Installation and Service Instructions

VIESMANN

Please file in Service Binder

Vitogas 050
ECV Series
Natural gas-/Propane-fired
atmospheric cast iron boiler

Rated input: 65 to 200 MBH
19 to 59 kW

VITOGAS 050

IMPORTANT

Read and save these instructions for future reference.

WARNING

If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

Do not store or use gasoline or other flammable liquids in the vicinity of this or any other appliance.

WHAT TO DO IF YOU SMELL GAS
- Do not try to light any appliances.
- Do not touch any electrical switches, do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

Installation and service must be performed by a qualified installer, service agency or the gas supplier.

WARNING

Improper installation, adjustment, and/or operation could cause carbon monoxide poisoning resulting in injury or loss of life.

This product must be installed and serviced by a professional service technician who is experienced and qualified in hot water boiler installation and gas combustion.

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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.

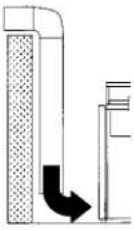
► *Please see section entitled "Important Regulatory and Installation Requirements".*

■ **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 reference in the future 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" and "Venting Connection".*

■ **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". 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.*

⚠ Warning

This boiler requires fresh air for safe operation and **must** be installed with provisions for adequate combustion and ventilation air (in accordance with local codes and regulations of authorities having jurisdiction).

Do not operate this boiler in areas with contaminated combustion air. High levels of contaminants such as dust, lint or chemicals can be found at construction sites, home renovations, in garages, workshops, in dry cleaning/laundry facilities, near swimming pools and in manufacturing facilities.

Contaminated combustion air **will damage** the boiler and may lead to substantial property damage, severe personal injury and/or loss of life. Ensure boiler/burner is inspected and serviced by a qualified heating contractor at least once a year in accordance with the Start-up/Service Instructions of the boiler.

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Safety, Installation and Warranty Requirements (continued)

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).

■ Fiberglass wool and ceramic fiber materials

⚠ WARNING

Inhalation of fiberglass wool and/or ceramic fiber materials is a possible cancer hazard. These materials can also cause respiratory, skin and eye irritation.

The state of California has listed the airborne fibers of these materials as a possible cancer hazard through inhalation. When handling these materials, special care must be applied.

Suppliers of ceramic fiber products recommend the following first aid measures:

- *Respiratory tract (nose and throat) irritation*
  If respiratory tract irritation develops, move the person to a dust free location.
- *Eye irritation*
  If eyes become irritated, flush immediately with large amounts of lukewarm water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Do not rub eyes.
- *Skin irritation*
  If skin becomes irritated, remove soiled clothing. Do not rub or scratch exposed skin. Wash area of contact thoroughly with soap and water. Using a skin cream or lotion after washing may be helpful.
- *Gastrointestinal irritation*
  If gastrointestinal tract irritation develops, move the person to a dust free environment.

Suppliers of fiberglass wool products recommend the following precautions be taken when handling these materials:

Precautionary measures

- Avoid breathing fiberglass dust and contact with skin and eyes.
- Use NIOSH approved dust/mist respirator.
- Wear long-sleeved, loose fitting clothing, gloves and eye protection.
- Wash work clothes separately from other clothing. Rinse washer thoroughly.
- Operations such as sawing, blowing, tearout and spraying may generate airborne fiber concentration requiring additional protection.

First aid measures

- If eye contact occurs, flush eyes with water to remove dust. If symptoms persist, seek medical attention.
- If skin contact occurs, wash affected areas gently with soap and warm water after handling.

■ Hazardous materials

⚠ WARNING

Appliance materials of construction, products of combustion and the fuel contain alumina, silica, heavy metals, carbon monoxide, nitrogen oxides, aldehydes and/or other toxic or harmful substances which can cause serious injury or loss of life and which are known to the State of California to cause cancer, birth defects and other reproductive harm. Always use proper safety clothing, respirators and equipment when servicing or working nearby the appliance.

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Important Regulatory and Installation Requirements

Codes
The installation of this unit shall be in accordance with local codes or, in the absence of local codes, use CAN/CSA-B149.1 or .2 Installation Codes for Gas Burning Appliances for Canada. For U.S. installations use the National Fuel Gas Code ANSI Z223.1. Always use latest editions of codes.

In Canada all electrical wiring is to be done in accordance with the latest edition of CSA C22.1 Part 1 and/or local codes. In the U.S. use the National Electrical Code ANSI/NFPA 70.
The heating contractor must also comply with the Standard for Controls and Safety Devices for Automatically Fired Boilers, ANSI/ASME CSD-1 where required by the authority having jurisdiction.

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

For information regarding other Viessmann System Technology componentry, please reference documentation of the respective product.

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

For installations in the Commonwealth of Massachusetts, the following local requirements apply in addition to all other applicable NFPA requirements:

1) For direct-vent appliances, mechanical-vent heating appliances or domestic hot water equipment, where the bottom of the vent terminal and the air intake is installed below four feet above grade the following requirements must be satisfied.

1. If there is not one already present, on each floor level where there are bedroom(s), a carbon monoxide detector and alarm shall be placed in the living area outside the bedroom(s). The carbon monoxide detector shall comply with NFPA 720 (2005 Edition).

2. A carbon monoxide detector shall be located in the room that houses the appliance or equipment and shall:

    a. Be powered by the same electrical circuit as the appliance or equipment such that only one service switch services both the appliance and the carbon monoxide detector;
    b. Have battery back-up power;
    c. Meet ANSI/UL 2034 Standards and comply with NFPA 720 (2005 Edition); and
    d. Have been approved and listed by a Nationally Recognized Testing Laboratory as recognized under 527 CMR.

3. A Product-approved vent terminal must be used, and if applicable, a Product-approved air intake must be used. Installation shall be in strict compliance with the manufacturer's instructions. A copy of the installation instructions shall remain with the appliance or equipment at the completion of the installation.
4. A metal or plastic identification plate shall be mounted at the exterior of the building, four feet directly above the location of vent terminal. The plate shall be of sufficient size to be easily read from a distance of eight feet away, and read **"Gas Vent Directly Below"**.

Continued on following page.

Important Regulatory and Installation Requirements (continued)

For direct-vent appliances, mechanical-vent heating appliances or domestic hot water equipment where the bottom of the vent terminal and the air intake is installed above four feet above grade the following requirements must be satisfied:

1. If there is not one already present, on each floor level where there are bedroom(s), a carbon monoxide detector and alarm shall be placed in the living area outside the bedroom(s). The carbon monoxide detector shall comply with NFPA 720 (2005 Edition).

2. A carbon monoxide detector shall:

    a. Be located in the room that houses the appliance or equipment;
    b. Be either hard-wired or battery powered or both; and
    c. Shall comply with NFPA 720 (2005 Edition).

3. A Product-approved vent terminal must be used, and if applicable, a Product-approved air intake must be used. Installation shall be in strict compliance with the manufacturer's instructions. A copy of the installation instructions shall remain with the appliance or equipment at the completion of the installation.

Mechanical room
Ensure the mechanical room complies with the requirements of the Technical Data Manual. In addition, see section entitled Mechanical Room in this manual.

→ *The completeness and functionality of field supplied electrical controls and components must be verified by the heating contractor. These include low water cut-offs, flow switches (if used), staging controls, pumps, motorized valves, air vents, thermostats, etc.*

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

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

Technical literature
Literature for the Vitogas boiler:
- Technical Data Manual
- Installation and Service Instructions
- Operating Instructions and User's Information Manual
- Instructions of other Viessmann products utilized and installed on the Vitogas 050, ECV boiler
- Installation codes mentioned in this manual

→ *This product comes with several safety instruction labels attached. Do not remove! Contact Viessmann immediately if replacement labels are required.*

→ *Leave all literature at the installation site and advise the system operator/ultimate owner where the literature can be found. Contact Viessmann for additional copies.*

About these Installation 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 substantial product/property damage, serious injury or loss of life.

→ *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 product/property damage or minor injury.

→ *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.*

Product Information

⚠ WARNING

Installation, service and maintenance work must be done by qualified and experienced technicians only. Improper installation, service or maintenance could create a hazard, which could result in property damage, severe personal injury and/or loss of life.

The Vitogas 050, ECV boiler is for use in closed-loop forced circulation hot water heating systems only. Boiler operation is limited by ASME Code to maximum water pressure of 50 psig and maximum water temperature of 248°F/120°C. The vast majority of applications operate below 30 psig and below 194°F/90°C.

The boiler model selected should be based on an accurate heat loss calculation of the building.

Necessary permits from local authorities must be obtained before installing boiler. Installation must be made in accordance with local ordinances which may differ from the instructions in this manual.

Excerpt from our Warranty Terms

⚠ CAUTION

This boiler is not for use in systems where water is constantly or frequently replenished. Minerals such as calcium in make-up water can deposit on heat exchanger causing overheating and eventual boiler leakage. This type of failure is not covered by warranty. Water must not be drained from system for use by cleaning personnel. Do not draw water from boiler for any purpose.

⚠ CAUTION

The boiler warranty does not cover leaks resulting from corrosion caused by the use of underfloor plastic tubing without an oxygen diffusion barrier. Such systems must have the non-oxygen diffusion barrier tubing separated from the boiler with a heat exchanger. Viessmann recommends the use of underfloor plastic tubing with an oxygen diffusion barrier.

The Vitogas 050, ECV boiler is not covered under any warranty terms for damages resulting from the following:

Improper application and installation, installation by unqualified personnel, ignorance of instructions, improper service and maintenance work, incorrect replacement component selection or application, incorrect field wiring. Full warranty applies only when boiler is installed and operated according to instructions and used only with the proper gas and the applicable gas pressures.

Please read boiler warranty card.

Mechanical Room

During the early stages of new home design, we recommend that proper consideration be given to constructing a separate mechanical room dedicated to gas- or oil-fired equipment including domestic hot water storage tanks.

The boiler must be located in a heated indoor space, near a floor drain, and as close as possible to the vertical chimney or vent.

Whenever possible, install boiler near an outside wall so that it is easy to duct fresh air directly to the boiler area. In addition, do not use exhaust fans in the boiler room and do not install the boiler in rooms with refrigeration equipment. This equipment requires uncontaminated outside air for safe operation - do not install where chemicals are stored or in a room with negative pressure. See section entitled "Combustion Air Supply" starting on page 12 for further details regarding the above.

Locate boiler on flooring capable of supporting the weight of the boiler filled with water. Pour a concrete pad if necessary. Ensure that the boiler location does not interfere with the proper circulation of combustion and ventilation air within the mechanical room.

The maximum room temperature of the mechanical room where the boiler is located must not exceed 104°F/40°C.

Standard Equipment

- Wet base sectional cast iron heat exchanger with stainless steel burners
- Induced draft blower and pressure switch
- Electronic ignition
- 24 VAC redundant seat gas valve
- Boiler fully insulated with 1½"/38 mm fiberglass wrap-around blanket
- Boiler control panel with adjustable operating limit (122°F - 194°F), fixed high limit (248°F) and temperature gage
- Pump aquastat to turn pump on at 104°F / 40°C and off at 91°F / 33°.
- One 120/24 VAC transformer
- 30 psig pressure relief valve, pressure gage and fittings
- One cleaning brush

Boiler comes standard equipped with 30 psig ASME-rated pressure relief valve. This 30 psig pressure relief valve may be exchanged at the job site with a 50 psig ASME-rated pressure relief valve only by strictly observing the minimum relief valve capacity in lb/h marked on the nameplate. The maximum allowable working pressure is 50 psig.

Be aware that best overall performance is achieved when all components are properly sized. Sizing of the required circulation pump according to the pipe layout and calculation of a proper volume expansion tank is vital to obtain the system's peak performance.

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Before Set-up

IMPORTANT

Do not use fan blower termination or boiler enclosure paneling to lift/move boiler into its installation location.

CAUTION

The boiler must be installed in such a way that gas ignition system components are protected from water (spraying, splashing, etc.) during boiler system operation and service.

The boiler is shipped on a wooden pallet in a cardboard crate. Crate and wooden pallet must be removed.
Before placing boiler in its installation location, ensure all necessary accessories are installed.

Installation on Combustible Floor

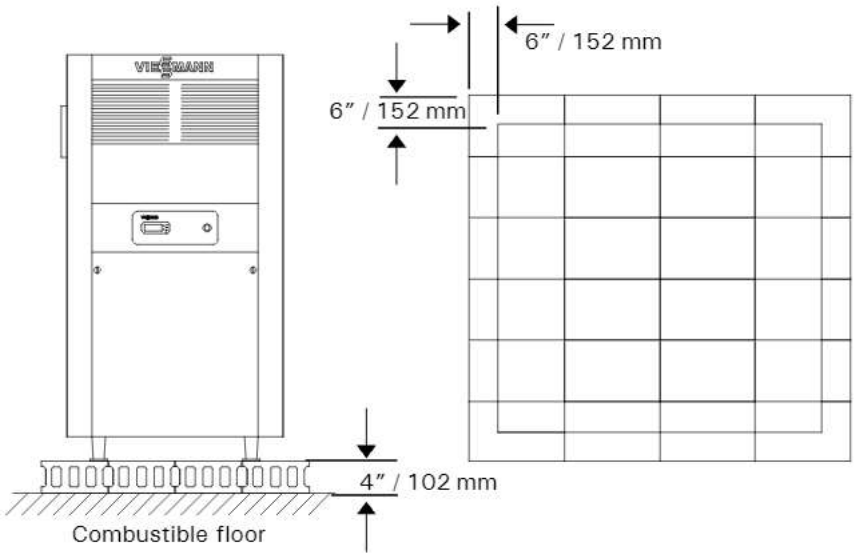


Fig. 1

CAUTION

Do not install boilers on carpeting. Install on non-combustible floor. If the boiler is to be installed on combustible floors or on a mezzanine, it should be equipped with a special base pan. Please reference the Viessmann Price List.

