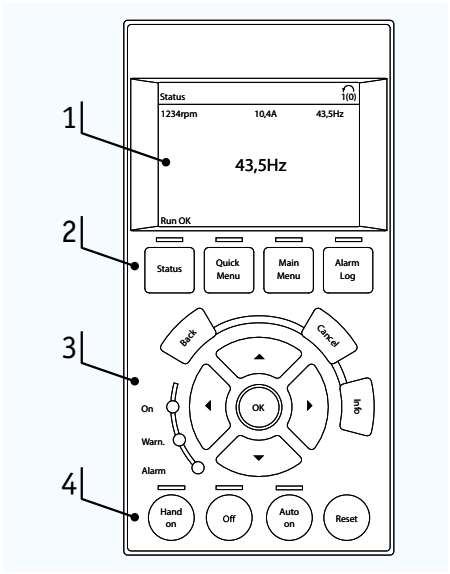
1. Set the mode switch to **Low** and wait until the burner is on low.
2. Set the control switch to **Off**.
3. Set the fuel switch to **Oil**.
4. Change over the condenser flue gas valve to bypass the condenser.

5. Open all manual valves for the fuel supply at the:
   - Fuel tank
   - Burner
   - Oil pump or firing set
6. Set the control switch to **Manual**.
7. After ignition, set the mode switch to **Automatic**.
   Make sure the boiler temperature is set to the required setting.

6.2 Frequency drive

The frequency drive is located next to the control panel and is used to control the motor of the burner fan. The frequency drive is operated via the interface in the top left corner.

NOTICE The factory settings of the frequency drive have been set by Vitotherm.



1. Graphical display with status information
2. Menu buttons and indicator LEDs
3. Navigation buttons and indicator LEDs
4. Operation buttons and indicator LEDs

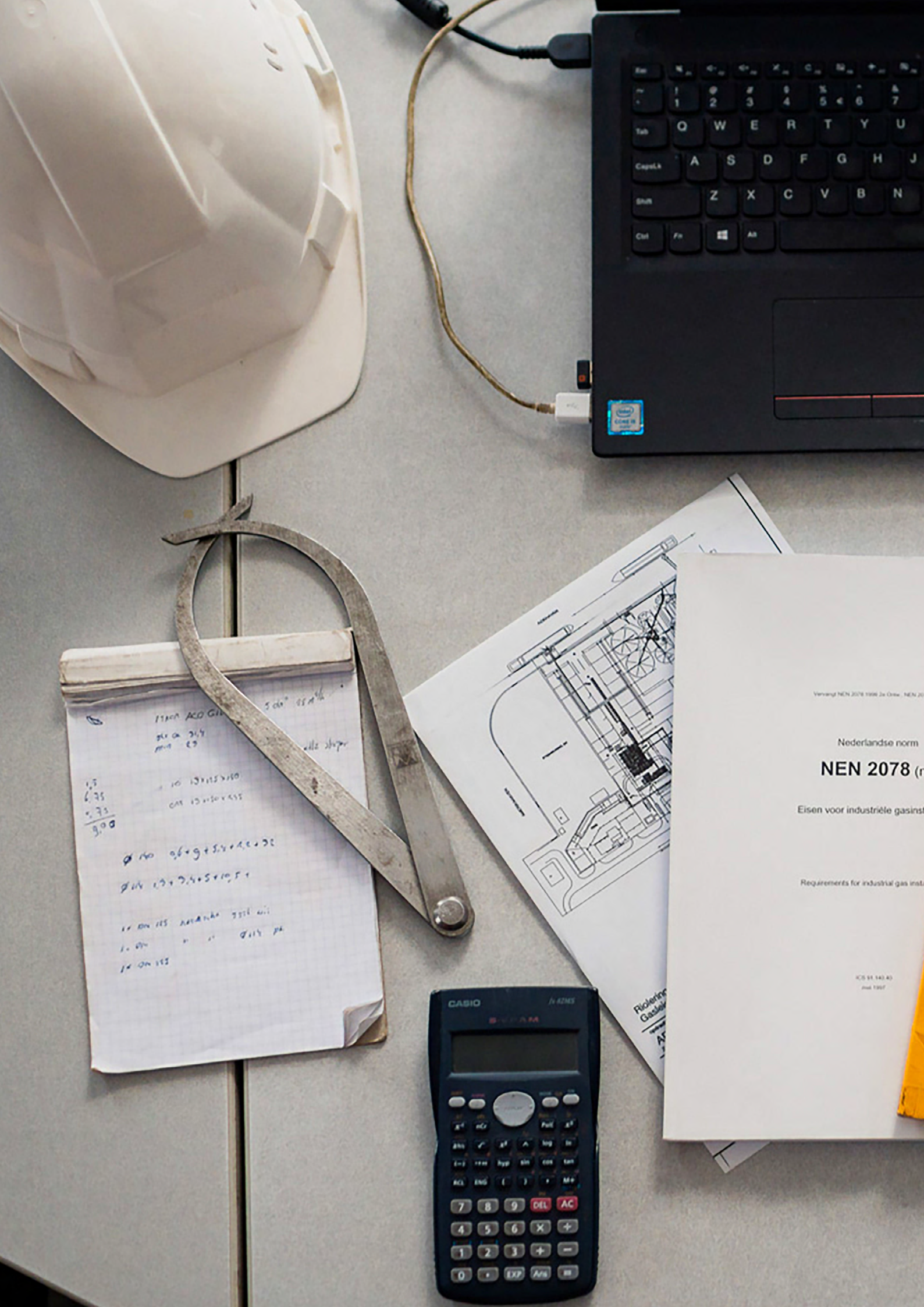
For more information, please refer to the OEM manual.

6.3 Emergency shut down

Certain hazardous situations require an emergency shut down of the burner system (see §2.8).

To perform an emergency shut down:

1. Use the control switch on the control panel to close the fuel supply to the burner.
2. Use the manual emergency shut-off switch outside the boiler house to close the gas supply to the boiler house.
3. Use the fire switch outside the boiler house to cut off the power to the burner.


Nederlandse norm
NEN 2078
CASIO

7 Troubleshooting

System failures are displayed on the interface of the control panel or frequency drive. The table below can be used to identify and solve the failure.

For more detailed information about these system failures, please refer to the OEM manual of the Lamtec Etamatic operating system.

7.1 Left module

Description	Instructions
Leak test (LT) failure	A leak is detected between the main or pilot gas valves. All valves must be checked by a specialist to identify the leaking valve. This valve must be replaced.
Frequency controller failure	Check the display of the frequency drive and read out the failure. Use the OEM manual to solve the problem.
Electronic low water level boiler failure	Check the water level of the boiler to see if the level is high enough. Remove any air in the system that may cause this problem.
Low water level boiler failure	
Max. boiler water temperature failure	Check the water temperature of the boiler. Make sure that the water temperature inside the boiler is below the boiling point.
Gas supply pressure too low (LD) failure	Check if the gas pressure to the burner corresponds with the required pressure mentioned on the burner plate (see §3.9). Adjust if necessary.
Min. gas pressure (LD1) failure	
Max. gas pressure (HD) failure	Check if there are any differences between the gas pressure regulator and the commissioned value. Check if the maximum capacity has not been exceeded. Adjust if necessary.
Max. water temperature condenser failure	Check the water temperature of the condenser system. Make sure that the condenser is below 95 °C and that the pump is running.
Max. flue gas pressure condenser (HD eco) failure	Check the condenser or economiser for any flue gas blockage or leakage.
Emergency stop	The emergency stop is engaged. Evaluate the situation and restart the burner.
Min. air pressure (LD2) failure	Check the display of the frequency drive for failures. Check the air intake for blockage. If the combustion air fan is still producing the needed pressure for the operation, compare the air pressure to the commissioned value. Adjust if necessary.
Max. water pressure condenser failure	Check the water pressure in the heating system of the condenser.
Thermal overload oil pump	Check if the supply power corresponds with the value on the burner plate (see §3.9). Make sure all the manual valves are open.

