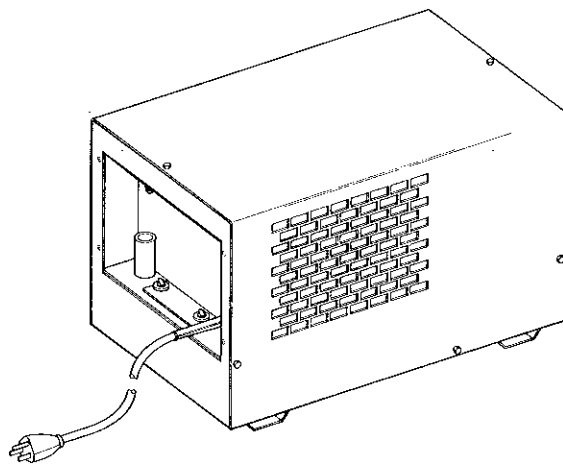


MODEL
Radiator 1
Radiator 2



OWNER'S MANUAL



MILLER ELECTRIC MFG. CO.

718 S. BOUNDS ST. P.O. Box 1079
APPLETON, WI 54912 USA

LIMITED WARRANTY

EFFECTIVE: JUNE 1, 1979

This warranty supersedes all previous MILLER warranties and is exclusive with no other guarantees or warranties expressed or implied.

LIMITED WARRANTY-Subject to the terms and conditions hereof, Miller Electric Mfg. Co., Appleton, Wisconsin warrants to its Distributor/Dealer that all new and unused Equipment furnished by Miller is free from defect in workmanship and material as of the time and place of delivery by Miller. No warranty is made by Miller with respect to engines, trade accessories or other items manufactured by others. Such engines, trade accessories and other items are sold subject to the warranties of their respective manufacturers, if any. All engines are warranted by their manufacturer for one year from date of original purchase.

Except as specified below, Miller's warranty does not apply to components having normal useful life of less than one (1) year, such as spot welder tips, relay and contactor points, MILLERMATIC parts that come in contact with the welding wire including nozzles and nozzle insulators where failure does not result from defect in workmanship or material.

Miller shall be required to honor warranty claims on warranted Equipment in the event of failure resulting from a defect within the following periods from the date of delivery of Equipment to the original user:

1. Arc welders, power sources and components . . . 1 year
2. Original main power rectifiers 3 years
(labor - 1 year only)
3. All welding guns and feeder/guns 90 days
4. All other Millermatic Feeders 1 year
5. Replacement or repair parts, exclusive of labor . 60 days
6. Batteries 6 months

provided that Miller is notified in writing within thirty (30) days of the date of such failure.

As a matter of general policy only, Miller may honor claims submitted by the original user within the foregoing periods.

In the case of Miller's breach of warranty or any other duty with respect to the quality of any goods, the exclusive remedies therefore shall be, at Miller's option (1) repair or (2) replacement or, where authorized in writing by Miller in appropriate cases, (3) the reasonable cost of repair or replacement at an authorized Miller service station or (4) payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at Customer's risk and expense. Upon receipt of notice of apparent defect or failure, Miller shall instruct the claimant on the warranty claim procedures to be followed.

ANY EXPRESS WARRANTY NOT PROVIDED HEREIN AND ANY IMPLIED WARRANTY, GUARANTY OR REPRESENTATION AS TO PERFORMANCE, AND ANY REMEDY FOR BREACH OF CONTRACT WHICH, BUT FOR THIS PROVISION, MIGHT ARISE BY IMPLICATION, OPERATION OF LAW, CUSTOM OF TRADE OR COURSE OF DEALING, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR PARTICULAR PURPOSE, WITH RESPECT TO ANY AND ALL EQUIPMENT FURNISHED BY MILLER IS EXCLUDED AND DISCLAIMED BY MILLER.