1. Verify that base size and material are in conformity with local codes.
2. Locate the base so that the minimum clearances of boiler to combustible materials are maintained.
3. Base must be constructed of hollow concrete blocks, minimum height 4"/100 mm, and covered with sheet metal at least 24 ga. thick.
4. The base must extend beyond the boiler enclosure by at least 6"/150 mm on all sides.
5. The blocks must be placed so as to provide an unbroken concrete surface under the boiler, with the hollows running continuously and horizontally to allow air circulation.

Combustion Air Supply

CAUTION

Follow local regulations with respect to CO detectors. Follow all safety information from LP or gas supplier.

This boiler needs fresh air for safe operation and must be installed so there are provisions for adequate combustion and ventilation air. Refer to requirements of local jurisdictions in addition to the information in this manual.

All combustion air must come from the outside.

Provisions for combustion and ventilation air must be made in accordance with section 5.3, Air for Combustion and Ventilation, of the National Fuel Gas Code, ANSI Z223.1 (latest edition) or applicable provisions of the local codes. In Canada follow CAN/CSA-B149.1 or .2 Natural Gas Installation Codes (latest edition) for combustion and ventilation air requirements.

Whenever possible, install boiler near an outside wall so that it is easy to duct fresh air directly to the boiler area. See example in Fig. 2. Refer to national codes for duct sizing. Round ducts can be used.

WARNING

Failure to provide an adequate supply of fresh combustion air can cause poisonous flue gases to enter living space which can cause severe personal injury or loss of life.

The boiler location should never be under negative pressure. Exhaust fans, attic fans, or dryer fans may cause air to be exhausted at a rate higher than air can enter the structure for safe combustion. Corrective action must be taken to ensure enough air is available. Never cover the boiler or store debris or other materials near the boiler, or in any way block the flow of adequate fresh combustion air to the boiler.

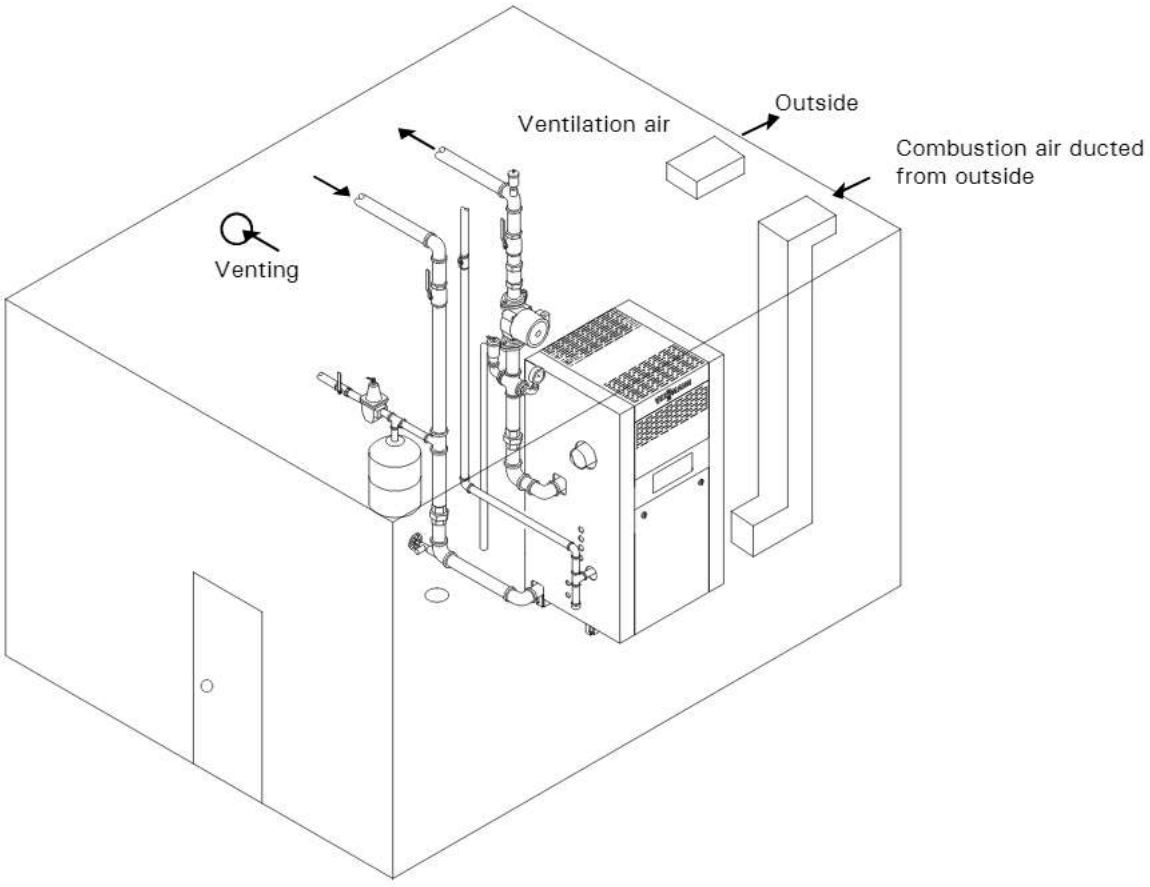


Fig. 2

Combustion Air Supply (continued)

If boiler is installed in a confined space (a space with a volume of less than 50 cubic feet per 1000 Btu/h of gas input for all fuel burning equipment) or building construction is unusually tight, adequate air for combustion must be provided by two openings: one located about 6" below the ceiling, the other about 6" above the floor. When communicating directly with the outside, each opening must have a minimum free area of one square inch per 2000 Btu/h of gas input. When all combustion air is provided by openings in doors, etc. to adjoining spaces having adequate infiltration, each opening must have a minimum free area of one square inch per 1000 Btu/h of gas input, but not less than 100 square inches. See table below.

Boiler size	Recommended combustion and ventilation air openings for closet installation
ECV-65, -80	10"x10" open or 14"x10" for metal louvers
ECV-100, -115	18"x6" open or 18"x10" for metal louvers
ECV-140, -155	22"x7" open or 22"x10" for metal louvers

You must know the free area of louvers used to cover up the combustion and ventilation openings in closet installations. If you do not know the free area, assume 20% for wood louvers and 60-75% free area for metal louvers. When using louvers, the openings have to be made larger. For example, a free 10" x 10" opening becomes a 14" x 10" opening for a grill containing metal louvers.

⚠ CAUTION

Do not store chemicals containing chlorine or other corrosive chemicals near the boiler, such as bleach, cleaning solvents, detergents, acids, hair spray, spray cans, paint thinners, paint, water softener salt, perchloroethylene, or carbon tetra chloride.

⚠ CAUTION

Exposure to corrosive materials can cause heat exchanger corrosion and failure.

⚠ CAUTION

Do not locate boiler in areas with high dust and/or humidity levels.

⚠ CAUTION

Do not install boiler during construction involving drywall or heavy dust of any kind. Dust can accumulate in the burners and cause sooting. Install boiler after all heavy dust construction is completed.

⚠ CAUTION

If the boiler has been exposed to high dust levels, then all burners and the heat exchanger must be cleaned prior to use.

⚠ CAUTION

If above criteria are not properly observed and boiler damage results, any warranty on the complete boiler and related components will be null and void.

Minimum Clearances

Recommended minimum service clearances

Side	mm	inches
Rear:	610	24
Top:	610	24
Right side:	610	24
Left side:	610	24
Front:	1220	48

All clearances are measured from boiler enclosure.

Minimum clearances to combustibles

Side	mm	inches
Rear:	25	1
Top:	150	6
Right side:	25	1
Left side:	150	6
Front:	150	6
Floor:	non combustible	

Above clearances apply to all ECV boilers.
(all measurements from boiler enclosure)

Minimum Clearances (continued)

Closet and alcove installation

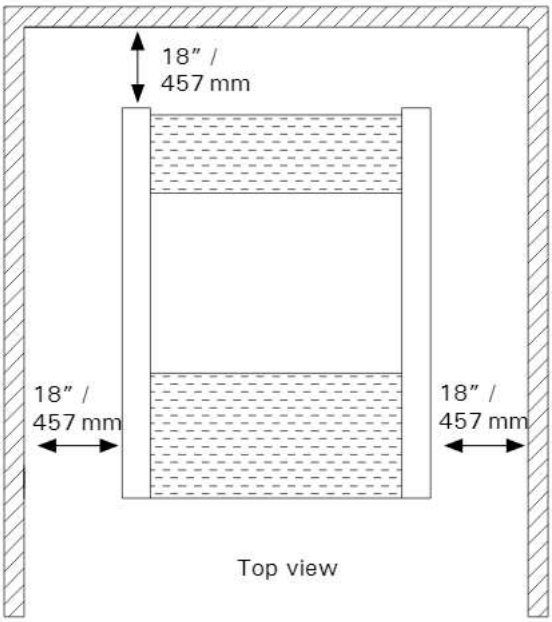


Fig. 3
Alcove installation for ECV-180, -200 boiler

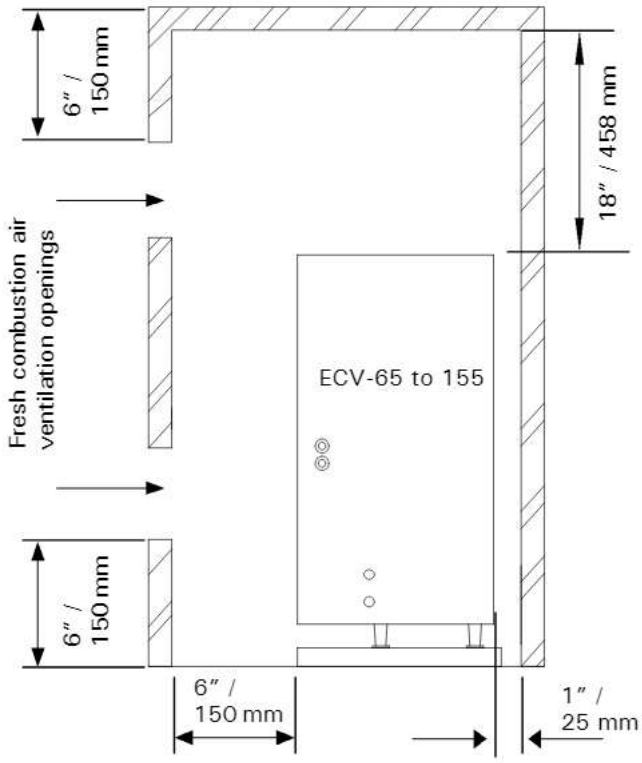


Fig. 4

Vitogas 050, ECV-65 to 155 boilers are approved for closet installation.
Vitogas 050, ECV-180, -200 boilers are approved for alcove installations. Do not use models ECV-180, -200 for closet installations.

Please note that the minimum clearance to combustibles listed below will apply when the boiler is located in a room large in comparison with the size of the equipment. Please see the Uniform Mechanical Code for definition. If the boiler is installed in a space that does not fit the definition of a ¨room large in comparison with the size of the equipment¨, then it is considered a closet or an alcove installation and the closet or alcove installations apply.

If boiler is located in a confined space, install main gas shutoff valve and main power supply switch in easily accessible location outside the confined space.

CAUTION

Permits from local authorities must be obtained before installing the boiler.

CAUTION

Installation must be made in accordance with local ordinances which may differ from this installation manual.

Flushing of Existing Piping

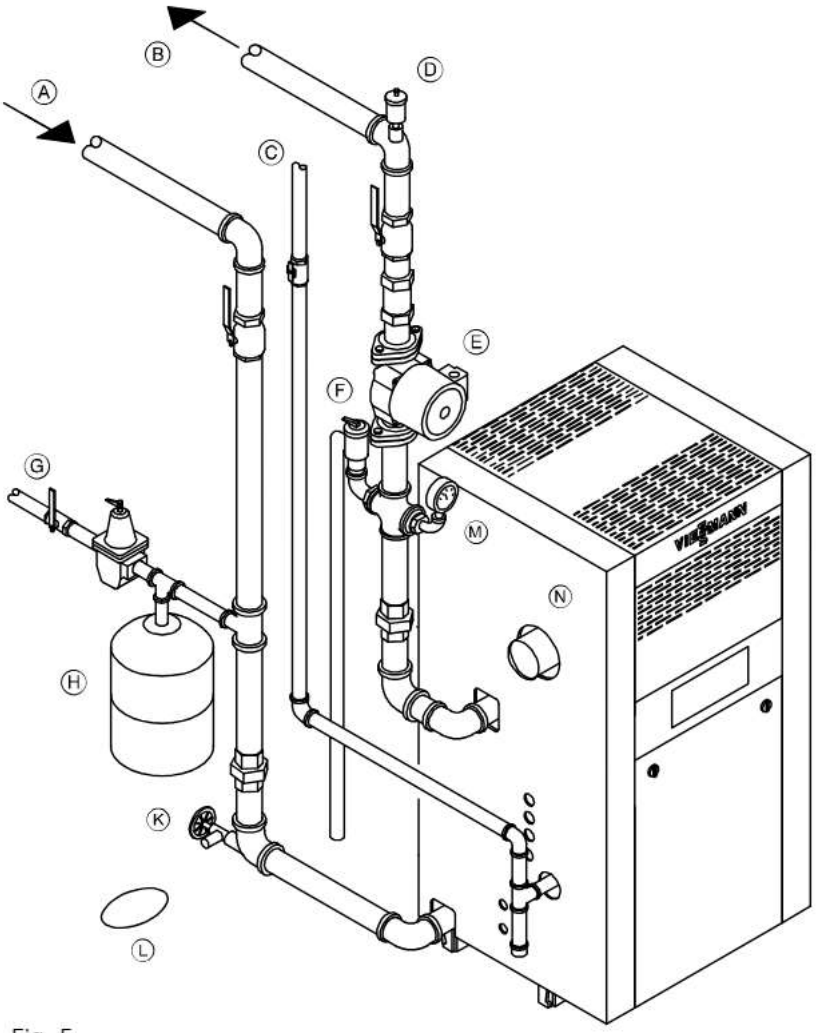


Fig. 5

Legend
- Ⓐ Return
- Ⓑ Supply
- Ⓒ Gas pipe
- Ⓓ Air vent (field supplied)
- Ⓔ Circulating pump
- Ⓕ Pressure relief valve
- Ⓖ City water
- Ⓗ Diaphragm expansion tank
- Ⓚ Drain
- Ⓛ Floor drain
- Ⓜ Pressure gage
- Ⓝ Vent connection

Before boiler is connected to a piping/heating system which has previously been in service (the ECV is a replacement boiler), the piping system should be flushed thoroughly with water in order to remove sludge or other contaminants, especially in large piping systems such as old gravity pipe systems. Flush from the top of the system with city water pressure. Failure to flush out system can lead to deposits in boiler resulting in boiler failure. This type of failure is not covered under warranty.
Typical boiler piping is shown in Fig.5.

