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OPERATION/MAINTENANCE MANUAL

WASHRACK AT BLDG 1450

MCB CAMP LEJEUNE

N62470-86-5420

BJM CONSTRUCTION

QUALITY ROOFERS & GUTTERING, INC.

ROOFING & SHEET METAL
P.O. BOX 135 JACKSONVILLE, NC 28540
(919) 346-8378

January,29,1988

George W. Kane, INC.
P.O. Box 990
New Port, N.C. 28570
ATTN: Sandy Howell

REF: Wash Rack Building - N62470-86-C-5420

Ms. Howell:

Our firm does hereby warrant all work for a period of five years from date of completion and acceptance on the above referenced work. All roofing and base flashing does comply with gcvernment plans and specifications.

Thank you,

Hugh S. Lanier
Quality Roofers & Guttering, INC.

HSL/pl

WASHRACK @ BUILDING 1450
CAMP LEJEUNE, NORTH CAROLINA
CONSTRUCTION CONTRACT #N62470-86-C-5420

B J & M Construction Co., INC.
330 Fishel Road
Winston Salem, North Carolina 27107

OPERATION AND MAINTENANCE INSTRUCTIONS

FOR

WASHRACK AT BUILDING 1450

MCB, CAMP LEJEUNE, NC

CONTRACT N62470-86-C-5420

DIVISION 15

SUPPLIER INFORMATION

SUPPLIER INFORMATION - WASHRACK

Prime Contractor..... B J & M Construction Co., INC.
P.O. Box 990
Newport, North Carolina 28570
919-223-4401

Sub-Contractor..... George W. Kane Co., INC.
P.O. Box 22027
Greensboro, North Carolina 27420
919-273-5538

Supplier..... American Mechanical
P.O. Box 37070
Raleigh, North Carolina 27627
1-800-662-9725

OPERATION AND MAINTENANCE INSTRUCTIONS

FOR

WASHRACK AT BUILDING 1450

MCB, CAMP LEJEUNE, NC

CONTRACT N62470-86-C-5420

DIVISION 15

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TABLE OF CONTENTS

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DESCRIPTION:

1. High Pressure Power wash - MI - T - HOT wash

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OPERATION AND MAINTENANCE INSTRUCTIONS

FOR

WASHRACK AT BUILDING 1450

MCB, CAMP LEJEUNE, NC

CONTRACT N62470-86-C-5420

DIVISION 15

MECHANICAL

POWER WASH SYSTEM

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specifications

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Confidential Records Management, Inc.
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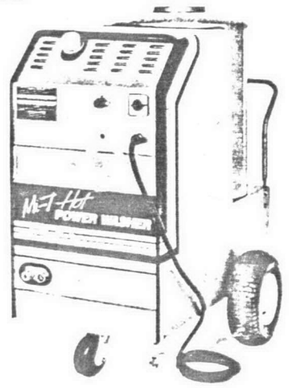
Mi-T-M CORPORATION ▪ Peosta, IA 52068

Mi-T Hot
2205 POWER WASHER



SPECIFICATIONS

SPECIFICATIONS: 2205 Series

Model Number	HW-2205-ME1 HW-2205-ME3
Electrical Specifications:	
~~HW-2205-ME1~~	~~240 Volt, 60 Hz, 1 phase, 34 Amps, NEMA 6-50P Plug, 10 foot cord~~
HW-2205-ME3	208/240 Volt, 60 Hz, 3 phase, 22 Amps, NEMA L15-30P Locking Plug, 10 foot cord
Discharge Capacity	4.5 GPM, 270 GPH, 17.0 L/min
Operating Pressure	2200 PSI, 152 Bar
Heating Power	304,000 BTU/HR, 89.0 KW
Cleaning Effector	5.78 H.P., 4.31 KW
System Efficiency	70% to 75%
Water Pump	Triplex, ceramic plunger, positive displacement, oil bath crankcase
Pump Motor:	
~~Single Phase~~	~~7 1/2 H.P., 1725 RPM, open drip-proof enclosed magnetic starter with manual reset thermal overload protection, UL approved~~
Three Phase	7 1/2 H.P., 1725 RPM, open drip-proof, enclosed magnetic starter with manual reset thermal overload protection, UL approved
Drive System	Belt driven, cast iron pulleys
Burner:	
Type	Oil fired, pressure atomizing, forced air, flame retention, automatic electric ignition, UL approved
Burner Motor	1/4 H.P., 3450 RPM, manual reset thermal overload protection
Burner Nozzle:	
Size	2.50/80° B Delavan
Consumption	2.96 gallons per hour
Smoke Density	No. 0 or No. 1 per ASTM D2156
Fuel Type	No. 1 or No. 2 fuel oil or kerosene
BTU Input	414,000 BTU/HR
Combustion Chamber	Ceramic fiber, enclosed in stainless steel
Fuel Tank	10.0 US gallons, 3 38 full load running hours, stainless steel, replaceable element fuel filter with 35 sq. in. filter media
Exhaust Outlet Size	8 inch diameter (permanent installation requires a draft diverter)
Heat Exchanger	1/2 inch O.D., 100 feet continuous length tubing, stainless steel coil in stainless steel insulated wrapper
Outlet Water Temperature	135°F minimum temperature rise above inlet ambient
Safety Relief Valve	Relieves excessive system pressure
Controls:	
Temperature	Adjustable to 210°F, automatic thermostat
Electrica	Heavy duty rotary switch, 3-position: OFF, PUMP ONLY, PUMP AND HEAT
Vacuum Switch	Immediate burner ignition shutoff upon trigger release or lack of water flow
Pressure Output	Preset to 2200 PSI maximum at factory, adjustable 1100 PSI through 2200 PSI by chemical valve on dual lance
Chemical Injection:	
High Pressure	Upstream from pump, activated by chemical valve on unit, chemical siphon ratio adjustable to 19.1 parts water to 1 part chemical maximum
Low Pressure	Downstream from pump, activated by reducing pressure by chemical valve on dual lance during operation and controlled by knob on injector, chemical siphon ratio adjustable to 7 90 parts water to 1 part chemical maximum
Inlet Strainer	80 mesh stainless steel, inline, 19 sq. in. filter media
Fittings	Brass and cadmium plated hydraulic fittings
Float Tank	1.70 US gallons, stainless steel, brass float valve, automatic fill for backflow prevention
Body	All stainless steel, exterior surfaces polished
Gun	Trigger controlled, insulated with safety lockoff, 3500 PSI rated
Lance	Adjustable pressure control, insulated dual type
Water Nozzles	One 15° fan, 6.0 orifice, high pressure One 40° fan, 60 orifice, low pressure-chemical
Hose	High pressure, 50 feet x 3/8 inch steel wire braided, oil and chemical resistant, 2500 PSI working and 10,000 PSI burst pressure
Portability	Two 13/5.00 pneumatic tires and wheels and one 5 inch swivel caster
Dimensions	42 inch (length) x 30 inch (width) x 45 inch (height)
Weight	420 Lbs., 190 Kg. dry net weight
Optional Equipment	Painted or stainless steel lifting hook, painted or stainless steel pull handle, steam combination, natural gas or propane fired burner, 480 Volt (three phase), dual trigger gun operation

Form #1484-1286-6M

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Start up/shut Down Procedures

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Mi - T - Hot Wash

Start Up Operation Procedures

1. Fill the fuel tank with a good quality clean No. 1 or No. 2 Fuel oil or kerosene.

2. Turn "ON" Water supply, WAIT 30 Seconds.

3. The main switch on the front of the machine has three settings:
   A. "OFF" - entire unit is off.
   B. "PUMP" - high/low pressure cold water only. There is no heat.
   C. "HEAT" - The burner and pump both operating. High or low pressure hot water only.

4. Turn switch to "PUMP" position. Brace yourself and squeeze trigger on gun. Keep trigger on gun squeezed for at least 30 seconds to purge all air from the system. NOTE: At this point the machine is operating as a cold water pressure washer. It can be used very effectively in many applications where hot water is not necessary. It is recommended at this point for the operator to spend a few minutes "getting the feel" of the gun and wand assembly. Experiment to determine the most comfortable way to hold the gun/wand. Trigger the gun several times. Adjust the low pressure/secondary metering valve on the dual lance to desired pressure.

5. For hot water, release trigger on the gun. Turn switch to "HEAT" position Squeeze trigger. On initial startup, water will begin turning hot in approximately 20 seconds, and will reach maximum temperature in one minute, provided the trigger remains squeezed. The burner will stop firing when the trigger is pulled. NOTE: Periodically while spraying, the burner may stop firing. This is normal. The automatic thermostat will cause combusion to cease when the temperature of the water exceeds the temperature setting of the thermostat. Combustion will begin again once the water temperature drops below the setting of the thermostat.

Shut Down Procedures

IMPORTANT: Never turn the switch from "HEAT" to "OFF" and walk away. For safety and mechanical reasons you must follow the procedures outlined below:

1. Release trigger on gun.

2. Turn switch to "PUMP" position.

3. Switch trigger allowing cold water to cool the coil/heat exchanger for a period of at least three minutes.

4. Release trigger.

5. Turn switch to "OFF" position .

6. Turn off water supply.

7. Store machine indoors, out of freezing temps and other adverse conditions.

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Low Pressure chemical cleaning

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Mi - T - Hot Wash

To Clean With Chemicals Under Low Pressure

1. Prepare your chemical solution accordint to label directions.
2. Make sure machine is off. NOTE: If machine has been operating in the hot water mode, be certain to follow the shut-down/cool-down procedures outlined previously.
3. Disconnect the high pressure hose from the discharge quick connect on the machine.
4. Insert the siphon injector assembly into the discharge quick connect. (ILL 2, p12 Item 13)
5. Connect the high pressure hose into the siphon injector assembly.
6. Turn the adjusting knob on the injector assembly a few rounds conterclockwise. NOTE: The adjusting knob can be removed. If this occurs, simply thread back on one full round clockwise.
7. Place the filter end of the chemical hose into the solution container. NOTE: Be certain the filter end is totally immersed into the liquid.
8. Start the machine as usual. Upon triggering the gun, water will begin spraying out of the high pressure nozzle. Release the trigger. Turn the low pressure secondary chemical valve control counter-clockwise to drop pressure to a light soft spray.
9. Upon triggering the gun, the flow will discharge our of the low pressure chemical nozzle. A short while later a chemical will follow.
10. While spraying low pressure chemicals, hold the nozzle approximately two feet from the surface being cleaned and completely "mist-wet" the object.
11. To rinse with water under high pressure, simply release the trigger. Turn the low pressure/secondary chemical valve fully clockwise. Low pressure chemical flow can be metered or shut off at the wand in this manner. (ILL 22 p. 48 Item 17)
12. Chemical flow can also be meter or shut off at the machine by turning the adjusting knob on the injector assembly. Clockwise for no chemical, counter clockwise for chemical
13. To shut down, first, siphon a gallon water through the injector to rinse any caustic chemicals to prevent complications during future use.
14. Shut down the machine in normal fashion as previously described.
15. Remove injector assembly.
16. Connect high pressure hose to discharge quick connect to machine.

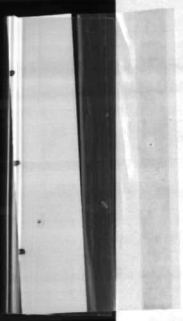


ILLUSTRATION #2
FEATURES & CONTROLS

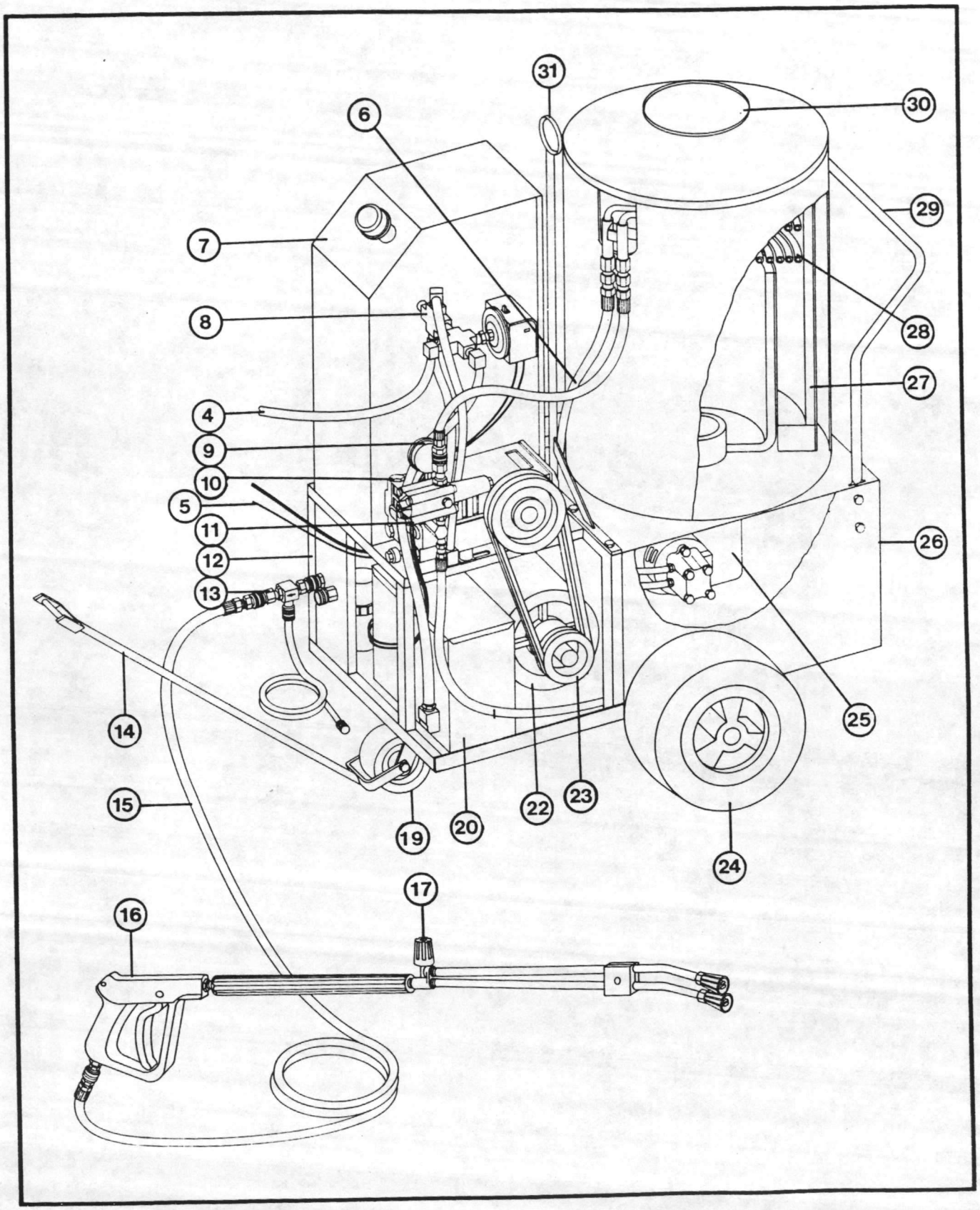
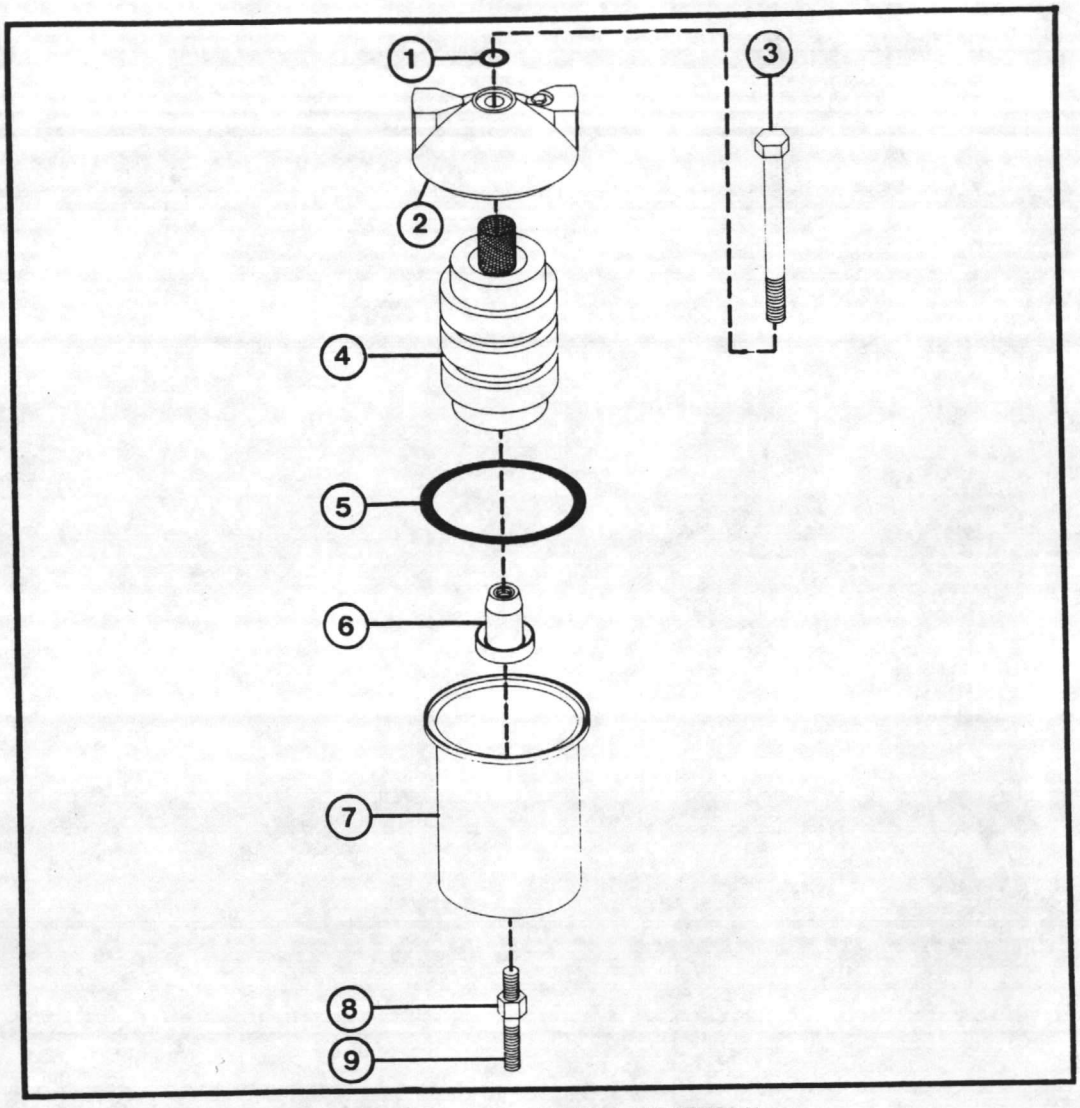


