WOJCIESZAK & ASSOCIATES, INC.
CONSULTING ENGINEERS
833 EAST 5TH STREET
STUART, FLORIDA 34994
(772) 286-8696

TECHNICAL BULLETIN

NO.	DATE	REVISION
201	04/25/06	3

WATER-COOLED, HEAT PUMP (HP) SYSTEM

Constraints

1. Building square footage 7,000 SQ. FT. or more
2. Smallest zone 300 SQ. FT.

System Description

Water-cooled heat pump systems are typically found in buildings that are a minimum of 7,000 square feet or that have a minimum of 15-ton cooling capacity requirements. Basically, heat pumps are located inside mechanical closets. The heat pump consists of a compressor, fan, DX valve and an evaporator coil. The compressor and DX valve cool the refrigerant that is piped into the evaporator coil. Air is pulled across the coil by the fan and then into the space. The compressor is cooled by water piped outside to a cooling tower. The cooling tower has a fan that blows air across this water and cools the water before it returns back to the compressor. Multiple heat pump units are attached to one cooling tower. (See attached schematic.)

Estimated Costs

Obtain from an HVAC contractor.

Notes:

1. Equipment Replacement Frequency
   - Heat pump unit (every 15-20 years)
   - Cooling tower fan motor (every 5 years)
   - Cooling tower (every 10-15 years)
   - Condenser water pumps (every 5-7 years)
   - Boiler (every 5-10 years)
   - Heat Exchanger (every 20 years)

Indoor Equipment

1. Heat Pump Unit (HP)
   a. Typical mechanical closet/room size
      1-ton 3'-2.5"W x 2'-5.5"D
      2-ton 3-7.5"W x 2'-5.5"D
      3-ton 3'8.5"W x 2'-10.5"D
      4-ton 4'-3.5"W x 3'-2.5"D
      5-ton 4'-4.5"W x 3'-2.5"D
   b. Because the compressor is inside the heat pump cabinet, inside the home, each mechanical equipment room should house no more than three HP. Care should be taken to sound insulate the room, seal around the doors and use sound blankets on the compressors.
   c. Location of equipment should be in areas where service personnel can easily access the equipment, via hallways in lieu of bedroom closets, for example. More service is required indoors than the air-cooled split systems because the compressors are now inside the house instead of outside in the condensing unit.
2. It is best to locate the pumps for condenser water inside the building. This shelters the equipment from the harsh outdoor environment, thus extending its useful life. The pumps run continuously, therefore it makes it important to carefully locate this equipment and sound proof the room. Pumps may be located outside if no interior space is available.
3. If space is available inside the residence, it is recommended to locate the heat exchanger there. Stainless steel construction will be necessary if located outdoors.
4. A boiler is used to heat the condenser water and provide heating on cool days. It too may be located inside to be protected from the weather, but air for combustion has to be provided as well as flue venting for the flue gases. If no room is available inside, it may be located outside.

Outdoor Equipment

1. Cooling Tower
   a. Typical cooling tower size

SQ. FT.	Length	Width	Height
7,000	7'-0"	4'-2"	5'-2"
10,000	7'-0"	4'-2"	6'-7"
15,000	11'-0"	4'-2"	5'-2"
20,000	11'-0"	4'-2"	6'-7"
30,000	15'-0"	4'-2"	6'-7"
40,000	18'-0"	4'-2"	6'-7"
50,000	18'-0"	4'-2"	6'-7"
60,000	15'-0"	7'-10"	6'-7"
70,000	15'-0"	7'-10"	6'-7"

   b. Because of the size of the cooling tower, a large space on the property is necessary. Although there are several options available for noise reduction, the tower should be located far away from the residence or sound sensitive outdoor areas of the property. Local codes may limit the noise levels at adjacent property lines.

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WATER-COOLED, HEAT PUMP (HP) SYSTEM