The following lists typical water flow rates for the ECV boiler series:

Model	Flow rate (GPM) for 20°F rise	Flow rate (GPM) for 30°F rise
ECV-65	5.3	3.5
ECV-80	6.6	4.4
ECV-100	8.3	5.5
ECV-115	9.5	6.3
ECV-140	11.6	7.7
ECV-155	12.8	8.5
ECV-180	14.9	9.9
ECV-200	16.6	11.0

The water pressure drop for ECV-65 to -200 is:

GPM	Pressure drop (ft. of water)
10	.33
15	.60
20	1.20

Removal of Existing Boiler

⚠ WARNING

The Vitogas 050, ECV boiler has a positive vent pressure when vented horizontally with 3″ or 4″ pipe. Do not common vent with any other appliance. Failure to heed this warning can cause carbon monoxide poisoning which can result in severe personal injury or loss of life.

⚠ CAUTION

The gas ignition system and components must be protected from water (dripping, spraying, rain etc.) during appliance operation and service (circulator replacement, control replacement, etc.).

When an existing boiler is removed from a common venting system, the common venting is likely to be too large for proper venting of the appliances remaining connected to it and may require the installation of a proper-sized chimney liner.

Boiler Piping in a Heating/Cooling Application

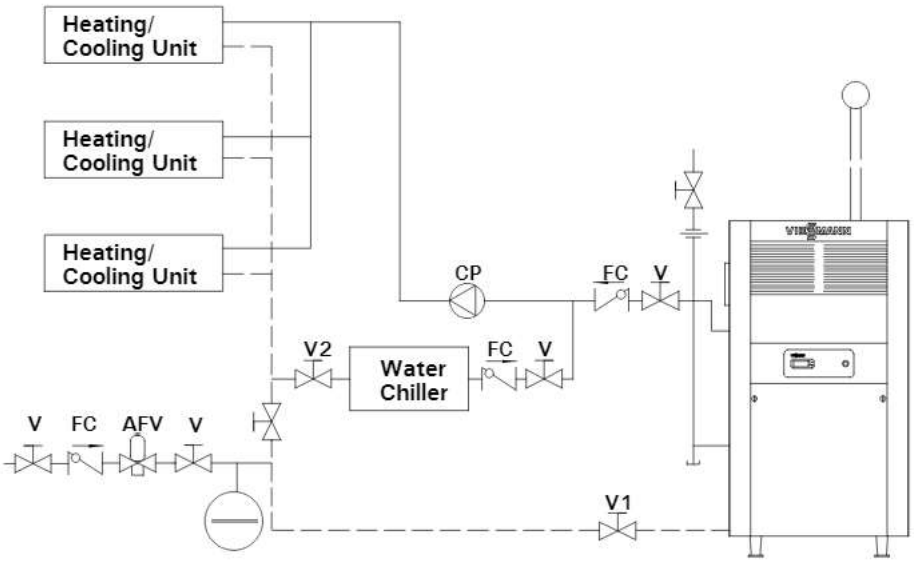


Fig. 6

The boiler, when used in connection with a refrigeration system, must be installed so the chilled medium is piped in parallel to the boiler with appropriate valves to prevent the chilled medium from entering the boiler (see Fig. 6). The boiler piping system of a hot water heating boiler connected to heating coils located in air handling units where they may be exposed to refrigerated air circulation must be equipped with flow control valves or other automatic means to prevent gravity circulation of the boiler water during the cooling cycle.

Check installation instructions of chiller manufacturer carefully for additional requirements.

Cooling season starts: Close valve V1 and open valve V2.
Heating season starts: Close valve V2 and open valve V1.

A metal tag should be attached to these valves as to purpose.

Venting Connection

The Vitogas 050, ECV boiler must be located so that the vent length is as short and direct as possible. The minimum equivalent length is 10 ft. All products of combustion must be safely vented to the outdoors. Do not common vent with any other appliance. The Vitogas 050, ECV vents under positive pressure and is a Category III boiler.

⚠ WARNING

Failure to ensure that all flue gases have been safely vented to the outdoors can cause property damage, severe personal injury, or loss of life. Flue gases contain deadly carbon monoxide.

This boiler model was certified by an independent testing agency to withstand 40 mph winds. Areas with frequent winds above 40 mph may not be suitable for the ECV boiler. The vent termination should be located on a wall that is least affected by prevailing winds. High winds may affect the boiler operation and/or degrade the exterior finish of the wall. If wind is a problem then steps should be considered to protect the vent terminal from high winds, such as a fence or shrub. Ensure that the total equivalent length is not exceeded.

All parts of the vent system must be accessible for inspection, repair, service, or replacement. Do not enclose the vent pipe such that the vent is not accessible for inspection, service, or replacement.

⚠ CAUTION

Under certain climatic conditions some building materials may be affected by flue products expelled in close proximity to unprotected surfaces. Sealing or shielding of the exposed surfaces with a corrosion resistant material (e.g. aluminum sheeting) may be required to prevent staining or deterioration. The protective material should be attached and sealed (if necessary) to the building before attaching the vent termination. It is strongly recommended to install the vent termination on the leeward side of the building.

Installing Z-FLEX AL-29-4C special stainless steel venting system

The AL-29-4C stainless steel venting system is completely sealed when fully assembled. Locking bands are used to reinforce the joints between pipe and fittings. Every fitting requires an application of high temperature silicone (see Fig. 7).

IMPORTANT

Do not use any other venting material. Do not use galvanized pipe. Do not use plastic pipe of any kind.

⚠ WARNING

Use of vent material other than Z-Flex AL-29-4C stainless steel, positive pressure vent pipe and fittings can cause property damage, severe personal injury, or loss of life.

Contents of vent kit:

Components	Part No.	Quantity
5 ft. length of pipe	5400 088	3
High temperature silicone	5400 109	1
90° elbow	5400 089	3
Vent termination (square)	5400 114	1
Locking band	5400 113	8

The contractor may substitute 45° elbows where needed. The total equivalent length of all parts in the vent kit is 24 ft. which exceeds 20 ft. of equivalent length. The lengths of pipe and number of elbows have been chosen for installation flexibility. You should have at least 4 ft. of equivalent length left unused.

Venting Connection (continued)

Maximum vent length

IMPORTANT

Maximum equivalent vent length (all models) is 20 ft. for 3″ of pipe.
Maximum equivalent vent length (all models) is 30 ft. for 4″ of pipe.
Do not exceed maximum vent length.

IMPORTANT

The minimum equivalent vent length for all models is 10 ft.

Example of maximum vent length calculation:

	Equivalent length
12 ft. of pipe length 3″ dia.	12 ft.
2 90° elbows 3″ dia.	6 ft.
Total equivalent length	18 ft.

Vent termination not included in vent length calculation.

Fitting	Equivalent length
90° elbow (3″ and 4″ pipe)	3 ft.
45° elbow (3″ and 4″ pipe)	2 ft.

Venting Connection (continued)

Installing Z-FLEX pipe and fittings

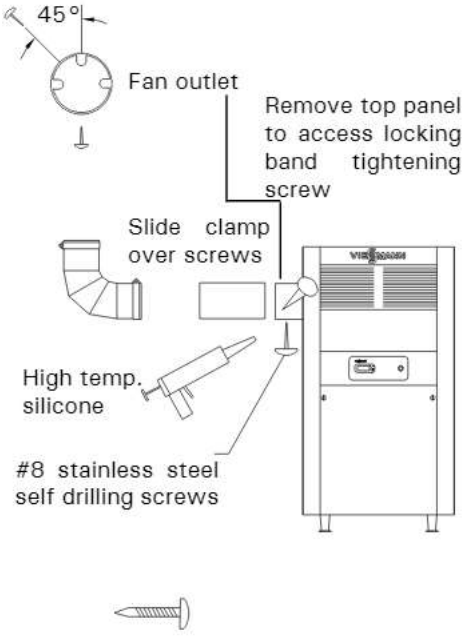


Fig. 7

IMPORTANT

- **Use liberal beads of silicone to seal joints.**
- **Use pipe hangers or metal strapping to support vent pipe.**
- **Vent length should be as short and as direct as possible.**
- **Clearance to combustibles must be maintained at 3". Fiberglass insulation sleeve material may be installed over pipe to reduce clearance to 1" from combustibles. Tape sharp edge of pipe to allow insulation to slide over. Remove tape when finished. Do not enclose vent in combustible material.**
- **Do not install vent pipe in joist space closed in by drywall or other ceiling materials which prevent accessibility.**
- **Do not install vent pipe in an unheated space where freezing temperatures occur.**
- **Do not use screws to secure the vent pipe except at the boiler fan adaptor connection (see Fig. 7).**

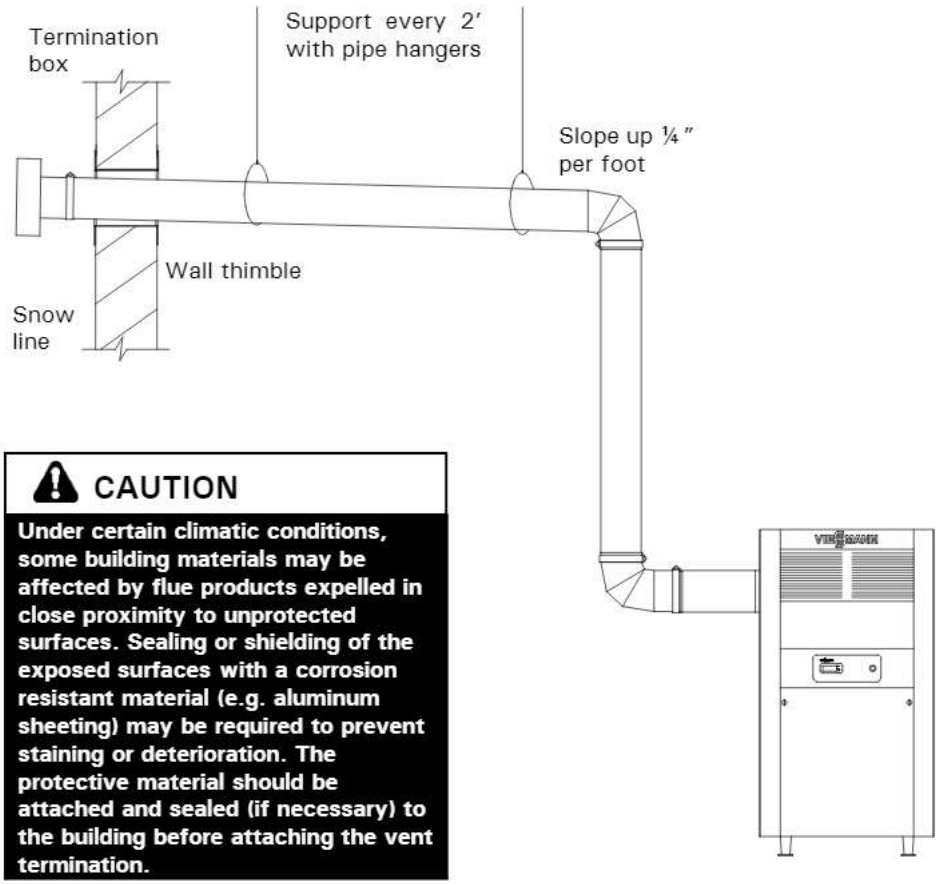
Use a hacksaw or sheet metal snips to cut the pipe to size. Use a file to smooth rough edges. Pipe must be round and not bent into an oval shape. All joints must be made with high temperature silicone.

The connection to the boiler is made with a short length (e.g. 8½") of pipe (male end on each side). Apply a bead of silicone to the fan adaptor and screw the short length of pipe to the fan adaptor with the #8 self-drilling stainless screws provided (see Fig. 7).

Continue on from the short piece with the rest of the venting. Do not install vent pipe such that flue gases flow downwards. There must be NO leakage of flue gas into the space. Check for leaks with gas turned off and fan running. Use a soapy solution to check for vent leaks.

FLEXMASTER has drain fittings available for condensate drainage from the vent system. Experience has shown not enough condensate forms to keep a drain tap primed.

Use figures (Figs.7 - 8) to install the venting system together with the Z-Flex Model SVE, Series II Installation Instructions.



CAUTION

Under certain climatic conditions, some building materials may be affected by flue products expelled in close proximity to unprotected surfaces. Sealing or shielding of the exposed surfaces with a corrosion resistant material (e.g. aluminum sheeting) may be required to prevent staining or deterioration. The protective material should be attached and sealed (if necessary) to the building before attaching the vent termination.

Fig. 8

WARNING

Annual inspection of the vent system, fan and wheel for corrosion, leaks and damage must be done by a qualified technician to ensure safe operation. Failure to perform periodic inspections and repair or replacement can cause property damage, severe personal injury, or loss of life. Birdscreen must be intact at all times to prevent dangerous blockage of vent gases by birds' nests.

