AquaBalance™ by WEIL-McLAIN®

WMB-155H and WMB-155C
Wall Mount Gas-Fired Heating Only Boiler & Combination Boiler – Heating and Domestic Hot Water

Direct Exhaust Venting Kit Instructions

AquaBalance™ WMB-155H & WMB-155C — Kit part number 383-500-107

STOP!
Read before proceeding

Hazard definitions

The following defined terms are used throughout this instruction to bring attention to the presence of hazards of various risk levels or to important information concerning the life of the product.

DANGER Indicates presence of hazards that will cause severe personal injury, death or substantial property damage.

WARNING Indicates presence of hazards that can cause severe personal injury, death or substantial property damage.

CAUTION Indicates presence of hazards that will or can cause minor personal injury or property damage.

NOTICE Indicates special instructions on installation, operation or maintenance that are important but not related to personal injury or property damage.

WARNING **These instructions must only be used by a qualified installer/service technician.** Read all instructions completely before beginning the installation. Failure to follow all instructions can cause severe personal injury, death or substantial property damage.

WARNING The boiler contains ceramic fiber and fiberglass materials. Use care when handling these materials per instructions in the Boiler Manual, available on-line at Weil-McLain.com. Failure to comply could result in severe personal injury.

WARNING **You must read and have the AquaBalance™ boiler manual with you to proceed with these instructions.**

Follow these instructions and the AquaBalance™ boiler manual to access and service components. The parts provided in this kit are required to complete the setup for Direct Exhaust Venting for the WMB-155 only.

The boiler manuals are available on-line at Weil-McLain.com

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DESIGN CERTIFIED®

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Part No. 550-100-320/0218

AquaBalance™ Direct Exhaust Vent Kit P/N 383-500-107 contents:			
Item	*Description*	**Part No.**	**Qty**
1	Vent Screen 3 In Mesh 304 Stainless Steel	560-907-632	1
2	Instructions Direct Exhaust Venting	550-100-320	1

Recommended tools

See **AquaBalance™** boiler manual for details.

Installation instructions

Installer

⚠WARNING Read all instructions before installing. Follow all instructions in proper order to prevent personal injury or death.

NOTICE Inlet and outlet pipe and fittings provided by installer.

1. Install 3” diameter PVC or CPVC pipe and elbow on air inlet of boiler.
2. Install 3” screen in opening of elbow.

NOTICE Installation of pipe and elbow in inlet is to prevent objects from inadvertently entering or blocking air inlet.

3. Run the exhaust vent piping to the ceiling in accordance with the instructions shown on the following pages.
4. Install appropriate size bird screen in end termination.

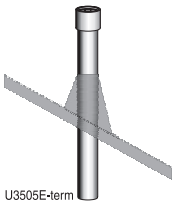
Perform Boiler Manual start-up

⚠WARNING Follow all instructions in boiler manual to start-up the boiler after converting to **Direct Exhaust**. Because the boiler has been changed, you must verify correct operation, including checking combustion with test instruments both at high fire and low fire as described in the Boiler Manual. Failure to comply could result in severe personal injury, death or substantial property damage.

Venting & air — general

FIGURE 1 **AquaBalance™ venting — DIRECT EXHAUST ONLY** — OPTIONS and PIPING LIMITS

NOTICE The table below lists the acceptable vent pipe terminations described in this instruction. Follow all instructions provided to install the vent system. **NOT SHOWN** below, but also approved, are the polypropylene piping and terminations listed in Figure 2, page 4. For these applications, use ONLY the manufacturers' parts listed and follow all instructions provided by the pipe manufacturer.

AquaBalance™ Model	Maximum vent length = 100 feet for all applications **(Minimum length for all applications is 2 feet equivalent plus termination)** (All applications include allowance for the termination fittings plus one elbow in vent piping).		**USE SWEEP ELBOWS ONLY**
	See Figure 2, page 4 for material specifications.		
	Vent sizes: Maximum vent lengths apply for 3" vent and air pipe. Boilers will derate as vent length increases — see rating data on Figure 173, page 131 in the boiler manual for derate amounts.		
	VERTICAL termination [Note 1]		
			
	See page 7		
	Size, inches	Materials page 4	
155	**3**	PVC/PVC-DWV CPVC, PP, SS	

⚠WARNING **All elbows in vent and air piping must be sweep elbows ONLY. DO NOT use short-radius elbows.**

Equivalent feet for elbows (USE SWEEP ELBOWS ONLY) — deduct from max equivalent length of piping (does not apply to termination fittings)
• 7 feet per for each additional 90° sweep elbow or 45° elbow for PVC only; for PP please see manufacturers recommendations. — If piping contains more than 1 elbow in vent piping, other than termination fittings.

