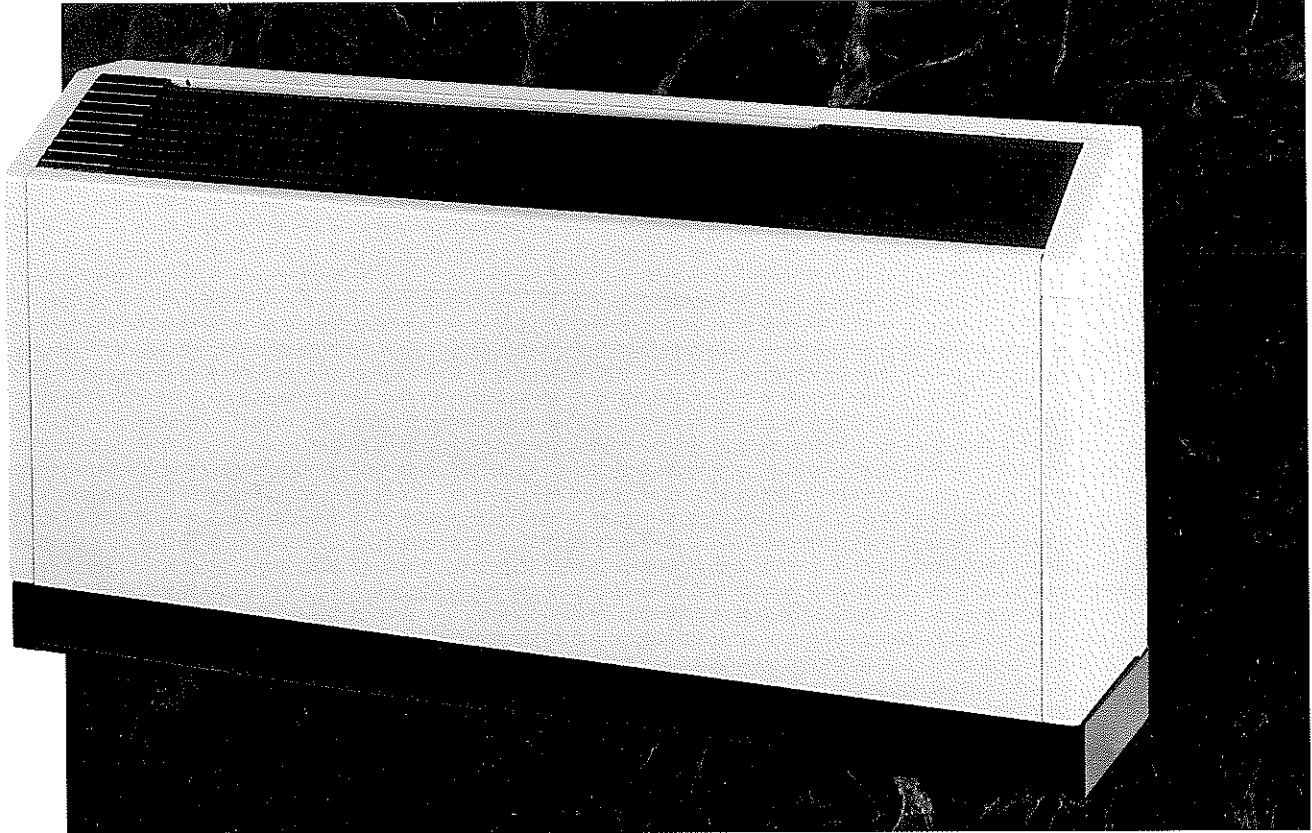


CONSOLE HEAT PUMP

CS / CL Catalog



W a t e r S o u r c e H e a t P u m p s

ClimateMaster®

Quality Heat Pumps Built For Life



ClimateMaster's state-of-the-art facility reflects the company's commitment to its customers, employees and products. More than a quarter of a million square feet is home to the hundreds of dedicated employees who design, build and market ClimateMaster heat pumps for use around the world. This is the largest facility in the world dedicated to the manufacture of water source heat pump products.

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ClimateMaster works continually to improve its products. As a result, the design and specifications of each product at the time of order may be changed without notice and may not be as described herein. Please contact ClimateMaster's Customer Service Department at 1-405-745-6000 for specific information on the current design and specifications. Statements and other information contained herein are not express warranties and do not form the basis of any bargain between the parties, but are merely ClimateMaster's opinion or commendation of its products.

Built For Life . . .

When ClimateMaster says "Quality Heat Pumps Built for Life", we are acknowledging that it is not enough just to manufacture equipment that works. The ClimateMaster philosophy integrates superior standards in engineering and manufacturing with an awareness of the lifestyle integrity of the end user.

ClimateMaster manufactures premium quality heating and cooling systems for the health and comfort of people.

At ClimateMaster, we're building heat pumps for life...for the life of buildings and the *lifestyle of the people who use them.*

For more than forty years, ClimateMaster has met air comfort needs by designing and building quality heat pump systems for a wide range of applications in many of the world's most prestigious buildings. Buildings like the Columbia Seafirst Center in Seattle, Ontario Place in Chicago, Tower City in Cleveland, and others around the world. To millions of people who use our equipment every day, the ClimateMaster name stands for quality and reliability. They know our heat pumps don't just heat and cool air, but actually provide an optimum air quality environment for people, whatever their activity.

ClimateMaster is the world leader in the production of water source heat pumps, manufacturing a complete line of quality-constructed units for a variety of commercial, industrial, and residential applications.



ClimateMaster offers more configurations than any other water source heat pump manufacturer. That is why ClimateMaster supplies more water source heat pumps for new construction and remodeling than anyone else.

Since the early 1950's, ClimateMaster has been the world's leading innovator in water source heat pump technology, for both ground source and closed-loop systems. We have transformed a simple, common sense concept into one of the finest heating and cooling systems available anywhere. By focusing special attention to advanced product design, solid construction and installation flexibility, ClimateMaster systems are capable of satisfying even the most unique and demanding heating and cooling requirements.



Today, ClimateMaster products are manufactured in a factory spanning over a quarter of a million square feet. Built in 1987, this state-of-the-art facility incorporates technologically advanced manufacturing equipment with a factory design that encourages efficiency and quality.

Employing over 100 quality control check points from start to finish, ClimateMaster builds heat pumps which meet the consistently high standards our customers have come to rely on.

No matter what your construction needs - new or remodel - when you select ClimateMaster, you will enjoy the confidence that comes from knowing you have selected...

***QUALITY HEAT PUMPS
BUILT FOR LIFE!***

A Simply Efficient System

For the design of an ideal heating and cooling system that offers individual zone control, recovers and utilizes excess heat for space conditioning or alternative uses and serves multi-tenant needs simply and efficiently, the ClimateMaster water source heat pump system is the right choice.

The closed-loop water source heat pump system is simple by design, and yet it is among the most efficient HVAC systems available today. **The primary concept is to take advantage of the heating and cooling requirements of each space in the**

entire building by recovering otherwise wasted energy in some spaces and utilizing it where needed elsewhere in the system.

The system is comprised of highly efficient packaged reverse cycle heat pump units interconnected by way of a water loop. Each unit satisfies the

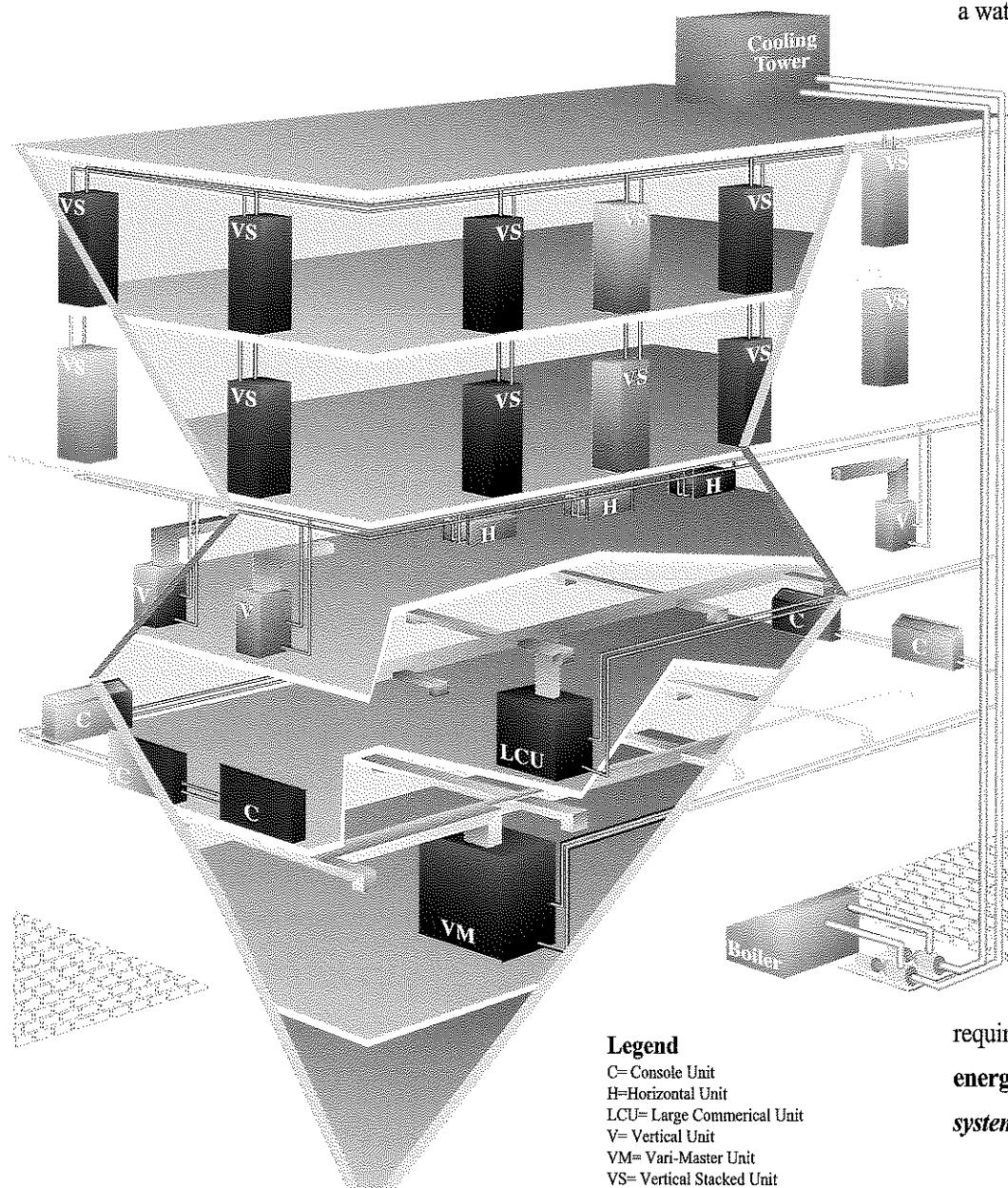
air comfort requirements of the particular zone in which it is installed. When heat is required, the heat pump removes heat from the water loop via the unit's specially designed refrigerant-to-water coaxial heat exchanger and transfers it to the air in the space.

When in the cooling mode, the unit removes heat from the air in the zone and transfers it back into the water loop through the coaxial heat exchanger.

The circulation of water in the closed-loop moves heat energy from zone to zone for use where needed.

Since zones have different cooling and heating

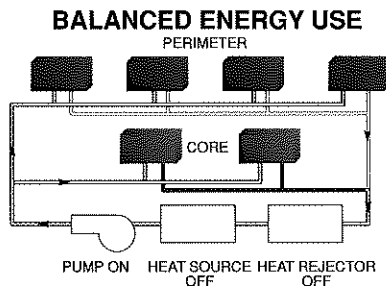
requirements, **the system balances energy use based on the entire system's needs.**



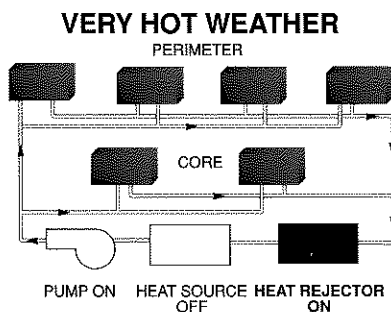
Legend

C= Console Unit
H=Horizontal Unit
LCU= Large Commercial Unit
V= Vertical Unit
VM= Vari-Master Unit
VS= Vertical Stacked Unit

During certain times of the year, the constantly changing combination of units in the heating and cooling operating modes may actually balance the system so that no additional heat injection or rejection is required to maintain the water loop at satisfactory operating temperatures.