Venting Connection (continued)

Vent terminal connection

The vent must be installed observing local regulations in addition to National Codes, CAN/CSA-B149.1 or 2, or ANSI Z223.1. A vent shall not terminate:

1. directly above a paved sidewalk or paved driveway which is located between two single-family dwellings and serves both dwellings;
2. less than 7 ft. (2.13 m) above a paved sidewalk or a paved driveway located on public property;
3. within 6 ft. (1.8 m) of a mechanical air supply inlet to any building (clothes dryer vents and non-sealed combustion furnace and hot water heater vents should be considered to be mechanical air inlets);
4. above a meter/regulator assembly within 3 ft. (900 mm) horizontally of the vertical center-line of the regulator;
5. within 6 ft. (1.8 m) of any gas service regulator vent outlet;
6. less than 1 ft. (300 mm) above grade level or anticipated snow level (consult local building authorities or local weather office). Locate the vent terminal so that it cannot be blocked by snow;
7. within the following distances of a window or door which can be opened in any building, any non-mechanical air supply inlet to any building, or the combustion inlet of any other appliance:
   i) 12 inches (300 mm) (CSA) for inputs up to and including 100,000 Btu/h (30 kW). Note ANSI requires 4 ft. (1.22 m);
   ii) 3 ft. (1 m) (CSA) for inputs exceeding 100,000 Btu/h (30 kW). Note ANSI requires 4 ft. (1.22 m);
8. underneath a veranda, porch or deck;
9. within 6 ft. (1.8 m) of an inside corner formed by 2 exterior walls; 10 ft. (3.0 m) or greater is recommended where possible;
10. within 29" (736 mm) horizontally or vertically from any soffit not containing an air intake opening;
11. in areas where condensation may cause problems, such as above planters, patios, or adjacent to windows where flue gases may cause fogging;
12. within 3 ft. (1 m) to the property line (advisable, not mandatory - check with local building authorities and municipal bylaws);
13. at a location where ice formation on the ground can present a hazard;
14. so that the flue gases are directed towards brickwork, siding, or other construction, in such a manner that may cause damage from heat or condensate from the flue gases;
15. where discharging hot flue gases may cause property damage or personal injury.

Venting Connection (continued)

Riser box

If unable to find sufficient clearance above grade at the point where the vent passes through the outside wall, a vent riser box may be used.

If a vent riser box is being considered, remember to include the equivalent lengths of two elbows (6 ft. / 1.83 m) plus the height of the riser in the vent length calculations. Do not exceed the total equivalent length of 20 ft. / 6 m. Also, the termination tee must be ordered.

The vent pipe enclosed in the riser box must be insulated to resist condensate freeze-up. The riser box must be sealed to prevent moisture entering and soaking insulation. If the exterior wall finish is a combustible material, the vent riser box should be constructed to provide sufficient clearance to combustibles.

⚠ CAUTION

Condensation can occur in the heat exchanger if boiler is operated for long periods of time with low return water temperatures (e.g. 120°F or less). Significant condensation in the boiler will cause corrosion and premature failure. This type of failure is not covered under warranty.

For boilers connected to large water content systems, such as a previous gravity system with large free-standing column type radiators, a bypass line from supply pipe to the return pipe can be used. A minimum return water temperature of 120°F can be achieved by diverting some of the flow of heated supply water into the flow of return water to the boiler. Valves suitable for balancing, such as globe valves, shall be used and a thermometer installed in the return line.

⚠ WARNING

The induced draft blower cannot compensate for inadequate combustion air. The blower is for the venting system only. Failure to provide adequate fresh combustion air can cause property damage, severe personal injury, or loss of life.

The Vitogas 050, ECV boiler is also approved for Flex-L Star-34 vent. If using this vent model, please contact Viessmann for the corresponding installation instructions.

For boilers connected to underfloor heating systems utilizing plastic tubing with an oxygen diffusion barrier, a 4-way mixing valve with external control or other suitable alternative must be installed to prevent condensation and keep boiler return water a minimum of 120°F.

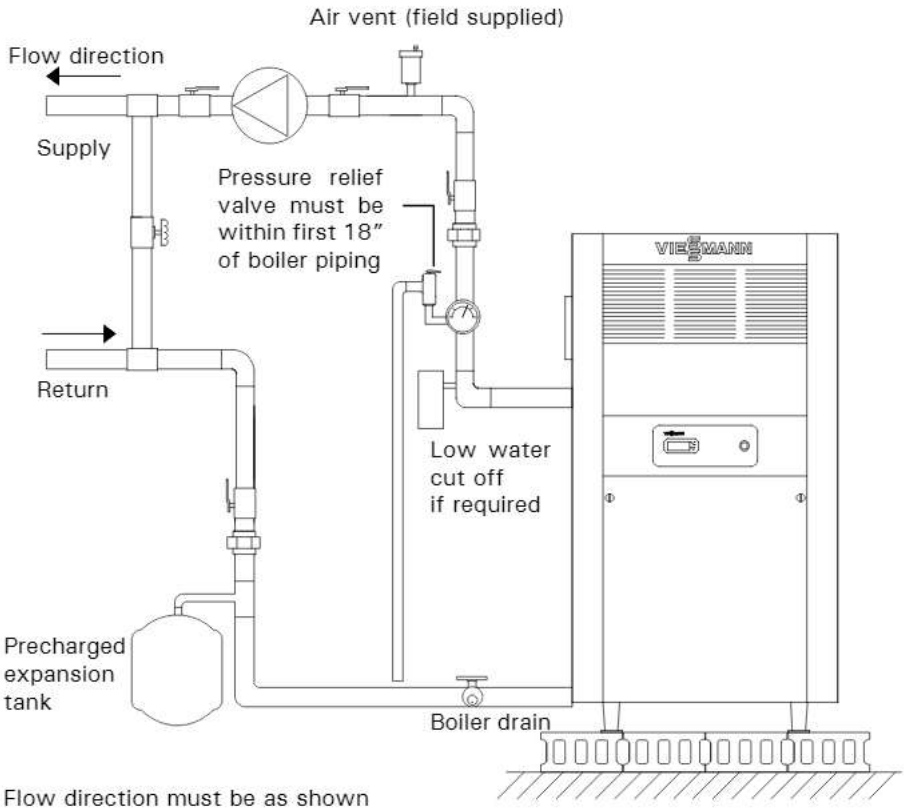
Manufacturer can be contacted to help resolve doubts and technical aspects of boiler installation.

Installation Checklist

Prior to and after the installation, use the following check list to ensure proper installation. Improper installation could create a hazard, resulting in property damage, severe personal injury, or loss of life. The correct answer is "yes" to all of the following questions.

	✓		✓	
Is the flow direction correct? Water flows in at bottom from the system connection and out at top 1¼" connection?		Yes		No
Is the pump electrically connected to the pump aquastat?		Yes		No
Is the boiler located so that the vent pipe length is minimized?		Yes		No
Is the outside vent terminal at least 1 ft. / 0.3 m above the usual snow level for your area?		Yes		No
Are all joints in the vent system siliconed and clamped tight so that there are no leaks? Is the vent pipe properly supported?		Yes		No
If the ECV boiler has been installed in an older piping system, has the system been flushed out to ensure debris, scale, rust and sludge will not settle in boiler?		Yes		No
Is the ECV vent pipe properly supported every 2 ft. / 0.6 m with metal strapping?		Yes		No
Is there an adequate supply of fresh combustion air?		Yes		No
Is the outside vent terminal located on a wall away from prevailing winds?		Yes		No

Low Water Cut-off



Flow direction must be as shown

Fig. 9

If the ECV boiler is installed above radiation level, a low water cut-off device must be installed. See Figs. 9 and 10 for location of low water cut-off device. Note: Flow direction must be as shown in Fig. 9. Low water cut-off supplied by others. When 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.

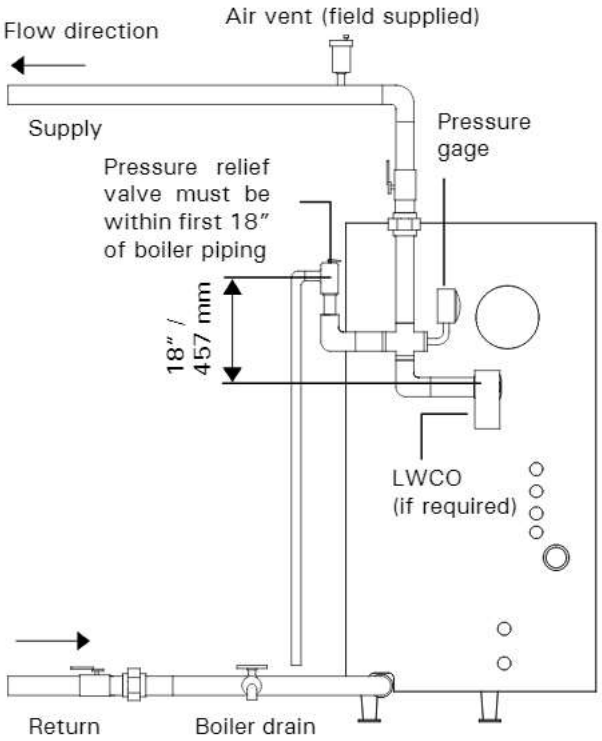


Fig. 10

Initial System Fill

Treatment for boiler feed water should be considered in areas of known problems, such as high mineral content and hardness. In areas where freezing might occur, an antifreeze may be added to the system water to protect the system. Please adhere to the specifications given by the antifreeze manufacturer. Do not use silicate based automotive anti-freeze solutions.

Please observe that an antifreeze/water mixture may require a backflow preventer within the automatic water feed and influence components such as diaphragm expansion tanks, radiation etc. A 40% antifreeze content will give freeze-up protection to -25°C (-13°F). Do not use antifreeze other than specific brands made for hot water heating systems. System also may contain components which might be negatively affected by antifreeze. Check total system frequently when filled with antifreeze.

A field supplied pressure reducing valve (or "fill" valve) is required to reduce the incoming water pressure to 12-15 psig (see Figs. 5 and 6 on pages 16 and 17).

Pressure Relief Valve

⚠ CAUTION

The pressure relief valve must not cap, plug or otherwise obstruct discharge pipe outlet. Do not pipe discharge to outdoors.

The 30 psig ASME-rated pressure relief valve supplied with the boiler must be installed. Do not install valve between pressure relief valve and boiler. When installing a discharge pipe from pressure relief valve to drain, adhere to the following excerpt from ASME Boiler and Pressure Vessel Code, Section IV. Use fittings supplied in accessory pack to install pressure relief valve.

1. *When a discharge pipe is used, its internal cross-sectional area shall be not less than the full area of the valve outlet or of the total of the valve outlets discharging there into and shall be as short and straight as possible and so arranged as to avoid undue stress on the valve or valves. When an elbow is placed on a safety relief valve discharge pipe, it shall be located close to the valve outlet.*

2. *The discharge from safety or safety relief valves shall be so arranged that there will be no danger of scalding attendants. When the safety or safety relief valve discharge is piped away from the boiler to the point of discharge, there shall be provisions made for properly draining the piping. The size and arrangement of discharge piping shall be such that any pressure that may exist or develop will not reduce the relieving capacity of the relieving devices below that required to protect the boiler.*

Gas Piping

Before connecting gas boiler to gas line, install main gas shut-off valve, union, and capped drip leg (see Fig. 11 below).

Size gas supply piping to boiler according to local utility requirements.

Identify the main shut-off valve as such with a tag and familiarize owner of boiler with this valve.

Support piping by proper suspension method. Piping must not rest on or be supported by boiler.

Testing Gas Pipe

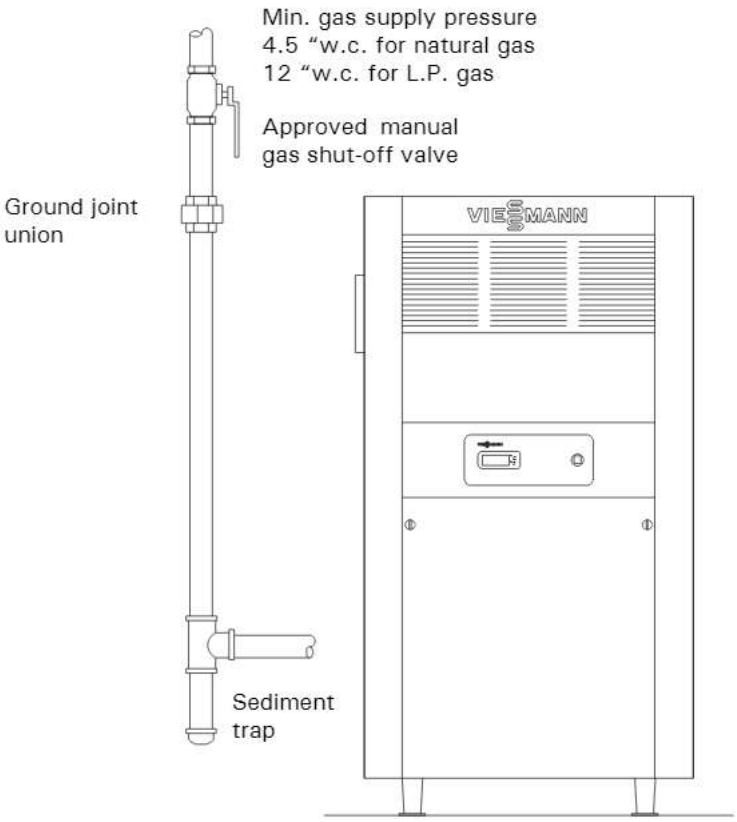


Fig. 11

The boiler and its individual shut-off valve must be disconnected from the gas supply piping system during any pressure testing of that system at pressures in excess of 0.5 psig (3.5 kPa).

The boiler must be isolated from the gas supply piping system by closing its individual manual shut-off valve during any pressure testing of the gas supply piping system at a test pressure equal to or less than 0.5 psig (3.5 kPa).