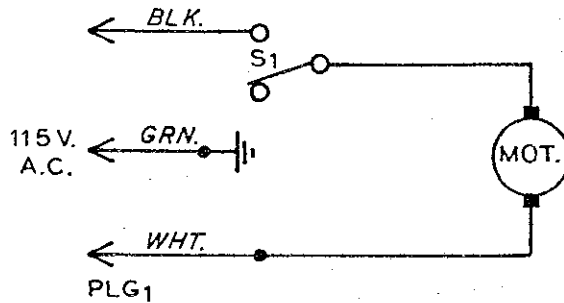
EXCEPT AS EXPRESSLY PROVIDED BY MILLER IN WRITING, MILLER PRODUCTS ARE INTENDED FOR ULTIMATE PURCHASE BY COMMERCIAL/INDUSTRIAL USERS AND FOR OPERATION BY PERSONS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT AND NOT FOR CONSUMERS OR CONSUMER USE. MILLER' WARRANTIES DO NOT EXTEND TO, AND NO RESELLER IS AUTHORIZED TO EXTEND MILLER'S WARRANTIES TO, ANY CONSUMER.

ERRATA SHEET

After this manual was printed, refinements in equipment design occurred. This sheet lists exceptions to data appearing later in this manual.

AMENDMENT TO SECTION 4 - MAINTENANCE

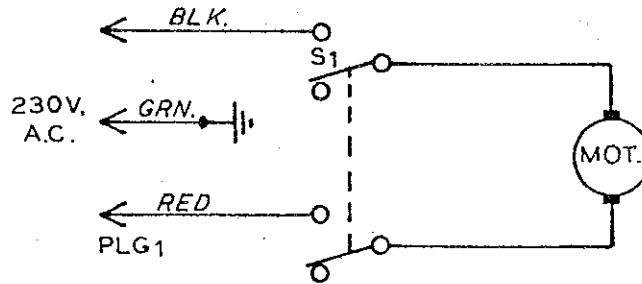
Add Figure 4-1. Circuit Diagram For 115 Volts Models



Circuit Diagram No. A-046 471

Figure 4-1. Circuit Diagram For 115 Volts Models Effective With Style No. HK-43

Add Figure 4-2. Circuit Diagram For 230 Volts Models



Circuit Diagram No. A-046 473

Figure 4-2. Circuit Diagram For 230 Volts Models Effective With Style No. HK-43

Item No.	Dia. Mkgs.	Part No. Listed In Parts List	Replaced With Part No.	Description	Quantity	
					Radiator 1	Radiator 2
11		081 577	046 510	HOSE, neoprene - braided No. 1 x 0.373 ID x 18 (Eff with S/N JA-2)	1	1
15		081 545	046 447	WRAPPER (Eff with S/N JA-2)	1	1
18	S1	011 609	011 609	SWITCH, toggle SPDT 15 amp 125 volts (Eff with S/N HK-43)	1	
18	S1	011 609	011 611	SWITCH, toggle DPDT 15 amp 125 volts (Eff with S/N HK-43)		1
19		081 546	046 694	PANEL, mounting - components (Eff with S/N JA-2)	1	1
24		048 903	046 445	CASE SECTION, front/bottom/back (Eff with S/N JA-2)	1	1
27		049 596	046 511	HOSE, neoprene - braided No. 1 x 3/8 ID x 17 (Eff with S/N JA-2)	1	1
29		081 544	081 544	BRACKET, anti-rotation pump (qty. change) (Eff with S/N JA-2)	2	2
32		048 809	046 695	COVER, tank - coolant (Eff with S/N JA-2)	1	1
			026 837	INSULATOR, terminal - nylon (Eff with S/N JA-2)	2	4

BE SURE TO PROVIDE MODEL AND SERIAL NUMBERS WHEN ORDERING REPLACEMENT PARTS.

SECTION 1 - INTRODUCTION

Model	Motor Input Voltage	Ampere Input Full Load	Motor Speed	Phase	Frequency	Tank Capacity	Overall Dimensions	Weight	
								Net	Ship
Radiator 1	115V	5.5A	1725 rpm	Single	50/60 Hz.	1.5 Gallons	Height - 12-1/4" Width - 12-1/4" Depth - 19-1/4"	45 lb. 6 oz.	50 lb. 6 oz.
Radiator 2	230V	2.8A							

