TECHNICAL SPECIFICATIONS

Y1SA Series

EarthDirEX™ Geothermal Direct Geoexchange Heat Pump

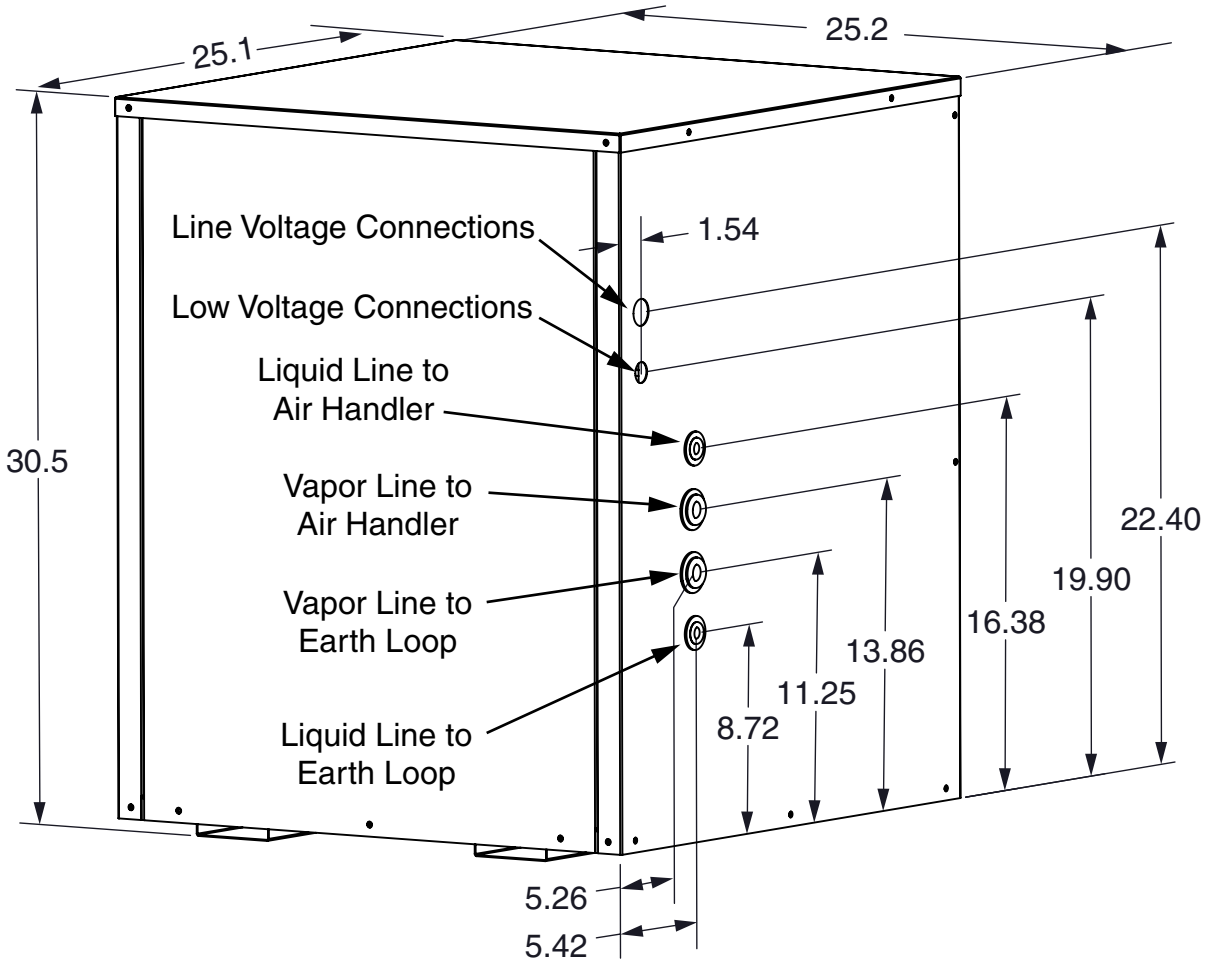
Cooling capacity 24,000 to 60,000
Heating capacity 21,000 to 57,000
EER 19.0 to 22.0 and COP 3.8 to 4.0

The Y1SA Geothermal heat pump, Earth loops and air handler are an incredibly quiet and efficient way to heat and cool your home or business. Because we are using the natural energy from the Earth, you can reduce your electric/utility bill by as much as 70%.

