ARI GROUND WATER-SOURCE HEAT PUMP CERTIFICATION DATA SHEET
(PRIVATE BRAND MANUFACTURER)

Sheet 1 of 1

MANUFACTURER ClimateMaster Inc. 25° EWT AKE 325

TRADE OR BRAND NAME Geo-Thermal

IGINAL EQ

DATE 4/12/90

| Type of Unit(1) | Private Brand Company Model Number(s) | | ARI STANDARD RATINGS(2) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | High Temperature Cooling 70° Low Temperature Cooling 50° | | | | High Temperature Heating 70° low Temperature Heating 50° | | | |
| | | | Capacity (Btuh) | EER (Btuh/Watt) | Water Flow Rate (gpm) | Water Pressure Drop(psi) | Capacity (Btuh) | COP | Water Flow Rate (gpm) | Water Pressure Drop(psi) |
| IRCU-GW-CB | 846-020GCE/ 846-020GAE | 70° | 19.5 | 10.8 | 3.0 | | 23.4 | 3.5 | 3.0 | |
| | | 50° | 22.0 | 13.8 | 3.0 | | 17.9 | 3.0 | 3.0 | |
| IRCU-GW-CB | 846-030GCE/ 846-030GAE | 70° | 28.4 | 12.0 | 5.0 | | 34.0 | 3.4 | 5.0 | |
| | | 50° | 31.0 | 15.0 | 5.0 | | 23.2 | 3.0 | 5.0 | |
| IRCU-GW-CB | 846-040GCE/ 846040GAE | 70° | 35.4 | 11.0 | 6.5 | | 41.0 | 3.4 | 5.0 | |
| | | 50° | 38.5 | 13.3 | 6.5 | | 30.8 | 3.0 | 5.0 | |
| IRCU-GW-CB | 846-050GCE/ 846-050GAE | 70° | 45.0 | 11.3 | 8.0 | | 47.0 | 3.4 | 5.0 | |
| | | 50° | 50.0 | 14.2 | 8.0 | | 36.0 | 3.0 | 5.0 | |
| IRCU-GW-CB | 846-060GCE 846-060GAE | 70° | 54.0 | 11.0 | 9.5 | | 64.0 | 3.3 | 9.5 | |
| | | 50° | 59.0 | 14.0 | 9.5 | | 50.0 | 3.0 | 9.5 | |
| IRCU-GW-CB | 846-070GCE/ 846-070GAE | 70° | 64.0 | 10.2 | 12.0 | | 76.0 | 3.3 | 12.0 | |
| | | 50° | 71.0 | 12.4 | 12.0 | | 60.0 | 3.0 | 12.0 | |
| HRCU-GW-CB | 846-090GCE 1, 3,4/ 846-090GAE 1, 3,4 | | 84.0 | 10.0 | 15.0 | | 103.0 | 3.4 | 10.0 | |
| | | | 89.0 | 11.7 | 15.0 | | 77.0 | 3.0 | 10.0 | |

I certify that the models listed above meet all the requirements of ARI Standard 325-81.

SIGNED Ray E Klassen TITLE Mgr. W.S.H.P. Prod. Eng.

4/83 (OVER) FORM GHH-PRS1

# SPLIT SYSTEM

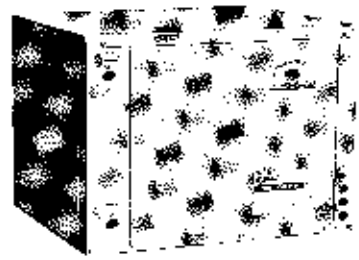
## RESIDENTIAL • COMMERCIAL

## WATER SOURCE HEAT PUMP UNITS

**AIR HANDLING UNITS** are available in several configurations: The Vertical model as shown, the Horizontal models or the counterflow configuration with the blower mounted for bottom air discharge.

The CLIMATE MASTER Split System differs from our standard Geo Thermal Units in that it consists of two remotely installed sections. The Split System offers the freedom and convenience of design allowing centralized air distribution while remotely locating the condensing section.

**THE CONDENSING SECTION** does not have to be located outdoors. Since the System is water cooled and does not require a large volume of air, the condensing section may be located in the garage, utility room, equipment room, or any area convenient for maintenance.



## PERFORMANCE DATA

| | COOLING ENTERING WATER TEMPERATURES | | | | | | HEATING ENTERING WATER TEMPERATURES | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 65°F | | 75°F | | 85°F | | 60°F | | 70°F | | 80°F | |
| MODEL | BTU/HR | EER | BTU/HR | EER | BTU/HR | EER | BTU/HR | COP | BTU/HR | COP | BTU/HR | COP |
| 846-015 | 15,100 | 13.5 | 14,700 | 12.2 | 14,000 | 10.8 | 16,700 | 3.7 | 19,000 | 3.9 | 20,100 | 4.0 |
| 846-019 | 19,900 | 13.8 | 19,400 | 12.4 | 18,500 | 11.0 | 21,100 | 3.8 | 24,000 | 4.0 | 25,400 | 4.1 |
| 846-023 | 24,200 | 15.4 | 23,600 | 13.9 | 22,500 | 12.3 | 24,500 | 4.0 | 27,800 | 4.2 | 29,500 | 4.3 |
| 846-027 | 27,500 | 14.6 | 26,800 | 13.2 | 25,600 | 11.7 | 29,400 | 3.8 | 33,400 | 4.0 | 35,400 | 4.1 |
| 846-034 | 35,000 | 14.6 | 34,200 | 13.2 | 32,600 | 11.7 | 37,800 | 3.8 | 43,000 | 4.0 | 45,600 | 4.1 |
| 846-042 | 44,600 | 13.8 | 43,500 | 12.4 | 41,500 | 11.0 | 44,900 | 3.7 | 51,000 | 3.9 | 54,100 | 4.0 |
| 846-052 | 51,600 | 13.5 | 50,300 | 12.2 | 48,000 | 10.8 | 56,300 | 3.7 | 64,000 | 3.9 | 67,800 | 4.0 |
| 846-062 | 64,500 | 13.4 | 62,900 | 12.1 | 60,000 | 10.7 | 70,400 | 3.5 | 80,000 | 3.7 | 84,800 | 3.8 |
| 846-080 | 81,700 | 12.5 | 79,600 | 11.3 | 76,000 | 10.0 | 98,600 | 3.9 | 112,000 | 4.1 | 118,700 | 4.2 |

Note: For entering water temperatures below 55°F consult factory.

COOLING CAPACITY DATA: Based on A.R.I. Conditions of 80° D.B. and 67° W.B. Entering Air. The A.R.I. certified capacities are with 85° E.W.T. and 95° L.W.T.

EER. = ENERGY EFFICIENCY RATIO: The Total Cooling Capacity divided by the Total Watts Electrical input.

HEATING CAPACITY DATA: Based on A.R.I. Conditions of 70°F Entering Air. The A.R.I. Certified Capacities are same air, with 70°F Entering Water Temperature, same flow as the Cooling Cycle.

COP = COEFFICIENT OF PERFORMANCE. A COP of 1 equals 3412 BTU/HR with an Electrical input of one Kilowatt. Therefore, COP listed is calculated by dividing the total heating capacity by the electrical input divided by 3412.

GeoThermal Heat Pumps
ClimateMaster

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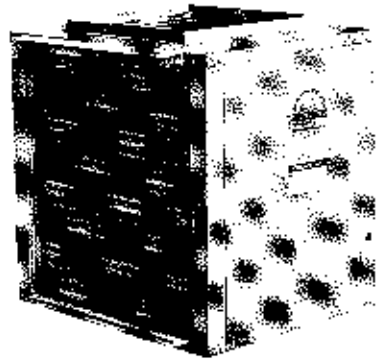
# SPLIT SYSTEM

## RESIDENTIAL • COMMERCIAL

## WATER SOURCE HEAT PUMP UNITS



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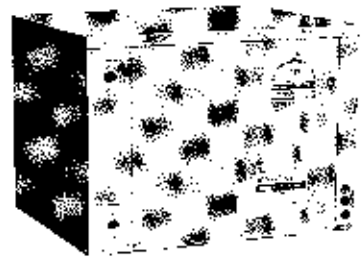