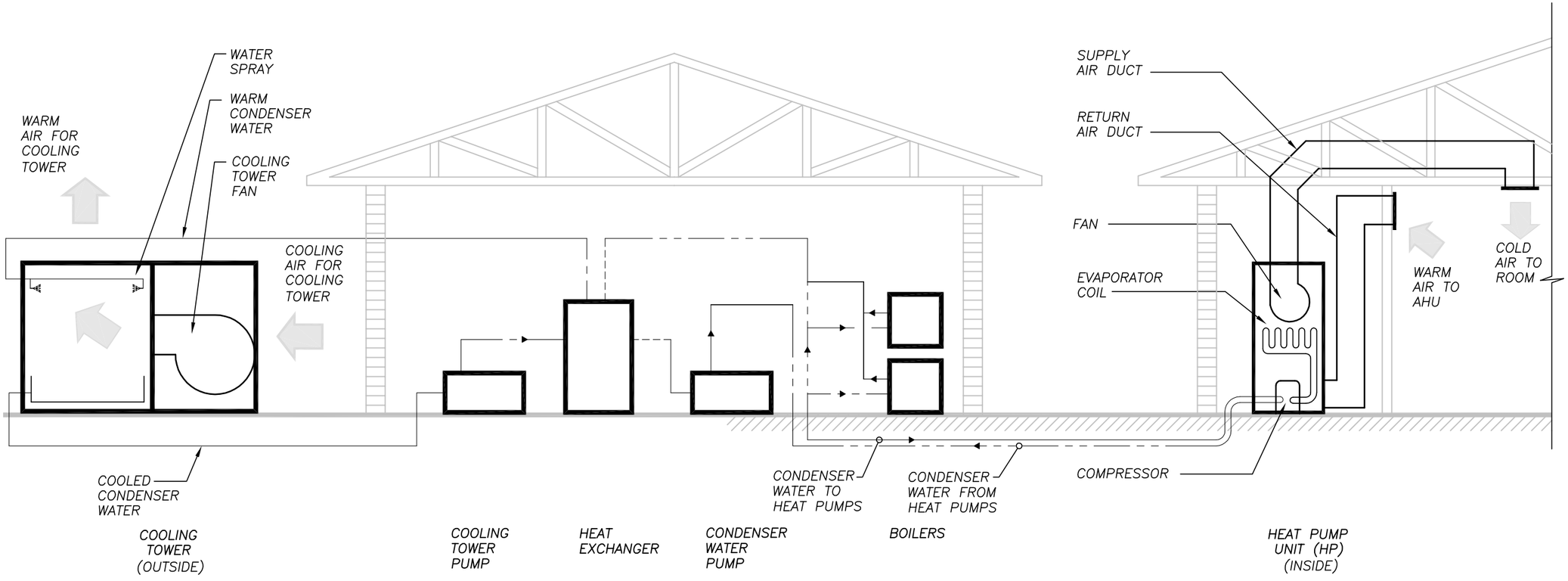
2. Overall Outdoor Equipment Pad Size

SQ. FT.	Length	Width	Height
7,000	11’	9’	6’
10,000	11’	9’	7’
15,000	15’	9’	6’
20,000	15’	9’	7’
30,000	19’	9’	7’
40,000	22’	9’	7’
50,000	22’	9’	7’
60,000	19’	12’	7’
70,000	19’	12’	7’

Piping
Condenser water piping is generally PVC underground and copper above ground and does not require insulation. It is usually run above the ceiling.

Humidity Control
Humidity control is available through a hot gas reheat unit mounted within the heat pump. This produces better control of humidity than the air-cooled split systems, but not as good as the chilled water system.

Energy Consumption
Energy consumption is quite low in units of 11 SEER or above. Consumption is fairly constant over the life of the HP mainly because it is located inside the house and does not corrode.