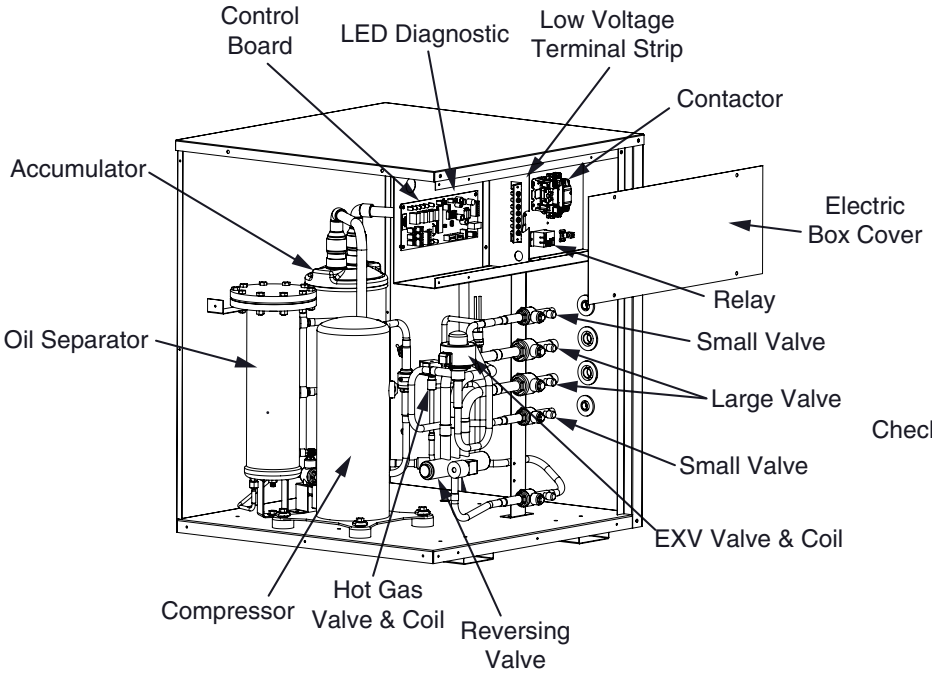
FEATURES and BENEFITS

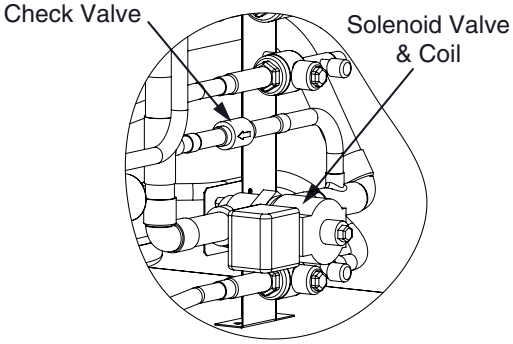
- **Single Stage -** Copeland Scroll compressor
- **Electronic Expansion Valve –** one valve for precise refrigerant control in all modes of operation
- **Interface Control Board –** Two digit LED provides system operation, status and diagnostic information.
    - **Diagnostic:** 12 event/fault codes provide troubleshooting information
    - **System Protection:** Internal controls monitor system operation to protect the compressor.
    - **Three Minute Restart Time Delay:** When the unit shuts down, a delay keeps the unit from restarting, eliminating the highest cause for compressor failure.
- **Micro-Channel –** Indoor coil is all aluminum designed to optimize heat transfer, minimize size and cost, and increase durability and reliability.
- **Earth Loop Seal Valve on 4 & 5 ton –** captures refrigerant in the outdoor Earth loop during off mode, complies with ASHRAE Standard 15
- **Oil Separator -** 99% efficient and has an internal filter, installed at the factory. A second filter (shipped with the unit) is to be used as a replacement in 24 to 48 hours
- **Hot Gas Bypass –** Injected into evaporator to prevent freeze up
- **Accumulator–** Protection from liquid flood back and future compressor failures.
- **Sight Glass-** Included for simple indication of proper refrigerant change.
- **Sound Blanket –** Is standard equipment
- **Energy Efficient Brushless DC Blower Motor -** ECM constant torque in all models
- **Improve aesthetics of your home -** No exposed or noisy outdoor equipment
- **Simpler System -** Our EarthDirEX™ geothermal systems do not use a water to refrigerant heat exchanger, or a pump to circulate the water