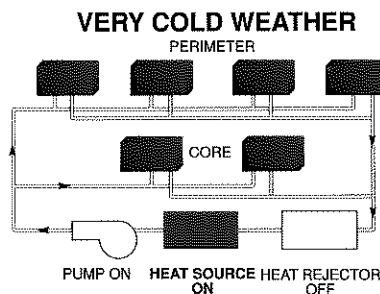


In very hot weather, when most of the system's individual units are operating in the cooling mode, more heat is extracted from the building and added to the water loop than is being utilized in other zones. This requires the rejection of heat from the system by way of a heat rejector



(most often a cooling tower) which is attached to the loop.

When the weather is very cold, most of the units are operating in the heating mode and the system requires more heat than is being placed in the loop by the other units. It then becomes necessary to add heat to the loop by way of a heat source (usually an energy efficient boiler).



Unlike other systems, at no time are the boiler and cooling towers operating simultaneously. Understandably, this total system operating concept is more efficient than other conventional systems.

One of the most important reasons for selecting a quality heat pump system includes the ability to easily and effectively meter the energy usage of individual zones or rooms. Any combination of spaces, large and small, can enjoy efficient, individual

heating and cooling control. The ability to monitor individual energy usage can be especially beneficial for any multi-tenant application such as office suites, shopping malls, condominiums, apartments and retirement facilities. As an added feature, the ClimateMaster water source heat pump system allows the option of installing only the units needed as the space is leased, staging the initial system installation expenses, and allowing increased flexibility regarding individual unit selection as the actual space configuration of the facility takes shape.

Since ClimateMaster offers more unit configurations than any other water source heat pump manufacturer in the world, our heat pumps satisfy the widest range of applications, regardless of size, shape or use. This allows the recapture of energy from many different sources within buildings, such as lights, equipment, computers...even people. ***It is this total building energy utilization which distances closed loop water source heat pumps from other systems.***

Applications

The ClimateMaster Console Water Source Heat Pump is ideal for office building, school, hotel/motel, nursing home and hospital applications where it is not desirable to install equipment in a ceiling or in a utility closet.

The Console Unit combines the installation flexibility of a stand alone console unit with the energy efficiency of a water source heat pump without the need to penetrate the outside wall.

The Console Unit is designed for occupant comfort. The unit is exceptionally quiet and provides

individual zone control of heating and air conditioning. Each unit heats and cools based on the demands of room occupants without affecting the comfort of other zones and without the need to heat or cool the entire facility. This means when one unit is shut down for a reason, the rest of the system can continue to operate.

The Console Unit is engineered for installation flexibility. The unit is typically installed on an outside wall either as a stand alone unit, as part of a ground loop system or as a part of a closed loop system (with a

boiler and a cooling tower). The unit may be controlled by the thermostat on the unit control panel, by a wall thermostat or it may be installed in a DDC system with other Water Source Heat Pump Units and controlled by an electronic controller. The CMC-2000 Series Controller is offered standard with all 24-volt units.

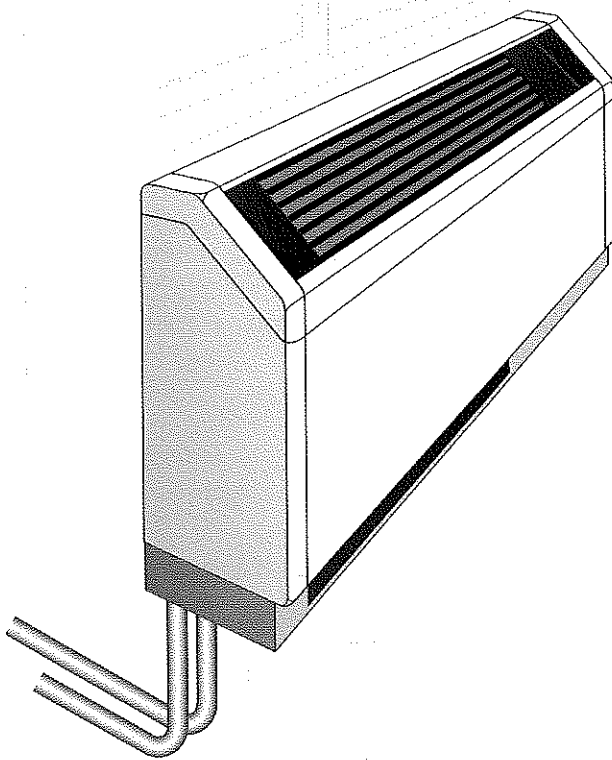
Because the Console Unit may be installed on a stand alone basis it is **an excellent choice for expansion or retrofit applications.**



The Console Unit is easy to install and efficient to operate and maintain. A optional pre-piped subbase is also available.

The unit operates at a broad range

of input water temperature (40°F to 110°F/ 4°C to 43°C) to cut operating costs by reducing the use of coolers or boilers, particularly during changes of season.



Access to the fan motor and to controls is made simple with the easily removable cabinet.

Refrigerant circuit protection is designed to result in fewer service calls. Units are equipped with easily accessible service access ports on both the suction and the discharge refrigerant lines for easy monitoring of refrigerant pressure and environmentally safe refrigerant recovery should service be required.

Durability is a hallmark of the Console Unit. The unit features a heavy duty steel cabinet, with a powder coat finish for extended unit life. Console Units are UL, ARI and CSA listed for owner peace of mind.

Features and Benefits

1 Quiet Operation

The Console Unit provides exceptionally quiet operation for maximum occupant comfort.

2 Modern Trim-Line Styling

The modern, trim-line styling of the cabinet provides eye appeal while it minimizes intrusion into the room. Standard cabinet width is a narrow 10 inches (254 mm). When recessed into the wall the unit is only 8 1/2 inches (216 mm) from the surface of the wall. The sloped top cabinet discourages clutter which may cause air blockage or spill damage to the unit.

3 Factory Assembly

The Console Unit arrives at the job site fully assembled to minimize installation time and reduce installation cost.

4 Convenient Access to Piping and Electrical Connections

The Console Unit is designed with a separate piping and electrical compartment in the cabinet for quick access to piping and electrical systems.

5 Pre-Piped Subbase

The Console Unit can be equipped with an optional pre-piped subbase for rapid installation and reduced installation cost.

6 Unit Refrigerant Circuit Protection

The *High Pressure Cut-Out* and *Thermal Overload Cut-Out* turns the compressor off in case of excessive entering water temperature or no water flow during the cooling cycle. The *Low Temperature Cut-Out* guards against water freezing due to low entering water temperature or no flow during the heating cycle. The *Lock-Out Relay* protects the unit from short-cycling if any safety controls turn the unit off. A *Loss of Charge Sensor* protects the compressor in the event of a refrigeration leak. Safety controls may be re-set at the thermostat

7 CMC-2000 Electronic Control System

The CMC-2000 Electronic System is standard on Console Units with 24 Volt controls and optional on all other units. The CMC-2000 Control Series is designed to enhance system performance. Units may be provided with RS-485 communication capability for DDC control. RS-485 capability is field upgradeable. ClimateMaster will also work with other DDC board manufacturers to factory-mount other controllers upon request.

8 Easy Access to Controls

The Control Box swings down to allow easy access for testing and service.

9 Factory Installed Valves

Optional factory installed shut-off valves can be secured within the cabinet. These valves simplify installation and maintenance without detracting from the appearance of the unit or from system security.

10 Extended Range for Increased Efficiency

CS units may be used with an entering loop water temperature range of 60°F to 95°F (15°C to 35°C). CL units are designed for use with an entering loop water temperature of 40°F to 110°F (4° to 43°C). These units, may reduce operation of the boiler through more efficient heat transfer and use of recovered energy.

11 Easy Access to Fan Motor

The fan section slides out for easy maintenance or service of the fan motor.

12 Service Access Ports on Refrigerant Circuit

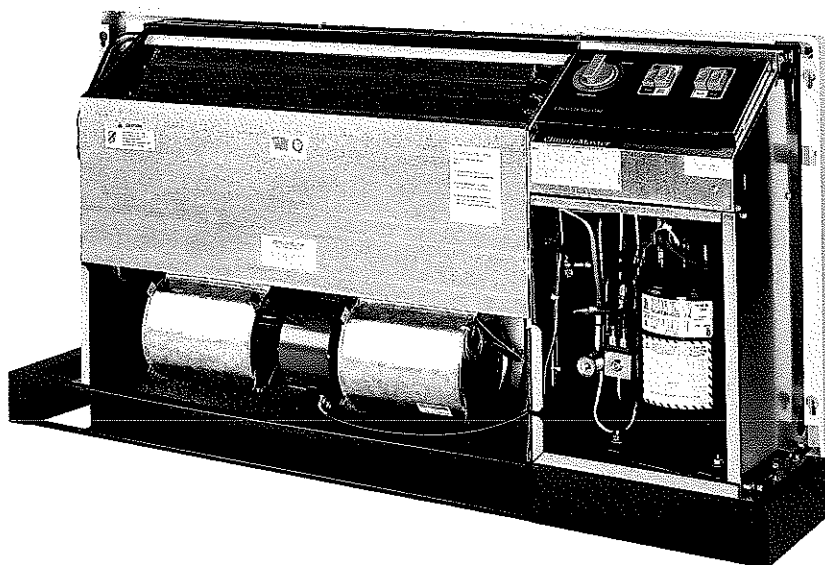
Console Units are equipped with easily accessible service access ports on both the suction and the discharge refrigerant lines allowing for easy monitoring of refrigerant pressure. These ports assure environmentally safe refrigerant recovery should service be required.

13 Control Panel

Addresses the "Americans with Disabilities Act"(ADA). Offers the ultimate in push-button operation and for total comfort, the rotary temperature control knob offers precise temperature control. Functions are identified by the International symbols and are marked in braille to assist the seeing impaired. Easy to use large control buttons stand-up to years of use. Since the buttons and knob cannot be easily removed, the controls are virtually tamper proof.

14 UL, ARI and CSA Listing

ClimateMaster units are UL, ARI and CSA listed for contractor and owner confidence.



For Optional Features and Accessories, See Page 20.

Selection Procedure

Unit Model Number Designation

CS = Console Standard Operating Range / CC = Cooling Only

CL = Console Low Operating Range / CO = Cooling only

Glossary of Terms

CFM	= Cubic Feet Per Minute
BTUH	= British Thermal Unit Per Hour
EER	= Energy Efficiency Rating
COP	= Coefficient of Performance
T	= Total
S	= Sensible
GPM	= Gallons Per Minute
LWT	= Leaving Water Temperature
WB	= Wet Bulb
DB	= Dry Bulb
EWT	= Entering Water Temperature
PD	= Pressure Drop
EAT	= Entering Air Temperature

Selection Procedure

- Step 1. Determine the actual heating and cooling loads for the space in question at the desired dry bulb and wet bulb conditions.
- Step 2. Obtain the following design parameters: Entering water temperature, water flow rate in GPM, air flow in CFM, water flow pressure drop and design wet and dry bulb temperatures. Air flow CFM should be between 300 and 450CFM per ton. Unit water pressure drops should be kept as close as possible to each other to make water balancing easier. Go to the appropriate tables and find the proper indicated water flow and water temperature.
- Step 3. Select a unit based on total and sensible cooling at ARI conditions. Select a unit which is closest to, but no larger than, the actual load.
- Step 4. Enter tables at the design water flow and water temperature. Read the total and sensible cooling capacities. (Note interpolation is permissible, extrapolation is not).
- Step 5. Read the heating capacity. If it exceeds the design criteria it is acceptable. It is quite normal for water source heat pumps to be selected on cooling capacity only since the heating capacity is always greater than the cooling capacity.
- Step 6. Determine the correction factors associated with the variable factors of dry bulb and wet bulb.
Corrected Total Cooling = tabulated total cooling x wet bulb correction.
Corrected Sensible Cooling = tabulated sensible cooling x wet/dry bulb correction.
- Step 7. Compare the corrected capacities to the load requirements. Normally if the capacities are within 10% of the loads, the equipment is acceptable. It is better to undersize than oversize, as undersizing improves humidity control, reduces sound levels and extends the life of the equipment.
- Step 8. If the units selected are not within 10% of the load calculations, then review what affect changing the GPM, water temperature and/or air flow and air temperature would have on the corrected capacities. If the desired capacity cannot be achieved, select the next larger or smaller unit and repeat the procedure. Remember, when in doubt, undersize slightly for best performance.