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TECHNICAL BULLETIN

WATER-COOLED HEAT PUMP (HP) SYSTEM

JOB NO.:	201
DATE:	03/25/03
REV. NO.:	1

V1 – VERTICAL HEAT PUMPS

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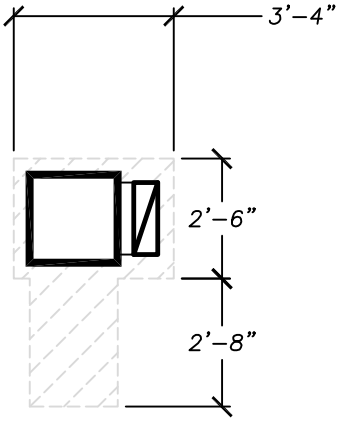
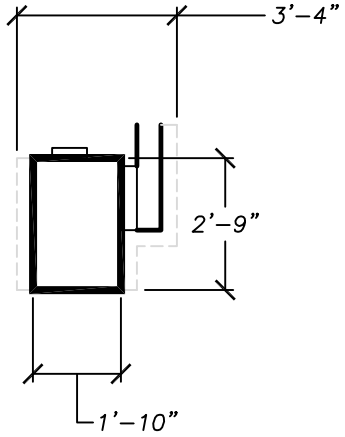
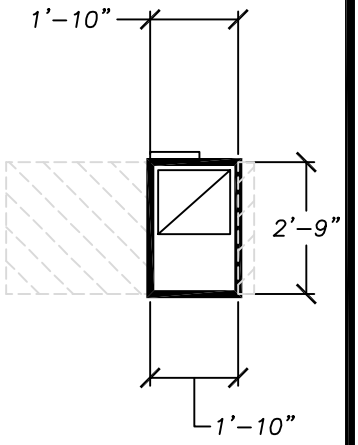
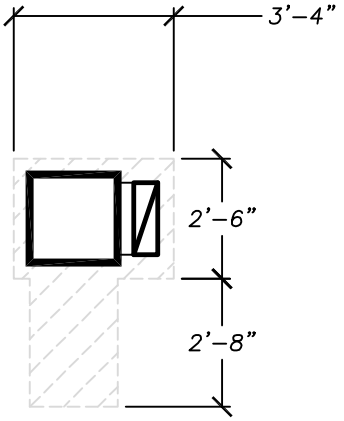
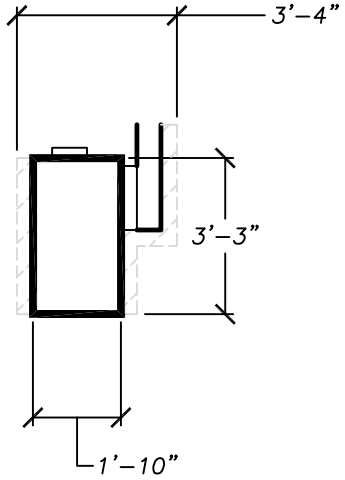
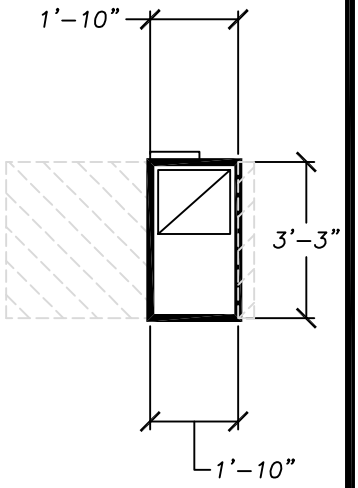
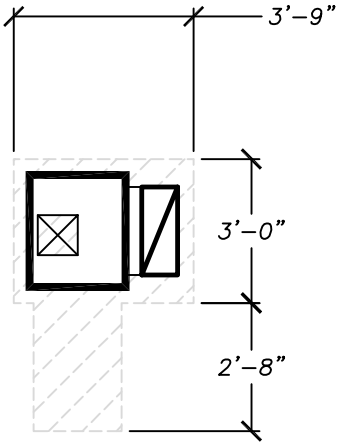
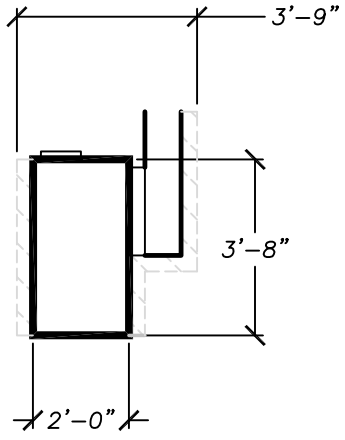
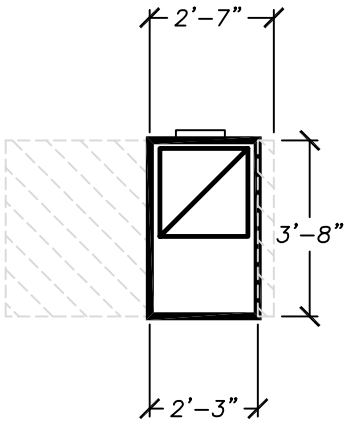
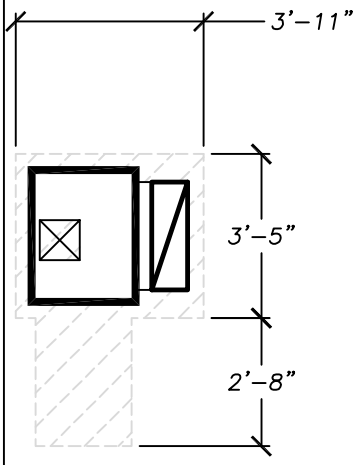
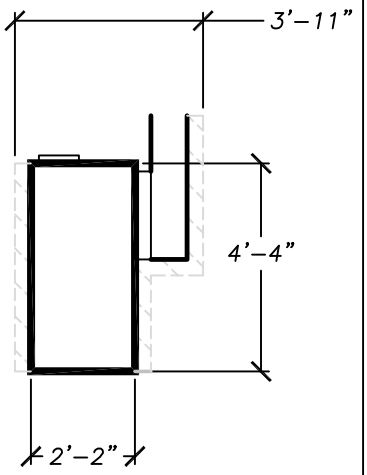
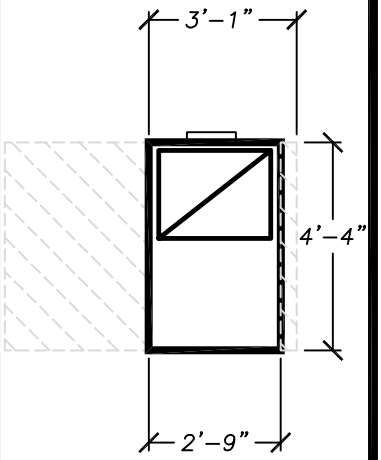
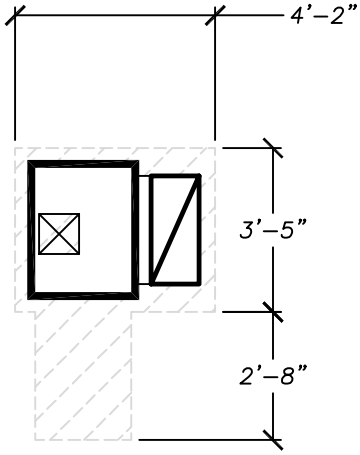
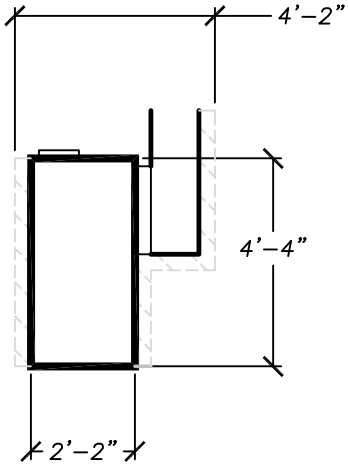
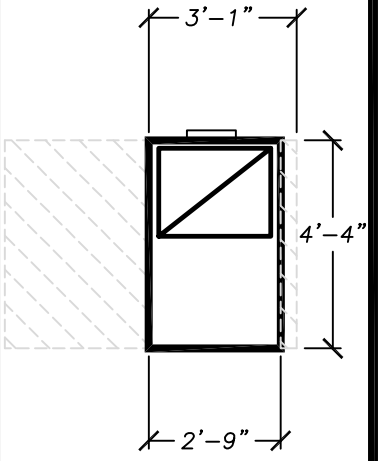
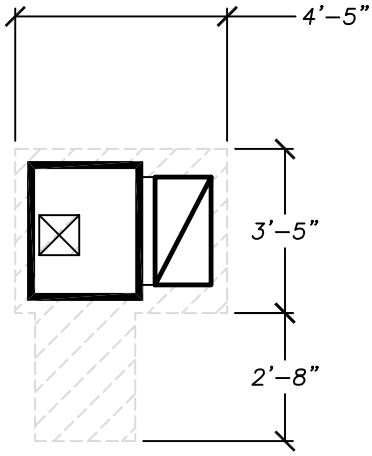
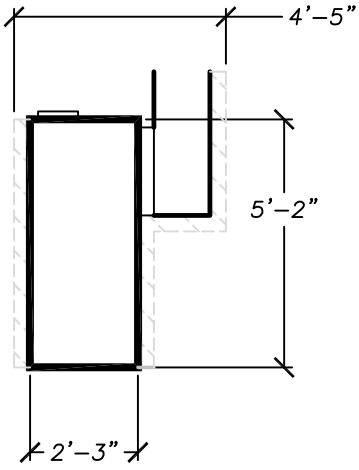
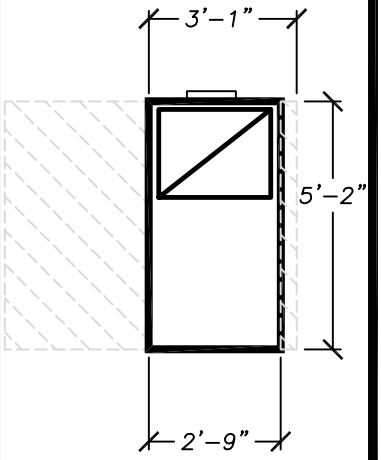
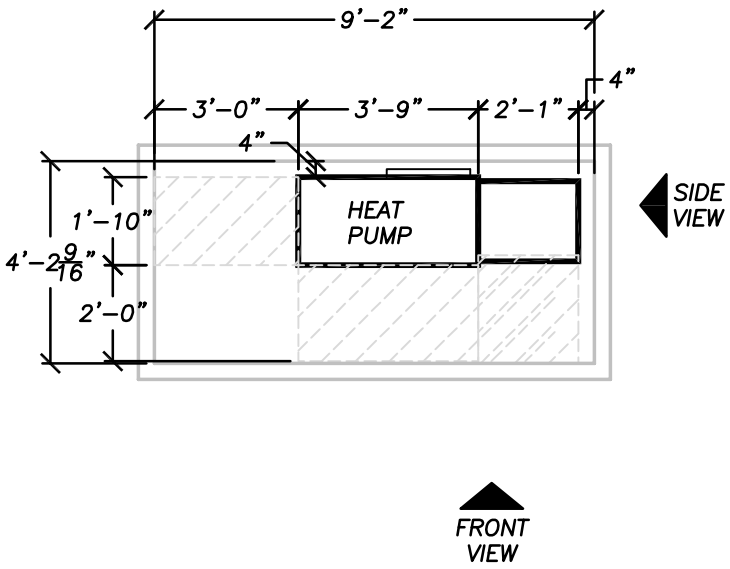
0.5 0.75 1	EP 007 EP 009 EP 012			
1.25 1.5	EP 015 EP 018			
2	LM 024			

