SHORE
DISTRIBUTORS

SHORE DISTRIBUTORS GEOTHERMAL DIAGNOSTIC FORM
(PLEASE TEST IN HEAT, WITH DOMESTIC HOT WATER TURN OFF)
Allow approx. 15 minutes (Run Time) before getting temperatures and pressures to allow a "Steady State" condition.

Formula Basics

Q (BTUH) = dt x GPM x Fluid Factor for HE (Heat Extraction)
HR (Heat Rejection)

dt or Delta T: Temperature Difference between Entering and Leaving Water-> EWT – LWT = dt

GPM (dp = Pressure Differential between EWT and LWT – dp converts to GPM using pressure drop table for each unit at the correct EWT) -> EWP – LWP = dp

Fluid Factor is the ability of a solution to transfer heat in a certain period of time. Water is 500 and Antifreeze is 485 in calculations.

Note: If a unit is operating 90% of its output in Btu's nothing needs to be done.

Heat of Extraction (BTUh) or Heating is:
____ Btuh = Flow (GPM) x (°F in - °F out) x Fluid Factor 500 or 485

Heat of Rejection (BTUh) or Cooling is:
____ Btuh = Flow (GPM) x (°F in - °F out) x Fluid Factor 500 or 485

Always use the unit performance chart to convert psi to gpm and other factor to understand its operation standard under certain conditions.

Always make sure unit has the Hot water generator (Desuperheater) is off before checking unit performance. Failure to do this will show a underperforming unit by calculations.

Measuring Superheat: Take temperature reading at #6 and Suction pressure. Formula is as followed:

Suction Pressure convert to Sat. temperature – reading at #6 = _____Superheat

Measuring Subcooling: Take temperature reading at #9LT1 (Cooling) or in the heat mode at #9LT2 (Heating) with discharge pressure converts to temperature. Formula is as followed:

Discharge Pressure convert to Sat. temperature – reading at #9 = ____Subcooling.

BASIC DESIGN RULES:

Well Water Requirements
-EWT > 55°F – 1.5 GPM/Ton
-EWT < 50°F – 2.0 GPM/Ton
Example:
(EWT 50°F 3 ton unit @ 2 GPM = 6 GPM required
-Water Well Capacity (max. GPM) should be verified before application
-Water Quality should be verified before application (compare results to Standards as published in IOM)
*Never use Galvanized or Steel fittings in ground due to their tendency to corrode.
*P/T plugs should be used so that flow can be measured using the pressure drop of unit heat exchanger.
Ground Loop Heat Pump Applications
Earth loop temperatures can range between 25 and 110°F. Flow rates between 2.25 and 3gpm per ton of cooling capacity is recommended in these applications. Antifreeze protection is according to the area. Freeze protection should be maintained to 15°F below the lowest expected entering loop temperature. Example: if 30°F is the minimum expected entering loop temperature, the leaving loop temperature would be 25 to 22°F and the freeze protection should be at 15°F
DHW Tank is used make sure the elements are set for 100°F or lower.
Adjust HWG piping valves until apx. 5 - 10°F rise between HWG Water In/ Water Out is achieved. (This will yield approximately 0.4 gpm/ton flow rate).
Well type: □ Pump and Dump □ Close Loop ____ psig (*Best results are20 - 25psig)*
Readings are taken where the numbers indicate on drawing.

DO NOT FORGET TO TURN THE DOMESTIC HOT WATER BACK ON!

SHORE DISTRIBUTORS

GEOTHERMAL heating & cooling

GEOTHERMAL COMFORT SYSTEMS

410-749-3121

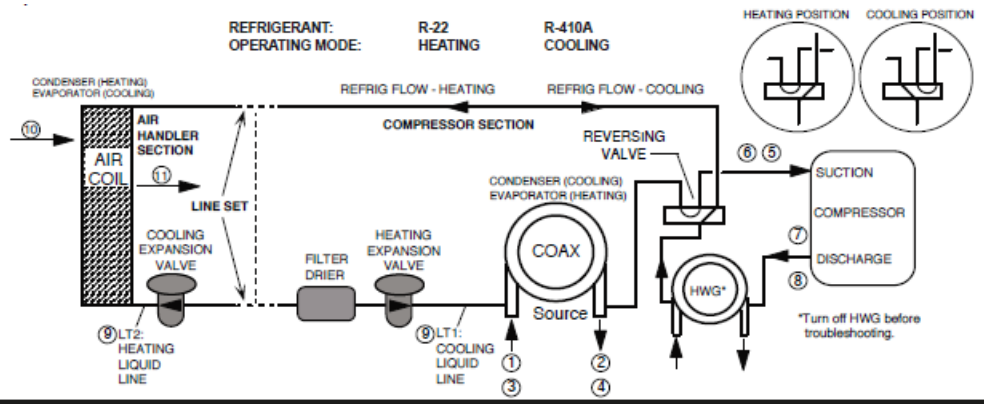
Dealer Name: _____ Date: _____

Technician Name: _____ Technician Number: _____

Job Name: _____ Job Address: _____

Loop Type: _____ Antifreeze Type & % _____

Problem: _____



	Description	Heating	Cooling	Notes
	Water Side Analysis			
1	Water In Temp.			
2	Water Out Temp.			Temp. Diff. =
3	Water In Pressure			
4	Water Out Pressure			
4a	Pressure Drop			
4b	GPM			

Heat of Extraction (Absorption) or Heat of Rejection:

HE or HR (Btuh) = _____ **Enter HE or HR:** _____

_____ **Flow Rate (GPM) x** _____ **Temp. Diff (deg F) x** _____ **Fluid Factor**

Fluid Factor:
500 (Water); 485 (Antifreeze)

	Refrigerant Analysis			
5	Suction Temp.			
6	Suction Pressure			
6a	Saturation Temp.			
6b	Superheat			
7	Discharge Temp.			
8	Discharge Pressure			
8a	Saturation Temp.			
8b	Subcooling			
9	Liquid Line Temp			
10	Return Air Temp.			
11	Supply Air Temp.			Temp. Diff. =
	Voltage			
	Compress Amps			

Line Set Size ___Suction in. Dia. ____ Liquid _____ in. Dia. Line set length _____Ft.