

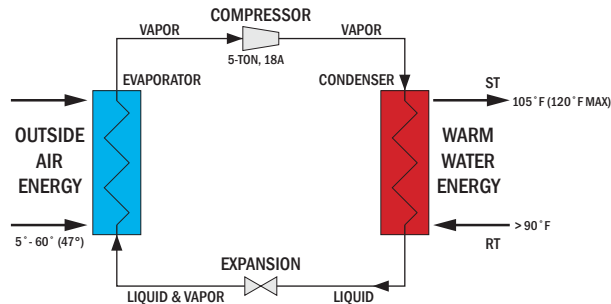
# NORAIRE<sup>®</sup>

## Heat Pump Boiler

### AIR TO WATER

*Is there heat in winter air?*

Yes, but the refrigeration cycle is required to capture and transfer this "heat".

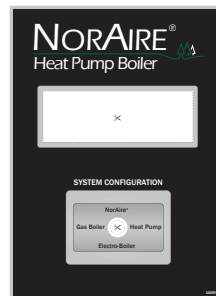


With the Heat Pump Boiler the outside air energy is converted to hot water and as a bonus the system is 332% efficient.



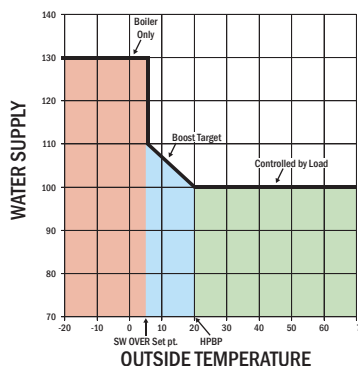
**Indoor Unit (IDU)**

- Wall-hung, easy access, 2 front panels
- Includes standard Electro-Boiler
- Coax condenser coil, no water filter required
- Circuit breakers, Electro-Boiler power
- Cabinet bottom refrigerant line set stubs and water pipe connection



**System Controller**

- Control and monitor for the ODU
- Safety redundant circuit
  - Safety limits are not part of microprocessor software
- 4 digital temperature sensors
- WarmFlo<sup>®</sup> technology, OT reference
  - Blending HP and EB for best annual COP
  - Boiler is used to boost the HP supply
  - Boiler has its own set point, target