Gas manifold has been factory-tested. Leak test must be repeated during initial trial operation of burner by mechanical contractor.

⚠ CAUTION

Never check for gas leaks with an open flame. Use approved spray liquid or soap water solution for bubble test.

⚠ WARNING

Maximum gas supply pressure is 14 "w.c. / 0.5 psig. Boiler must be disconnected from gas piping for piping pressure tests above 14 "w.c. / 0.5 psig.

Gas Pressure - Orifice Sizes

PILOT PRESSURE FOR Q3451A PILOT	
Natural Gas	5 - 7 "w.c.
Propane Gas	8 - 10 "w.c.

Natural Gas
Minimum gas valve inlet pressure ..... 4½ "w.c.
Maximum gas valve inlet pressure ..... 14 "w.c.
Propane Gas
Minimum gas valve inlet pressure ..... 11 "w.c.
Maximum gas valve inlet pressure ..... 14 "w.c.

Manifold orifices - natural gas (1,000 Btu/cu. ft.)

Boiler size ECV	Orifices required	Low altitude 0-610 m 0-2000 ft. Orifice size ø	High altitude 610-1370 m 2000-4500 ft. Orifice size ø	Gas valve. manifold pressure "w.c.
65	2	2.65	2.55	3.5
80	2	2.95	2.80	3.5
100	3	2.70	2.60	3.5
115	3	2.85	2.75	3.5
140	4	2.75	2.65	3.5
155	4	2.85	2.80	3.5
180	5	2.80	2.65	3.5
200	5	2.95	2.80	3.5

Manifold orifices - propane (2,500 Btu/cu. ft.)

Boiler size ECV	Orifices required	Orifice size	Low altitude 0-610 m 0-2000 ft Gas valve/manifold pressure "w.c.	High altitude 610-1370 m 2000-4500 ft. Gas valve/manifold pressure "w.c.
65	2	1.60	10	8
80	2	1.80	10	8
100	3	1.65	10	8
115	3	1.75	10	8
140	4	1.70	10	8
155	4	1.75	10	8
180	5	1.70	10	8
200	5	1.80	10	8

All orifice sizes given in mm! Orifice size is stamped onto each orifice for identification. When ordering orifices, state boiler size, type of gas, number of orifices required and orifice size.

Gas Burner Removal

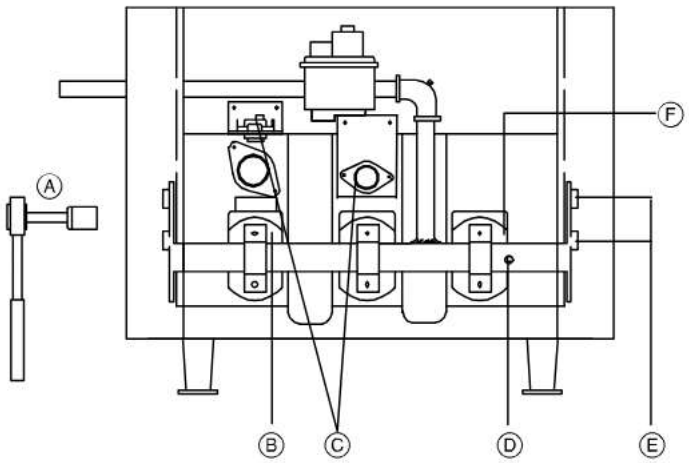


Fig. 12

Legend
- Ⓐ Socket wrench (13 mm)
- Ⓑ Pilot burner location for ECV-65, 80, 100, 115, 140, 155
- Ⓒ Flame roll-out switch
- Ⓓ Manifold pressure test port
- Ⓔ Manifold attachment screws (2 per side)
- Ⓕ Burner tubes

The main gas burner manifold with the individual stainless steel burners mounted may be easily removed from the boiler.

1. Close the main gas shut-off valve external to boiler.
2. Disconnect all power to boiler.
3. Remove front cover panel from boiler.
4. Break ground joint union before gas valve, remove gas pipe.
5. Disconnect wiring to gas valve. Disconnect wiring from igniter sensor and ground connection.
6. Loosen manifold bolts (do not remove, only loosen). Use socket with extension to access bolts through holes in side panel.
7. Remove burners once manifold is loose.
8. Slide out manifold on an upper angle once burners are removed.

Gas Input

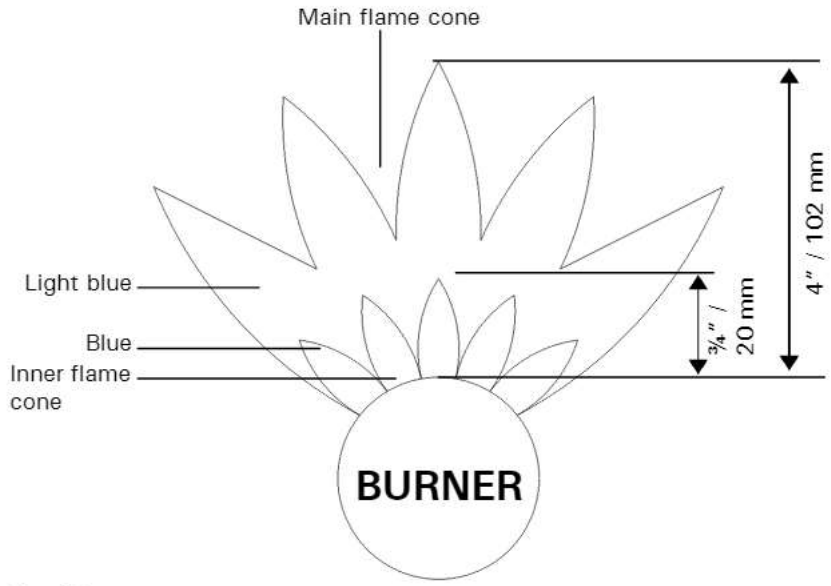


Fig. 13

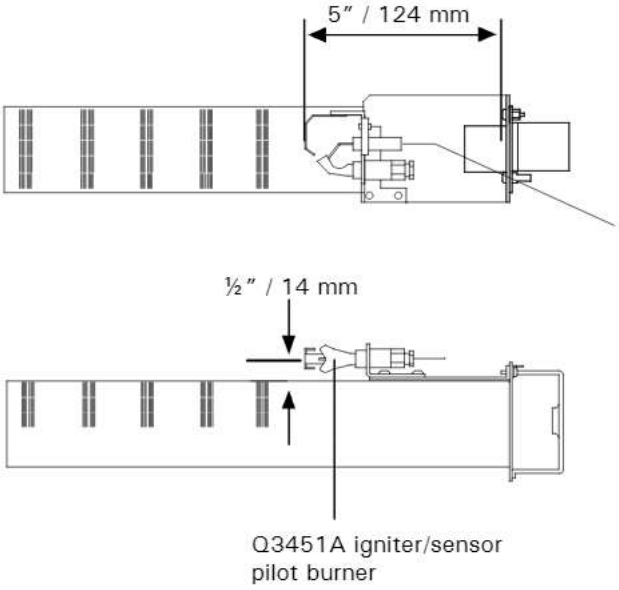


Fig. 14a

CAUTION

Do not exceed input rating stamped on rating plate of boiler.

1. Close main gas shut-off valve.
2. Disconnect main power supply to boiler.
3. Remove plug $^1/_8$" NPT on manifold. Install test plug and connect U-tube manometer or equivalent.
4. Place boiler/burner in operation.
5. Read manifold gas pressure and compare with stamped rating on rating plate. If necessary, adjust pressure on gas valve. Also clock input using gas meter.
   If using meter clocking method: Ensure there is no gas flow through the meter other than to the boiler being checked. Other appliances must remain off, including their pilot burners.
6. Deactivate boiler, reinstall $^1/_8$" NPT plug, place boiler in operation again.
7. Repeat gas leak test at plug $^1/_8$" NPT and ensure tightness.

Main Burner

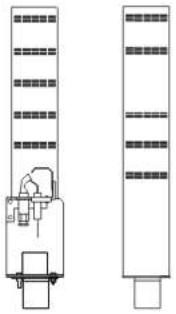
Proper flame: Upper main flame cone with light orange coloring, sharply defined individual flames. See Fig. 13 on previous page.

Underfired: Lazy-burning main flame cone, mushy flame appearance throughout, smaller flame sizes than in Fig. 13.

Overfired: Increased burner noise, larger flame sizes than in Fig. 13.

Gas Burner Positioningg

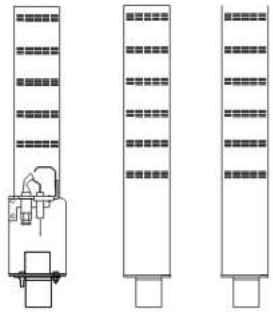
Left **Right**



ECV-(65,80)

Fig. 14b

Left **Right**



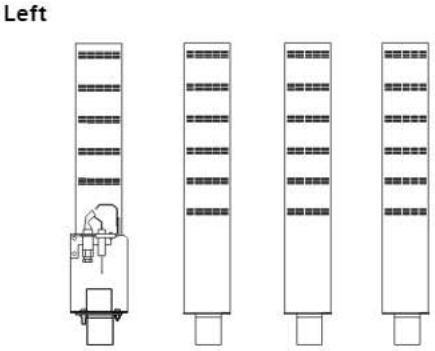
ECV-(100,115)

Fig. 14c

⚠ CAUTION

For ECV boiler with Honeywell intermittent pilot (spark) ignition, the main burner for mounting the Q3451A pilot assembly contains one less group of main burner ports (5). If the burners are disassembled or replaced for any reason, they must be reassembled as shown in Figs. 14a, 14b, 14c, 14d. If the Q3451A pilot assembly is accidentally assembled into a 6 port burner, it will be exposed to the flames from the first row of ports and will overheat and become defective. Defective pilot will prevent boiler from operating, which could cause property damage from freezing.

Gas Burner Positioningg (continued)



ECV-(140,155)

Fig. 14d

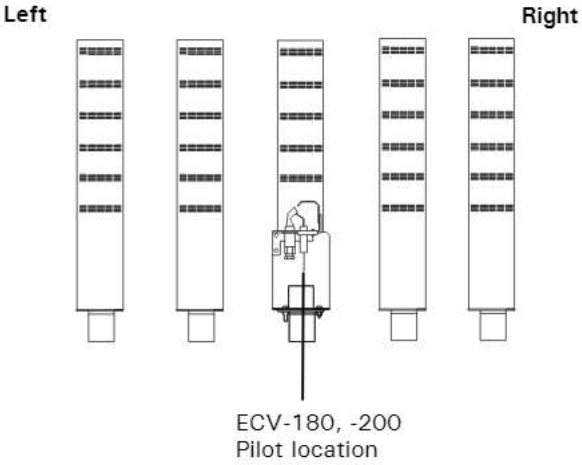


Fig. 14e

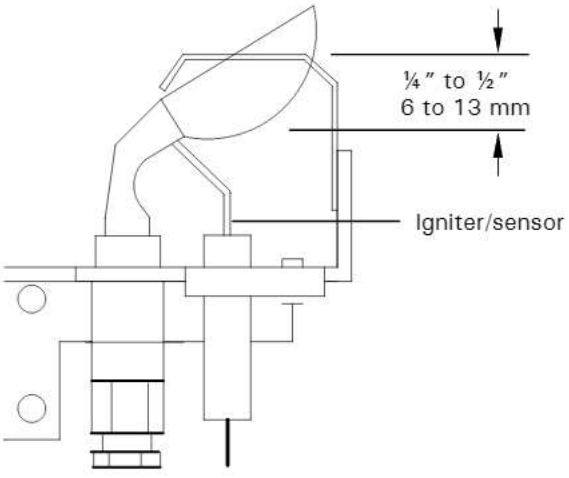


Fig. 15

Every ECV boiler will have a flame roll-out switch (set at 200 °F / 93 °C) located in the burner area (see Fig.12 on page 28).

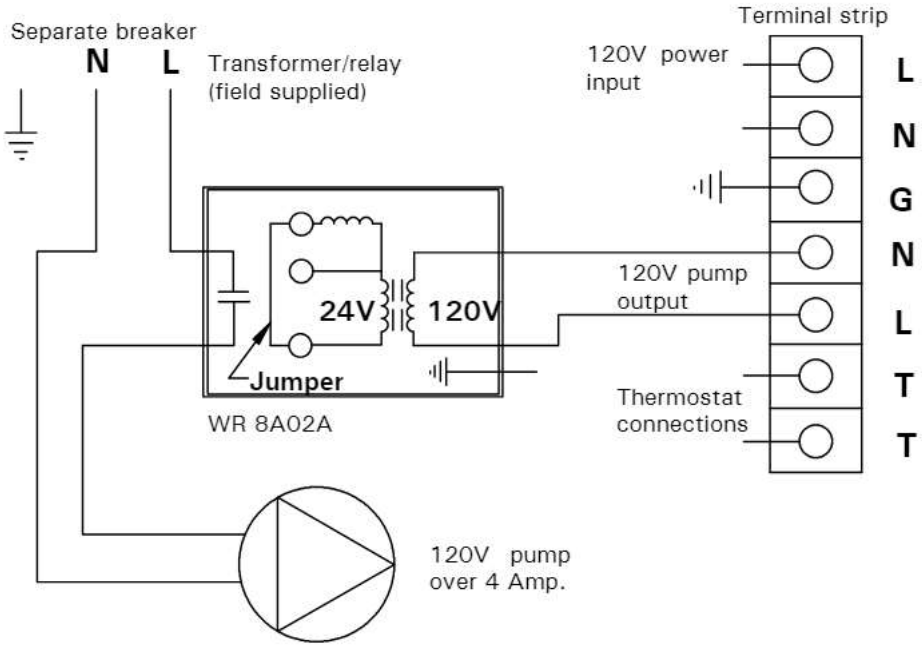
⚠ WARNING

If a flame roll-out switch trips during start-up operation, it indicates a hazardous condition to be corrected immediately.