## PERFORMANCE DATA

| | COOLING ENTERING WATER TEMPERATURES | | | | | | HEATING ENTERING WATER TEMPERATURES | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 65°F | | 75°F | | 85°F | | 60°F | | 70°F | | 80°F | |
| MODEL | BTU/HR | EER | BTU/HR | EER | BTU/HR | EER | BTU/HR | COP | BTU/HR | COP | BTU/HR | COP |
| 846-015 | 15,100 | 13.5 | 14,700 | 12.2 | 14,000 | 10.8 | 16,700 | 3.7 | 19,000 | 3.9 | 20,100 | 4.0 |
| 846-019 | 19,900 | 13.8 | 19,400 | 12.4 | 18,500 | 11.0 | 21,100 | 3.8 | 24,000 | 4.0 | 25,400 | 4.1 |
| 846-023 | 24,200 | 15.4 | 23,600 | 13.9 | 22,500 | 12.3 | 24,500 | 4.0 | 27,800 | 4.2 | 29,500 | 4.3 |
| 846-027 | 27,500 | 14.6 | 26,800 | 13.2 | 25,600 | 11.7 | 29,400 | 3.8 | 33,400 | 4.0 | 35,400 | 4.1 |
| 846-034 | 35,000 | 14.6 | 34,200 | 13.2 | 32,600 | 11.7 | 37,800 | 3.8 | 43,000 | 4.0 | 45,600 | 4.1 |
| 846-042 | 44,600 | 13.8 | 43,500 | 12.4 | 41,500 | 11.0 | 44,900 | 3.7 | 51,000 | 3.9 | 54,100 | 4.0 |
| 846-052 | 51,600 | 13.5 | 50,300 | 12.2 | 48,000 | 10.8 | 56,300 | 3.7 | 64,000 | 3.9 | 67,800 | 4.0 |
| 846-062 | 64,500 | 13.4 | 62,900 | 12.1 | 60,000 | 10.7 | 70,400 | 3.5 | 80,000 | 3.7 | 84,800 | 3.8 |
| 846-080 | 81,700 | 12.5 | 79,600 | 11.3 | 76,000 | 10.0 | 98,600 | 3.9 | 112,000 | 4.1 | 118,700 | 4.2 |

Note: For entering water temperatures below 55°F consult factory.

COOLING CAPACITY DATA: Based on A.R.I. Conditions of 80° D.B. and 67° W.B. Entering Air. The A.R.I. certified capacities are with 85° E.W.T. and 95° L.W.T.

EER = ENERGY EFFICIENCY RATIO: The Total Cooling Capacity divided by the Total Watts Electrical input.

HEATING CAPACITY DATA: Based on A.R.I. Conditions of 70°F Entering Air. The A.R.I. Certified Capacities are same air, with 70°F Entering Water Temperature, same flow as the Cooling Cycle.

COP = COEFFICIENT OF PERFORMANCE. A COP of 1 equals 3412 BTU/HR with an Electrical input of one Kilowatt. Therefore, COP listed is calculated by dividing the total heating capacity by the electrical input divided by 3412.

GeoThermal Heat Pumps
ClimateMaster

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# "846" Heating Performance

for fluid entering temperatures below 45° F (7.2°C).

| MODEL | ENTERING WATER (1) TEMP., °F | FLOW RATE GPM | HEATING PERFORMANCE (2) | | | SCFM |
|---|---|---|---|---|---|---|
| | | | BTUH | WATTS | COP | |
| 846-020 | 25 | 5.0 | 11500 | 1330 | 2.5 | 650 |
| | 30 | | 13000 | 1370 | 2.8 | |
| | 35 | | 14500 | 1415 | 3.0 | |
| | 38 | | 15200 | 1440 | 3.1 | |
| | 41 | | 16000 | 1470 | 3.2 | |
| | 44 | | 17200 | 1485 | 3.4 | |
| 846-030 | 25 | 7.0 | 16700 | 1890 | 2.5 | 950 |
| | 30 | | 18100 | 1950 | 2.7 | |
| | 35 | | 20100 | 2010 | 2.9 | |
| | 38 | | 21100 | 2040 | 3.0 | |
| | 41 | | 22200 | 2060 | 3.2 | |
| | 44 | | 23600 | 2110 | 3.3 | |
| 846-040 | 25 | 8.0 | 19800 | 2380 | 2.4 | 1200 |
| | 30 | | 22700 | 2480 | 2.7 | |
| | 35 | | 25500 | 2580 | 2.9 | |
| | 38 | | 27200 | 2640 | 3.0 | |
| | 41 | | 28900 | 2700 | 3.1 | |
| | 44 | | 30600 | 2770 | 3.2 | |
| 846-050 | 25 | 11.0 | 23700 | 2755 | 2.5 | 1500 |
| | 30 | | 27000 | 2900 | 2.7 | |
| | 35 | | 30000 | 3020 | 2.9 | |
| | 38 | | 32000 | 3100 | 3.0 | |
| | 41 | | 33800 | 3170 | 3.1 | |
| | 44 | | 35800 | 3230 | 3.2 | |
| 846-060 | 25 | 13.0 | 32500 | 3550 | 2.7 | 1700 |
| | 30 | | 36000 | 3680 | 2.9 | |
| | 35 | | 39900 | 3830 | 3.1 | |
| | 38 | | 42000 | 3890 | 3.1 | |
| | 41 | | 44300 | 4010 | 3.2 | |
| | 44 | | 46500 | 4100 | 3.3 | |
| 846-070 | 25 | 16.0 | 36500 | 4540 | 2.4 | 2000 |
| | 30 | | 41000 | 4690 | 2.6 | |
| | 35 | | 46500 | 4850 | 2.8 | |
| | 38 | | 48000 | 4940 | 2.8 | |
| | 41 | | 51000 | 5030 | 3.0 | |
| | 44 | | 53500 | 5140 | 3.1 | |
| 846-090 | 25 | 20.0 | 51000 | 6070 | 2.4 | 3000 |
| | 30 | | 57000 | 6350 | 2.6 | |
| | 35 | | 64000 | 6700 | 2.8 | |
| | 38 | | 66500 | 6720 | 2.9 | |
| | 41 | | 70400 | 6880 | 3.0 | |
| | 44 | | 74000 | 6990 | 3.1 | |

NOTES:

(1) Minimum entering temperature with plain fresh water is 40° F (4.5° C). Below 40° F (4.5° C) entering temperature, ratings are based on the use of a solution of 15% Methanol and 85% water by weight.

(2) Ratings are based on the heat source fluid flow rate and indoor SCFM as shown, with air entering the indoor coil at 70° F (21.1° C).

All ratings and specifications are subject to change without notice.

7300 S.W. 44th STREET • OAKLAHOMA CITY, OK. 73179

# "846" Cooling Performance Ratings
# E.W.T 70° F thru 100° F

| MODEL | EWT °F (2) | FLOW RATE GPM | COOLING (1) | | | SCFM |
|---|---|---|---|---|---|---|
| | | | BTU/HR. | WATTS | EER | |
| 846-020 | 100 | 5 | 16900 | 1920 | 8.8 | 650 |
| | 90 | | 18000 | 1820 | 9.9 | |
| | 80 | | 19700 | 1720 | 11.5 | |
| | 70 | | 20400 | 1620 | 12.6 | |
| 846-030 | 100 | 7 | 23300 | 2283 | 10.2 | 950 |
| | 90 | | 25000 | 2164 | 11.6 | |
| | 80 | | 26700 | 2044 | 13.1 | |
| | 70 | | 28300 | 1925 | 14.7 | |
| 846-040 | 100 | 8 | 30600 | 3220 | 9.5 | 1200 |
| | 90 | | 32800 | 3040 | 10.8 | |
| | 80 | | 35000 | 2870 | 12.2 | |
| | 70 | | 37200 | 2715 | 13.7 | |
| 846-050 | 100 | 11 | 37000 | 3960 | 9.3 | 1500 |
| | 90 | | 39700 | 3750 | 10.6 | |
| | 80 | | 42400 | 3560 | 11.9 | |
| | 70 | | 45000 | 3350 | 13.4 | |
| 846-060 | 100 | 13 | 46800 | 4680 | 10.0 | 1700 |
| | 90 | | 50100 | 4430 | 11.3 | |
| | 80 | | 53500 | 4190 | 12.8 | |
| | 70 | | 56800 | 3945 | 14.4 | |
| 846-070 | 100 | 16 | 54300 | 6240 | 8.7 | 2000 |
| | 90 | | 58200 | 5880 | 9.9 | |
| | 80 | | 62200 | 5600 | 11.1 | |
| | 70 | | 66300 | 5280 | 12.5 | |
| 846-090 | 100 | 20 | 73700 | 8700 | 8.5 | 3000 |
| | 90 | | 78400 | 8200 | 9.6 | |
| | 80 | | 83400 | 7700 | 10.8 | |
| | 70 | | 88740 | 7300 | 12.1 | |

NOTES:

(1) For earth coupled application, these ratings are based on the loop fluid being a solution of 15% methanol and 85% water by weight, with the flow rate as shown.

