

Start-up, Maintenance and Service Instructions

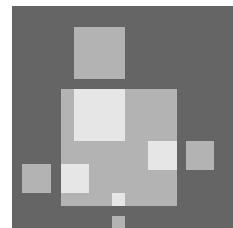
VIESSMANN

Please file in Service Binder

Oil Chassis Burner-V, VEC Series

for Vitola 200 VB2 series hot water heating boiler
Input capacities 83 to 219 MBH (24 to 64 kW)

Oil Chassis Burner-V



IMPORTANT

Read and save these instructions
for future reference.

Summary of Important Requirements

Safety Terminology

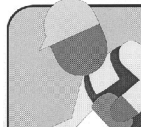
Safety, Installation and Warranty Requirements

Please ensure that this manual is read and understood before commencing installation. Failure to comply with the issues listed below and details printed in this manual can cause **product/property damage, severe personal injury, and/or loss of life**. Ensure all requirements below are understood and fulfilled (including detailed information found in manual subsections).

■ Licensed professional heating contractor

The installation, adjustment, service, and maintenance of this equipment *must* be performed by a licensed professional heating contractor.

Please see section entitled "Safety" in Installation Instructions.



■ Contaminated air

Air contaminated by chemicals can cause by-products in the combustion process which are *poisonous* to inhabitants and destructive to Viessmann equipment.

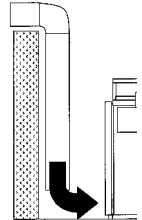
For a listing of chemicals which cannot be stored in or near the boiler room, please see manual entitled "Installation Instructions".



■ Fresh air

This equipment requires fresh air for safe operation and must be installed ensuring provisions for *adequate combustion and ventilation* air exist.

For information pertaining to the fresh air requirements of this product, please see manual entitled "Installation Instructions".



■ Product documentation

Read all applicable documentation before commencing installation. Store documentation near boiler in a readily accessible location for reference in the future by service personnel.

For a listing of applicable literature, please see section entitled "Safety".



■ Carbon monoxide

Improper installation, adjustment, service and/or maintenance can cause flue products to flow into living space. Flue products contain *poisonous* carbon monoxide gas.

For information pertaining to the proper installation, adjustment, service and maintenance of this equipment to avoid formation of carbon monoxide, please see section entitled "Values for Burner Calibration" in Start-up, Maintenance and Service Instructions.



■ Equipment venting

Never operate boiler without an *installed venting system*. An improper venting system can cause carbon monoxide poisoning.

For information pertaining to venting and chimney requirements, please see Installation Instructions of the boiler. All products of combustion must be safely vented to the outdoors.



■ Advice to owner

Once the installation work is complete, the heating contractor must familiarize the system operator/ultimate owner with all equipment, as well as safety precautions/requirements, shut-down procedure, and the need for professional service annually before the heating season begins.



WARNING

Installers must follow local regulations with respect to installation of carbon monoxide detectors. Follow manufacturer's maintenance schedule of boiler.

■ Warranty

Information contained in this and related product documentation must be read and followed. *Failure to do so renders warranty null and void.*



Safety Terminology

The following terms are used throughout this manual to bring attention to the presence of potential hazards or important product information. **Please heed the advice given!**



DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death, serious injury or substantial product/property damage.



WARNING

Indicates an imminently hazardous situation which, if not avoided, could result in death, serious injury or substantial product/property damage.



CAUTION

Indicates an imminently hazardous situation which, if not avoided, may result in minor injury or product/property damage.

IMPORTANT

Helpful hints for installation, operation or maintenance which pertain to the product.

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1.1 Customer Site Information

1.2 Maintenance Record

1.1 Customer Site Information

Site:	Boiler:	Burner:
Name:	Mfr.: Viessmann	Mfr.: Viessmann
Street:	Series:	Series: VEC
City:	Heating Input: MBH	Heating Input: MBH
	Model No.:	Model No.:

Installing Contractor:

Name:

Street:

City:

Tel.:

Date:

1.2 Maintenance Record

Annual service should include:

1. Cleaning and vacuuming of boiler heat exchanger.
2. Replacement of oil nozzle, filter cartridge and O-ring.
3. Inspection of venting system and oil supply lines. Ensure adequate supply of fresh combustion air.

Please complete Maintenance Table on following page to ensure warranty coverage.

Burner Models

(use only Vitola 200 boiler models listed below)

Burner	Model No.	VEC-O-18	VEC-O-22	VEC-O-33	VEC-O-40	VEC-O-50	n.a.
Boiler	Model No.	VB2-18	VB2-22	VB2-33	VB2-40	VB2-50	VB2-63
Input	MBH	83	107	135	170	219	n.a.
	kW	24	31	39	50	64	
Output	MBH	72	92	116	146	189	n.a.
	kW	21	27	34	43	55	

The Viessmann VEC series Oil Chassis Burner-V is only intended for use with the Vitola 200 VB2 series hot water heating boiler. Do not overfire or underfire burner. Each burner/boiler is only certified for the input shown above.

Maintenance

Burner calibration must be verified according to Section 4.2 during annual service.

_____	_____	_____
20.....	20.....	20.....
_____	_____	_____
Service Company:	Service Company:	Service Company:

.....			
Technician	Date	Technician	Date
_____	_____	_____	_____
.....			
Service Company:	Service Company:	Service Company:	Service Company:

.....			
Technician	Date	Technician	Date
_____	_____	_____	_____

WARNING

The service procedures described in this manual must be performed by a licensed and authorized service technician only!

2.1 Safety

2.2 Necessary Tools

2.1 Safety



Take note of all symbols and notations intended to draw attention to potential hazards or important product information. These include "DANGER", "WARNING", "CAUTION", and "IMPORTANT". See page 2 for details.

Working on the equipment

All personnel working on the equipment or the heating system must have the **proper qualifications** and hold all necessary licenses.

Ensure **main power** to equipment, heating system, and all external controls has been **deactivated. Close main oil supply valve.** Take precautions in both instances to avoid accidental activation of power during service work.

We offer frequent installation and service seminars to familiarize our partners with our products. Please inquire.