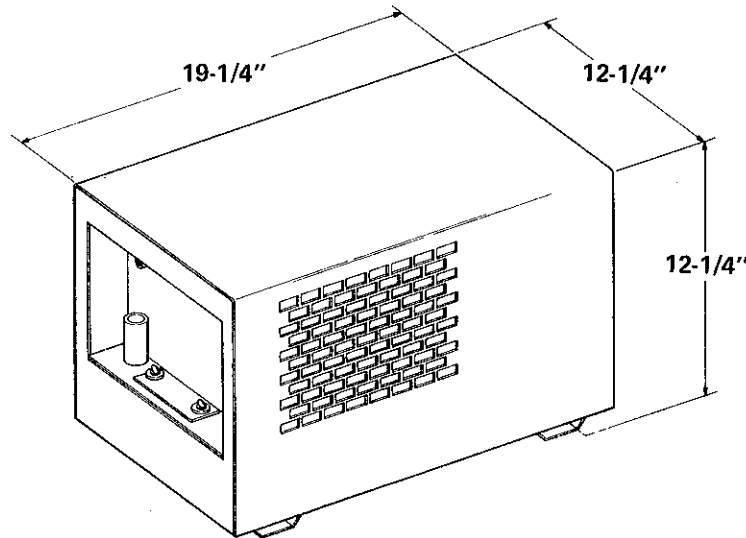


Figure 1-1. Specifications

TC-049 137

1-1. GENERAL

This manual has been prepared especially for use in familiarizing personnel with the design, installation, operation, maintenance, and troubleshooting of this equipment. All information presented herein should be given careful consideration to assure optimum performance of this equipment.

1-2. RECEIVING-HANDLING

Prior to installing this equipment, clean all packing material from around the unit and carefully inspect for any damage that may have occurred during shipment. Any claims for loss or damage that may have occurred in transit must be filed by the purchaser with the carrier. A copy of the bill of lading and freight bill will be furnished by the carrier on request if occasion to file claim arises.

When requesting information concerning this equipment, it is essential that Model Description and/or Stock Number and Serial (or Style) Numbers of the equipment be supplied.

1-3. DESCRIPTION

The coolant system consists of an electric motor, stainless steel tank, radiator, fan, and high pressure pump to circulate the coolant. The pump discharge line is equipped with a by-pass valve for pressure relief.

The coolant system is designed and built to work in conjunction with inert gas torches and other water-cooled equipment to supply adequate coolant circulation to the equipment and connecting cables.

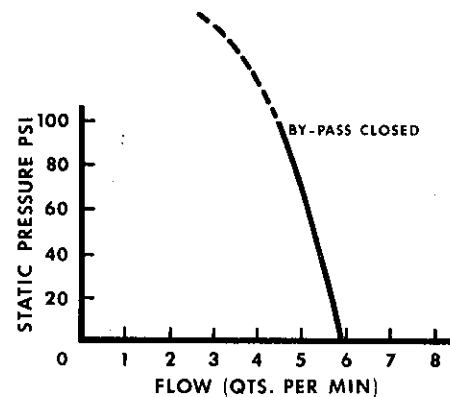
1-4. COOLANT SYSTEM RATINGS

The effectiveness of the coolant system is dependent upon several factors: the coolant system design, coolant flow rate, and torch design. To be effective, the coolant system must be able to circulate coolant through the torch with a flow rate great enough to provide adequate cooling of the torch and must effectively dissipate heat to lower the coolant temperature.

A. Pump Performance

The pumping ability of the coolant system with the pump by-pass valve closed is illustrated in Figure 1-2. Operation of the pump with the by-pass valve closed is not normally recommended (see Section 3-1). Figure 1-3 illustrates the pumping ability of the coolant system with the by-pass valve set for 50 psi. A by-pass valve setting of 50 psi should provide adequate protection for most torches. The apparent loss of flow when the by-pass valve is opened is caused by a portion of the coolant being diverted to the tank through the by-pass valve.

The amount of water that will flow for a given by-pass setting is determined by the resistance of the torch and lines and can be illustrated by a resistance curve as shown in Figure 1-3. The most efficient operating point for the system will be where the torch resistance curve and pump performance curve cross. As illustrated, the torch with low resistance has a higher coolant flow rate.