DIMENSIONS

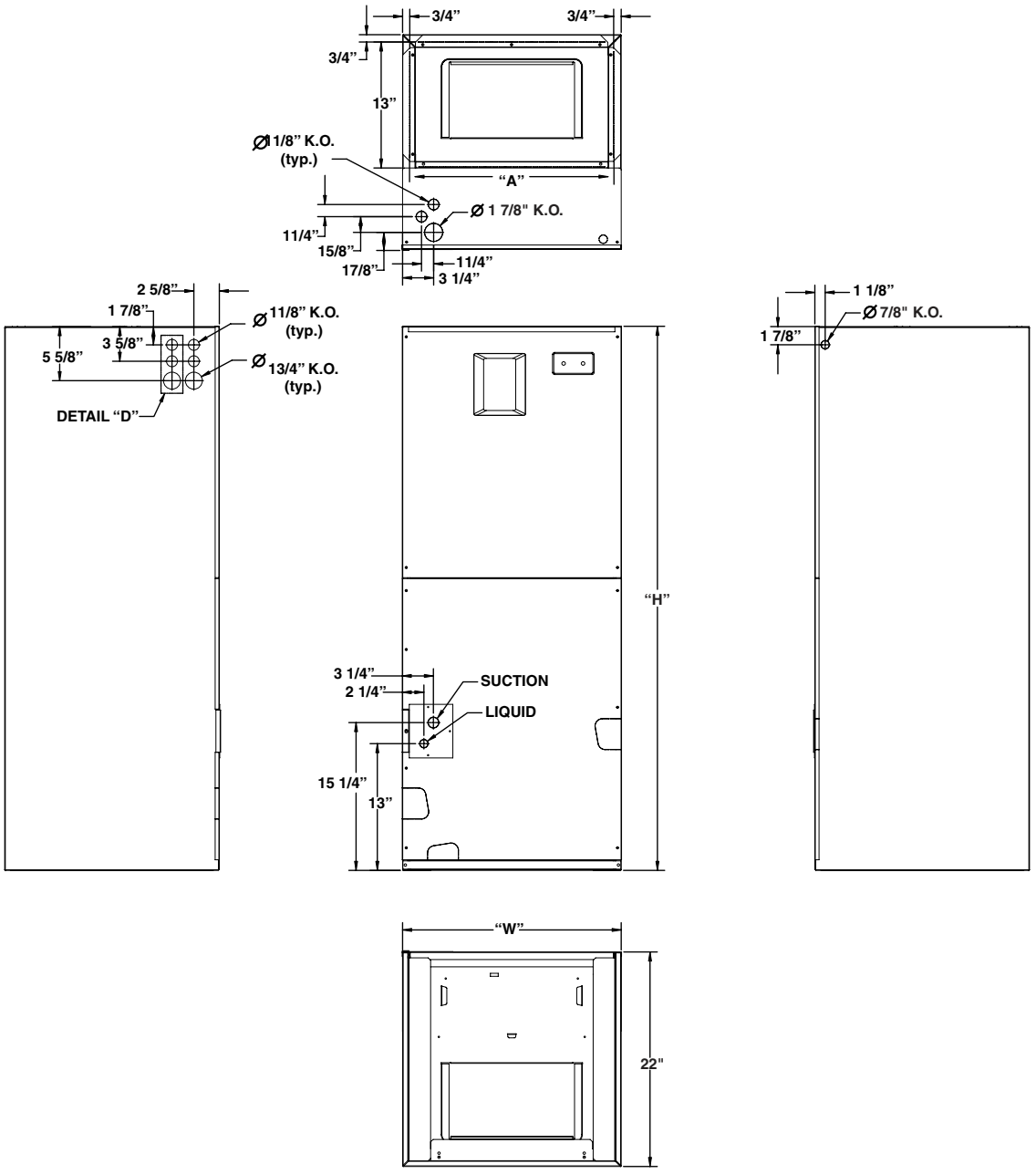


COMPONENTS





FIGURES & TABLES



CABINET SIZE	H	W	A	DETAIL D
Tall B	49-5/16	19-11/16	18-1/4	No
C	55-15/16	22-7/16	21	Yes

	SWITCH SETTINGS 0 = OFF, 1 = ON				COOLING OR HEATING AIRFLOW (CFM) DRY COIL ESP							
	1/5	2/6	3/7	4/8	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
B6EM B-CABINET	0	0	0	0	600	550	430	390	—	—	—	—
	1	0	0	0	660	610	540	460	425	—	—	—
	0	1	0	0	830	750	695	640	580	520	—	—
	1	1	0	0	860	825	765	690	630	600	525	485
	0	0	1	0	935	895	835	790	710	655	620	585
	1	0	1	0	1045	975	920	875	830	795	720	685
	0	1	1	0	1095	1040	995	950	900	850	805	750
	1	1	1	0	1155	1105	1060	1010	965	920	870	825
	0	0	0	1	1230	1185	1140	1090	1045	1010	965	920
	1	0	0	1	1285	1260	1210	1165	1125	1080	1040	1010
	0	1	0	1	1330	1290	1245	1205	1170	1125	1085	1045
	1	1	0	1	1395	1365	1315	1275	1235	1205	1160	1130
	0	0	1	1	1450	1405	1375	1335	1295	1260	1220	1180
	1	0	1	1	1490	1450	1410	1385	1340	1300	1270	1230
	0	1	1	1	1530	1485	1460	1425	1380	1350	1310	1280
	1	1	1	1	1530	1490	1465	1425	1390	1350	1310	1285