2.2 Necessary Tools

Tools

- Assortment of screwdrivers
- Assortment of metric wrenches
- Assortment of Metric Allen keys
- Viessmann Allen key with T-handle

Technical information

Literature applicable to maintenance/service of the Oil Chassis Burner-V:

- Installation Instructions
- Start-up, Maintenance and Service Instructions
- Operating Instructions and User's Information Manual
- Parts List

Parts

Components included with power oil burner:

- Oil filter assembly
- Oil nozzle (see table on page 7)
- Flexible supply and return lines
- Single-pipe conversion copper tee
- Blower motor
- Oil primary ignition control
- CAD cell
- Ignition electrode
- Ionization electrode
- Ignition transformer

Testing/analysis equipment

(use only calibrated equipment)

- Instruments to measure 0 - 15.0% CO₂ or 0 - 21.0% O₂ such as Bacharach Fyrite gas analyzer or suitable electronic combustion analyzer
- Multimeter to measure 0 - 120 VAC, 0 - 12 AAC, and 0 - 300 microamps DC
- Oil pressure gage 0 - 200 psig / 0 - 14 bar
- Oil vacuum gage 0 - 30" Hg
- Stack thermometer 0 - 500 °F / 0 - 260 °C such as Bacharach Tempoint thermometer, model 12-7014
- Bacharach smoke spot tester
- Draft gage to measure breeching draft and overfire draft
- Carbon monoxide measuring equipment (0 - 400 ppm) such as Bacharach Monoxor (glass tube indicators with manual sample pump), Monoxor II electronic CO gas analyzer specifically for CO only. The CO cell on a suitable electronic combustion efficiency analyzer will also measure CO in the range 0 - 400 ppm.

Cleaning supplies

- Hand brush
- Rags
- Vacuum cleaner



CAUTION

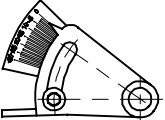
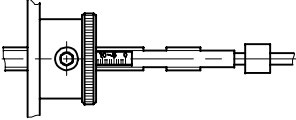
Use only Viessmann original components when replacing defective parts. Installation of incorrect replacement parts can cause hazardous operation.

Order replacement components from your Viessmann distributor.

The above listed parts represent a recommended spare parts list.

For a complete listing of replacement components, please see separate Parts List.

3.1 Values for Burner Calibration

Burner Model	Model No.	VEC-O-18	VEC-O-22	VEC-O-33	VEC-O-40	VEC-O-50	n.a.
Boiler	Model No.	VB2-18	VB2-22	VB2-33	VB2-40	VB2-50	VB2-63
Input	MBH	83	107	135	170	219	n.a.
	kW	24	31	39	50	64	
Burner nozzle							
Mfr. Steinen	GPH	0.50x45xS	0.65x45xS	0.75x45xS	1.00x45xS	1.25x45xS	n.a.
Oil pressure	psig	145	145	170	165	170	n.a.
Nozzle oil flowrate *	GPH	.59	.76	.96	1.21	1.56	n.a.
Air pressure	" w.c.	1.3	1.2	1.3	1.2	1.2	n.a.
Air intake settings (primary air gate)		6	7	9	9	11 - 12	n.a.
							
Drawer assembly (turbulator)	mm	3	7	10	8	11	n.a.
							

* based on 140 MBH per U.S. gallon

Acceptable combustion measurements are: 11.5 to 13.5 % CO₂, 0 to 1 smoke spot, 200 to 350 °F gross flue gas temperature, -0.02 to -0.04" w.c. chimney draft, 0 - 50 ppm CO, +0.01 to +0.04" w.c. positive overfire.

Field Calibration

The above values for oil pressure, air intake and drawer assembly settings are the result of production line testing under ideal conditions.

Burner has been factory tested to provide operation without flame failure at initial field start-up.

Final burner adjustment to suit local field conditions is necessary for safe operation. The above burner adjustment values serve as a starting point only. Follow procedures in Section 3.3.

Combustion results must be field verified using properly calibrated Bacharach or equivalent instruments.

Each boiler/burner combination is certified for one input only. Do not overfire or underfire boiler/burner combination.

Field tests may result in no change of the factory settings or may result in a change to one or more of oil pressure, air gate or drawer assembly. Failure to properly calibrate burner can result in hazardous operation which could cause carbon monoxide poisoning. Refer to factory test sheet shipped with burner for factory test results.

Cold oil from an outside storage tank can cause difficulty in calibrating burner.

3.1 Values for Burner Calibration

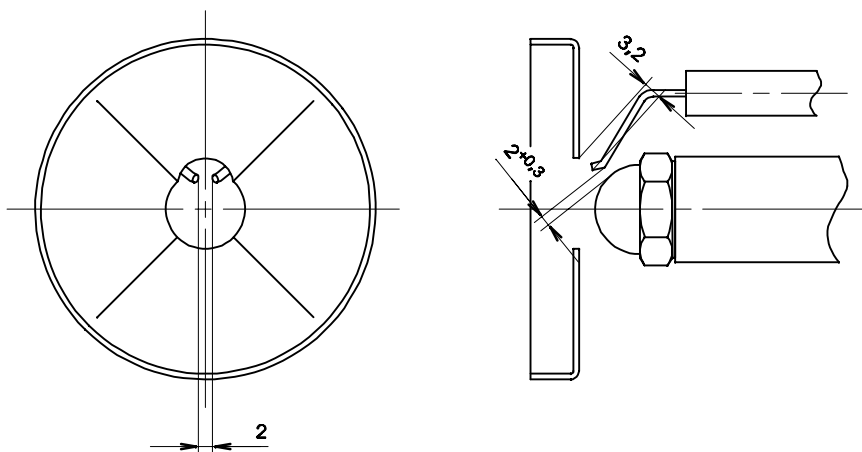
Ignition electrode and observation port

VEC-O-18, VEC-O-22, VEC-O-33

(turbulator - 60 mm outer diameter)

VEC-O-40, VEC-O-50

(turbulator - 80 mm outer diameter)