(2) Ratings are also based on air entering the indoor coil at 80° F db (26.7° C) and 67° F wb (19.4° C), at rated SCFM as shown above.

All ratings and specifications are subject to change without notice.

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Geo-Thermal Heat Pumps

ClimateMaster

# start-up and maintenance manual

## SUPPLEMENT FOR SPLIT SYSTEMS — CONDENSING SECTION WITH MATCHING AIR HANDLER

The **condensing section** should be mounted on a cement slab or similar support to provide a good base and some degree of levelness. It is designed for outdoor installation, however, where ambient temperatures can fall below freezing, we recommend the unit be installed in a heated area to prevent possible condenser freeze-up and to optimize the overall system performance.

The **air handler** should be mounted on isolating pads, and air supply and return ducts should be attached thru canvas connectors to isolate vibration and noise from the building structure. Flexible wiring and conduit should be used for the same reasons.

**CAUTION: Holding charge of refrigerant:**

Both the condensing section and the air handler section are **factory supplied with a holding charge of refrigerant only.** Using the gauge ports provided, evacuate this holding charge before attempting to cut the sealed refrigerant lines or otherwise open the system.

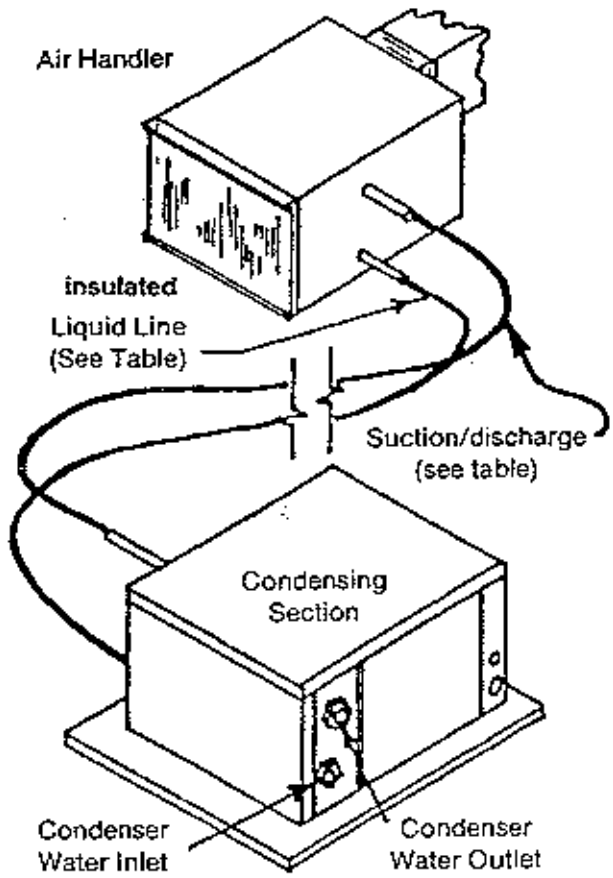
**Interconnecting refrigerant line** sizes should be in accordance with table 1 in the following instructions. Copper tubing should be clean and free of moisture and dirt or trash. Suction/discharge line MUST be insulated with at least ⅜" wall, closed cell, foam rubber insulation or the equivalent.

Refrigerant lines generally can and should be routed and supported so as to prevent the transmission of vibrations into the building structure.

After the interconnecting refrigerant lines have been installed, the entire system should be pressurized with R22 and leak checked. Then, using a good vacuum pump, evacuate the system for a minimum of six (6) hours, then charge in accordance with Tables 1 and 2 in the following instructions.

Experience and good design practice dictate 75 feet as the maximum practical length for interconnecting refrigerant lines in split system heat pumps, without special considerations. Beyond 75 feet system losses become considerable, and the total refrigerant charge required can compromise the reliability and design life of the equipment.

Pump-down must never be used with heat pumps.



# Table 1: Split System Line Sizing and Charging

| SYSTEM MODEL | BASIC R-22 CHARGE OZ (NOTE 4) | REFRIGERATION LINE O.D. SIZES FOR EQUIVALENT LENGTHS (NOTE 3) | | | | | | | | | | | | | | | | | | SUCTION LINE VERTICAL RISER MAX O.D. (NOTE 5) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 15 FT | | 25 FT | | 35 FT | | 45 FT | | 50 FT | | 60 FT | | 70 FT | | 80 FT | | 120 FT MAX | | |
| | | LIQ | SUCT | LIQ | SUCT | LIQ | SUCT | LIQ | SUCT | LIQ | SUCT | LIQ | SUCT | LIQ | SUCT | LIQ | SUCT | LIQ | SUCT | |
| 846-015 | 31 | ¼ | ⅝ | ¼ | ⅝ | ¼ | ⅜ | 5/16 | ⅜ | 5/16 | ⅜ | 5/16 | ⅜ | 5/16 | ⅜ | 5/16 | ⅜ | 5/16 | ⅜ | ⅝ |
| 846-019 | 32 | ¼ | ⅝ | ¼ | ⅜ | 5/16 | ⅜ | 5/16 | ⅜ | 5/16 | ⅜ | 5/16 | ⅜ | 5/16 | ⅞ | ⅜ | ⅞ | ⅜ | ⅞ | ⅝ |
| * 846-020 | 35 | | | | | | | | | | | | | | | | | | | |
| 846-023 | 39 | ¼ | ⅝ | 5/16 | ⅜ | 5/16 | ⅜ | 5/16 | ⅜ | 5/16 | ⅜ | 5/16 | ⅞ | ⅜ | ⅞ | ⅜ | ⅞ | ⅜ | ⅞ | ⅜ |
| 846-027 | 52 | 5/16 | ⅝ | 5/16 | ⅜ | 5/16 | ⅜ | 5/16 | ⅜ | ⅜ | ⅜ | ⅜ | ⅞ | ⅜ | ⅞ | ⅜ | ⅞ | ⅜ | ⅞ | ⅜ |
| * 846-030 | 61 | | | | | | | | | | | | | | | | | | | |
| 846-034 | 58 | 5/16 | ⅜ | ⅜ | ⅜ | ⅜ | ⅜ | ⅜ | ⅞ | ⅜ | ⅞ | ⅜ | ⅞ | ⅜ | ⅞ | ½ | ⅞ | ½ | ⅞ | ⅞ |
| * 846-040 | 59 | | | | | | | | | | | | | | | | | | | |
| 846-042 | 69 | ⅜ | ⅜ | ⅜ | ⅞ | ⅜ | ⅞ | ⅜ | ⅞ | ⅜ | ⅞ | ⅜ | ⅞ | ½ | 1⅛ | ½ | 1⅛ | ½ | 1⅛ | ⅞ |
| * 846-050 | 82 | | | | | | | | | | | | | | | | | | | |
| 846-052 | 94 | ⅜ | ⅞ | ⅜ | ⅞ | ⅜ | ⅞ | ⅜ | 1⅛ | ½ | 1⅛ | ½ | 1⅛ | ½ | 1⅛ | ½ | 1⅛ | ½ | 1⅛ | ⅞ |
| * 846-060 | 94 | | | | | | | | | | | | | | | | | | | |
| 846-062 | 99 | ⅜ | ⅞ | ⅜ | 1⅛ | ½ | 1⅛ | ½ | 1⅛ | ½ | 1⅛ | ½ | 1⅛ | ½ | 1⅛ | ½ | 1⅛ | ½ | 1⅛ | 1⅛ |
| * 846-070 | 105 | | | | | | | | | | | | | | | | | | | |
| 846-080 | 134 | ½ | 1⅛ | ½ | 1⅛ | ½ | 1⅛ | ½ | 1⅛ | ½ | 1⅛ | ½ | 1⅛ | ½ | 1⅜ | ⅝ | 1⅜ | ⅝ | 1⅜ | 1⅛ |
| * 846-090 | 134 | | | | | | | | | | | | | | | | | | | |
| 846-100 | 152 | ½ | 1⅛ | ½ | 1⅛ | ½ | 1⅜ | ½ | 1⅜ | ½ | 1⅜ | ½ | 1⅜ | ⅝ | 1⅝ | ⅝ | 1⅝ | ⅝ | 1⅝ | 1⅜ |
| 846-120 | 194 | ½ | 1⅛ | ½ | 1⅜ | ½ | 1⅜ | ½ | 1⅜ | ⅝ | 1⅝ | ⅝ | 1⅝ | ⅝ | 1⅝ | ⅝ | 1⅝ | ⅝ | 1⅝ | 1⅜ |

* LOW TEMP MODELS

# Table 2: Liquid Line Charge per Linear Foot.

| | Liquid line size, O.D. | | | | |
|---|---|---|---|---|---|
| | ¼ | 5/16 | ⅜ | ½ | ⅝ |
| R22 oz. per foot | .25 | .44 | .60 | 1.15 | 1.95 |

**Example:** Model 846-030 with 35 feet of 5/16" o.d. liquid line.
Total system charge = Basic charge + .44 oz. per foot
Total system charge = 61 oz. + (.44 x 35 ft.) = 76.4 oz.