V2 – VERTICAL HEAT PUMPS

TONS	FLORIDA HEAT PUMP MODEL NUMBER	PLAN VIEW	FRONT VIEW	SIDE VIEW
3	LM 036			
4	LM 048			
5	LM 060			

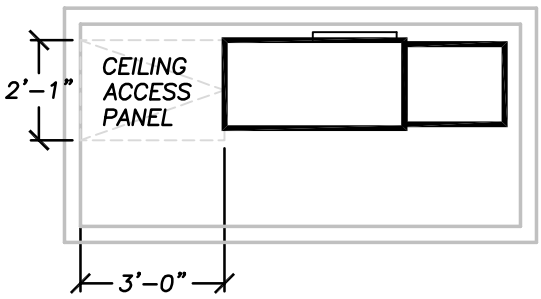
H1 – HORIZONTAL HEAT PUMP

FLORIDA HEAT PUMP EP 012
(1–TON)



PLAN VIEW

SCALE: 1/4" = 1'–0"



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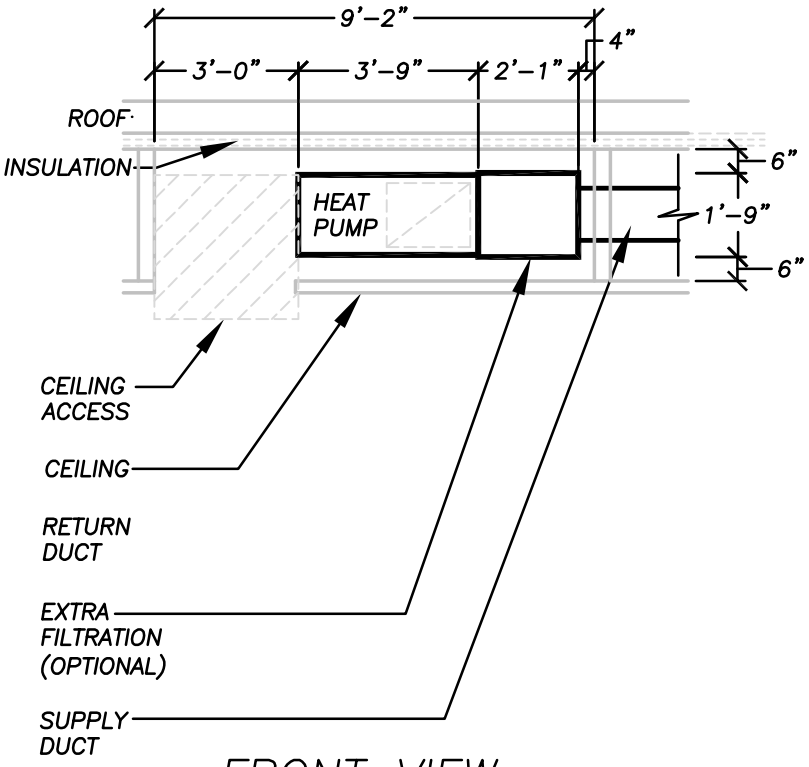

FRONT VIEW

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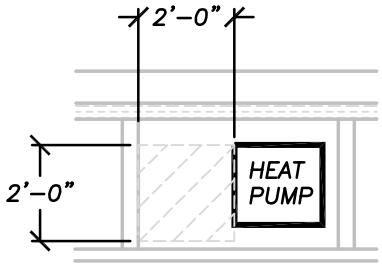
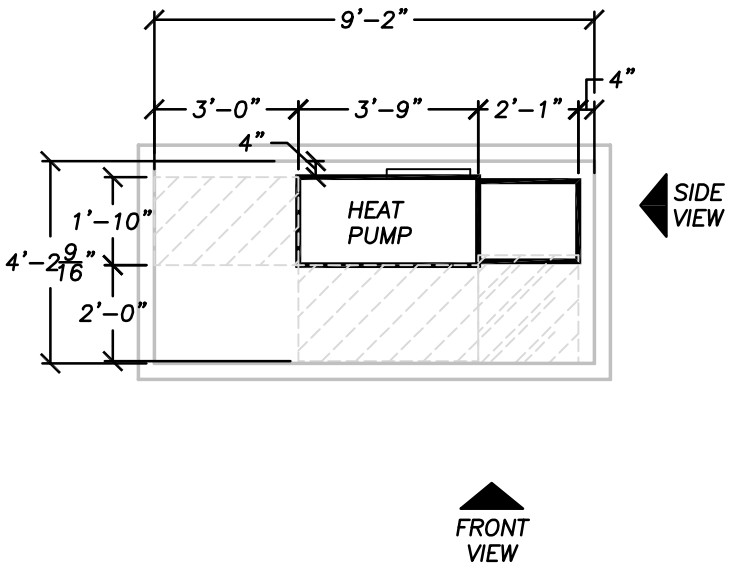