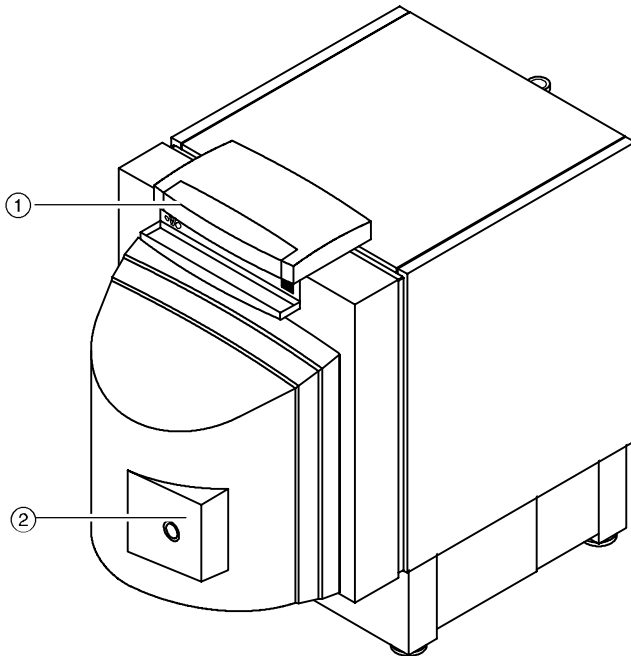
IMPORTANT

All dimensions are in mm.

IMPORTANT

Electrode spannings are set at factory when installed on burner. Replacement electrodes must be set by service technician.

3.2 Start-up

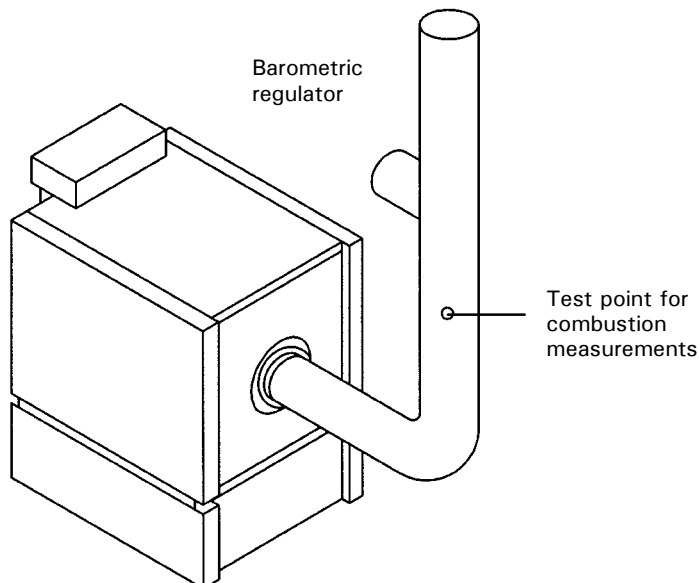


1. Ensure stainless steel combustion chamber is installed properly.
2. Ensure proper pressure in heating system and oil supply.
3. Open shut-off valves located near the oil tank and the filter. Ensure oil lines and oil filter are properly charged with fuel oil.
4. Activate main power.
5. Activate system switch on boiler control. Burner operation is indicated by control ①. The burner reset button ② serves as a self-illuminated flame failure indicator. If flame failure occurs, push this button. Do not push reset button more than three times.

CAUTION

When the boiler is fired for the first time, the ceramic fiber insulation on the back of the combustion chamber door will require ½ to 1 hour of firing time to "cure". An odor will occur during this time. If possible, homeowners should not be at home so as to avoid the odor during the initial firing. Final combustion measurements must be done only after the "cure" is complete.

3.3 Burner Calibration



Ensure vent pipe is mounted and sealed properly with boiler. Inaccurate measurements result if fresh air is drawn into flue. Drill holes through round cast-iron flue collar on boiler. Silicone inside of vent pipe. Connect vent pipe to boiler with three sheet metal screws ensuring silicone completely seals the connection. Only use high temperature silicone.

For optimal initial burner calibration, measure combustion products of hot burner (minimum 2 minute activation and 140 °F / 60 °C boiler water temperature). These include CO, CO₂ flue gas temperature, room temperature, chimney draft and smoke spot number.

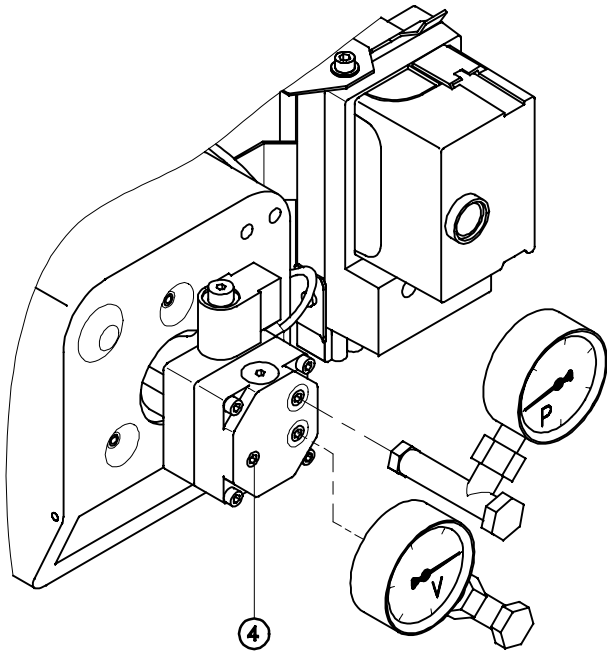
If necessary, the oil pressure or the air intake may be adjusted (both factory preadjusted).

The combustion measurement opening (approx. 3/8" / 10 mm Ø) should be distanced about two to three vent pipe diameters behind the boiler. Take measurements before dilution air.

Record combustion product values in a log book. Refer to Section 4.2. Burner calibration should be performed once a year before the heating season begins.

3.3 Burner Calibration

Regulating oil pressure and testing for vacuum



Suntex oil pump, Model AL 35

Values for burner calibration
see page 7.

1. Remove "P" plug from oil pump.
2. Remove "V" plug from oil pump.

IMPORTANT

Ensure seals of plugs are not caught in the threads.

