

Figure 3 - Wall Mount Model Dimensions

	Description	Diameter
A	Automatic Air Vent	-
B	Air Intake Adapter	3"
C	Exhaust Vent Adapter	
D	Pressure Relief Valve Adapter	3/4" NPTF
E	CH Supply Adapter	1" NPT
F	CH Return Adapter	
G	DHW Outlet Adapter	3/4" NPT
H	DHW Inlet Adapter	
I	Gas Inlet Adapter	
J	Condensate Adapter	1/2" NPT

Table 9 - Adapter Specifications - All Models

Model	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE
140	17.3	34	15.4	10.6	6.7	4.3	2.8	5.1	11.0	2.3	5.7	8.9	10.8	14.9	15.1	10.5	5.9	2.3	6.8	12.6	3.9
199	19.7	37	16.8		7.8	5.4	4.0	6.3	12.3	2.5	5.9	10.6		16.6	17.0	12.5	7.0	3.2	9.2	15.1	3.7

Table 10 - Wall Mount Specifications and Dimensions

#### How the Appliance Operates

Condensing technology intelligently delivers hydronic heating while maximizing efficiency. Outlined below are the features of the system and how they operate:

**Stainless Steel Heat Exchanger** - The highly efficient 316L stainless steel fire tube heat exchanger with internal aluminum is designed to extract all available heat from the combustion process and pass it into heat transfer fluid. The stainless steel construction provides protection for longer service life. The heat exchanger offers greater water content, providing lower system pressure and greater overall system efficiency.

**10 to 1 Modulating Combustion System** - The combustion system is specially designed to provide very high turn down. This combustion system will modulate the burner output to very low levels to match the system demand and achieve better overall control of the heating system for maximum efficiency and reliability.

**Control** - The integrated control system monitors the system and responds to internal and external signals to regulate fan speed and control output. This allows the appliance to deliver only the amount of heat energy required and nothing more.

The control can be set up to monitor outdoor temperature through

an outdoor sensor to regulate appliance set point temperature, increasing overall system efficiency while providing great comfort. The system can be further enhanced by installing an indirect water heater to provide domestic hot water.

The control can regulate the output of multiple appliances through its cascade system function by establishing one appliance as the master and the other connected appliances as followers. The master appliance requires a sensor to provide feedback on set point temperature in order to adjust heating output from the connected appliances. Multiple appliance cascaded systems offer greater system turndown and redundancy.

**Electronic LCD Display** - The high resolution display allows the user to monitor appliance functions. The display also provides the means to program the system parameters to maximize the efficiency of the system design.

**Combustion System (Blower - Gas Valve - Mixer - Burner - Spark Ignition)** - The highly efficient spark ignition combustion system uses a variable speed blower to adjust combustion as the system requires more or less energy. The negative regulated gas valve provides only the amount of fuel required to ensure clean combustion. The mixer accurately regulates the combination of gas and air throughout

