

Start-up/Service Instructions

for use by heating contractor

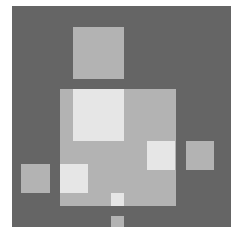
VIESSMANN

Vitoflame 100

Oil Burner (VEM Series)

for Vitola 200 boiler

Heating input: 83 to 300 MBH
24 to 88 kW



VITOFLAME 100



Vitoflame 100 oil burner
installed on a Vitola 200 boiler



IMPORTANT

Read and save these instructions
for future reference.

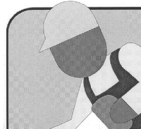
Safety, Installation and Warranty Requirements

Please ensure that these instructions are read and understood before commencing installation. Failure to comply with the instructions 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 "Important Regulatory and Installation Requirements".



■ Contaminated air

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

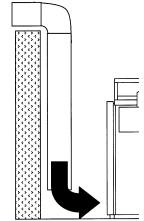
► For a listing of chemicals which cannot be stored in or near the boiler room, please see section entitled "Combustion Air Supply".



■ 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 section entitled "Combustion Air Supply".



■ Product documentation

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

► For a listing of applicable literature, please see section entitled "Important Regulatory and Installation Requirements".



■ 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 sections entitled "Combustion Air Supply" in the Installation Instructions of the burner and "Venting Connection" in the Installation Instructions of the boiler.



■ 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 section entitled "Venting Connection" in the 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.*



Operating and Service Documentation

It is recommended that all product documentation such as parts lists, operating and service instructions be handed over to the system user for storage.

Documentation is to be stored near boiler in a readily accessible location for reference by service personnel.

Safety

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Important Regulatory and Installation Requirements

■ Installation

Please carefully read this manual prior to attempting installation. Any warranty is null and void if these instructions are not followed.

The burner installation shall be in accordance with the regulations of the authorities having jurisdiction or, in the absence of such requirements, in accordance with National Codes. In Canada use CSA B-139 for oil boiler installations. In the U.S. use NFPA 31, "Standard for the Installation of Oil Burning Equipment" for oil boiler installations. Always use latest editions of codes.

All electrical wiring is to be done in accordance with the applicable codes. In Canada use the Canadian Electrical Code CSA C22.1 and/or local codes. In the U.S.A. use the latest edition of the National Electrical Code ANSI/NFPA 70.

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

■ Working on the equipment

The installation, adjustment, service, and maintenance of this boiler and burner must be done by a **licensed professional heating contractor** who is qualified and experienced in the installation, service, and maintenance of oil-fired hot water heating equipment. There are no user serviceable parts on the boiler, burner, or control.

Ensure **main power** supply to equipment, the 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.

■ Literature

Literature applicable to installation of the Vitoflame oil burner, VEM Series

- Installation Instructions
- Start-up/Service Instructions
- Operating Instructions and User's Information Manual
- Installation codes mentioned in this manual

■ Approvals and Standards

Where required by the authority having jurisdiction, the installation must conform to the Standard for Controls and Safety Devices for Automatically Fired Boilers, ANSI/ASME CSD-1.

Follow all local codes.

The oil burner/boiler combinations as shown in Section 2.3 are approved by CSA to the latest editions of the following standards:

- CAN/CSA - B140.2.1 - Oil Burners, Atomizing Type
- UL 296 - Oil Burners
- CAN/CSA - C22.2 No. 0 - General Requirements - Canadian Electrical Code, Part II
- CSA C22.2 No. 3 - Electrical Features of Fuel Burning Equipment

About these Instructions



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



WARNING

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

→ Warnings draw your attention to the presence of potential hazards or important product information.



CAUTION

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

→ Cautions draw your attention to the presence of potential hazards or important product information.

IMPORTANT

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



→ This symbol indicates that additional, pertinent information is to be found in column three.



→ This symbol indicates that other instructions must be referenced.

Necessary Tools

Tools

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

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 - 300 psig / 0 - 20 bar)
- Vacuum gage (0 - 30" Hg)
- Stack thermometer 0 - 500 °F / 0 - 260 °C such as Bacharach Tempoint thermometer
- 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.

Technical information

Literature applicable to installation of the Vitoflame oil burner, VEM Series

- Installation Instructions
- Start-up/Service Instructions
- Operating Instructions and User's Information Manual
- Installation codes mentioned in this manual

Cleaning supplies

- Hand brush
- Rags
- Vacuum cleaner

Parts

Components included with power oil burner:

- Oil filter assembly
- Oil nozzle (x2)
- Flexible supply and return lines
- Single-pipe conversion copper tee
- Blower motor
- Oil primary ignition control
- CAD cell
- Ignition electrode
- Ignition transformer
- Installation fittings



CAUTION

Use only original Viessmann 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 Parts List on page 28 of these instructions.

Customer Site Information

Site:

Name:

Street:

City:

Boiler:

Mfr.: Viessmann

Series:

Heating Input: MBH

Model No.:

Burner:

Mfr.: Viessmann

Series: VEM

Heating Input: MBH

Model No.:

Installing Contractor:

Name:

Street:

City:

Tel.:

Date:

Annual Maintenance

Regular inspection and service by a qualified heating technician is critical to the performance of the Viessmann Vitoflame 100 oil burner. Neglected maintenance impacts on product warranty; regular cleaning and maintenance ensures clean, environmentally friendly and efficient operation. We recommend a maintenance contract with a qualified heating contractor.

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.
4. Cleaning and vacuuming of blower wheel.
5. Cleaning of turbulator disc.

For detailed annual maintenance requirements see CSA B-139 in Canada or NFPA 31, "Standard for the Installation of Oil Burning Equipment" in the U.S.A.

Please complete Maintenance Record on page 30 of these instructions to ensure warranty coverage.

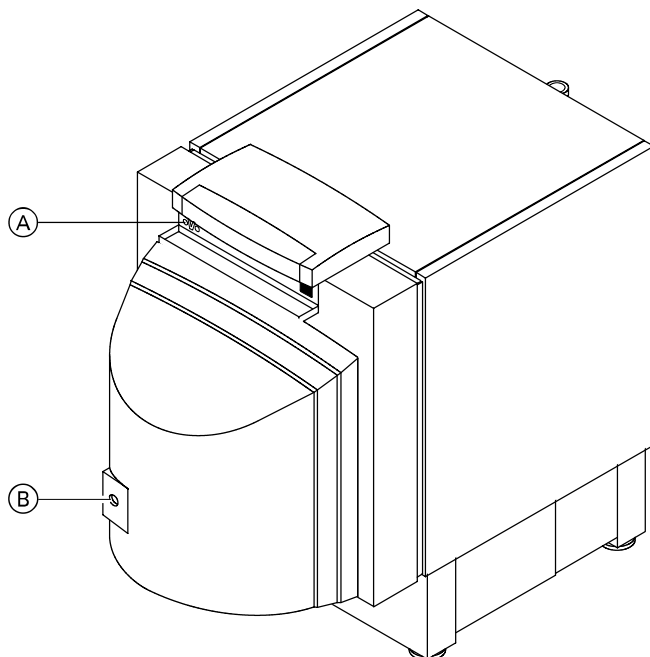
Procedure Overview

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		Service steps	
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Procedure

Initial start-up

1. Start up heating system



1. Ensure stainless steel combustion chamber is installed properly.
2. Ensure proper pressure in heating system and oil supply.
3. Open shutoff 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. Turn on heating system with system on/off switch on the boiler control. Burner operation is indicated by the control (A). The burner reset button (B) serves as a self-illuminated flame failure indicator. If flame failure occurs, push this button. Do not push reset button more than three times.