3. Mount oil pressure gage (measurement capacity 0 - 25 bar / 0 - 200 psig) and vacuum gage (measurement capacity 0 - 1 bar / 0 - 30" Hg); do not use thread sealant when connecting gages. Thread sealants may damage pump. Use copper washers only for pressure tight seal.
4. Activate burner.
5. After magnetic valve opens, take reading of oil pressure and vacuum from manometer and vacuum gage (vacuum less than 0.3 bar / 8.8" Hg).
6. If necessary, oil pressure can be adjusted via set screw ④.
Turn right → pressure increases.
Turn left → pressure falls.
See Section 3.1 for correct pressures.
7. After setting the oil pressure, measure and record a preliminary value of flue gas temperature.
8. After calibration, remove oil pressure gage and vacuum gage.
9. Install "P" and "V" plugs.

IMPORTANT

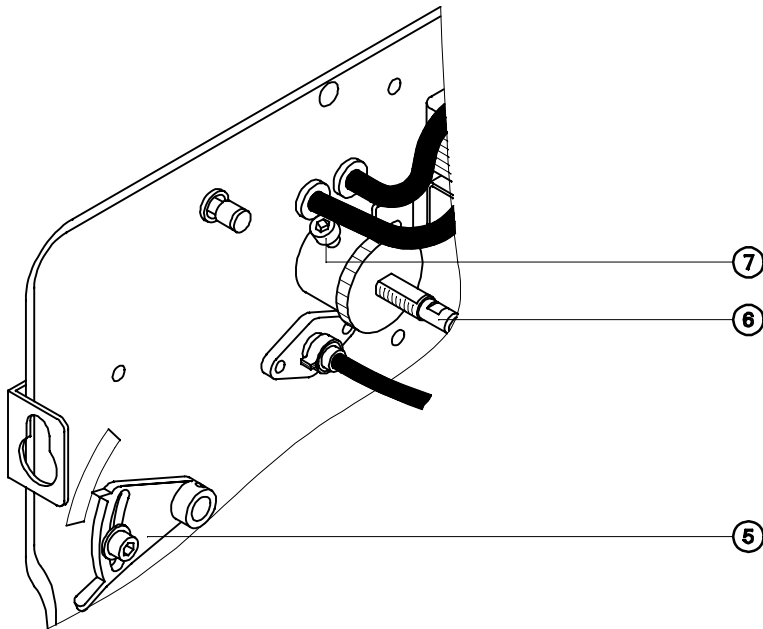
Ensure plug seal rings are not damaged.
Replace damaged rings.

10. Activate burner and ensure plugs seal fully.

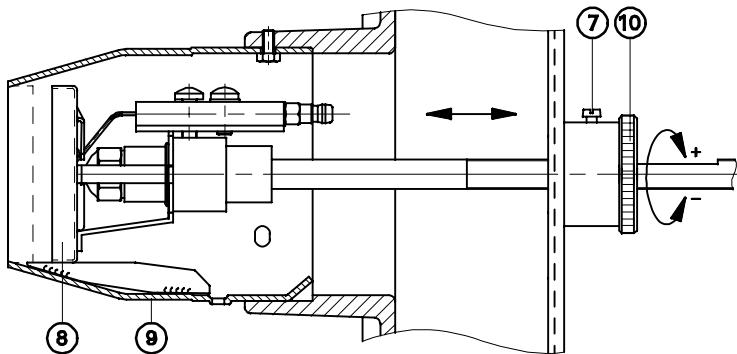
IMPORTANT

- 1 bar = 14.5 psig
= 29.52" Hg (inches of mercury)
= 76 cm Hg

Air adjustment



Air intake is regulated by the air gate



The drawer assembly enables fine adjustments to the air intake

The burner air intake is adjustable in two fashions:

1. **Air gate** ⑤ on the discharge side of the fan regulates air intake (factory preadjusted).
2. **Drawer assembly** ⑥ is a fine adjustment regulating air intake.

Values for burner calibration
see page 7.

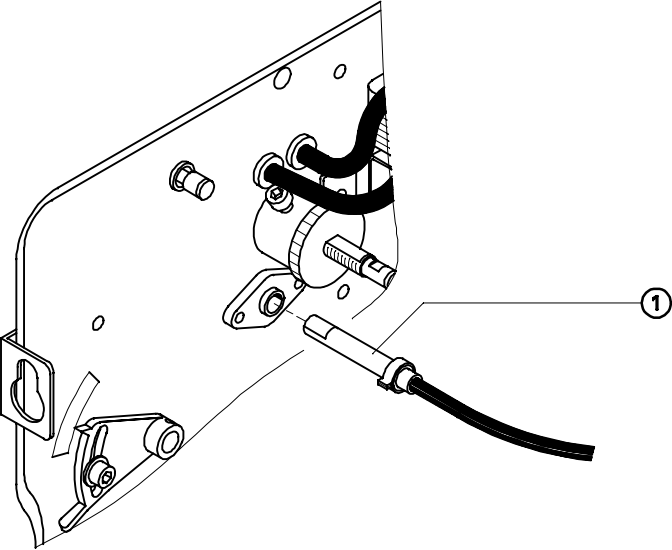
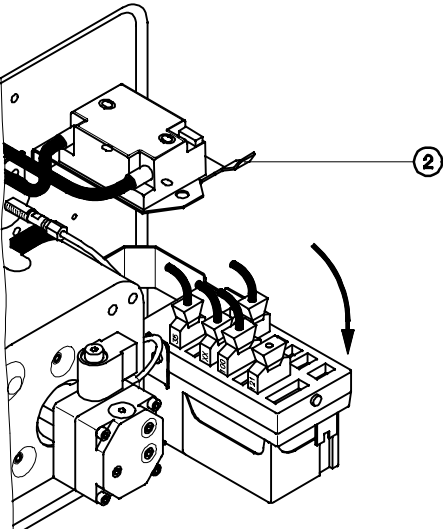
When starting up the burner, it will be necessary to fine-tune the air intake using the drawer assembly. The procedure is as follows:

1. Loosen set screw ⑦.
2. To adjust the position of the turbulator ⑧ in the blast tube ⑨, turn turbulator insertion adjustment screw ⑩:
Turn right → larger diameter → more air,
Turn left → smaller diameter → less air.
3. Tighten set screw ⑦.