**Notes:**

1. Maximum linear (actual) liquid line lengths **without a suction line accumulator** installed are:

   Model sizes 15 thru 60 = **60 feet**
   Model sizes 62 thru 90 = **50 feet**

   Maximum linear line lengths **with** suction accumulator installed are **100 feet**, all models.

2. Liquid and suction line sizes (diameter) are basd on EQUIVALENT LINE LENGTHS. When the computed equivalent length falls between values in table 1, use size given for next longer length.

3. Refrigerant line charge is based on **LINEAR LINE LENGTH**. Total system refrigerant charge is **BASIC CHARGE** plus **LINE CHARGE**. Refer to table 2 for example.

4. These line sizes are required for vertical suction/hot gas lines, whether or not the air handler is above or below the compressor, to maintain adequate gas velocity for oil entrainment.

5. Horizontal suction/hot gas line sizes must not exceed the largest diameter given in table 1 for a given heat pump.

# SPLIT SYSTEM REFRIGERANT LINE SIZING & CHARGING

## PREFACE:

To minimize system performance, efficiency, and reliability, and to minimize installation costs, it is always in the best interest of the consumer to keep refrigerant lines as short as possible. Every effort should be made to locate the condensing (outdoor) section and the air handler (indoor) section of the system as close as possible to each other.

## GENERAL INFORMATION:

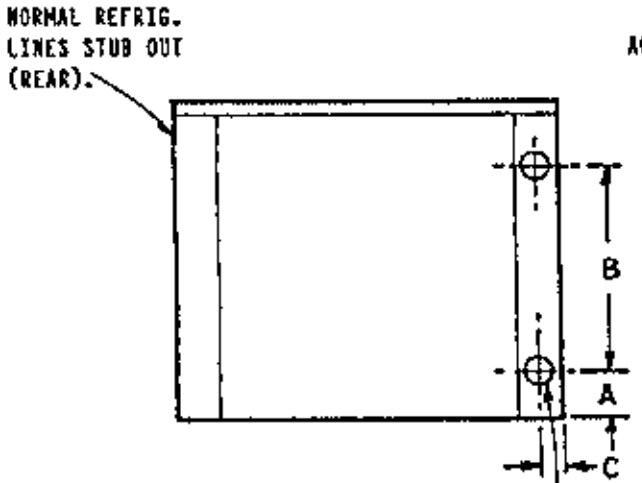
1. Pressure drop (friction losses) in refrigerant suction and hot gas lines reduces system capacity and increases power consumption as much as 10 percent or more, depending on length of lines, number of bends, etc. Pressure drop in liquid lines affects performance to a lesser degree, provided that a solid column of liquid (no flash gas) is being delivered to the expansion device, and that the liquid pressure at the expansion device is sufficient to produce the required refrigerant flow.
2. Oil is continually being circulated with the refrigerant and, so, oil return to the compressor is always a consideration in line sizing. Suction lines on split system heat pumps are also hot gas lines in the heating mode, but are treated as suction lines for sizing purposes. If the recommended suction line sizes are used, there should be no problem with oil return.
3. Vertical lines should be kept to a minimum. Vertical liquid lines will have a vertical liquid lift in either cooling or heating, and the weight of the liquid head is added to the friction loss to arrive at the total liquid line pressure drop.

## LINEAR VS. EQUIVALENT LINE LENGTH:

1. **Linear length** of a line is the actual measured length, including bends. The **linear length of the liquid line is used to compute the additional refrigerant charge** that must be added to the basic charge to determine the total charge for a given system (refer to table 2).
2. **Equivalent length** is the combined total of (1), the actual lengths of all straight runs and (2), the equivalent lengths of all elbows, valves, and fittings in a particular line. Equivalent valve or fitting length is equal to the length of a straight pipe or tubing of the same size having the same pressure drop as a particular valve or fitting. The **ASHRAE Fundamentals Handbook,** Chapter 34, provides tables for determining losses in equivalent feet of pipe or tubing for various valves and fittings.
   **Liquid and suction line sizes are based on equivalent lengths,** as given in Table 1.

## THINGS TO REMEMBER:

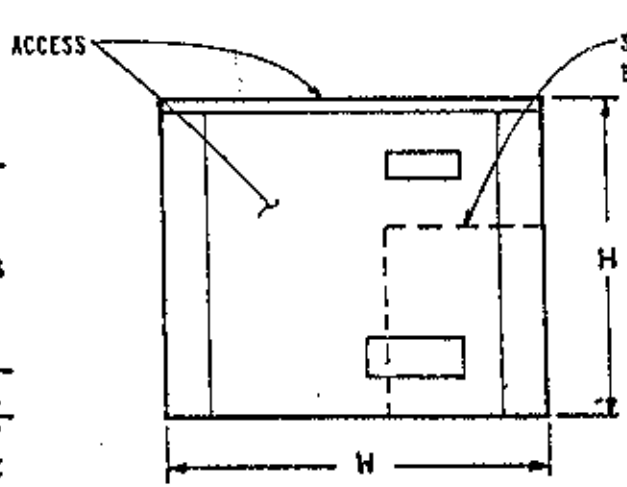
1. **Do not overcharge a system.** Charge all systems by weight as determined from the total of the BASIC CHARGE (table 1) and the LIQUID LINE CHARGE (table 2).
2. **Do not oversize liquid lines** unless absolutely unavoidable. If oversized lines must be used, a suction line accumulator may be required, and the addition of a crankcase heater may be necessary on some models, depending upon the total system charge. **Consult factory for recommendation.**
3. **Suction line size** must be one of those given in Table 1. Horizontal suction runs should be pitched slightly toward the compressor to provide free drainage and aid oil return.
4. If a liquid line drier-filter is required, it must be of the **bi-directional type only.**
5. **Linear line lengths** in excess of 100 feet are not recommended, either with or without a suction line accumulator.




LEFT SIDE

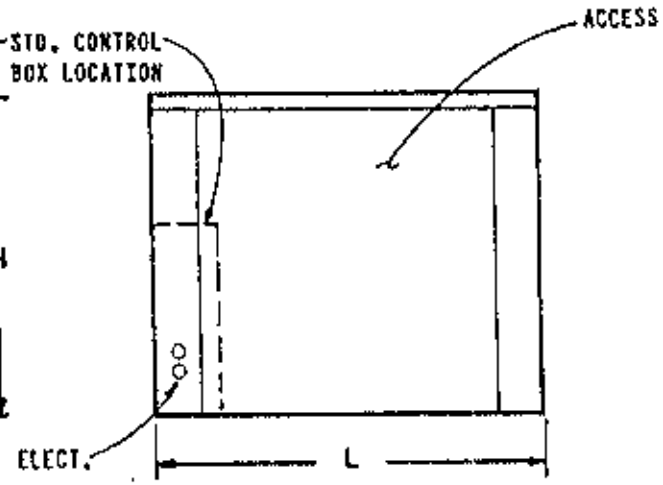
C/W CONNECT SIZES

| | |
|---|---|
| 15 THRU | 42 = 3/4"FPT |
| 20 THRU | 50 = 3/4"FPT |
| 52 THRU | 62 = 1"FPT |
| 60 THRU | 70 = 1"FPT |




FRONT VIEW

* CONNECT SIZES ONLY
NOT REQ'D LINE SIZES
(REFER LINE SIZE DATA)