	SWITCH SETTINGS 0 = OFF, 1 = ON				COOLING OR HEATING AIRFLOW (CFM) DRY COIL ESP							
	1/5	2/6	3/7	4/8	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
B6EM C-CABINET	0	0	0	0	710	580	395	—	—	—	—	—
	1	0	0	0	830	690	675	530	505	—	—	—
	0	1	0	0	930	875	710	665	560	530	—	—
	1	1	0	0	1065	1015	900	840	800	705	665	635
	0	0	1	0	1185	1115	1010	960	925	875	830	745
	1	0	1	0	1275	1220	1175	1120	1060	970	930	890
	0	1	1	0	1365	1350	1255	1200	1150	1105	1060	1025
	1	1	1	0	1480	1430	1370	1325	1265	1225	1185	1140
	0	0	0	1	1560	1535	1485	1430	1375	1335	1285	1240
	1	0	0	1	1650	1600	1545	1500	1450	1405	1360	1305
	0	1	0	1	1730	1685	1660	1610	1570	1520	1470	1420
	1	1	0	1	1785	1740	1695	1645	1615	1545	1510	1470
	0	0	1	1	1865	1820	1785	1750	1695	1655	1605	1560
	1	0	1	1	1920	1890	1850	1805	1765	1715	1675	1640
	0	1	1	1	2010	1965	1960	1900	1850	1810	1775	1730
	1	1	1	1	2065	2020	1985	1955	1915	1880	1840	1810

NOTE: When matched with two-stage outdoor units, the airflow on low (Y1 or W1) input will be 70% of the values shown in this table.