Note 1	Material abbreviations: PP = polypropylene, SS = AL29-4C stainless steel If using polypropylene or stainless pipe, provide adapters for 3" boiler connections and for terminations. For ULC S636 compliance, all pipe, fittings and cement must be IPEX System 636. If using IPEX kits, use only IPEX product code listed in Figure 159, page 117 in the boiler manual. Contact Weil-McLain for ordering information and availability of Weil-McLain venting kits.

Venting & air — general *(continued)*

FIGURE 2 **Vent and air piping materials** — Use only the materials listed below, ensuring that all materials meet local codes (see Figure 159, page 117 in the boiler manual for part/kit numbers)

Item	Material	Standards for installations in:		
		United States	Canada (Note 2)	
Plastic piping materials		**Vent or air piping**	**Vent piping**	**Air piping**
Vent or air pipe & fittings	PVC schedule 40	ANSI/ASTM D1785	ULC S636	PVC, PVC-DWV, CPVC or polypropylene
	PVC-DWV schedule 40 (Note 1)	ANSI/ASTM D2665	NA	
	CPVC schedule 40 (Note 1)	ANSI/ASTM F441	ULC S636	
PVC & ABS pipe cement & primer	PVC	ANSI/ASTM D2564/F656	ULC S636	Use only cement and primer suitable for piping material used
	CPVC (Note 1)	ANSI/ASTM F493	ULC S636	
Polypropylene vent pipe, fittings, terminations and cement	**Simpson-Duravent —** Obtain all materials from M&G Simpson-Duravent **Centrotherm Eco Systems InnoFlue® Single-wall —** Obtain all materials from Centrotherm	See manufacturer's literature for detailed information ***MUST USE LOCKING COLLAR ON EVERY JOINT***	ULC S636	PVC, PVC-DWV, CPVC or polypropylene
AL29-4C stainless steel piping materials				
Vent pipe AL29-4C stainless steel	Heat Fab, Inc. — Saf-T-Vent® Z-Flex, Inc. — Z-Vent II Dura-Vent — FasNSeal® Metal-Fab, Inc. — CORR/GUARD	Certified for direct vent appliance venting	Certified for direct vent appliance venting	
Stainless steel bird screens, 3" *(purchase separately) — see Figure 159, page 117 for part numbers*				

Note 1: Weil-McLain concentric vent kits are made from PVC pipe and fittings.

Note 2: System 636 PVC concentric terminations utilize PVC pipe/fittings certified to ULC S636. If ULC S636 compliance is required, use only System 636 pipe, fittings and cement.

WARNING DO NOT mix piping from different pipe manufacturers unless using adapters specifically designed for the purpose by the manufacturer.

WARNING Every joint on **polypropylene vent piping must** include a locking collar.

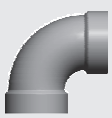
WARNING DO NOT use cellular core PVC (ASTM F891), cellular core CPVC, or Radel® (polyphenolsulfone) in venting systems.

WARNING DO NOT cover non-metallic vent pipe and fittings with thermal insulation.

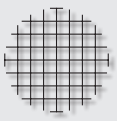
WARNING **ADAPTERS** – The boiler comes with a 3", 3-in-1 adapter as standard. This adapter allows the installation of 3" PVC schedule 40, CPVC schedule 40, PVC-DWV schedule 40, AL29-4C stainless steel and Polypropylene (from Simpson-Duravent only) piping without the need for extra adapters.

It may require an adapter at terminations.

If your venting system uses Centrotherm Eco systems InnoFlue single wall material, then an approved adapter is required.



WARNING **USE SWEEP ELBOWS FOR ALL VENT AND AIR PIPING** — DO NOT use short radius elbows for vent or air piping. Boiler performance could be affected.