Figure 15 shows pilot burner flame with proper flame adjustment.

For proper pilot pressure for Q3451B pilot see table on page 27.

Electrical Connections



Using transformer/relay to switch pumps over 4 Amp.
WR 8A02A contact can switch 120VAC, 12 Amp.

Fig. 16

Refer to wiring diagrams on pages 46 and 47. All wiring must be properly grounded! Before attempting to wire unit, disconnect power supply at main service panel first. For pumps exceeding 4 A, refer to Fig. 16 and wiring diagrams on pages 46 and 47.

In the United States all electrical wiring must be in accordance with the National Electrical Code ANSI/NFPA 70 (latest edition).
In Canada all electrical connections must be in accordance with Canadian Electrical Code C22.1 Part 1 (latest edition.)

If an external electrical source is utilized, the boiler, when installed, must be electrically grounded in accordance with the requirements of the authority having jurisdiction or, in the absence of such requirements, with the National Electrical Code, ANSI/NFPA 70.

Electrical Connections (continued)

Pumps under 4 Amp. can be connected directly to boiler terminal strip. Pumps over 4 Amp. must be switched by an external relay or transformer/relay to prevent failure of the pump aquastat See Fig. 16 on previous page.

Pump will not activate until boiler water temperature reaches 116°F. Refer to pump aquastat shown on wiring diagrams.

If boiler has been underwater, all electrical parts must be replaced. All other parts must be inspected by a qualified service agency for acceptability before being used.

Electronic Thermostat Connection

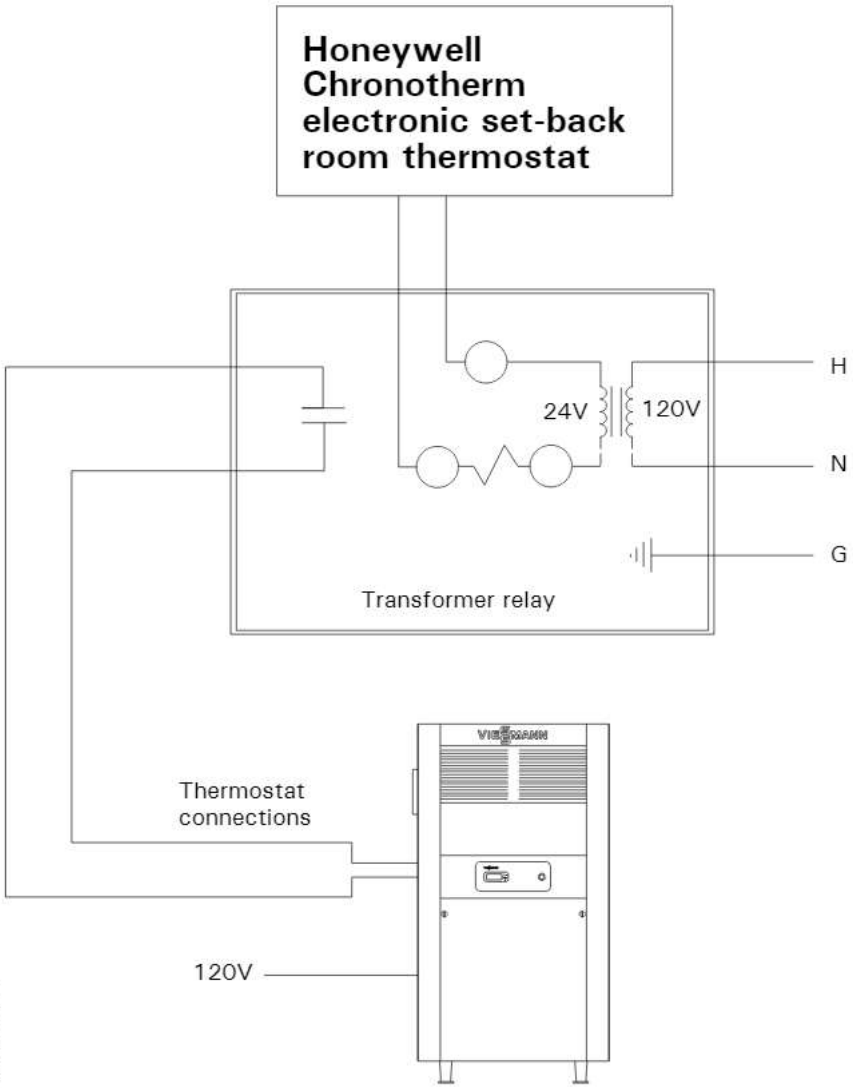


Fig. 17

For those installations where an electronic set-back thermostat is used, an isolation relay may be necessary. Any electronic thermostat that normally requires current from the boiler transformer will require an isolation relay. For example when installing a Honeywell Chronotherm, use an isolation relay as shown in Fig. 17.

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Initial Start-up

The boiler, piping and radiation must be full of water and purged of all air before boiler can be fired. Pressure relief valve must be installed as described on page 25. All installation requirements as described in this manual must be completed.

Follow Lighting and Operating Instructions on page 51.

If the system was shut down for an extended period of time, have a qualified service technician restart and recondition your system.

1. Check if all national and/or local rules and regulations have been adhered to on this installation. Do not attempt to start the boiler if you smell gas. If you smell gas, open windows. Do not touch electrical switches, extinguish any open flame, close all gas valves immediately. Call your gas supplier immediately from a neighbor's phone.

2. Check system for proper water fill (cold fill pressure). Make sure that complete system is properly vented of air. Adjust automatic feed valve to proper desired fill pressure between 12-15 psig.

⚠ CAUTION

Do not tamper with the unit or controls. Never burn garbage or paper in the unit or leave combustible materials around it.

Also pay attention to the following...

1. Once system water is heated, deactivate circulating pump/boiler and vent system of any remaining air within piping, radiation and boiler.

2. Check for proper boiler circulation, pump, zone valve, thermostat or operating control functions.

3. Check high limit aquastat by dialing it to a setting below the water temperature in the boiler. The gas burner must be deactivated. Turning the dial back to a setting higher than the present boiler water temperature must result in reactivation of gas burner.

4. Cycle boiler on and off with the room thermostat (or other operating control) to verify that the burner shuts down when the room thermostat is adjusted below room temperature.

Initial Start-up

Annual shut-down

If boiler is used for comfort heating only and not used with an indirect-fired domestic hot water storage tank, the boiler/heating system should be shut down during the summer.

1. Turn down operating control (thermostat).
2. Disconnect main power switch.
3. Close main gas shut-off valve and turn knob on gas valve to "off" (see Figs. 11 on page 26 and the Lighting and Operating Instructions on page 51).

Viessmann indirectly heated stainless steel DHW tanks may be used with the Vitogas 050, ECV boiler for domestic hot water production. Consult your Viessmann representative for assistance.

⚠ CAUTION

If system is shut down during the heating season and subject to freezing temperatures and is not filled with antifreeze for protection, the system including the boiler must be drained of water. Valve before automatic feed valve (if installed) must be closed; any other valves, air vents and drain valves must stay open after servicing.

Advise the owner/operator

1. Advise the owner/operator of the proper system operation sequence.
2. Explain the equipment as well as the need for combustion air.
3. Demonstrate an emergency shut-down, what to do and what not. Refer to lighting instructions on page 51.
4. Explain that there is no substitute for proper maintenance to help ensure safe operation.

Before leaving jobsite:
Fill in and sign warranty card for boiler and hand over to owner for record keeping.

Service Schedule

⚠ CAUTION

In order to ensure that the boiler continues to operate at its peak performance, safety and efficiency, observe and follow the recommendations for maintenance, inspection and service routine. Early detection of problems and their immediate repair will usually result in less damage, lower repair cost and continued safe operation.

Frequently - by owner	Check pressure gage for correct system (water) pressure. Check for water on floor from discharge pipe of the pressure relief valve or any other pipe, pipe joint, valve or air vent.
	Check for moisture, water, or appearance of rust on flue gas pipes or their joints.
	The area around the outside side wall vent terminal must be inspected frequently when severe weather conditions prevail, otherwise on a weekly basis to ensure that the vent terminal is not blocked by snow, ice or debris.
	Ensure that nothing is obstructing the flow of combustion ventilation air and no chemicals, garbage, gasoline, chlorides, combustible materials, flammable vapors and liquids are stored (not even temporarily) in the vicinity of the boiler.
Periodically	Inspect low water cut-offs, including flushing of float types (if used).
	Inspect flow switch (if used).
	Inspect main burner flame and pilot burner (see Figs. 13 and 14a on page 29).
Annually	A service/inspection of the boiler and the system is mandatory once a year.
Boiler servicing — heat exchanger cleaning	Before heating season starts, boiler/burner should be serviced by a qualified service agency. The owner should establish a service contract with a qualified service agency.

Service Procedure Overview

Service steps

Service Procedure

Service — 1. Shut down heating system

1. Deactivate main power and ensure against accidental reactivation.
2. Disconnect [41] plug.
3. Close gas supply valve.

Service — 2. Cleaning heat exchanger

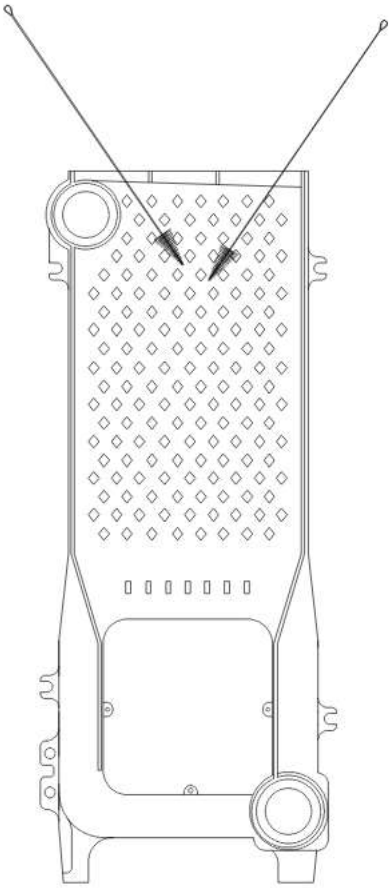

Fig. 18

1. Disconnect power supply to boiler and all heating related components.
2. Close main gas shut-off valve. Allow boiler to cool if necessary.
3. Remove top panel, upper front panel and front access panel.
4. Disconnect vent pipe from fan assembly.
5. Unscrew and remove box collector (4 screws).
   Remove fan motor assembly and inspect blower wheel for any obstructions and/or deformations. Clean as required.

⚠ CAUTION

Do not use water to clean.

6. Disconnect gas line from boiler.
7. Disconnect connection wiring between gas train and main boiler control panel.
8. Remove gas burner assembly from boiler (refer to section entitled *Gas Burner Removal* on page 28).
9. Clean fins by brushing diagonally through sections as shown in the diagram on the left.

⚠ CAUTION

Do not use water to clean cast iron heat exchanger. Use provided brush and vacuum cleaner.

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Procedure (continued)

Service | **2. Cleaning heat exchanger (continued)**

10. Inspect combustion chamber by using a flashlight between front section legs.

11. Before reinserting burner manifold, clean stainless steel burners with a soft brush. Vacuum or sweep away particles.

⚠ CAUTION

Do not use water to clean.

12. Inspect pilot burner system. Check igniter for deterioration.

13. Inspect all parts which come into contact with flue gas for corrosion, deterioration, leaks, and proper operation. Replace parts as necessary with replacement parts obtained from a Viessmann distributor. **Do not** replace with non Viessmann parts.

14. Reverse steps 3 through 8 to reassemble boiler. Seal collector box to side brackets using adhesive backed ½" fiberglass gasket and high temperature RTV silicone sealant (500°F temperature rating).

15. Reconnect all wiring between gas manifold and boiler control panel. See wiring diagram on page 46.

16. Check ignition system for proper operation. See ladder diagram on page 47.

Procedure (continued)

Service | **3. Check flue pipe and vent termination**

> **⚠ CAUTION**
>
> **Under certain climatic conditions, some building materials may be affected by flue products expelled in close proximity to unprotected surfaces. Sealing or shielding of the exposed surfaces with a corrosion resistant material (e.g. aluminum sheeting) may be required to prevent staining or deterioration. The protective material should be attached and sealed (if necessary) to the building before attaching the vent termination.**

Repair or replace as necessary.

Service | **4. Check pressure relief value and system pressure**

Check pressure relief valve and system pressure, and verify proper operation of automatic feed if installed.

Service | **5. Check for leaks**

Check heating pipe joints, valves, air vents, etc. System leaks must be corrected immediately to avoid damages. The cause of any system defect must be determined and corrected in order to prevent property damage, personal injury, or loss of life.

Procedure (continued)

Service 6. Check for proper combustion air supply and ventilation for the boiler

Service 7. Ensure no combustible materials or chemicals are stored near the boiler

Service 8. Check high limits, pumps and low water cut-off

Operate high limits by dialing lower settings, switching burner on/off to verify function of same. If low water cut-off is installed, check and verify proper function according to manufacturer's instructions. If oil lubricated circulating pump is used, check for proper lubrication.