RIGHT SIDE

NOTE: C/S ALSO AVAILABLE
BOTTOM ACCESS FOR ELEC.
AND C/W CONNECTS.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

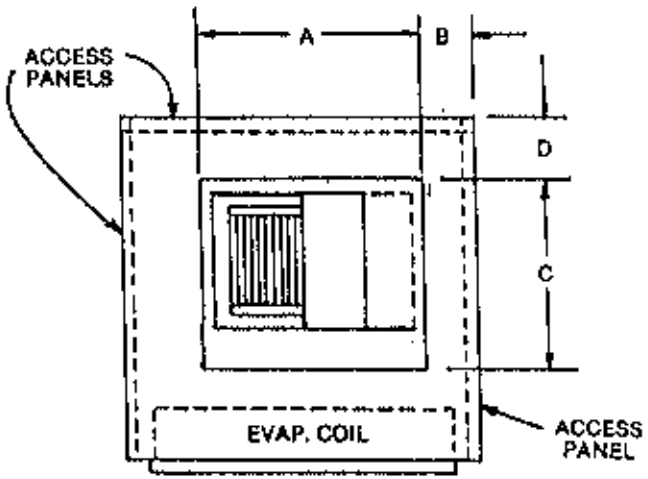
| MODEL | CABINET H | CABINET W | CABINET L | C/W PIPING A | C/W PIPING B | C/W PIPING C | *REFRIGERANT LIQ | *REFRIGERANT SUC |
|---|---|---|---|---|---|---|---|---|
| 015 | 13 1/2 | 21 3/4 | 21 3/4 | 2 1/4 | 8 1/2 | 1 1/16 | 3/8 | 1/2 |
| 019,020 | 17 1/4 | 21 3/4 | 21 3/4 | 2 1/4 | 11 | 1 1/16 | 3/8 | 1/2 |
| 023 | 19 1/4 | 21 3/4 | 21 3/4 | 2 1/4 | 10 | 1 1/16 | 3/8 | 5/8 |
| 027,030 | 19 1/4 | 21 3/4 | 21 3/4 | 2 1/4 | 10 | 1 1/16 | 3/8 | 5/8 |
| | 19 1/4 | 21 3/4 | 21 3/4 | N/A | N/A | N/A | 3/8 | 5/8 |
| 034,042,040,050 | 19 1/4 | 26 1/8 | 21 3/4 | 2 1/4 | 12 1/4 | 1 1/16 | 1/2 | 3/4 |
| 052,062,060,070 | 21 1/4 | 32 3/4 | 24 5/8 | 2 1/4 | * | 1 1/8 | 1/2 | 7/8 |

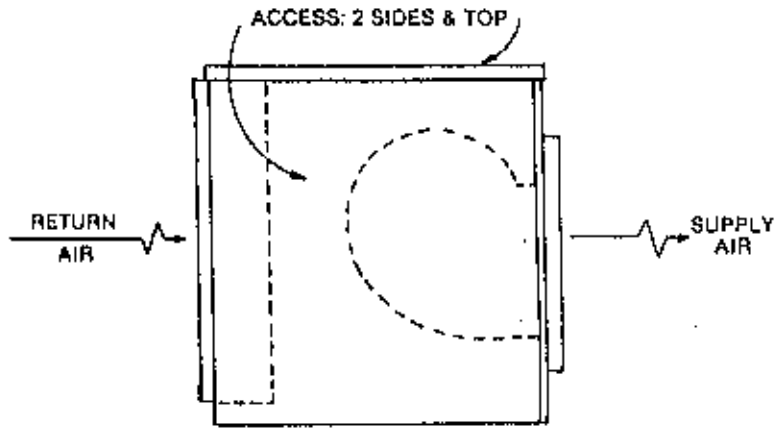
ClimateMaster

# SPLIT SYSTEM CONDENS'G SECTION 846

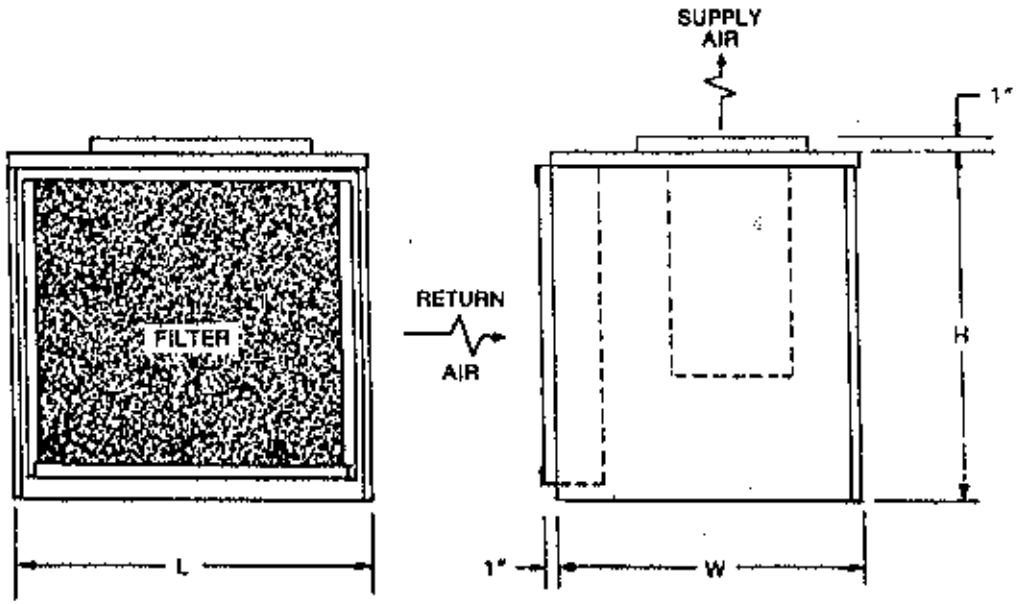
| DWN BY | DATE | |
|---|---|---|
| HWN | 3-14-90 | CM230C |

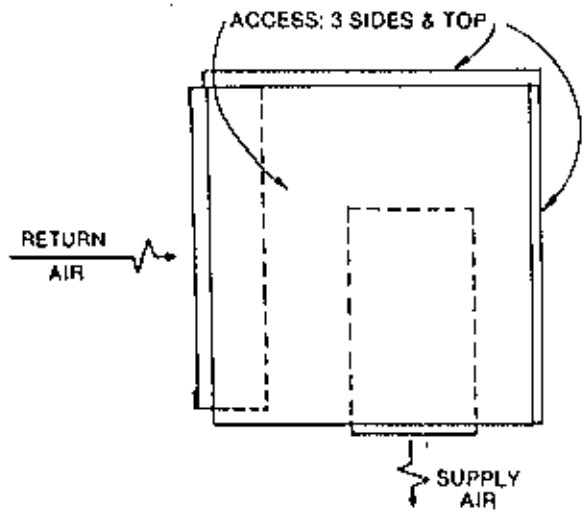
* 052 & 060 : 16 1/4  062 & 070 : 13 7/8




ALTERNATE BLOWER ARRANGEMENT




ALTERNATE BLOWER ARRANGEMENT

DIMENSIONS, INCHES

| MODEL | L | W | H | A | B | C | D |
|---|---|---|---|---|---|---|---|
| 027,030 | 21¼ | 20⅝ | 22¼ | 16 | 2½ | 14 | 2½ |
| 034,042<br>040,050 | 27½ | 21¼ | 26½ | 18 | 3½ | 16 | 2½ |
| 052,062<br>060,070 | 32 | 24¼ | 25¾ | 20 | 6 | 18 | 2½ |

