

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

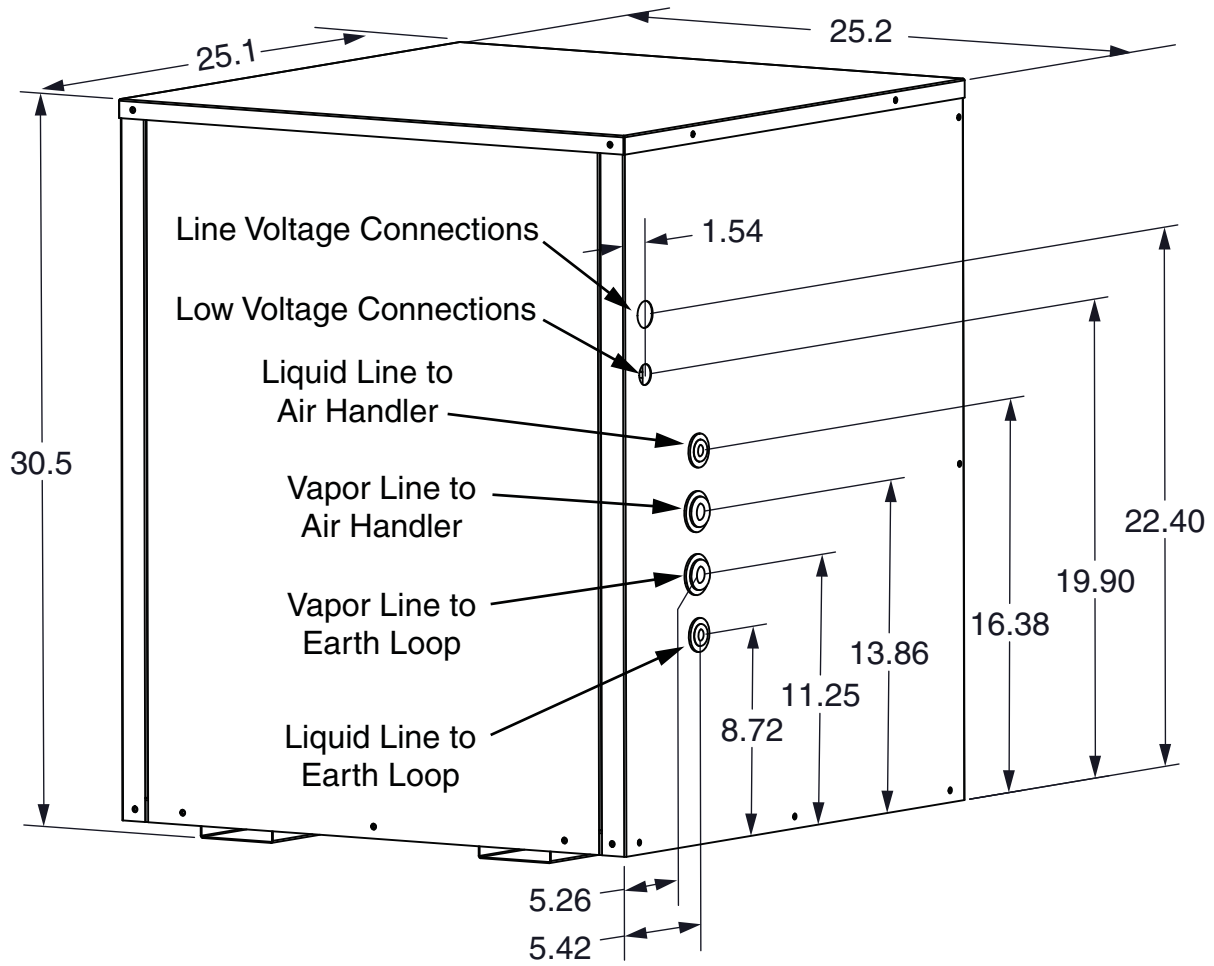
The Y1SA Geothermal heat pump, Earth loops and air handler are an incredibly quiet and efficient way to heat and cool your home or business. Because we are using the natural energy from the Earth, you can reduce your electric/utility bill by as much as 70%.