Service 9. Check for gas-tight connection of gas piping, unions, gas valve and manifold

Service 10. Check proper ignition and gas burner operation

Service 11. Perform combustion test

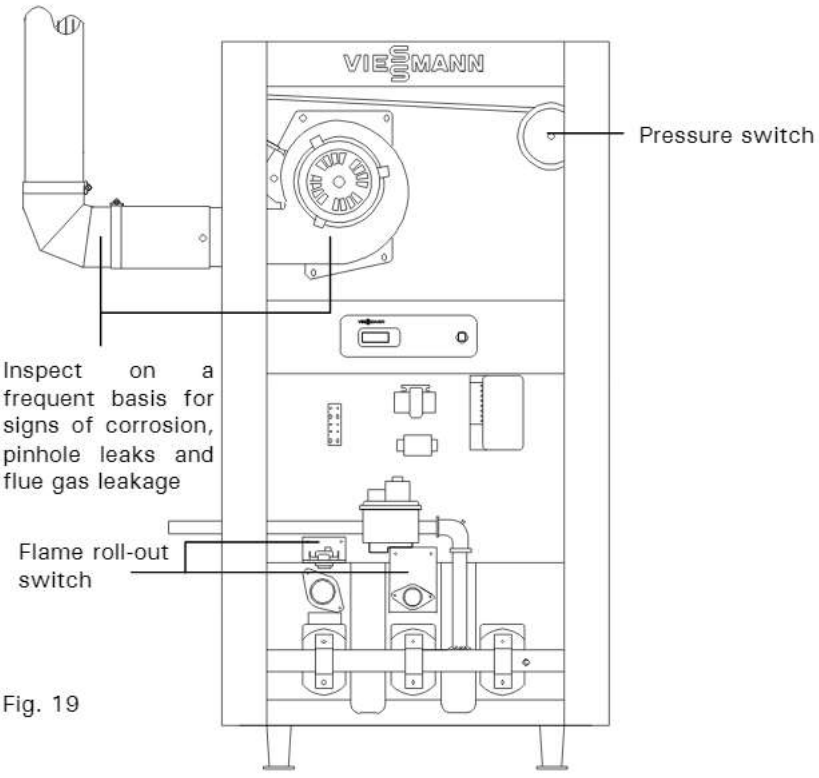


Fig. 19

⚠ WARNING

The built-in power venter and vent system should be inspected annually to ensure that all products of combustion are being safely vented to the outdoors and that there is no leakage from corroded parts or joints (see Fig. 19).
Failure to perform periodic inspections and replacement of damaged, corroded, or worn parts can cause property damage, severe personal injury, or loss of life.

Troubleshooting Guide

Fan does not start	Remedy
Thermostat not calling for heat	Turn up room thermostat
No 120V power	Check 120V power with voltmeter
Fuse or breaker blown	Replace fuse or breaker
Fan relay defective	Replace 24V fan relay
Defective 24V transformer	Replace 24V transformer
Thermostat defective	Replace 24V thermostat
Thermostat wires defective	Check continuity of wires; if necessary, replace wires
Check wires in 120V quick connect plug	Push wire terminals in housing
Fan motor defective	Replace built-in power venter assembly
Manual reset aquastat activated	Reset green button, prevent water from reaching 248°F

Fan runs, pilot does not spark, no pilot gas	Remedy
Pressure switch contacts not closing	Pressure switch defective, replace switch
	Lack of air flow, defective blower (replace blower) or blocked vent (remove blockage, clean heat exchanger)
Flame roll-out switch activated	Flame roll-out switch may have activated because of vibration during shipping. Repeated activation of switch indicates a hazardous condition which must be corrected by cleaning heat exchanger and/or replacing deteriorated power venter
24V sequencer defective	Replace 24V sequencer
Ignition module defective	Replace S8600 module with same model

Fan runs, pilot sparks but does not light	Remedy
Air in gas line	Purge air from gas line
Gas valve turned off	Turn gas valve on
Debris in pilot orifice	Clean pilot orifice
Pilot orifice defective	Replace pilot orifice
Pilot shield missing	Install pilot shield Part No. 9543 383
Faulty ground connection at pilot burner	Replace ground wire
Gas supply has been interrupted	Check incoming gas pressure
Pilot valve on gas valve not opening	Defective gas valve
Ignition module defective	Replace ignition control

Troubleshooting Guide (continued)

Fan runs, pilot lights, burner short cycles	Remedy
Thermostat anticipator too low	Set anticipator to 0.9A on mercury bulb thermostats
No ground or weak ground connection on pilot	Replace ground wire on pilot burner
Pilot on wrong burner	Ensure five-port burner is used (see Fig. 13).
Lack of proper air flow	Remove any obstruction from vent or vent terminal, replace power venter if deteriorated, clean heat exchanger
Excessive wind	Relocate vent terminal, protect from wind with fence or shrub
Ignition module defective	Replace ignition control module

Technical Data

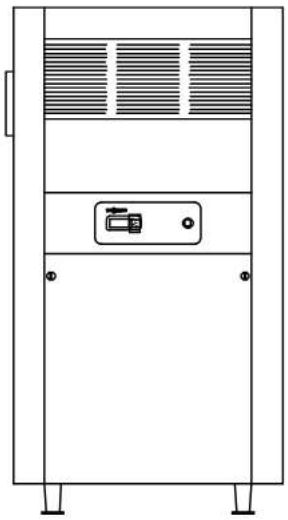


Fig. 20
Front view

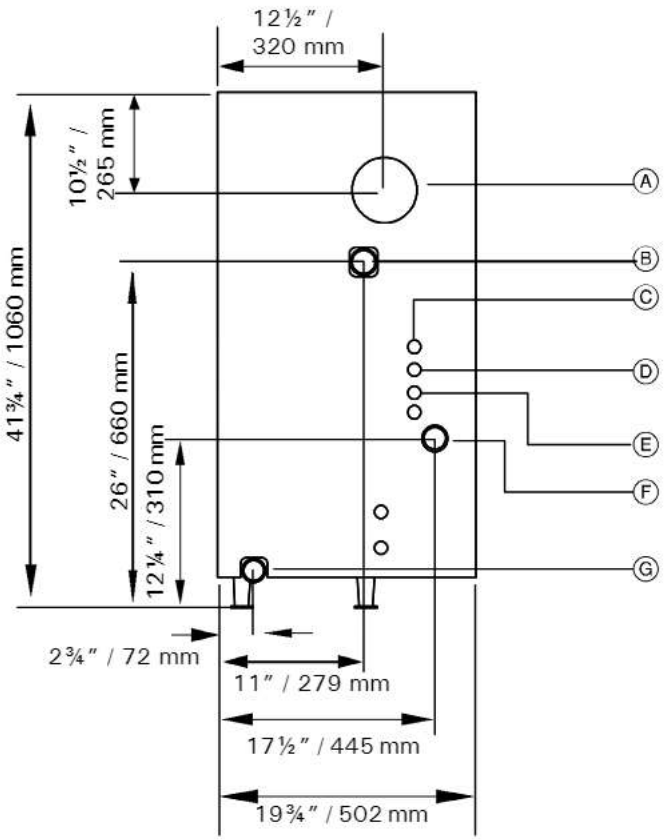


Fig. 21

Legend

- Ⓐ Vent connection, Ø 3" / 76 mm
- Ⓑ Boiler water supply, 1¼" / 32 mm
- Ⓒ 120V power in
- Ⓓ 120V outlet for pump (max. 4 Amp.)
- Ⓔ 24V thermostat 0.9A anticipator setting
- Ⓕ Gas connection, ½" / 13 mm
- Ⓖ Boiler water return, 1¼" / 32 mm

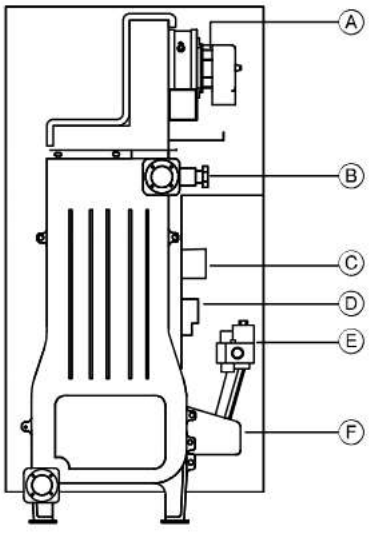


Fig. 22

Legend

- Ⓐ Built-in power venter for sidewall venting
- Ⓑ Boiler well for capilleries
- Ⓒ Transformer
- Ⓓ Ignition control
- Ⓔ 24V gas valve
- Ⓕ Burner manifold

Technical Data (continued)

Boiler Model	Model No.	ECV-65	ECV-80	ECV-100	ECV-115	ECV-140	ECV-155	ECV-180	ECV-200
CSA input	MBH	65	80	100	115	140	155	180	200
	kW	19	23	29	34	41	45	53	58
CSA output	MBH	55	67	84	97	118	131	151	168
DOE heating capacity	kW	16	19	24	28	34	38	44	49
AFUE[*1]	%	83.1	83.1	83.1	83.1	83.1	83.1	83.1	83.1
Steady state efficiency	%	84.5	84.3	84.2	84.5	84.5	84.5	84.0	84.0
Total dimensions									
Length	inches	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾
	mm	502	502	502	502	502	502	502	502
Width	inches	13½	13½	17	17	21	21	25	25
	mm	340	340	432	432	533	533	635	635
Height	inches	39½	39½	39½	39½	39½	39½	39½	39½
	mm	1003	1003	1003	1003	1003	1003	1003	1003
Total weight (incl. insulation, burners and packaging)	lbs	243	243	295	295	365	365	432	432
	kg	110	110	133	133	165	165	195	195
Number of cast iron sections		3	3	4	4	5	5	6	6
Number of burners		2	2	3	3	4	4	5	5
Water connection	inches	1¼							
Water content	USG	2.6	2.6	3.5	3.5	4.3	4.3	7.1	7.1
	ltr	9.9	9.9	13.2	13.2	16.5	16.5	26.8	26.8
Gas connection	inches	½							
Vent pipe collar	outside Ø"	3							

*[*1] With intermittent pilot electronic ignition system and integrated power vent, Vitogas 050, ECV boilers exceed the Canadian and U.S. minimum AFUE requirement of 80%.*

All sizes available with propane gas. For net IBR rating divide output by 1.15. Electrical requirement: 120V, 60Hz, less than 12A.

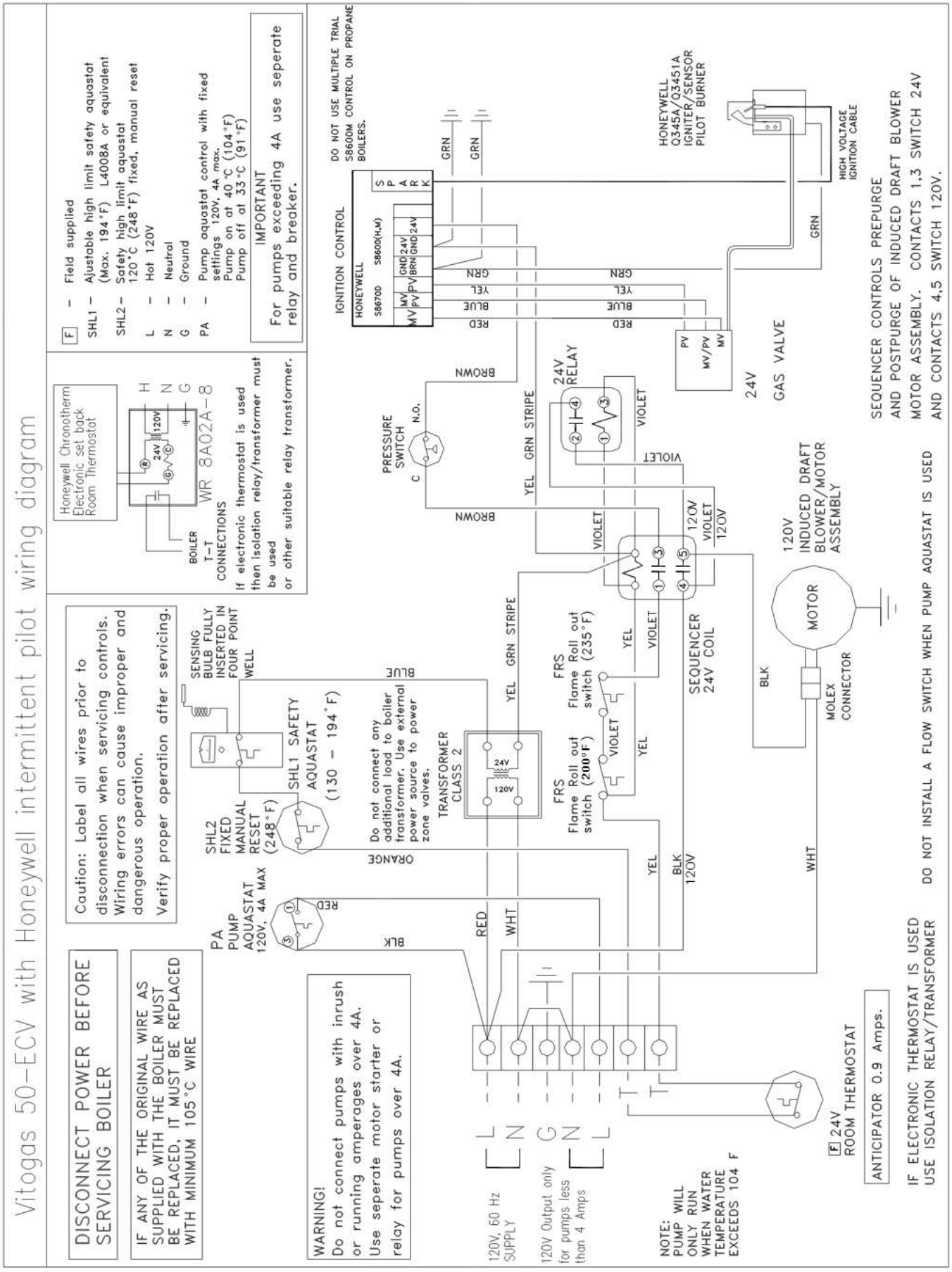
For use with natural gas 1000 Btu/ft.^{3}. kW figures are approximate.