ILLUSTRATION #21

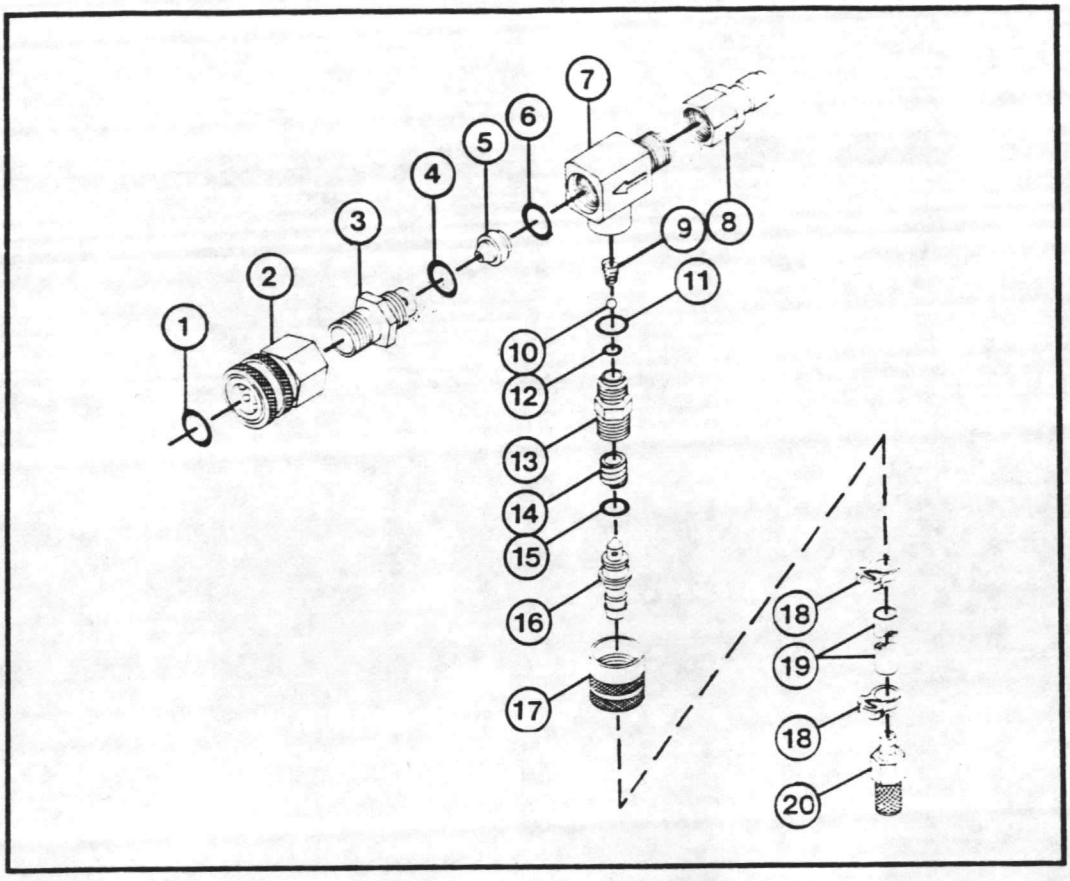


COMPLETE OIL FILTER ASSEMBLY

Ref. No.	Description	Part No.
1	Gasket	**
2	Cap	*
3	3/8"-16 x 3-1/2" HHCS	27-0127
4	Element	19-0010
5	Gasket	**
6	Coupler	*
7	Cup	*
8	3/8"-16 Hex nut 3	30-0006
9	Stud	31-3246
	Complete Oil Filter (Includes items 1, 2, 4-8)	19-0012

*Not available separately, must order complete filter assembly
**Not available separately, must order either complete filter assembly or #5 Element

ILLUSTRATION #22



COMPONENTS FOR LOW PRESSURE CHEMICAL VENTURI ASSEMBLY

Ref. No.	Description	Part No.
1	O-ring for 3/8"F quick connect	25-0123
2	3/8"F x 3/8"F quick connect	17-0004
3	Nipple	8-0130
4	O-ring	25-0051
5	Orifice, 2.1mm	8-0121
6	O-ring	25-0050
7	Body	50-0015
8	3/8"F x 3/8"M quick connect	17-0006
9	Stainless steel tapered spring	49-0020
10	Stainless ball	50-0012
11	O-ring	25-0014
12	O-ring	25-0045
13	Valve seat	50-0014
14	Spring	49-0019
15	O-ring	25-0046
16	Shutter barb	50-0013
17	Adjusting knob	7-0024
18	Clamp	42-0001
19	Chemical hose (6 feet required)*	15-0021
20	Chemical strainer	19-0019
	Complete Low Pressure Chemical Siphon Injector Assembly (Includes all items shown above)	850-0021

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Mi - T - Hot Wash

To Clean With Chemicals Under High Pressure

1. IMPORTANT: This feature is designed for use with MILD soaps and detergents ONLY. Since the chemicals travel through the coil/heat exchanger and pump, DO NOT use corrosives as they may cause extensive damage.

2. Prepare chemical solution according to label directions.

3. Start the machine as directed in start-up/operation procedure outlined previously.

4. Insert the filter end of the clear vinyl chemical hose (ILL. #1, Item 4) into your chemical container. NOTE: Make certain the filter is totally immersed in the liquid.

5. Locate the "high pressure chemical metering valve" on the front of the machine. (ILL. #1, Item 2)

*6. Loosen thumbscrew on primary knob (Ill. #7, pg 24). Turn knob fully counter clockwise and tighten thumbscrew.

7. Turn secondary knob to fully "open" position as shown (ILL. #7, pg 24)

8. Turn knob on dual lance clockwise to "closed" position for high pressure operation. (Ill #7, pg. 24)

9. Brace yourself, and squeeze the trigger on gun. In a few moments a detergent/water mixture will exit the high pressure nozzle on dual lance.

10. Although this feature has been designed primarily for high pressure chemical injection, it can also be used as a "low pressure" injector simply by turning the knob (ILL #6, pg. 24) counter-clockwise, which diverts flow from the high pressure nozzle to the low pressure nozzle.

11. To apply chemical solution, start spraying the lower portion of the surface being cleaned and move up, using long, overlapping strokes.

12 To rinse, turn both the primary and secondary knobs on the high pressure chemical metering valve to the "OFF" position as shown (ILL #7 pg 24) will take approximately 30 seconds to purge all chemical from the line.

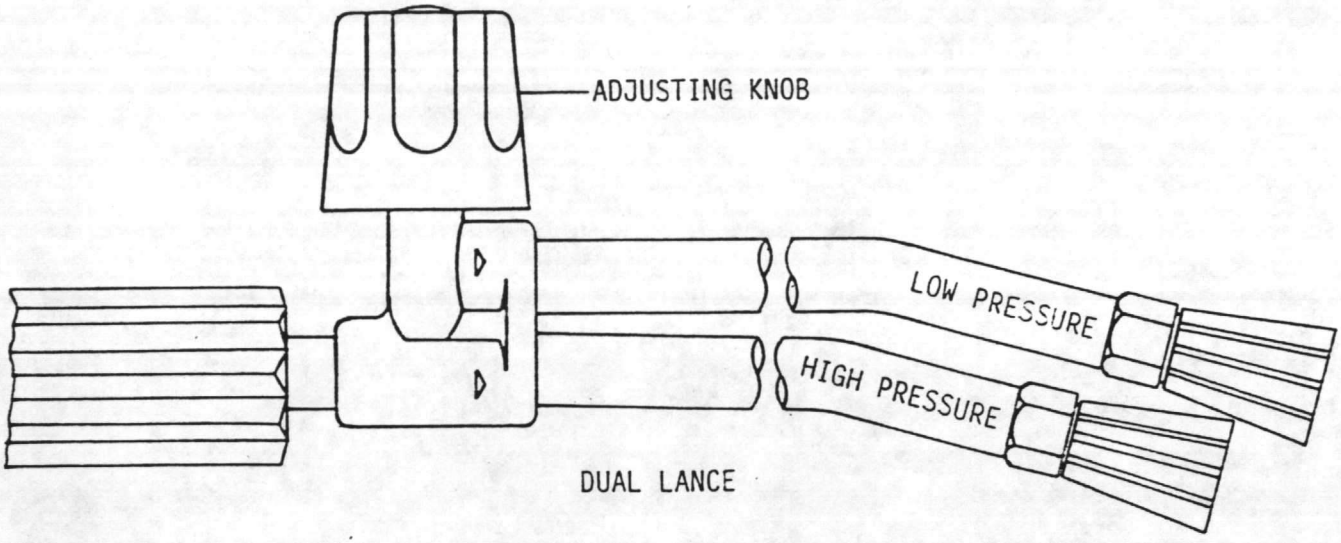
13. For best rinsing results (to avoid "streaking"), start at the top and work down.

14. It is always recommended that a gallon of water is siphoned through the high pressure injection system after each use. This prevents the possibility of corrosion or detergent residue causing mechanical problems during the next use.

15. IMPORTANT: The metering valve must be turned to the "OFF" position as shown (ILL #7, pg. 24), when not in use, or when chemical filter is not totally submerged in solution. If not, the pump will lose its prime, resulting in no spray discharge at the nozzles, and over an extended period of time, damage the pump.

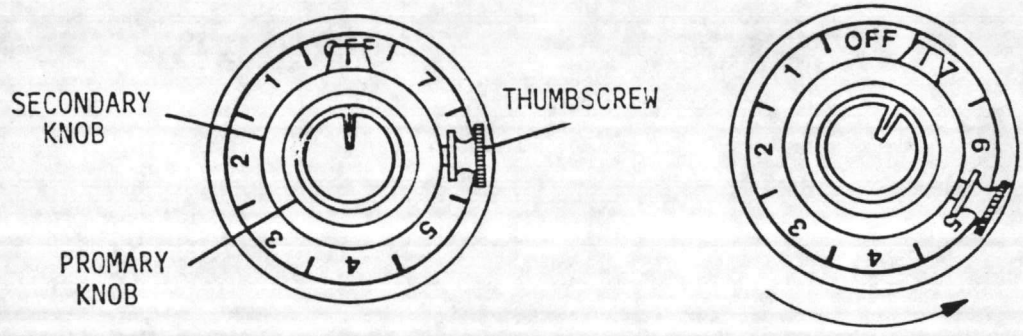
*NOTE: The chemical siphon rate can be metered to the desired chemical ratio, by setting the primary knob to any of the numbers 1 through 7 on the dial. Some experimentation will be required to determine the most efficient siphoning rate for your needs .

ILLUSTRATION #6
LOW PRESSURE CHEMICAL METERING VALVE



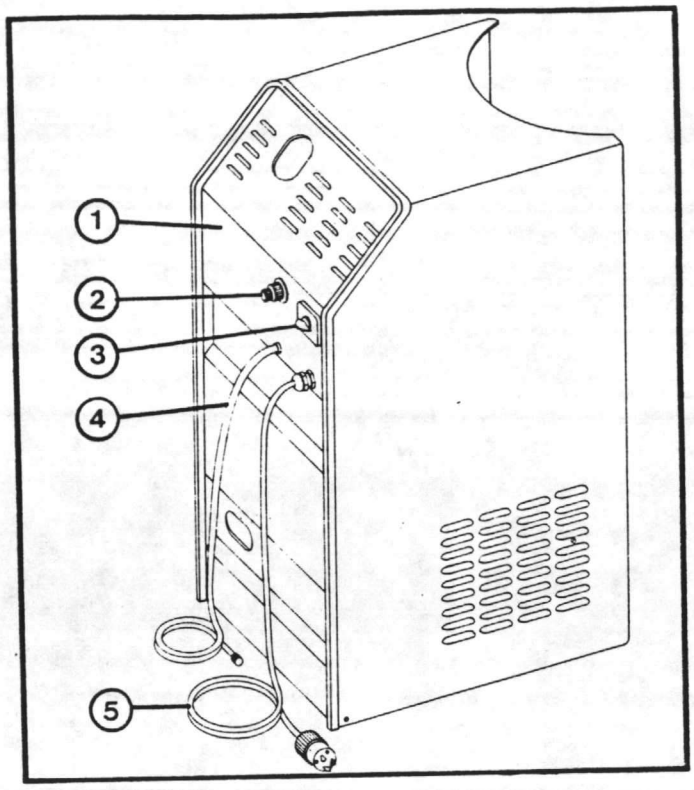
DUAL LANCE

ILLUSTRATION #7
HIGH PRESSURE CHEMICAL METERING VALVE



SHOWN IN FULLY CLOSED POSITION SHOWN IN FULLY OPEN POSITION

ILLUSTRATION #1



FEATURES & CONTROLS

Ref. No.	Description
	ILLUSTRATION #1
1	Stainless steel hood
2	High pressure chemical metering valve
3	Main 3-position switch
4	High pressure chemical injection siphon hose with strainer
5	10 foot electrical cord with plug
	ILLUSTRATION #2
6	Wire braided high pressure hoses
7	Stainless steel float tank, 10 U.S. gallon capacity
*8	Vacuum switch manifold
9	Glycerine filled gauge
10	High pressure pump
11	Flow sensing regulating unloader valve
12	Replacement element fuel filter (hidden from view) Adjustable thermostatic temperature control (hidden from view)
13	Low pressure chemical siphon injector with hose and strainer
14	Pull handle (optional)
15	50 foot wire braided high pressure hose
16	Insulated trigger gun with safety lock-off
17	Low pressure/secondary chemical valve
18	Inlet water filter
19	Caster
*20	Stainless steel float tank with brass float valve
22	Motor
23	Cast iron pulleys for motor & pump
24	Fully pneumatic tires
25	Oil fired burner
26	Heavy gauge stainless steel frame
27	Ceramic lined, stainless steel combustion chamber
28	Stainless steel heat exchanger/ coil assembly
29	Stainless steel push/pull handle
30	8" stainless steel exhaust outlet
31	Lifting eye (optional)

*On 1Ø and 3Ø units, #8 & #20 are installed in opposite locations

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⚠ SAFETY WARNINGS ⚠

1. Service should only be performed by a Mi-T-M distributor or qualified professional. DO NOT attempt repairs on your own. Perform only the simple steps outlined in the troubleshooting section of this manual.

2. DO NOT put hands or face directly over exhaust. Serious injury may result.

3. READ AND UNDERSTAND all operation, installation and safety tips described herein. Provide a copy of this manual to anyone operating the machine. Failure to follow these simple guidelines can result in serious personal injury or machine malfunction.

4. THIS MACHINE MUST BE PROPERLY ELECTRICALLY GROUNDED. Failure to insure proper grounding risks serious personal injury.

5. Observe ALL state, local and national codes providing for installation of electrical service and allow your Mi-T-M serviceman or a qualified electrician to work on the electrical features of your pressure washer.

6. Observe ALL state, local and national codes providing for indoor installation of this unit. Consult your Mi-T-M serviceman or a qualified heating or furnace contractor for proper ventilation procedures necessary for safe permanent indoor installation.

7. NEVER operate this machine in the presence of flammable vapors or combustible dust, gases or other combustible materials. (To prevent the possibility of explosion or fire.) When servicing this machine, be especially careful to properly dispose of any flammable materials.

8. When using indoors or in a closed area, ALWAYS make certain there is adequate air (oxygen) for combustion to prevent the presence of poisonous carbon monoxide gases. Beware of poorly ventilated areas or exhaust fans which can cause inadequate combustion, or motor overheating.

9. To prevent the possibility of fire, be certain the machine is shut down (as described on pp. 20 & 21) before refueling. NEVER attempt to refuel while machine is operating.