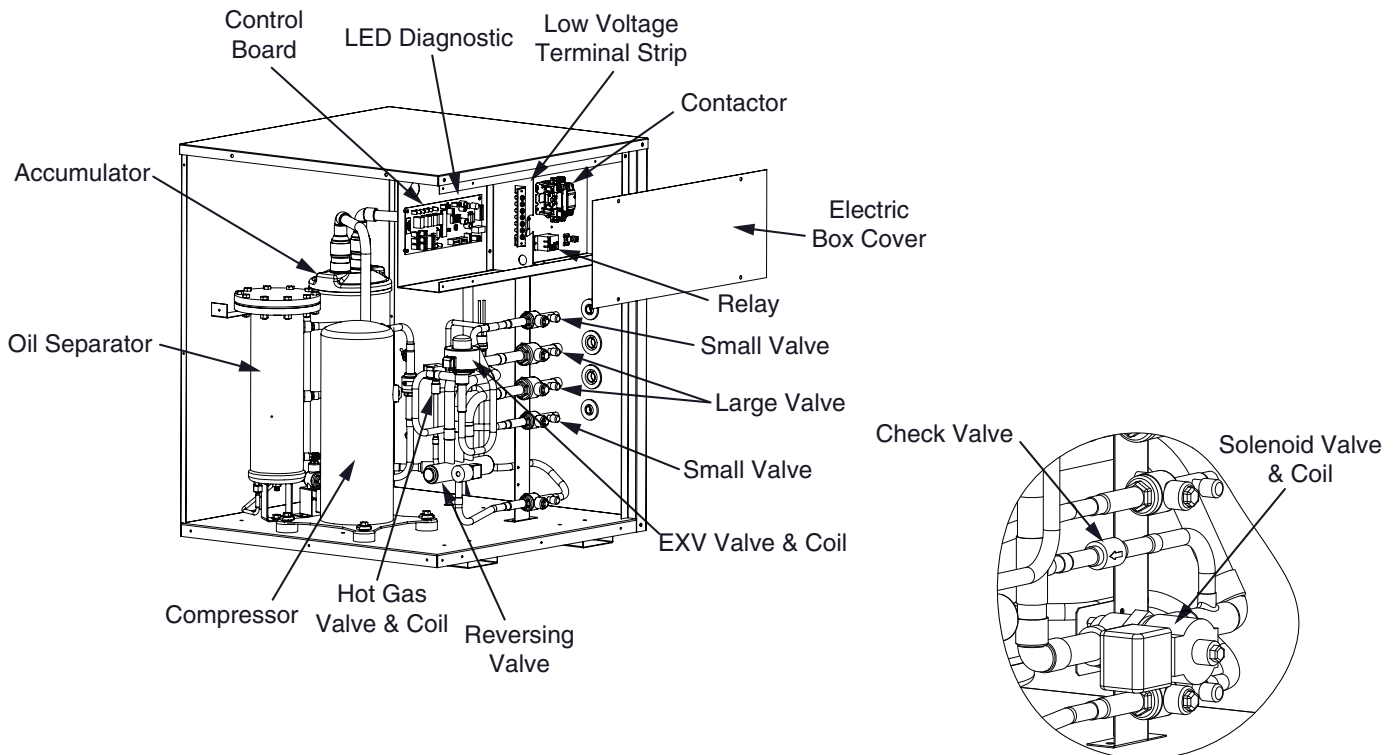
FEATURES and BENEFITS

- **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

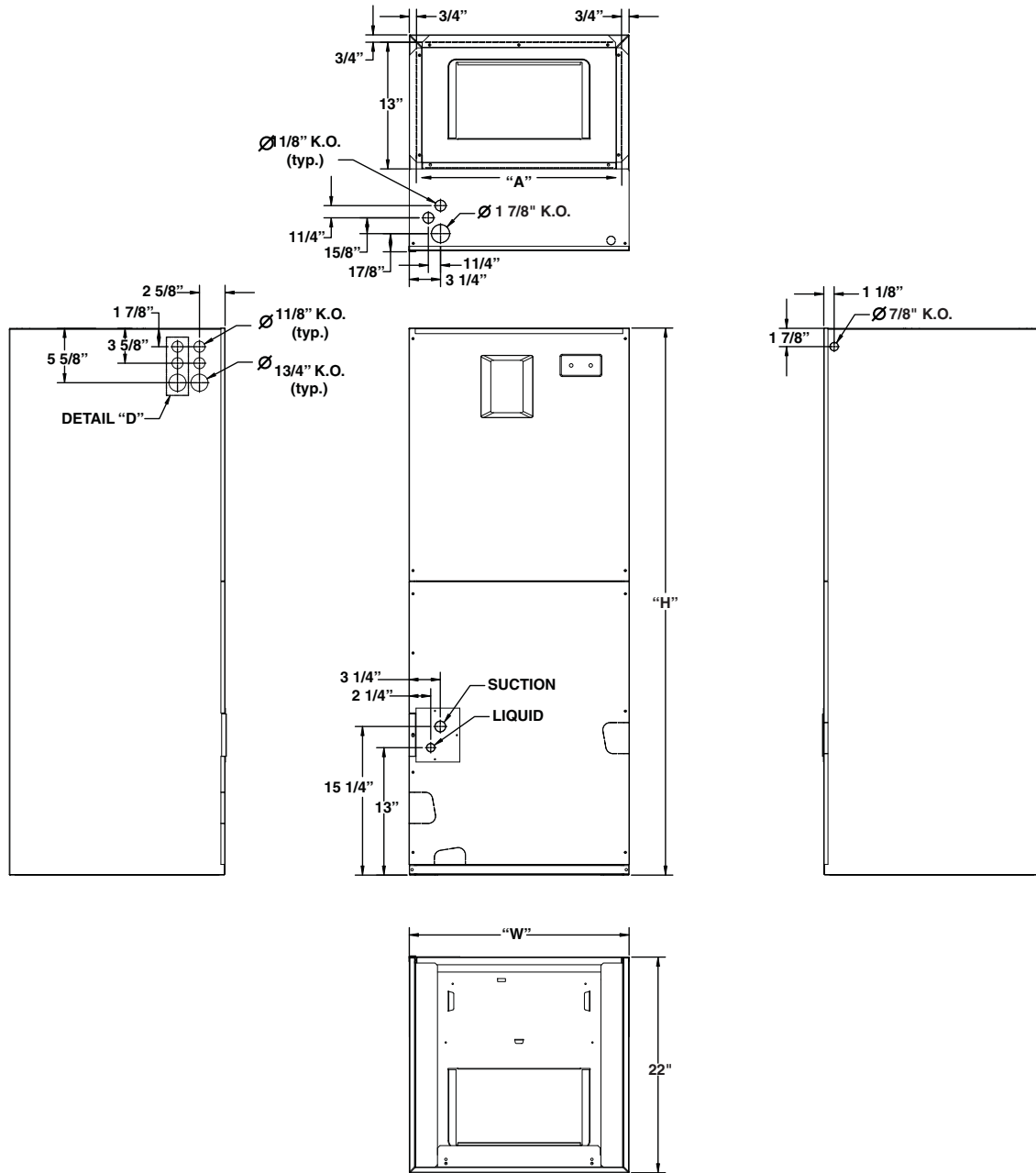
DIMENSIONS



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

CABINET SIZE	SWITCH SETTINGS 0 = OFF, 1 = ON				COOLING OR HEATING AIRFLOW (CFM & L/s)															
					DRY COIL ESP (INCHES)								DRY COIL ESP (CM)							
	1/5	2/6	3/7	4/8	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.25	0.5	0.75	1	1.25	1.5	1.75	2
B	0	0	0	0	601	551	431	391	0	0	0	0	283	260	203	184	0	0	0	0
	1	0	0	0	661	611	541	461	426	0	0	0	312	288	255	217	201	0	0	0
	0	1	0	0	831	751	696	641	581	521	0	0	392	354	328	302	274	246	0	0
	1	1	0	0	861	626	766	691	631	601	526	486	406	295	361	326	298	283	248	229
	0	0	1	0	936	896	836	791	711	656	621	586	442	423	394	373	335	309	293	276
	1	0	1	0	1046	976	921	876	831	796	721	686	494	461	435	413	392	375	340	324
	0	1	1	0	1096	1041	996	951	901	851	806	751	517	491	470	449	425	401	380	354
	1	1	1	0	1157	1106	1061	1011	966	921	871	826	546	522	501	477	456	435	411	390
	0	0	0	1	1232	1187	1142	1091	1046	1011	966	921	581	560	538	515	494	477	456	435