SIDE VIEW

SCALE: 1/4" = 1'–0"

H2 – HORIZONTAL HEAT PUMP

FLORIDA HEAT PUMP EP018
(1.5–TON)



PLAN VIEW

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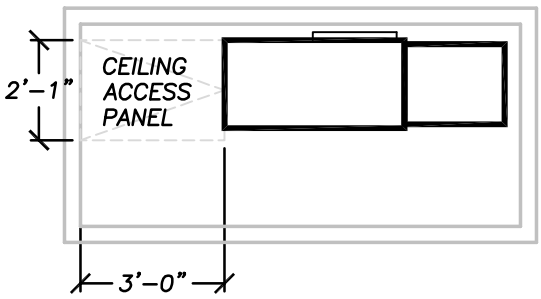

PLAN VIEW

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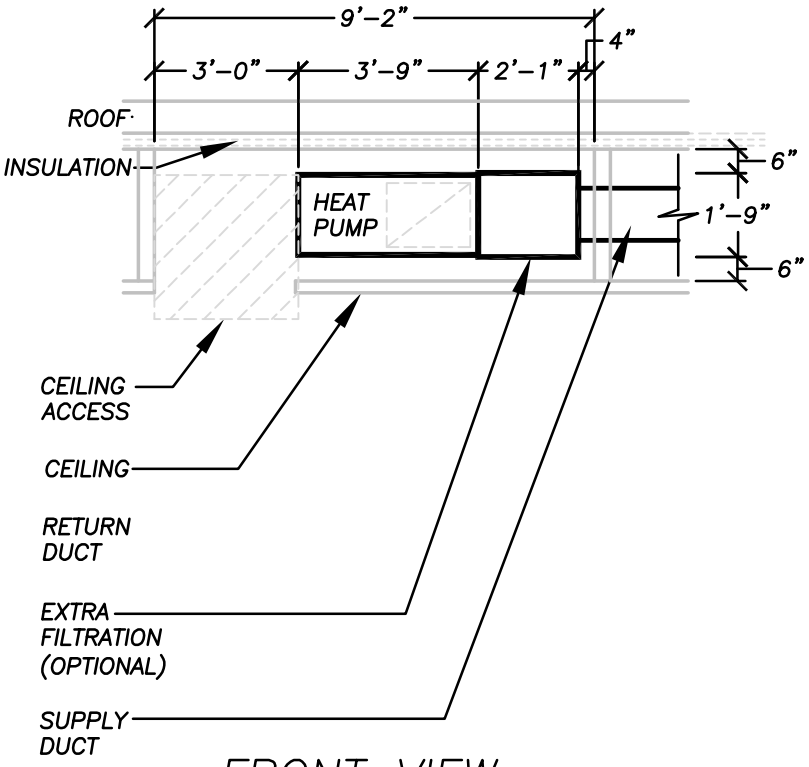

FRONT VIEW

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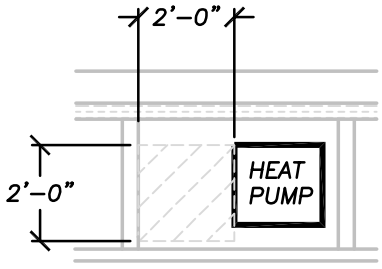
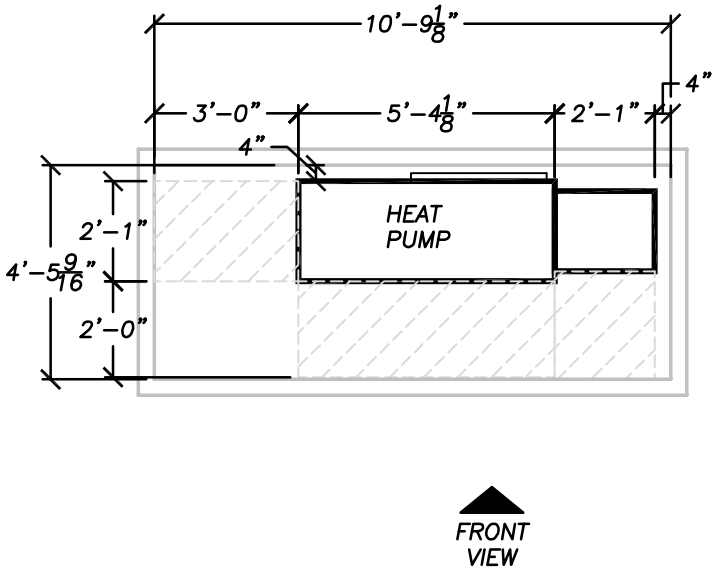


SIDE VIEW

SCALE: 1/4" = 1'–0"

H3 – HORIZONTAL HEAT PUMP

FLORIDA HEAT PUMP LM024
(2–TON)



PLAN VIEW

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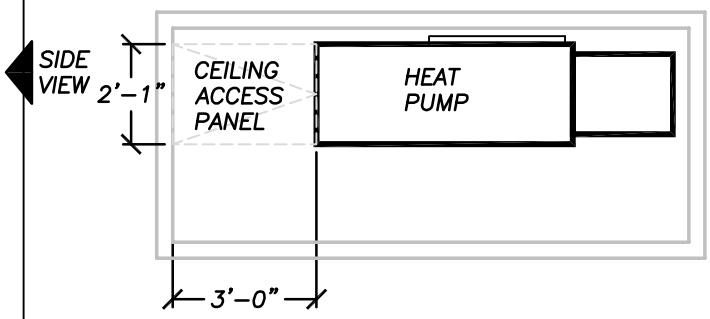