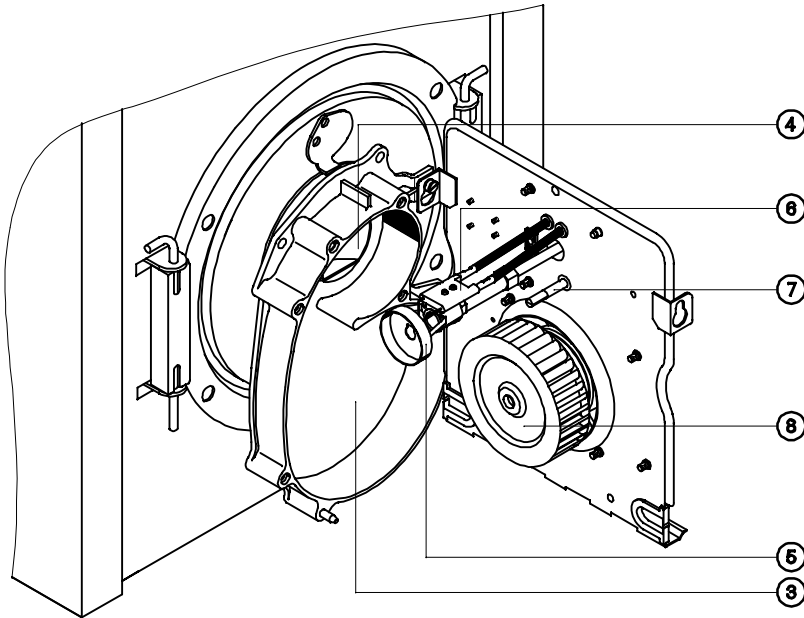
When making large adjustments, consult **Values for Burner Calibration** on page 7.

4.1 Maintenance Procedures

4.1 Maintenance Procedures

	20	20				
1. Burner measurements taken, calibration values recorded	Record values on page 15. Vent pipe must be securely fastened and sealed to boiler flue collector collar. Values invalid if fresh air enters vent system.					
2. Testing operation of flame sensor	Remove flame sensor ① from sensor well while burner is activated. Removal should cause flame to extinguish, necessitating the reset process.					
						
3. Shut-down of system	1. Deactivate main power ensuring it cannot be reactivated accidentally. 2. Disconnect 41 plug. 3. Close oil supply valve (near oil filter).					
4. Testing electrical connections	1. Lift control release ② and fold oil primary ignition control and subbase in service position. 2. Ensure all electrical plug connections are seated securely.					
						
IMPORTANT Landis & Gyr LOA24 ignition control may be removed from subbase by depressing the two metal clips on top and bottom of control with small flathead screwdriver, and pulling the control forwards using moderate force.						

5. Cleaning burner



1. Hang burner in service position.

2. Clean housing (3), inside blast tube (4), turbulator (5), ignition electrodes (6), flame sensor (7) and fan wheel (8).

To clean combustion chamber and flue gas passageways, please consult boiler service checklist.

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6. Ensure blast tube is properly secured

See diagram in 5.

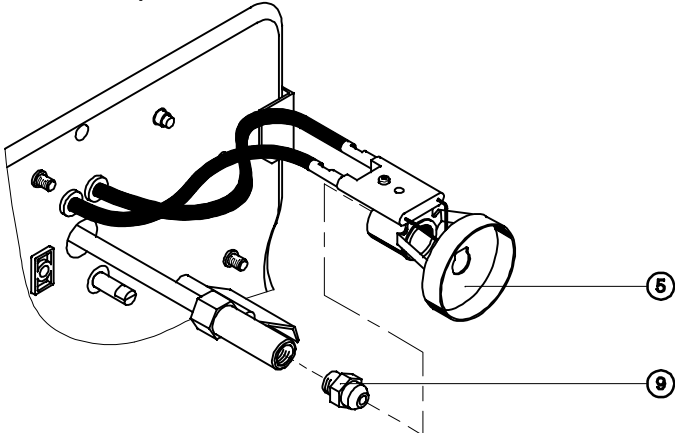
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7. Ensure fan blower wheel is properly secured

See diagram in 5.

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8. Nozzle replacement



1. Remove turbulator (5) from drawer assembly.

2. Remove nozzle (9) from drawer assembly.

3. Install new nozzle in drawer assembly. Avoid trapping air. For manufacturers and models, see page 7.

4. Install turbulator. Position nozzle in middle of turbulator, carefully observing the required distance between the turbulator and the nozzle.

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9. Testing and calibrating ignition electrodes

If necessary, replace ignition electrodes. See page 7 for calibration values.

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10. Mount burner on burner chassis

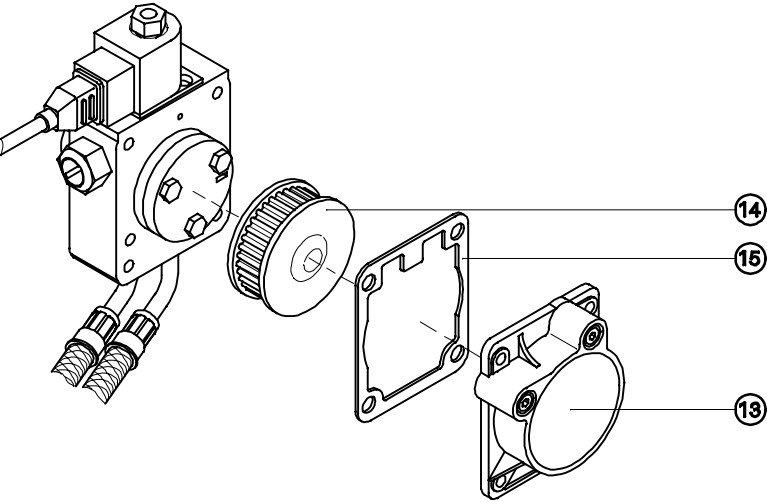
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4.1 Maintenance Procedures

	20	20				
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11. Clean oil pump filter, replace if necessary

Suntec oil pump, Model AL 35



- 1. Remove 4 screws of pump housing and remove pump cover 13.
- 2. The oil filter 14 may be cleaned with regular fuel oil or replaced depending on its condition.
- 3. Replace seal 15 of cover 13 during reassembly.