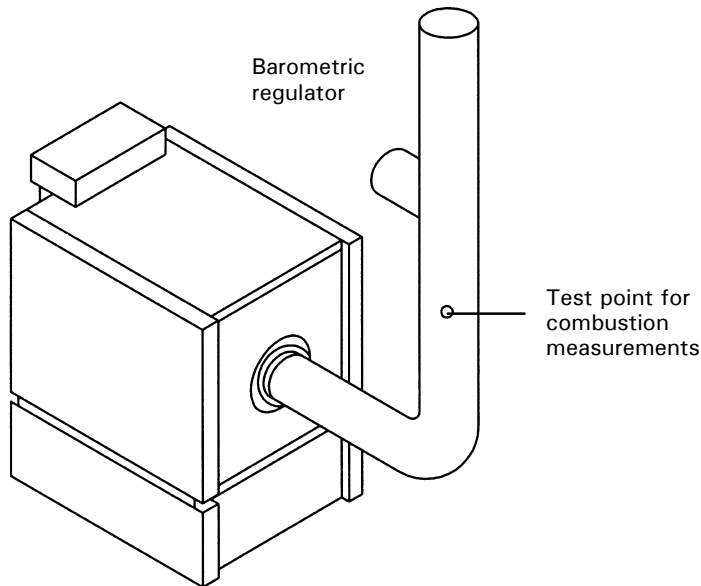
CAUTION

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.

Procedure *(continued)*

Initial start-up

2. Calibrate burner



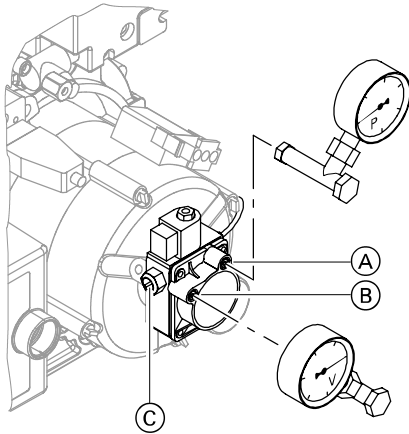
For optimal initial burner calibration, measure combustion products of hot burner (minimum 2 minute activation and 140 °F / 60 °C boiler water temperature). These include CO, CO₂ flue gas temperature, room temperature, chimney draft and smoke spot number.

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 Maintenance Record on page 30 in these instructions. Burner calibration should be performed once a year before the heating season begins.

*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.*

Procedure *(continued)***I** Initial start-up**S** Service**3. Regulate oil pressure and test for vacuum**

Suntec oil pump, Model AL 35

The oil pressure is factory preset to the oil flow rate.
If required adjust oil pressure in the field.

1. Switch off main system switch and secure against accidental activation.
2. Remove "P" (A) plug from oil pump.
3. Remove "V" (B) plug from oil pump. → **Important!**
Oil might leak from oil pump when removing the plugs!

When removing plugs ensure seals are not caught in threads.
4. Mount oil pressure gage (measurement capacity 0 - 30 bar / 0 - 300 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. → **Important!**
Do not use thread sealant.
5. Activate burner. → Solenoid valve opens.
6. After magnetic valve has opened, take reading of oil pressure and vacuum from pressure gage and vacuum gage (max. vacuum with 9.9 ft. / 3 m of head is 0.35 bar). → With vacuum larger than 0.35 bar / 5 psig / 10 cm Hg check filter for residue and proper operation. Also check for proper oil line sizing as detailed in the Installation Instructions.
7. If required, adjust oil pressure with set screw (C). → **Important!**
Turn right → pressure increases.
Turn left → pressure drops.
See page 23 for burner calibration values.
8. After setting the oil pressure, measure and record a preliminary value of flue gas temperature.
9. After calibration, remove oil pressure gage and vacuum gage.
10. Reinstall "P" (A) and "V" (B) plugs. → **Important!**
Ensure plug seal rings are not damaged. Replace damaged rings.
11. Activate burner and ensure plugs seals are leak-tight. → 1 bar = 14.7 psig / 29.52" Hg / 76 cm Hg

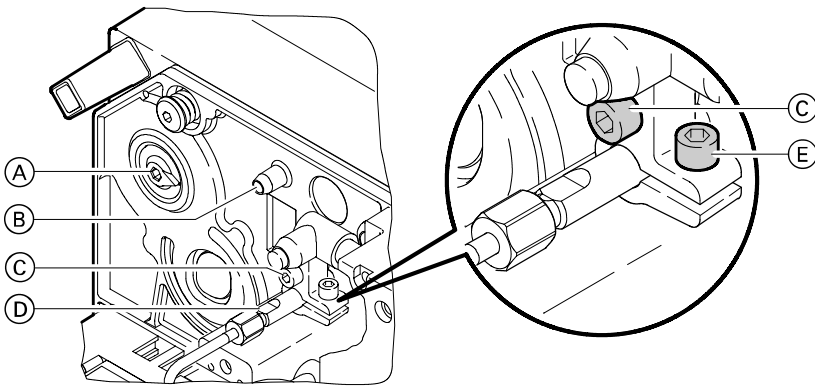
Procedure *(continued)*

Initial start-up

Service

4. Adjust air intake

*Air intake is factory preset. If required, adjust air intake in the field.
At burner start-up, fine-tuning of the air intake might be required.*



1. To adjust position of turbulator (F) in the blast tube (G), turn drawer assembly adjustment screw (C)
 - counterclockwise → more air.
 - clockwise → less air.

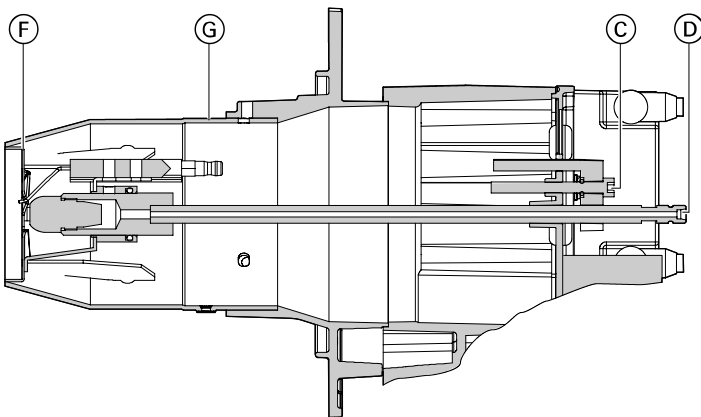
IMPORTANT

See page 23 for burner calibration values.

2. Measure fan static pressure at nipple (B).
3. Measure and check emission values.

IMPORTANT

Do *not* loosen set screw (E).
Loosening the set screw will change 0-point of drawer assembly.



- (A) Air gate
- (B) Measurement nipple
- (C) Drawer assembly adjustment screw
- (D) Drawer assembly
- (E) Set screw
- (F) Turbulator disc
- (G) Blast tube

Procedure *(continued)*

Initial start-up

Service

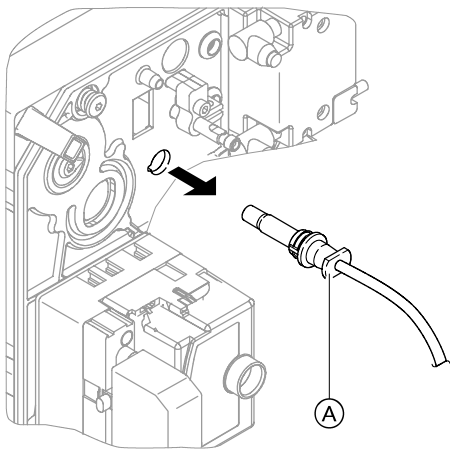
5. Take burner measurements

Record measurements following the sequence of the Maintenance Record on page 30 of these instructions.