ARI Conditions

Ratings @ ARI Conditions

Model Number	Nominal CFM	Cooling (EAT=80/67, EWT=85)				Heating (EAT=70, EWT=70)			Pressure Drop	
		Total BTUH	EER	Input Watts	LWT Deg. F.	Total BTUH	COP	Input Watts	GPM	Ft. H ₂ O
CS/CL 007	275	6800	12.8	531	95.0	8600	4.6	548	1.7	2.3
CS/CL 009	275	9000	12.1	744	95.0	11600	4.3	791	2.3	4.2
CS/CL 012	350	11800	12.8	922	95.0	14000	3.9	1052	3.0	9.4
CS/CL 015	395	15000	12.5	1200	95.0	17100	4.1	1222	3.8	3.0
CS/CL 019	395	17600	12.0	1467	95.0	21000	3.8	1620	4.5	4.2

50 Hertz Correction Factors

Cooling (EAT=80/67, EWT=85)				Heating (EAT=70, EWT=70)		
TOTAL	SENSIBLE	KW	HEAT OF REJECTION	TOTAL	KW	HEAT OF ABSORPTION
.90	.94	.85	.89	.90	.85	.92

Selection Example

The following is an example of an appropriate unit selection.

For Cooling:

Assume we have determined that the appropriate cooling load at the desired dry bulb 75°F and wet bulb 64°F conditions is as follows:

Total Cooling 11500 BTUH
 Sensible Cooling 7245 BTUH
 Entering Air Temp 75°F Dry Bulb / 64°F Wet Bulb

Similarly, we have also obtained the following design parameters:

Entering Water Temp 90°F
 GPM = 3.0
 CFM = 350

After making our preliminary selection with a CS 12, we enter the tables at design water flow and water temperature and read Total Cooling and Sensible Cooling capacities:

Total Cooling 11426 BTUH
 Sensible Cooling 7902 BTUH

Next, we determine our correction factors.

Corrected Total Cooling = 11426 x .955 = 10912 BTUH

Corrected Sensible Cooling = 7902 x .881 = 6962 BTUH

Actual Temperature Rise =

$$14536 \times .948 = \frac{13780}{500 \times 3} = 9.18 + 90^\circ \text{ EWT} = 99.18^\circ \text{ LWT}$$

When we compare the *Corrected Total Cooling* and *Corrected Sensible Cooling* figures with our load requirements stated in Step 1, we discover that our selection is well within +10% of our actual load requirement. Furthermore, we see that our *Corrected Total Cooling* figure is actually undersized as recommended, when compared to the actual indicated load.

Performance Data

CS/CL Console 007

Rated Air Flow 275 CFM

Shaded areas represent CL units only.

CS - Water temperature range is 60°F - 95°F

CL - Water temperature range is 40°F - 110°F

		Cooling Performance - EAT 80/67°F (EER = 12.8)				Heating Performance - EAT 70°F (COP = 4.6)			UNIT WATER PRESSURE DROP
GPM	EWT °F	TOTAL BTUH	SENSIBLE BTUH	HEAT OF REJECTION BTUH	POWER INPUT WATTS	TOTAL BTUH	HEAT OF ABSORPTION BTUH	POWER INPUT WATTS	
1.0	40	8512	6299	10621	448	OPERATION NOT RECOMMENDED			0.8
1.5	40	8676	6420	10824	430				1.8
1.7	40	8742	6496	10906	406				2.3
2.5	40	9005	6664	11231	390				5.0
1.0	50	8080	5980	10086	462	6074	4616	477	0.8
1.5	50	8245	6101	10290	446	6367	4901	481	1.8
1.7	50	8310	6150	10371	418	6484	5044	474	2.3
2.5	50	8573	6344	10697	405	6953	5410	508	5.0
1.0	60	7649	5660	9552	485	7132	5659	488	0.8
1.5	60	7813	5782	9755	465	7425	5913	502	1.8
1.7	60	7879	5830	9837	438	7542	6017	506	2.3
2.5	60	8142	6025	10162	428	8011	6404	534	5.0
1.0	70	7217	5341	9017	540	8190	6558	542	0.8
1.5	70	7381	5462	9221	524	8483	6834	549	1.8
1.7	70	7447	5511	9302	500	8600	6958	548	2.3
2.5	70	7710	5705	9628	494	9069	7366	569	5.0
1.0	85	6570	4862	8215	562	9777	7957	609	0.8
1.5	85	6734	4938	8419	545	10070	8253	610	1.8
1.7	85	6800	5032	8500	531	10188	8389	605	2.3
2.5	85	7063	5226	8826	518	10657	8802	625	5.0
1.0	90	6354	4702	7948	563	OPERATION NOT RECOMMENDED			0.8
1.5	90	6518	4824	8152	543				1.8
1.7	90	6584	4872	8233	533				2.3
2.5	90	6847	5067	8559	549				5.0
1.0	95	6138	4542	7681	558	OPERATION NOT RECOMMENDED			0.8
1.5	95	6303	4664	7884	544				1.8
1.7	95	6368	4713	7966	540				2.3
2.5	95	6631	4907	8291	557				5.0
1.0	100	5922	4383	7414	520	OPERATION NOT RECOMMENDED			0.8
1.5	100	6087	4504	7617	516				1.8
1.7	100	6152	4553	7698	517				2.3
2.5	100	6415	4747	8024	534				5.0
1.0	110	OPERATION NOT RECOMMENDED				OPERATION NOT RECOMMENDED			2.3
1.5	110								
1.7	110								
2.5	110								

Interpolation is permissible. Extrapolation is not.

Correction Factors

For Variations In Entering Air Temperature

Cooling Corrections								Heating Corrections			
Entering Air °F WB	Total Cooling Capacity	Sensible Cooling Capacity Entering Dry Bulb					Heat of Rejection	Entering Air °F DB	Heating Capacity	Heat of Absorption	Power Input Watts
		70° DB	75° DB	80° DB	85° DB	90° DB					
61	0.910	0.763	1.030	*	*	*	0.893	60	1.025	1.047	0.965
64	0.955	0.615	0.881	*	*	*	0.948	65	1.010	1.023	0.990
67	1.000	0.466	0.733	1.000	*	*	1.000	70	0.995	1.00	1.015
70	1.045	*	0.585	0.852	1.118	*	1.052	75	0.980	0.977	1.040
73	1.090	*	0.436	0.703	0.970	1.234	1.111	80	0.965	0.953	1.065

For Variations In Entering Air Flow

Cooling Corrections					Heating Corrections		
CFM	Total Cooling Capacity	Sensible Cooling Capacity	Heat of Rejection	Power Input Watts	Heating Capacity	Heat of Absorption	Power Input Watts
350	0.986	0.983	0.986	0.969	0.986	0.988	1.017
395	1.000	1.000	1.000	1.000	1.000	1.000	1.000

CS/CL Console 009

Rated Air Flow 275 CFM

Shaded areas represent CL units only.

CS - Water temperature range is 60°F - 95°F

CL - Water temperature range is 40°F - 110°F

GPM	EWT °F	Cooling Performance - EAT 80/67°F (EER = 12.1)				Heating Performance - EAT 70°F (COP = 4.3)			UNIT WATER PRESSURE DROP
		TOTAL BTUH	SENSIBLE BTUH	HEAT OF REJECTION BTUH	POWER INPUT WATTS	TOTAL BTUH	HEAT OF ABSORPTION BTUH	POWER INPUT WATTS	
1.0	40	11137	8248	14179	625	OPERATION NOT RECOMMENDED			0.8
1.7	40	11371	8421	14471	600				2.3
2.3	40	11571	8569	14722	573				4.3
3.0	40	11804	8741	15015	545				7.2
1.0	50	10566	7825	13463	645	7960	5904	669	0.8
1.7	50	10800	7998	13755	623	8383	6307	678	2.3
2.3	50	11000	8146	14006	590	8746	6655	684	4.3
3.0	50	11233	8319	14299	565	9169	6980	717	7.2
1.0	60	9995	7402	12747	676	9387	7300	687	0.8
1.7	60	10228	7575	13039	649	9810	7659	709	2.3
2.3	60	10428	7723	13290	619	10173	7958	731	4.3
3.0	60	10662	7896	13583	598	10597	8307	755	7.2
1.0	70	9424	6980	12031	754	10814	8494	766	0.8
1.7	70	9657	7153	12323	732	11237	8885	778	2.3
2.3	70	9857	7301	12574	707	11600	9215	791	4.3
3.0	70	10091	7473	12867	691	12024	9591	807	7.2
1.0	85	8567	6346	10956	784	12955	10356	863	0.8
1.7	85	8800	6518	11249	762	13378	10776	867	2.3
2.3	85	9000	6667	11500	744	13741	11126	873	4.3
3.0	85	9234	6839	11792	723	14164	11507	888	7.2
1.0	90	8281	6134	10598	785	OPERATION NOT RECOMMENDED			0.8
1.7	90	8515	6307	10891	758				2.3
2.3	90	8715	6455	11142	754				4.3
3.0	90	8948	6628	11434	767				7.2
1.0	95	7996	5923	10240	777	OPERATION NOT RECOMMENDED			0.8
1.7	95	8229	6096	10533	759				2.3
2.3	95	8429	6244	10784	764				4.3
3.0	95	8663	6417	11076	778				7.2
1.0	100	7710	5712	9882	724	OPERATION NOT RECOMMENDED			0.8
1.7	100	7943	5884	10175	720				2.3
2.3	100	8144	6032	10426	731				4.3
3.0	100	8377	6205	10718	746				7.2
1.0	110	OPERATION NOT RECOMMENDED				OPERATION NOT RECOMMENDED			4.3
1.7	110								
2.3	110								
3.0	110								

Interpolation is permissible. Extrapolation is not.

Correction Factors

For Variations In Entering Air Temperature

Entering Air °F WB	Cooling Corrections							Heating Corrections			
	Total Cooling Capacity	Sensible Cooling Capacity Entering Dry Bulb					Heat of Rejection	Entering Air °F DB	Heating Capacity	Heat of Absorption	Power Input Watts
		70° DB	75° DB	80° DB	85° DB	90° DB					
61	0.910	0.763	1.030	*	*	*	0.893	60	1.025	1.047	0.965
64	0.955	0.615	0.881	*	*	*	0.948	65	1.010	1.023	0.990
67	1.000	0.466	0.733	1.000	*	*	1.000	70	0.995	1.00	1.015
70	1.045	*	0.585	0.852	1.118	*	1.052	75	0.980	0.977	1.040
73	1.090	*	0.436	0.703	0.970	1.234	1.111	80	0.965	0.953	1.065

For Variations In Entering Air Flow

CFM	Cooling Corrections				Heating Corrections		
	Total Cooling Capacity	Sensible Cooling Capacity	Heat of Rejection	Power Input Watts	Heating Capacity	Heat of Absorption	Power Input Watts
350	0.986	0.983	0.986	0.969	0.986	0.988	1.017
395	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Performance Data

CS/CL Console 012

Rated Air Flow 350 CFM

Shaded areas represent CL units only.