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12. Replace filter cartridge and O-ring

☐	☐	☐	☐	☐	☐
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13. Activate system

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14. Ensure no leaks exist in oil lines and connections

Air pockets in the prefilter are an indication of leaks in the preceding fuel train. Ensure all fuel lines and connections seal tightly. Leaks in the oil lines draw in air, causing incomplete combustion.

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15. Calibrate burner. Record settings and measurements.

Record actual values on page 15. (Optimum values on page 7).

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4.2 Settings and Measurements

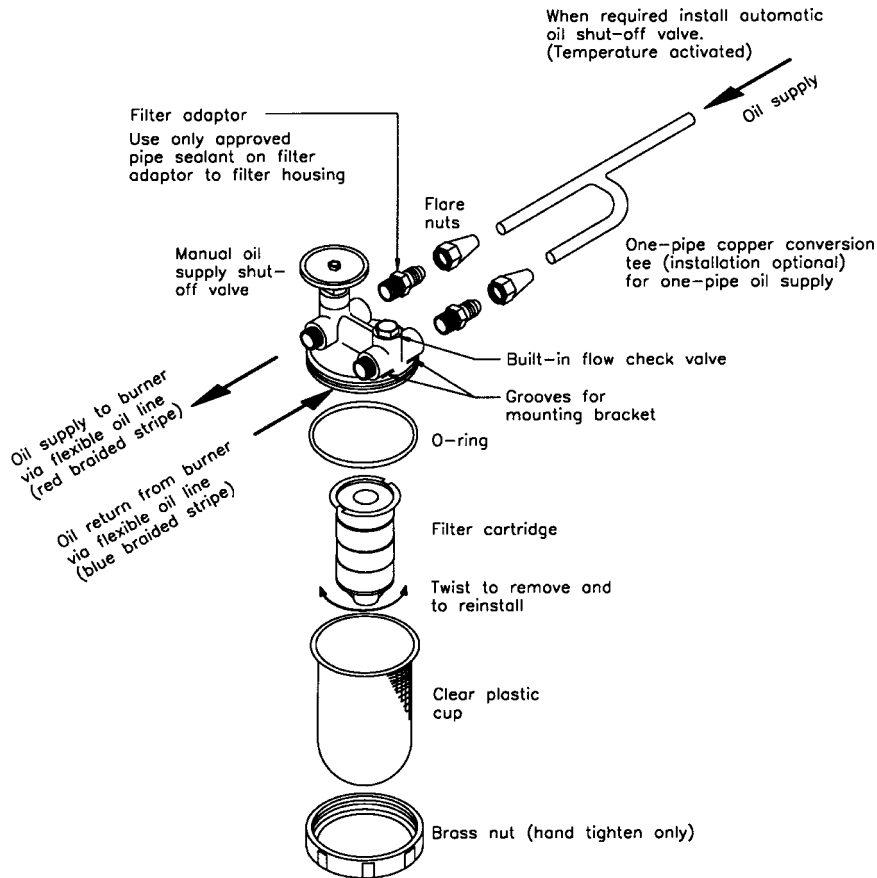
Acceptable combustion measurements are given on page 7.

	20.....	20.....				
1. Oil pressure in psig	tested values					
	values after adjustment					
2. Vacuum pressure in " Hg	tested values					
	values after adjustment					
3. Smoke spot number (0 - 1)	tested values					
	values after adjustment					
4. ☐ Carbon dioxide (CO₂) in % or ☐ Oxygen (O₂) in %	tested values					
	values after adjustment					
5. Flue gas temperature (gross) in ☐ °F or ☐ °C (please indicate) Gross temperature is the measured value. Net flue gas temperature is gross flue gas temperature minus temperature of combustion air.	tested values					
	values after adjustment					
6. Flue gas loss in % (based on net flue gas temperature)	tested values					
	values after adjustment					
7. Combustion efficiency	tested values					
	values after adjustment					
8. Chimney draft in " w.c. * (at flue gas outlet from boiler, prior to barometric damper)	tested values					
	values after adjustment					
9. Drawer assembly calibration (numbered scale on drawer assembly)	tested values					
	values after adjustment					
10. Air gate setting (numbered scale on air gate)	tested values					
	values after adjustment					

* 1 kPa = 4.0" w.c.

4.3 Oil Cartridge Replacement

4.3 Oil Cartridge Replacement



Oil cartridge assembly

When replacing oil cartridge:

1. Electrically disconnect boiler and burner.
2. Close oil supply valve on oil filter.
3. Place pail below filter housing.
4. Loosen brass nut and remove plastic cup.
5. Remove O-ring and discard.
6. Twist filter cartridge and remove. This is a disposable cartridge; please discard in the proper manner, do not attempt to clean or reuse.
7. Check that all surfaces are clean before installing new O-ring supplied with replacement filter cartridge.
8. Set O-ring in place and mount new filter cartridge.
9. Reattach clear plastic cup and tighten brass nut.

