

AFL Series Multi-Position High Efficiency Hydronic Furnace



1. Safety Instruction

Potential safety hazards are alerted using the following symbols. The symbol is used in conjunction with terms that indicate the intensity of the hazard.



WARNING

This symbol indicates a potentially hazardous situation, which if not avoided, could result in serious injury, property damage, product damage or death.



CAUTION

This symbol indicates a potentially hazardous situation, which if not avoided, may result in moderate injury or property damage.



WARNING

Certified technicians or those individuals meeting the requirements specified by NATE may use this information. Property and product damage or personal injury hazard may occur without such background.



WARNING

All power sources should be disconnected prior to servicing. Failure to do so may cause personal injury or property damage.



WARNING

Product designed and manufactured to permit installation in accordance with local and national building codes. It is the installer's responsibility to ensure that product is installed in strict compliance with national and local codes. Manufacturer takes no responsibility for damage (personal, product or property) caused due to installations violating regulations. In absence of local/state codes, refer to National Electric Code: NFPA 90A & 90B Uniform Mechanical Code.



WARNING

When this unit is installed in an enclosed area, such as a garage or utility room with any Carbon Monoxide producing devices (i.e. automobile, space heater, water heater etc.) ensure that the enclosed area is properly ventilated.



CAUTION

Only factory authorized kits and accessories should be used when installing or modifying this unit unless it is so noted in these instructions. Some localities may require a licensed installer/service personnel.



WARNING

Unit is not approved for outdoor installations.



WARNING

The unit is designed for operation with 208/240 V, single phase, 60 Hz power supply. Aspen will not be responsible for damages caused due to modification of the unit to operate with alternative power sources.

2. Important Messages

2A. To the Installer:

"The United States Environmental Protection Agency ("EPA") has issued various regulations regarding the introduction of disposal of refrigerants in this unit. Failure to follow these regulations may harm the environment and can lead to the imposition of substantial fines. Because these regulations may vary due to the passage of new laws we suggest that any work on this unit be done by a certified technician. Should you have any questions please contact the local office of EPA." Some Aspen coils may include a Schrader valve on the suction manifold. During installation, this Schrader valve must be protected from heat or it may leak.

All Aspen coils are shipped with a nitrogen holding charge. DO NOT install the coil if this charge is not present.

2B. To the Owner:

These instructions should be carefully read and kept near product, for future reference. While these instructions are addressed primarily to the installer, useful maintenance information is included. Have your installing dealer acquaint you with the operating characteristics of the product and periodic homeowner maintenance requirements. As expressed in our product warranty, Aspen will not be billed for any structural damage due to failure to follow these installation requirements. Once installed, Aspen coils may contain chlorofluorocarbons (CFC's) or hydrochlorofluorocarbons (HCFC's). Under certain conditions, CFC's & HCFC's may pose a health risk. Please notify a licensed service technician immediately if you suspect your system may contain a leak.

3. Codes And Regulations

This product is designed and manufactured to permit installation in accordance with National Codes. It is the installer's responsibility to install the product in accordance with National Codes and/or prevailing local codes and regulations. The manufacturer assumes no responsibility for equipment installed in violation of any code or regulation.

4. Inspection

This product has been inspected and run tested at the factory and released to the transportation agency without known damage. Inspect exterior of carton for evidence of rough handling in shipment. Unpack carefully, if damage is found, report immediately to the transportation agency.

5. Replacement Parts

Order all replacement parts through your local distributor. When ordering parts, give complete model and serial number as shown on the unit rating plate.

6. Specifications

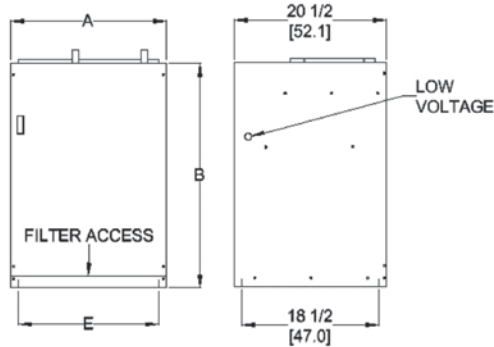
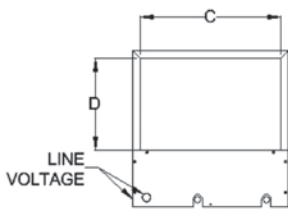
X-13 BLOWER DATA