CS - Water temperature range is 60°F - 95°F

CL - Water temperature range is 40°F - 110°F

GPM	EWT °F	Cooling Performance - EAT 80/67°F (EER = 12.8)				Heating Performance - EAT 70°F (COP = 3.9)			UNIT WATER PRESSURE DROP
		TOTAL BTUH	SENSIBLE BTUH	HEAT OF REJECTION BTUH	POWER INPUT WATTS	TOTAL BTUH	HEAT OF ABSORPTION BTUH	POWER INPUT WATTS	
1.5	40	14649	10126	18530	775	OPERATION NOT RECOMMENDED			2.3
2.3	40	14927	10318	18874	743				5.5
3.0	40	15170	10485	19175	708				9.7
4.0	40	15517	10725	19605	676				16.7
						9412	6602	906	
1.5	50	13901	9609	17602	800	9688	6910	898	2.3
2.3	50	14178	9801	17946	772	10150	7358	905	5.5
3.0	50	14421	9969	18247	729	10555	7751	911	9.7
4.0	50	14768	10208	18677	701	11134	8180	960	16.6
1.5	60	13152	9093	16672	839	11410	8589	921	2.3
2.3	60	13429	9284	17018	804	11873	8978	946	5.5
3.0	60	13672	9452	17319	766	12278	9305	972	9.7
4.0	60	14020	9691	17749	742	12856	9768	1011	16.6
1.5	70	12403	8576	15747	935	13132	9999	1026	2.3
2.3	70	12680	8767	16091	907	13595	10430	1038	5.5
3.0	70	12923	8935	16392	874	14000	10797	1052	9.7
4.0	70	13271	9175	16822	857	14579	11297	1079	16.6
1.5	85	11279	7801	14355	973	15716	12208	1154	2.3
2.3	85	11557	7992	14699	943	16179	12676	1156	5.5
3.0	85	11800	8160	15000	922	16584	13070	1161	9.7
4.0	85	12147	8400	15415	897	17162	13577	1187	16.6
1.5	90	10905	7542	13891	975				2.3
2.3	90	11183	7734	14235	939				5.5
3.0	90	11426	7902	14536	932				9.7
4.0	90	11773	8141	14966	952				16.6
1.5	95	10530	7284	13427	965				2.3
2.3	95	10808	7467	13772	941				5.5
3.0	95	11051	7643	14073	945				9.7
4.0	95	11398	7883	14503	966				16.6
1.5	100	10156	7026	12964	899				2.3
2.3	100	10434	7217	13308	892				5.5
3.0	100	10677	7385	13609	904				9.7
4.0	100	11024	7624	14039	925				16.6
1.5	110	OPERATION NOT RECOMMENDED							
2.3	110								
3.0	110	9928	6868	12681	894				9.7
4.0	110	10275	7108	13111	926				16.6

Interpolation is permissible. Extrapolation is not.

Correction Factors

For Variations In Entering Air Temperature

		Cooling Corrections					Heating Corrections				
Entering Air °F WB	Total Cooling Capacity	Sensible Cooling Capacity Entering Dry Bulb					Heat of Rejection	Entering Air °F DB	Heating Capacity	Heat of Absorption	Power Input Watts
		70° DB	75° DB	80° DB	85° DB	90° DB					
61	0.910	0.763	1.030	*	*	*	0.893	60	1.025	1.047	0.965
64	0.955	0.615	0.881	*	*	*	0.948	65	1.010	1.023	0.990
67	1.000	0.466	0.733	1.000	*	*	1.000	70	0.995	1.00	1.015
70	1.045	*	0.585	0.852	1.118	*	1.052	75	0.980	0.977	1.040
73	1.090	*	0.436	0.703	0.970	1.234	1.111	80	0.965	0.953	1.065

For Variations In Entering Air Flow

CFM	Cooling Corrections				Heating Corrections		
	Total Cooling Capacity	Sensible Cooling Capacity	Heat of Rejection	Power Input Watts	Heating Capacity	Heat of Absorption	Power Input Watts
310	0.986	0.983	0.986	0.969	0.986	0.988	1.017
350	1.000	1.000	1.000	1.000	1.000	1.000	1.000

CS/CL Console 015

Rated Air Flow 395 CFM

Shaded areas represent CL units only.

CS - Water temperature range is 60°F - 95°F

CL - Water temperature range is 40°F - 110°F

		Cooling Performance - EAT 80/67°F (EER = 12.5)				Heating Performance - EAT 70°F (COP = 4.1)			UNIT WATER PRESSURE DROP
GPM	EWT °F	TOTAL BTUH	SENSIBLE BTUH	HEAT OF REJECTION BTUH	POWER INPUT WATTS	TOTAL BTUH	HEAT OF ABSORPTION BTUH	POWER INPUT WATTS	
1.8	40	18587	13577	23465	1009	OPERATION NOT RECOMMENDED			0.8
2.7	40	18901	13806	23856	966				1.5
3.8	40	19284	14086	24333	924				3.0
4.9	40	19668	14366	24811	880				5.0
1.8	50	17635	12882	22280	1042	11780	8578	1038	1.8
2.7	50	17949	13111	22671	1003	12281	9079	1041	1.5
3.8	50	18332	13391	23148	952	12893	9648	1058	3.0
4.9	50	18716	13671	23626	912	13505	10110	1107	5.0
1.8	60	16683	12187	21095	1092	13884	10632	1066	0.7
2.7	60	16997	12416	21486	1045	14385	11062	1090	1.5
3.8	60	17380	12696	21963	999	14997	11557	1130	3.0
4.9	60	17764	12976	22441	965	15609	12057	1167	5.0
1.8	70	15731	11492	19910	1218	15988	12347	1188	0.7
2.7	70	16045	11721	20300	1179	16488	12853	1198	1.5
3.8	70	16428	12001	20778	1141	17100	13395	1222	3.0
4.9	70	16812	12281	21256	1114	17712	13937	1247	5.0
1.8	85	14303	10450	18132	1267	19143	15098	1318	0.7
2.7	85	14617	10679	18523	1225	19644	15618	1335	1.5
3.8	85	15000	10959	19000	1200	20256	16194	1349	3.0
4.9	85	15384	11239	19478	1167	20868	16742	1372	5.0
1.8	90	13827	10102	17539	1269	OPERATION NOT RECOMMENDED			0.7
2.7	90	14141	10331	17930	1219				1.5
3.8	90	14524	10611	18408	1217				3.0
4.9	90	14908	10891	18885	1238				5.0
1.8	95	13351	9755	16947	1257	OPERATION NOT RECOMMENDED			0.7
2.7	95	13665	9984	17338	1221				1.5
3.8	95	14048	10264	17815	1233				3.0
4.9	95	14432	10544	18293	1256				5.0
1.8	100	12875	9407	16354	1171	OPERATION NOT RECOMMENDED			0.7
2.7	100	13189	9636	16745	1158				1.5
3.8	100	13572	9916	17223	1181				3.0
4.9	100	13956	10197	17700	1203				5.0
1.8	110	OPERATION NOT RECOMMENDED				OPERATION NOT RECOMMENDED			OPERATION NOT RECOMMENDED
2.7	110								
3.8	110								
4.9	110								
1.8	110	12620	9221	16037	1168	OPERATION NOT RECOMMENDED			3.0
4.9	110	13004	9502	16515	1204				5.0

Interpolation is permissible. Extrapolation is not.

Correction Factors

For Variations In Entering Air Temperature

Cooling Corrections								Heating Corrections			
Entering Air °F WB	Total Cooling Capacity	Sensible Cooling Capacity Entering Dry Bulb					Heat of Rejection	Entering Air °F DB	Heating Capacity	Heat of Absorption	Power Input Watts
		70° DB	75° DB	80° DB	85° DB	90° DB					
61	0.910	0.763	1.030	*	*	*	0.893	60	1.025	1.047	0.965
64	0.955	0.615	0.881	*	*	*	0.948	65	1.010	1.023	0.990
67	1.000	0.466	0.733	1.000	*	*	1.000	70	0.995	1.00	1.015
70	1.045	*	0.585	0.852	1.118	*	1.052	75	0.980	0.977	1.040
73	1.090	*	0.436	0.703	0.970	1.234	1.111	80	0.965	0.953	1.065

For Variations In Entering Air Flow

Cooling Corrections					Heating Corrections		
CFM	Total Cooling Capacity	Sensible Cooling Capacity	Heat of Rejection	Power Input Watts	Heating Capacity	Heat of Absorption	Power Input Watts
350	0.986	0.983	0.986	0.969	0.986	0.988	1.017
395	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Performance Data

CS/CL Console 019

Rated Air Flow 395 CFM

Shaded areas represent CL units only.

CS - Water temperature range is 60°F - 95°F

CL - Water temperature range is 40°F - 110°F

		Cooling Performance - EAT 80/67°F (EER = 12.0)				Heating Performance - EAT 70°F (COP = 3.8)			UNIT WATER PRESSURE DROP
GPM	EWT °F	TOTAL BTUH	SENSIBLE BTUH	HEAT OF REJECTION BTUH	POWER INPUT WATTS	TOTAL BTUH	HEAT OF ABSORPTION BTUH	POWER INPUT WATTS	
2.4	40	21949	15405	27963	1236	OPERATION NOT RECOMMENDED			1.2
3.5	40	22307	15656	28412	1182				2.6
4.5	40	22633	15885	28821	1125				4.2
6.3	40	23220	16295	29558	1077				8.3
2.4	50	20830	14622	26557	1276	14229	9862	1360	1.2
3.5	50	21189	14873	27007	1228	14690	10359	1397	2.6
4.5	50	21515	15102	27416	1158	15288	10963	1399	4.2
6.3	50	22101	15512	28153	1116	15833	11508	1402	8.3
2.4	60	19712	13839	25152	1338	16812	12226	1487	1.2
3.5	60	20070	14090	25602	1279	17273	12881	1431	2.6
4.5	60	20396	14319	26012	1215	17872	13390	1462	4.2
6.3	60	20983	14729	26749	1181	18416	13830	1497	8.3
2.4	70	18593	13057	23747	1492	19396	14603	1565	1.2
3.5	70	18952	13308	24198	1442	19857	14983	1592	2.6
4.5	70	19278	13536	24607	1388	20456	15557	1603	4.2
6.3	70	19864	13946	25344	1364	21000	16058	1620	8.6
2.4	85	16915	11882	21640	1552	21980	16890	1670	1.2
3.5	85	17274	12133	22091	1499	23732	18283	1789	2.6
4.5	85	17600	12361	22500	1467	24331	18912	1784	4.2
6.3	85	18186	12772	23237	1429	24875	19453	1788	8.3
2.4	90	16356	11491	20938	1554	25855	20299	1835	1.2
3.5	90	16715	11742	21388	1492				2.6
4.5	90	17041	11970	21798	1479				4.2
6.3	90	17627	12380	22534	1516				8.3
2.4	95	15797	11099	20236	1540				1.2
3.5	95	16155	11350	20686	1495				2.6
4.5	95	16514	11601	21136	1501				4.2
6.3	95	17068	11989	21832	1538				8.3
2.4	100	15238	10708	19533	1434				1.2
3.5	100	15596	10959	19984	1417				2.6
4.5	100	15922	11187	20393	1434				4.2
6.3	100	16509	11598	21130	1473				8.3
2.4	110	OPERATION NOT RECOMMENDED							
3.5	110								
4.5	110	14836	10427	19029	1421				4.2
6.3	110	15390	10815	19725	1473				8.3

Interpolation is permissible. Extrapolation is not.