Table 1. Airflow Data for B6EM Air Handlers

B6(E,V)M MINIMUM CIRCUIT AMPACITY & MAXIMUM OVERCURRENT PROTECTION																	
CABINET	CAPACITY	HEAT KIT MODEL NUMBER H6HK-	240 VAC, 50 & 60 HZ, SINGLE PHASE								208 VAC, 50 & 60 HZ, SINGLE PHASE							
			MCA				MOP				MCA				MOP			
			CIRCUIT A	CIRCUIT B	CIRCUIT C	SINGLE CIRCUIT	CIRCUIT A	CIRCUIT B	CIRCUIT C	SINGLE CIRCUIT	CIRCUIT A	CIRCUIT B	CIRCUIT C	SINGLE CIRCUIT	CIRCUIT A	CIRCUIT B	CIRCUIT C	SINGLE CIRCUIT
B	36	NONE	4.5	-	-	4.5	15	-	-	15	4.8	-	-	4.8	15	-	-	15
		005H-XX	29.5	-	-	29.5	30	-	-	30	26.4	-	-	26.4	30	-	-	30
		008H-XX	44.1	-	-	44.1	45	-	-	45	39.1	-	-	39.1	40	-	-	40
		010H-XX	54.5	-	-	54.5	60	-	-	60	48.1	-	-	48.1	50	-	-	50
		015H-XX	54.5	25.0	-	68.1	60	30	-	80	48.1	21.7	-	69.8	50	25	-	70
		020H-XX	54.5	50.0	-	104.5	60	60	-	110	48.1	43.3	-	91.4	50	45	-	100
		009Q-XX	-	-	-	31.6	-	-	-	35	-	-	-	28.2	-	-	-	30
		015Q-XX	-	-	-	47.8	-	-	-	50	-	-	-	42.3	-	-	-	45
C	60	NONE	6.3	-	-	6.3	15	-	-	15	6.8	-	-	6.8	15	-	-	15
		005H-XX	31.3	-	-	31.3	35	-	-	35	28.4	-	-	28.4	30	-	-	30
		008H-XX	45.8	-	-	45.8	50	-	-	50	41.1	-	-	41.1	45	-	-	45
		010H-XX	56.3	-	-	56.3	60	-	-	60	50.1	-	-	50.1	60	-	-	60
		015H-XX	56.3	25.0	-	81.3	60	30	-	90	50.1	21.7	-	71.8	60	25	-	80
		020H-XX	56.3	50.0	-	106.3	60	60	-	110	50.1	43.3	-	93.4	60	45	-	100
		024H-XX	56.3	50.0	25.0	131.3	60	60	60	150	50.1	43.3	21.7	115.1	60	45	45	125
		029H-XX	56.3	50.0	50.0	156.3	60	60	60	175	50.1	43.3	43.3	136.8	60	45	45	150
		009Q-XX	-	-	-	33.3	-	-	-	35	-	-	-	30.2	-	-	-	35
		015Q-XX	-	-	-	49.6	-	-	-	50	-	-	-	44.3	-	-	-	45

Table 2. B6(E,V)M Minimum Circuit Ampacity & Maximum Overcurrent Protection

ELECTRICAL AND PHYSICAL DATA

GEOTHERMAL SYSTEM		Y1SA-E24K (2 TON)	Y1SA-E36K (3 TON)	Y1SA-E48K (4 TON)	Y1SA-E60K (5 TON)
Physical Data	Length (L)	25.1	25.1	25.1	25.1
	Width (W)	25.2	25.2	25.2	25.2
	Height (H)	30.5	30.5	30.5	30.5
	Weight	165	170	215	220
Compressor Data	Volts-Cycles-Phase (1)	208/230V, 1phase, 60Hz			
	Min. Circuit Ampacity (MCA)	16	21	28	33
	Max. Overcurrent Protection (MOP)	25	35	45	50
	Rated Load Amps (RLA)	12.8	16.6	21.8	26.2
	Locked Rotor Amps (LRA)	58.3	79	117	134
	Air Handler Match	B6EMMN36K-B	B6EMMN36K-B	B6EMMN60K-C	B6EMMN60K-C
Filter Size (Field Supplied)		18 x 20 x 1	18 x 20 x 1	20 x 20 x 1	20 x 20 x 1
Refrigerant Vapor Line O.D. (Both to air handler and earth loop)		3/4”	3/4”	7/8”	7/8”
Liquid Line O.D. (Both to air handler and earth loop)		1/2”	1/2”	1/2”	1/2”

†† Unit is shipped from factory with nitrogen holding charge.