MODEL	MOTOR SPEED	CFM V. EXTERNAL STATIC*				
		0.10	0.20	0.30	0.40	0.50
AFLS+ WC2SR WC3SR	5	900	855	800	740	675
	4	670	650	615	600	550
	3	460	445	420	400	385
	2	900	855	800	740	675
	1	350	335	315	300	280
AFLM+ WC2SR WC3SR WC4SR	5	1200	1130	1085	1030	985
	4	1140	1090	1030	975	910
	3	905	870	835	800	740
	2	760	730	695	650	605
	1	475	450	425	400	375
AFLL+ WC2LR WC3LR WC4LR	5	1875	1800	1730	1690	1625
	4	1705	1660	1600	1530	1480
	3	1495	1460	1430	1400	1365
	2	1340	1295	1255	1200	1140
	1	910	875	840	800	745

* Dry coil with filter in place

DIMENSIONS AND SPECIFICATIONS

MODEL	WIDTH A"	HEIGHT B"	DUCT OPENING		BOTTOM OPENING	FILTER SIZE	SHIP WEIGHT (LBS)	SKID QTY
			C"	D"	E"			
AFLS	21	21	18-3/4	12	18-1/2	16 x 16	83	8
AFLM	21	21	18-3/4	12	18-1/2	16 x 16	85	6
AFLF	24-1/2	21	22-1/4	14-1/2	22-1/4	20 x 20	110	6



INSTALLATION CLEARANCES

	OPERATION	SERVICE
TOP	0"	0"
FRONT	0"	30"
SIDES	0"	0"
REAR	0"	0"

7. Equipment Sizing

7A. Air Handler Selection

Select an air handler with a heating output that exceeds the space heating loss of the structure and that has a cooling coil sized to match the outdoor condensing unit. Special note... the heating output of the air handler or hot water coil will not be greater than the output of the selected hot water heater. Therefore, if the water heater is undersized the heating BTUH of the air handler will be LESS than it's rated output.

7B. Water Heater Selection

The following sizing information should only be used as a basic guide to adequate water heater sizing because of variations in each family's domestic hot water requirements. For additional assistance in water heater sizing contact a professional engineer.

Proper water heater sizing should consider both the gallon capacity AND the BTU input of the water heater.

I. To determine water heater GALLON CAPACITY:

A minimum 40 gallon high recovery and/or high efficiency gas or oil-fired water heater is recommended. The following volume sizing guide is satisfactory in most areas of the country:

- 600800 CFM air handlers minimum 40 gallon water heater
- 10001200 CFM air handlers minimum 50 gallon water heater
- 14001600 CFM air handler either two 40 gallon water heaters piped together, one high input 50 gallon (63,000 to 75,000 BTU input), or one 72 to 75 gallon.
- 2000 CFM air handler any combination of water heaters having at least 105,000 BTU OUTPUT.

II. To determine water heater BTU INPUT:

(assumes a water heater recovery efficiency of 76%)

- For mild climates: BTU INPUT=structure's heat loss x 1.51
- For colder climates: BTU INPUT=structure's heat loss x 1.58

8. Installation

8A. Product Location

In an attic installation, where unit is resting on the floor, a suitable isolation pad should be provided to minimize equipment sound transmission to ceiling below.

FURTHERMORE, IN ALL COOLING APPLICATIONS, A SECONDARY DRAIN PAN MUST BE PROVIDED BY THE INSTALLER AND PLACED UNDER THE ENTIRE UNIT WITH A SEPARATE DRAIN LINE PROPERLY SLOPED AND TERMINATED IN AN AREA VISIBLE TO OWNER. THIS SECONDARY PAN CAN PROVIDE EXTRA PROTECTION TO THE AREA UNDER THE UNIT SHOULD THE PRIMARY DRAIN PLUG UP AND OVERFLOW. AS EXPRESSED IN OUR PRODUCT WARRANTY, ASPEN WILL NOT BE BILLED FOR ANY STRUCTURAL DAMAGE DUE TO THE FAILURE TO FOLLOW THIS INSTALLATION REQUIREMENT.

8B. Installation Notes

This unit must be installed in accordance with all local and national codes. The furnace is completely serviceable from the front. All Units are approved for 0" clearance. This Hydronic Furnace allows substantial freedom in positioning the product to best serve the structure requirements. Units may, without field modification, be positioned for upflow, horizontal left or horizontal right installation. The downflow position requires a slight field modification (See section 8F). Use a low temperature, NON-LEAD solder on all water line copper joints. Insulate all water piping as necessary to prevent freezing. If screws or holes must be drilled into fan coil cabinet, check carefully to insure that no damage is done to internal components.