WARNING **ALL** vent and air pipes require a **BIRD SCREEN at each termination**. Most kits do not include the bird screens. Purchase bird screens separately from Weil-McLain or vent kit supplier if not included.

Direct Exhaust Boiler room air opening

Combustion air openings for direct exhaust

The **AquaBalance™** boiler can use inside air if no contaminants are present in the boiler space. (If contaminants are likely to be present, install the boiler as a direct vent appliance, using the appropriate vent instructions in the boiler manual.)

The boiler room must be fitted with combustion air openings large enough to provide air for all appliances in the room. Use the following information to size the openings. Ensure the installation complies with all applicable codes and standards.

Sizing combustion air openings

Air openings provide for ventilation (as well as combustion air) to prevent overheating of the boiler controls and boiler space. Air is also needed for other appliances located in the same space.

Use Figure 3, page 6, selecting the appropriate installation conditions.

⚠WARNING Air openings must be sized to handle all appliances and air movers (exhaust fans, etc.) using the air supply.

The sizing given in Figure 3, page 6, is based on the National Fuel Gas Code, ANSI Z223.1 – latest edition, allowing adequate air openings for gravity-vented gas appliances (Category I) in addition to that needed for the **AquaBalance™** boiler.

The air openings recommended in Figure 3, page 6, will allow adequate ventilation and combustion air provided the boiler room is not subjected to negative pressure due to exhaust fans or other mechanical ventilation devices.

Refer to the National Fuel Gas Code for dealing with other conditions.

Free area — louver allowance

The free area of openings means the area **after reduction for any installed louvers or grilles**. Be sure to consider this reduction when sizing the air openings.

Special considerations

Tight construction

ANSI Z223.1 defines unusually tight construction where:

1. Walls and ceilings exposed to the outside atmosphere have a continuous water vapor retarder with a rating of 1 perm or less with openings gasketed, and . . .
2. Weather-stripping has been added on openable windows and doors, and . . .
3. Caulking or sealants are applied to areas such as joints around windows and door frames, between sole plates and floors, between ceiling joints, between ceiling panels, at penetrations for plumbing, electrical, and gas lines, and in other openings.

For buildings with such construction, provide air openings into the building from outside, sized per the appropriate case in Figure 3, page 6, if appliances are to use inside air for combustion and ventilation.

Exhaust fans and air movers

The appliance space must never be under a negative pressure unless all appliances are installed as direct vent. Always provide air openings sized not only to the dimensions required for the firing rate of all appliances, but also to handle the air movement rate of the exhaust fans or air movers using air from the building or space.

Motorized air dampers

If the air openings are fitted with motorized dampers, electrically interlock the damper to:

- Prevent the boiler from firing if the damper is not fully open.
- Shut the boiler down should the damper close during boiler operation.

The **AquaBalance™** control provides a Proof of Closure function which will prevent the boiler from firing if the damper is not fully open or closes during boiler operation. Please refer to the Boiler Manual for installation and wiring instructions.

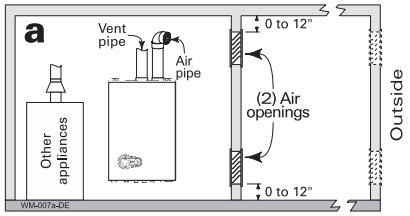
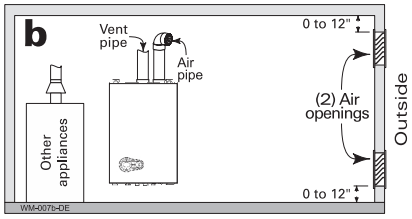
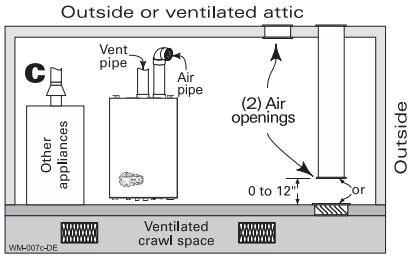
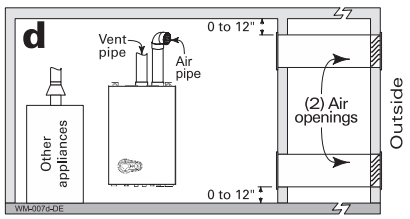
⚠WARNING Ensure that the combustion air will not contain any of the contaminants in Table 1, page 8 of the boiler manual.
Do not pipe combustion air near a swimming pool, for example. Avoid areas subject to exhaust fumes from laundry facilities. These areas will always contain contaminants.