Correction Factors

For Variations In Entering Air Temperature

Cooling Corrections								Heating Corrections			
Entering Air °F WB	Total Cooling Capacity	Sensible Cooling Capacity Entering Dry Bulb					Heat of Rejection	Entering Air °F DB	Heating Capacity	Heat of Absorption	Power Input Watts
		70° DB	75° DB	80° DB	85° DB	90° DB					
61	0.910	0.763	1.030	*	*	*	0.893	60	1.025	1.047	0.965
64	0.955	0.615	0.881	*	*	*	0.948	65	1.010	1.023	0.990
67	1.000	0.466	0.733	1.000	*	*	1.000	70	0.995	1.00	1.015
70	1.045	*	0.585	0.852	1.118	*	1.052	75	0.980	0.977	1.040
73	1.090	*	0.436	0.703	0.970	1.234	1.111	80	0.965	0.953	1.065

For Variations In Entering Air Flow

Cooling Corrections					Heating Corrections		
CFM	Total Cooling Capacity	Sensible Cooling Capacity	Heat of Rejection	Power Input Watts	Heating Capacity	Heat of Absorption	Power Input Watts
350	0.986	0.983	0.986	0.969	0.986	0.988	1.017
395	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Electrical & Blower Data

CS/CL Console Data Chart

Model Number	Voltages 1 Phase	Heater Watts	Min. CRC Amp.	Max. Fuse	Max. CRKT BRKR CSA	Comp. LRA	Comp. FLA	Blower FLA	Total FLA	Blower HP	Hi Speed CFM	Lo Speed CFM
CS/CL-007	115	0	7.6	15	15	40.0	5.7	.50	6.2	1/20	297	259
	208/230	0	3.7	15	15	18.0	2.7	.33	3.0	1/20	275	240
		2100/ 2500	13.9	15	15	-	-	.33	11.2	1/20	275	240
		2800/ 3400	18.8	20	20	-	-	.33	15.1	1/20	275	240
		0	3.4	15	15	15.0	2.4	.35	2.8	1/20	297	259
	265	2500	12.1	15	15	-	-	.35	2.8	1/20	297	259
		3400	16.4	20	20	-	-	.35	13.2	1/20	297	259
CS/CL-009	115	0	3.5	15	15	44.0	7.4	.50	7.9	1/20	297	259
	208/230	0	6.0	15	15	20	3.8	.33	4.1	1/20	275	240
		2100/2500	13.9	15	15	-	-	.33	11.2	1/20	275	240
		2800/3400	18.8	20	20	-	-	.33	15.1	1/20	275	240
		0	4.5	15	15	18.6	3.3	.35	3.7	1/20	297	259
	265	2500	12.1	15	15	-	-	.35	9.8	1/20	297	259
		3400	16.4	20	20	-	-	.35	13.2	1/20	297	259
CS/CL-012	115	0	14.2	20	20	54.0	9.7	1.28	11.0	1/15	378	335
	208/230	0	6.6	15	15	26.3	4.8	.55	5.4	1/15	350	310
		2100/2500	14.2	15	15	-	-	.55	11.4	1/15	350	310
		2800/3400	19.1	20	20	-	-	.55	15.3	1/15	350	310
		3900/4800	26.7	30	30	-	-	.55	21.4	1/15	350	310
	265	0	6.0	15	15	28.0	4.2	.50	4.7	1/15	378	335
		2500	12.3	15	15	-	-	.50	9.9	1/15	378	335
CS/CL-015	208/230	0	9.4	15	15	38.0	6.4	.55	7.0	1/15	395	350
		2100/2500	14.2	15	15	-	-	.55	11.4	1/15	395	350
		2800/3400	19.1	20	20	-	-	.55	15.3	1/15	395	350
		3900/4800	26.7	30	30	-	-	.55	21.4	1/15	395	350
	265	0	7.4	15	15	32.0	5.4	.50	5.9	1/15	427	378
		2500	12.3	15	15	-	-	.50	9.9	1/15	427	378
		3400	16.5	20	20	-	-	.50	13.3	1/15	427	378
CS/CL-019	208/230	0	10.9	15	15	45.0	7.6	.55	8.2	1/15	395	350
		2100/2500	14.2	15	15	-	-	.55	11.4	1/15	395	350
		2800/3400	19.1	20	20	-	-	.55	15.3	1/15	395	350
		3900/4800	26.7	30	30	-	-	.55	21.4	1/15	395	350
	265	0	8.5	15	15	32.0	6.3	.50	6.8	1/15	427	378
		2500	12.3	15	15	-	-	.50	9.9	1/15	427	378
		3400	16.5	20	20	-	-	.50	12.5	1/15	427	378
		4800	23.2	30	30	-	-	.50	18.6	1/15	427	378

Physical Characteristics

General CS/CL Console Unit Data

PHYSICAL CHARACTERISTICS	CS/CL-007	CS/CL-009	CS/CL-012	CS/CL-015	CS/CL-019
Blower:					
Motor Horsepower	1/20	1/20	1/15	1/15	1/15
Wheel Size (D" x W") in. (2 each)	5 1/4 x 6 1/4	5 1/4 x 6 1/4	5 1/4 x 6 1/4	5 1/4 x 6 1/4	5 1/4 x 6 1/4
FILTER SIZE	8x29 1/2x3/8	8x29 1/2x3/8	8x29 1/2x3/8	8x29 1/2x3/8	8x29 1/2x3/8
UNIT WEIGHT (Lbs):					
Shipping	158	162	172	178	183
Operating	151	154	164	168	174
REF. TO AIR HEAT EXCHANGER					
Face Area (Sq. Ft.)	1.44	1.44	1.44	1.81	1.81
No. of Rows Deep	2	2	3	3	3
Copper Tube Size (O. D. In.)	3/8	3/8	3/8	3/8	3/8
No. of Fins/Inch	13	13	13	13	13
REFRIG. CHARGE (R-22)/CKT	15.5	15.0	22	22	22
No. of Circuits	1	1	1	1	1
UNIT W" x H" x D"	48x24x10	48x24x10	48x24x10	48x24x10	48x24x10
WATER IN/OUT SIZE O. D. Sweat)	5/8	5/8	5/8	5/8	5/8
CONDENSATE SIZE (I.D. Vinyl)	5/8	5/8	5/8	5/8	5/8

Operating Limits

Environment

This equipment is designed for indoor installation ONLY.

Power Supply

A voltage variation of +/- 10% of nameplate utilization voltage is acceptable.

Starting Conditions

CS Units:

CS Units start and operate in an ambient of 50°F, with entering air at 50°F, with entering water at 60°F, with both air and water at the flow rates used in the ARI Standard 320-86 rating test, for initial start-up in winter.

CL Units:

CL Unit Heat Pumps will start and operate in an ambient of 40°F, with entering air at 40°F, with entering water at 40°F, with both air and water at the flow rates used in the ARI Standard 320-86 rating test, for initial start-up in winter.

Air and Water Limits

	CS		CL	
	Cooling	Heating	Cooling	Heating
Min. Ambient Air	50°F	50°F	40°F	40°F
Rated Ambient Air	80°F	70°F	80°F	70°F
Max. Ambient Air	100°F	85°F	100°F	85°F
Min. Entering Air	50°F	50°F	50°F	40°F
Rated Entering Air, db/wb	80/67°F	70°F	80/67°F	70°F
Max. Entering Air, db/wb	100/83°F	80°F	100/83°F	80°F

Water Limits

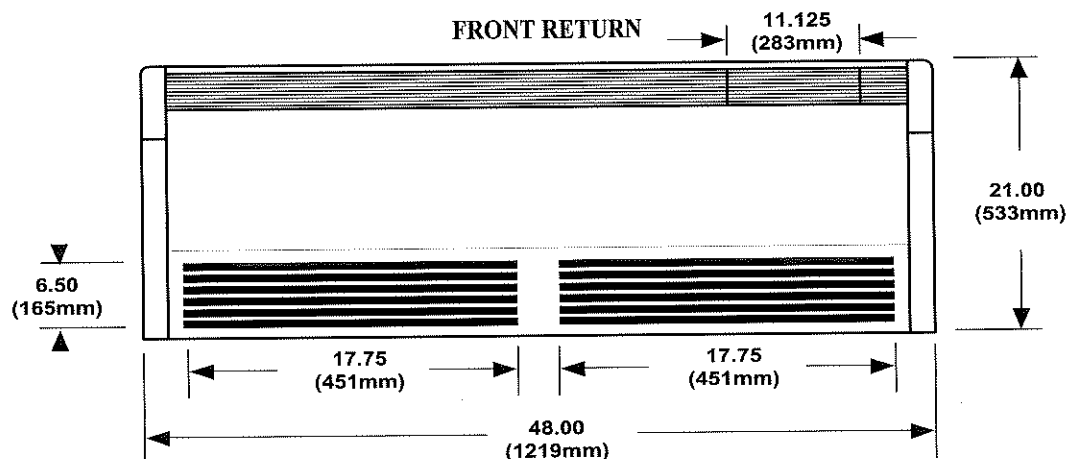
	CS		CL	
	Cooling	Heating	Cooling	Heating
Min. Entering Water	60°F	60°F	40°F	40°F
Normal Entering Water	85°F	70°F	85°F	70°F
Max. Entering Water	95°F	90°F	110°F	90°F

NOTES: (A) Minimum Air and Water conditions can only be used at ARI flow rates.
(B) Only one maximum or minimum value may be used with CS Units, all other parameters must be at normal conditions. CS Units may have up to two values at maximum or minimum with all other parameters at normal conditions.

Dimensions

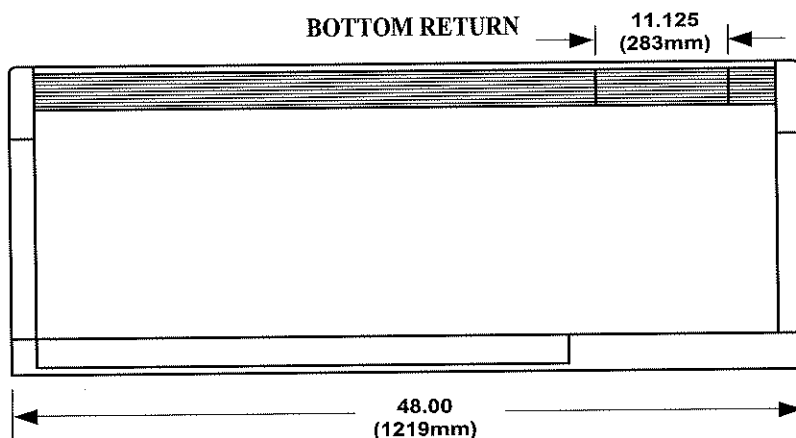
CS / CL All Models

FRONT VIEW

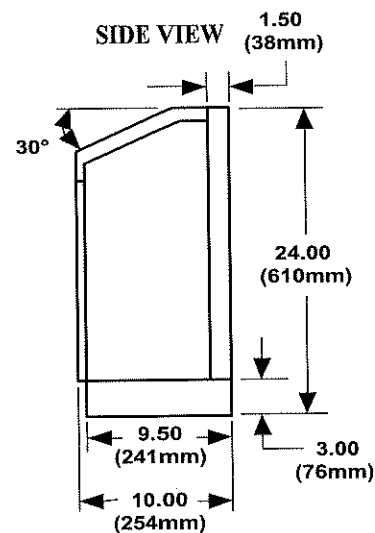


FRONT VIEW

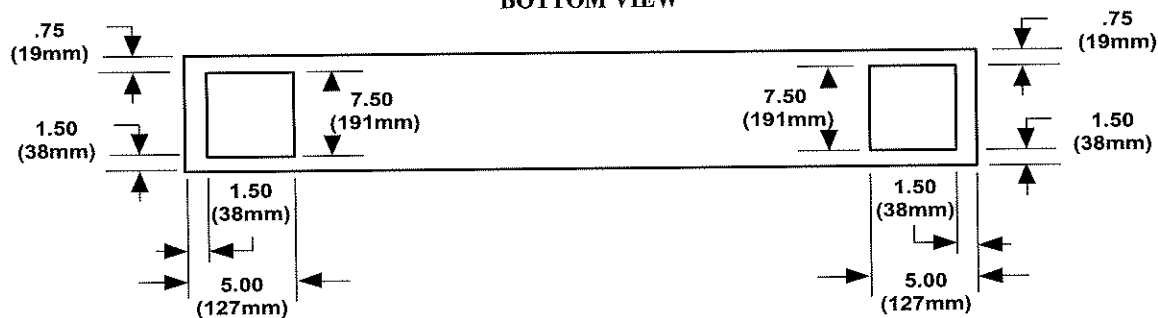
BOTTOM RETURN



SIDE VIEW



BOTTOM VIEW



Piping, Electrical opening in bottom of subbase.*

Note: All measurements are in inches. Measurements in parenthesis are in millimeters.

*Subbase provided on bottom return units only.

Options and Accessories

Factory-Installed Options

Refrigerant to Water Heat Exchanger

Refrigerant to Water Heat Exchanger may be ordered with Copper (standard) or Cupronickel (optional) inner tube assemblies.

Extended Operating Range

CL Units may be specified to operate at a loop water temperature range of 40°F to 110°F (4°C to 43°C). This option more than doubles the storage capacity of the pipe loop, reduces the required size of the heat rejector and reduces boiler demand for more efficient unit operation.