	1	0	0	1	1287	1262	1212	1167	1126	1081	1041	1011	607	595	572	550	531	510	491	477
	0	1	0	1	1332	1292	1247	1207	1172	1126	1086	1046	628	609	588	569	553	531	512	494
	1	1	0	1	1397	1367	1317	1277	1237	1207	1162	1132	659	645	621	602	583	569	548	534
	0	0	1	1	1452	1407	1377	1337	1297	1262	1222	1182	685	664	649	631	612	595	576	557
	1	0	1	1	1492	1452	1412	1387	1342	1302	1272	1232	704	685	666	654	633	614	600	581
0	1	1	1	1532	1487	1462	1427	1382	1352	1312	1282	723	701	690	673	652	638	619	605	
1	1	1	1	1532	1492	1467	1427	1392	1352	1312	1287	723	704	692	673	657	638	619	607	
C	0	0	0	0	711	581	396	0	0	0	0	0	335	274	187	0	0	0	0	0
	1	0	0	0	831	691	676	531	506	0	0	0	392	326	319	250	239	0	0	0
	0	1	0	0	931	876	711	666	561	531	0	0	439	413	335	314	265	250	0	0
	1	1	0	0	1066	1016	901	841	801	706	666	636	503	479	425	397	378	333	314	300
	0	0	1	0	1187	1116	1011	961	926	876	831	746	560	527	477	453	437	413	392	352
	1	0	1	0	1277	1222	1177	1121	1061	971	931	891	602	576	555	529	501	458	439	420
	0	1	1	0	1367	1352	1257	1202	1152	1106	1061	1026	645	638	593	567	543	522	501	484