→ **Important!**
The vent pipe must be securely fastened and sealed to boiler flue gas collar. Measurement values are invalid if fresh air enters vent system.

Service

6. Test operation of CAD cell



Ⓐ Flame sensor

Safety check	Resulting action
Burner start-up with covered CAD cell.	Burner lockout at end of safety period.
Faulty CAD cell or CAD cell is seeing light before trial for ignition.	Burner lockout after max. 40 seconds.
Burner operation with simulated flame failure. To simulate, cover CAD cell during operation and keep covered.	Burner lockout at end of safety period.

Service

7. Shut down heating system

1. Switch off main system switch and secure against accidental activation.
2. Disconnect ⁴¹ plug from burner.
3. Close oil supply valve (near oil filter).

Service

8. Check electrical connections

Check that electrical plug-in connections of all burner components, as well as cable ducts are seated securely.

Procedure *(continued)*

Service

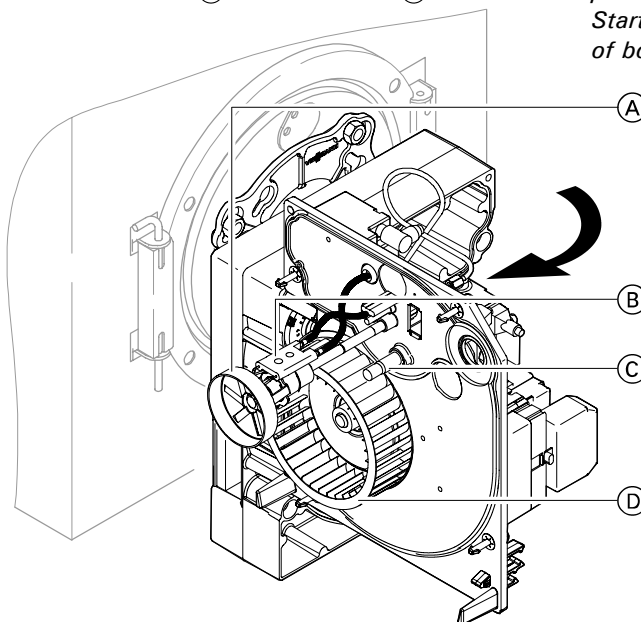
9. Clean burner

1. Hang burner in service position.

2. Clean burner housing and blast tube, turbulator (A), ignition electrodes (B), flame sensor (C) and fan wheel (D).



To clean combustion chamber and flue gas passageways, please consult Start-up/Service Instructions of boiler.



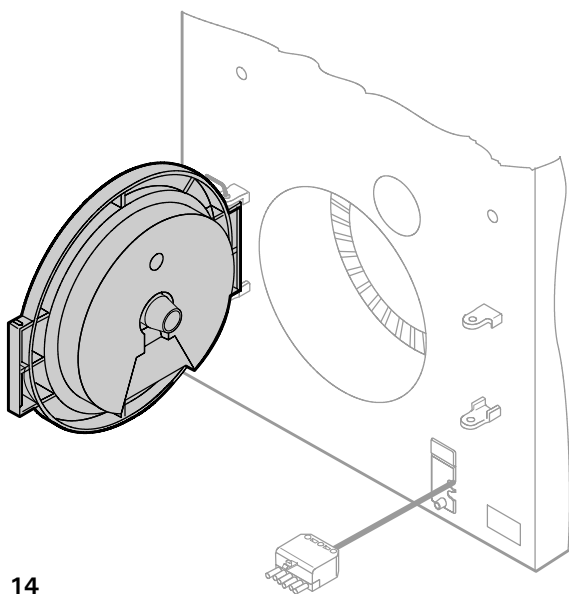
Service

10. Check that fan wheel is properly secured

See service step 9.

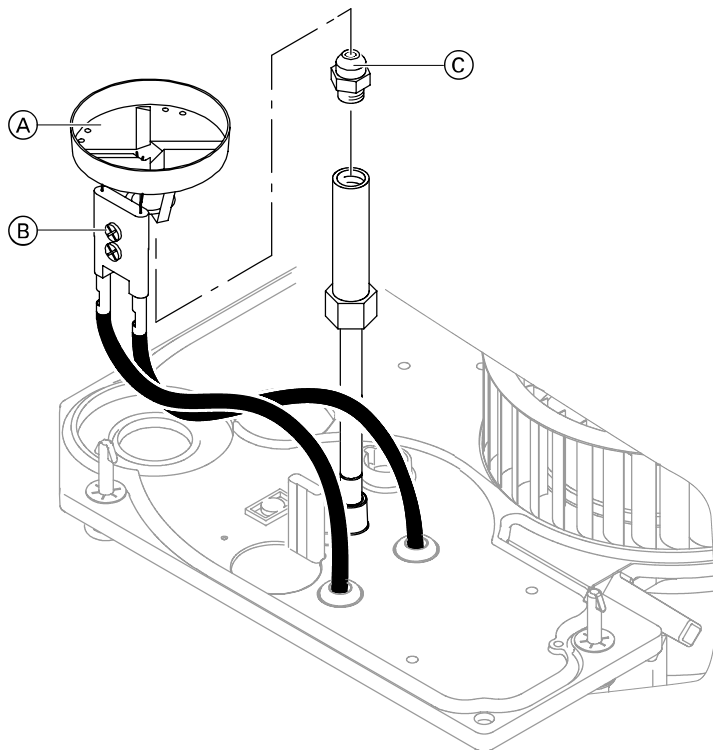
Service

11. Check that burner blast tube is properly secured



→ **Important!**

Burner blast tube must be securely fit into place.

Procedure *(continued)***S**ervice**12. Replace nozzle**

1. Attach burner cover to burner housing with drawer assembly facing upward.

Important!

This prevents air bubble formation during nozzle replacement.

2. Loosen screw (B) with two rotations.
3. Remove turbulator (A) from drawer assembly.
4. Remove nozzle (C) (holding on to drawer assembly).
5. Install new nozzle (holding on to drawer assembly).

Important!

See page 23 for nozzle brand and size.

6. Fully mount turbulator (A) on drawer assembly and tighten screw (B).

Procedure *(continued)*

Service

13. Check and calibrate ignition electrodes

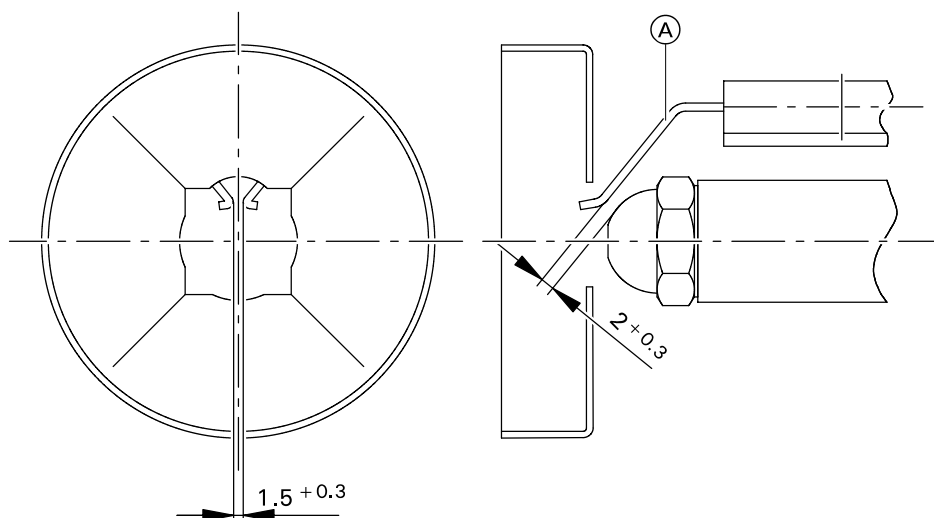
Check ignition electrodes (A) for signs of wear, debris and for proper positioning (see illustration below); replace if required.