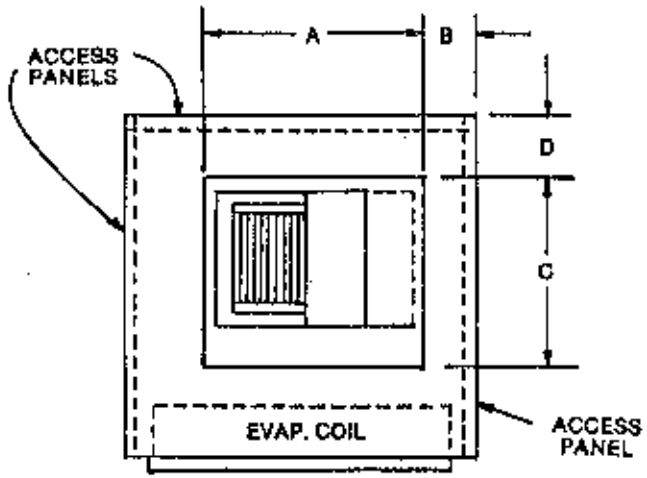
846 AIR HANDLER

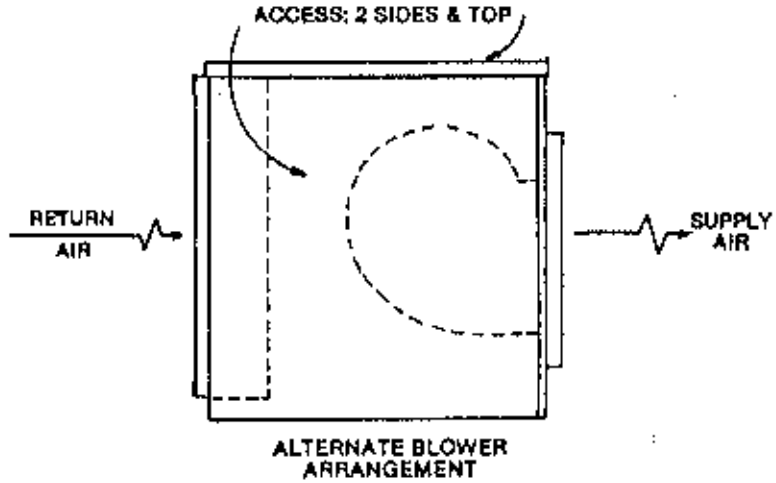
ClimateMaster

DAE CM231B

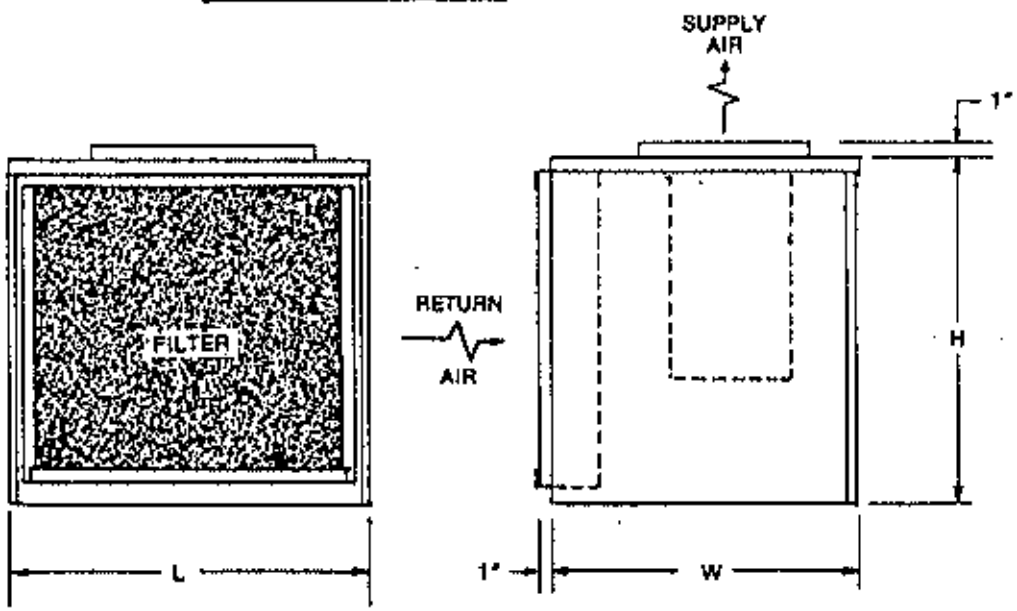
DATE: 8 - 14 - 90

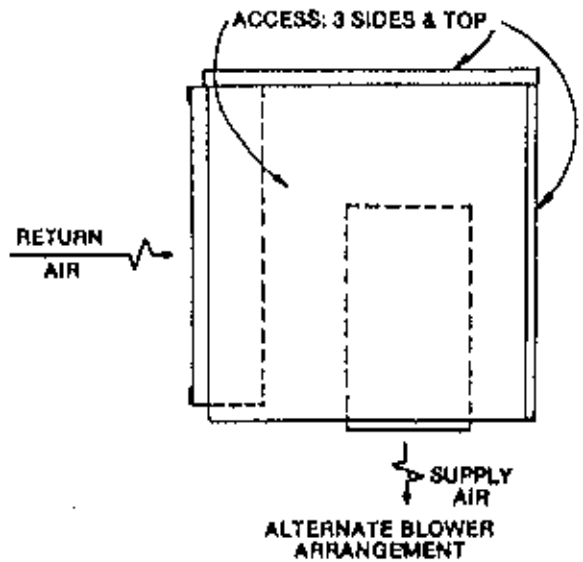
DWN BY: HWN




ALTERNATE BLOWER ARRANGEMENT




ALTERNATE BLOWER ARRANGEMENT

DIMENSIONS, INCHES

| MODEL | L | W | H | A | B | C | D |
|---|---|---|---|---|---|---|---|
| 015 | 21¾ | 21¾ | 13 | 10 | 7¾ | 11⅞ | 4 |
| 019 020 | 21¾ | 21¾ | 17 | 14 | 5¾ | 11⅞ | 2½ |
| 023 | 21¾ | 21¾ | 19 | 14 | 6¼ | 11¾ | 3 |