PLAN VIEW

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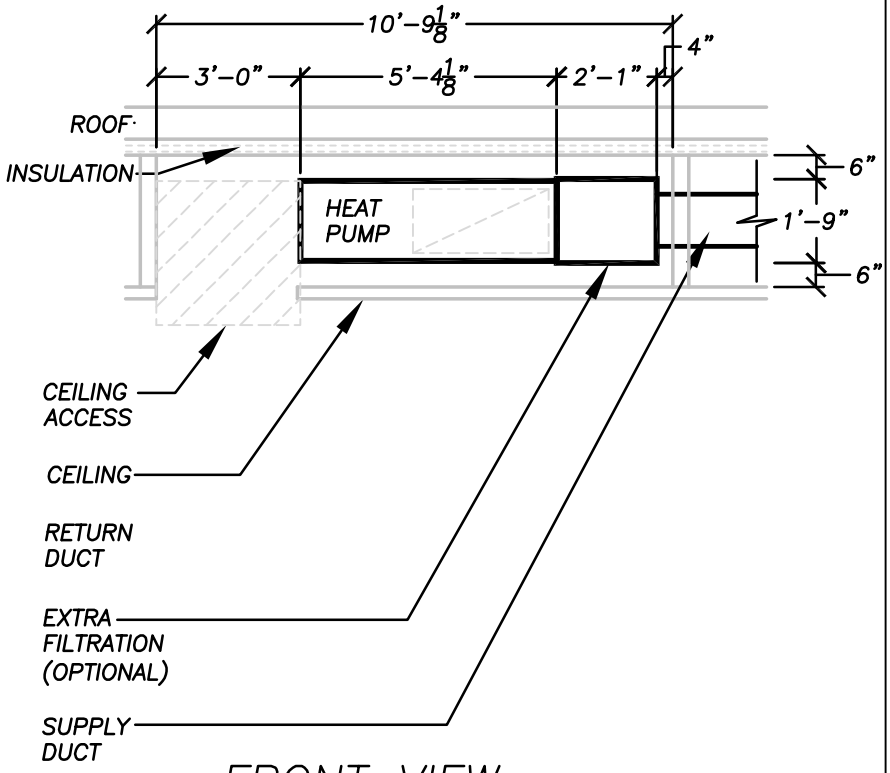

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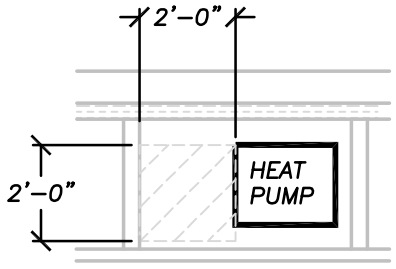

SIDE VIEW

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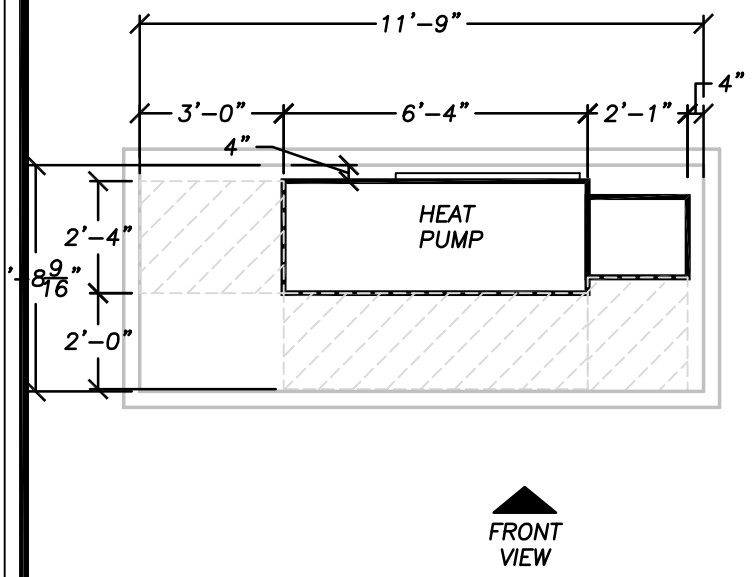
H4 – HORIZONTAL HEAT PUMP

FLORIDA HEAT PUMP LM036
(3–TON)



PLAN VIEW

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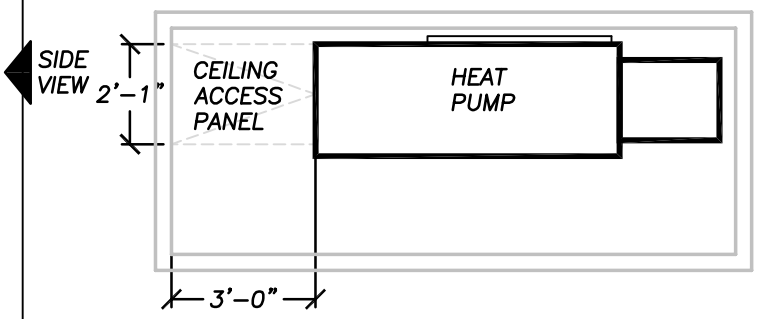

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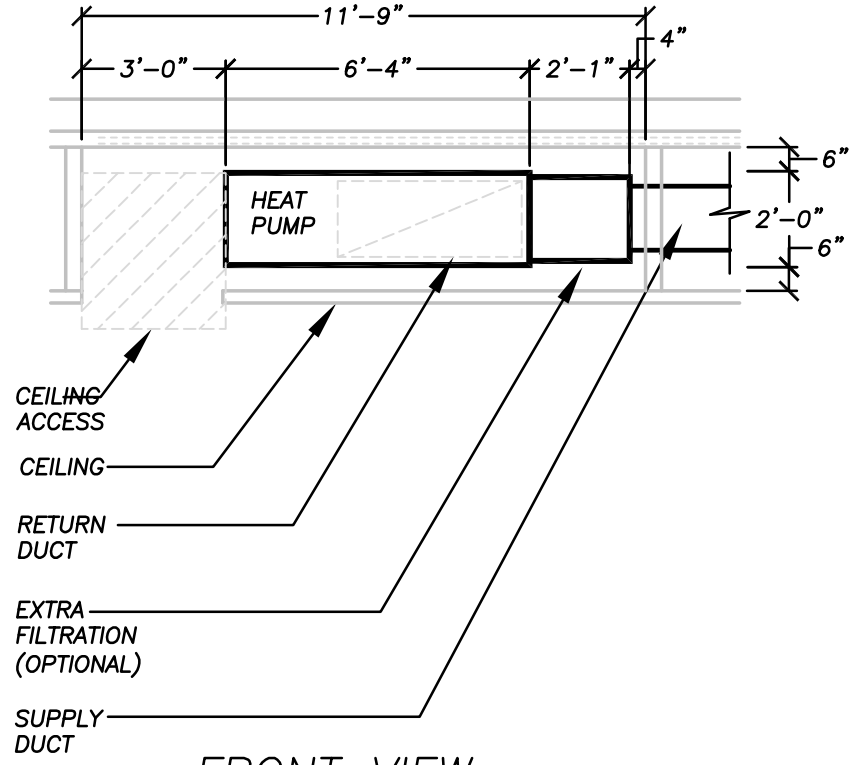