RECOMMENDED INITIAL R410-A CHARGES

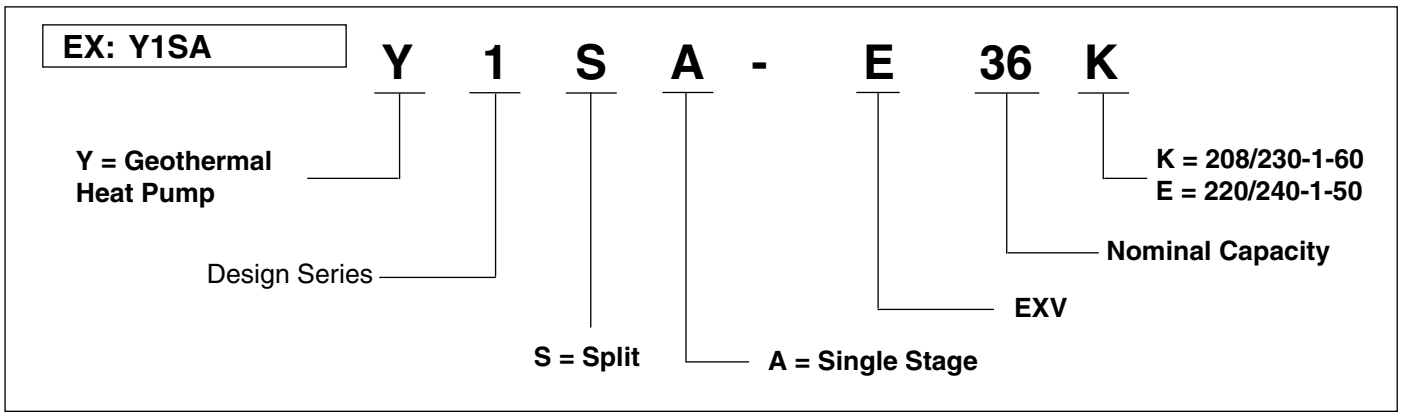
2 TON		3 TON		4 TON		5 TON	
WELL LENGTH (FT.)	**R-410A CHARGE OZ. (LBS)**	**WELL LENGTH (FT.)**	**R-410A CHARGE OZ. (LBS)**	**WELL LENGTH (FT.)**	**R-410A CHARGE OZ. (LBS)**	**WELL LENGTH (FT.)**	**R-410A CHARGE OZ. (LBS)**
200	469 (29.3)	325	854 (53.4)	400	1,313 (82)	400	1,313 (82)
165	393 (24.6)	250	692 (43.3)	325	1,133 (70.8)	325	1,133 (70.8)
130	318 (19.9)	200	584 (36.5	280	1,025 (64)	(x2) 250*	1,553 (97)

NOTES:

- The charge amounts shown above are for total system initial charge.
- Initial charge above assumes a 6 ft line set length between the compressor unit and the air handler (L1).
- Initial charge above assumes a 25 ft line set length between the compressor unit and the earth loop (L2).
- If line set lengths are different than the default lengths of 6 ft for L1 and 25 ft for L2, see installation instructions.

* When 2-250 ft Earth Loops are used, 2 refrigerant distributors are required, one for vapor and one for liquid line. (See Earth Loops next page).