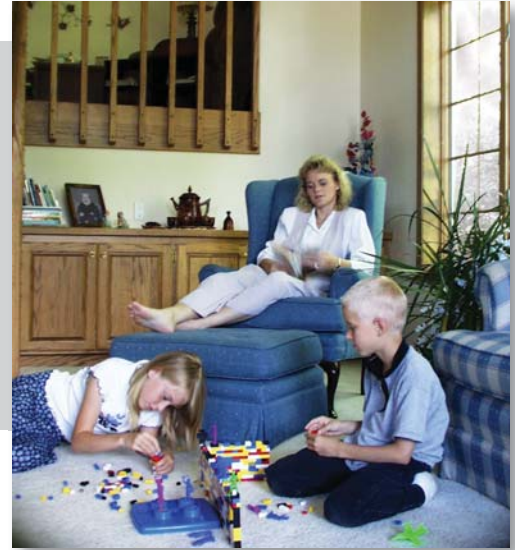


**Outdoor Unit (ODU)**

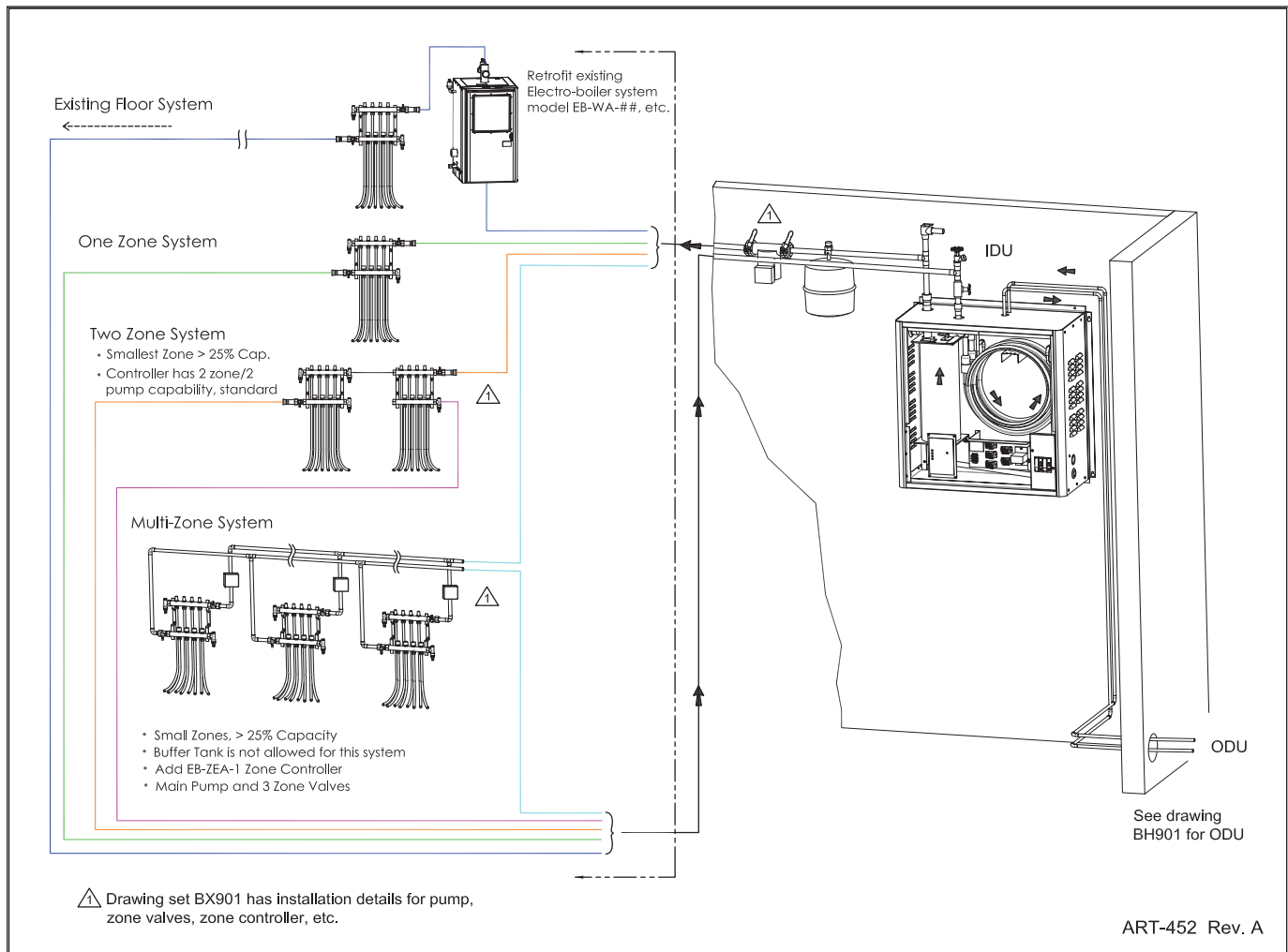
- Standard, R-410A, high efficiency
- Installer can use his own brand
  - Must specify brand/ model on order
  - Buy local, save freight
- Factory provided hookup and setup drawings to match the specific brand used
- In addition, Electro stocks the Nordyne ODU
- TXV required, kit included with each system



# APPLICATION - Radiant Floor



Electro Industries is the only US manufacturer of an integrated air to water heat pump providing -20° F to 70° F comfort.



# Why should I be interested in Electro-Boiler Heat Pump?

## EFFICIENCY - - - EFFICIENCY - - - EFFICIENCY

$$\text{Coefficient of Performance (COP)} = \frac{\text{Heated Energy Output}}{\text{Net Input Energy}}$$

$$\text{Efficiency \%} = \text{COP} \times 100$$

### NorAire Heat Pump Boiler

$$\text{Output Energy (Btu/h)} = 500 \times (\text{ST} - \text{RT}) \times \text{GPM}$$

$$\text{Net Input Energy (Btu/h)} = \text{Compressor Watts} \times 3.412$$

$$\text{Output vs. Input Difference} = \text{Captured Air Energy} - \text{Internal Losses}$$

Example, Mpls:

$$\begin{aligned} \text{Output @47}^\circ\text{OT} &= 500 \times (105^\circ - 91^\circ) \times 8 = 56,000 \\ \text{Input @47}^\circ\text{OT} &= 17.2\text{A} \times 240 \times 3.41 = 14,076 \text{ (COP} = 3.98) \end{aligned}$$

$$\begin{aligned} \text{Output @10}^\circ &= 500 \times (98^\circ - 90^\circ) \times 8 = 32,000 \\ \text{Input @10}^\circ &= 17.8\text{A} \times 240 \times 3.41 = 14,567 \text{ (COP} = 2.20) \end{aligned}$$