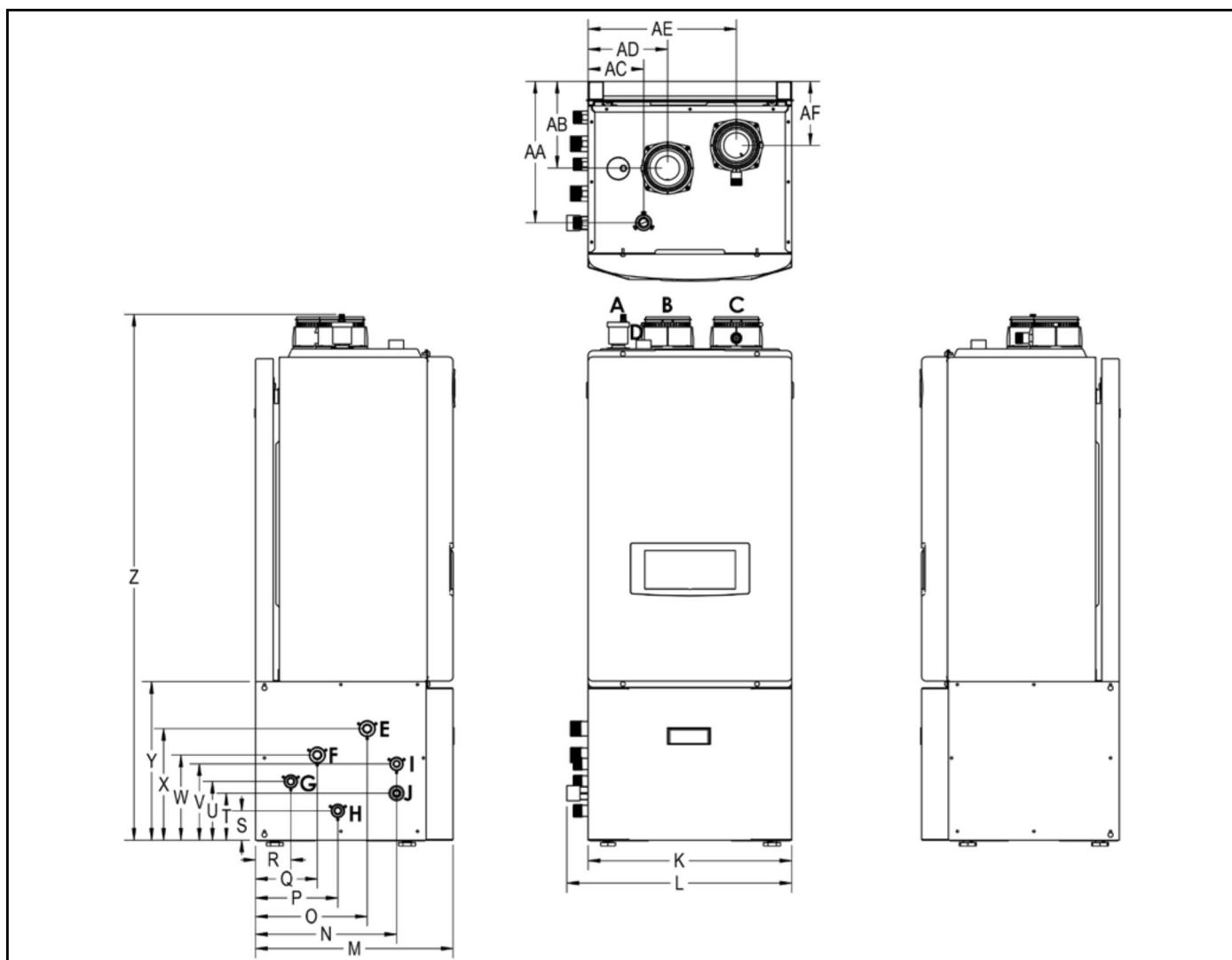


Figure 4 - Floor Model Dimensions

Model	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE
140	17.3	34	15.4	10.6	6.7	4.3	2.8	5.1	11.0	2.3	5.7	8.9	10.8	14.9	15.1	10.5	5.9	2.3	6.8	12.6	3.9
199	19.7	37	16.8		7.8	5.4	4.0	6.3	12.3	2.5	5.9	10.6		16.6	17.0	12.5	7.0	3.2	9.2	15.1	3.7

Table 11 - Floor Model Specifications and Dimensions

the modulating range to ensure high reliability. The burner is constructed of durable ceramic metal fiber for long service life.

**Appliance Sensors (Inlet – Outlet – Flue - Outdoor)** - Sensors provide highly accurate temperature monitoring to assure accurate system control. These sensor inputs can be monitored through the appliance control system and display.

**Pressure Gauge** – Allows the user to monitor system pressure.

**System Safeties** – The appliance is provided with many safety features to ensure reliable and safe operation. Each safety is connected to the appliance control. The appliance will alert the user if an unsafe condition occurs and needs to be addressed. The following are provided safeties: Flue Pressure Switch (monitors flue pressure), Burner High Limit (monitors burner plate temperature), High Limit Water Switch (monitors appliance temperature), Low Water Sensor (monitors water level in the heat exchanger), optic flame sensor (monitors flame quality), Flue Sensor (monitors flue temperature), Condensate Pressure Switch (monitors pressure to ensure condensation does not back up into appliance).