	1	1	1	0	1482	1432	1372	1327	1267	1227	1187	1142	699	675	647	626	597	579	560	538
	0	0	0	1	1562	1537	1487	1432	1377	1337	1287	1242	737	725	701	675	649	631	607	586
	1	0	0	1	1652	1602	1547	1502	1452	1407	1362	1307	779	756	730	708	685	664	642	616
	0	1	0	1	1732	1687	1662	1612	1572	1522	1472	1422	817	796	784	760	742	718	694	671
	1	1	0	1	1787	1742	1697	1647	1617	1547	1512	1472	843	822	801	777	763	730	713	694
	0	0	1	1	1867	1822	1787	1752	1697	1657	1607	1562	881	860	843	827	801	782	758	737
	1	0	1	1	1923	1893	1852	1807	1767	1717	1677	1642	907	893	874	853	834	810	791	775
0	1	1	1	2013	1968	1963	1903	1852	1812	1777	1732	949	928	926	897	874	855	838	817	
1	1	1	1	2068	2023	1988	1958	1918	1882	1842	1812	975	954	938	923	905	888	869	855	

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.

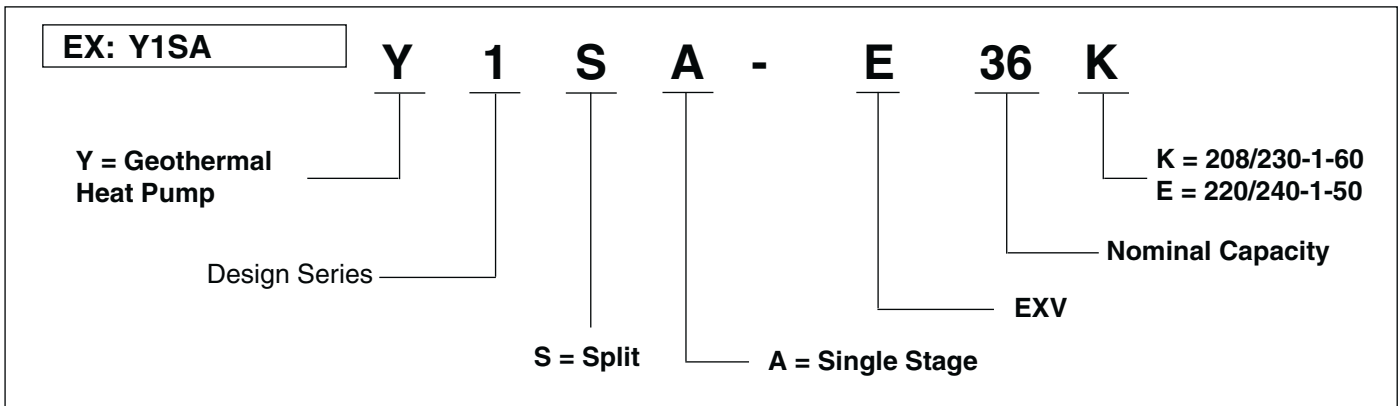
RECOMMENDED INITIAL R410-A CHARGES

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	B6EMMN36K-B	24,000	22	21,000	4.0	900
Y1SA-E36K	B6EMMN36K-B	36,000	21	35,000	4.0	1350
Y1SA-E48K	B6EMMN60K-C	48,000	20	46,000	4.0	1800
Y1SA-E60K	B6EMMN60K-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.