B-049 272

Figure 1-2. Pump Performance With By-Pass Valve Closed

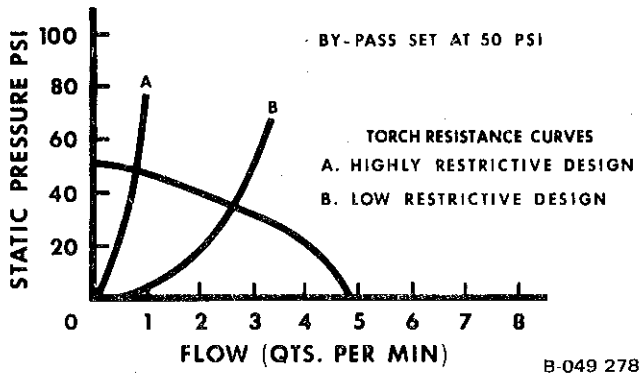


Figure 1-3. Pump Performance With By-Pass Valve Set At 50 PSI

B. Heat Dissipation Abilities

The actual performance of the coolant system is dependent upon and will vary with individual torch design. For each torch there is a maximum temperature the coolant going into the torch can reach and still provide adequate cooling. If this torch inlet temperature, along with the corresponding torch outlet temperature is known, Figure 1-4 can be used to determine the adequacy of the total system if the flow rate is approximately 1 quart per minute.

1. Obtain the maximum coolant inlet and corresponding outlet temperatures in degrees Fahrenheit from the torch manufacturer.
2. Multiply the difference in temperature by 125 to obtain the heat extracted from the torch in BTU's per hour.
3. Use the BTU's/hour obtained above and the torch output temperature in degrees Centigrade to locate a point on the Heat Dissipation Chart Figure 1-4.

The heat dissipation ability of the coolant system must be equal to or greater than the heat extracted from the torch when compared with the torch outlet temperature.

Example: A torch manufacturer states that the maximum torch inlet temperature is 136°F. The torch outlet temperature after system equilibrium is reached is 176°F. The flow rate is approximately 1 quart/minute. If the temperature difference, 40°F, is multiplied by 125, 5000 BTU's/hr is extracted by the coolant. The torch outlet temperature is 80°C. Since the capability of the coolant system at 80°C is greater than the 5000 BTU's/hr extracted from the torch (5800 vs 5000 BTU's/hr), the coolant system would be more than

adequate for that particular torch. In comparison, the coolant system with a 40 gallon tank is rated for 3600 BTU's/hr at 80°C. That coolant system would not have sufficient heat dissipation ability once the system has reached equilibrium. However, due to the large tank capacity, approximately 334 pounds of coolant, the system could handle substantial overloads until such time that system equilibrium is reached.

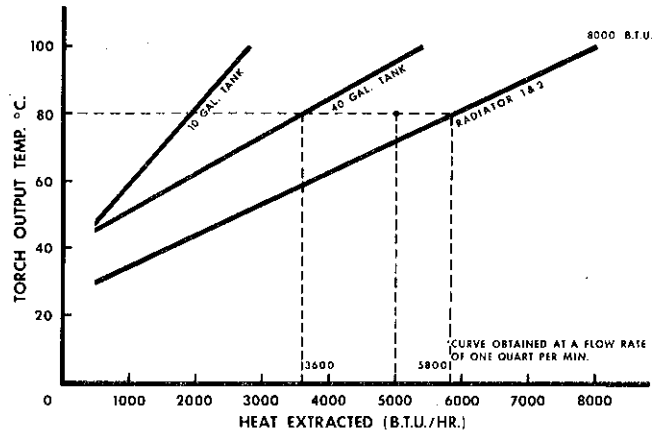


Figure 1-4. Heat Dissipation Chart

1-5. SAFETY

The following definitions apply to CAUTION and IMPORTANT blocks found throughout this manual:

CAUTION

Under this heading, installation, operating, and maintenance procedures or practices will be found that if not carefully followed may create a hazard to personnel.

IMPORTANT

Under this heading, installation, operating, and maintenance procedures or practices will be found that if not carefully followed may result in damage to equipment.

SECTION 2 - INSTALLATION

IMPORTANT

Do not block air flow through the unit. Allow a minimum of 18 inches of unrestricted space between the unit and the nearest obstruction.

2-1. PRIMARY CONNECTIONS

The coolant systems come equipped with a 115 or 230 volts ac motor (depending on the model).