10. When leaving the unit unattended, ALWAYS unplug from the wall receptacle to prevent the possibility of inadvertent motor or burner startup in the event of a switch failure.

11. Before attempting any repairs on the machine, BE CERTAIN to unplug the cord

from the wall receptacle, plug in again only to verify troubleshooting success.

12. NEVER point the nozzle at yourself or anything that you do not intend to spray. Doing this can cause serious injury to the operator or bystander(s).

13. ALWAYS hold on firmly to the gun/dual lance assembly when starting and operating the machine. Failure to do so can cause the wand to fall and "whip" dangerously. NEVER operate the gun with the trigger "wired" in the open position.

14. ALWAYS wear protective goggles when operating the machine to shield eyes from flying debris. Other protective equipment such as rubber suits, gloves and respirators are advisable when using cleaning chemicals of a corrosive nature.

15. Keep the machine and any toxic chemicals you may be using for cleaning away from children. Know your chemicals and the necessary safety precautions when using them. Be prepared to tell a physician exactly what chemicals you were using should the necessity arise. DO NOT use highly corrosive chemicals or acid type cleaners with the pressure washer.

16. DO NOT leave the machine unattended after shutdown until it is completely cooled down as described by the shutdown/cooldown procedures outlined in this manual. (See pp. 20 & 21)

17. When quick connecting high pressure hoses to the machine, or the gun/dual lance assembly, BE CERTAIN the "collar" on the female quick connect is locked securely.

18. High pressure hoses should be inspected on a daily basis for leaks or signs of wear. If evidence of failure exists, promptly replace all suspect hoses to prevent the possibility of burns or injury from high pressure spray. If a hose is leaking, NEVER place your hand directly on the leak.

19. DO NOT turn the main 3-position switch to the "HEAT" position unless water is spraying from the nozzle at the end of the gun/dual lance, or water is not connected or turned on.

20. NEVER fill the fuel tank with anything other than good quality, clean No.1 or No. 2 fuel oil or kerosene. NEVER use gasoline.

21. Avoid contact with the exterior of the heat/coil exchanger assembly and the exhaust stack on the top of the machine to prevent the possibility of burns.

(SAFETY WARNINGS, CONT'D)

22. NEVER alter your machine in such a way as to exceed any of the system ratings or specifications outlined elsewhere in this manual. Your safety, as well as the function of the equipment, is at stake.

23. Use ONLY genuine Mi-T-M parts for repairs of your Pressure Washer. Failure to do so can create hazardous operating conditions and will void warranty.

24. Before plugging the unit into a compatible power source, be sure the main switch is in the "OFF" position.

25. DO NOT operate if you see any fuel oil, pump oil or water dripping from underneath the machine. DO NOT RESUME OPERATION until the machine has been inspected and repaired by your Mi-T-M serviceman.

26. The electrical cord and any connections should NEVER be allowed to lay in water. This creates a hazard and a potential for severe shock. All cords and connections should be inspected before each use for any cuts or scrapes. If the outside cover of the cord has been penetrated, do not operate until repairs are made.

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Preventive maintenance

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OPERATOR MAINTENANCE AND LONG LIFE GUIDELINES

1. You Mi-T-M dealer can show you how to clean the incoming water strainer on your machine. This must be done after every 20 hours of use. This is the only time you should expose the internal parts of your machine. Be certain the machine is off, and that the electrical supply is not connected when servicing the incoming water strainer.

2. Always be certain the machine is receiving proper voltage. If the use of an extension cord is desired consult your dealer. Be certain the cord is equipped with the appropriate 3-prong plug to insure proper grounding. Do not allow electrical cords or connections to lay in water or in such a position where water could come in contact with them.

3. Always follow the shut-down/cool-down procedures outlined in the "OPERATION" section of this manual.

4. DO NOT allow this machine to operate in bypass mode (with trigger closed) for more than three minutes without triggering the gun. Failure to follow this simple rule can cause premature failure of pump packing seals resulting in costly pump repair.

5. DO NOT allow the pump to run dry (without incoming water line attached and turned on) for more than ten seconds.

6. Promptly eliminate any leaks found in the pumping system by removing suspect parts, applying thread sealant to the threads and reinstalling. NOTE: If using teflon tape, be certain no tape gets inside any plumbing to prevent the possibility of a plugged spray nozzle.

7. NEVER allow this machine to operate with the switch in either the "PUMP" or "HEAT" position without the water supply turned all the way on.

8. The high pressure chemcial injection feature standard on this machine is NOT designed for use with highly corrosive cleaning agents such as acids. The use of acids or similarly corrosive materials jeopardizes the function of the equipment as well as the safety of the operator and will void warranty.

9. When not using the chemical injection feature, be sure the chemical valve on the front panel of the machine is not in the "ON" position. The clear vinyl chemical siphon hose should be rolled up to prevent damage from contact with the tires.

10. Upon finishing the use of either chemical injection feature, be certain to run one gallon of clean water through the injection line to flush out any possibly corrosive agents as well as to prevent the possibility of soap residue impairing any working parts.

11. Clean the chemical filters after each use to insure proper operation for the next job.

12. The oil in the pump crankcase must be changed after the initial 50 hours of unit operation, every 250 hours after that, or three months, whichever comes first. Consult your dealer first. Use only 30 weight non-detergent oil (SAE-30) and fill only to the notch on the dipstick. DO NOT OVERFILL.

Overfilling can cause excessive load on the motor which will cause high amperage draw. The oil level in the pump should be checked at least once weekly.

13. Use only a good quality, clean No. 1 or No. 2 fuel oil. Kerosene can be used but lacks some of the lubricating properties of No. 1 or No. 2 and can shorten the life of the fuel pump.

14. Have the fuel filter to the burner changed every six months or more often if necessary.

15. Have the screen in the fuel pump on the burner inspected and/or replaced at least once yearly.

16. Do not store the machine in a freezing environment. This can cause the coil/heat exchanger to rupture and "lock-up" conditions in the water pump. Never pour hot water on a frozen pump. A temperature change greater than 150°F can cause the pump to crack.

17. Never spray water directly onto the machine or allow the machine to remain outdoors where it can be exposed to rain or other adverse weather conditions.

18. If the mineral content of the incoming water supply is high, it is recommended that a water softener be installed to avoid the accumulation of mineral deposits in the coil/heat exchanger. If this is not possible, it will be necessary to "descale" the coil occasionally. Consult your Mi-T-M dealer.

19. Due to the unknown and often corrosive characteristics of many chemicals commonly used in the pressure washer cleaning industry, it may be necessary to repair or replace components of the chemical injectors (such as the chemical metering valve, venturi assembly, and/or dual lance valve) periodically as part of normal maintenance.

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maintenance

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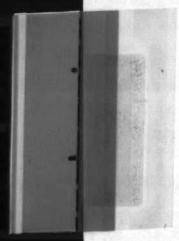
OPERATOR TROUBLESHOOTING

PROBLEM	CAUSE	REMEDY
Pump runs but there is no pressure.	Water turned off.	Check incoming water supply.
	Obstruction in nozzle.	Clean or replace.
	High pressure chemical valve is open without the end of the hose inserted into chemical (causes vacuum leak and eliminates prime).	Close valve or submerge chemical hose into solution. Or consult Mi-T-M service dealer.
Pump runs but has low pressure.	Nozzle not installed.	Follow nozzle assembly procedure on p. 18.
	Inadequate incoming water supply.	Increase hose diameter or provide sufficient water supply.
	Wrong size or worn high pressure nozzle.	Replace with correct or new nozzle.
	Dual/lance valve is open.	Dual lance valve must be closed for maximum operating pressure. Or consult Mi-T-M service dealer.
Pump runs but there is eratic, fluctuating pressures; hose pulsates.	Not enough water is supplied.	Use larger inside diameter hose.
	Inlet strainer is clogged.	Clean strainer screen.
	Air entering water lines.	Check all incoming hose connections for watertight seals. Or consult Mi-T-M service dealer.
Burner will not heat.	Switch not in "heat" position.	Check switch position.
	Chemical metering valve is open without end of hose in solution; this causes safety devices to turn off fuel to burner.	Close valve or submerge hose into chemical.



(OPERATOR TROUBLESHOOTING, CONT'D.)

PROBLEM	CAUSE	REMEDY
Burner will not heat (cont'd).	Out of fuel.	Refuel. Or consult Mi-T-M service dealer.
Burner discharges white smoke.	Low on fuel.	Refuel. If after refueling it still smokes white, consult dealer.
Burner discharges black smoke.		Shut off machine and consult Mi-T-M service dealer.
Chemical will not siphon into high pressure injection line.	Clogged nozzle.	Clean or replace high pressure nozzle.
	Chemical strainer plugged or not submerged in solution.	Check screen on strainer, submerge in solution.
	Valve clogged.	Check valve knob position.
	Chemical hose cut or kinked.	Inspect hose, replace as necessary. Or consult Mi-T-M service dealer.
Chemical will not siphon into "low pressure" injector.	Knob on venturi is closed (turned all the way clockwise).	Check and adjust knob if necessary.
	Knob on dual lance must be turned counterclockwise to initiate chemical flow.	Check and adjust knob if necessary.
	Chemical strainer plugged or not submerged in liquid.	Check screen on strainer.
	Chemical hose cut or kinked.	Inspect hose, replace as necessary.
	Working parts of venturi assembly stuck, corroded or missing.	Disassemble and clean. Replacing parts as needed. Or consult Mi-T-M service dealer.

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Mi-T-M CORPORATION WARRANTY

PLEASE RETAIN THIS WARRANTY CARD FOR YOUR RECORDS

Mi-T-M Corporation warrants its high pressure washers (excluding engine/motor which is covered by separate warranty) to be free from defects in factory materials or workmanship for a period of one year from the date of purchase. Defective parts not subject to normal wear and tear will be repaired or replaced at our option during the warranty period. In any event liability is limited to the purchase price paid. This warranty does not cover parts damaged due to normal wear, misapplication, misuses, operation at other than recommended speeds, pressures or temperatures. Parts damaged or worn because of the use of caustic liquids or by operation in abrasive or corrosive environments or under conditions causing pump cavitation are not warranted. Failure to follow recommended operating and maintenance procedures also voids warranty.

Parts returned, prepaid, to our factory will be inspected and replaced free of charge if found to be defective and subject to this warranty. All trade accessories and the engine/motor shall be subject only to the warranty of the respective manufacturers.

There are no warranties which extend beyond the description of the face hereof. Under no circumstances shall Mi-T-M Corporation have any responsibility for loss of use of the unit, loss of time, inconvenience, commercial loss or consequential damages.

Model No. _____

Date of Purchase _____ Serial No. _____

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TAB PLACEMENT HERE

DESCRIPTION:

Tool accessories

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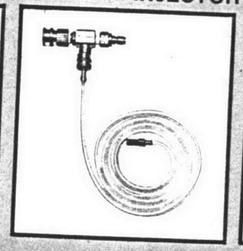
ACCESSORIES

ASK YOUR DEALER ABOUT THESE OTHER FINE Mi-T-M PRODUCTS

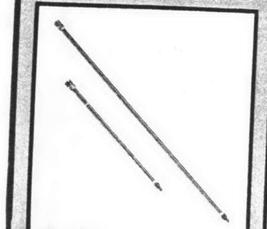
SAND INJECTOR

CHEMICAL INJECTOR

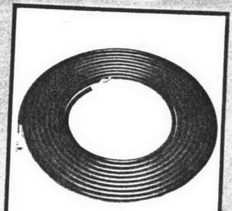


CLEANING AGENTS

WAND EXTENSIONS



HOSE



ROTATING BRUSH

Form#1710-387-5M

SPECIAL TOOLS REQUIRED FOR MAINTENANCE - NONE.

through (when trigger is squeezed) or it stops the flow of water (when trigger is released). With the Trigger Gun squeezed, water passes through the Low Pressure/Secondary Chemical Valve (16) which when closed allows water out of the High Pressure Water Nozzles (17) or can be adjusted open to allow water out of the Low Pressure Chemical Nozzle (18). When the Low Pressure/Secondary Chemical Valve is closed, water then flows out the High Pressure Water Nozzle at maximum PSI onto the targeted surface being cleaned. For low pressure chemical use, the Low Pressure/Secondary Chemical Valve must be at least partially open (causing a pressure reduction). The Low Pressure/Primary Chemical Venturi (19) must also be in the open position with the chemical line submerged in liquid for low pressure injection to occur.

Although this has been a very limited and simplified overview, it should give you the information you need to understand how your machine operates. Answers to any related questions may be found elsewhere in this manual or answered by your Mi-T-M dealer.

ILLUSTRATION #4
WIRING DIAGRAM-MODELS HW-2205-ME1 & HW-3004-ME1

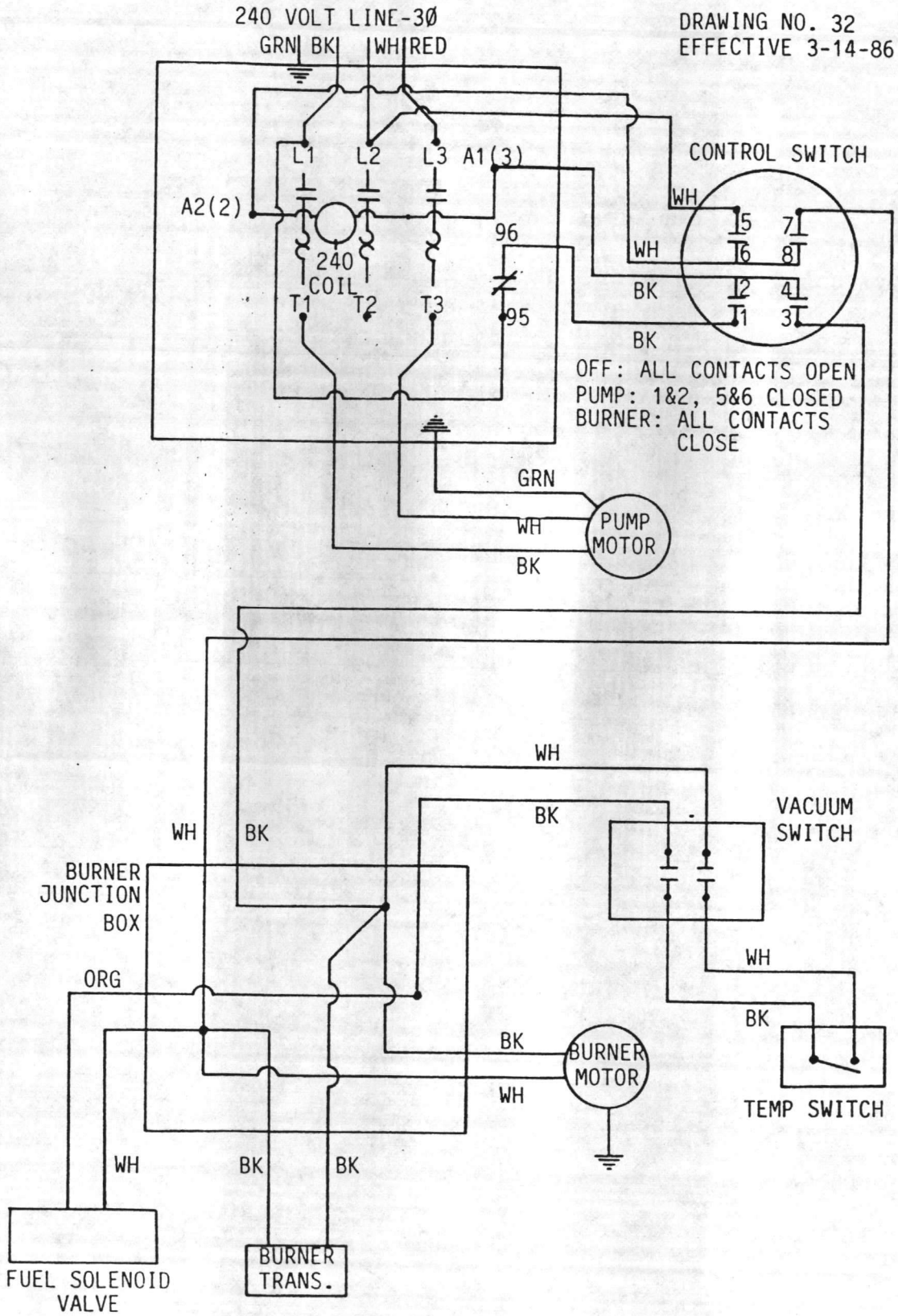
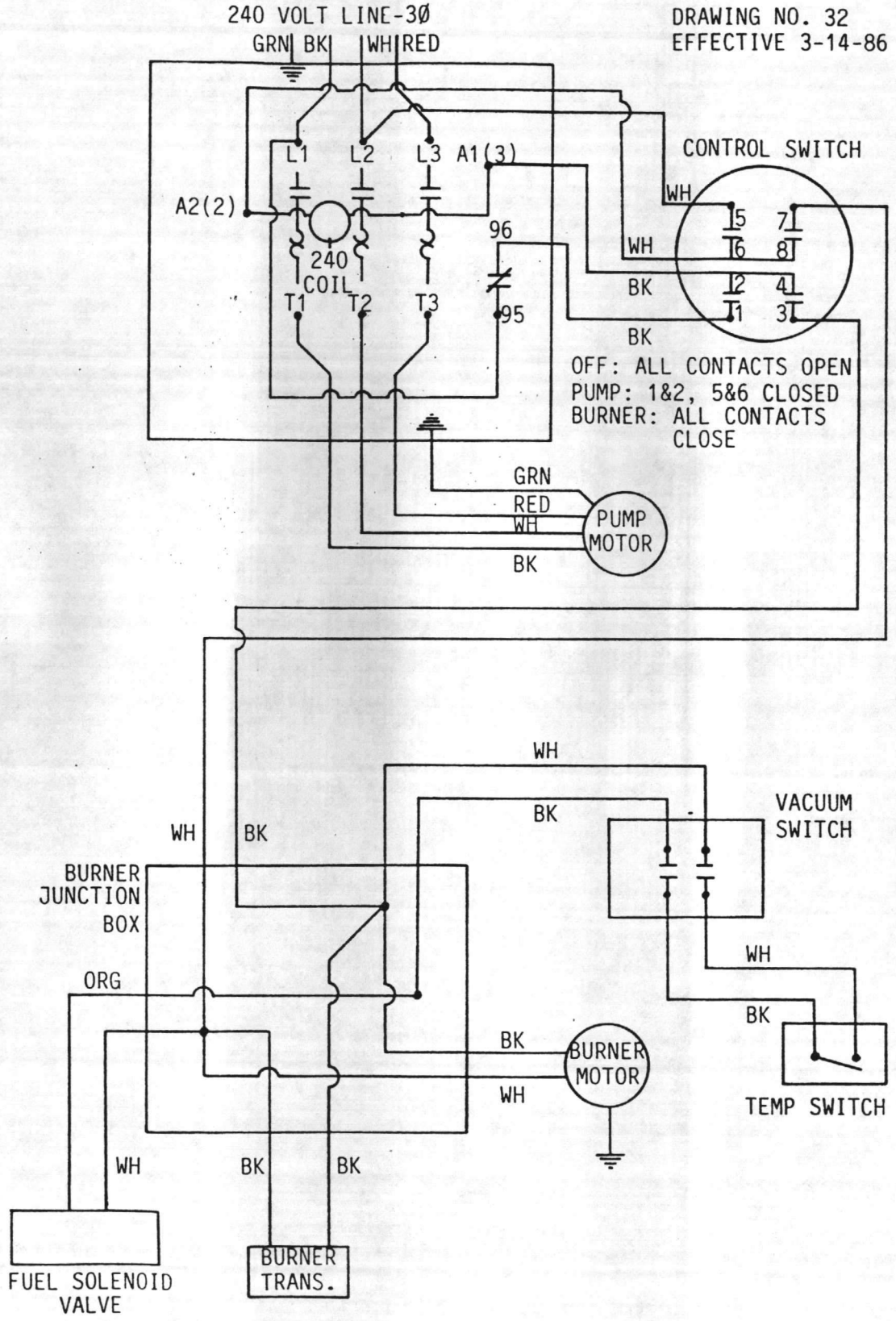