MODEL IDENTIFICATION CODES



MATCH UP AND CAPACITIES

Comp. Section	Air Handler	Cooling	EER	Heating	COP	CFM
Y1SA-E24K	B6BMMN36K-B	24,000	22	21,000	4.0	900
Y1SA-E36K	B6BMMN36K-B	36,000	21	35,000	4.0	1350
Y1SA-E48K	B6BMMN48K-C	48,000	20	46,000	4.0	1800
Y1SA-E60K	B6BMMN48K-C	60,000	19	57,000	3.8	2000

EARTH LOOPS

Size/Length	65	80	100
2	130	165	200
3	200	250	325
4	280	325	400
5	325	400	2/250 (1)

(1) Use part #1003463 distributor for vapor lines 3/4 - 3/4 to 7/8, part #1003462 distributor for vapor lines 3/4 - 3/4 to 3/4, and part #1006755 for liquid line 1/2.

DIRECT GEOEXCHANGE EARTH LOOPS

SKU	Length	Vapor	Liquid
922563	130 ft	3/4	3/8
922558	165 ft	3/4	3/8
922559	200 ft	3/4	3/8
922560	250 ft	3/4	3/8
922561	280 ft	7/8	3/8
922562	325 ft	7/8	3/8
922564	400 ft	7/8	3/8

Earth Loop Design Length

The sub-surface refrigerant lines used for geothermal heat exchange purposes must be sized to accommodate the maximum of the greater of the heating or cooling capacity design loads. Typically, in mostly non-porous rock or in permanently water saturated soil, an earth loop length between 65 ft and 100 feet per ton (5.6-10.8m/kW) of capacity is required.

Within the United States, see Figure 1 (page 7) to help determine the appropriate earth loop length.

For installations outside of the United States, the following rules will dictate the sizing of the earth loop. These rules assume that the earth loop will be installed within bedrock or permanently water saturated ground.

For the building to be conditioned, calculate the annual heating and the annual cooling loads. Use ACCA Manual J or other locally recognized load calculation program.

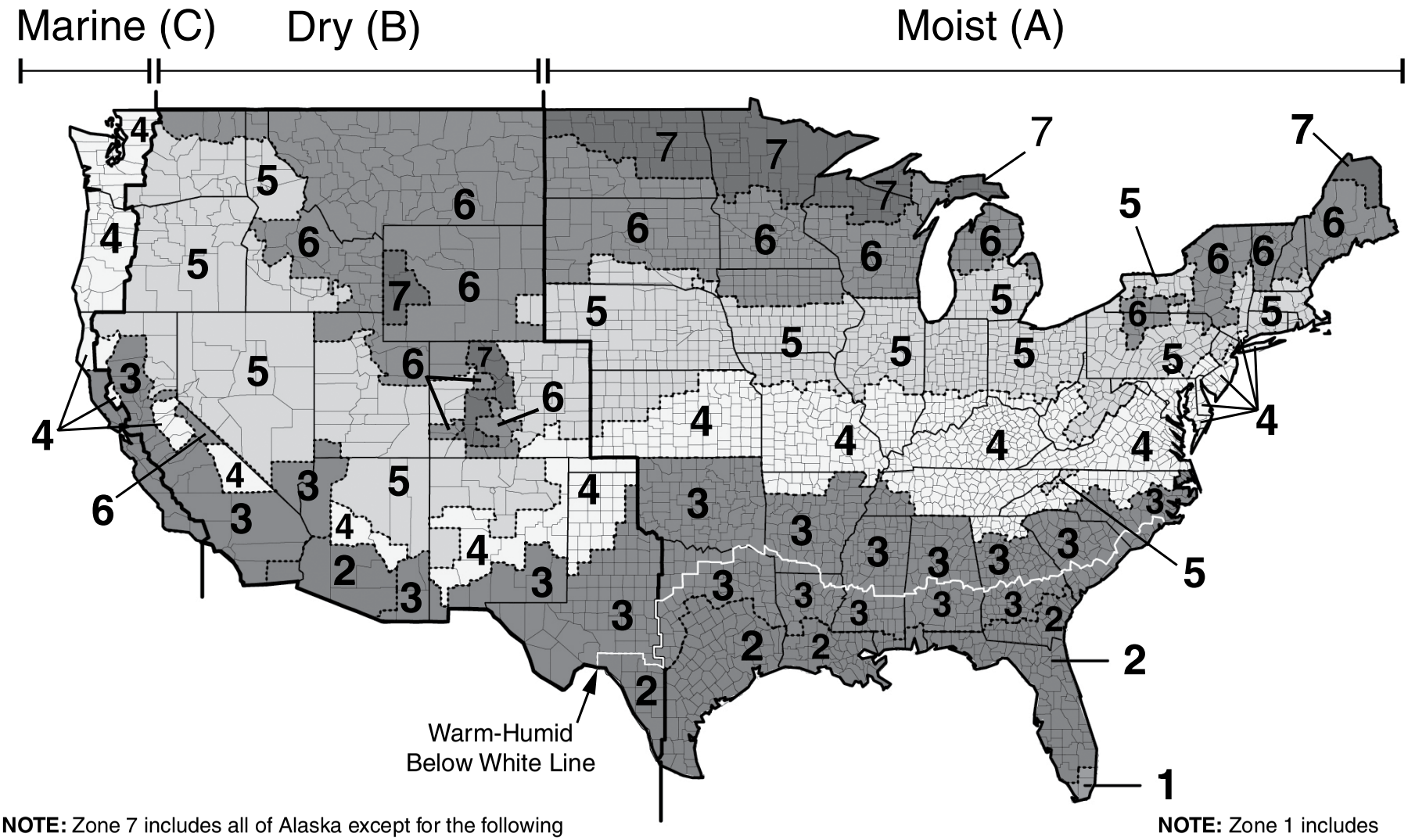
Annual Cooling Load / Annual Heating Load	Earth Loop Needed (per Ton of System Size)
≤ 1	65 ft
≥ 1 but ≤ 1.75	80 ft
> 1.75	100 ft