CAUTION

Before making electrical connections to the welding power source, "machinery lockout procedures" should be employed. If the connection is to be made from a line disconnect switch, the switch should be padlocked in the open position. If the connection is made from a fuse box, remove the fuses from the box and padlock the cover in the closed position. If the unit is connected to a circuit breaker, or other disconnecting device without locking facilities, attach a red tag to the device to warn others that the circuit is being worked on.

These coolant systems are designed to be operated from a single-phase, 50 or 60 Hertz, ac power supply which has a line voltage rating that corresponds with one of the electrical input voltages shown on the unit nameplate. Consult the local electric utility if there is any question about the type of electrical system available at the installation site or how proper connections to the coolant systems are to be made.

When 230 volts ac is not available, and the welding power source is connected for 230 volts single or three-phase, the coolant system power may be taken directly from the single-phase line, or from one phase of a three-phase line on the welding power source primary power input panel. When undertaking this procedure, it is important to make the connections to the primary power input panel on the welding power source in the following manner: Connect the black and white wires from the coolant system motor lead to terminals L₁ and L₂ and connect the green wire to the ground stud.

Do not attempt to get 115 volts ac power from the 230 volts welding power source in any manner except for the use of the external receptacle plug where furnished. If 115 volts ac power is required and not available, an auxiliary power source will have to be provided.

2-2. COOLANT CONNECTIONS

Both the pump outlet and the return line are 5/8-18 female left hand adapters, which are standard connections on most inert gas torches.

2-3. COOLANT

IMPORTANT

Do not add lubricant to the coolant.

Where freezing conditions may be encountered, permanent type anti-freeze may be added to the coolant. Mix coolant according to the anti-freeze manufacturers recommendation for the ambient temperature encountered.

IMPORTANT

Do not use sealant type anti-freeze in the coolant system as it may block torch coolant passages.

Ensure that all coolant connections are air tight to provide maximum cooling efficiency.

SECTION 3 - OPERATION

3-1. BY-PASS VALVE

A by-pass valve is installed in the pump discharge line to help accommodate for differences in torch design and to provide pressure relief in case the discharge line should be closed for any reason. Factory setting of the by-pass valve is 50 lbs. of pressure. This setting can be adjusted to follow the torch manufacturer's recommended pressure.

IMPORTANT

If for normal operation the by-pass valve is closed or set to a pressure higher than recommended by the torch manufacturer, damage to the torch will result. If the by-pass valve is set to a pressure lower than recommended, the torch will not be properly cooled and damage to the torch may result.

To adjust the by-pass valve pressure, remove the lock nut and turn the pressure adjustment screw clockwise to increase pressure. Replace lock nut to lock the pressure adjustment screw at the desired pressure. The higher the setting of the by-pass valve pressure, the more coolant flows through the system per minute.

3-2. POWER SWITCH

This coolant system is equipped with a Power switch which when placed in the ON position will energize the coolant systems motor and thereby permit coolant circulation. Placing the Power switch in the OFF position will shut the coolant system down.

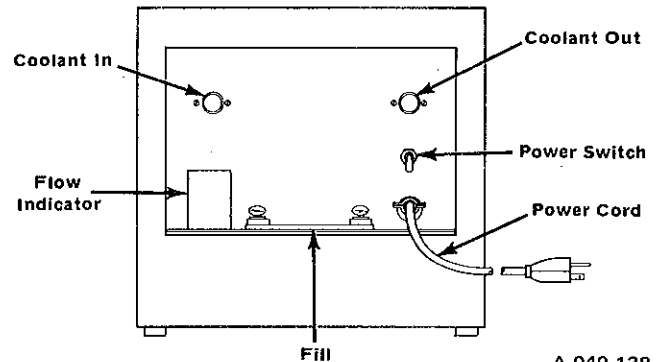


Figure 3-1. Component Locations

A-049 138

SECTION 4 - MAINTENANCE

4-1. COOLANT SYSTEM TANK

The coolant system tank and filter should periodically be cleaned and fresh water added.