7.2 Middle module

Description	Instructions
Condensor bypass valve not open (ES OIL) failure	When switched over to emergency oil operation, check the condensor bypass valve. The bypass valve has to make sure that the flue gases are bypassed on the condensor to prevent blockage and corrosion when operating on oil.
Min. water boiler pressure failure	Check the water level of the boiler system to see if the level is ok. Remove any air in the system that can cause this problem.
Max. water pressure boiler failure	Check the water pressure in the heating system of the boiler.
Flame failure	Check the flame scanner. Check the complete ignition. Check the pilot and main gas valves. Check the flame stability and combustion.
CMS/ETAMATIC S OEM failure	Check the screen of the Lamtec burner control and read out the failure. Check the OEM manual of the burner control to solve the problem.
CO_2 chimney valve not closed (ES CO_2) failure	Check if the CO_2 fluegas valve in the chimney to the CO_2 collector is closed during the start-up procedure of the burner.

Vitotherm

Notes

8 Maintenance

8.1 Pre-emptive parts replacement schedule

Certain parts of the burner system should be replaced every X years to prevent failure of vital components. The table below gives an overview of these maintenance activities and the frequency with which they should be performed.

NOTICE A set of the most commonly replaced parts is available (see §3.8.5). To order this set or other replacement parts, please contact Vitotherm or your supplier.

Task	Interval (years)							To be carried out by
	1	2	5	8	10	15	20	
Burner								
Ignition pins	●							
UV-cell		●						
Ignition cable		●						
Rajah clamps		●						
Pressure switch					●			
End switches					●			
Oil nozzles		●						
Sound insulation					●			
Flexible oil hoses			●					
Gas valve train								
Pressure switch					●			
Actuators (Siemens SKP15)						●		
Actuators (Siemens SKP25)						●		
Pneumatic pressure hose (blue)		●						
Control panel								
Pneumatic timers					●			
Main power relay motor fan							●	
Interface relay					●			
Electronic timers					●			
Auxiliary relay					●			
VCD								
Pump		●						
CO sensor			●					
3-way valve			●					
Boiler / condenser								
HD condenser			●					
Maximum thermostat boiler				●				

8.2 Annual Periodic Maintenance

To guarantee the quality and safety of the burner system, Vitotherm advises annual Periodic Maintenance (PM) to be performed by their own certified service engineers.

⚠CAUTION	To guarantee the quality and safety of the burner system, Vitotherm advises annual Periodic Maintenance (PM) to be performed by their own certified service engineers.
NOTICE	This section contains maintenance instructions for the standard components of a burner system. For maintenance instructions for any other (optional) components, please refer to the corresponding OEM manual.

A checklist of maintenance activities during Periodic Maintenance can be found in Appendix D of this manual.

8.2.1 Control panel

The following aspects of the control panel should be inspected:

- All electrical connections;
- The cables, for any sign of overload or burns;
- The circuit breaker fuses, for a correct rating;
- All switches and lights, for correct functioning;
- The cam timers, for correct functioning;
- The alarm display;
- The fuel interlocks.

8.2.2 Burner unit

To perform Periodic Maintenance on the burner unit, do the following:

1. Perform a visual check of all components for correct functioning.
2. Remove the burner head.
3. Clean and check:
    - the burner ignition system, including the HT lead and cap;
    - the igniters. Reset if necessary;
    - the condition of the atomizer cup, including concentricity;
    - the cup shroud. Ensure it is set correctly;
    - the splash wheel, for noise;
    - the primary air cashing, for any signs of oil;
    - the condition of the burner quarrel and flame baffle;
    - the flame control sensor (UV-cell or ionization probe).
4. Replace the ignition pins.

8.2.3 Moveable parts

The linkages and moveable parts of the burner system require the following maintenance activities:

- Clean and check:
  - the operation of the linkage and cam unit, for wear free movement;
  - the modulation of the motor and clutch;
  - the operation of low and high fire micro switches;
  - the secondary air dampers, for free movement;
  - the primary air butterfly, for free movement.

8.2.4 Gas

For VGI and VGOI

- Check the gas supply to the burner for leaks and correct pressure;
- Check and test the gas train for correct functioning;
- Check the combustion performance for optimal efficiency for CO2 and heat output.
  - Adjust if necessary.

8.2.5 Oil

For VOI and VGOI

- Perform a visual check of:
  - the installation for oil leaks;
  - the wiring and connections;
  - the condition of flexible oil hoses (if applicable), replace every 5 years;
  - the oil meter.

- Check and test:
  - the solenoid valves for correct functioning;
  - the test block heater and trace heat tape for correct functioning;
  - the thermostat for operational oil temperature;
  - the oil for correct temperature and pressure.

- Check the combustion performance for optimal efficiency for CO2 and heat output.
  - Adjust if necessary.

8.2.6 Flue gas measurements

The concentration of the following gases in the flue gas must be measured and compared to the commissioning report:

- CO
- O2
- NOx

If the concentration of (one of) these gases differs from the values in the commissioning report, adjust back to the original settings.

8.3 Maintenance of the burner

This section provides information and instructions on how to perform maintenance on the MONO-block burner.

⚠WARNING Make sure the burner system is completely shut down before performing maintenance on the burner:

- ▶ Use the control switch on the control panel to close the fuel supply to the burner.
- ▶ Interrupt the mains power supply to the burner system.

⚠WARNING All mechanical screw connections (e.g. gas/oil line, flange connections, oil valves, electrical terminals) must be retightened prior to every Periodic Maintenance.

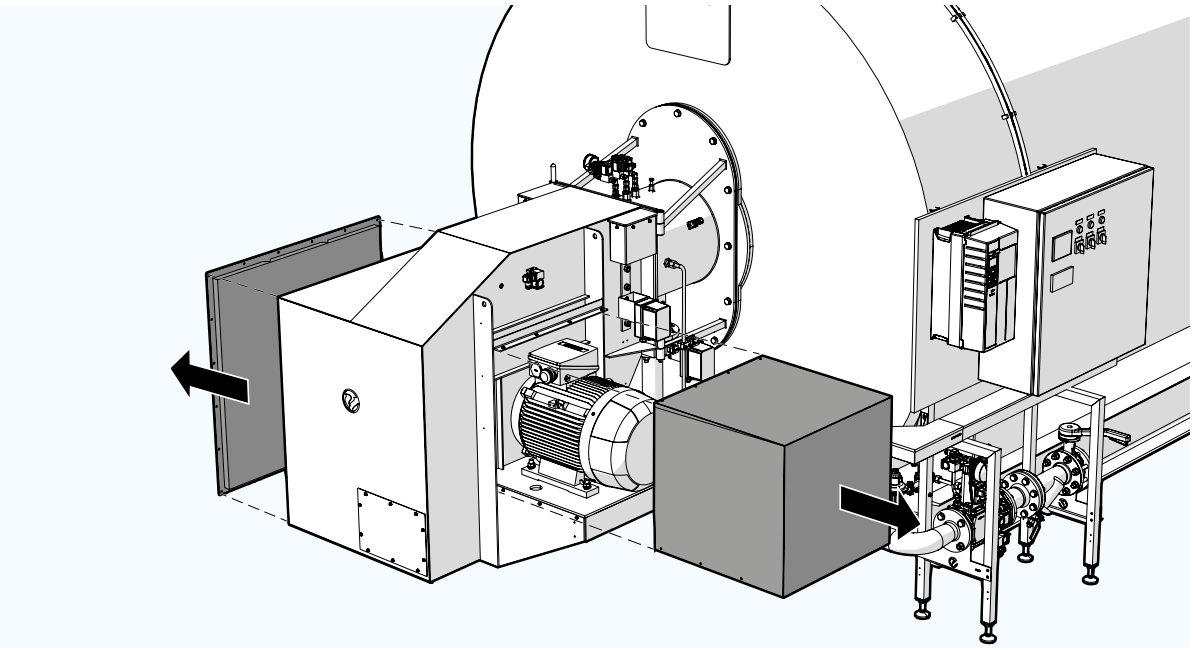
⚠CAUTION To guarantee the quality and safety of the burner system, Vitotherm advises annual Periodic Maintenance (PM) to be performed only by their own certified service engineers.