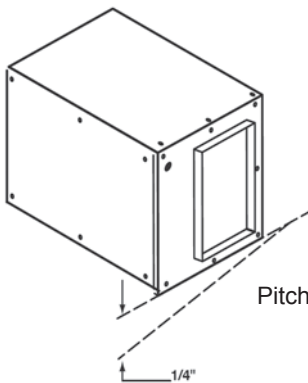


CAUTION If a back flow preventer is installed in the system, an expansion tank is necessary.



CAUTION The hot water coil and all water lines must be purged of air before the hot water pump can be energized. Failure to purge the water system of air can result in damage to the pump.

8C. Horizontal Application



Pitch unit 1/4" toward drain side.

8D. Duct Installation

Air duct systems should be installed in accordance with standards for airconditioning systems, National Fire Protection Association Pamphlet No. 90A or 90B. They should be sized in accordance with National Environmental System Contractors Association Manual K, or whichever is applicable.

On any job, nonflammable flexible collars should be used for the

return air and discharge connections to prevent transmission of vibration. Although these units have been specially designed for quiet vibration free operation, air ducts can act as soundboards and could, if poorly installed, amplify the slightest vibration to the annoyance level.

All main supply and return air drops should be run full size as determined by the designer of the duct system and should not necessarily be the size of the duct flange openings of the unit

When installing a central air return grille in or near the living space, it is advisable to design the ductwork so that the grille is not in direct line with the opening in the unit. One or two elbows and acoustical duct liner will also assure a quieter installation and system.

It is recommended that wherever supply and return air sheet metal duct pass through unconditioned areas, they be insulated to prevent excessive heat loss during heating operation. When applied in conjunction with summer air conditioning, sheet metal duct routed through unconditioned areas should be insulated and have an outside vapor barrier to prevent formation of condensation.

8E. Electrical Installation

These units are designed for single phase 120 volt 60 Hertz power supply. Wire selection and wiring must be in accordance with the National Electric Code and/or local codes. Unit terminals are designed to accommodate copper and aluminum wiring. If aluminum wiring is used, please observe the special precautions relative to sizing, handling, wire connections and corrosion protection.

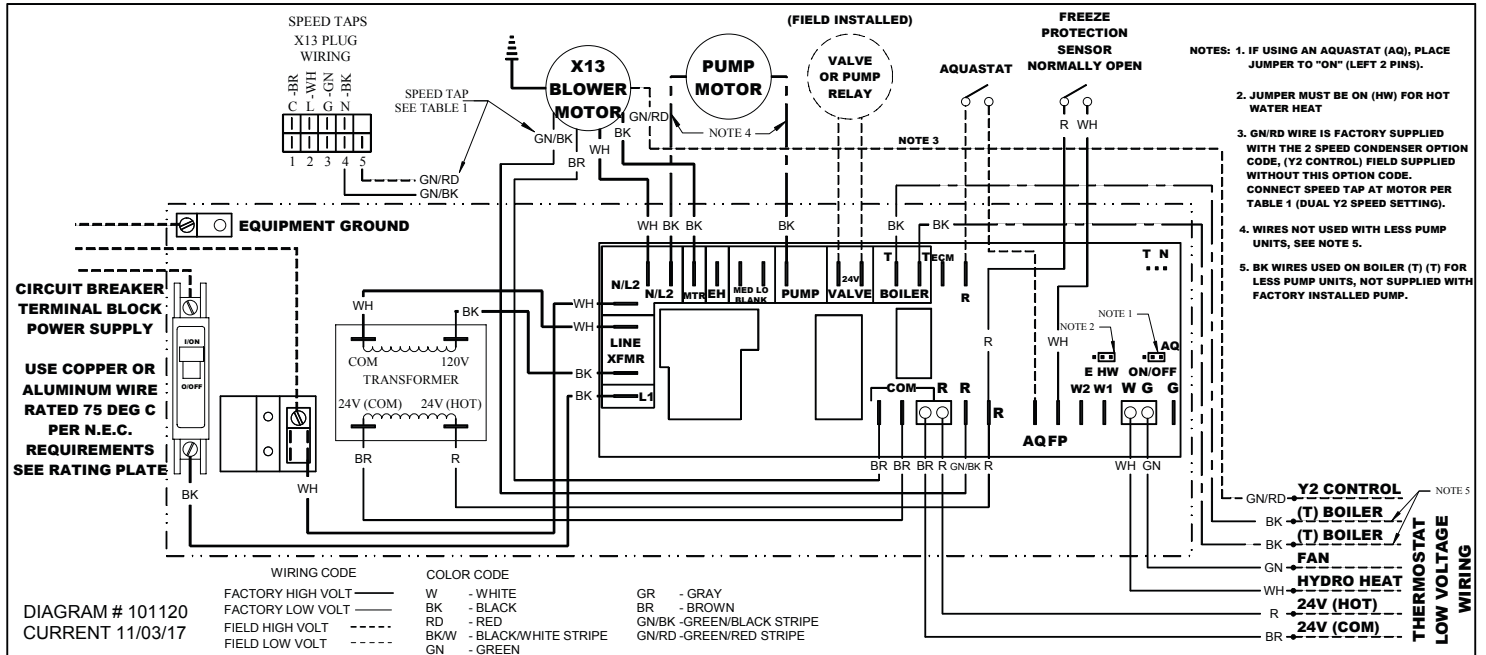
8F. Special Instructions For Counterflow Applications (AFL)