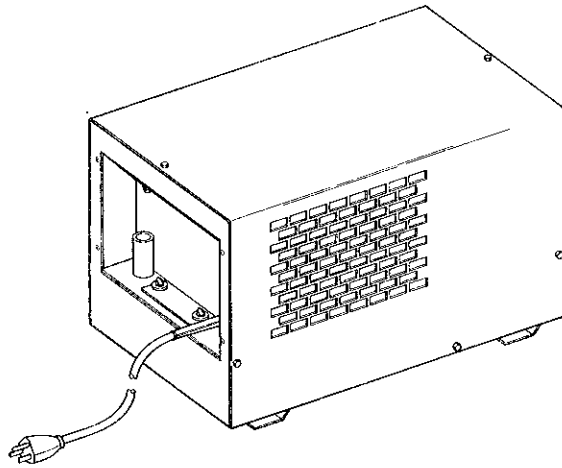
4-2. GENERAL

Keep the unit clean and free from accumulated dust and dirt. The radiator fins should be cleaned occasionally by blowing them out with compressed air. Wipe other surfaces with a clean, dry cloth.

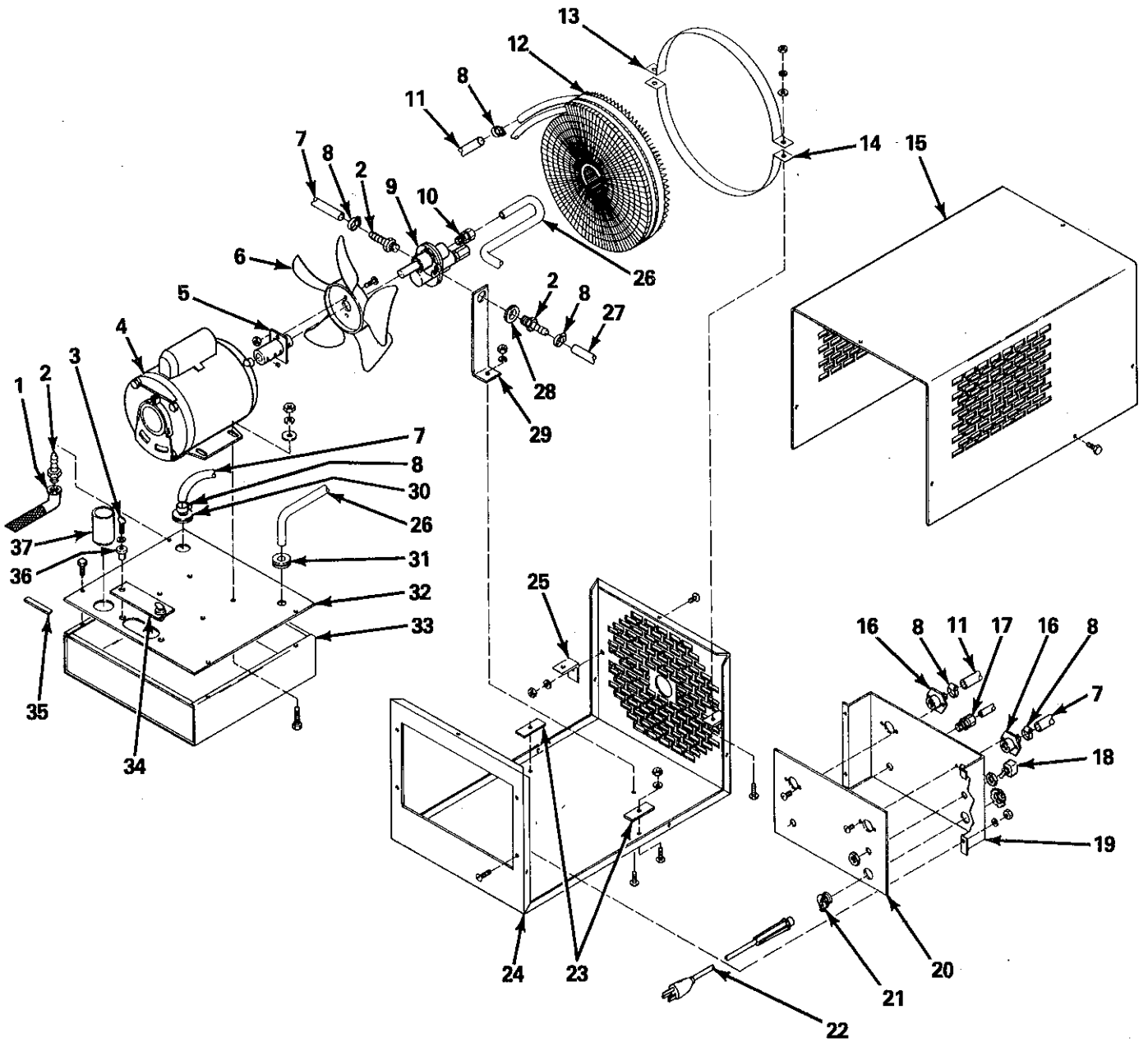
The bearings of the motor should be oiled according to the manufacturer's recommendations on the motor nameplate.