Contaminated combustion air will damage the boiler, resulting in possible severe personal injury, death or substantial property damage.

Direct Exhaust Boiler room air opening *(continued)*

FIGURE 3 MINIMUM combustion air openings for direct exhaust applications – **ALL OPENINGS ARE FREE AREA**

Provisions for combustion and ventilation air to be in accordance with the section "Air for Combustion and Ventilation," of the National Fuel Gas Code, ANSI Z223.1/NFPA 54 – latest edition, or applicable provisions of the local building codes.

Air openings The required air opening sizes below are FREE AREA, after reduction for louver obstruction. Note the exception below for large spaces.	**AquaBalance™ boiler WITH other appliances in room**	**AquaBalance™ boiler WITHOUT other appliances in room**
	**TWO** openings, each at least: **1** square inch per **1,000** Btuh of all other appliances in the room	**TWO** openings, each at least: **1** square inch per **4,000** Btuh of all other appliances in the room
	**TWO** openings, each at least: **1** square inch per **4,000** Btuh of all other appliances in the room — OR — **ONE** opening **, each at least: **1** square inch per **3,000** Btuh of all other appliances in the room	**TWO** openings, each at least: **1** square inch per **4,000** Btuh of all other appliances in the room — OR — **ONE** opening **, each at least: **1** square inch per **3,000** Btuh of all other appliances in the room
	**TWO** openings, each at least: **1** square inch per **2,000** Btuh of all other appliances in the room — OR — **ONE** opening **, each at least: **1** square inch per **3,000** Btuh of all other appliances in the room	**TWO** openings, each at least: **1** square inch per **4,000** Btuh of all other appliances in the room — OR — **ONE** opening **, each at least: **1** square inch per **3,000** Btuh of all other appliances in the room
	**TWO** openings, each at least: **1** square inch per **4,000** Btuh of all other appliances in the room — OR — **ONE** opening **, each at least: **1** square inch per **3,000** Btuh of all other appliances in the room	**TWO** openings, each at least: **1** square inch per **4,000** Btuh of all other appliances in the room — OR — **ONE** opening **, each at least: **1** square inch per **3,000** Btuh of all other appliances in the room
**** NOTICE:** **Requirements for using the SINGLE air opening option.**	A single combustion air opening can be used for cases **b**, **c**, or **d** above, sized as listed, provided that: • The single opening must communicate directly to the outdoors or to a space that communicates directly with outdoors (NOT to an interior space). • The top of the opening must be within 12 inches of the ceiling. • The free area of the opening must be at least equal to the sum of the areas of all equipment vent connectors in the space.	
SPECIAL EXCEPTION FOR LARGE SPACES	NO combustion air openings are needed if the boiler (and other appliances) are installed in a space with a volume NO LESS than 50 cubic feet per 1,000 Btuh of all appliances in the space. That is, total the input of all appliances in MBH (1,000's of Btuh), then multiply this total times 50. The building MUST NOT be of tight construction. Example: For a total input of 500 MBH (500,000 Btuh), the minimum volume would be 50 x 500 = 25,000 cubic feet.	

Direct Exhaust – Vertical

Allowable vent/air pipe materials & lengths

⚠WARNING Use only the vent materials listed in Figure 2, page 4. Provide pipe adapters if specified.

1. Locate the termination such that the total vent piping from the boiler to the termination will not exceed the maximum length given in Figure 1, page 3.

Determine termination location

1. The vent terminations must be installed as shown in Figure 4.
2. The terminations must comply with clearances and limitations shown in Figure 4.
3. Locate the termination so it is not likely to be damaged by foreign objects, such as stones or balls, or subject to buildup of leaves or sediment.