Required tools:

- Ring wrenches or adjustable spanners.

To perform maintenance on the burner:

1. Perform maintenance on the fan housing:
   a. Remove the sound cover of the fan motor. Check the sound material for defects and check if the sound material is still physically attached to the plate material.
   b. Remove the side plate of the fan housing inlet. Check the sound material for defects and check if the sound material is still physically attached to the plate material.



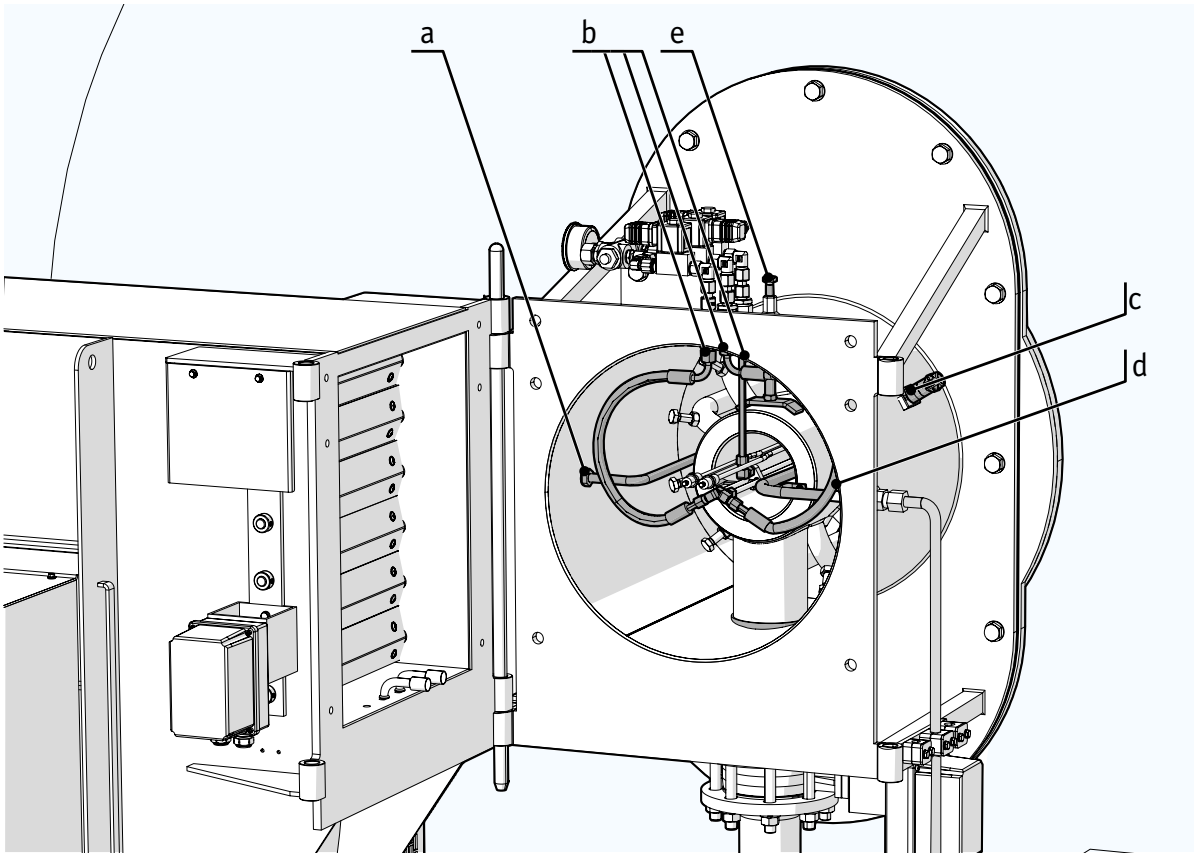
   c. Mark the position of the intake and remove it.
   d. Check the fan for any dirt or defects
   e. Check the fan motor for any defects and clean if necessary.
   f. Check and clean the inlet of the air pressure switch (LD2).
   g. Place the intake back and check if the fan is running free from the intake.
   h. Put back the side plate of the fan housing inlet and the sound cover of the fan motor.

2. Open the fan housing to access the combustor:
    a. Remove the bolts.
    b. Remove the (small) locking pin.
    c. Slightly rotate the housing away from the combustor.
    d. Disconnect the ignition cables.
    e. Fully rotate the housing away from the combustor.

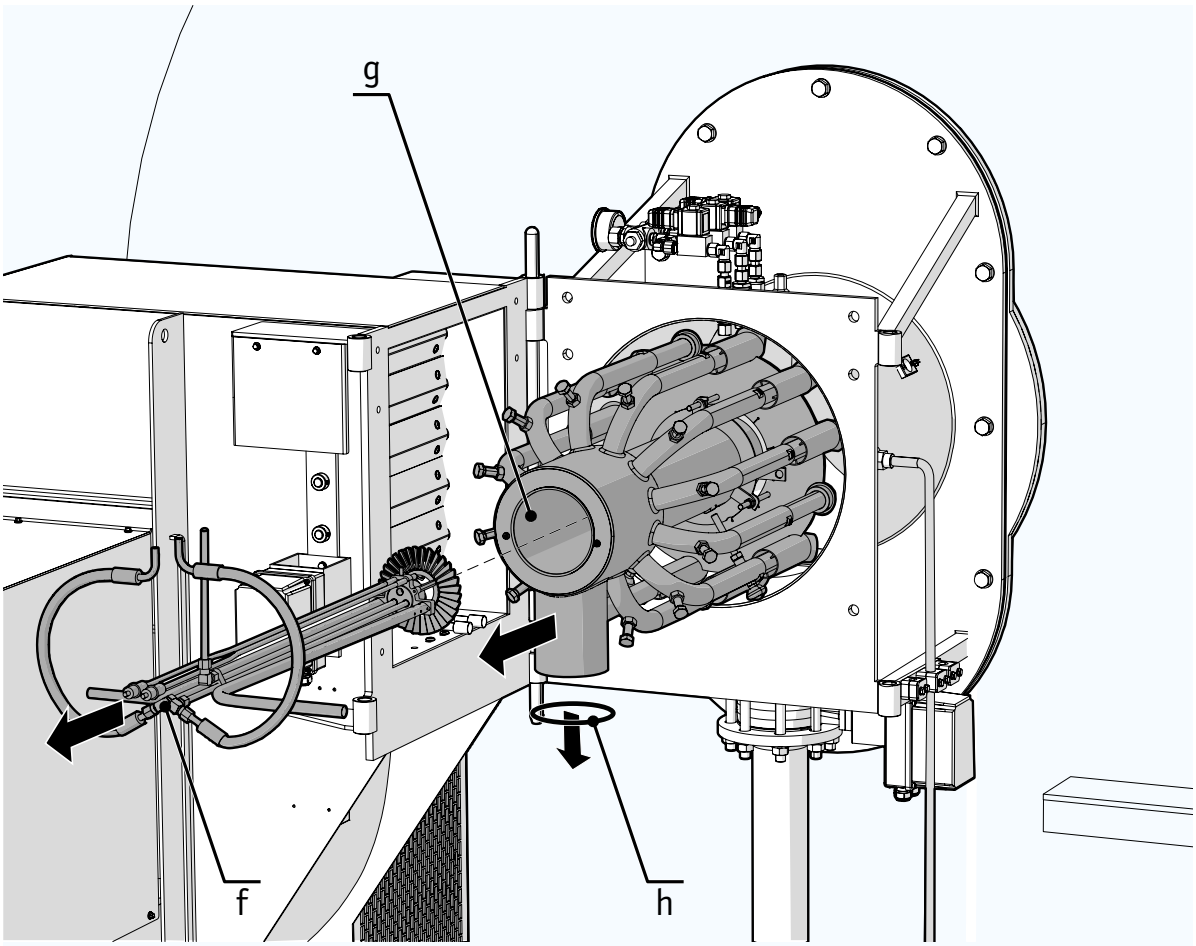
3. Check the following combustor components for any dirt or defects:
    - The air measure pipe
    - The UV cell
    - The pilot burner
    - The ignitors
    - The high voltage cable and the connectors for the ignitors
    - The combustor housing
    - If necessary, clean or replace the components above.