Boost (EB modulating) is only 16,000 Btu/h or 4.7 kW average

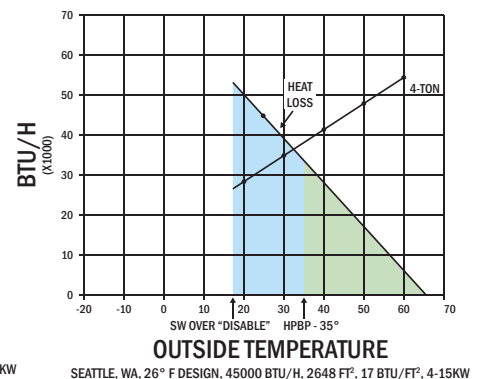
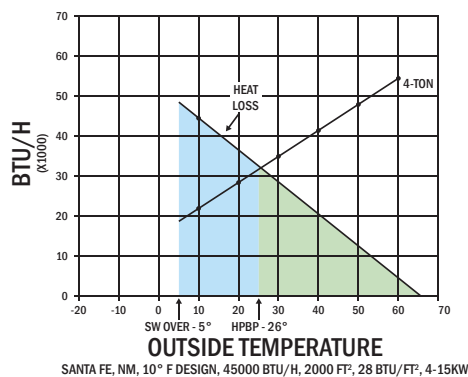
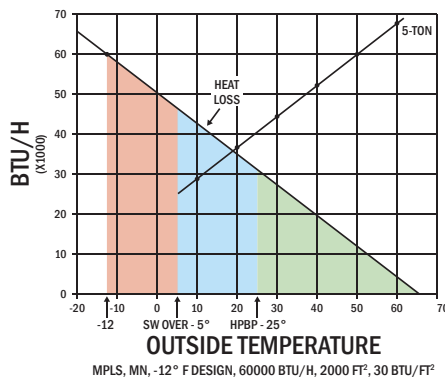
### Various COP's

Old Oil Boiler	0.50
Open Flame Flue	0.75
Direct Vent Gas	0.87
Condensing Gas	0.95
Electric Heat (Electro-Boiler)	1.00
HPB, 5-Ton at 47° F	3.89
HPB, 5-Ton at 30° F	3.78
HPB, 5-Ton at 10° F	2.28
Below HP Lockout (5° F)	1.00

$$\text{*Annual COP} = \frac{\text{Weather Bin Hours (per } 5^\circ \text{ bins)} \times \text{BTU Energy}}{\text{Input BTU for each weather bin cell}}$$

### Reference Information, Selected City

ARI Region	City	NA HPB Size	Manual J Design Temp	Hours < 5° F	Annual BTU-NA (x 1,000,000)	HP Bal. Point	Boost BTU (HP + EB)	Design BTU/FT²	Est. Annual COP*	Annual Savings (10¢/kWh)
V	Minneapolis, MN	5-20	-12° F	526	86.68	20° F	8,280	34	1.73 (1.99)	\$2,218
IV (N)	Omaha, NE	5-15	-3° F	169	49.02	18° F	3,507	26	2.1 (2.54)	\$1,900
IV (S)	Santa Fe, NM	4-15	10° F	3	25.12	28° F	760	23	2.8	\$1,325
III	Kansas City, MO	4-15	6° F	30	32.39	25° F	2,919	22	2.3	\$1,048
VI	Seattle, WA	4-10	26° F	0	53.36	32° F	0	20	3.0	\$3,114