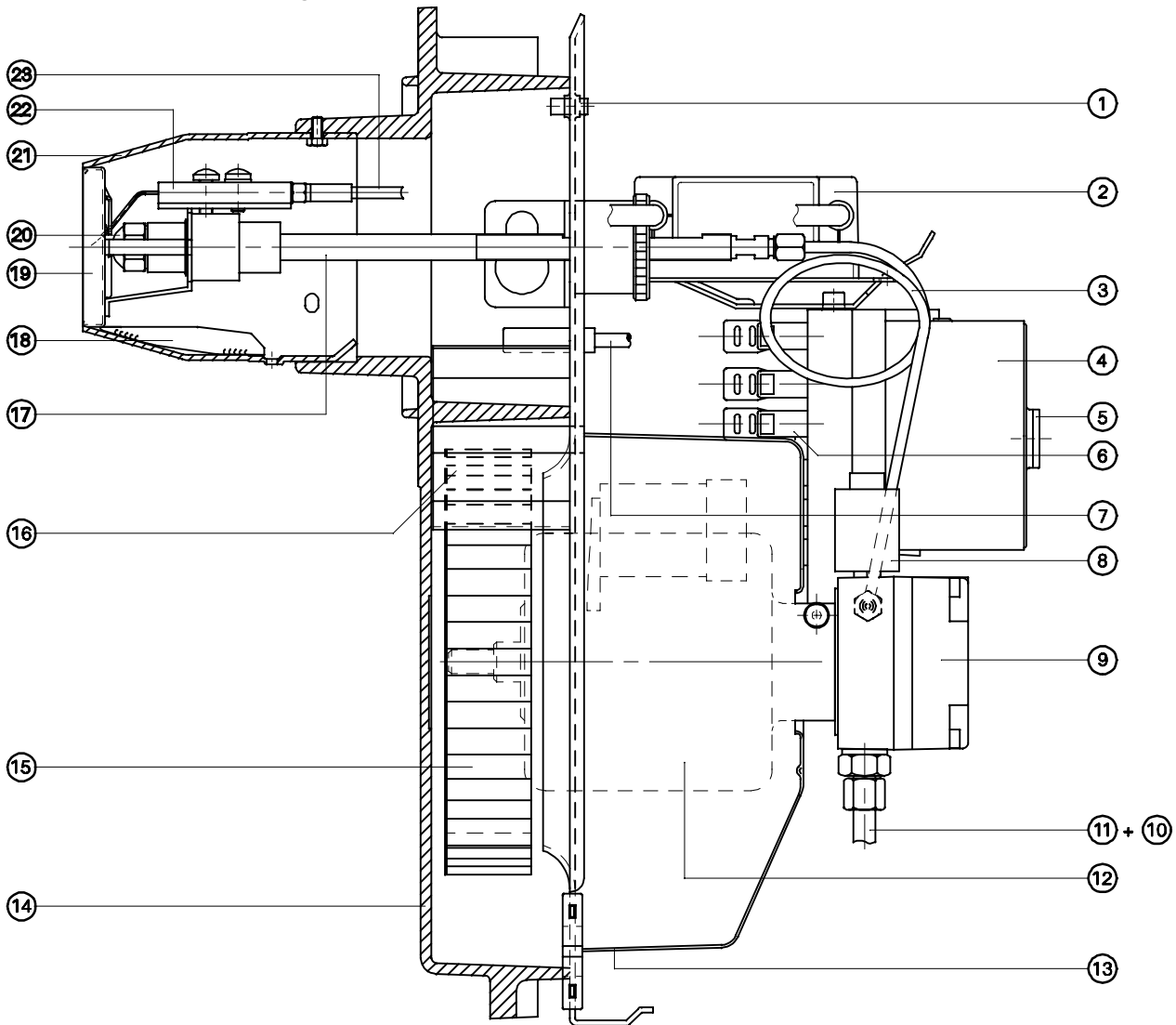
IMPORTANT

Never tighten brass nut with a tool - hand tighten only. Cap and O-ring might deform and leak air.

IMPORTANT

The flare adaptors are tapped 3/8" BSP (British straight pipe) at the factory. Replacement flare adaptors must be ordered from Viessmann. Do not use a 3/8" NPT flare adaptor as a replacement.