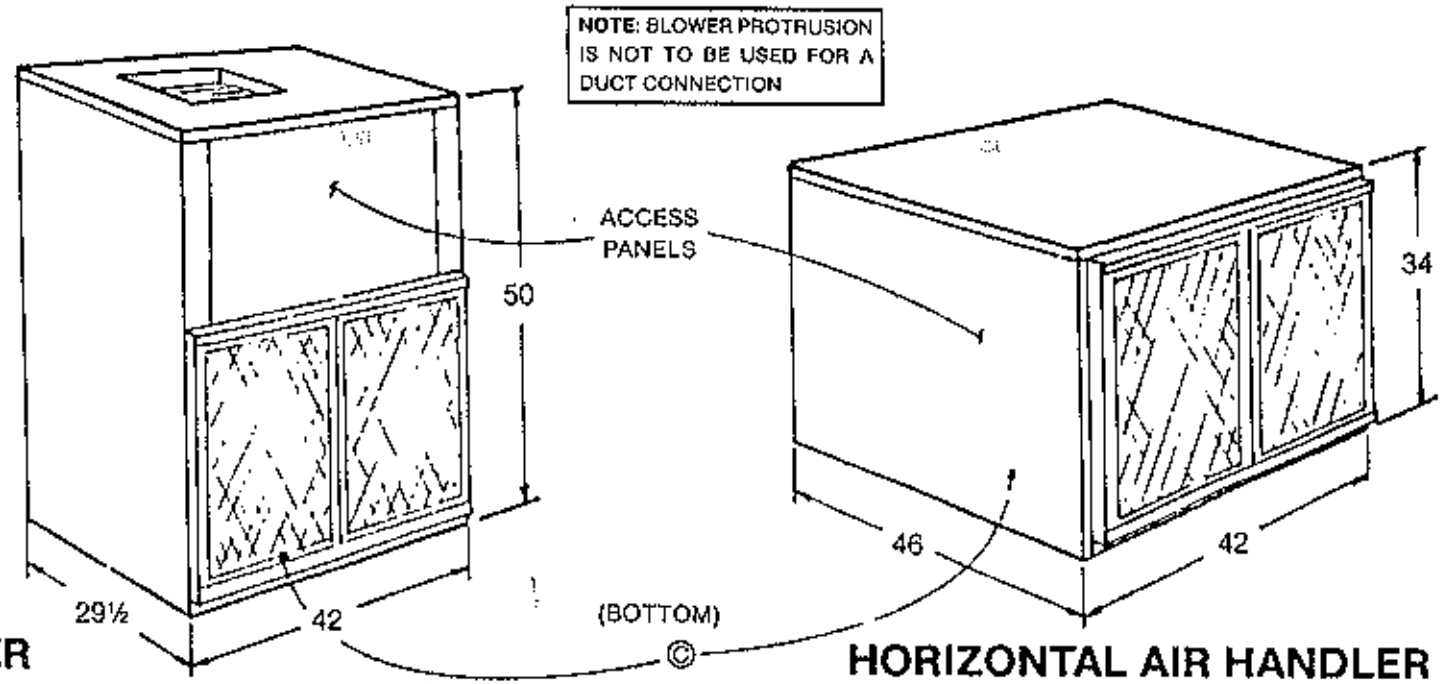
846 AIR HANDLER

ClimateMaster

DAE: CM232A

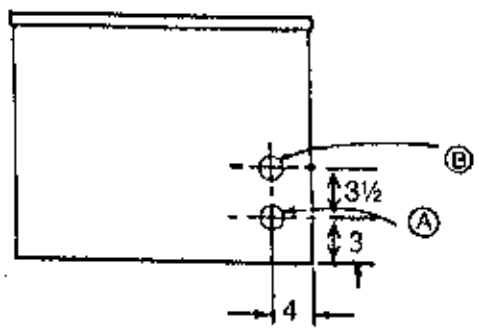
DATE: 3 - 14 - 90

DWN BY: HWN

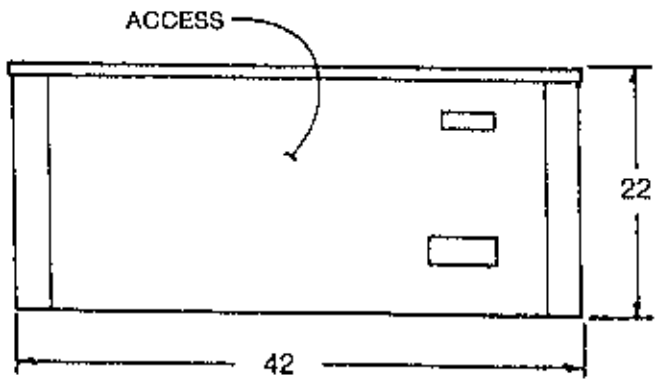



**VERTICAL AIR HANDLER**

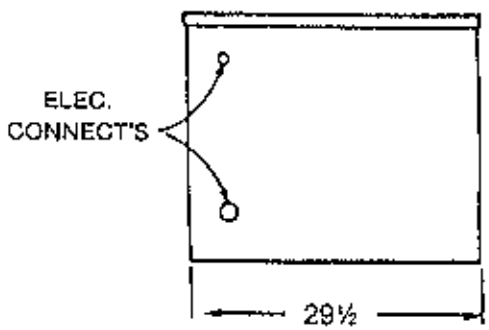
**HORIZONTAL AIR HANDLER**




*LEFT SIDE*




*FRONT*




*RIGHT SIDE*

PIPING CONNECTIONS

Ⓐ Condenser water IN: Models 060 & 100 = 1 F.P.T.
Model 120 = 1¼ F.P.T.

Ⓑ Condenser water OUT: Models 060 & 100 = 1 F.P.T.
Model 120 = 1¼ F.P.T.

© Condensate Drain: 1 F.P.T. (all 3 models)

ELECTRICAL

☐ 208-230/1/60 (060 Only)
☐ 208-230/3/60
☐ 460/3/60

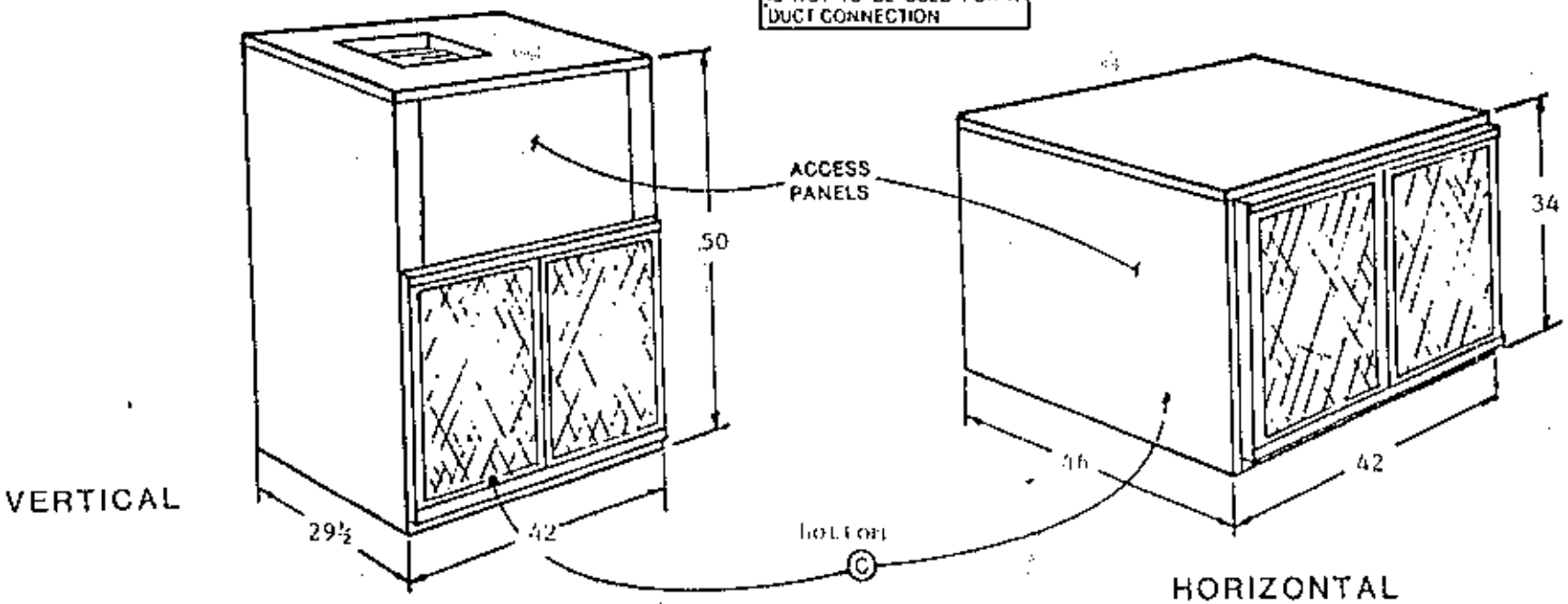
Geothermal Heat Pumps
ClimateMaster

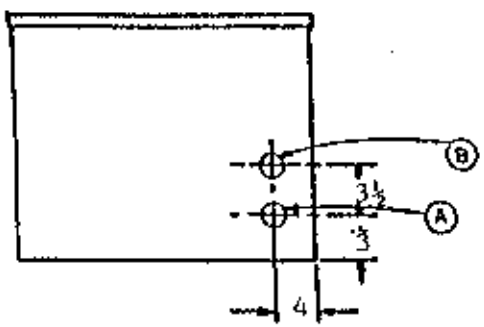
# 846-080,100,120

REF: 3 - 14 - 90

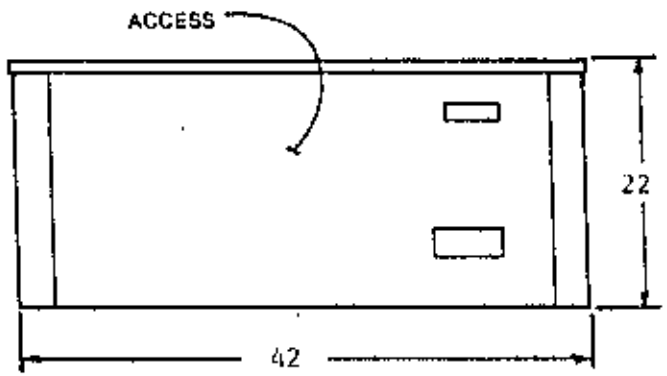
DAE D-201A

NOTE: BLOWER PROTRUSION IS NOT TO BE USED FOR A DUCT CONNECTION

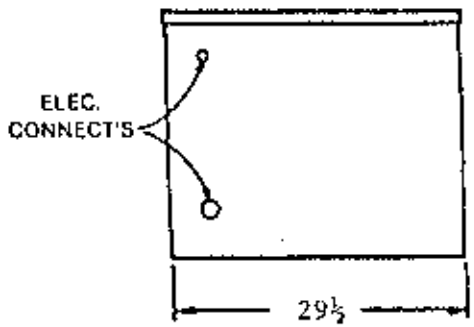



LEFT SIDE




FRONT




RIGHT SIDE

**PIPING CONNECTIONS**

Ⓐ Condenser water IN: 1 F.P.T.

Ⓑ Condenser water OUT: 1 F.P.T.

Ⓒ Condensate Drain: 1 F.P.T.