**Manual Air Vent** – Each appliance is equipped with an air vent to discharge air from the system during start-up.

**Intake and Exhaust Adapters** – The appliance is equipped with adapters to ease connection to the vent system. The adapters are provided with clamps and seals to secure field supplied piping, and

test ports to ease monitoring of the combustion system. Each appliance is supplied with a 6 inch piece of CPVC that must be connected into the exhaust vent adapter.

**Appliance 1" Return and 1" Supply Connection** – Appliances are equipped with both top and bottom piping connections for greater installation flexibility.

**Gas Connection** – The appliance is equipped with a 3/4" gas connection to connect the incoming gas supply.

**Field Wiring and Power Switch** – Each appliance is supplied with a power switch to cut off power. The appliance is also equipped with two front mounted terminal strips. These terminal strips are separated into low and line voltage to ease system wiring.

**Condensate Trap and Hose Assembly** – Each appliance has a built-in condensate trap to control the discharge of condensate produced by the appliance during normal operation. A corrugated condensate hose is also provided to ensure proper drainage of condensate into the pump or drain.

**Low Water Cut Off Probe** – LWCO is provided with each appliance to ensure the appliance has an adequate water level to eliminate overheating and damage to the heat exchanger.

**Pump Service Mode** – Allows manual operation of pumps to commission system and check pump operation.

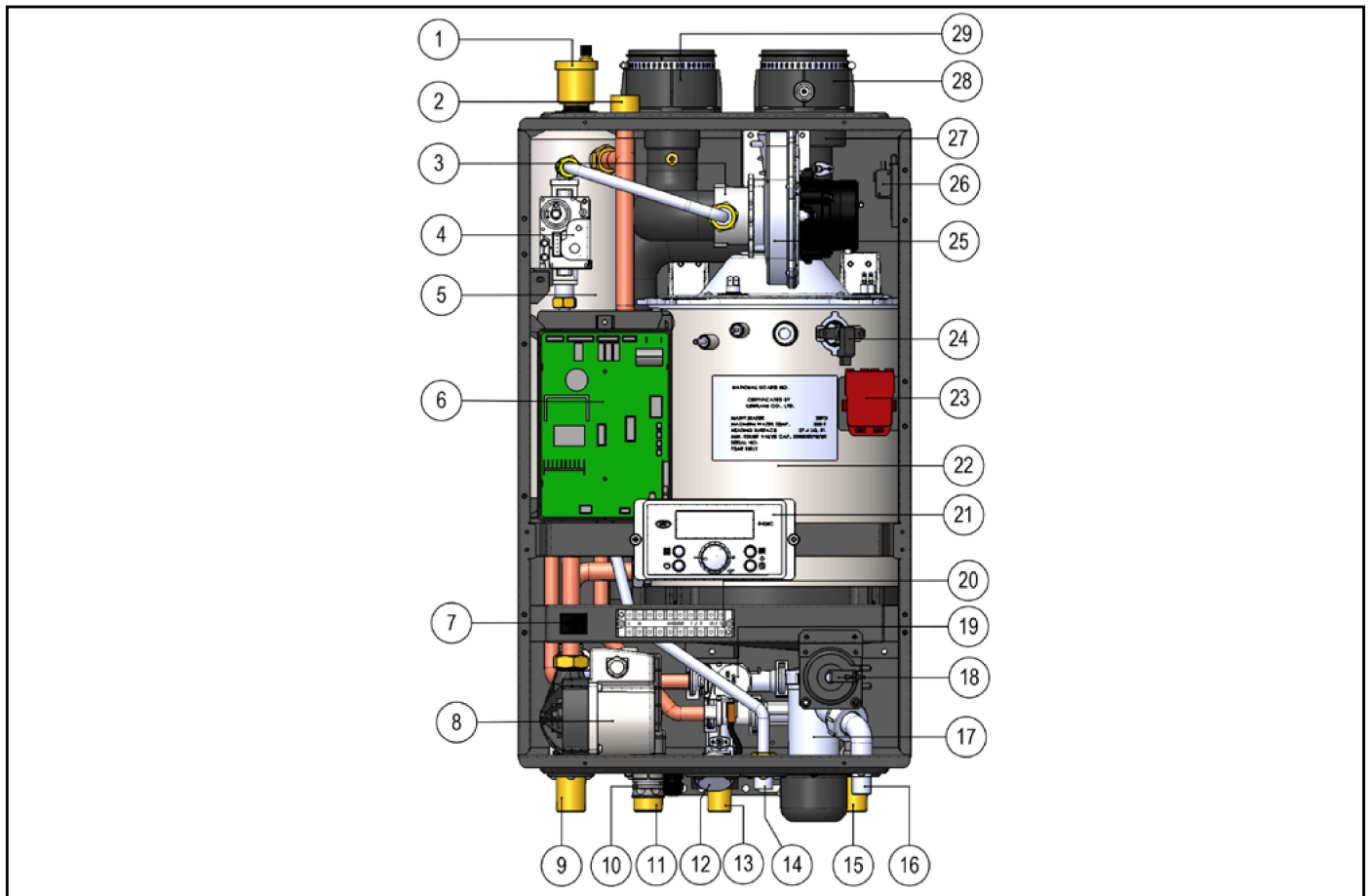


Figure 5 - Components

Number	Component Description	Number	Component Description	Number	Component Description
1	Air Vent	11	CH Return Adapter	21	Control Panel
2	Relief Valve Adapter	12	CH Pressure Gauge	22	Heat Exchanger
3	Air / Gas Mixing Pipe	13	DHW Outlet Adapter	23	Ignition Transformer
4	Gas Valve	14	Gas Inlet Adapter	24	Flame Detecting Sensor
5	Internal Storage Tank	15	DHW Inlet Adapter with Filter and Flow Restrictor	25	BLDC Fan
6	Main PCB	16	Condensate Adapter	26	Air Pressure Switch
7	Manual ON/OFF Power Switch	17	Condensate Trap	27	Exhaust Vent Pipe
8	Internal Recirculation Pump (DHW) / CH Internal Primary Pump	18	Condensate Air Pressure Switch	28	Exhaust Vent Adapter
9	CH Supply Adapter	19	Mixing Valve	29	Air Intake Adapter
10	CH Return Filter	20	Terminal Block		

Table 12 - Component List

### J. Wall-Mounting (Wall Mount Models Only)

#### WARNING

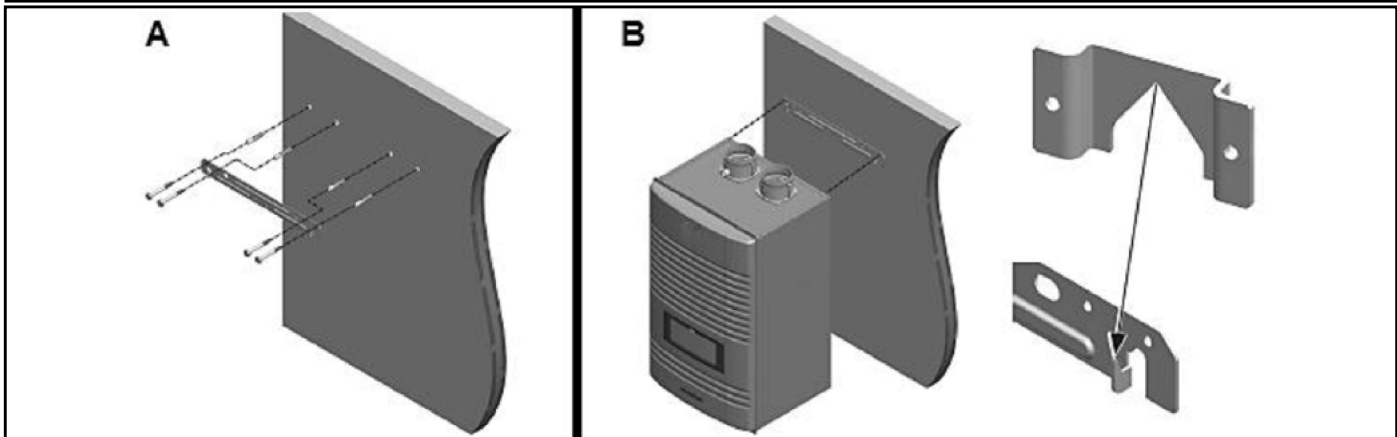
The appliance must be installed on a wall that can bear its weight (more than 110 lbs. when fully plumbed and full of water). Installing the appliance on a wall which cannot support its weight could result in property damage, personal injury, or death.