Multiple vent/air terminations

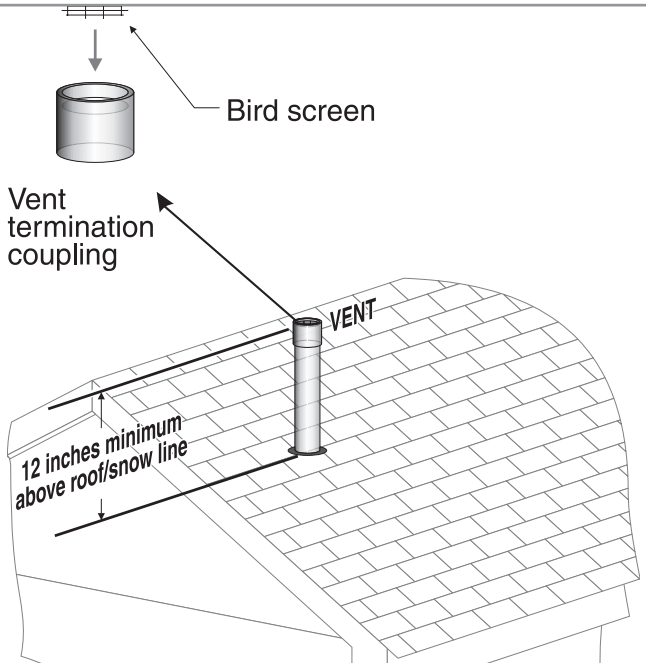
1. Terminate each vent of multiple direct exhaust **AquaBalance™** boilers as described in this instruction or the boiler manual for individual vents.
2. Space terminations as required for best installation practices and required maintenance.

Prepare roof penetration

1. Vent pipe penetration:
   a. Cut a hole for the vent pipe. For either combustible or noncombustible construction, size the vent pipe hole at least 0.5" larger than the vent pipe diameter.
   b. Hole diameter in the metal plates must be at least 3" for PVC pipe. For AL29-4C vent pipe and coupling (or elbow) — size hole 0.5" larger than vent pipe outside diameter.
   c. Insert a galvanized metal thimble in the vent pipe hole.
2. Follow all local codes for isolation of vent pipe when passing through floors, ceilings and roofs.
3. Provide flashing and sealing boots sized for the vent pipe.

NOTICE Where the vent penetrates the roof, the annular space around the penetration must be permanently sealed using approved materials to prevent entry of combustion products into the building.

FIGURE 4 **INSTALLATION SEQUENCE** — Direct exhaust vertical



Step 1	Read and follow all instructions in this instruction. **DO NOT proceed with vent/air installation until you have read page 19 through page 25 in the boiler manual.**
Step 2	Install the boiler in a location that allows proper routing of all vent to the selected ceiling location.
Step 3	Make sure the selected vertical termination location complies with Figure 4.
Step 4	Use only the vent materials listed in Figure 2, page 4. Provide pipe adapters where required. Vent piping lengths must not exceed the values shown in Figure 1, page 2.
Step 5	Prepare the vertical penetration and secure penetration components as instructed in this section. See "Prepare roof penetrations" and "Termination and fittings" on page 7.
Step 6	The vent piping must terminate in a **coupling pointed upward** as shown above.
Step 7	Install vent piping between the boiler and the vertical termination. Slope horizontal piping downward toward the boiler at least 1/4 inch per foot. Install pipe supports every 5 feet on both the horizontal and vertical runs. Install a hanger support within 6 inches of any upturn in the piping.
Step 8	Maintain minimum clearance of 3/16 inch between vent pipe and any combustible wall or material.
Step 9	Insert the vent piping through the vertical penetration and secure the termination coupling.
Step 10	Maintain clearances shown above. Vent terminations must be fitted with a bird screen as shown.

Direct Exhaust, air piping and boiler connections

Follow termination instructions

Read and follow all instructions for the termination type used before proceeding with this page. Follow all instructions provided by vent pipe manufacturer.

⚠WARNING Use only materials from the manufacturers listed in Figure 2, page 4.