ILLUSTRATION #5
WIRING DIAGRAM MODELS HW-2205-ME3 & HW-3004-ME3



INSTALLATION

DELIVERY:

1. To uncrate, cut plastic banding (use eye protection), and remove carton, loosen caster nut, remove caster from angle iron, reinstall caster nut and roll machine off of pallet.

2. Once the machine has been uncrated, inspect for signs of obvious or concealed freight damage. If damage does exist, notify the transportation company immediately to file a claim. Be sure that all damaged parts are replaced and that the mechanical problems are corrected prior to installation or operation of the unit.

3. Inspect the contents of the carton and be sure no components are missing. Refer to the "Features and Controls" diagram (ILL. #1 & #2, pp. 11 & 12) for comparison. Also, refer to the "Quality and Controls Checklist" sheet which is attached to the machine. If something appears to be missing, contact your Mi-T-M dealer immediately.

4. Your Mi-T-M dealer is qualified to install this machine. If your dealer has not been contracted for installation, follow the procedures for installation outlined below, employing professionals as prescribed.

ASSEMBLY:

The following assembly procedures must be followed before operation:

1. High pressure spray nozzle: (ILL. #23, p. 49, Item 5)
   A. Remove the high pressure spray nozzle which is tied to the handle mounting holes on the rear of the machine.
   B. Apply a pipe thread sealant and, using a 9/16" socket and ratchet, tighten into the end of the dual lance.
   C. If using teflon tape, be careful to avoid getting any inside the spray nozzle.

2. Push/pull handle must be assembled: (ILL. #8, p. 30, Item 9)
   A. With a flathead screwdriver remove the four screws (Item 4) and remove the cover plate (Item 36).
   B. Locate the handle (usually shipped under the machine on the pallet) and the handle hardware (usually shipped on top of Item 1).
   C. Slide handle (Item 9) into mounting slots on back of frame.
   D. Install Items 8, 10, 11 & 39. Tighten using a 1/2" socket and boxend wrench.
   E. Replace cover plate (Item 36) and tighten the four screws (Item 4).

ELECTRICAL:

1. Mi-T-M recommends that any electrical service be done by a qualified licensed electrician.

2. Be sure that all electrical connections are made in accordance with local and national codes. Failure to do so will void warranty.

3. The unit MUST be properly electrically grounded and connected to a circuit that is wired for the voltage specified on the identification plate on the front of the machine.

(INSTALLATION, CONT'D)

4. Consult your Mi-T-M dealer concerning the use of extension cords. Install any cord in such a way as to prevent connections from being exposed to water and possibly causing an electrical hazard.

VENTILATION:

A qualified serviceman, familiar with applicable local, state and federal codes should be contacted prior to installation indoors or in a closed area. The burner exhaust should be stacked to the outside atmosphere and a barometric draft regulator should be installed as well.

INSTALLATION PRECAUTIONS:

1. The machine should only be installed on a level surface.

2. Do not install the unit where combustible materials, vapors or dusts are present or likely to be present.

3. If the machine is installed in a closed area be certain the ambient temperature in that environment does not exceed 100°F, and insure adequate air supply for the burner.

4. When not in use do not leave the unit exposed to rain, snow or freezing temperatures. Never spray water directly into the machine.

WATER SUPPLY:

1. The water supply should be transferred from the faucet through a 3/4" hose or pipe. If the inlet water pressure is less than 40 PSI, a larger diameter hose may be required. Consult your dealer.

2. If the mineral content of the water in your area is extremely high, the use of a water softener is recommended to prevent the possiblity of excessive scale build-up in the coil/heat exchanger.

SET-UP

Once the machine has been installed properly by a qualified Mi-T-M serviceman or equivalent thereof, you are ready to set up for operation. Follow the steps below:

1. Hook up a 3/4" I.D. garden hose no longer than 50' to your pressurized city water supply or equivalent. The incoming water supply should be at least 40 PSI. Thread the other end of the hose to the swivel connector on the front of the machine.

2. Connect the male quick connect fitting on the 50' high pressure hose to the female quick connect on the front of the machine.

In the same manner, connect the trigger gun assembly to the other end of the high pressure hose. NOTE: Be certain quick connects are "locked" securely before proceding.

(SET-UP, CONT'D)

3. Turn the main 3-position switch to the "OFF" position. Connect the power source securely. NOTE: Be certain the incoming voltage has identical specifications as that on the power washer name plate.

4. Fill the fuel tank with a good quality clean No. 1 or No. 2 fuel oil or kerosene.

START-UP, OPERATION

1. Turn on water supply, wait 30 seconds.

2. The main switch on the front of the machine has three settings:
   A. "OFF" - entire unit is off.
   B. "PUMP" - high/low pressure cold water only. There is no heat.
   C. "HEAT" - The burner and pump both operating. High or low pressure hot water only.

3. Turn switch to "PUMP" position. Brace yourself and squeeze trigger on gun. Keep trigger on gun squeezed for at least 30 seconds to purge all air from the system. NOTE: At this point the machine is operating as a cold water pressure washer. It can be used very effectively in many applications where hot water is not necessary. It is recommended at this point for the operator to spend a few minutes "getting the feel" of the gun and wand assembly. Experiment to determine the most comfortable way to hold the gun/wand. Trigger the gun several times. Adjust the low pressure/secondary metering valve on the dual lance to desired pressure. (ILL. #6, p. 24)

4. For hot water, release trigger on the gun. Turn switch to "HEAT" position. Squeeze trigger. On initial startup, water will begin turning hot in approximately 20 seconds and will reach maximum temperature in one minute, provided the trigger remains squeezed. The burner will stop firing when the trigger is pulled. NOTE: Periodically while spraying, the burner may stop firing. This is normal. The automatic thermostat will cause combustion to cease when the temperature of the water exceeds the temperature setting of the thermostat. Combustion will begin again once the water temperature drops below the setting of the thermostat.

SHUT-DOWN PROCEDURES

IMPORTANT: Never turn the switch from "HEAT" to "OFF" and walk away. For safety and mechanical reasons you must follow the procedures outlined below:

1. Release trigger on gun.

2. Turn switch to "PUMP" position.

3. Squeeze trigger allowing cold water to cool the coil/heat exchanger for a period of at least three minutes.

4. Release trigger.

5. Turn switch to "OFF" position.

(SHUT-DOWN PROCEDURES, CONT'D)

6. Turn off water supply.

7. Disconnect and roll up all hoses and electrical cords.

8. Store machine indoors, out of freezing temperatures and other adverse weather conditions.

TO CLEAN WITH CHEMICALS UNDER LOW PRESSURE
(For use with mildly corrosive solutions)

INSTALLATION:

1. Prepare your chemical solution according to label directions.

2. Make sure machine is off. NOTE: If the machine has been operating in the hot water mode, be certain to follow the shut-down/cool-down procedures outlined previously in this manual.

3. Disconnect the high pressure hose from the discharge quick connect on the machine.

4. Insert the siphon injector assembly into the discharge quick connect. (ILL. #2, p. 12, Item 13)

5. Connect the high pressure hose into the siphon injector assembly.

6. Turn the adjusting knob on the injector assembly a few rounds counter-clockwise. NOTE: The adjusting knob can be removed. If this occurs, simple thread back on one full round clockwise.

7. Place the filter end of the chemical hose into the solution container. NOTE: Be certain the filter end is totally immersed into the liquid.

OPERATION:

After following installation procedures outlined above, procede as follows:

Start the machine as usual. Upon triggering the gun, water will begin spraying out of the high pressure nozzle. (ILL. #6, p. 24) Release the trigger. Turn the low pressure/secondary chemical valve control counter-clockwise to drop pressure to a light soft spray. Upon triggering the gun, the flow will discharge out of the low pressure chemical nozzle. A short while later a chemical mixture will follow.

While spraying low pressure chemicals, hold the nozzle approximately two feet from the surface being cleaned and completely "mist-wet" the object.

To rinse with water under high pressure, simple release the trigger. Turn the low pressure/secondary chemical valve fully clockwise. Low pressure chemical flow can be metered or shut off at the wand in this manner.

(TO CLEAN WITH "LOW PRESSURE" CHEMICALS, CONT'D)

Chemical flow can also be metered or shut off at the machine by turning the adjusting knob (ILL. #22, p. 48, Item 17) on the injector assembly. Clockwise for no chemical, counter-clockwise for chemical.

SHUT-DOWN:

1. First, siphon a gallon of water through the injector to rinse any caustic chemicals to prevent complications during future use.

2. Shut down the machine as previously described on pp. 20 & 21.

3. Remove injector assembly.

4. Connect high pressure hose to discharge quick connect on machine.

TO CLEAN WITH CHEMICALS UNDER HIGH PRESSURE

1. IMPORTANT: This feature is designed for use with MILD soaps and detergents ONLY. Since the chemicals travel through the coil/heat exchanger and pump, DO NOT use corrosives as they may cause extensive damage.

2. Prepare chemical solution according to label directions.

3. Start the machine as directed in the "start-up/operation" procedure outlined previously in this manual.

4. Insert the filter end of the clear vinyl chemical hose (ILL. #1, p. 11, Item 4) into your chemical container. NOTE: Make certain the filter is totally immersed in the liquid.

5. Locate the "high pressure chemical metering valve" on the front of the machine. (ILL. #1, p. 11, Item 2)

*6. Loosen thumbscrew on primary knob (ILL. #7, p. 24). Turn knob fully counter-clockwise and tighten thumbscrew.

7. Turn secondary knob to fully "open" position as shown. (ILL. #7, p. 24)

8. Turn knob on dual lance clockwise to "closed" position for high pressure operation. (ILL. #7, p. 24)

9. Brace yourself, and squeeze trigger on gun. In a few moments a detergent/water mixture will exit the high pressure nozzle on dual lance.

10. Although this feature has been designed primarily for high pressure chemical injection, it can also be used as a "low pressure" injector simply by turning the knob (ILL. #6, p. 24) counter-clockwise, which diverts flow from the high pressure nozzle to the low pressure nozzle.

11. To apply chemical solution, start spraying the lower portion of the surface being cleaned and move up, using long, overlapping strokes.

(TO CLEAN WITH THE "HIGH PRESSURE" CHEMICAL INJECTION FEATURE, CONT'D.)

12. To rinse, turn both the primary and secondary knobs on the high pressure chemical metering valve to the "OFF" position as shown (ILL. #7, p. 24) will take approximately 30 seconds to purge all chemical from the line.

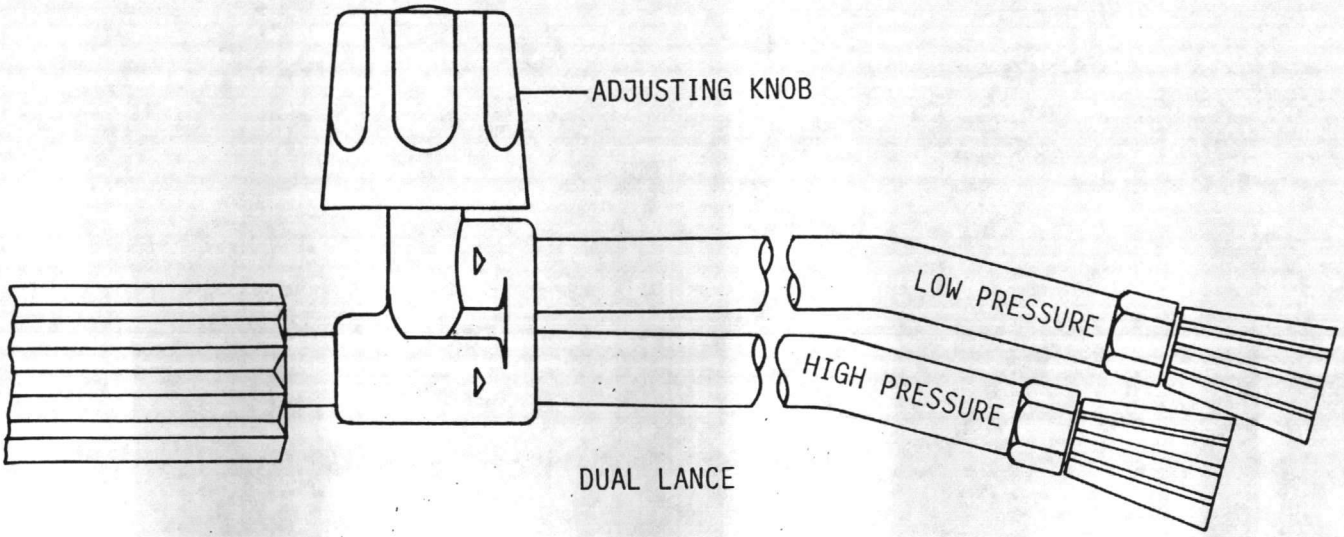
13. For best rinsing results (to avoid "streaking"), start at the top and work down.

14. It is always recommended that a gallon of water is siphoned through the high pressure injection system after each use. This prevents the possibility of corrosion or detergent residue causing mechanical problems during the next use.

15. IMPORTANT: The metering valve must be turned to the "OFF" position as shown (ILL. #7, p. 24), when not in use, or when chemical filter is not totally submerged in solution. If not, the pump will lose its prime, resulting in no spray discharge at the nozzles, and over an extended period of time, damage the pump.

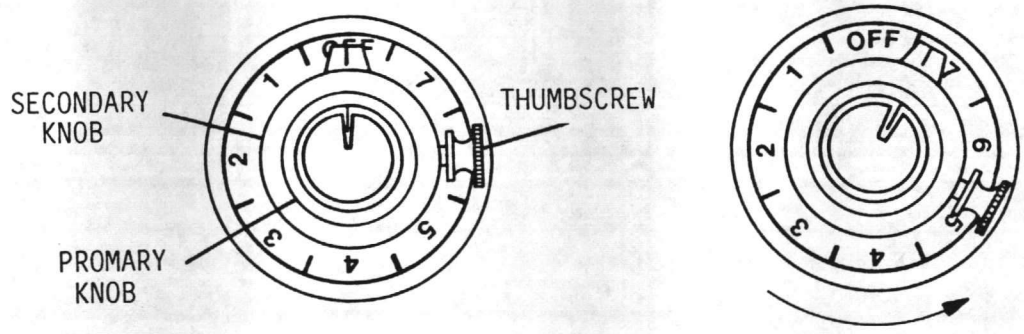
*NOTE: The chemical siphon rate can be metered to the desired chemical ratio, by setting the primary knob to any of the numbers 1 through 7 on the dial. Some experimentation will be required to determine the most efficient siphoning rate for your needs.