The AFL Series Hydronic Furnace is specifically designed for the use in the upflow, horizontal and counterflow positions. Should the application be for counterflow position, the following steps should be taken:

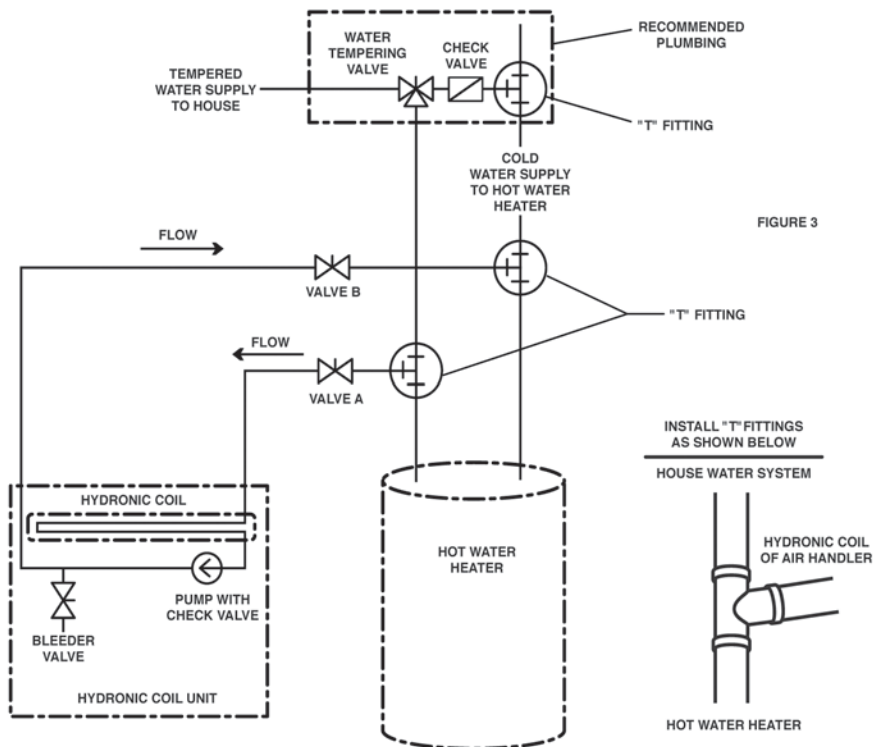
- 1) Some units are supplied with factory installed circuit breakers. If the air handler has circuit breakers, they must be snapped out of the factory installed bracket and inverted to reflect "up" as the "on" and "down" as the "off" position.
- 2) The above procedure should be done at the job site, as the unit is not designed to be shipped in the counterflow mode.

9. Electrical Wiring

All information needed to connect the 120VAC supply and 24VAC control wiring is supplied with the unit. Two knockouts are located for connection of power and control wiring. Since this unit is supplied with a 24 volt Class 2 transformer, a thermostat with isolating contacts must be used when connecting other add-on equipment using a Class 2 transformer.



10. Piping Diagram



11. Start Up

After all connections are made, start up and check out of the unit must be performed before proper evaluation of the entire system can be made. Make sure that heat anticipator is properly set as noted on low voltage wiring diagrams.

Load requirements can vary in each residence and it may be necessary for the installer or homeowner to make slight adjustments to the heat anticipator setting for longer or shorter cycles. It is recommended to change the setting no more than plus or minus .05 amps at one time. Greater changes can cause the unit to rapid cycle or remain on excessively. To properly check the unit's operation, the installer should have an electrical current measuring device (010 amp Amprobe), air pressure measuring device (01.0 in slope gauge), and a temperature measuring device (0-200°F thermometer).

Install the amprobe to measure blower current, the slope gauge to measure static air pressure at the units and the temperature device to measure unit supply and return air temperature. Before taking measurements, be sure that all registers, grilles and dampers are open or are set to their proper positions. Be sure that clean filters are in place. Temperature measuring device must be installed to obtain average temperature at both inlet and outlet. For outlet, measure temperature of each main trunk at a location far enough away to avoid heater radiation and read the average temperatures.