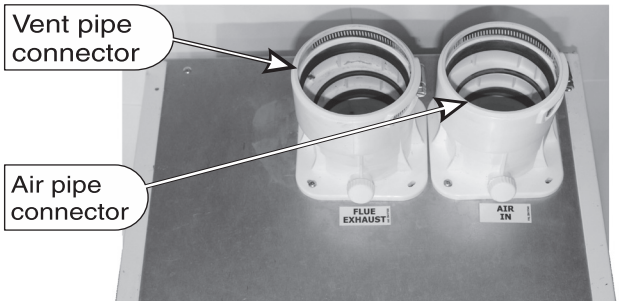
Installing vent and air piping

Polypropylene For polypropylene applications, comply with any additional requirements in the vent system manufacturer's instructions. Provide 3" PVC-to-PP transition pieces at the boiler vent and air connections. PP adapter must have smooth, straight section of pipe to insert in to the boiler vent and air connections and must fit and seal tightly. PP adapters with their own seal which would interfere with the internal seal of the boiler vent or air connections must not be used. Refer to page 117 in the boiler manual for a list of compliant adapters. Install a locking collar at every joint.

AL29-4C S.S. For AL29-4C vent pipe applications, comply with any additional requirements in the vent system manufacturer's instructions. Provide a 3" PVC transition piece at the boiler vent connection. Air piping must be PVC or CPVC. Connect to the boiler air piping only with 3" PVC. ork from the boiler to vent termination. Do not exceed the lengths given in the previous pages for vent piping.

1. See Figure 5 for attaching vent pipe at the boiler. Connections must be 3" PVC or CPVC only — use transitions if needed to adapt to other material.
2. Cut pipe to required length.
3. Dry assemble entire vent or air piping to ensure proper fit before assembling any joint.
4. Maintain minimum clearance of 3/16 inch between vent pipe and any combustible wall or material.
5. Seal ceiling or floor penetration openings following local code requirements.
6. Assembling PVC or CPVC: (**Polypropylene** **AL29-4C S.S.** — follow pipe manufacturer's instructions for preparation and assembly)
   a. Deburr inside and outside of pipe ends.
   b. Chamfer outside of each pipe end to ensure even cement distribution when joining.
   c. Clean all pipe ends and fittings. Dry thoroughly.
   d. For each joint:
      - Handle fittings and pipes carefully to prevent contamination of surfaces.
      - Apply primer liberally to both joint surfaces — pipe end and fitting socket.
      - While primer is still damp, lightly apply approved cement to both surfaces in a uniform coating.
      - Apply a second coat to both surfaces. Avoid using too much cement on sockets to prevent cement buildup inside.
      - With cement still wet, insert pipe into fitting, twisting ¼ turn. Make sure pipe is fully inserted.
      - Wipe excess cement from joint. Check joint to be sure a smooth bead of cement shows around the entire joint.

FIGURE 5 Boiler vent and air connections



⚠WARNING **ADAPTERS** — Use adapters if using other than 3-inch PVC or CPVC. This is required for different materials or if using 3-inch pipe.

1. Use ONLY 3" PVC or CPVC pipe at boiler connections.
2. Clean and deburr inside and outside of both ends of air and vent pipes. Chamfer boiler end of vent pipe for ease of insertion.

⚠WARNING The vent pipe end must be smooth and chamfered to prevent possible damage to sealing gasket in vent pipe adapter.

3. Inspect vent or air adapter (above) — verify no obstructions or foreign objects inside.
4. Loosen clamp screw.
5. Measure 3 inches from end of pipe and make a mark with felt-tip pen.
6. Loosen adapter clamp screw.
7. Apply small amount of silicon grease to end of pipe to ease insertion.
8. Insert pipe into adapter.
9. Slide pipe down until the 3 inch mark is reached.

⚠WARNING Do not apply excessive force or bend the adapter or flue/air pipe when inserting. The adapter or seal could be damaged. If any portion of the vent or air system is damaged, it must be replaced.

10. Secure vent or air pipe by tightening the adapter clamp securely. Do not overtighten.
11. The seal is accomplished with the internal gasket. The clamp is only to hold the pipe in place.

DIRECT EXHAUST ONLY

⚠WARNING **DIRECT EXHAUST installations — air inlet opening protection:** Install an elbow at the boiler air inlet and obtain a bird screen (sized for air inlet fitting - included in kit). Insert the bird screen into the air inlet fitting to prevent foreign objects from entering the opening.

⚠WARNING **USE SWEEP ELBOWS FOR ALL VENT AND AIR PIPING** — DO NOT use short radius elbows for vent or air piping. Boiler performance could be affected.

WEIL-McLAIN®

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