	Annual Cooling Load	Annual Heating Load	Size of Unit (in tons)	Annual Cooling Load / Annual Heating Load	Earth Loop Needed (per Ton of System Size, rounded up)
Example 1	36,000	75,000	3 tons	.48	(3 ton x 65 ft = 195 ft) **200 ft**
Example 2	48,000	25,000	4 tons	1.92	(4 ton x 100 ft = 400 ft) **400 ft**

Line Set Sizing between the Compressor Unit & Air Handler

COMPRESSOR SIZE (BTU)*	LIQUID LINE	VAPOR LINE
24,000 - 36,000	1/2 inch O.D.	3/4 inch O.D.
48,000 - 60,000	1/2 inch O.D.	7/8 inch O.D.

*Compressor size is the actual compressor size in the compressor unit box, not maximum system capacity, system size, or air handler size.



NOTE: Zone 7 includes all of Alaska except for the following burroughs in Zone 8: Bethel, Northwest Arctic, Dellingham, Southeast Fairbanks, N. Star, Wade Hampton, Nome, Yukon-Koyukuk, North Slope.

IECC ZONES	EARTH LOOP SIZE (FT/TON)
1, 2, 3A, 3B	100
3C, 4A, 4B	80
4C, 5, 6, 7, 8	65

There are exceptions to the earth loop sizes shown in this table. Within a climate zone, the weather, and underground conditions vary from place to place. The earth loop length may need to be adjusted accordingly.

Earth loop size indicated in the table assumes installation within bedrock or permanently water saturated ground.

NOTE: Zone 1 includes Hawaii, Guam, Puerto Rico, and the Virgin Islands

GENERAL TERMS OF LIMITED WARRANTY

Nortek Global HVAC LLC will furnish a replacement for any part of this product which fails in normal use and service within the terms and conditions of the warranty.

For complete details of the Limited Warranty, including applicable terms and conditions, see your local installer or contact the Nortek Global HVAC LLC warranty department for a copy.

Before purchasing this appliance, read important energy cost and efficiency information available from your retailer. Specifications and illustrations subject to change without notice and without incurring obligations. Printed in U.S.A (06/2015)

300E-0115 (Replaces 300E-1214)