4. Check if the air valves are clean and open smoothly.
    - Clean the valves and the axles if necessary.

5. Disassemble the combustor:
    a. Disconnect the air measure pipe.
    b. Disconnect the oil lines (VOI and VGOI only)
    c. Pull out the UV cell.
    d. Disconnect the pilot gas pipe.
    e. Remove the burner head locking bolt and the bracket it holds into place.



f. Disconnect and remove the complete pilot burner with oil lances and pilot gas line
g. Lift the burner head out of the combustor.
h. Remove the gasket.



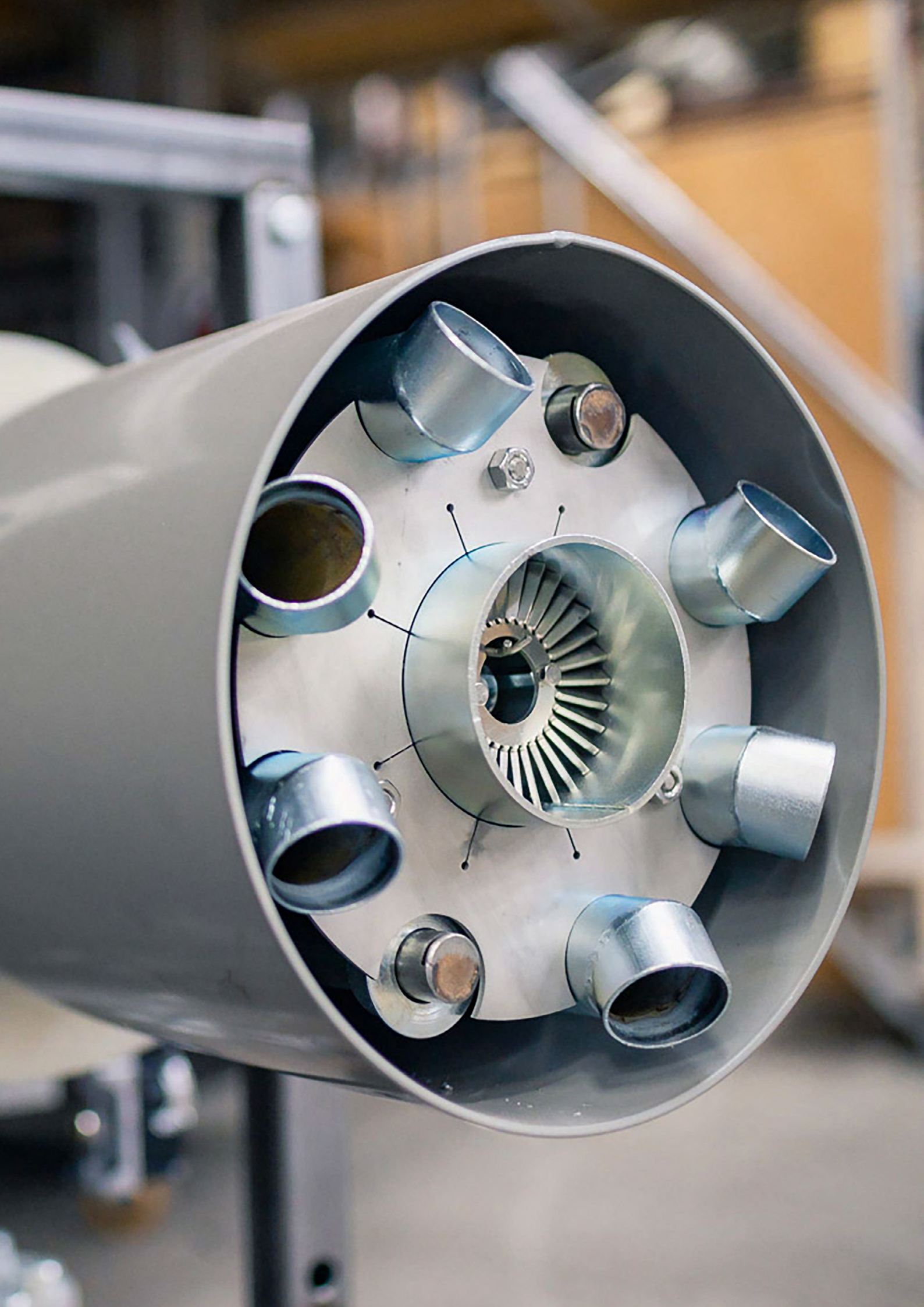
6. Check the following components of the burner head for any dirt or defects:

- Burner head gasket
- Flame plate and connections
- Inner tube
- Gas pipes
- Mixer tubes
- If necessary, clean or replace the components above.

7. Reassemble the burner.

Vitotherm

Notes



9 Decommissioning and disposal

This section contains instructions and information on how to properly decommission and dispose of the burner.

⚠CAUTION The burner system may only be installed by qualified personnel. Handling the burner unit and supporting components without the required knowledge and experience may damage the burner system or cause hazardous situations during installation and use.

9.1 Decommissioning

To decommission the burner system:

1. Use the control switch on the control panel to switch the burner off.
2. Close the gas and oil supply to the burner.
3. Cut off the power to the burner.

9.2 Dismantling the burner

Required tools

- Mobile crane with adequate lifting capacity.
- Ring wrenches or adjustable spanners.
- Suitable hoisting equipment:
  - D-shackles
  - Round sling

To dismantle the burner:

1. Disconnect the cabling from the:
   a. Fan housing
   b. Gas train
   c. Control panel
   d. Boiler thermostat set
2. Remove the fan housing.
3. Disconnect the oil supply line from the combustor.
4. Disconnect the gas line adapter from the combustor.
5. Remove the combustor from the boiler.
6. Remove the boiler thermostat set.
7. Remove the Vitopack.
   or
   Remove the control panel and gas train.

9.3 Disposal

⚠CAUTION Separate and dispose the components of the burner into the applicable waste streams based on their material, in accordance with local regulations.

NOTICE All structural components of a Vitotherm automatic forced draught burner are made of powder-coated steel and should be disposed of accordingly.

For more information on how to properly dispose of supplier parts, please refer to the OEM manual.

10 Transport and storage

This section contains instructions and information on how to properly transport and store the burner.