The appliance may be installed on any suitable internal wall (suitable sound-proofing may be required when installing onto a stud partition wall).

## ⚠ WARNING

This appliance is too heavy for one person to lift. It is highly recommended to install the appliance with two people. Use caution as to not drop the appliance, which could damage the appliance and cause property damage and/or severe personal injury. Verify that the appliance is properly and securely mounted before leaving unsupervised. Failure to comply with the above and properly mount the appliance could result in substantial property damage, severe personal injury, or death.

This wall mounting system is not seismic rated and should not be applied as such. Failure to comply with the above and properly mount the appliance could result in substantial property damage, severe personal injury, or death.



**Figure 6 - Wall-Mounting the Appliance**

### Positioning the Appliance on the Wall

1. Attach the wall bracket on the location where you want to install the appliance. Ensure it is level and on stud (16" centers) before proceeding.
2. Mark the four drill holes with a pencil or marker. Remove the wall bracket.
3. Drill four (4) holes using a 5/32 drill bit at the marked hole locations.
4. Mount the wall bracket to the wall with the four (4) included anchor bolts. Ensure the mounted bracket is level. See Figure 7A.
5. Align the appliance bracket grooves on the back of the appliance with the tongues on the wall bracket and hang the appliance on the bracket. See Figure 7B.

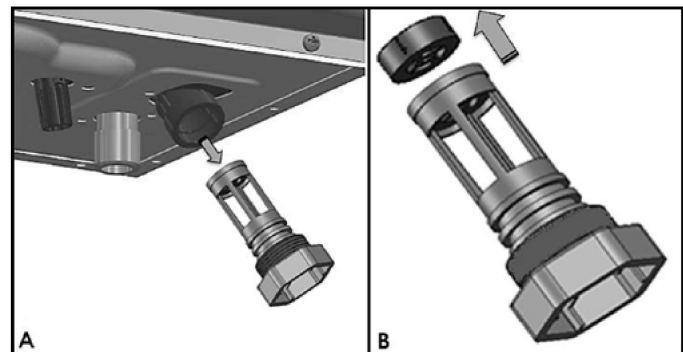
### K. Flow Restrictor

A flow restrictor is installed on this appliance in the DHW inlet adapter to avoid excessive flow at the faucets. See Flow Charts, this manual, for more information.

If it is necessary to further increase flow to the system, replace the factory installed white flow restrictor with the blue included with the appliance by following the instructions below.

## ⚠ WARNING

If the appliance is already fully installed, turn the gas, power, and water off to the appliance and drain all water from the appliance BEFORE proceeding. Failure to comply could result in substantial property damage, severe personal injury, or death.



**Figure 7 - A - Removing the DHW Inlet Filter, B - Removing the Flow Restrictor**

1. Locate the DHW inlet adapter on the bottom of the appliance.
2. Pull the two pins to release the DHW inlet filter. See Figure 7-A. The flow restrictor is attached to the top of the filter assembly.
3. Remove the installed white flow restrictor and replace it with the blue flow restrictor included with the appliance. See Figure 7-B.
4. Reinstall the DHW inlet filter.
5. Reinstall the two pins.