IMPORTANT

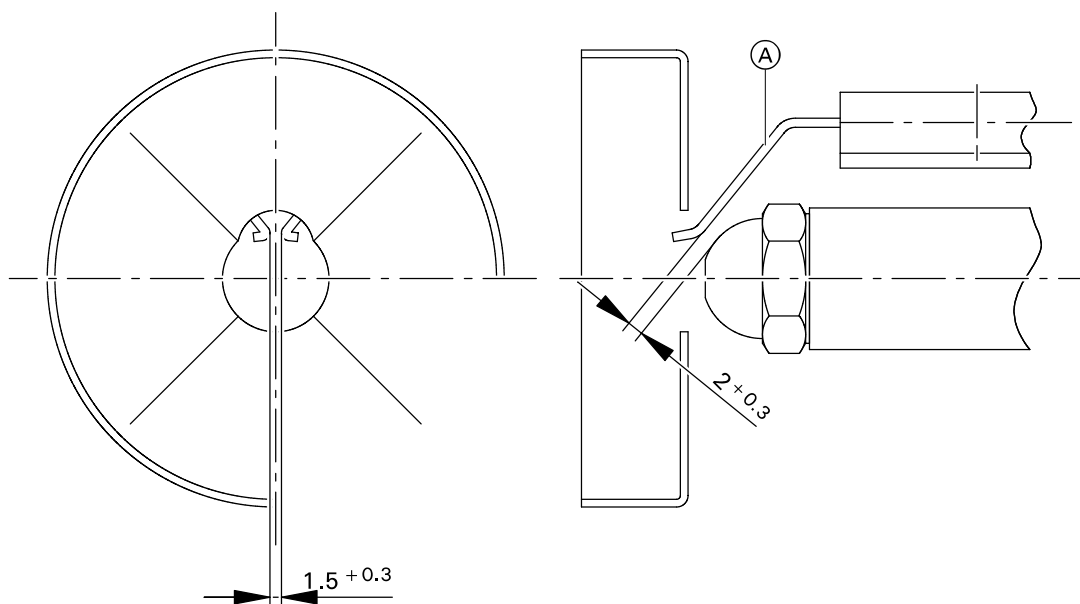
All dimensions are in mm.

IMPORTANT

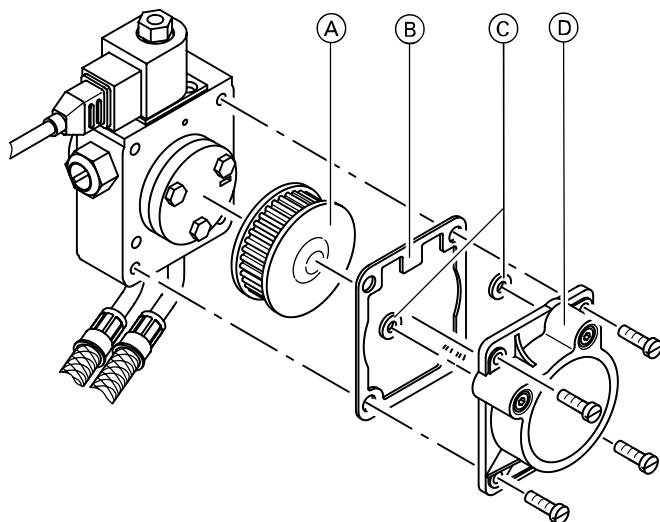
Electrode spannings are set at factory when installed on burner. Replacement electrodes must be set by service technician.



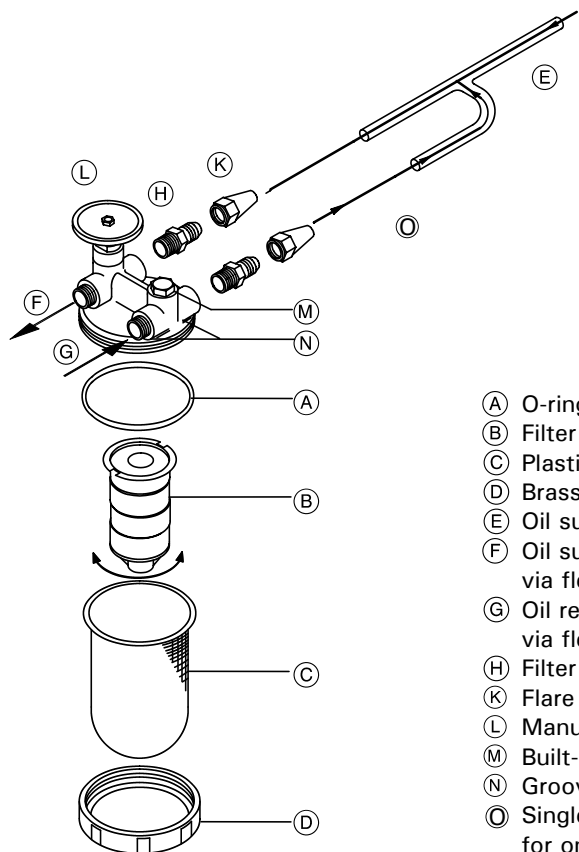
(turbulator - 60 mm outer diameter)
Burner models VEM-18 to VEM-33



(turbulator - 80 mm outer diameter)
Burner models VEM-40 to VEM-63

Procedure *(continued)***Service****14. Clean oil pump filter and replace if necessary****Suntec oil pump, Model AL 35**

1. Remove 4 screws on pump housing and remove cover (D).
2. Clean oil filter (A) with regular fuel oil or replace depending on its condition.
3. Replace seal (B) of cover (D) and O-rings (C) of sealing plugs during reassembly.

Service**15. Replace filter cartridge and O-ring**

- (A) O-ring
- (B) Filter cartridge
- (C) Plastic cup
- (D) Brass nut
- (E) Oil supply
- (F) Oil supply to burner via flexible oil line (red)
- (G) Oil return from burner via flexible oil line (blue)
- (H) Filter adaptor
- (K) Flare nut
- (L) Manual oil shutoff valve
- (M) Built-in flow check valve
- (N) Grooves for mounting bracket
- (O) Single-pipe copper conversion tee for one-pipe oil supply

When replacing the 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 (D) and remove plastic cup (C).
5. Remove O-ring (A) and discard.
6. Twist filter cartridge (B) 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 (A) supplied with replacement filter cartridge.
8. Set O-ring (A) in place and mount new filter cartridge (B).
9. Reattach clear plastic cup (C) and tighten brass nut (D).

Procedure *(continued)*

Service

15. Replace filter cartridge and O-ring (continued)

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.

Service

16. Start up heating system

1. Open oil supply valve.
2. Switch on main system switch (located outside of mechanical room).
3. Turn on heating system with on/off switch on boiler control.

Service

17. Check for leaks 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.

Service

18. Calibrate burner. Record settings and measurements

Record measurements following the sequence of the Maintenance Record on page 30 in these instructions.

→ **Important!**

The vent pipe must be securely fastened and sealed to boiler flue gas collar. Measurement values are invalid if fresh air enters vent system.

Ignition Module

Ignition module LOA 24.171B1V

For sequence of operation see wiring diagram on page 26 in these instructions.