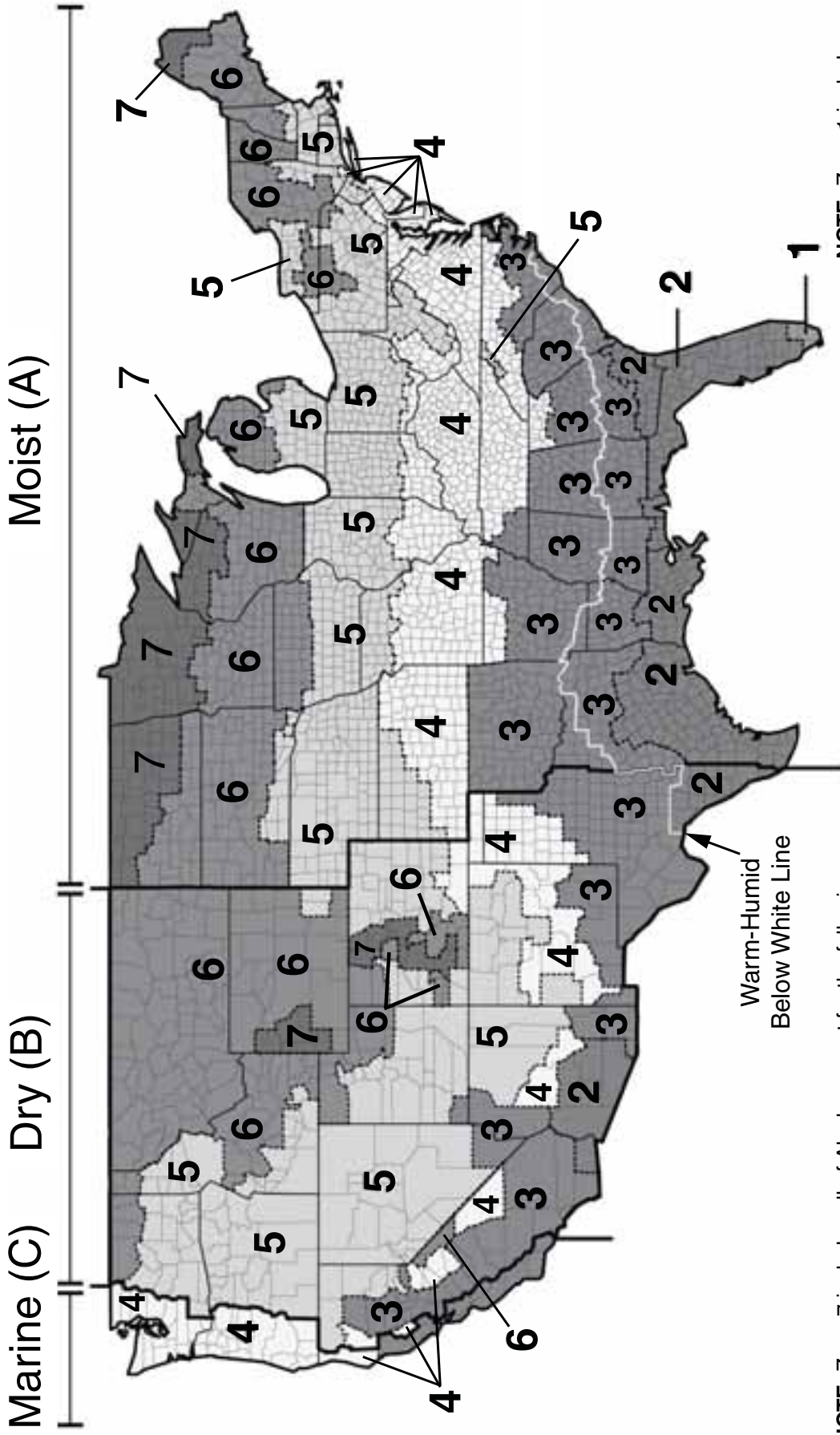
Annual Cooling Load Annual Heating Load		Earth Loop Needed (per Ton of System Size)			
≤ 1		65 ft			
≥ 1 but ≤ 1.75		80 ft			
> 1.75		100 ft			

	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 1 includes Hawaii, Guam, Puerto Rico, and the Virgin Islands

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 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.



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 (02/2016)