10.1 Transport

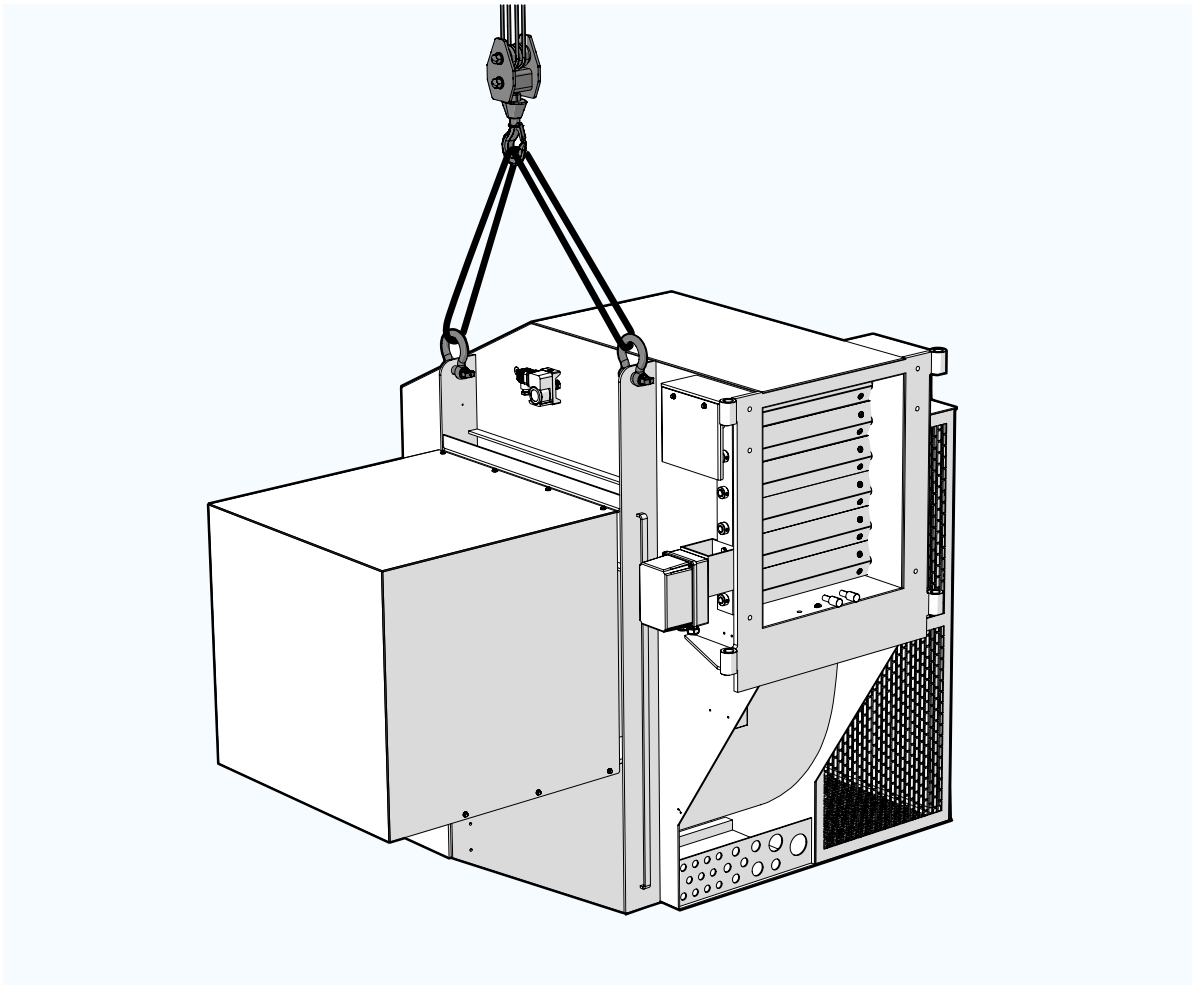
When transporting the components of the burner system separately, use suitable hoisting or lifting equipment.

⚠WARNING Heavy objects such as the fan housing and combustor may drop or topple when transported incorrectly.

- ▶ Use suitable lifting or hoisting equipment.
- ▶ Make sure no personnel is below or near the object when lifting or hoisting.

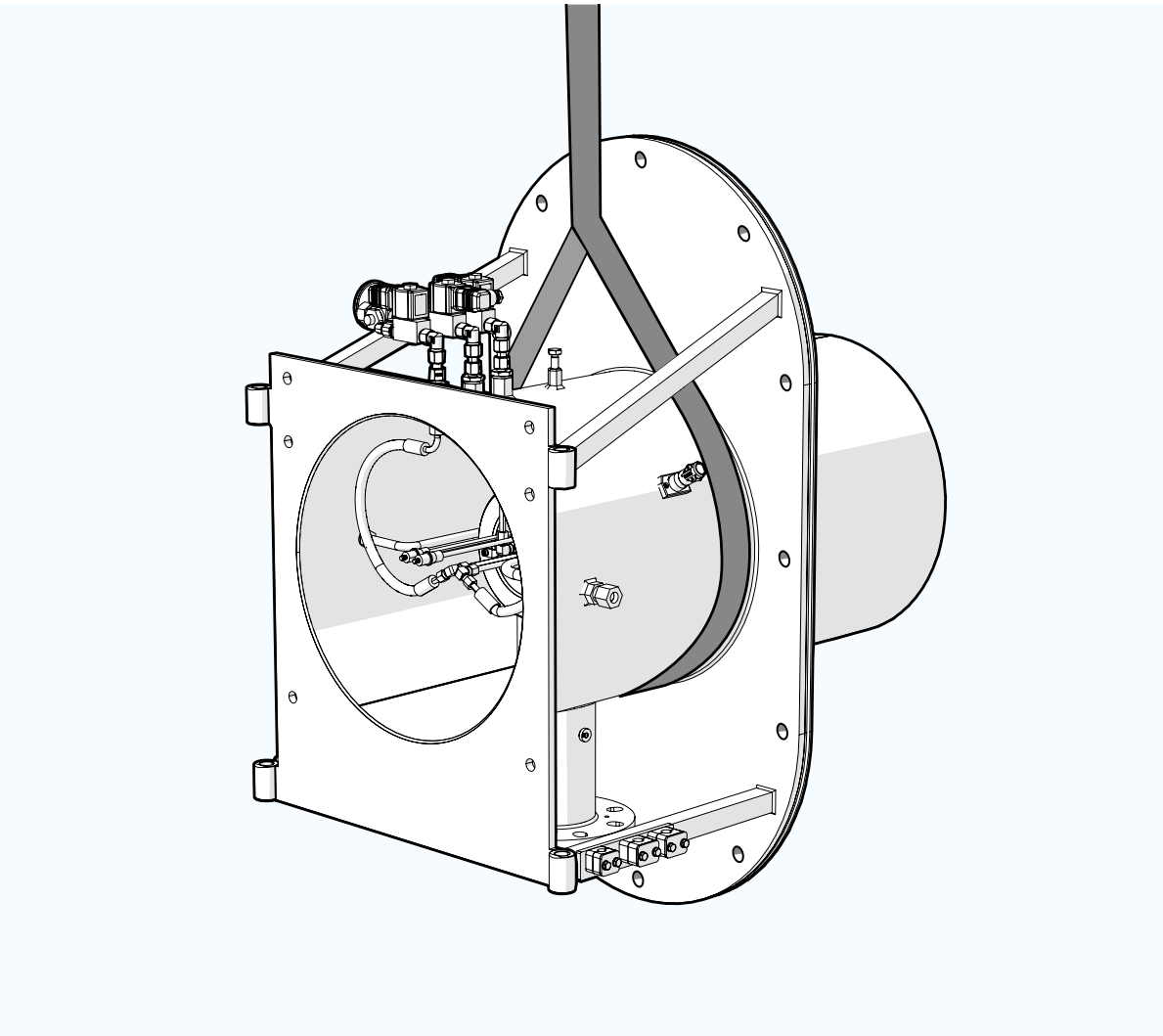
10.1.1 Fan housing

The fan housing of the burner is equipped with two holes, located above the centre of gravity. These holes can be used to attach D-shackles and round slings to hoist the housing.



10.1.2 Combustor

The combustor can be lifted with a hoisting sling. This sling should be attached to the housing of the combustor, between the flange and the back plate.