Sensor current requirements:

- minimum: 50 μ A
- max. allowable without flame: 5.5 μ A

Low voltage

With a power supply lower than 102 VAC, burner start-up is prevented, i.e. the oil supply is blocked, resulting in a burner lockout.

Flame failure indication

Lockout of the ignition module due to flame failure is also indicated by a light in the manual reset button.

Cause	Resulting action
Power outage	Burner restart
Voltage below minimum voltage requirement	Burner restart
Faulty CAD cell or CAD cell is seeing light before trial for ignition t1	Burner lockout at the end of pre-purge period t1
Ignition failure of burner within safety period t2	Burner lockout at the end of safety period t2
Flame failure during operation	Burner lockout after trial for ignition

Burner lockout

After a burner lockout, the ignition module remains locked and the fault indicator light is lit.
This condition remains unchanged even with power outages.

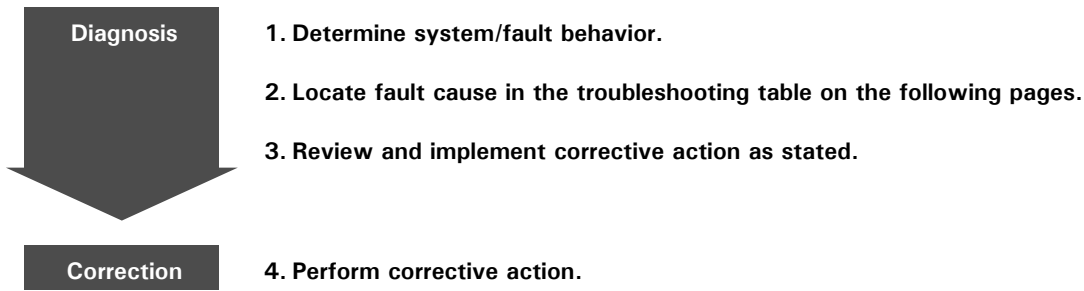
Reset of ignition module

After a burner lockout, immediate resetting of the ignition module is possible. Press reset button for approx. 1 second (< 3 s).

Ignition program

With flame failure during the safety period, reignition takes place until the end of the maximum safety period. This allows several ignition trials within a safety period; see sequence of operation on page 20 in these instructions.

Sequence of Operation



Diagnosis

Failure	Cause	Correction
Burner does not activate (no flame failure indication - reset button is not illuminated)	No power	Check electrical connections and main power. Refer to Vitotronic control manual.
	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 16).
	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 correct. 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.
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 23).
	Dirty turbulator	Clean turbulator.

Diagnosis

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 23).
CO ₂ content too low	Improper calibration	Calibrate properly (see page 23)
	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 23.
	Boiler sooted	Clean boiler, correct burner calibration.

Technical Data

Burner Model	Model No.	VEM-18	VEM-22	VEM-33	VEM-40	VEM-50	VEM-63
Boiler	Model No.	VB2-18	VB2-22	VB2-33	VB2-40	VB2-50	VB2-63
Input	MBH kW	83 24	107 31	135 39	170 50	219 64	300 88
Consumption at oil discharge pressure stated ¹	GPH	0.59	0.76	0.96	1.21	1.56	2.15
	ltr/h	2.23	2.87	3.63	4.58	5.90	8.10
	psig	240	170	170	180	180	175
Voltage	V	120	120	120	120	120	120
Frequency	Hz	60	60	60	60	60	60
Amperage	A	2.0	2.0	2.0	2.0	2.0	2.0
Power consumption	Watt	90	90	90	90	90	90
Motor revolutions	rpm	3450	3450	3450	3450	3450	3450
Max. oil pump flow capacity	ltr/h	45	45	45	45	45	45
Connections (metric flare) inside threads of supply and return oil lines	inches	3/8	3/8	3/8	3/8	3/8	3/8
Recommended combustion air supply duct size - round duct Ø	inches	5	5	6	7	8	8
Depth ²	inches	13	13	13	15	15	15
	mm	335	335	335	370	370	370
Width ²	inches	21	21	21	26	26	26
	mm	535	535	535	650	650	650
Height ²	inches	23	23	23	26	26	26
	mm	580	580	580	660	660	660
Weight (shipping weight)	lbs	46	46	46	49	50	50
	kg	21	21	21	22	22.5	22.5

¹The oil pressure may deviate from the stated values due to nozzle tolerances and varying oil consistency.

² Dimensions include burner hood.

The Viessmann Vitoflame, VEM Series oil burner 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.

Burner Calibration Values

Burner Model	Model No.	VEM-18	VEM-22	VEM-33	VEM-40	VEM-50	VEM-63
Input	Btu/h	83 000	107 000	135 000	170 000	219 000	300 000
Burner nozzle Mfg. Steinen	GPH	0.40 x 45°S	0.60 x 45°S	0.75 x 45°S	1.00 x 45°S	1.25 x 45°S	1.65 x 45°S
Burner nozzle Mfg. Hago	GPH	0.40 x 45°B	0.60 x 45°B	0.75 x 45°B	1.00 x 45°B	1.25 x 45°B	n.a.
Oil discharge pressure ¹	psig	240	170	170	180	180	175
Nozzle oil flow rate ²	GPH	0.59	0.76	0.96	1.21	1.56	2.15
Fan discharge pressure (air)	"w.c.	1.1	1.0	1.1	0.85	1.2	1.15
Air gate		6	7	8	10	11	19
Turbulator	mm	3	6.5	9	11	12	23

¹The oil pressure may deviate from the stated values due to nozzle tolerances and varying oil consistency.

²Based on 140 MBH per USG.

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.

Additional Information

Burner Calibration Values *(continued)*

Field Calibration

The values stated on page 23 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 the procedure in subsection entitled "Calibrate burner" on page 18 in these instructions.

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.