ILLUSTRATION #6
LOW PRESSURE CHEMICAL METERING VALVE



DUAL LANCE

ILLUSTRATION #7
HIGH PRESSURE CHEMICAL METERING VALVE



SHOWN IN FULLY CLOSED POSITION SHOWN IN FULLY OPEN POSITION

11001 1.2.3

Mi-T-M™

Mi-T Hot

STAINLESS STEEL SERIES

SUPERIOR HOT WATER POWER WASHERS

OPERATION AND PARTS MANUAL

- ☐ Model HW-2205-ME1
- ☑ Model HW-2205-ME3
- ☐ Model HW-3004-ME1
- ☐ Model HW-3004-ME3

OPTIONAL EQUIPMENT INSTALLED:

- ☐ 480 VOLT ELECTRICAL SERVICE
- ☐ STEAM COMBINATION OPTION
- ☐ NATURAL GAS FIRED BURNER
- ☐ LP GAS FIRED BURNER

Mi-T-M™ CORPORATION ▪ Peosta, IA 52068

800-553-9053 / In Iowa 800-942-0014 / Tx 853-875-MI T M UD

Form #37-0038-1087-1C

CONTENTS

INTRODUCTION

Congratulations on the purchase of your new Mi-T-Hot Pressure Washer! Your new hot water cleaning machine is one of the best and most innovative pressure washers to be introduced to the marketplace in recent years. It has been carefully designed to work reliably when used in the way intended with a minimal amount of maintenance.

The Mi-T-M Corporation has been manufacturing high pressure cleaning equipment since 1971. We think you will agree all these years of experience really shine through in our Mi-T-Hot Series.

This operators manual was compiled for your benefit. By reading and following the simple installation, operation, maintenance and troubleshooting steps described in this booklet, you will receive years of troublefree operation from your new Mi-T-Hot cleaning machine.

OPTIONS: IF ANY OF THE "OPTIONS" ARE CHECKED ON THE COVER OF THIS MANUAL, AN ADDEDENDUM EXPLAINING THE OPTIONAL EQUIPMENT IS AVAILABLE AND SHOULD BE INCLUDED AS PART OF THIS MANUAL. CONSULT YOUR Mi-T-M DEALER FOR FURTHER INFORMATION.

IMPORTANT: THE PARTS LISTING SECTION IN THIS MANUAL IS PROVIDED TO AID A PROFESSIONAL TECHNICIAN IN THE EVENT YOUR TRAINED Mi-T-M SERVICEMAN CANNOT BE CONTACTED. THERE ARE NO USER SERVICEABLE PARTS ON THIS MACHINE. DO NOT REMOVE ANY COVERS, SHIELDS, HOSES, WIRES, OR PLUMBING UNLESS PRESCRIBED IN THIS MANUAL.

WARNING: YOU AS THE OWNER, ARE RESPONSIBLE FOR THE SAFE OPERATION OF THIS MACHINE. ALWAYS PROVIDE A COPY OF THIS MANUAL TO ANYONE USING THIS EQUIPMENT AND ESPECIALLY POINT OUT THE "SAFETY WARNINGS" TO PREVENT THE POSSIBILITY OF PERSONAL INJURY TO THE OPERATOR.

Mi-T-HOT POWER WASHER
MODEL SPECIFICATIONS

MODEL:	HW-2205-ME1 HW-2205-ME3
ELECTRICAL SPECIFICATIONS:	
HW-2205-ME1:	240 Volt, 60 Hz, 1 phase, 34 Amps, NEMA 6-20P Plug, 10 foot cord
HW-2205-ME3:	240 Volt, 60 Hz, 3 phase, 22 Amps, NEMA L15-30P Locking plug, 10 foot cord
DISCHARGE CAPACITY:	4.5 GPM, 270 GPH, 17.0 L/min
OPERATING PRESSURE:	2200 PSI, 152 Bar
HEATING POWER:	304,000 BTU/HR, 89.0 KW
CLEANING EFFECTOR:	5.78 H.P., 4.31 KW
SYSTEM EFFICIENCY:	70% TO 75%
WATER PUMP:	Triplex ceramic plunger, positive dispacement, oil bath crankcase
PUMP MOTOR:	
Single Phase:	7.5 H.P., 1725 RPM, open drip-proof enclosed magnetic starter with manual reset thermal overload protection. UL approved
Three Phase:	7.5 H.P., 1725 RPM, open drip-proof enclosed magnetic starter with manual reset thermal overload protection. UL approved
DRIVE SYSTEM:	Belt driven, cast iron pulleys
BURNER:	
TYPE:	Oil fired, pressure atomizing, forced air, flame retention, automatic electric ignition, UL approved
BURNER MOTOR:	1/4 H.P., 3450 RPM, manual reset thermal overload protection
BURNER NOZZLE:	
SIZE:	2.50/80°B Delavan
CONSUMPTION:	2.96 gallons per hour
SMOKE DENSITY:	No. 0 or No. 1 per ASTM D2156
FUEL TYPE:	No. 1 or No. 2 fuel oil or kerosene
BTU INPUT:	414,000 BTU/HR
COMBUSTION CHAMBER:	Ceramic fiber, enclosed in stainless steel
FUEL TANK:	10.0 US gallons, 3.88 full load running hours, stainless steel, replaceable fuel filter with 35 sq. in. filter media
EXHAUST OUTLET SIZE:	8 inch (permanent installation requires a draft diverter)
HEAT EXCHANGER:	1/2 inch O.D., 100 feet continuous length tubing, stainless steel coil in stainless steel wrapper

OUTLET WATER TEMPERATURE:	135°F maximum temperature rise above inlet ambient
SAFETY RELIEF VALVE:	Relieves excessive system pressure
CONTROLS:	
TEMPERATURE:	Adjustable to 210°F from front panel, automatic thermostat
ELECTRICAL:	Heavy duty rotary switch, 3 position: OFF, PUMP ONLY, PUMP AND HEAT
FLOW SWITCH:	Immediate burner ignition shutoff upon trigger release or lack of water flow
PRESSURE OUTPUT:	Preset to 2000 PSI at factory, adjustable 1100 PSI through 2200 PSI by chemical valve on dual lance
CHEMICAL INJECTION:	
High Pressure:	Upstream from punp, activated by chemical valve on unit, chemical siphon ratio adjustable to 19.1 parts water to 1 part chemical maximum
Low Pressure:	Downstream from pump, activated by reducing pressure on dual lance valve during operation and controlled by knob on injector, chemical siphon ratio adjustable to 7.90 parts water to 1 part chemical maximum
INLET STRAINER:	80 mesh stainless steel, inline, 19 sq. in. filter media
FITTINGS:	Brass and cadmium plated hydraulic fittings
FLOAT TANK;	1.7 US gallons, stainless stgeel, brass float
BODY:	All stainless steel, exterior surfaces polished
GUN:	Trigger controlled, insulated with safety lockoff, 3500 PSI rated
LANCE:	Adjustable pressure control, insulated dual type
WATER NOZZLES:	One 15° fan, 6.0 orifice, high pressure One 40° fan, 60 orifice, low pressure-chemical
HOSE:	High pressure, 50 feet x 3/8 inch steel wire braided, oil and chemical resistant, 2500 PSI working and 10,000 PSI burst pressure
PORTABILITY:	Two 13/5.00 pneumatic tires and wheels and one 5 inch swivel caster
DIMENSIONS:	42 inch(length) x 30 inch(width) x 45 inch(height)
WEIGHT:	420 Lbs., 190 Kg dry net weight
OPTIONAL EQUIPMENT:	Painted or stainles steel lifting hook, painted or stainless steel pull handle, steam combination, natural gas or propane fired burner, welder range plug (single phase), 480 Volt (three phase), dual trigger gun operation

In a continued commitment to improve quality, Mi-T-M Corporation reserves the right to make component or design changes when necessary.

Mi-T-HOT POWER WASHER
MODEL SPECIFICATIONS

MODEL:	HW-3004-ME1 HW-30042205-ME3
ELECTRICAL SPECIFICATIONS:	
HW-3004-ME1:	240 Volt, 60 Hz, 1 phase, 34 Amps, NEMA 6-20P Plug, 10 foot cord
HW-3004-ME3:	240 Volt, 60 Hz, 3 phase, 22 Amps, NEMA L15-30P Locking plug, 10 foot cord
DISCHARGE CAPACITY:	3.6 GPM, 216 GPH, 13.6 L/min
OPERATING PRESSURE:	3000 PSI, 207 Bar
HEATING POWER:	243,000 BTU/HR, 71.2 KW
CLEANING EFFECTOR:	6.30 H.P., 4.70 KW
SYSTEM EFFICIENCY:	70% TO 75%
WATER PUMP:	Triplex ceramic plunger, positive displacement, oil bath crankcase
PUMP MOTOR:	
Single Phase:	7.5 H.P., 1725 RPM, open drip-proof, enclosed magnetic starter with manual reset thermal overload protection, UL approved
Three Phase:	7.5 H.P., 1725 RPM, open drip-proof, enclosed magnetic starter with manual reset thermal overload protection, UL approved
DRIVE SYSTEM:	Belt driven, cast iron pulleys
BURNER:	
TYPE:	Oil fired, pressure atomizing, forced air, flame retention, automatic electric ignition, UL approved
BURNER MOTOR:	1/7 H.P., 3450 RPM, manual reset, thermal overload protection
BURNER NOZZLE:	
SIZE:	2.00/80°B Delavan
CONSUMPTION:	2.37 gallons per hour
SMOKE DENSITY:	No. 0 or No. 1 per ASTM D2156
FUEL TYPE:	No. 1 or No. 2 fuel oil or kerosene
BTU INPUT:	332,000 BTU/HR
COMBUSTION CHAMBER:	Ceramic fiber, enclosed in stainless steel
FUEL TANK:	10.0 US gallons, 4.228 full load running hours, stainless steel, replaceable fuel filter with 35 sq. in. filter media
EXHAUST OUTLET SIZE:	8 inch (permanent installation requires a draft diverter)
HEAT EXCHANGER:	1/2 inch O.D., 100 feet continuous length tubing, stainless steel coil in stainless steel wrapper

OUTLET WATER TEMPERATURE:	135°F maximum temperature rise above inlet ambient
SAFETY RELIEF VALVE:	Relieves excessive system pressure
CONTROLS:	
TEMPERATURE:	Adjustable to 210°F from front panel, automatic thermostat
ELECTRICAL:	Heavy duty rotary switch, 3 position: OFF, PUMP ONLY, PUMP AND HEAT
FLOW SWITCH:	Immediate burner ignition shutoff upon trigger release or lack of water flow
PRESSURE OUTPUT:	Preset to 3000 PSI at factory, adjustable 1000 PSI through 3000 PSI by chemical valve on dual lance
CHEMICAL INJECTION:	
High Pressure:	Upstream from punp, activated by chemical valve on unit, chemical siphon ratio adjustable to 16.8 parts water to 1 part chemical maximum
Low Pressure:	Downstream from pump, activated by reducing pressure on dual lance valve during operation and controlled by knob on injector, chemical siphon ratio adjustable to 6.70 parts water to 1 part chemical maximum
INLET STRAINER:	80 mesh stainless steel, inline, 19 sq. in. filter media
FITTINGS:	Brass and cadmium plated hydraulic fittings
FLOAT TANK;	1.7 US gallons, stainless stgeel, brass float
BODY:	All stainless steel, exterior surfaces polished
GUN:	Trigger controlled, insulated with safety lockoff, 3500 PSI rated
LANCE:	Adjustable pressure control, insulated dual type
WATER NOZZLES:	One 15° fan, 4.5 orifice, high pressure One 40° fan, 60 orifice, low pressure-chemical
HOSE:	High pressure, 50 feet x 3/8 inch steel wire braided, oil and chemical resistant, 4000 PSI working and 16,000 PSI burst pressure
PORTABILITY:	Two 13/5.00 pneumatic tires and wheels and one 5 inch swivel caster
DIMENSIONS:	42 inch(length) x 30 inch(width) x 45 inch(height)
WEIGHT:	420 Lbs., 190 Kg dry net weight
OPTIONAL EQUIPMENT:	Painted or stainles steel lifting hook, painted or stainless steel pull handle, steam combination, natural gas or propane fired burner, 480 Volt (three phase), dual trigger gun operation

In a continued commitment to improve quality, Mi-T-M Corporation reserves the right to make component or design changes when necessary.

⚠ SAFETY WARNINGS ⚠

1. Service should only be performed by a Mi-T-M distributor or qualified professional. DO NOT attempt repairs on your own. Perform only the simple steps outlined in the troubleshooting section of this manual.

2. DO NOT put hands or face directly over exhaust. Serious injury may result.

3. READ AND UNDERSTAND all operation, installation and safety tips described herein. Provide a copy of this manual to anyone operating the machine. Failure to follow these simple guidelines can result in serious personal injury or machine malfunction.

4. THIS MACHINE MUST BE PROPERLY ELECTRICALLY GROUNDED. Failure to insure proper grounding risks serious personal injury.

5. Observe ALL state, local and national codes providing for installation of electrical service and allow your Mi-T-M serviceman or a qualified electrician to work on the electrical features of your pressure washer.

6. Observe ALL state, local and national codes providing for indoor installation of this unit. Consult your Mi-T-M serviceman or a qualified heating or furnace contractor for proper ventilation procedures necessary for safe permanent indoor installation.

7. NEVER operate this machine in the presence of flammable vapors or combustible dust, gases or other combustible materials. (To prevent the possibility of explosion or fire.) When servicing this machine, be especially careful to properly dispose of any flammable materials.

8. When using indoors or in a closed area, ALWAYS make certain there is adequate air (oxygen) for combustion to prevent the presence of poisonous carbon monoxide gases. Beware of poorly ventilated areas or exhaust fans which can cause inadequate combustion, or motor overheating.

9. To prevent the possibility of fire, be certain the machine is shut down (as described on pp. 20 & 21) before refueling. NEVER attempt to refuel while machine is operating.

10. When leaving the unit unattended, ALWAYS unplug from the wall receptacle to prevent the possibility of inadvertent motor or burner startup in the event of a switch failure.

11. Before attempting any repairs on the machine, BE CERTAIN to unplug the cord

from the wall receptacle, plug in again only to verify troubleshooting success.

12. NEVER point the nozzle at yourself or anything that you do not intend to spray. Doing this can cause serious injury to the operator or bystander(s).

13. ALWAYS hold on firmly to the gun/dual lance assembly when starting and operating the machine. Failure to do so can cause the wand to fall and "whip" dangerously. NEVER operate the gun with the trigger "wired" in the open position.

14. ALWAYS wear protective goggles when operating the machine to shield eyes from flying debris. Other protective equipment such as rubber suits, gloves and respirators are advisable when using cleaning chemicals of a corrosive nature.

15. Keep the machine and any toxic chemicals you may be using for cleaning away from children. Know your chemicals and the necessary safety precautions when using them. Be prepared to tell a physician exactly what chemicals you were using should the necessity arise. DO NOT use highly corrosive chemicals or acid type cleaners with the pressure washer.

16. DO NOT leave the machine unattended after shutdown until it is completely cooled down as described by the shutdown/cooldown procedures outlined in this manual. (See pp. 20 & 21)

17. When quick connecting high pressure hoses to the machine, or the gun/dual lance assembly, BE CERTAIN the "collar" on the female quick connect is locked securely.

18. High pressure hoses should be inspected on a daily basis for leaks or signs of wear. If evidence of failure exists, promptly replace all suspect hoses to prevent the possibility of burns or injury from high pressure spray. If a hose is leaking, NEVER place your hand directly on the leak.

19. DO NOT turn the main 3-position switch to the "HEAT" position unless water is spraying from the nozzle at the end of the gun/dual lance, or water is not connected or turned on.

20. NEVER fill the fuel tank with anything other than good quality, clean No.1 or No. 2 fuel oil or kerosene. NEVER use gasoline.

21. Avoid contact with the exterior of the heat/coil exchanger assembly and the exhaust stack on the top of the machine to prevent the possibility of burns.

(SAFETY WARNINGS, CONT'D)

22. NEVER alter your machine in such a way as to exceed any of the system ratings or specifications outlined elsewhere in this manual. Your safety, as well as the function of the equipment, is at stake.