Pre-Piped Subbase

A factory pre-piped subbase is available which includes all necessary valves and piping for simplified installation.

Motorized Shut Off Valves

Motorized shut off valves are available for variable pump applications.

Water Regulating Valves

Water regulating valves for cooling only are available for use when code permits units to be connected to the city water supply. This valve modulates water flow for optimum equipment operation and reduced water consumption.

Control Door Access

A key-lock can be ordered for increased security on the control access door.

Paint

Standard units are factory painted with Polar Ice powder painted finish. Custom colors are available.

Disconnect Switch

Units can be supplied with a factory mounted disconnect switch (fused or unfused) for faster and easier maintenances.

Direct Digital Control (DDC) Board

A Factory installed DDC board by ClimateMaster is available for electronic control. ClimateMaster also installs DDC boards by other manufacturers upon request. Contact ClimateMaster for more information on control product offerings and control requirements.

Motorized Fresh Air Damper

A motorized fresh air damper is available for all models. This damper opens when-ever the unit fan is in operation. A manual override switch is provided.

Unit Mount Auto Change-Over

Automatic change-over units are supplied with a unit mounted ACO thermostat which allows the unit to operate in heating or cooling mode to satisfy an owner controlled set point.

24 Volt Remote Control Option

All remote wall thermostat applications are provided with a CMC- 2001 controller.

Unoccupied Control

A 24 volt relay can be provided to turn the unit off when the building is unoccupied.

Low Limit Thermostat

A factory installed and pre-set low limit thermostat can be provided to prevent space temperatures from becoming too cold when the unit is in unoccupied mode.

Anti-Short Cycle Relay

A five minute factory installed anti-short cycle relay can be provided. This prevents rapid cycling of the compressor and increases compressor life.

Field-Installed Options

Wall Mount Thermostats

Electro-Mechanical wall mount thermostats are available for both manual and automatic change-over applications.

Automatic change-over thermostats offer one-stage heating, one-stage cooling with system "OFF-AUTO" switch and fan "ON-AUTO" switch. A service LED is provided. *Manual change-over thermostats* provide one-stage heating, one-stage cooling with "HEAT-OFF-COOL" switch and "ON-OFF" fan switch.

Electronic Thermostats are available as Automatic change-over or Manual change-over with LED service light.

A Programmable Thermostat is available which operates in either Manual or Automatic change-over. This thermostat is a true 7- day programmable thermostat with up to 4 heating and cooling cycles for each day of the week.

Supply and Return Water Hoses

Standard hoses are 1 foot (305 mm) long galvanized steel hoses with a UL94 rating. Optional stainless steel hoses may be ordered.

Self Balancing Hose Kits

Each hose kit includes two fire rated hoses, an automatic flow control valve with test port, two shut-off valves (one with a test port), a blow-down valve and a Y-strainer. Hoses are 1 foot (305 mm) long.

Low Profile Installation

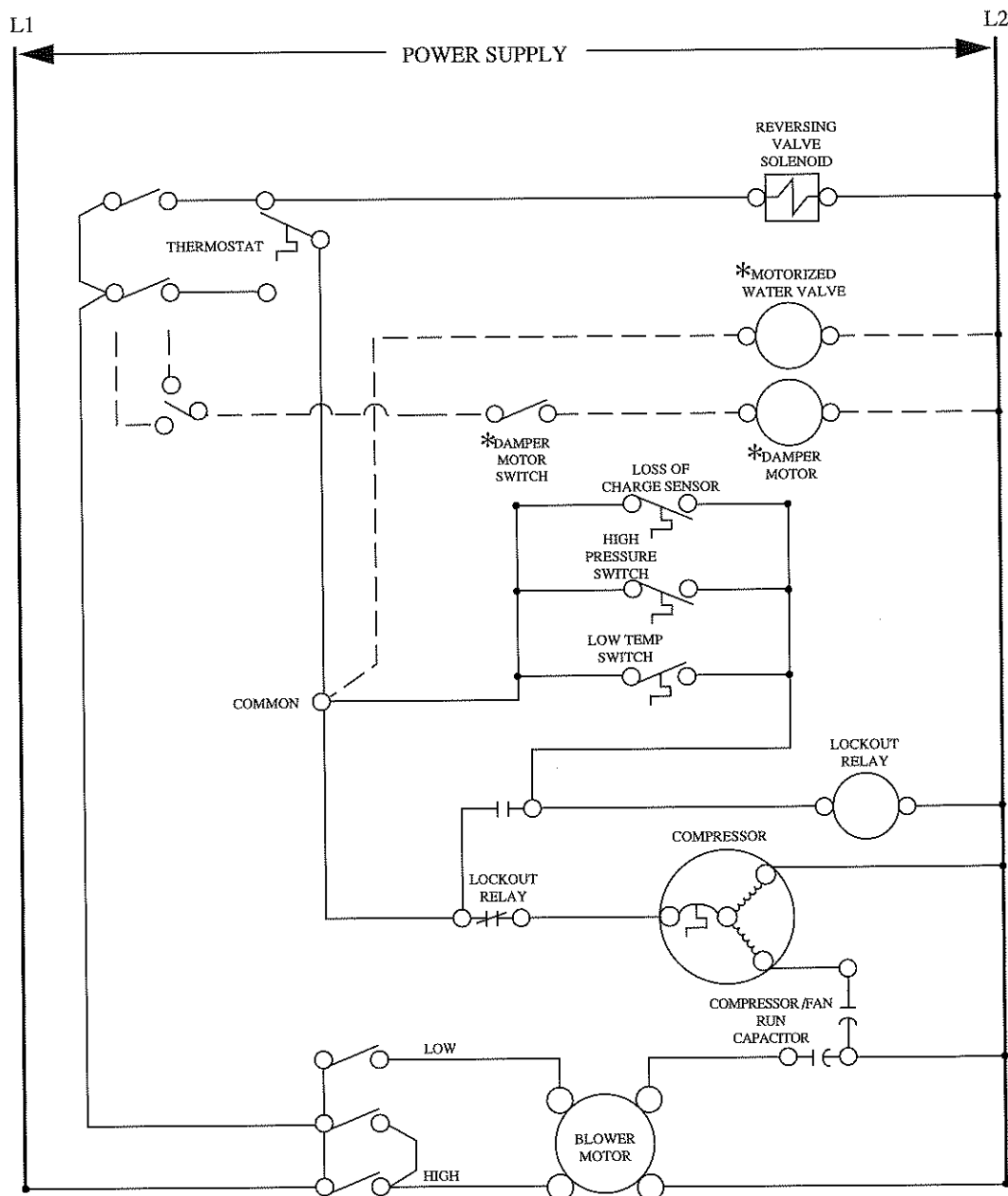
The standard chassis may be installed in a cabinet without a subbase to reduce the overall unit height by 3 inches (76 mm). This cabinet is equipped with a front air return.

Installation

The following recommendations are ideas designed to promote efficient installation and operation of your unit. This information should not be interpreted as detailed installation procedures. For complete information on all proper installation procedures, please refer to your ClimateMaster Installation, Operation and Maintenance manual shipped with each unit.

1. Compare the electrical data on the unit nameplate with ordering and shipping information to verify that the correct unit has been shipped.
2. Use the shipping carton to keep both the chassis and cabinet covered until installation is complete, and all plastering, painting, etc. is finished.
3. Verify that the refrigerant tubing is free of kinks or dents, and that it does not touch other unit components.
4. Inspect all electrical connections; connections should be clean and tight at the terminals.
5. Before installing a unit, ensure that adequate space is available for routine maintenance and service. See dimensional drawings for access panel locations.
6. Provide room for easy access for filter changes.
7. To ensure a proper, trouble-free installation, it is very important to flush the entire pipe-loop before any units are connected to it. Once the units are connected, make sure that each unit has the correct water flow and water temperature within the range of specifications.
8. Connect a condensate drain to each unit according to the installation instructions provided with the unit. The condensate pipe must be sloped away from the unit towards a drain.
9. The use of flexible hoses is recommended to eliminate vibration and noise transmission. If the unit must be removed for service, the use of hoses makes this task much easier.
10. All electrical connections must be made in accordance with NEC and local codes.
11. The units must be installed level.
12. Never use water source heat pumps for temporary heating or cooling.
13. Prior to system start-up, install a clean air filter in all units.

CONSOLE MANUAL CHANGEOVER



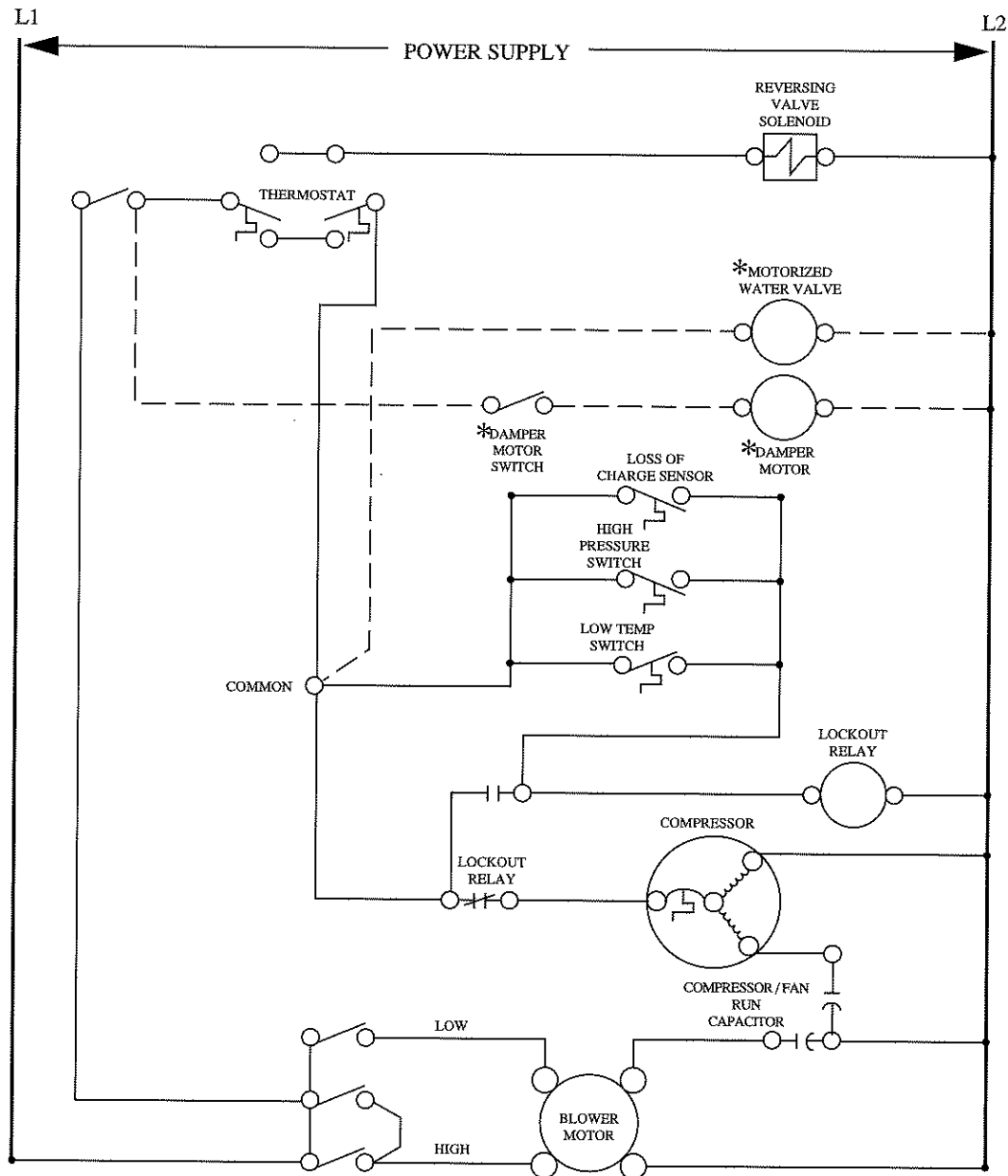
NOTES:

- NOTES:
1. ALL WIRING TO UNIT MUST COMPLY WITH NEC AND LOCAL CODES.
 2. LINE VOLTAGE FIELD WIRING. USE COPPER CONDUCTORS ONLY.
 3. COMPRESSOR AND FAN MOTORS THERMALLY PROTECTED.