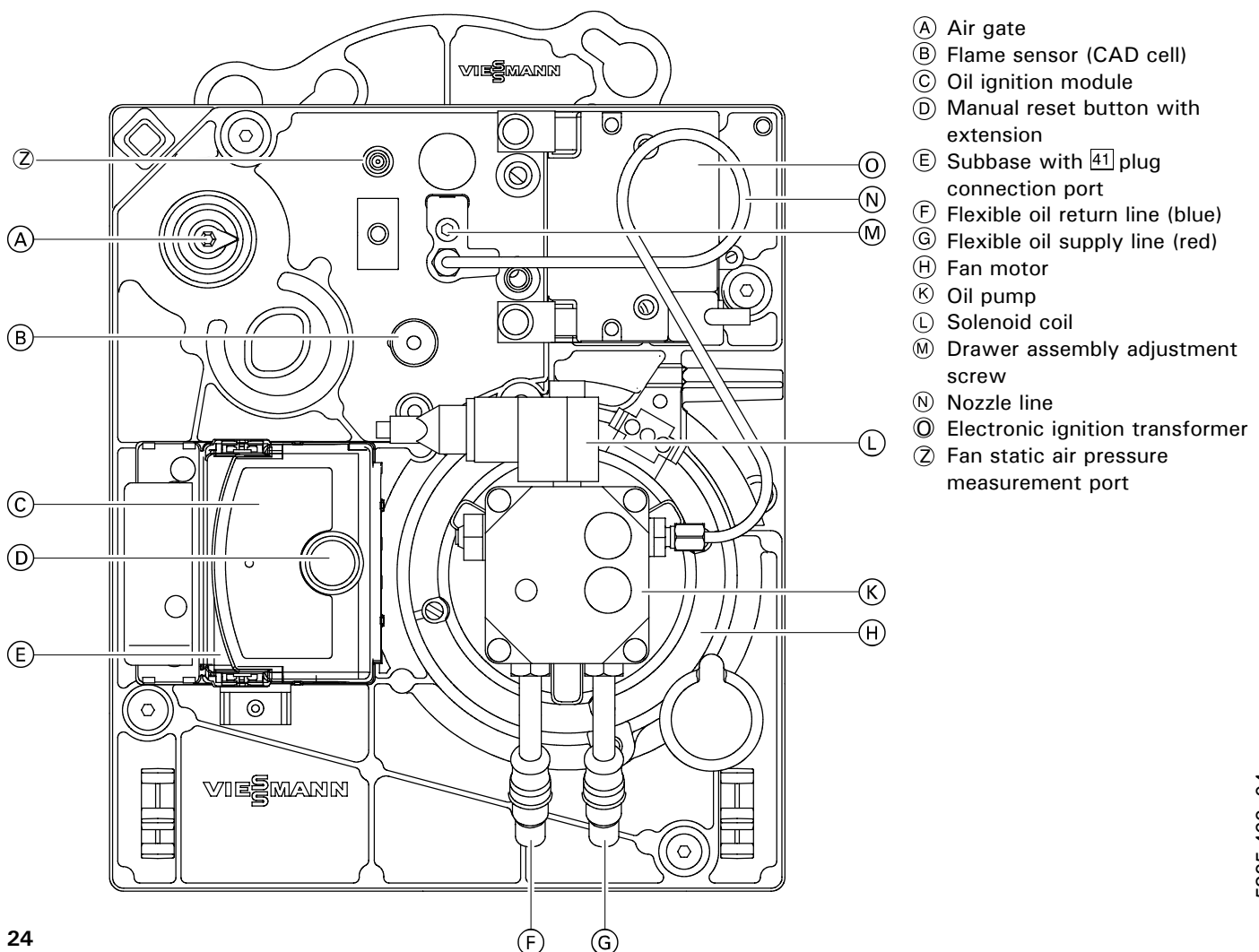
Field tests may result in no change of the factory settings or may result in a change to one or more of oil pressure, air gate or drawer assembly.

WARNING

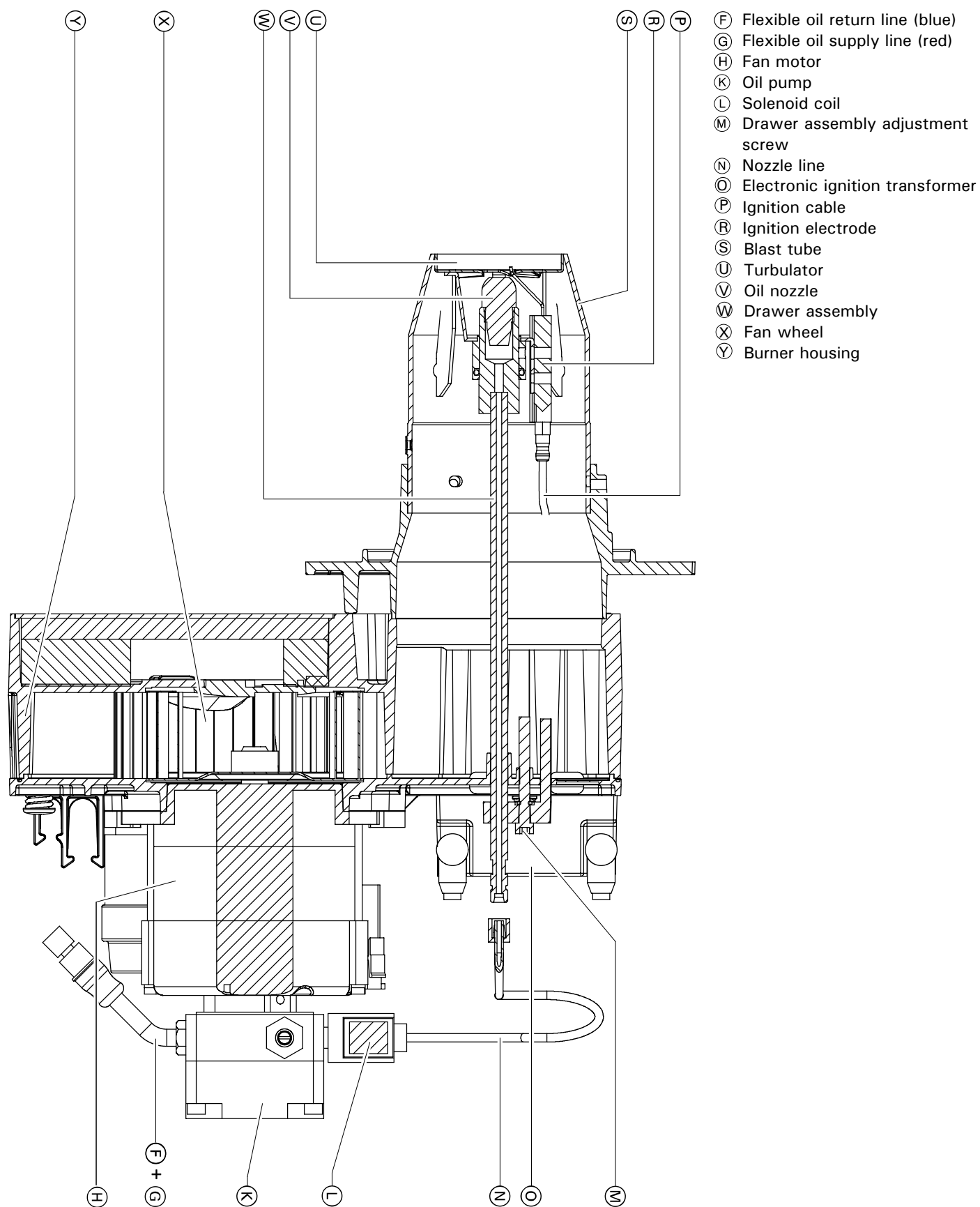
Failure to properly calibrate burner can result in hazardous operation, which could cause carbon monoxide poisoning. Refer to factory test sheet shipped with burner for factory test results.