12. General Operation And Maintenance

12A. Room Thermostat

This is the device that controls that operation of your heating and/or cooling unit. It senses the indoor temperature and signals the equipment to start or stop maintaining the temperature you have selected for your comfort. The room thermostat should be in a central, draft free inside wall location for best operation. Do not place any heat producing apparatus such as lights, radio, etc., near the thermostat as this will cause erratic operation of the comfort system. The thermostat can accumulate dust or lint, which can affect its accuracy. It should be cleaned annually.

12B. Air Filter(s)

All central air moving comfort systems must include air filter(s). These filters will be located either in the equipment or in the return air duct system upstream of the equipment. The filter(s) removes dust and debris from the air thus helping to keep your air conditioned space clean. More important, the filter keeps dust and debris from collecting on the heat transfer surfaces thus maintaining optimum equipment efficiency and performance. Inspect and clean or replace filters every month. This routine maintenance procedure will pay big dividends in reduced operating cost and reduced service expense. Never operate comfort equipment without filter(s).

An air filter can restrict the airflow of air to the fan coil if it is not cleaned or replaced periodically. When replacing the air filter, always replace with the same type and size as originally furnished with the unit.

12C. Fuses and/or Circuit Breakers

This comfort equipment should be connected to the building electric service in accordance with local and National Electric codes. This electrical connection will include over current protection in the form of circuit breakers. Have your contractor identify the circuits and the location of over current protection so that you may be in a position to make inspections or replacements in the event the equipment fails to operate.



WARNING

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



CAUTION

Do not operate the comfort equipment with panels removed.



WARNING

Have your contractor point out and identify the various cutoff devices, switches, etc., that serve your comfort equipment.

There is a main switch that will cut off energy to your heating system. Know where they are so that you may cut off the flow of energy in the event of overheating.

12D. Periodic Checkup and Service

This product is designed to provide many years of dependable, trouble free comfort when properly maintained. Proper maintenance will consist of annual checkups and cleaning of the internal electrical and heat transfer components by a qualified service technician. Failure to provide periodic checkup and cleaning can result in excessive operating cost and/or equipment malfunction.

12E. Lubrication

Direct drive blower motors are equipped with permanently lubricated bearings and do not require further lubrication.

13. Service & Troubleshooting

13A. Pump Replacement

1. Disconnect electrical power to the unit before servicing.
2. Remove access door to reveal pump. Close supply valve ("A") and return valve ("B"). Open the air bleed valve to depressurize the system and drain water.
3. Remove the metal pump housing by loosening the four screws on the pump. **DO NOT UNSOLDER PUMP.**
4. Replace the new pump housing assembly and reconnect components to the pump. Before assembling, make sure that the rubber on the o-ring is in place on the pump housing.

Purge the system of air as described earlier and reconnect the electrical power.

13B. Noisy Pump

System may not be totally purged of air. Purge the system again as described earlier.

13C. T & P Valve On Water Heater Weeps

This normally occurs when a backflow preventer has been installed in the cold water line supplying the water heater. An expansion tank may be necessary to correct the problem. Contact a qualified plumbing professional for assistance.

13D. Hot Water Is Circulating Through The Heating Coil During The Cooling Cycle

The check valve may be stuck open and allowing hot water to circulate through the coil.

13E. Little Or No Heat From Water Coil

- A. Purge the system.
- B. The inlet and outlet connections may be reversed at the fan coil.
- C. Water heater thermostat is not set at proper temperature.
- D. Water heater thermostat is not calibrated.
- E. The dip tube in the water heater may not be installed correctly or may be restricted.
- F. Look for restriction in heating system from water heater to fan coil. Because some water heaters are supplied with check valves, remove any extra check valves except for the one supplied with the fan coil.
- G. The air handler is undersized for the space being heated.
- H. Water heater is undersized.

14. Ensure These Steps are Completed to Reduce Chances of a Frozen Hydronic Coil

- Ensure the air handler motor and control board are receiving proper power input per the wiring diagram.
- Ensure the hydronic coil has access to a constant water supply as loss of water movement can lead to a frozen coil.
- Prime the water circulator pump using the purge valve per the “Start-Up” section of this installation guide.
- Run the pump for five minutes after priming to ensure no air is in the system.
- If any interruption to the water supply occurs, prime the water circulator pump again.
- Insulate the water piping in unconditioned spaces or within structures that may be unoccupied during freezing conditions.
- If the air handler does not have an internal pump and/or relies on an external boiler system for hot water, the installer may need to rewire the system to ensure that it maintains access to a constant water supply.



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