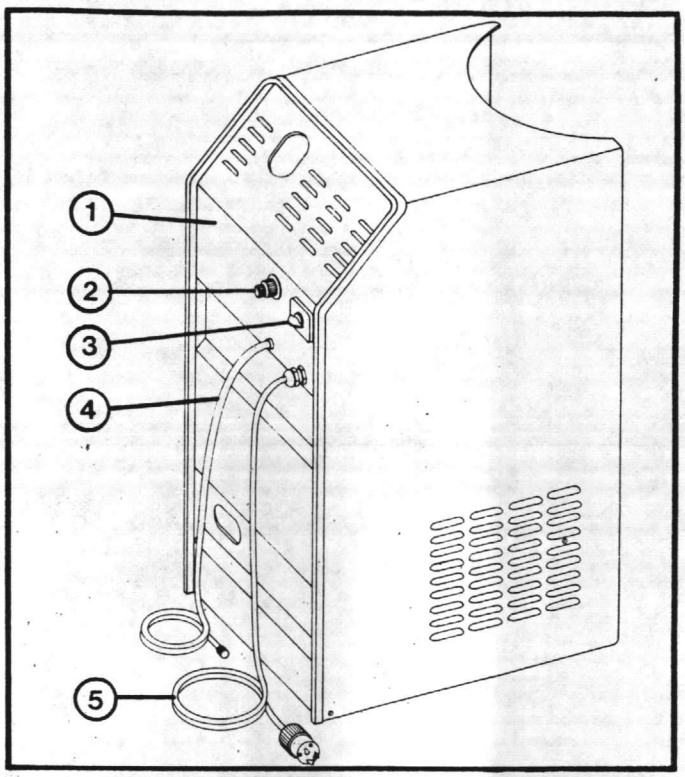
23. Use ONLY genuine Mi-T-M parts for repairs of your Pressure Washer. Failure to do so can create hazardous operating conditions and will void warranty.

24. Before plugging the unit into a compatible power source, be sure the main switch is in the "OFF" position.

25. DO NOT operate if you see any fuel oil, pump oil or water dripping from underneath the machine. DO NOT RESUME OPERATION until the machine has been inspected and repaired by your Mi-T-M serviceman.

26. The electrical cord and any connections should NEVER be allowed to lay in water. This creates a hazard and a potential for severe shock. All cords and connections should be inspected before each use for any cuts or scrapes. If the outside cover of the cord has been penetrated, do not operate until repairs are made.

ILLUSTRATION #1



FEATURES & CONTROLS

Ref. No.	Description
	ILLUSTRATION #1
1	Stainless steel hood
2	High pressure chemical metering valve
3	Main 3-position switch
4	High pressure chemical injection siphon hose with strainer
5	10 foot electrical cord with plug
	ILLUSTRATION #2
6	Wire braided high pressure hoses
7	Stainless steel float tank, 10 U.S. gallon capacity
*8	Vacuum switch manifold
9	Glycerine filled gauge
10	High pressure pump
11	Flow sensing regulating unloader valve
12	Replacement element fuel filter (hidden from view) Adjustable thermostatic temperature control (hidden from view)
13	Low pressure chemical siphon injector with hose and strainer
14	Pull handle (optional)
15	50 foot wire braided high pressure hose
16	Insulated trigger gun with safety lock-off
17	Low pressure/secondary chemical valve
18	Inlet water filter
19	Caster
*20	Stainless steel float tank with brass float valve
22	Motor
23	Cast iron pulleys for motor & pump
24	Fully pneumatic tires
25	Oil fired burner
26	Heavy gauge stainless steel frame
27	Ceramic lined, stainless steel combustion chamber
28	Stainless steel heat exchanger/ coil assembly
29	Stainless steel push/pull handle
30	8" stainless steel exhaust outlet
31	Lifting eye (optional)

*On 1Ø and 3Ø units, #8 & #20 are installed in opposite locations

ILLUSTRATION #2
FEATURES & CONTROLS

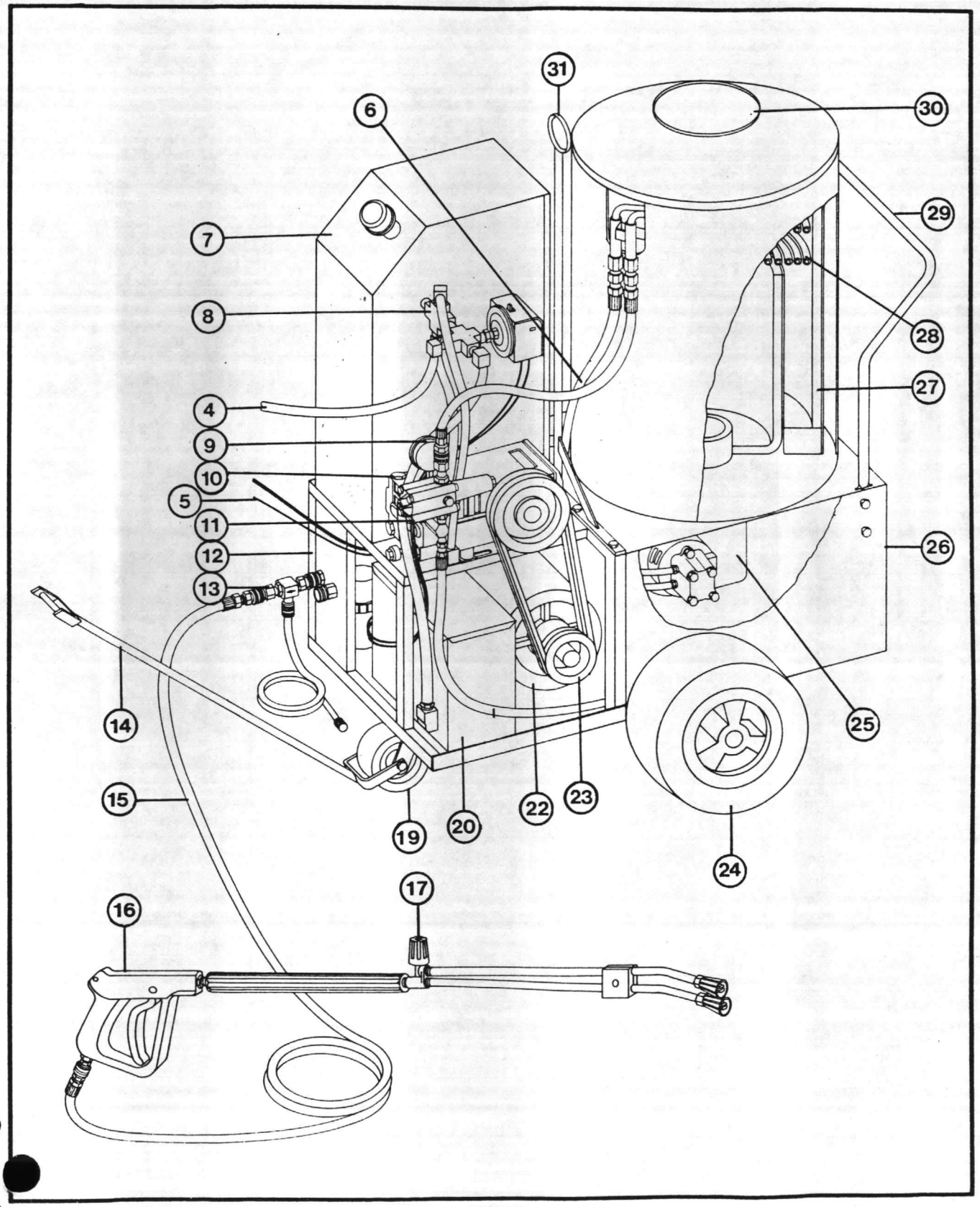
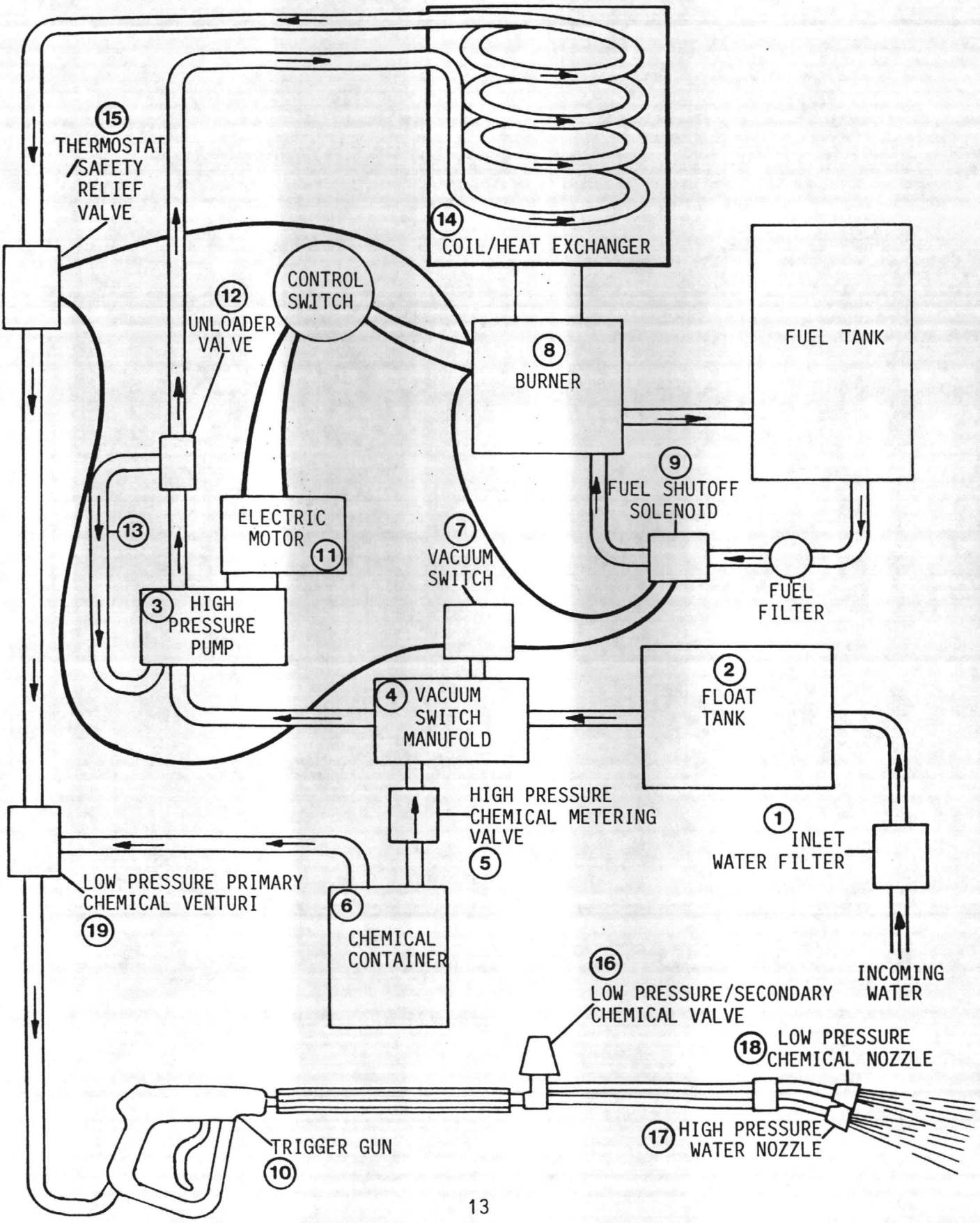


ILLUSTRATION #3
SIMPLIFIED SYSTEM DIAGRAM



SYSTEM EXPLANATION

This section will give you a simplified overview of some of the components that make up you new Mi-T-Hot Power Washer. By reading this section and referring to the "Simplified System Diagram" (ILL. #3, p. 13), you will develop a basic understanding of the various components and their functions.

Pressurized incoming water travels from the faucet through a garden hose and is immediately strained for impurities by the stainless steel mesh Inlet Water Filter (1). The water then enters the Float Tank (2). The float tank serves two purposes: first as a reservoir that maintains the proper level of water for the Pump (3) by means of a float valve, and second maintains a restriction in the line that forces the Pump to prime and create a vacuum between the Float Tank and Pump when water is flowing.

Before the water enters the Pump, however, it passes through a series of hoses and a junction point called the Vacuum Switch Manifold (4). The Vacuum Switch Manifold serves two purposes: it allows the chemicals to enter into the water lines when the "High Pressure" Chemical Metering Valve (5) is opened and the chemical line is immeresed in detergent (6), it is also the sight of the Vacuum Switch (7). The Vacuum Switch is electrically operated and responds to the vacuum created by the pump to start the combustion process at the burner (8). Very simply, when water is flowing, the vacuum created by the pump activates the Vacuum Switch to signal the Fuel Shutoff Solenoid (9) to open, allowing fuel to enter the combustion chamber and ignition to occur. When the flow is stopped, the water lines are static (there is no vacuum present). Therefore, the Vacuum Switch responds electrically by closing the Fuel Shutoff Solenoid and stopping the flow of fuel to the burner which causes combustion to cease. The flow of water is activated by squeezing the trigger on the Gun (10) and is stopped by releasing the trigger.

Following the path of water flow as it enters the Pump, which is driven by the Electric Motor (11), it is pressurized and discharged through the Unloader Valve (12) when the trigger on the Gun is squeezed. When the trigger is not squeezed, water flow does not exit the Unloader Valve, but rather circulates through the Bypass Hose (13) and back through the Pump continuously. This prevents the generation of excess pressure when water flow is stopped, even though the Motor continues to drive the Pump.

When the water exits the Unloader it then travels through the Coil/Heat Exchanger (14). There the temperature is elevated approximately 135°F. (NOTE: If incoming water temperature is 60°F, it should be 195°F as it exits the coil.)

Water then flows from the Coil/Heat Exchanger through the Thermostat (15). It is an adjustable, electrically operated temperature control designed to shut off fuel to the burner and cease combustion temporarily in case the out-going water temperature exceeds the temperature setting. It will allow the burner to fire again once the temperature has dropped to an acceptable level.

Built into the Thermostat is a Safety Relief Valve which is designed to "pop-off" or release water from the system in the case of Unloader failure, maladjustment or in-line obstruction which can cause excessive system pressure in the Pump, Coil/Heat Exchanger or High Pressure Hoses.

The water then exits the machine and travels through 50 feet of High Pressure Hose and enters the Trigger Gun (10). As you probably have determined by now, the function of the Trigger Gun is quite simple. It either allows water to pass

OPERATOR MAINTENANCE AND LONG LIFE GUIDELINES

1. You Mi-T-M dealer can show you how to clean the incoming water strainer on your machine. This must be done after every 20 hours of use. This is the only time you should expose the internal parts of your machine. Be certain the machine is off, and that the electrical supply is not connected when servicing the incoming water strainer.

2. Always be certain the machine is receiving proper voltage. If the use of an extension cord is desired consult your dealer. Be certain the cord is equipped with the appropriate 3-prong plug to insure proper grounding. Do not allow electrical cords or connections to lay in water or in such a position where water could come in contact with them.

3. Always follow the shut-down/cool-down procedures outlined in the "OPERATION" section of this manual.

4. DO NOT allow this machine to operate in bypass mode (with trigger closed) for more than three minutes without triggering the gun. Failure to follow this simple rule can cause premature failure of pump packing seals resulting in costly pump repair.

5. DO NOT allow the pump to run dry (without incoming water line attached and turned on) for more than ten seconds.

6. Promptly eliminate any leaks found in the pumping system by removing suspect parts, applying thread sealant to the threads and reinstalling. NOTE: If using teflon tape, be certain no tape gets inside any plumbing to prevent the possibility of a plugged spray nozzle.

7. NEVER allow this machine to operate with the switch in either the "PUMP" or "HEAT" position without the water supply turned all the way on.

8. The high pressure chemcial injection feature standard on this machine is NOT designed for use with highly corrosive cleaning agents such as acids. The use of acids or similarly corrosive materials jeopardizes the function of the equipment as well as the safety of the operator and will void warranty.

9. When not using the chemical injection feature, be sure the chemical valve on the front panel of the machine is not in the "ON" position. The clear vinyl chemical siphon hose should be rolled up to prevent damage from contact with the tires.

10. Upon finishing the use of either chemical injection feature, be certain to run one gallon of clean water through the injection line to flush out any possibly corrosive agents as well as to prevent the possibility of soap residue impairing any working parts.

11. Clean the chemical filters after each use to insure proper operation for the next job.

12. The oil in the pump crankcase must be changed after the initial 50 hours of unit operation, every 250 hours after that, or three months, whichever comes first. Consult your dealer first. Use only 30 weight non-detergent oil (SAE-30) and fill only to the notch on the dipstick. DO NOT OVERFILL.

Overfilling can cause excessive load on the motor which will cause high amperage draw. The oil level in the pump should be checked at least once weekly.

13. Use only a good quality, clean No. 1 or No. 2 fuel oil. Kerosene can be used but lacks some of the lubricating properties of No. 1 or No. 2 and can shorten the life of the fuel pump.

14. Have the fuel filter to the burner changed every six months or more often if necessary.

15. Have the screen in the fuel pump on the burner inspected and/or replaced at least once yearly.

16. Do not store the machine in a freezing environment. This can cause the coil/heat exchanger to rupture and "lock-up" conditions in the water pump. Never pour hot water on a frozen pump. A temperature change greater than 150°F can cause the pump to crack.

17. Never spray water directly onto the machine or allow the machine to remain outdoors where it can be exposed to rain or other adverse weather conditions.

18. If the mineral content of the incoming water supply is high, it is recommended that a water softener be installed to avoid the accumulation of mineral deposits in the coil/heat exchanger. If this is not possible, it will be necessary to "descale" the coil occasionally. Consult your Mi-T-M dealer.