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

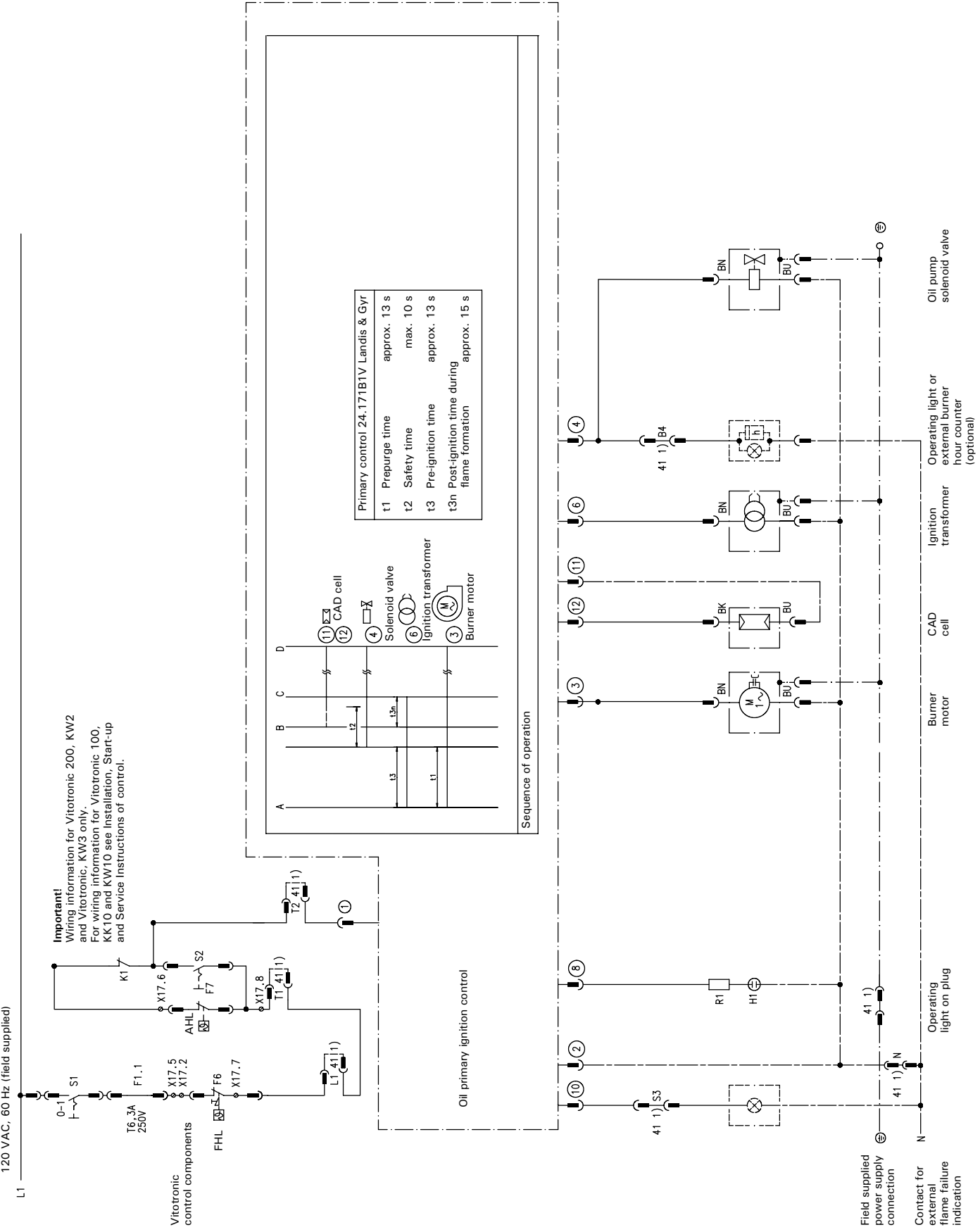
Component Overview



Component Overview *(continued)*



Wiring Diagram



Wiring Diagram *(continued)*

Legend

A Beginning of pre-purge and pre-ignition time
 B Flame formation point
 C Operational setting
 D Control shutdown
 FHL Fixed high limit
 AHL Adjustable high limit

Color codes

BK black
 BN brown
 BU blue
 RD red

41 Burner plug on control
 F1.1 Fuse in control
 F6 Fixed high limit
 F7 Adjustable high limit
 S1 Power switch
 S2 Emission test switch
 K1 Burner relay
 ① - ⑫ Plug-in locations on oil primary ignition control

¹⁾ Connection of components and accessory parts via 7-pole **41** plug (e.g. extension cord, etc.).

IMPORTANT

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

Parts List

Ordering Replacement Parts:

Please provide boiler Model and Serial Number from rating plate when ordering replacement parts. Order replacement components from your Viessmann distributor.

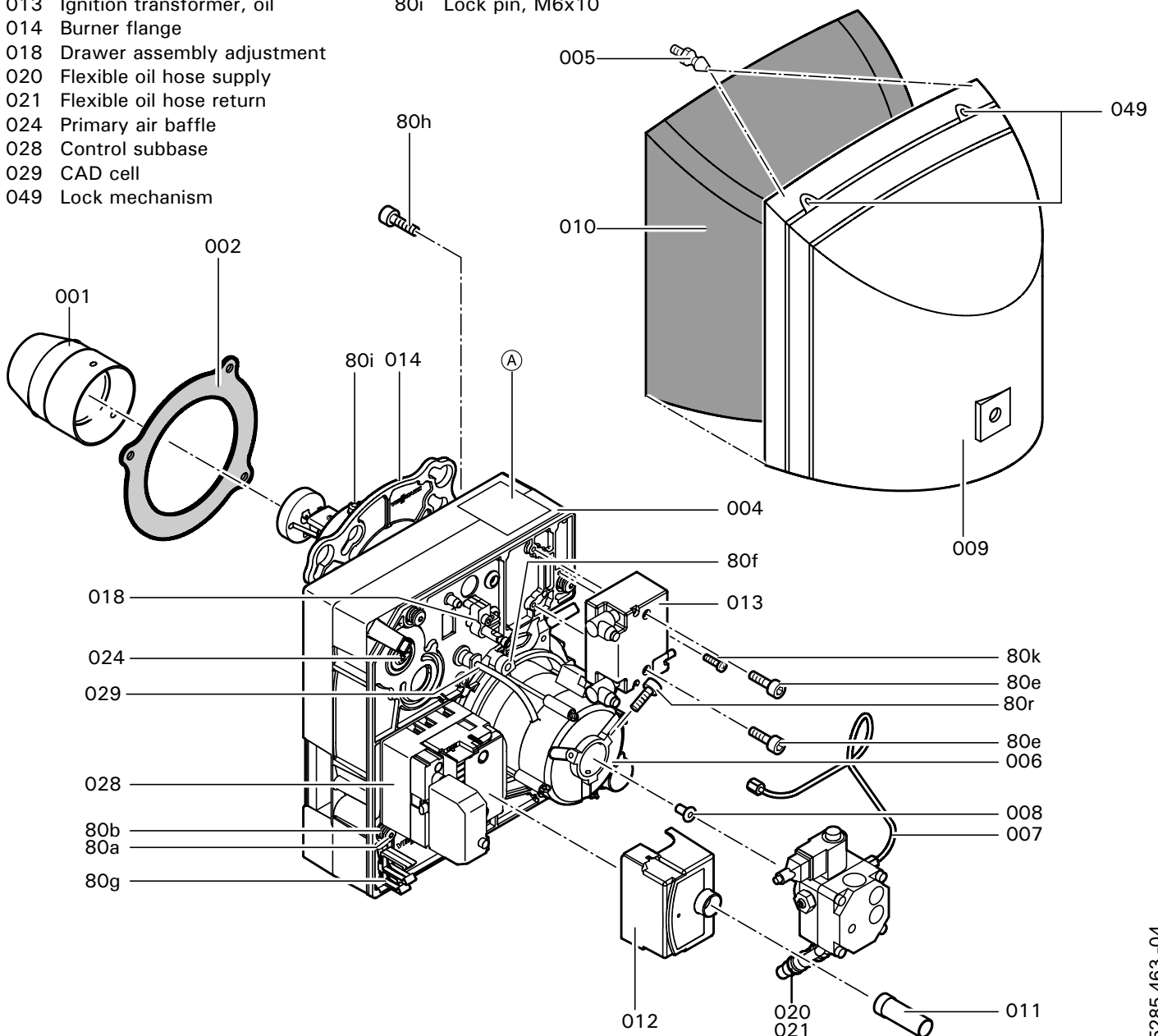
Parts

001 Blast tube	080 Miscellaneous parts, including:	80k Pan head screw, AM4x10H
002 Burner housing gasket	80a Locking pin, Allen head 4 mm	80l Spring washer, A5
004 Burner chassis	80b Pressure spring for locking pin	80m O-Ring, 19x25
005 Hood holding mounts	80c Lock washer for locking pin	80r Pan head screw, M5x12
006 Burner motor, 120 VAC	80d Allen bolt, M5x10	
007 Nozzle line	80e Allen bolt, M5x45	
009 Burner hood	thread length 30 mm	
010 Acoustic liner with adhesive	80f Allen bolt, M6x20	
011 Reset button extension	80g Line clip	
012 Burner primary ignition control	80h Allen bolt, M6x30	
013 Ignition transformer, oil	80i Lock pin, M6x10	
014 Burner flange		
018 Drawer assembly adjustment		
020 Flexible oil hose supply		
021 Flexible oil hose return		
024 Primary air baffle		
028 Control subbase		
029 CAD cell		
049 Lock mechanism		