## Providing Comfort Through Efficient Energy Solutions

### Specification Table

	Units	3-Ton	4-Ton	5-Ton
Heating capacity, EB ①②③④⑤⑥⑦	Btu/h	34,000 (10 kW)	51,000 (15 kW)	68,000 (20 kW)
Heating capacity, HP ①②③	Btu/h	33,300	44,400	59,100
Heating capacity, HP @ 47° F	Btu/h	27,300	40,400	49,700
Power voltage	Volts/60Hz	240, 1 phase	240, 1 phase	240, 1 phase
IDU source breaker	Amps	50	80	125
IDU EL boiler	Amps	42	63	84
IDU non-EL boiler	Amps	1	2	2
ODU source breaker	Amps	30	45	60
ODU RLA	Amps	15.1	21.3	27.7
ODU LRA	Amps	76	106	139
ODU noise level	dB	74	75	75
IDU/ODU width	Inches	26.5/31	26.5/31	26.5/31
IDU/ODU height	Inches	30/45	30/45	30/45
IDU/ODU depth	Inches	11/32	11/32	11/32
Line sets	Inches	3/8 and 1/2	3/8 and 1/2	3/8 and 1/2
Max line set	Feet	75	75	75 (1-1/8", 50 and up)
Max vertical separation	Feet	25	25	25
R-410A ODU factory charge	Ounces	See nameplate	See nameplate	See nameplate
Water connection	NPT, female	1"	1"	1"
Maximum water flow	GPM per minute	7	10	10
Nominal water flow ②	GPM per minute	6	8	8
Minimum water flow	GPM per minute	3	3.5	3.5
Internal pressure drop	Ft of head, Rated GPM	2.3	2.4	3
IDU shipping weight	Pounds	162	162	162
ODU shipping weight	Pounds	158	193	201

① HEATING CAPACITY AT 60° F ODU OUTSIDE AIR    ② LOAD CONDITIONS, HYDRONIC RETURN 90° F AND NOMINAL GPM  
 ③ TYPICAL RETURN TO SUPPLY TEMP RISE SHOULD BE 10° TO 15° F    ④ ELECTRO-BOILER ENTERING TEMP IS HP COIL OUTPUT, 90° TO 110° F  
 ⑤ TYPICAL ELECTRO-BOILER TEMP RISE SHOULD BE 10° TO 20° F    ⑥ ELECTRO-BOILER IS DISABLED ABOVE HPBP AND MODULATES BETWEEN HPBP AND SWOVER (BOOST)  
 ⑦ ELECTRO-BOILER SIZE DETERMINES BTU/H RATING AT COOLEST TEMP    ⑧ DATA MAY BE UPDATED WITHOUT NOTICE

### Product Models, Indoor Unit Only

<b>EB-HPH-3-00</b>	3-Ton Hydronic, 34,000 Btu/h, No AUX Electro-Boiler	<b>EB-HPH-4-15</b>	4-Ton Hydronic, 48,000 Btu/h, 15 kW AUX Electro-Boiler
<b>EB-HPH-3-10</b>	3-Ton Hydronic, 34,000 Btu/h, 10 kW AUX Electro-Boiler	<b>EB-HPH-4-20</b>	4-Ton Hydronic, 48,000 Btu/h, 20 kW AUX Electro-Boiler
<b>EB-HPH-3-15</b>	3-Ton Hydronic, 34,000 Btu/h, 15 kW AUX Electro-Boiler	<b>EB-HPH-5-00</b>	5-Ton Hydronic, 57,000 Btu/h, No AUX Electro-Boiler
<b>EB-HPH-3-20</b>	3-Ton Hydronic, 34,000 Btu/h, 20 kW AUX Electro-Boiler	<b>EB-HPH-5-10</b>	5-Ton Hydronic, 57,000 Btu/h, 10 kW AUX Electro-Boiler
<b>EB-HPH-4-00</b>	4-Ton Hydronic, 48,000 Btu/h, No AUX Electro-Boiler	<b>EB-HPH-5-15</b>	5-Ton Hydronic, 57,000 Btu/h, 15 kW AUX Electro-Boiler
<b>EB-HPH-4-10</b>	4-Ton Hydronic, 48,000 Btu/h, 10 kW AUX Electro-Boiler	<b>EB-HPH-5-20</b>	5-Ton Hydronic, 57,000 Btu/h, 20 kW AUX Electro-Boiler

### Optional - Matching Outdoor Unit (ODU)

<b>6400-030</b>	3-Ton Outdoor Unit, 34,500 Btu/h, 14 SEER Nordyne
<b>6400-040</b>	4-Ton Outdoor Unit, 48,000 Btu/h, 14 SEER Nordyne
<b>6400-050</b>	5-Ton Outdoor Unit, 57,000 Btu/h, 14 SEER Nordyne

PRICE AND SPECIFICATION SUBJECT TO CHANGE WITHOUT NOTICE, ALL RIGHTS RESERVED.



**ELECTRO  
INDUSTRIES**

Monticello, Minnesota  
800.922.4138  
www.electromn.com