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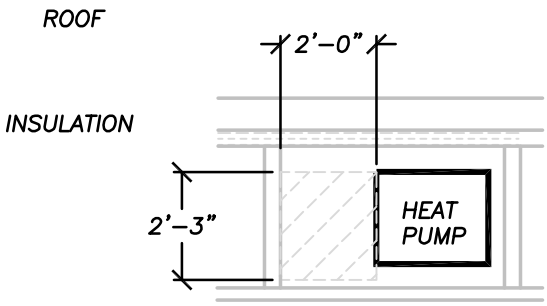
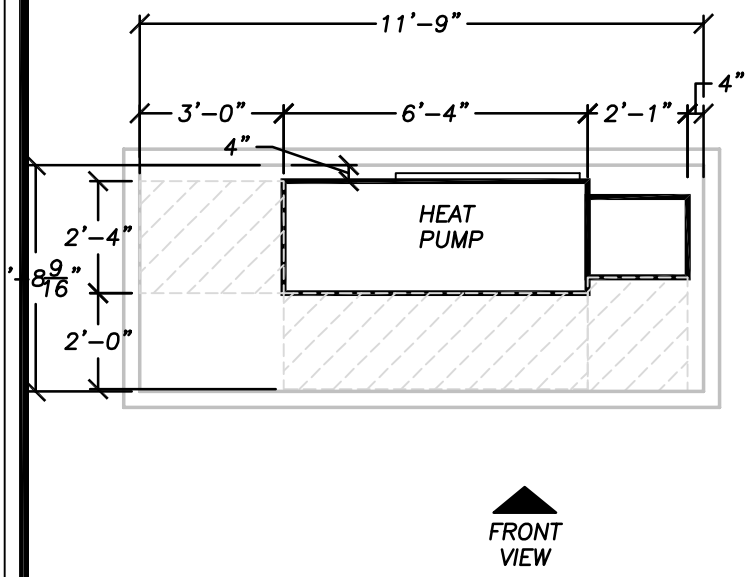


SIDE VIEW

SCALE: 1/4" = 1'–0"

H5 – HORIZONTAL HEAT PUMP

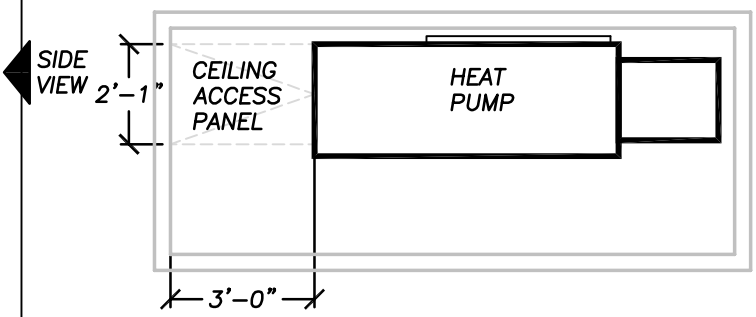
FLORIDA HEAT PUMP LM048
(4–TON)



FRONT VIEW

PLAN VIEW

SCALE: 1/4" = 1'–0"



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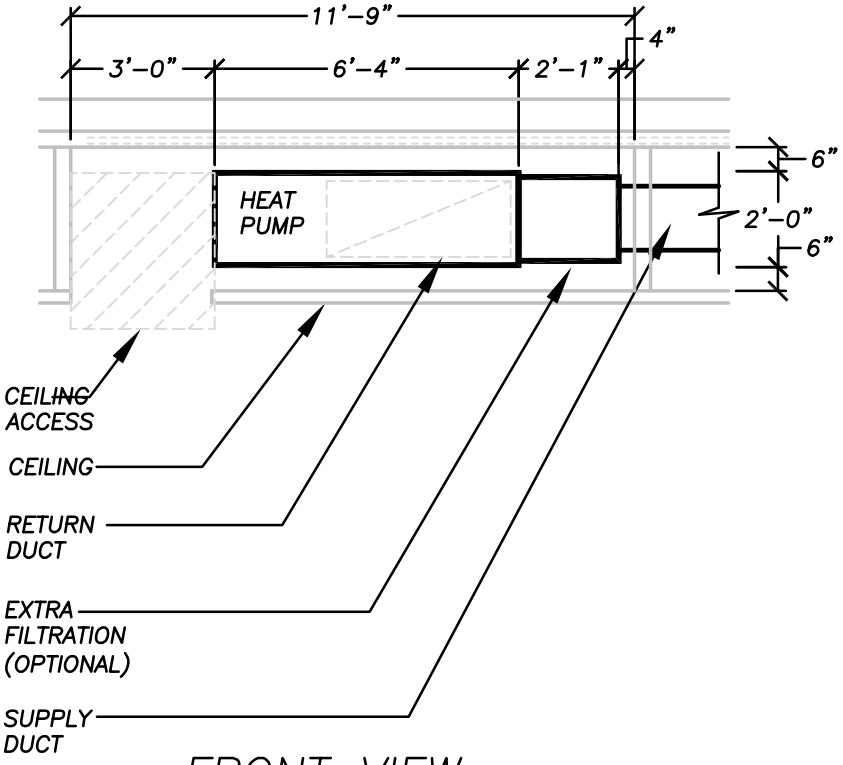