**ELECTRICAL**

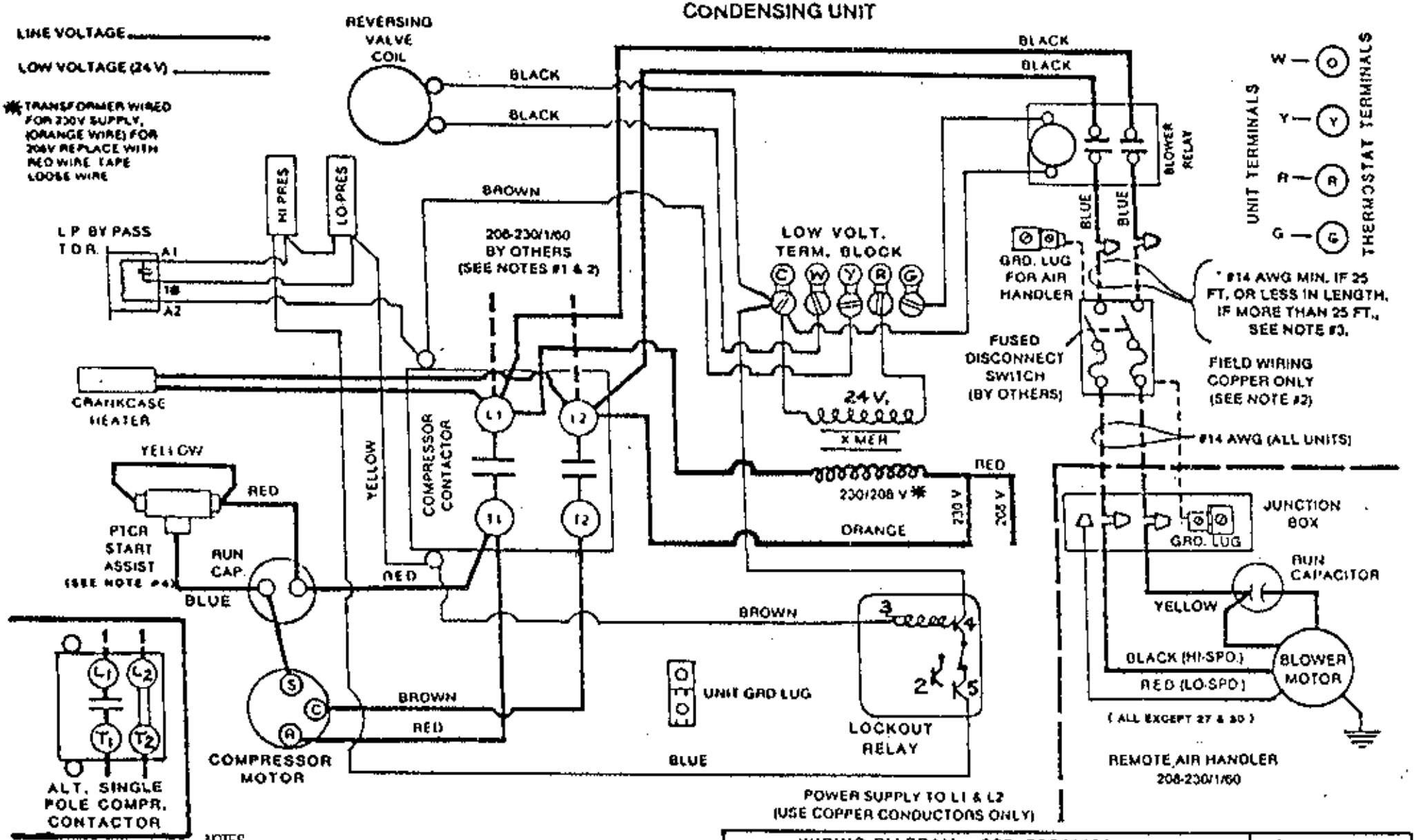
☐ 208-230/1/60
☐ 208-230/3/60

GeoThermal Heat Pumps
ClimateMaster

# 846-090

REF: 3 - 14 - 90

DAE: HWN



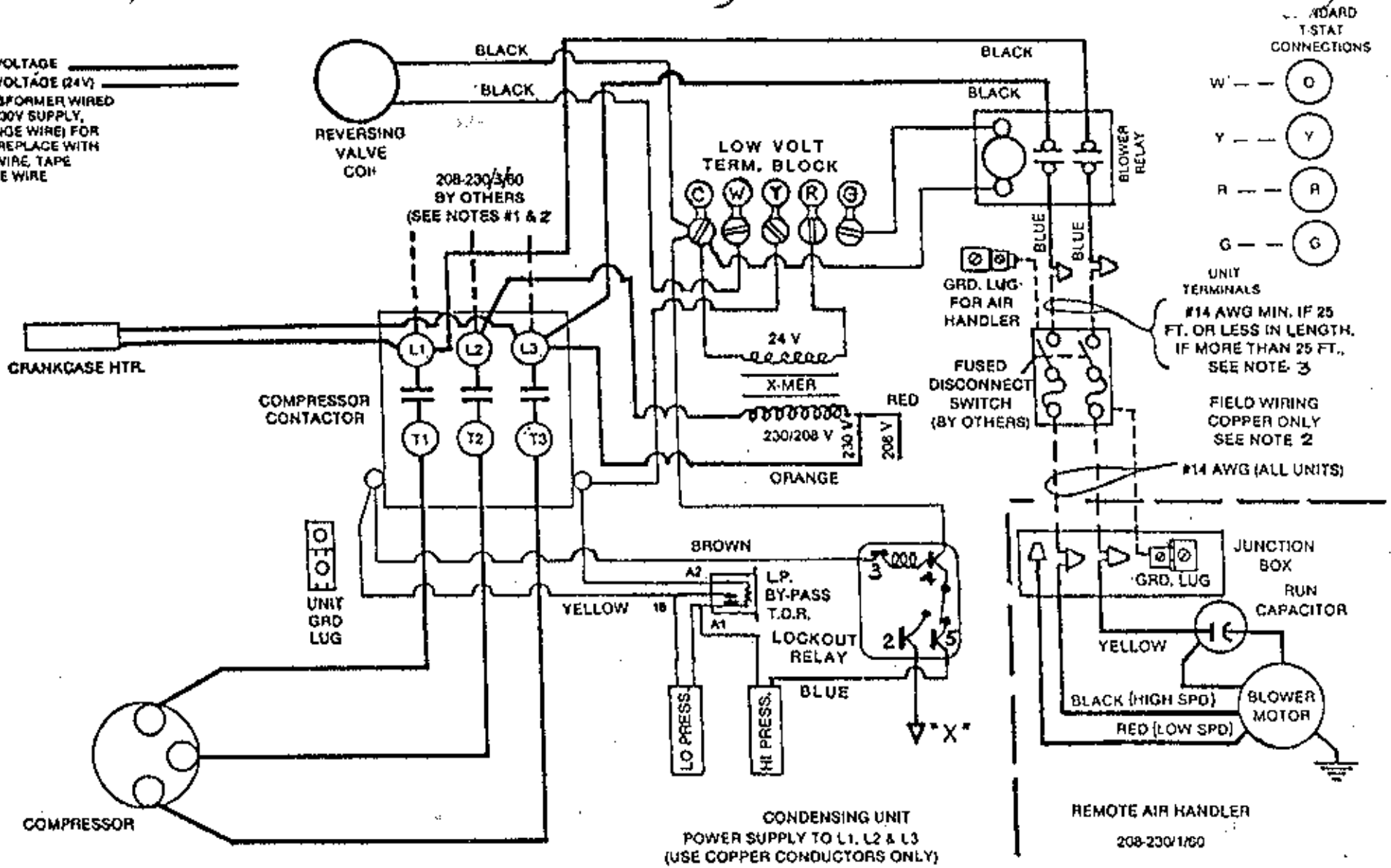

NOTES

1. SEE UNIT RATING PLATE FOR ELECTRICAL RATINGS.
2. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH N.E.C. NFPA NO. 70, LATEST EDITION AND ALL APPLICABLE STATE AND LOCAL CODES.
3. WHEN THESE CONDUCTORS EXCEED 25 FT. IN LENGTH FROM THE OUTDOOR UNIT TO THE FUSED DISCONNECT SWITCH, THEY MUST BE OF THE SAME SIZE (AMPACITY) AS THE SUPPLY CONDUCTORS TO THE OUTDOOR UNIT.
4. USED IN MODELS 846 - 30, 40, 50, 60, & 70.

WIRING DIAGRAM 208-230/1/60
SPLIT SYSTEM HEAT PUMPS 846 SERIES

ClimateMaster
P.O. Box 25788
Oklahoma City, OK 73125

DAE: E-157E
DATE: 3 - 14 - 00
DWN BY: HWN




NOTES:

1. SEE UNIT RATING PLATE FOR ELECTRICAL RATINGS.
2. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH N.E.C. NFPA NO. 70, LATEST EDITION, AND ALL APPLICABLE STATE AND LOCAL CODES.
3. WHEN THESE CONDUCTORS EXCEED 25 FT. IN LENGTH, FROM THE OUTDOOR UNIT TO THE FUSED DISCONNECT SWITCH, THEY MUST BE OF THE SAME SIZE (AMPACITY) AS THE SUPPLY CONDUCTORS TO THE OUTDOOR UNIT.

| | | |
|---|---|---|
| 846 SERIES | WIRING DIAGRAM 208-230/3/60 | DAE: CM168C |
| ClimateMaster | | DATE: 3 - 14 - 90 |
| | | DWN BY: HWN |