19. Due to the unknown and often corrosive characteristics of many chemicals commonly used in the pressure washer cleaning industry, it may be necessary to repair or replace components of the chemical injectors (such as the chemical metering valve, venturi assembly, and/or dual lance valve) periodically as part of normal maintenance.

DEALER MAINTENANCE

Your Mi-T-M dealer is qualified to perform the following maintenance procedures outlined below. Contract with him to service your machine at least once every three months. Costs is minimal, and a small investment in preventative maintenance will add countless hours to the life of your power washer.

PROCEDURE	3 months	6 months	9 months	12 months
Pump oil change*	X	X	X	X
Fuel oil filter		X		X
Water nozzles	X	X	X	X
Fuel oil nozzle				X
Fuel pump filter				X
Hose inspection	X	X	X	X
Leak inspection	X	X	X	X
Belt inspection	X	X	X	X
Oil motor bearings	X	X	X	X
Water pressure test	X	X	X	X
Oil pressure test	X	X	X	X
Burner inspection	X	X	X	X
Water temperature test	X	X	X	X
Coil residue test	X	X	X	X

*The pump oil must be changed after the first 50 hours of operation and every 250 hours, or three months, whichever occurs first.

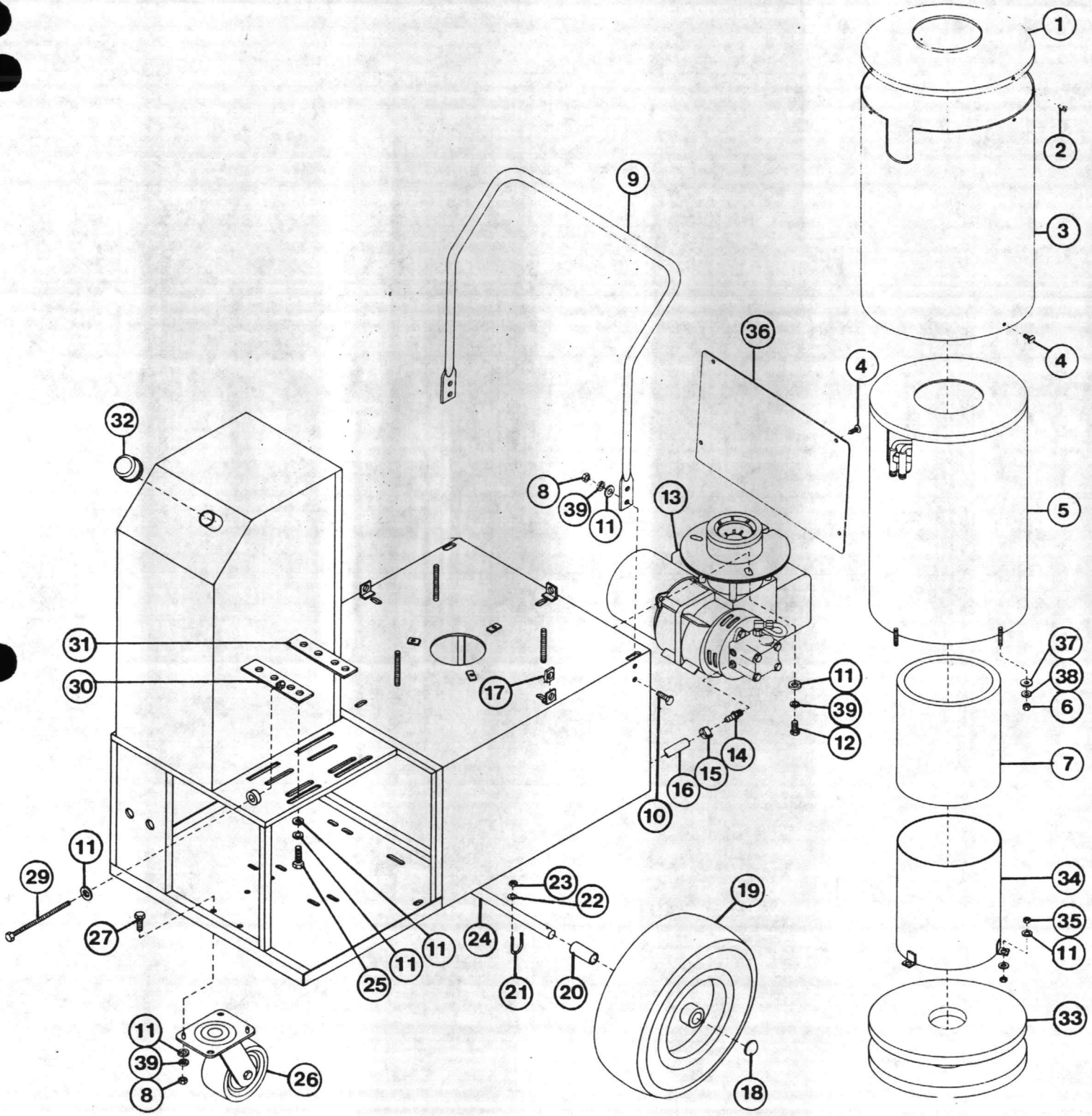
OPERATOR TROUBLESHOOTING

PROBLEM	CAUSE	REMEDY
Pump runs but there is no pressure.	Water turned off.	Check incoming water supply.
	Obstruction in nozzle.	Clean or replace.
	High pressure chemical valve is open without the end of the hose inserted into chemical (causes vacuum leak and eliminates prime).	Close valve or submerge chemical hose into solution. Or consult Mi-T-M service dealer.
Pump runs but has low pressure.	Nozzle not installed.	Follow nozzle assembly procedure on p. 18.
	Inadequate incoming water supply.	Increase hose diameter or provide sufficient water supply.
	Wrong size or worn high pressure nozzle.	Replace with correct or new nozzle.
	Dual/lance valve is open.	Dual lance valve must be closed for maximum operating pressure. Or consult Mi-T-M service dealer.
Pump runs but there is eratic, fluctuating pressures; hose pulsates.	Not enough water is supplied.	Use larger inside diameter hose.
	Inlet strainer is clogged.	Clean strainer screen.
	Air entering water lines.	Check all incoming hose connections for watertight seals. Or consult Mi-T-M service dealer.
Burner will not heat.	Switch not in "heat" position.	Check switch position.
	Chemical metering valve is open without end of hose in solution; this causes safety devices to turn off fuel to burner.	Close valve or submerge hose into chemical.

(OPERATOR TROUBLESHOOTING, CONT'D.)

PROBLEM	CAUSE	REMEDY
Burner will not heat (cont'd).	Out of fuel.	Refuel. Or consult Mi-T-M service dealer.
Burner discharges white smoke.	Low on fuel.	Refuel. If after refueling it still smokes white, consult dealer.
Burner discharges black smoke.		Shut off machine and consult Mi-T-M service dealer.
Chemical will not siphon into high pressure injection line.	Clogged nozzle.	Clean or replace high pressure nozzle.
	Chemical strainer plugged or not submerged in solution.	Check screen on strainer, submerge in solution.
	Valve clogged.	Check valve knob position.
	Chemical hose cut or kinked.	Inspect hose, replace as necessary. Or consult Mi-T-M service dealer.
Chemical will not siphon into "low pressure" injector.	Knob on venturi is closed (turned all the way clockwise).	Check and adjust knob if necessary.
	Knob on dual lance must be turned counter-clockwise to initiate chemical flow.	Check and adjust knob if necessary.
	Chemical strainer plugged or not submerged in liquid.	Check screen on strainer.
	Chemical hose cut or kinked.	Inspect hose, replace as necessary.
	Working parts of venturi assembly stuck, corroded or missing.	Disassemble and clean. Replacing parts as needed. Or consult Mi-T-M service dealer.

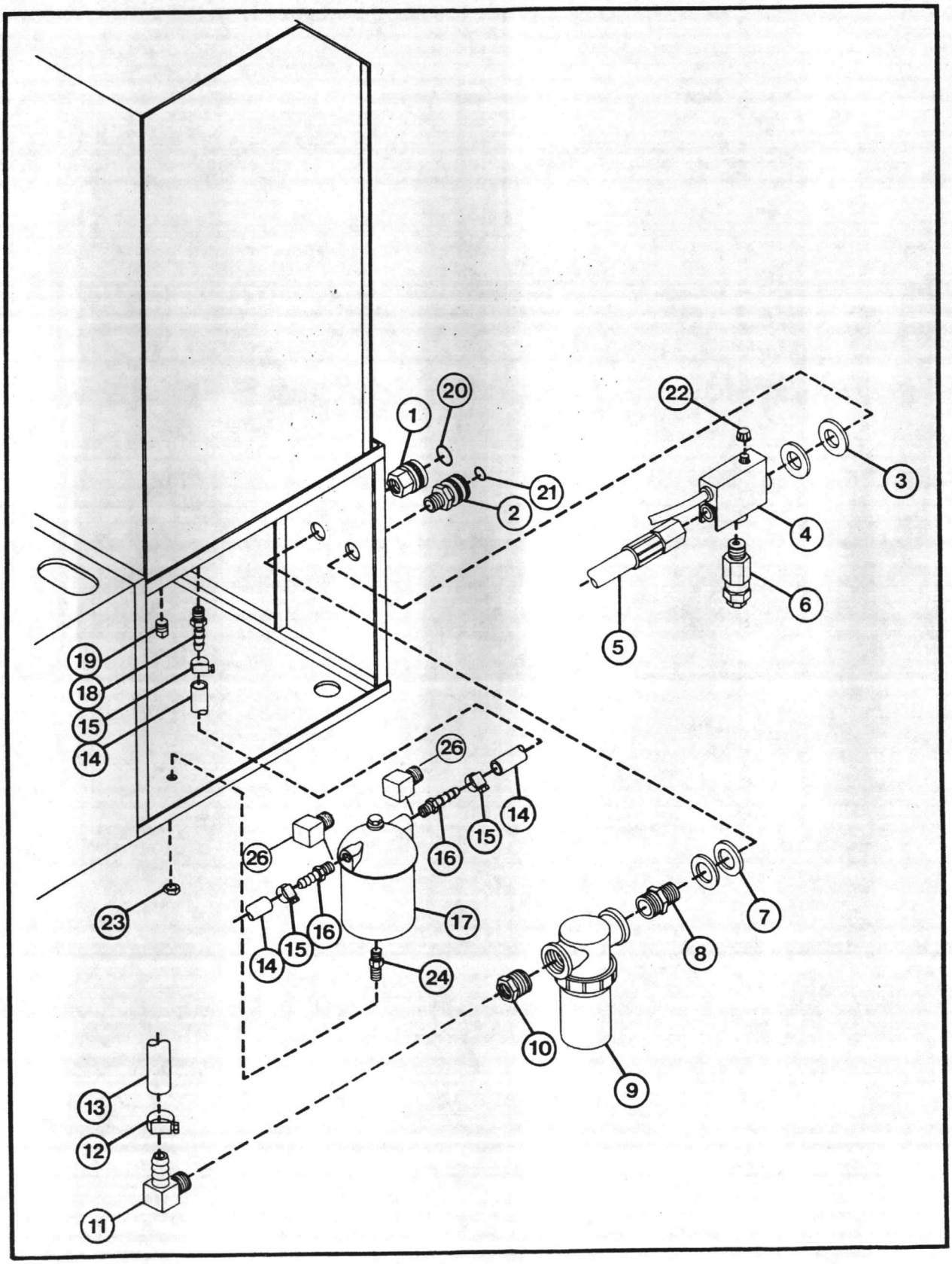
ILLUSTRATION #8
FRAME & HEAT EXCHANGER



FRAME & HEAT EXCHANGER BREAKDOWN

Ref. No.	Description	Part No.
1	Spun dome	21-0005
2	Pop rivet	33-0024
3	Outer chamber shell	21-0008
4	Slotted head screw #10 x 1/2", stainless	27-6162
5	Coil assembly	850-0011
6	Nut, 3/8"-16	30-0006
7	Ceramic chamber	33-0026
8	Nut, 5/16"-18	30-0004
9	Handle	7-0021
10	Hex head screw, 5/16" x 3/4", zinc	27-0066
11	Washer	28-0022
12	Hex head screw, 5/16" x 3/4"	27-0066
13	Burner assembly, 240V (Models: HW-2005)	4-0004
13	Burner assembly, 240V (Models: HW-3004)	4-0002
14	1/2"M x 1/4" hose barb	23-0051
15	Worm clamp	42-0004
16	Fuel line hose, 1/4" I.D.	15-0008
17	Nut clip, 1/4"-20	30-2104
18	Hub cap	33-0018
19	Wheel assembly	14-0006
20	Axle spacer	56-0003
21	U-bolt	31-2002
22	Washer, 1/4"	28-0002
23	Nut - nylon lock, 1/4"-20	30-0155
24	Axle	20-0023
25	Hex socket screw, M10-1.5P x 18mm	27-8471
26	Caster - swivel	14-0001
27	Hex head screw, 5/16" x 3/4"	27-0066
29	Hex head screw, 5/16"-18 x 6	27-0540
30	Pump mount tightener	850-0026
31	Pump mount	13-0045
32	Fuel tank cap	39-0029
33	Insulation circle (2 necessary)	850-0027
34	Burner chamber	21-0031
35	Nut jam, 5/16"-18	30-0107
36	Cover plate	21-0033
37	Washer, 5/16"	28-0022
38	Lockwasher, 3/8"	29-0008
39	Lockwasher, 5/16"	29-0007

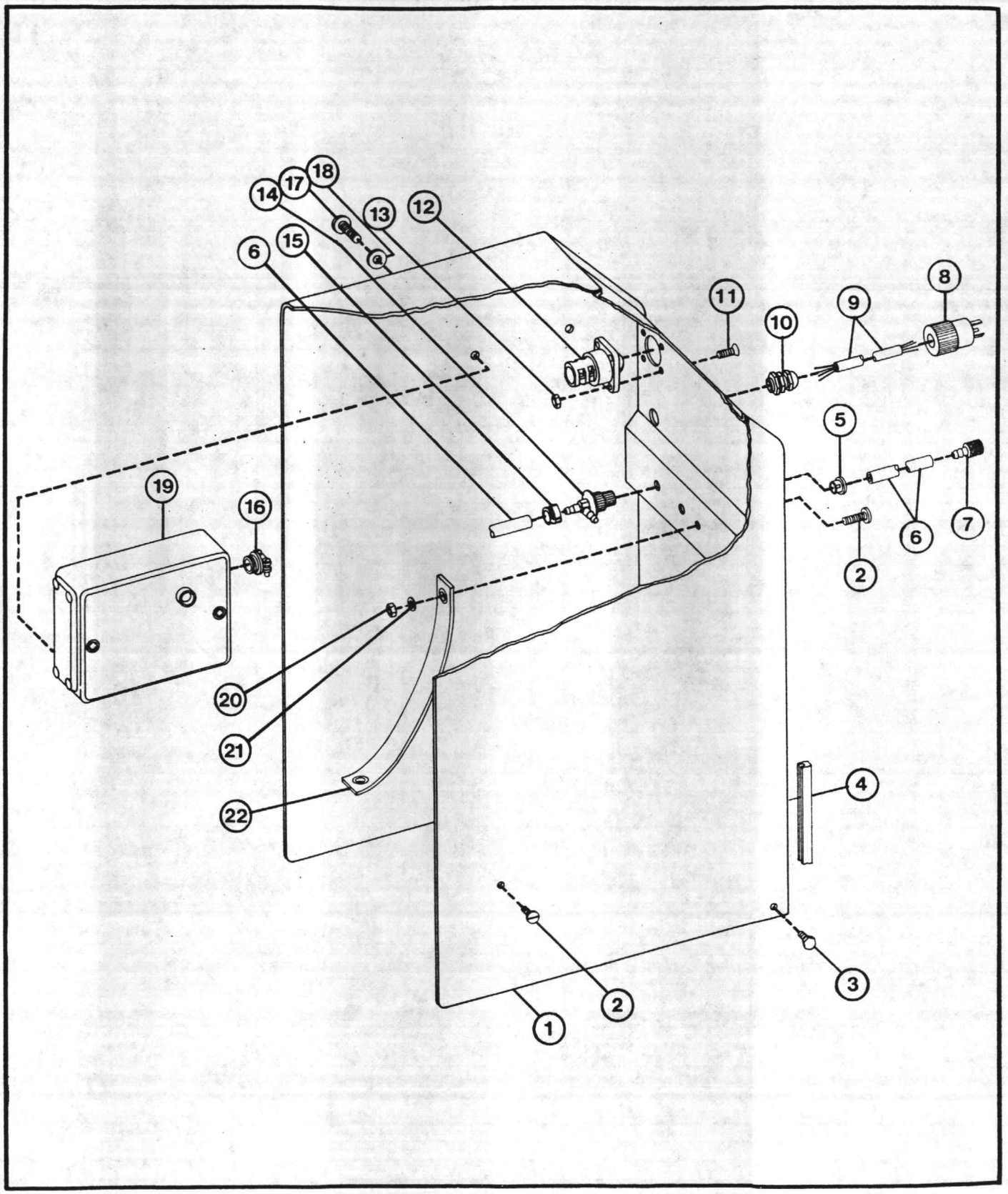
ILLUSTRATION #9
THERMOSTAT, FUEL FILTER, WATER FILTER ASSEMBLIES



THERMOSTAT, FUEL FILTER, WATER FILTER ASSEMBLIES

Ref. No.	Description	Part No.
1	1/2"F x 3/4" garden hose	23-0001
2	3/8"M x 3/8" quick connect	17-0007
3	Washer, 11/16" x 1 1/2"	28-0050
4	Thermostatic temperature switch assy. (Includes #22)	850-0001
5	Hose assembly 41" long	15-0010
6	Excessive pressure pop-off	22-0046
7	Washer, 27/32" x 1 1/2"	28-0051
8	Hex nipple, 1/2"M x 3/4"M	23-0082
9	Filter assembly	19-0004
10	Hex reducer, 1/2"F x 3/4"M	23-0023
11	Elbow, 1/2"M x 1/2" hose barb	23-0053
12	Worm clamp, 1/2"	42-0011
13	Hose, 1/2" I.D. (specify feet)	15-0007
14	Fuel line hose, 1/4" (specify feet)	15-0008
15	Worm clamp, 1/4"	42-0004
16	3/8" x 1/4" hose barb	23-0052
17	Fuel filter	19-0012
18	1/4"M x 1/4" hose barb	23-0051
19	Square head plug, 1/2"	39-0016
20	Garden hose gasket	26-0001
21	O-ring for 3/8" quick connect	25-0123
22	Thermostat knob	7-0001
23	Locknut, 3/8"-16	30-5159
24	Stud, 3/8"-16 x 2"	31-3245
25	Elbow, 3/8"M x 3/8"F (HW-2205-ME1 & HW-3004-ME1)	23-0034