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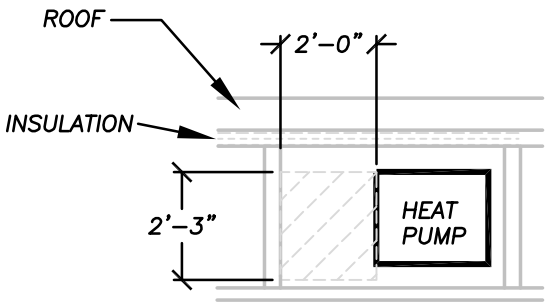
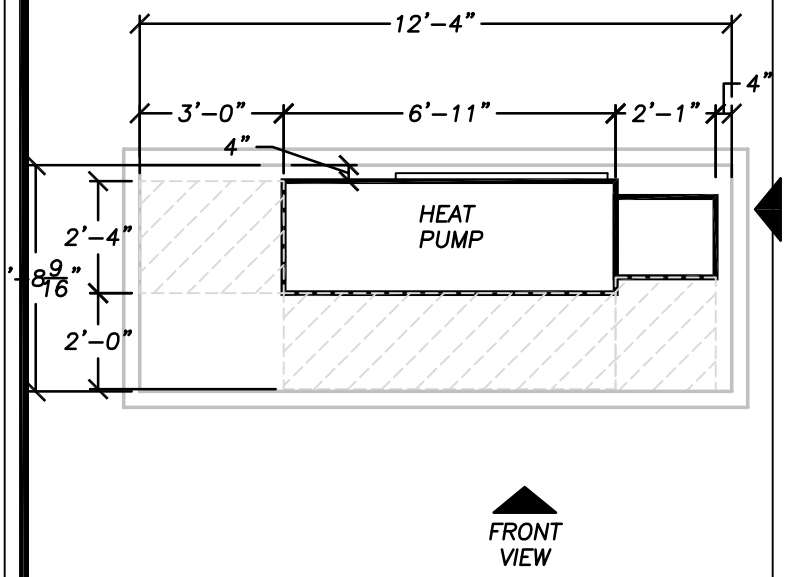


SIDE VIEW

SCALE: 1/4" = 1'–0"

H6 – HORIZONTAL HEAT PUMP

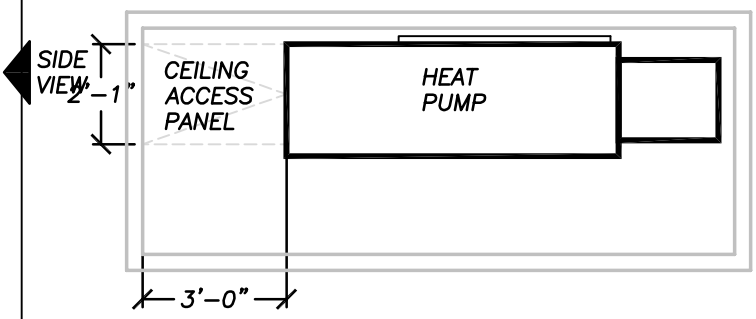
FLORIDA HEAT PUMP LM060
(5–TON)



FRONT VIEW

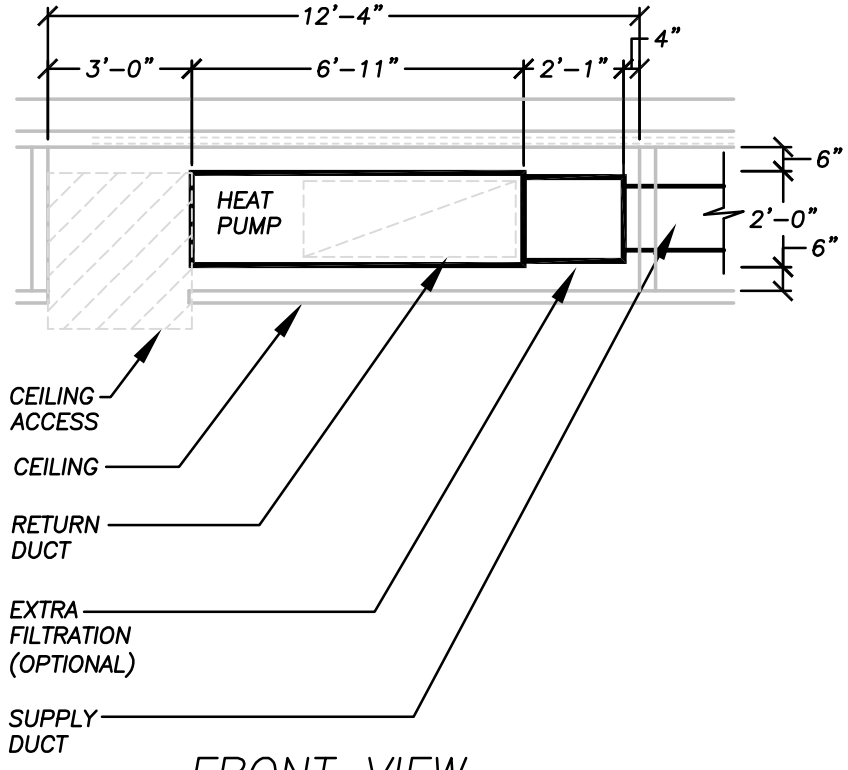
PLAN VIEW

SCALE: 1/4" = 1'–0"



PLAN VIEW

SCALE: 1/4" = 1'–0"



FRONT VIEW

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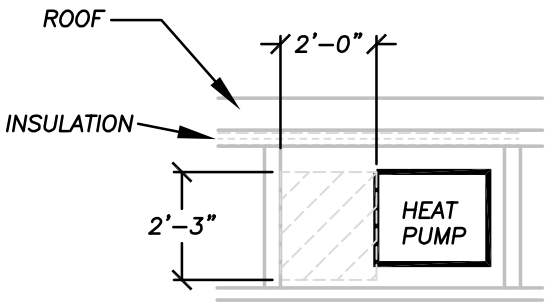

SIDE VIEW

SCALE: 1/4" = 1'–0"