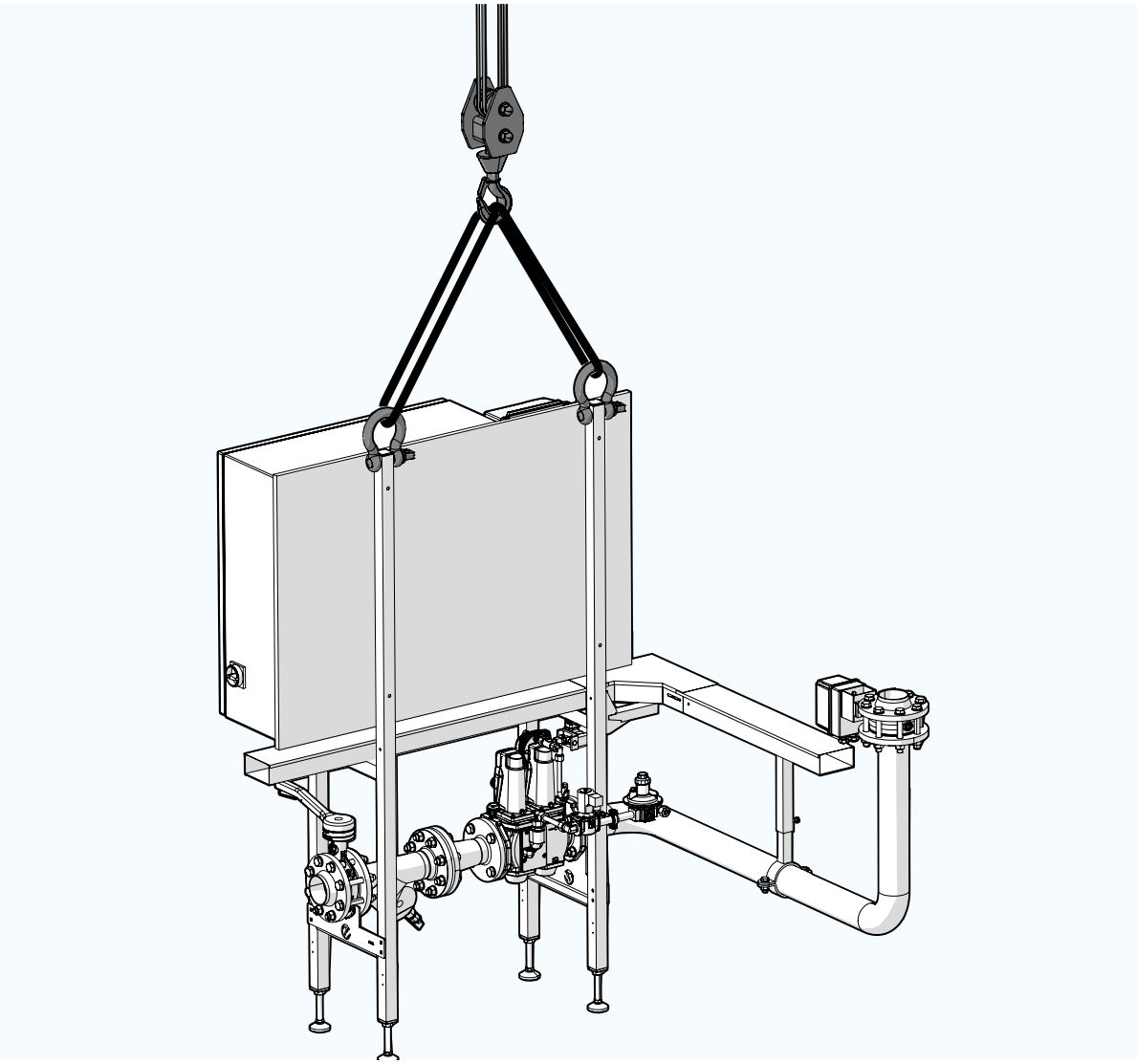


⚠WARNING Slings might shift due to hoisting movements, causing unforeseen movement or toppling of the combustor.

- ▶ Make sure that the sling is trapped in the combustor construction and cannot slide off.
- ▶ Do not attach slings to the open front section of the combustor, where the sling might slide off, or to the reinforcement bars.

10.1.3 Vitopack

The Vitopack is equipped with two holes at the top of the frame. These holes can be used to attach D-shackles and round slings to hoist the installation.



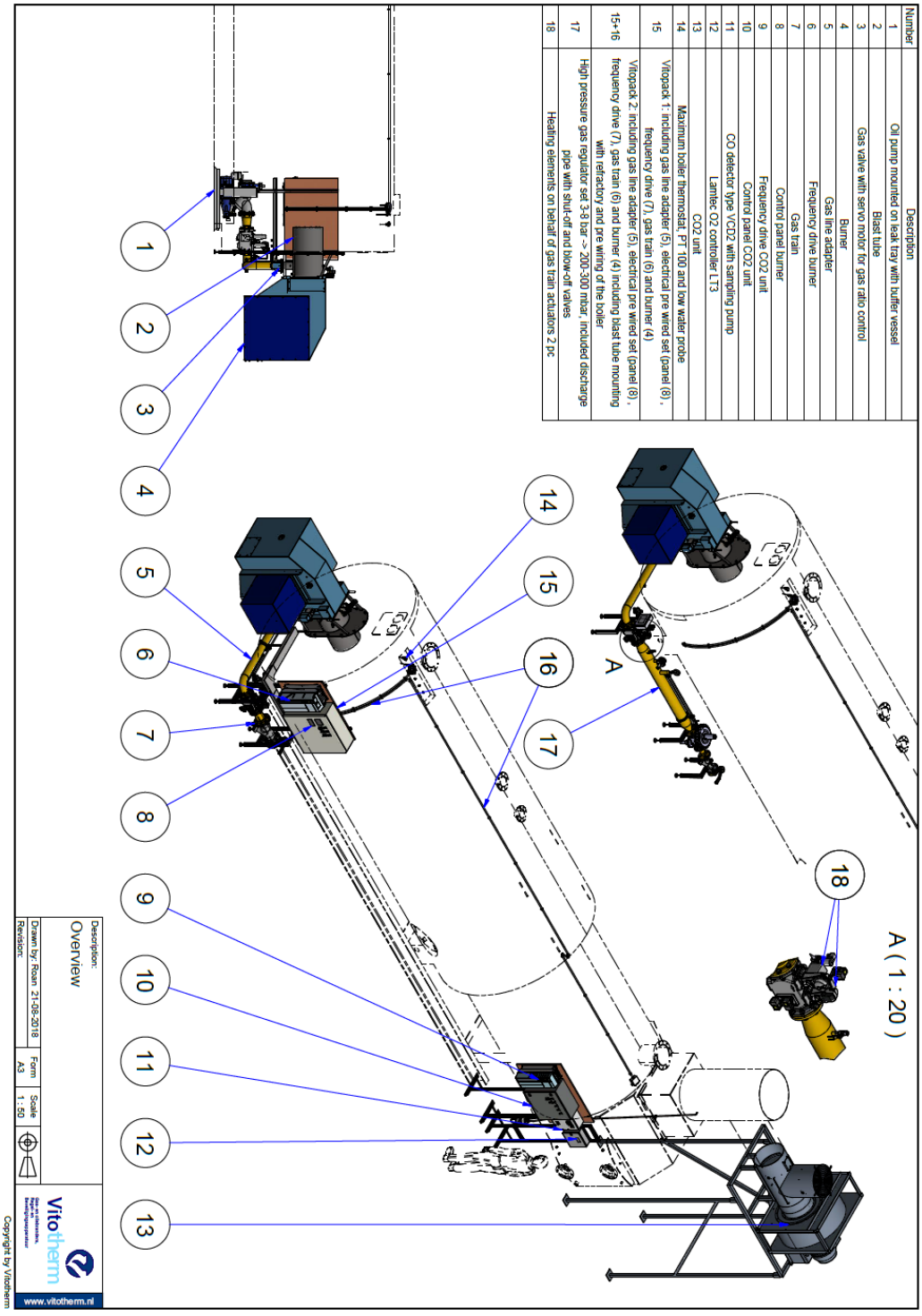
10.2 Storage

⚠CAUTION The steel components of the burner are sensitive to corrosion damage.

- ▶ Always store the burner in a dry, indoor location.
- ▶ Do not unpack the burner from the crate until you are ready to install it.