Wear Parts

008 Shaft bushing

Ⓐ Rating Plate



Parts List (continued)

Parts

- 019 Blower wheel, 133 mm
- 027 Turbulator disc
- 030 Drawer assembly, oil
- 033 Suntec solenoid coil, 110 VAC
- 034 Suntec solenoid coil nut
- 038 Suntec oil pump, 120 VAC
- 039 Suntec solenoid shaft
- 042 Ignition cable

080 Miscellaneous parts, including:

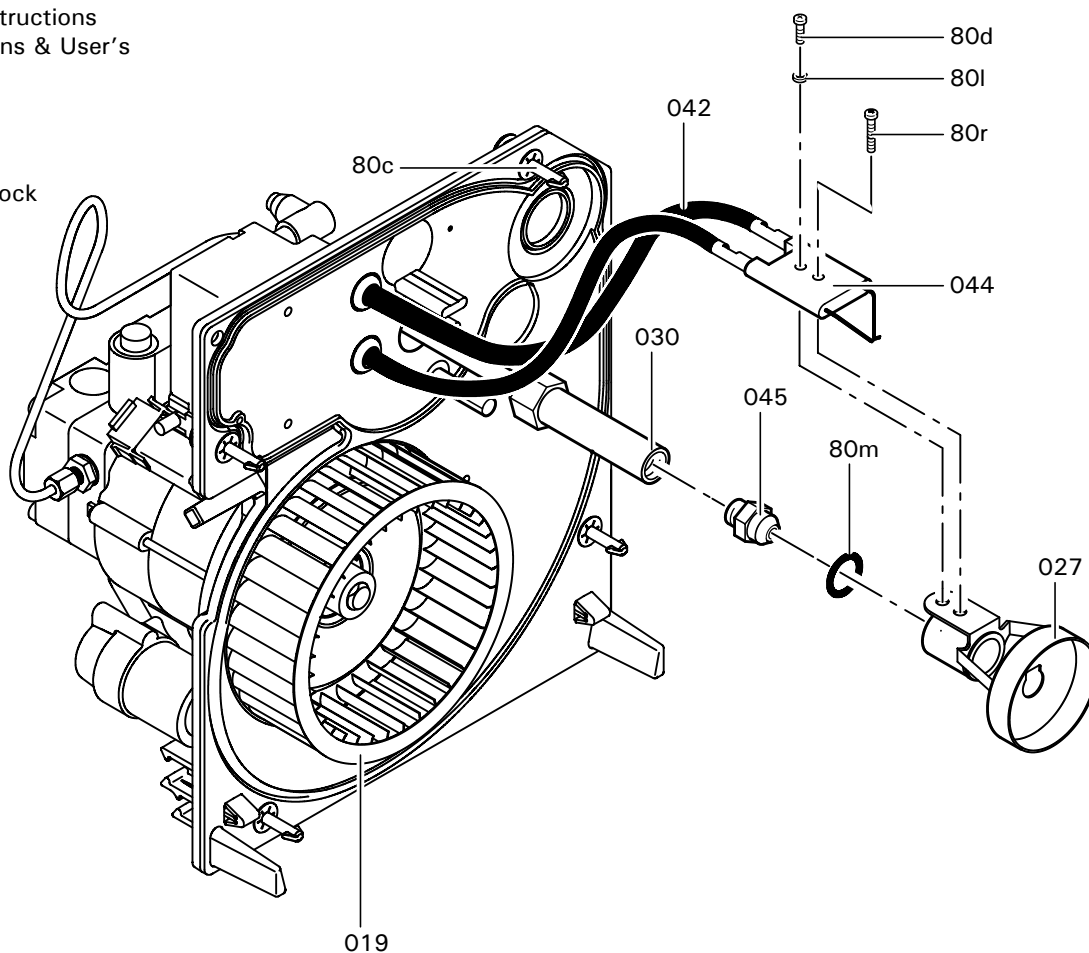
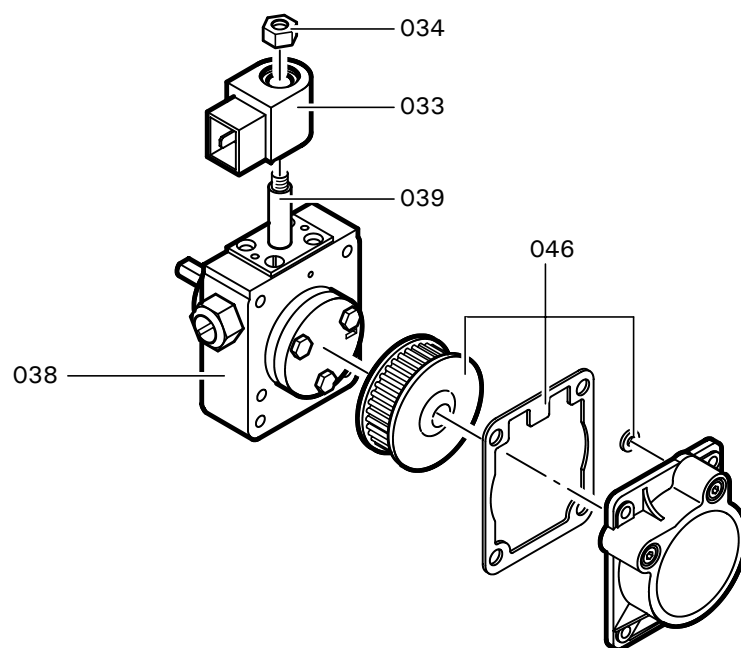
- 80a Locking pin, Allen head 4 mm
- 80b Pressure spring for locking pin
- 80c Lock washer for locking pin
- 80d Allen bolt, M5x10
- 80e Allen bolt, M5x45
thread length 30 mm
- 80f Allen bolt, M6x20
- 80g Line clip
- 80h Allen bolt, M6x30
- 80i Lock pin, M6x10
- 80k Pan head screw, AM4x10H
- 80l Spring washer, A5
- 80m O-ring, 19x25
- 80r Pan head screw, M5x12

Parts (not illustrated)

- 071 Installation Instructions
- 072 Start-up/Service Instructions
- 073 Operating Instructions & User's
Information Manual
- 079 Accessory Pack

Wear Parts

- 044 Ignition electrode block
- 045 Oil nozzle
- 046 Suntec rebuild kit



Maintenance Record

Initial start-up		Service Date:	By:	Service Date:	By:	Service Date:	By:	Service Date:	By:
Oil pressure	before	psig							
	after	psig							
Vacuum	before	"Hg							
	after	"Hg							
Smoke spot No.	before								
	after								
Carbon dioxide CO ₂ in %	before	Vol.-%							
	after	Vol.-%							
Oxygen O ₂ in %	before	Vol.-%							
	after	Vol.-%							
Flue gas temperature	before	°F / °C							
	after	°F / °C							
Fan discharge pressure (air)	before	"w.c.							
	after	"w.c.							
Turbulator head setting	before	in. / mm							
	after	in. / mm							
Air gate setting	before	in. / mm							
	after	in. / mm							

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