5.1 Component Listing

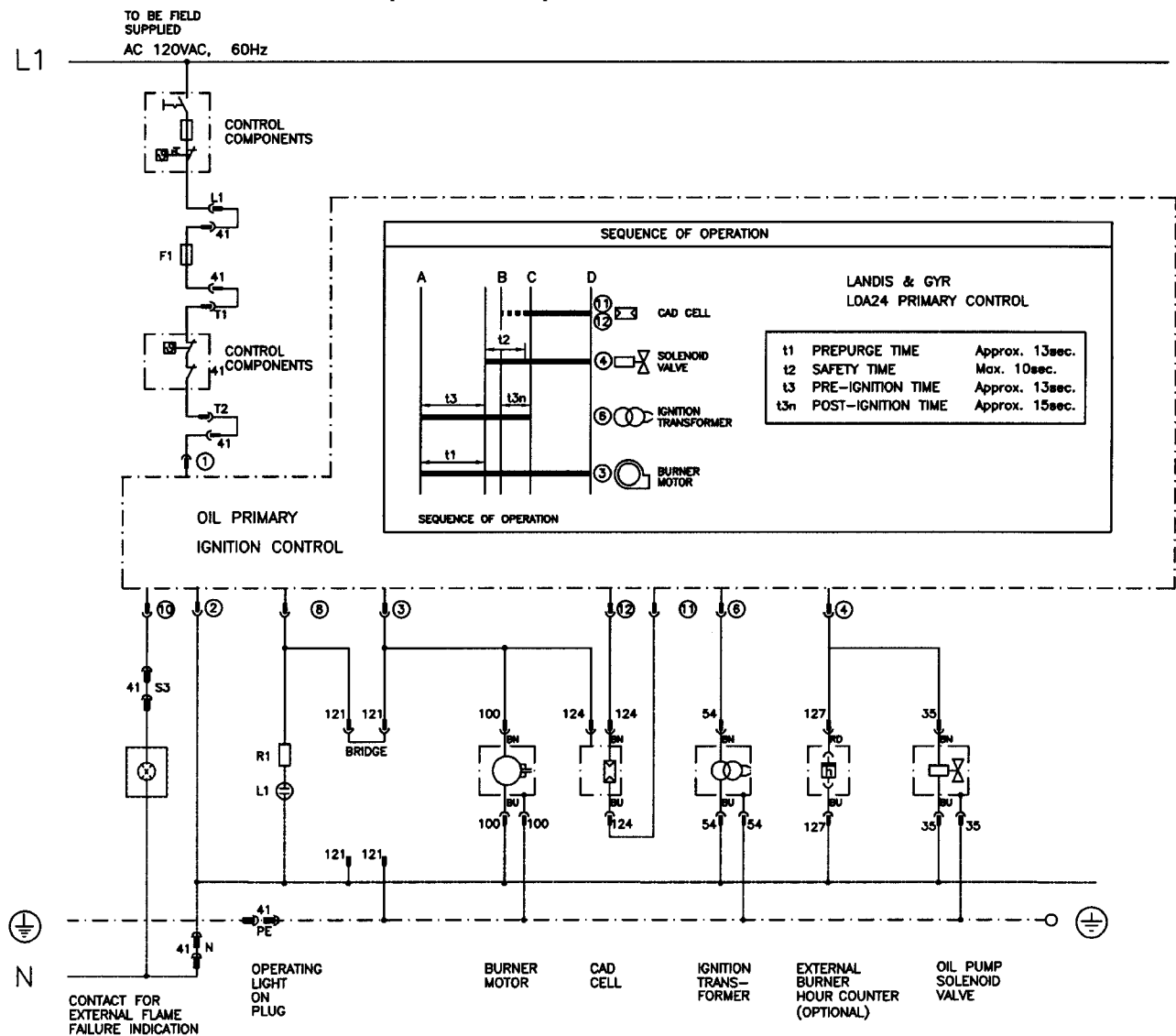


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|--------------------------------|-----------------------------------|----------------------|
| ① Quick release | ⑨ Oil pump | ⑬ Drawer assembly |
| ② Oil ignition transformer | ⑩ Flexible oil hose supply (red) | ⑭ Guide rail |
| ③ Nozzle line | ⑪ Flexible oil hose return (blue) | ⑮ Turbulator |
| ④ Oil primary ignition control | ⑫ Motor | ⑯ Oil nozzle |
| ⑤ Manual reset button | ⑬ Air intake housing * | ⑰ Blast tube |
| ⑥ Subbase | ⑭ Burner housing | ⑱ Ignition electrode |
| ⑦ CAD cell | ⑮ Fan wheel | ⑲ Ignition cable |
| ⑧ Solenoid coil | ⑯ Primary air baffle | |

* Not applicable to North American models.

5.2 Electrical Schematic and Sequence of Operation

5.2 Electrical Schematic and Sequence of Operation



Color abbrev.	Wire color
BN	brown
BU	blue
BK	black
RD	red

Legend	
35	Solenoid coil
54	Oil ignition transformer
100	Burner motor
124	CAD cell
127	Burner hour counter (optional)
41	Burner plug on control
F1	Fuse in ignition console
K..	Burner contact

① - ⑫	Subbase plug locations
A	Beginning of prepurge and pre-ignition time
B	Beginning of safety time
C	Safety timer
D	Operational setting

IMPORTANT

This schematic is only valid in the installation context of Viessmann products.

5.3 Troubleshooting Guide

Failure	Cause	Correction
Burner does not activate (no flame failure indication - reset button is not illuminated)	No power	Check fuse in control and plug console, electrical connections, position of the system switch on control, and main power.
	Boiler safety high limit has activated	Press reset on boiler system control.
Burner does not activate (flame failure indication)	Loose plug connections	Ensure all subbase plug connections are firmly in place.
	Defective burner motor	Replace burner motor.
Burner activates but flame fails	Ignition electrodes not positioned properly	Position properly (see page 8).
	Ignition electrode wet and dirty	Clean ignition electrode block.
	Damaged ignition electrode insulation	Replace ignition electrode block.
	Defective oil ignition transformer	Replace oil ignition transformer.
	Defective ignition cable	Replace ignition cable.
	Pump is not supplying oil	Determine if pressure builds up by installing pressure and vacuum gauges on pump (see following instructions).
Pump is not supplying oil	Oil supply valves near filter or at tank are closed	Open valves.
	Clogged filter	Replace all oil line filter cartridges and clean pump filter inside oil pump.
	Defective clutch between motor and pump	Replace clutch.
	Supply line or filter housing is leaking	Tighten threads. Ensure supply lines are leak-free.
	Oil supply and return lines have been reversed	Make appropriate connections observing notation on pump.
	Vacuum in supply line too high (above 0.35 bar / 8.8" Hg)	Ensure oil line diameter is proper. Replace filter.
Burner activates but need for oil is not fulfilled	Defective magnetic valve coil	Replace magnetic valve coil.
	Defective oil pump	Replace oil pump.
	Clogged oil nozzle	Replace oil nozzle.
	Defective CAD cell	Replace CAD cell.
Burner activates and creates a flame but after completion of safety timing, flame failure indication occurs	Dirty CAD cell	Clean CAD cell.
	CAD cell receives too little light	Clean turbulator and CAD cell.
	Defective CAD cell	Replace CAD cell.
	Defective ignition module	Replace ignition module ¹ .
Flame lift-off occurs during operation	Air in oil supply line	Ensure lines and filter are completely sealed.
	Defective nozzle	Replace nozzle.
	Improper burner calibration	Recalibrate using recommended values (see page 7).
	Dirty turbulator	Clean turbulator.

¹ Landis & Gyr LOA24 ignition control may be removed from subbase by depressing the two metal clips on top and bottom of control with small flathead screwdriver, and pulling the control forwards using moderate force.

5.3 Troubleshooting Guide

Failure	Cause	Correction
Ignition activates during burner operation	Dirty CAD cell	Clean CAD cell.
	Dirty turbulator	Clean turbulator.
Flame pulsates	Blower pressure too high	Measure blower pressure at pressure tap located on top side of burner cover using a manometer. Calibrate air gate and drawer assembly to avoid air pressure above 3.0 mbar / 1.2" w.c. *
Sooting burner	Air deficiency or air surplus	Ensure calibrations are correct. Ensure fan wheel is operating and clean. Ensure adequate ventilation in mechanical room.
	Inadequate chimney draft	Ensure chimney and venting are operating properly.
	Defective nozzle	Replace nozzle, install correct type (see page 7).
CO ₂ content too low	Improper calibration	Calibrate properly (see page 7).
	Air leakage into boiler flue collar connector or combustion chamber door	Seal vent pipe at boiler flue collector collar. Tighten combustion chamber door and flue gas vent bolts.
Flue gas temperature too high	Oil consumption too high	Calibrate oil consumption to heating input of boiler using correct nozzle and pump pressure. See page 7.
	Boiler sooted	Clean boiler, correct burner calibration.

*1 mbar = 0.4" w.c.

IMPORTANT

Whenever adjustments to the combustion process are made (any air supply and oil pressure adjustments), verify combustion results with proper test equipment. The boiler/burner unit shall be connected to a flue having sufficient draft at all times, to ensure safe, proper operation.

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