Parts List for Honeywell Intermittent Pilot Ignition System

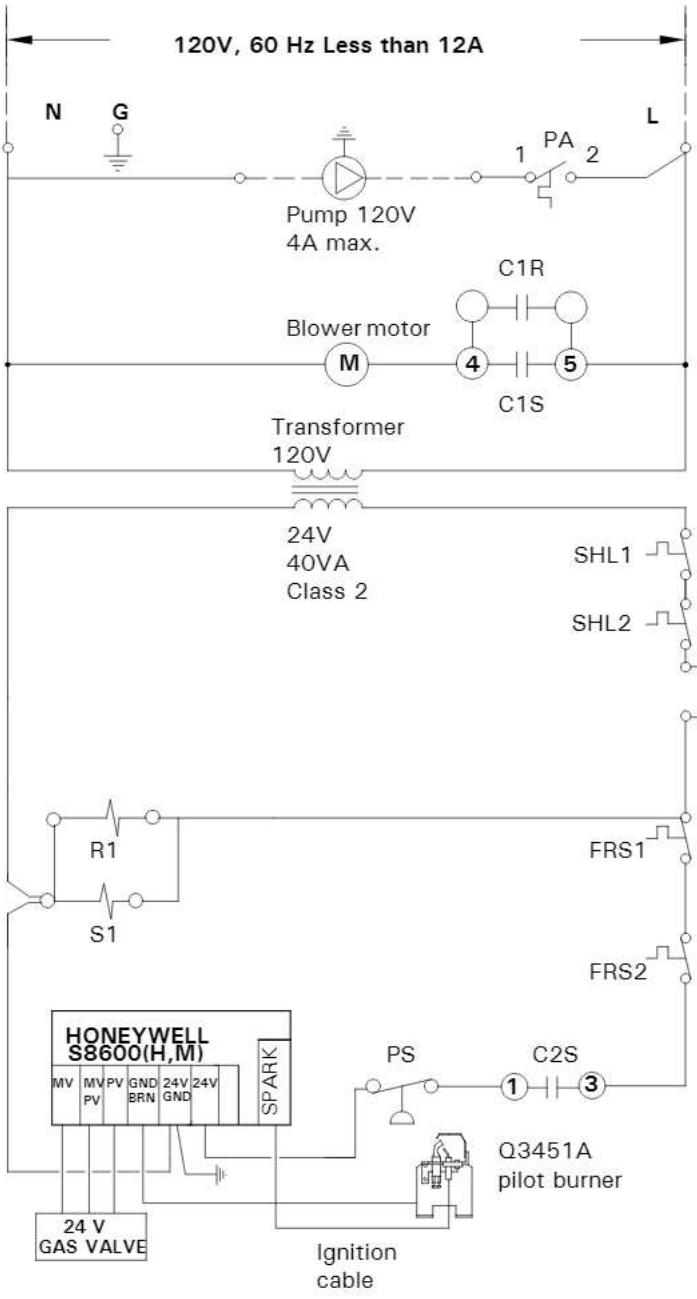
	NATURAL GAS		PROPANE GAS	
GAS CONTROL LIST	HONEYWELL PART NO.	VIESSMANN PART NO.	HONEYWELL PART NO.	VIESSMANN PART NO.
Gas Valve	VR8204M1133	9543730	VR8204M1133	9543730
LP Conversion Kit				9543396
Ignition Control	S8600M	7133567	S8600H	7134197
Pilot Burner	Q3451A2012	7133473	Q3451A2012	7133473
Pilot Orifice	.020 inches dia. 390686-4 BCR 20	9549687	.014 inches dia. 390696-24 BBR 14	9543392

Note: Do not use S8600M control (continuous trial for ignition) on propane gas.

Wiring Diagram - Vitogas 050, ECV with Honeywell Intermittent Pilot



Ladder Diagram - Vitogas 050, ECV with Honeywell Intermittent Pilot



SHL1 Adjustable high limit aquastat (Maximum setting 194°F)

SHL2 Manual reset aquastat (Fixed setting 248°F)

PA Pump Aquastat
Pump on at 40°C (104°F)
Pump off at 33°C (91°F)

FRS Flame roll-out switch

R1 24V Relay 1

C1R N.O. contact of relay 1

S1 Sequencer 24V

C1S N.O. contact, upper stage marked 4,5 delay on break and make

C2S N.O. contact, lower stage marked 1,3 delay on make and break

PS Pressure Switch 24V

Fan Induced draft blower motor assembly

———— FIELD WIRING

———— FACTORY WIRING

Use external relay if pump exceeds 4A.

24V Room thermostat or other operating control

Anticipator setting: 0.9A

Caution: Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.

Note: Burner should not activate if pressure tube is disconnected from pressure switch.

Refer to wiring label affixed to boiler access panel. Viessmann reserves the right to substitute components or wiring methods. Boiler wiring label takes precedence.

Do not connect any external load to the boiler 24V transformer. Use external power source to power zone valves.

Do not operate boiler without high limit aquastats wired in control unit.

SEQUENCE OF OPERATION

1. Thermostat calls for heat. SHL1, SHL2 are closed.
2. Relay and sequencer are energized with 24V.
3. Relay contacts close.
4. Fan is energized with 120V.
5. Fan develops sufficient pressure to close pressure switch.
6. After 30 second prepurge, contacts 1,3 of sequencer close allowing 24V to ignition system.
7. Provided FRS is closed (not activated) and pressure switch has remained closed, pilot will spark, light and prove flame, allowing main burner to operate.
8. Pilot and main burner will cycle off SHL1 aquastat setting until thermostat or other operating control is satisfied.
9. Thermostat is satisfied, ignition system will de-energize, burner will stop and there will be a fan post purge of 50 seconds through contacts 4,5 of sequencer.

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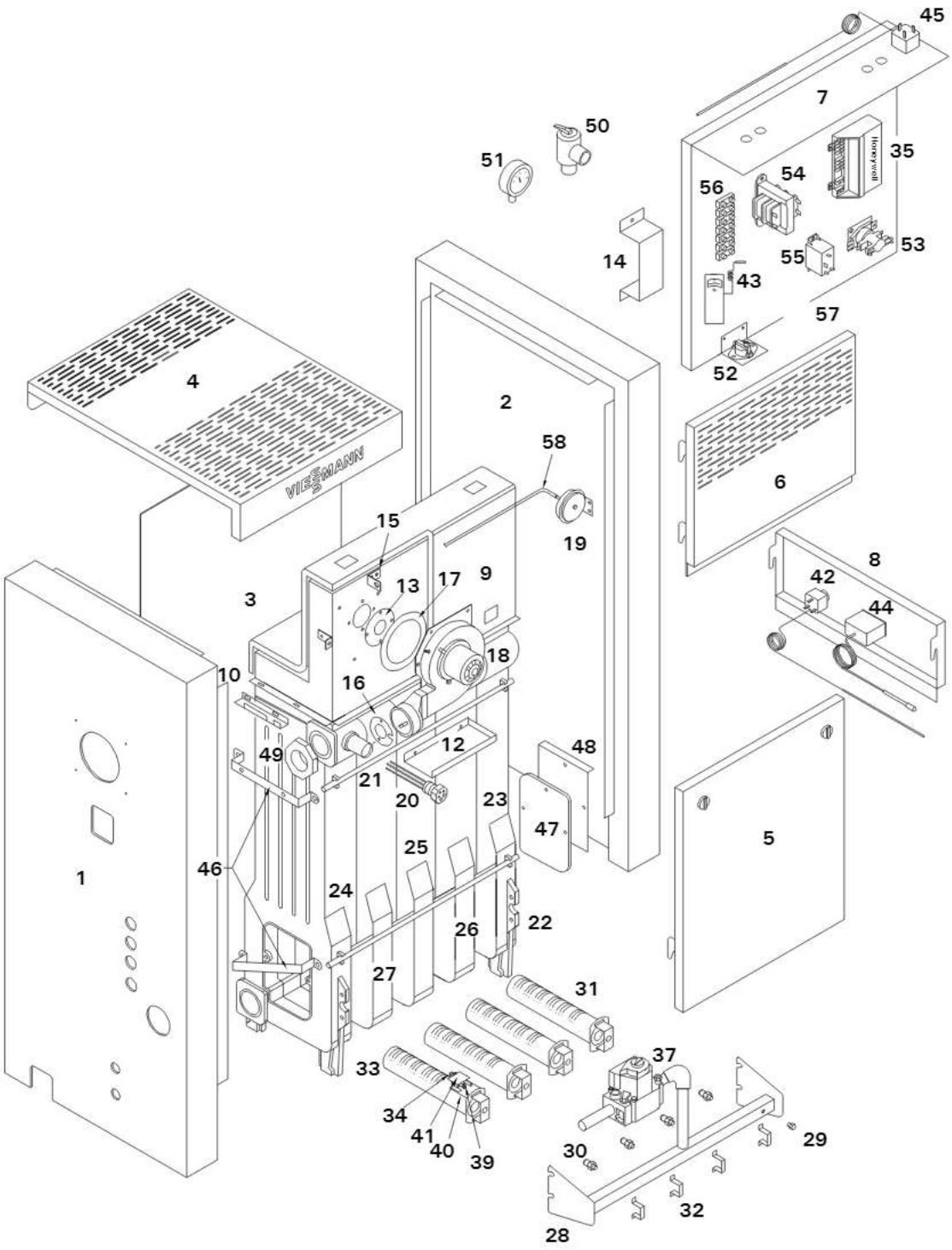
Parts List

Parts

001 Left panel
002 Right panel
003 Back panel
004 Top panel
005 Front access panel
006 Front upper panel
007 Mid panel
008 Control panel
009 Collector box
010 Collector box
brackets
011 Baffle plate (ECV-180, -200)
012 Collector box
lower cover
013 Fan inlet restrictor
plate (ECV-65 to 155)
014 Terminal strip cover
015 Pressure tube
bracket
016 Fan outlet restrictor
plate (ECV-65, -80)
017 Venter gasket
018 Magnetek blower
019 Pressure switch
020 Thermowell
021 Thermowell nipple
022 Assembled cast-iron
heat exchanger
023 Section - right side*
024 Section - left side*
025 Section - intermediate*
026 Section - intermediate with pilot
opening on right*
027 Section - intermediate with pilot
opening on left*
028 Manifold
029 Pipe plug $^{1}/_{8}$"
030 Manifold orifices
Natural gas
0-2000 ft.
2000-4500 ft.
4500-7000 ft.
LP
0-2000 ft.
2000-4500 ft.
4500-7000 ft.
031 Stainless steel
burner tube
032 Burner mounting
saddle
033 Burner tube for pilot
mounting
034 Pilot igniter assembly w/ shield
Q3451A2012
035 Ignition control
module S8600M
037 Gas valve
VR8204M
039 Pilot orifice
NG .020"
LP .014"
040 Pilot bracket for
Q3451A2012
041 Pilot shield
042 Manual reset
safety high limit
control (248°F)
043 Adjustable aquastat
044 Thermometer
045 Pump aquastat
046 Support bracket
upper
lower
047 Insulation cover
left side
right side
048 Insulation plate
left side
right side
049 Hex bushing, 1½" x 1¼"
050 Pressure relief valve, ¾"
30 psig
Watts M335
051 Pressure gauge
0-100 psig
052 Flame roll-out switch
60T15 L (200°F)
053 Sequence timer
14S22
054 Transformer
120/24V 40VA
055 Switching relay
056 Terminal strip
057 Flame roll-out switch
60T15 235F (235°F)

* When ordering replacement boiler sections, order 4 push nipples per intermediate section and 2 push nipples per side section.

Parts List *(continued)*



Maintenance Record

	Maintenance/Service	Maintenance/Service	Maintenance/Service	Maintenance/Service	Maintenance/Service
on:					
by:					

	Maintenance/Service	Maintenance/Service	Maintenance/Service	Maintenance/Service	Maintenance/Service
on:					
by:					

	Maintenance/Service	Maintenance/Service	Maintenance/Service	Maintenance/Service	Maintenance/Service
on:					
by:					

	Maintenance/Service	Maintenance/Service	Maintenance/Service	Maintenance/Service	Maintenance/Service
on:					
by:					

	Maintenance/Service	Maintenance/Service	Maintenance/Service	Maintenance/Service	Maintenance/Service
on:					
by:					

	Maintenance/Service	Maintenance/Service	Maintenance/Service	Maintenance/Service	Maintenance/Service
on:					
by:					

Lighting and Operating Instructions

FOR YOUR SAFETY READ BEFORE OPERATING

WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

A. This appliance is equipped with an ignition device which automatically lights the pilot. Do not try to light the pilot by hand.

B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

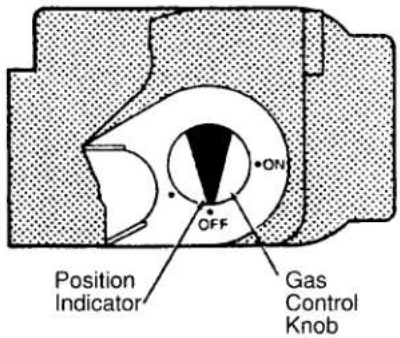
WHAT TO DO IF YOU SMELL GAS
- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

C. Use only your hand to turn the gas control knob. Never use tools. If the knob will not turn by hand, don't try to repair it; call a qualified service technician. Force or attempted repair may result in a fire or explosion.

D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

OPERATING INSTRUCTIONS

1. STOP! Read the safety information above on this label.
2. Set the thermostat or other operating control to lowest setting.
3. Turn off all electric power to the appliance.
4. This appliance is equipped with an ignition device which automatically lights the pilot. Do not try to light the pilot by hand.



5. Remove control access panel.
6. Turn gas control knob clockwise ↷ to "OFF".
7. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, STOP! Follow "B" in the safety information above on this label. If you don't smell gas, go to the next step.
8. Turn gas control knob counterclockwise ↶ to "ON".
9. Replace the control access panel.
10. Turn on all electric power to the appliance.
11. Set the thermostat or other operating control to desired setting.
12. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.

TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat or other operating control to lowest setting.
2. Turn off all the electric power to the appliance if service is to be performed.
3. Remove control access panel.
4. Turn gas control knob clockwise ↷ to "OFF". Do not force.
5. Replace control access panel.

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