* OPTIONAL DEVICE

Typical Wiring Diagrams

CONSOLE AUTO CHANGEOVER

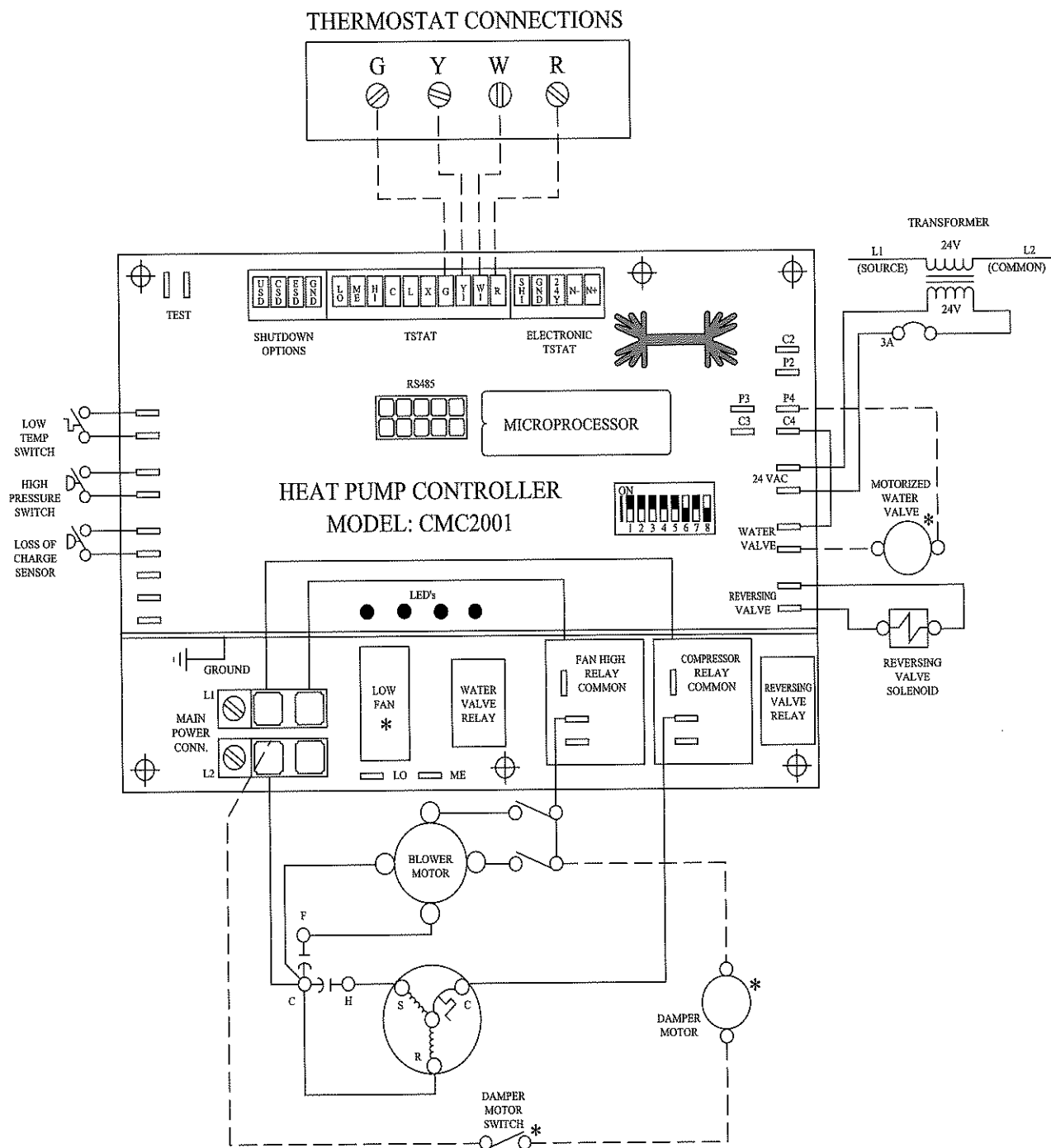


NOTES:

1. ALL WIRING TO UNIT MUST COMPLY WITH NEC AND LOCAL CODES.
2. LINE VOLTAGE FIELD WIRING. USE COPPER CONDUCTORS ONLY.
3. COMPRESSOR AND FAN MOTORS THERMALLY PROTECTED.
4. LTS AND RVS ARE OMITTED FOR COOLING ONLY UNITS.

* OPTIONAL DEVICE

CONSOLE W/REMOTE TSTAT



Control Features

CMC-2000 Series Controllers

The CMC-2000 Series Controllers are designed to enhance heat pump unit performance with the ability to coordinate complete systems. CMC 2000 Series Controllers offer either complete stand-alone unit control or allow you to connect your heat pump system to a DDC control system which includes lighting and other energy saving controls. The CMC Series is the most advanced controller made by any heat pump manufacturer today. And best of all, *the CMC-2000 Series board is the ONLY electronic controller designed to accommodate future upgrades without board replacement.*

Standard Basic Functions

The basic controller package (CMC-2001) offers all the standard features available with electromechanical systems, plus **13 additional standard functions.** This group of added features include *intelligent re-set*, designed to automatically restart a unit within a specific period of time following a fault, given the fault has been adequately corrected. Also included is the *fail-safe reversing valve operation*, a feature that energizes the reversing valve on cooling and de-energizes the reversing valve on heating.

Options

Three styles of CMC Controllers (CMC-2001, 2005, 2010) offer up to **39 standard and optional features**, from basic unit control to full DDC system control. With three basic control boards to choose from, along with a variety of options on each, you get the right amount of control you want for the price you want to pay.

Communications/ Future Upgrades to DDC Status

The CMC-2000 Series incorporates a socket which accommodates the future installation of an RS-485 interface board. This on-board programming system allows communication with local or remote PCs via a modem. With the availability of the RS-485, you have the flexibility to upgrade your control system as your demands require, giving you the freedom to choose the system you need for today, without sacrificing the upgrade you may need in the future. The RS-485 interface board can be included on new products or simply snapped into place at a later date in the field. No other controller offers you this kind of flexibility.

Diagnostics

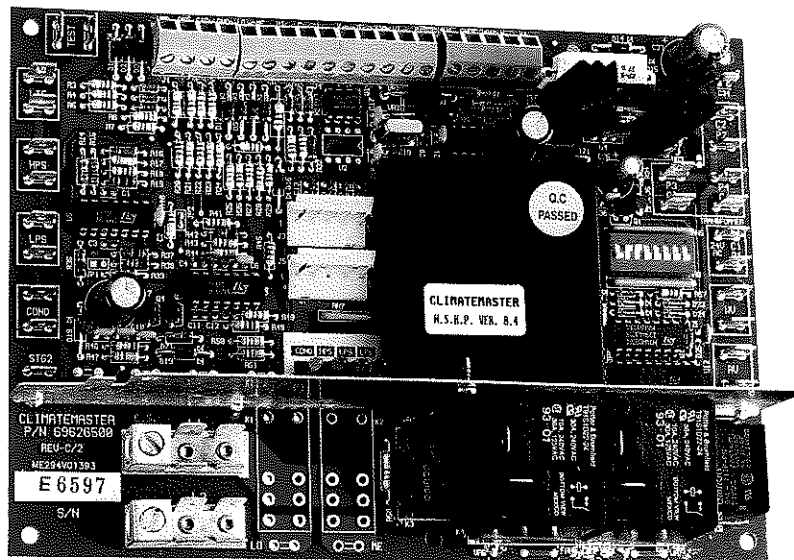
Five on-board diagnostics highlight seven different possible reasons for unit malfunction, speeding-up service time, eliminating unnecessary service charges and minimizing down-time. Diagnostics can be observed from a remote location when the RS-485 option is utilized.

Unit/System Operating Efficiency

Random-start, demand load-shed, night set-back, demand limit and protective circuits all work to enhance the performance of your system. These features are standard on CMC-2000 Series Electronic Controllers.

Comfort Control

Hi-Low fan speed controls, motorized air damper controls, and the ability to utilize more accurate electronic thermostats adds up to increased comfort through superior unit control.



ClimateMaster offers three standard electronic controller configurations, each with optional features available, so that you can choose the control you need and **pay only for the features you want.**

s = Standard Feature o = Optional Feature e = either Outdoor-Air Damper-Control or Motorized Water Valve
u = Upgrade can be selected, but not both.

* To use this feature requires a personal computer to link to the system and run the required ClimateMaster software.

Specifications

CS/CL Console Heat Pumps

General

Furnish and install Water Source Heat Pumps, as indicated on the plans with capacities and characteristics as listed in the schedule and the specifications that follow. Units shall be ClimateMaster model CS (standard range 60°F to 95°F / 15°C to 35°C water) or model CL (extended range 40°F to 110°F / 4°C to 43°C water). Equivalent units from other manufacturers can be proposed provided approval to bid is given 10 days prior to bid closing.

All Equipment listed in this section must be rated in accordance with American Refrigeration Institute (ARI), Underwriters Laboratories (UL) and Canadian Standards Association (CSA). The units shall have ARI, UL, CSA labels. All units shall be factory tested under normal operating conditions at nominal water flow rates. Units which are tested without water flow are not acceptable.

Basic Construction

Cabinet:

The Cabinet shall be constructed of heavy gauge steel with welded corner bracing. A removable front cabinet allows easy service access to the chassis. The cabinet shall have a 30° sloped top with an aluminum rigid bar type discharge grille.

An access door shall be provided to cover the swing down control section.

OPTION: Access door shall be held closed by a keyed lock.

For all capacities of the Console Heat Pump, the cabinet shall be one size (48"L x 10"D x 24"H / 1219 mm x 254 mm x 610 mm). It shall be powder painted Polar Ice. The panels of the compartment shall be thermally and acoustically insulated.

OPTION: Special colors are available.

Fan & Motor Assembly

The fan motors shall be multi-speed permanently lubricated, PSC type with thermal overload protection. To facilitate field service all units shall have a slide out fan deck and quick electrical disconnect.

Refrigerant Circuit

Units shall have a sealed refrigerant circuit including a hermetic compressor, a refrigerant metering device, a finned tube refrigerant to air heat exchanger, a reversing valve, a coaxial (tube in tube) refrigerant to water heat exchanger, and safety controls including a high pressure sensor, a loss of charge sensor to protect against loss of refrigerant, and a low water temperature (freezestat) sensor.

Rotary compressors shall have thermal overload protection and shall be located in an insulated compartment to minimize sound transmission. Units shall have the compressor mounted on isolators to reduce noise and vibration transmission.

Refrigerant to air heat exchangers shall utilize enhanced aluminum fins and rifled copper tube construction rated to withstand 425 PSI refrigerant working pressure.

Refrigerant to water heat exchangers shall be of copper inner water tube and steel refrigerant outer tube design rated to withstand 450 PSI working refrigerant pressure.

Reversing valve shall be four way solenoid activated refrigerant valves which shall fail to heating operation. If the unit fails to cooling a low temperature thermostat must be provided to prevent over-cooling of the room.

OPTION: Coaxial water to refrigerant heat exchangers shall be cupro nickel.

Safety controls shall include a high refrigerant pressure sensor, a loss of charge sensor, and a low water temperature sensor (freeze-stat). Activation of any safety device shall prevent compressor operation via a lockout relay. The lockout relay shall be reset at the thermostat or at the contractor supplied disconnect switch. Units which may be reset at the disconnect switch only shall not be acceptable. The chassis shall have a removable condensate drain pan for easy service and cleaning.

Electrical

A control box shall be located within the unit and shall contain controls for compressor, reversing valve and fan motor operation. Low voltage field wiring connections on 24V units.

Unit Controls

Unit controls shall be located in a box under the control door. The control box shall be able to swing down for easy access for service.

Operating controls shall consist of push button knobs to select stop, hi cool, lo cool, hi heat, lo heat, fan only operation. A unit mounted thermostat with a remote bulb measuring return air temperature shall control the compressor for heating and cooling.