Effective With Style No. HK-1

MODEL
Radiator I
Radiator II



PARTS LIST



TD-049 135-B

Figure A – Complete Assembly

Item No.	Factory Part No.	Description	Quantity	
			Model	
			Radiator 1	Radiator 2
Figure A Complete Assembly				
1	035 632	STRAINER, w/street ell	1	1
2	081 646	FITTING, brass - barbed male 3/8 TBG x 1/4 NPT	3	3
3	081 894	SCREW, thumb - steel 10-32 x 1	2	2
4	027 803	MOTOR, 1/4 hp 115/230 volts ac 50/60 Hz	1	1
5	081 541	COUPLER, motor - shaft/pump	1	1
6	081 286	BLADE, fan 60 Hz 9 inch 5 wing 0.182 bore	1	1
7	081 576	TUBING, polyvinyl - clear 1/2 OD x 1/16 wall (order by ft.)	2 ft.	2 ft.
8	010 323	CLAMP, hose 1/4-5/8 dia	6	6
9	000 848	PUMP, coolant	1	1
10	048 739	FITTING, brass - compression connector male 5/16 TBG x 1/4 NPT	1	1
11	081 577	TUBING, impolene 1/2 OD x 1/16 wall (order by ft.)	2 ft.	2 ft.
12	047 596	RADIATOR, water - coolant tank	1	1
13	048 807	STRIP, mounting - radiator top	1	1
14	048 805	STRIP, mounting - radiator bottom	1	1
15	081 545	WRAPPER	1	1
16	081 543	FITTING, water	2	2
17	081 651	FITTING, plastic - compression male 3/8 TBG x 1/4 MPT	1	1
18	011 609	SWITCH, toggle SPDT 15 amp 125 volts	1	1
19	081 546	PANEL, mounting - components	1	1
20		NAMEPLATE (order by model and style number)	1	1
21	010 610	CONNECTOR, clamp - cable 1/2 inch	1	1
22	023 618	CORD SET, 115 volts 16 ga 3 conductor 10 ft.	1	
22	023 625	CORD SET, 230 volts 16 ga 3 conductor 10 ft.		1
23	081 539	STRIP, mounting - tank	2	2
24	048 903	CASE SECTION, front/bottom/back	1	1
25	048 806	ANGLE, mounting - radiator	2	2
26	048 808	TUBING, coolant - return pump by-pass	1	1
27	049 596	TUBING, poly-flo 1/2 OD x 1/16 wall	2 ft.	2 ft.
28	010 378	GROMMET, rubber 9/16 x 3/4 mounting hole	1	1
29	081 544	BRACKET, anti - rotation pump	1	1
30	010 594	GROMMET, rubber 1/2 ID x 1 mounting hole	1	1
31	015 713	GROMMET, rubber 5/16 ID x 1/2 mounting hole	1	1
32	048 809	COVER, tank - coolant	1	1
33	081 535	TANK, coolant	1	1
34	081 936	COVER, filler	1	1
35	603 115	WEATHERSTRIPPING, adhesive 1/8 x 3/8 (order by ft.)	5 ft.	5 ft.
36	081 895	NUT, well 10-32 blind fastener	2	2
37	082 079	GAUGE, sight - tank coolant	1	1

BE SURE TO PROVIDE MODEL AND STYLE NUMBERS WHEN ORDERING REPLACEMENT PARTS.