Appendices

A Burner system overview



B Declaration of conformity

Declaration of conformity

Manufacturer:	VITOTHERM B.V.							
Adress:	Overgauwseweg 8 2641NE Pijnacker							
Products:	Force draft burners							
Type:	**VITOTHERM B.V. burner types:**							
Gas burners:	VGIs-100	VGIs-150	VGIs-200	VGIs-250	VGIs-300	VGIs-350	VGIs-400	VGIs-450
	VGIs-500	VGIs-600	VGIs-700	VGIs-800	VGIs-1000	VGIs-1250	VGIs-1500	
Gas/oil burner:	VGOIs-100	VGOIs-150	VGOIs-200	VGOIs-250	VGOIs-300	VGOIs-350	VGOIs-400	VGOIs-450
	VGOIs-500	VGOIs-600	VGOIs-700	VGOIs-800	VGOIs-1000	VGOIs-1250	VGOIs-1500	
Oil burner:	VOIs-100	VOIs-150	VOIs-200	VOIs-250	VOIs-300	VOIs-350	VOIs-400	VOIs-450
	VOIs-500	VOIs-600	VOIs-700	VOIs-800	VOIs-1000	VOIs-1250	VOIs-1500	
Fuels:	Natural gas		LPG	LNG	BIO-gas	Light oil	BIO-oil	
	The suitability of fuels of different quality must be confirmed in advance by VITOTHERM B.V.							
Applications:	**VITOTHERM BURNERS are suitable for intermittent firing and continuous firing on:**							
	Warm-water / Hot-water Boilers , direct and indirect fired Steam Boilers Air Heaters direct and indirect fired Process applications							
Standards:	**Mentioned products are in compliance with the following technical standards:**							
	EN 267 EN 676 EN 746							
Directives:	**Mentioned products are according the following European directives:**							
	GAR 2016-426-EU MD 2006-42-EG PED 2014-68-EU EMC 2014-30-EU LVD 2014-35-EU CE-PIN 2009/142/EC							
NOx emission	**VITOTHERM B.V. declares that the mentioned Products comply with the following standards:**							
	BEMS 1. BImSchV NOx class 3							
Protection class IP:	**Degree of protection**							
	IP54	IP - EN 60529						
Marking of type plate:	**The burners are labelled with:**							
	CE mark CE Pin nr Identification No. of Notified Body EAC							

C Performance data (Imperial)

MONO-block low NOx gas burner

Type	Boiler capacity (n=93%)	Burner input	Control	Gas pressure	Max. boiler backpressure	Motor / drive power	Turn down	Consumption	Max. height
	HP	MMBTU	Gas	PSI	"wc	HP	Gas	Gas ($ft^{3)}$	ft
VGIs-100	119	4	Modulating	1,45-4,35	4,0	3,0	1:5	5015	1640
VGIs-150	178	6	Modulating	1,45-4,35	4,0	5,4	1:5	7522	1640
VGIs-200	237	9	Modulating	1,45-4,35	4,0	5,4	1:5	10029	1640
VGIs-250	296	11	Modulating	1,45-4,35	4,0	7,5	1:5	12537	1640
VGIs-300	356	13	Modulating	1,45-4,35	4,8	10,2	1:6	15044	1640
VGIs-350	415	15	Modulating	1,45-4,35	4,8	10,2	1:6	17198	1640
VGIs-400	474	17	Modulating	1,45-4,35	4,8	15,0	1:6	20059	1640
VGIs-450	534	19	Modulating	1,45-4,35	4,8	15,0	1:6	22566	1640
VGIs-500	593	21	Modulating	1,45-4,35	4,8	20,4	1:7	25073	1640
VGIs-600	711	26	Modulating	1,45-4,35	5,2	25,2	1:7	30088	1640
VGIs-700	830	30	Modulating	2,90-4,35	5,6	29,9	1:8	35103	1640
VGIs-800	948	34	Modulating	4,35	6,0	40,8	1:8	40117	1640
VGIs-1000	1186	43	Modulating	4,35	6,8	50,4	1:10	50147	1640
VGIs-1250	1423	51	Modulating	4,35	6,8	61,2	1:10	60176	1640

MONO-block low NOx gas & emergency back-up oil burner

Type	Boiler capacity (n=93%)	Burner input	Control		Gas pressure	Max boiler backpressure	Motor/drive power	Turn down		Con-sumption	Max. height
	HP	MMBTU	Gas	Oil	PSI	"wc	HP	Gas	Oil	Gas ($ft^{3)}$	ft
V(G)OIs-100	119	4	Modulating	2-stage	1,45-4,35	4,0	3,0	1:5	1:2	5015	1640
V(G)OIs-150	178	6	Modulating	2-stage	1,45-4,35	4,0	5,4	1:5	1:2	7522	1640
V(G)OIs-200	237	9	Modulating	2-stage	1,45-4,35	4,0	5,4	1:5	1:2	10029	1640
V(G)OIs-250	296	11	Modulating	2-stage	1,45-4,35	4,0	7,5	1:5	1:2	12537	1640
V(G)OIs-300	356	13	Modulating	2-stage	1,45-4,35	4,8	10,2	1:6	1:2	15044	1640
V(G)OIs-350	415	15	Modulating	2-stage	1,45-4,35	4,8	10,2	1:6	1:2	17198	1640
V(G)OIs-400	474	17	Modulating	2-stage	1,45-4,35	4,8	15,0	1:6	1:2	20059	1640
V(G)OIs-450	534	19	Modulating	2-stage	1,45-4,35	4,8	15,0	1:6	1:2	22566	1640
V(G)OIs-500	593	21	Modulating	2-stage	1,45-4,35	4,8	20,4	1:7	1:2	25073	1640
V(G)OIs-600	711	26	Modulating	2-stage	1,45-4,35	5,2	25,2	1:7	1:2	30088	1640
V(G)OIs-700	830	30	Modulating	2-stage	2,90-4,35	5,6	29,9	1:8	1:2	35103	1640
V(G)OIs-800	948	34	Modulating	2-stage	4,35	6,0	40,8	1:8	1:2	40117	1640
V(G)OIs-1000	1186	43	Modulating	2-stage	4,35	6,8	50,4	1:10	1:2	50147	1640
V(G)OIs-1250	1423	51	Modulating	2-stage	4,35	6,8	61,2	1:10	1:2	60176	1640

MONO-block low NOx gas & long term oil dual fuel burner

Type	Boiler capacity (n=93%)	Burner input	Control		Gas pressure	Max. boiler back-pressure	Motor / drive power	Turn down		Con-sumption	Max. height
	HP	MMBTU	Gas	Oil	PSI	"wc	HP	Gas	Oil	Gas (ft³)	ft
V(G)OIs-100	119	4	Modulating		1,45-4,35	4,0	3,0	1:5	1:5	5015	1640
V(G)OIs-150	178	6	Modulating		1,45-4,35	4,0	5,4	1:5	1:5	7522	1640
V(G)OIs-200	237	9	Modulating		1,45-4,35	4,0	5,4	1:5	1:5	10029	1640
V(G)OIs-250	296	11	Modulating		1,45-4,35	4,0	7,5	1:5	1:5	12537	1640
V(G)OIs-300	356	13	Modulating		1,45-4,35	4,8	10,2	1:6	1:5	15044	1640
V(G)OIs-350	415	15	Modulating		1,45-4,35	4,8	10,2	1:6	1:5	17198	1640
V(G)OIs-400	474	17	Modulating		1,45-4,35	4,8	15,0	1:6	1:5	20059	1640
V(G)OIs-450	534	19	Modulating		1,45-4,35	4,8	15,0	1:6	1:5	22566	1640
V(G)OIs-500	593	21	Modulating		1,45-4,35	4,8	20,4	1:7	1:5	25073	1640
V(G)OIs-600	711	26	Modulating		1,45-4,35	5,2	25,2	1:7	1:5	30088	1640
V(G)OIs-700	830	30	Modulating		2,90-4,35	5,6	29,9	1:8	1:5	35103	1640
V(G)OIs-800	948	34	Modulating		4,35	6,0	40,8	1:8	1:5	40117	1640
V(G)OIs-1000	1186	43	Modulating		4,35	6,8	50,4	1:10	1:5	50147	1640
V(G)OIs-1250	1423	51	Modulating		4,35	6,8	61,2	1:10	1:5	60176	1640

D Checklist Periodic Maintenance

Vitotherm	Vitotherm B.V. Overgauwseweg 8 2641 NE Pijnacker **tel: +31153694757** Netherlands www.vitotherm.nl	**Location name:** **Burner type:** **Serial number:** **Customer reference:** **Excecuted by (name):** **Date:**	