OPTION:

- a. Operating controls shall consist of push button switches to select stop, fan, low, high for automatic change over control. A unit mounted thermostat with a remote bulb measuring return air temperature shall control the compressor for heating or cooling.

- b. *The unit shall be provided with 24 volt controls for use with a wall thermostat. The thermostat shall be manual change over type with off, heat, cool selection switch and fan, auto selection switch. Unit shall have the CMC-2000 series solid state controller.*
- c. *The unit shall be provided with 24 volt controls for use with a wall thermostat. The thermostat shall be an automatic change over type with an off, auto selector switch and a fan, auto selector switch. Unit shall have the CMC-2001 solid state controller.*

Master Slave: The master-slave operation shall be accomplished with a remote thermostat controlling up to 3 units in parallel.

Boilerless Unit: The unit shall have an electric heating coil, an aquastat and an override switch such that when the water temperature drops below 60°F (16°C) the unit control will shut off the compressor and activate the electric coil. The override switch permits electric heating in the event of the compressor's failure.

Motorized Zone Valves: The unit shall be provided with a factory mounted motorized zone valve. When the compressor operates in either heating or cooling modes, the valve is open. The valve closes when the compressor is off.

Fresh Air Damper: The unit shall be provided with a motorized outside air damper, factory mounted and wired. Manual override switch shall be provided.

Factory Supplied Cord and Plug The unit shall be provided with a factory mounted cord and plug, conforming to NEMA (6-20P, 7-20P or 6-30P).

Factory Supplied Receptacle: The unit shall be provided with a factory supplied receptacle conforming to NEMA (6-20R, or 7-20R, or 6-30R). The receptacle shall be field mounted on the building wall between the back wrapper and the chassis. (The unit shall be provided with a factory supplied circuit breaker or disconnect switch.)

Cabinet Options: Front return. With a front panel return air grille that swings down for filter removal.

Piping Options

- a. **Threaded Connections:** A half inch male or female pipe threaded fitting shall be factory mounted on the supply and return water connections.
- b. **Pre-Piped Subbase:** A subbase shall be provided. The subbase shall consist of supply, return and condensate piping. The piping shall be copper.

Unit Mounted Thermostat Control Options

- a. Unit shall be supplied with a 24 volt night setback relay. Relay shall be normally open or normally closed as shown on the control wiring diagram.
- b. Unit shall be supplied with a five minute anti-short cycle relay.
- c. Unit shall be supplied with a factory set low limit thermostat to prevent the space from becoming over cooled when the unit is in setback mode.

OPTIONAL CMC-2001 SOLID-STATE CONTROL SYSTEM

Standard with 24 volt remote thermostat control. Unit shall have a solid state control system. The control shall interface to any type of wall thermostat either mechanical or electronic. The control system shall have the following features.

- a. Anti-short cycle time delay on compressor operation, time delay shall be 5 minutes minimum.
- b. Random start on power up mode or return from night setback.
- c. Minimized reversing valve operation for extended-life and quiet operation.
- d. Night setback override from low temperature thermostat.
- e. Two hour override initiated by a signal from wall thermostat.
- f. Low voltage protection.
- g. High voltage protection.
- h. Ability to work with any thermostat.
- i. Single grounded wire to initiate night setback, demand load shed, or emergency shut down.
- j. Unit shut down if high or low pressure sensors trip.
- k. Unit shut down if low water temperature sensor is actuated.
- l. Option to reset unit at thermostat or at disconnect.
- m. Automatic intelligent reset to automatically reset the unit 30 minutes after trip if the fault has cleared. Should the fault re-occur within 10 minutes after reset then permanent lockout shall occur.
- n. Ability to defeat time delays for servicing.

Specifications cont.

- o. Light emitting diodes (LED) to indicate high pressure, low pressure, low voltage, high voltage, freeze protection, and control voltage status.
- p. Control logic to move the reversing valve only when cooling is called for the first time. The reversing valve shall be held in this position until the first call for heating. This scheme ensures quiet operation and increased valve life. Only control schemes that provide this reduced reversing valve operation shall be accepted.
- q. Thermostat to be single stage automatic change-over with system OFF-AUTO switches and fan ON-auto switch. Thermostat shall incorporate an LED to indicate fault. When an unoccupied control is employed, the thermostat shall have a low temperature setting 10°F (-12°C) below set-point to maintain unoccupied temperature. A momentary contract re-set switch shall be provided to initiate the two hour override.
- r. Ability to be upgraded to a DDC system with a plug-in module.

Optional CMC-2005 Control System

Optional CMC-2005 Control System shall have all features of the CMC-2001 panel with the following additional features:

- a. The ability to select high, medium or low fan speed.
- b. A relay to operate an external damper. The control to be such that the damper shall not open until 30 minutes after the unit comes back from unoccupied mode or the relay shall operate a motorized water valve. Relay or damper action to be selectable from a dip switch on the printed circuit board.

Optional CMC-2010 Control System

Shall have all features of the CMC-2001 panel with the following additional features:

- a. Control board shall be supplied with an RS-485 interface board. This will permit all units to be connected by a 2-wire twisted pair shielded cable. This contractor is responsible for all heat pump control wiring. The units shall be segregated into groups of 32. Each group shall be connected to a UCI (unitary controller interface). All UCT's shall be wired together with a 2-wire twisted shielded cable. A TAP interface and an IBM compatible computer shall be supplied.
- b. All boards shall have the electronic addresses FACTORY SET. The electronic address and the unit tagging shall be on the carton and on a nameplate affixed to the unit. In order to prevent field errors, on site addressing is NOT PERMITTED.

The computer shall utilize a 286 micro-processor chip as a minimum and shall have a 20M hard drive, a single 3.5 floppy drive and a color monitor. The WSHP manufacturer shall supply the software to supervise the operation of the individual WSHP units. This software shall provide a minimum of the following:

1. Unoccupied control.
2. Emergency shutdown.
3. Demand limit control (Demand input by others).
4. Individual alarms for each fault if unit fails.
5. Water leaving temperature from each unit.
6. Ability to change room set points.
7. Ability to select high, medium or low fan speed.
8. Graphics of an individual unit or group of units, complete with point readings displayed.
9. Ability to read individual points at fixed intervals for trend tracking.
10. Ability to show the number of hours of compressor run time.

The unit manufacturer shall load the software and ensure that all units are communicating as part of the start-up procedure. The contractor is responsible to correct any wiring errors. Graphics are not produced by the manufacturer but may be custom made by the owner. Graphics may be purchased from the WSHP manufacturer under a separate quotation.

Optional CMC-2001 Through CMC-2010 Features

- a. The ability to select high, medium or low fan speed.
- b. A relay to operate an external damper. The control to be such that the damper shall not open until 30 minutes after the unit comes back from unoccupied or the relay shall operate a motorized water valve. When selected for motorized valve operation the signal to open the valve shall be silver 30 seconds prior to the compressor starting. Relay action to be selectable from a dip switch on the printed circuit board.
- c. An electronic room sensor.
- d. A digital room thermostat with set point adjustment, sensor and override button.
- e. Ability to read leaving water temperature.
- f. Ability to read compressor discharge temperature.
- g. Ability to show the number of compressor starts.
- h. Ability to show the number of hours of fan operation.

Warranty

Limited Express Warranty Limitation of Remedies and Liability

It is expressly understood that unless a statement is specifically identified as a warranty, statements made by ClimateMaster, Inc., a Delaware corporation, ("CM") or its representatives, relating to CM's products, whether oral, written or contained in any sales literature, catalog or agreement, are not express warranties and do not form a part of the basis of the bargain, but are merely CM's opinion or commendation of CM's products. Except as specifically set forth herein, **THERE IS NO EXPRESS WARRANTY as to any of CM's products and CM MAKES NO WARRANTY OF MERCHANTABILITY OF THE GOODS OR OF THE FITNESS OF THE GOODS FOR ANY PARTICULAR PURPOSE.**

GRANT OF LIMITED EXPRESS WARRANTY

CM warrants CM products purchased and retained in the United States of America and Canada to be free from defects in material and workmanship under normal use and maintenance as follows: (1) All complete air conditioning, heating, and/or heat pump units built or sold by CM for 12 months from date of unit start-up or 18 months from date of shipment (from factory), whichever comes first; and (2) Repair and replacement parts, which are not supplied under warranty, for 90 days from date of shipment (from factory). All parts must be returned to CM's factory in Oklahoma City, Oklahoma, freight prepaid, no later than 60 days after the date of the failure of the part; if CM determines the part to be defective and within CM's Limited Express Warranty, CM shall, when such part has been either replaced or repaired, return such to a factory recognized dealer, contractor or service organization, F.O.B. CM's factory, Oklahoma City, Oklahoma, freight prepaid. The warranty on any part repaired or replaced under warranty expires at the end of the original warranty.

This warranty does not apply to: (1) Air filters, fuses, refrigerant, oil; (2) Products relocated after initial installation; (3) Any portion of the system not supplied by CM; (4) Products on which the unit tags have been removed or defaced; (5) Products on which payment to CM is or has been in default; (6) Products which have defects or damage which result from improper installation, wiring, electrical imbalance characteristics or maintenance; or are caused by accident, misuse or abuse, fire, flood, alteration or mis-application of the product; (7) Products which have defects or damage which result from a contaminated or corrosive air or liquid supply, operation at abnormal temperatures, or unauthorized opening or refrigerant circuit; (8) Corrosion or abrasion; (9) Products manufactured or supplied by others; (10) Products which have been subjected to misuse, negligence or accidents; (11) Products which have been operated in a manner contrary to CM's printed instructions; or (12) Products which have defects, damage or insufficient performance as a result of insufficient or incorrect system design or the improper application of CM's products.

CM is not responsible for: (1) the costs of labor, refrigerant, materials or services incurred in the removal of the defective part, or in obtaining and replacing the new or repaired part; or, (2) transportation costs of the defective part from the installation site to CM or of the return of any part not covered by CM's Limited Express Warranty.

Limitation: This Limited Express Warranty is given in lieu of all other warranties. If, notwithstanding the disclaimers contained herein, it is determined that other warranties exist, any such express warranty, and any implied warranties of fitness for a particular purpose and merchantability shall be limited to the duration of the Limited Express Warranty.

LIMITATION OF REMEDIES

In the event of the Limited Express Warranty, CM will only be obligated at CM's option to repair the failed part or unit, or to furnish a new or rebuilt part or unit for the part or unit which has failed. If after written notice to CM's factory in Oklahoma City, Oklahoma of each defect, malfunction or other failure and a reasonable number of attempts by CM to correct the defect, malfunction or other failure and the remedy fails of its essential purpose, CM shall refund the purchase price paid to CM in exchange for the return of the sold good(s). Said refund shall be the maximum liability of CM. **THIS REMEDY IS THE SOLE AND EXCLUSIVE REMEDY AGAINST CM FOR THE BREACH OF ANY WARRANTY OR FOR CM'S NEGLIGENCE OR IN STRICT LIABILITY.**

LIMITATION OF LIABILITY

CM shall not be liable for any damages occasioned by any delay in performance or any default caused by war, government restrictions or restraints, strikes, material shortages, acts of God or any other reason beyond the sole control of CM. **CM EXPRESSLY DISCLAIMS AND EXCLUDES ANY LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGE IN CONTRACT, FOR BREACH OF ANY EXPRESS OR IMPLIED WARRANTY, OR IN TORT, WHETHER FOR NEGLIGENCE OR AS STRICT LIABILITY. CM MAKES NO WARRANTY AGAINST LATENT DEFECTS.**

OBTAINING WARRANTY PERFORMANCE

Normally, the contractor or service organization who installed the products will provide warranty performance for the owner. Should the installer be unavailable, contact any CM recognized dealer, contractor or service organization. If assistance is required in obtaining warranty performance, write or call:

Climate Master, Inc.
Customer Service
7300 S.W. 44th Street
Oklahoma City, Oklahoma 73179
(405) 745-6000

NOTE: Some states or Canadian provinces do not allow limitations on how long an implied warranty lasts, or the limitation or exclusion of consequential or incidental damages, so the foregoing exclusions and limitations may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state or Canadian province to Canadian province.

Please refer to the CM Installation, Operation and Maintenance Manual for operating and maintenance instructions.

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This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.