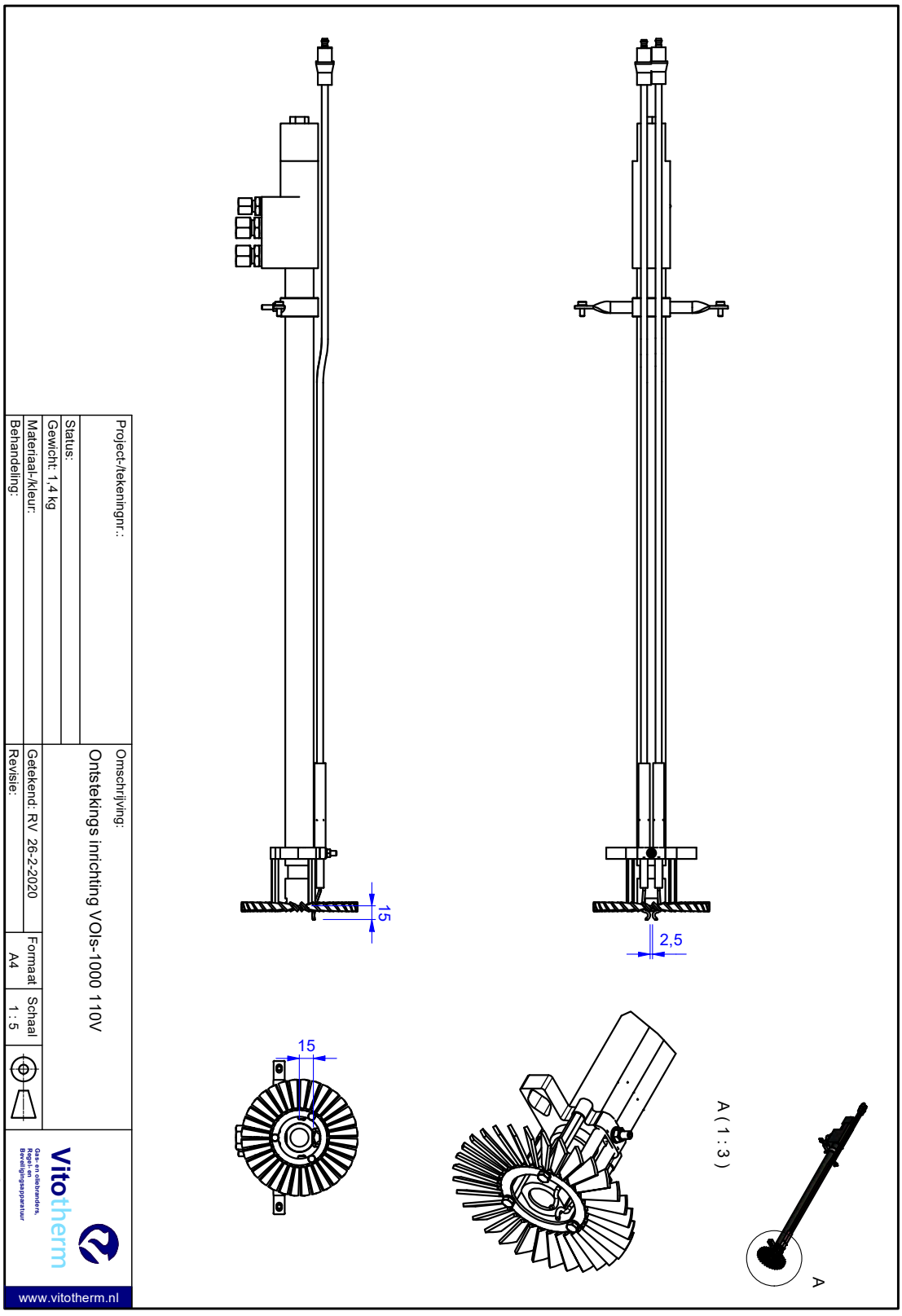
General preventive guidelines (M&E) for a Vitotherm burner installation on a hot water boiler

Control panel	Check status Burner flame controller unit	**Burner unit**	Check all components are sure
	Check status flame amplifier		Check burner ignition system
	Check if copy of the program is made		Check and clean igniters, replace if required
	Check visual of electrical connections		Check condition of burner head
	Check cables for any sign of overload / burning		Check injectors on condition
	Check fuses circuit breakers rating correct		Check connectors
	Check for correct operation of timers		Check / clean oil nozzles
	Check operation of alarms on panel		Check ignition transformer
	Check switch computer funtional or manual use burner		Check and clean UV / IR scanner
	Check fuel interlocks	**Motor**	Check and clean wheel
Air transport	Check modulation motor air damper		Check and clean air intake
	Check free movement of air dampers		Check / remove status soundproofing material
	Check and clean air dampers		Check bearings (noise and flexibility)
	Check soundness shipments		Check RPM sensor, mounting correct ?
Converter	Check display function	**Gastrain**	Check general status gas train
	Check if copy of settings is made		Check operation of gas train
Measuring nipples closed	Checked ?		Check shutters and components for leak
			Check pilot valves on function
			Check main valves on function
			Check Leaktest

High pressure Gas regulator	Check if pressure output is stable	-	mbar
	Check Pressure relief setting and status	-	mbar
	Check Pressure exhaust setting and status	-	mbar
Pressure switches	Check LD Minimum gas pressure switch before gas valves	-	mbar
	Check LD1 minimum gas pressure switch after gas valves	-	mbar
	Check LD2-L Air pressure switch	-	mbar
	Check LD2-H Air pressure switch	-	mbar
	Check LT Leaktest control switch	-	mbar
	Check HD maximum gas pressure switch after gas regulator	-	mbar
	Check HD1 / Start maximum gas pressure switch after gas valves	-	mbar
Switches (if pressent)	Check ES-1 next to butterfly gas valve.	-	Setting < 10% closed position
	Check ES-2 in to the main gas valve	-	Setting < 2% above closed pos.
	Check ES-3 next to the air damper open position.	-	Setting < 90% open position
	Check ES-4 next to the air damper closed position.	-	Setting < 10% closed position
Boiler safety switches	Check Maximum boiler temperature thermostat		Setting < 110 °C
	Check Minimum liquid level switch (low water probe)		resistent Ω
	Check Maximum boiler pressure switch		Setting < 3 Bar
	Check Minimum boiler pressure switch		Setting > 0,2 Bar
	Check Shuntpump is running at burner release		
CO2	Check visual valve motor condition		
	Check valve connection okay ?		
	Check pipes connected well on the fan?		
Temperature safety	Check Maximum temperature CO2		Setting < 65°C
Pressure switch	Check LD2-CO2 Air pressure switch	-	mbar
Switches (if pressent)	Check Valve not closed ES6		Setting < 15% closed position
CO detection	Check for correct operation and status		
	Check pump operation		
	Check sensor with 100 ppm CO gas		
	Check pump pressure switch		
Condensor	Check if condensation tray is clean		
	Check if drain pipe is clean		
	Check if damper is movable		
Temperature safety	Check Maximum temperature condensor		Setting < 95°C
Pressure switch	Check HD condensor maximum pressure switch by condensor	-	mbar
	Check Pump running at burner release		
Oil	Check oilpump visual on status and running		
	Check for leaks		
	Check filter is clean		
	Check operation of solenoid valves		
Pressure switches (if pressent	Check Maximum oil pressure switch	-	bar
	Check Minimum oil pressure switch	-	bar
Switches (if present)	Check ES condensor valve position oil		Setting < 85% open;
			Blocking oil function when chimney not open
Flue gas emmissions	Check O2		>< %
	Check CO		< ppm
	Check NOx		< ppm
	Check flue gas temperature		< °C

Notes:	

E Ignition electrodes spacing



Notes

Vitotherm BV
Overgauwseweg 8
2641 NE Pijnacker
T (+31) 015 369 47 57
info@vitotherm.nl
www.vitotherm.nl

rev-07_August 2021