ILLUSTRATION #10
HOOD COMPONENT BREAKDOWN

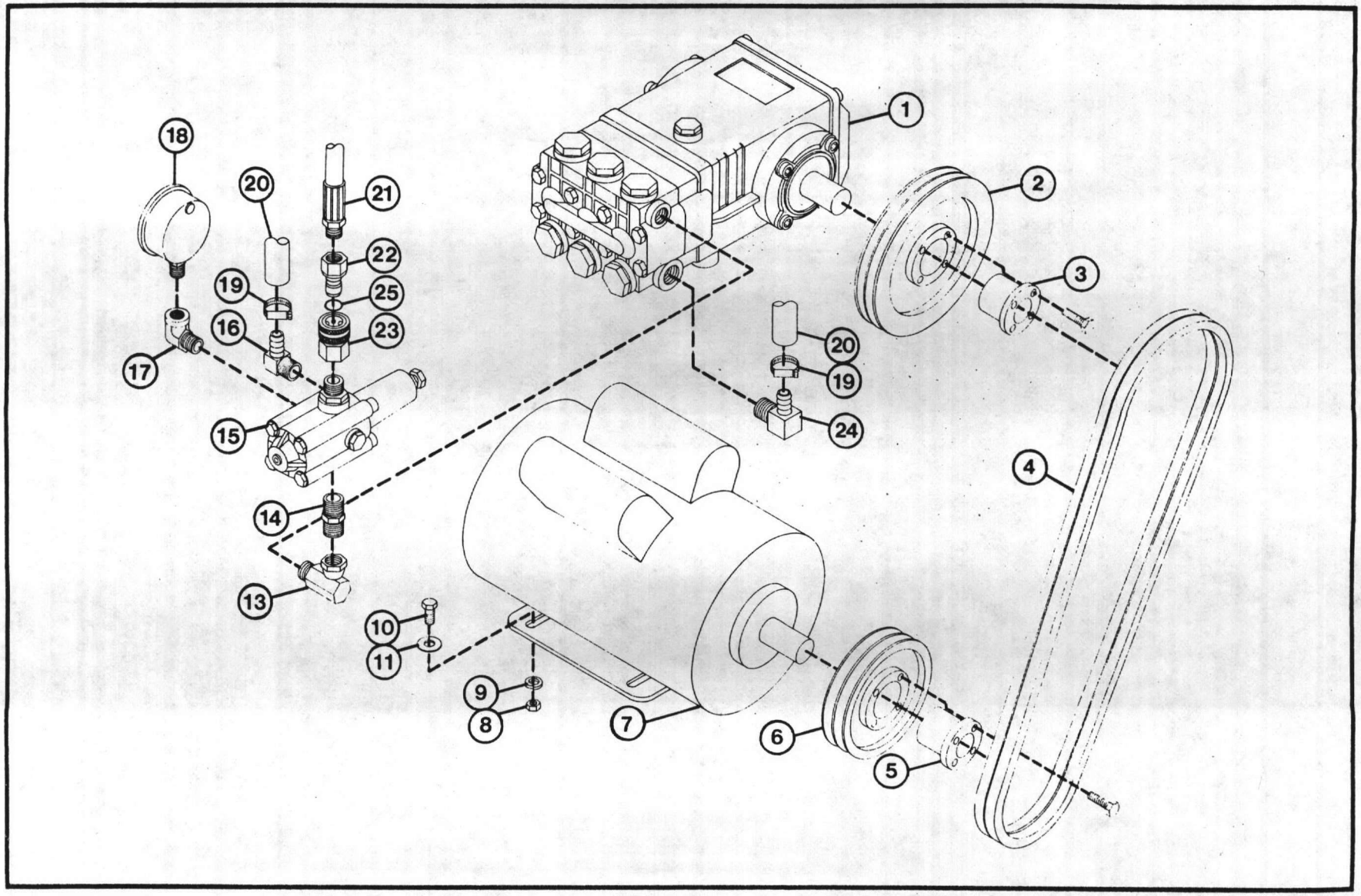


HOOD COMPONENT BREAKDOWN

Ref. No.	Description	Part No.
1	Hood assembly	21-0003
2	Slotted head screw - stainless, 10-24 x 1/2"	27-6162
3	Hex head screw, 1/4"-20 x 1/2" stainless	27-5015
4	Edging (trim) (12 feet required)*	33-0020
5	Snap bushing	9-0028
6	Chemical hose, 1/4" I.D. (10 feet required)*	15-0021
7	Soap strainer	19-0019
8	Electrical plug, L6-50P (Models: HW-2205-ME1, HW-3004-ME1)	33-0012
8	Electrical plug, L15-30P (Models: HW-2205-ME3, HW-3004-ME3)	32-0037
9	Power cord, 8/3 (Models: HW-2205-ME1, HW-2004-ME1)	32-0022
9	Power cord, 10/4 (Models: HW-2205-ME3, HW-3004-ME3)	33-0021
10	Watertight cord bushing	9-0027
11	Flat head slotted screw, #6-32 x 3/4"	27-2248
12	Three position control switch	22-0033
13	Hex nut, #6-32	30-0052
14	Chemical metering valve	22-0032
15	Clamp, 3/8"	42-0001
16	Romex connector, 3/4"	32-0085
17	Slotted head screw - stainless, M6-1P x 12mm	27-9209
18	Washer - stainless	28-0120
19	Starter box assembly (Models: HW-2205-ME1, HW-3004-ME1)	32-0070
19	Starter box assembly (Models: HW-2205-ME3, HW-3004-ME3)	32-0069
20	Hex nut, 10-24 nylon lock	30-0154
21	Washer, 3/16" x 3/4"	28-0054
22	Hood strap	33-0015

*Order in 1 foot lengths

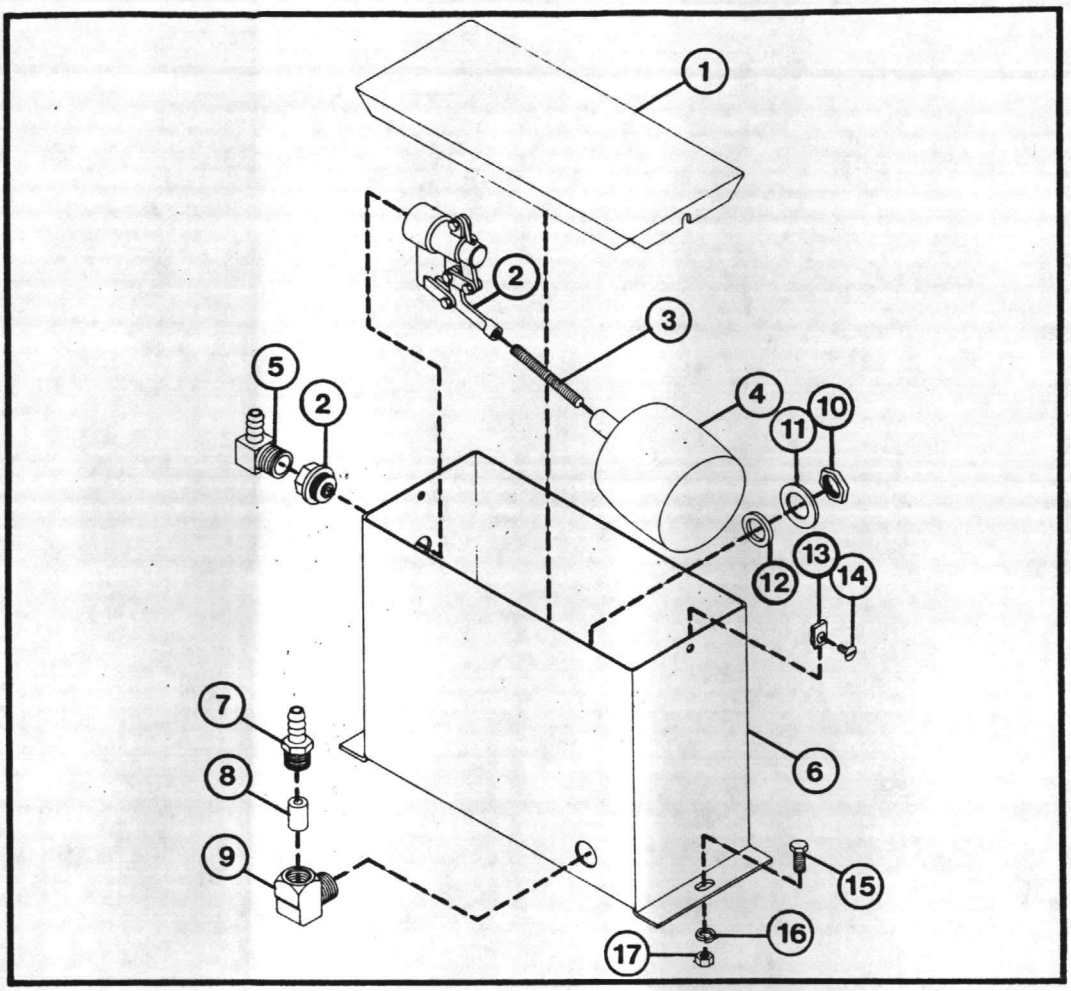
ILLUSTRATION #11
PUMP, MOTOR, UNLOADER BREAKDOWN



PUMP, MOTOR, UNLOADER BREAKDOWN

Ref. No.	Description	Part No.
1	Pump (Models: HW-2205)	3-0009
1	Pump (Models: HW-3004)	3-0011
2	Sheave	10-0035
3	Bushing - pump	9-0017
4	Belt	11-0004
5	Bushing - motor	9-0008
6	Sheave - motor	10-0030
7	Motor, 7-1/2 H.P., 1Ø, O.D.P. (Models: HW-2205-ME1, HW-3004-ME1)	2-0014
7	Motor, 7-1/2 H.P., 3Ø, O.D.P. (Models: HW-3004-ME3, HW-3004-ME3)	2-0015
8	Nut, 5/16"-18	30-0004
9	Lockwasher, 5/16"	29-0007
10	Hex head bolt, 5/16" x 1"	27-0067
11	Washer, 5/16"	28-0022
13	Elbow steel, 3/8"M x 3/8"F	24-0054
14	Nipple steel, 3/8"M x 3/8"M	24-0010
15	Unloader (Models: HW-2205)	8-0013
15	Unloader (Models: HW-3004)	8-0012
16	Elbow, 3/8"M x 1/2" hose	23-0050
17	Elbow steel, 1/4"F x 1/4"M	24-0021
18	Gauge, 0-3000 PSI (Models: HW-2205)	22-0007
18	Gauge, 0-5000 PSI (Models: HW-3004)	22-0011
19	Worm clamp	42-0011
20	Hose, 1/2" I.D.	15-0007
21	Hose assembly, 20" long	15-0015
22	3/8"F x 3/8" Q.C. plug	17-0006
23	3/8"F x 3/8" Q.C. socket	17-0004
24	Elbow, 1/2"M x 1/2" hose	23-0053
25	O-ring	25-0123
Not Shown	Motor guard	6-0026

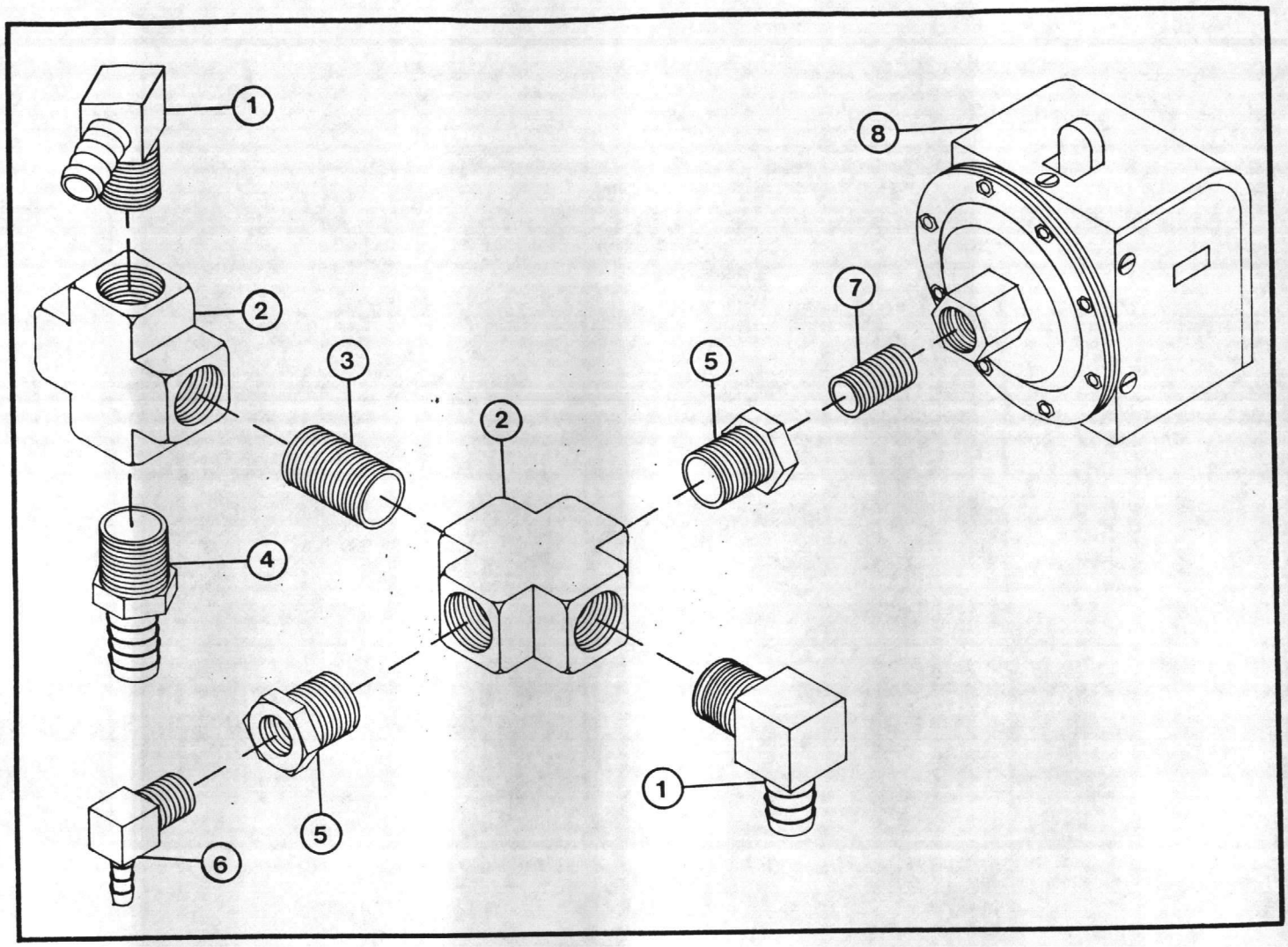
ILLUSTRATION #12



FLOAT TANK

Ref. No.	Description	Part No.
1	Stainless steel float tank lid	12-0018
2	1/2" brass float valve	22-0058
3	Brass stud	31-3318
4	Float	22-0059
5	Elbow, 1/2"M x 1/2" barb	23-0053
6	Stainless steel float tank without feet (3Ø units)	12-0019
7	1/2"M x 1/2" barb	23-0045
8	Restrictor	Consult dealer
9	1/2"M x 1/2"F 90° elbow	23-0035
10	Hex nut	30-9506
11	Washer	28-0051
12	Rubber washer	26-0087
13	U-clip	30-2104
14	Stainless steel screw, #10 x 1/2"	27-6162

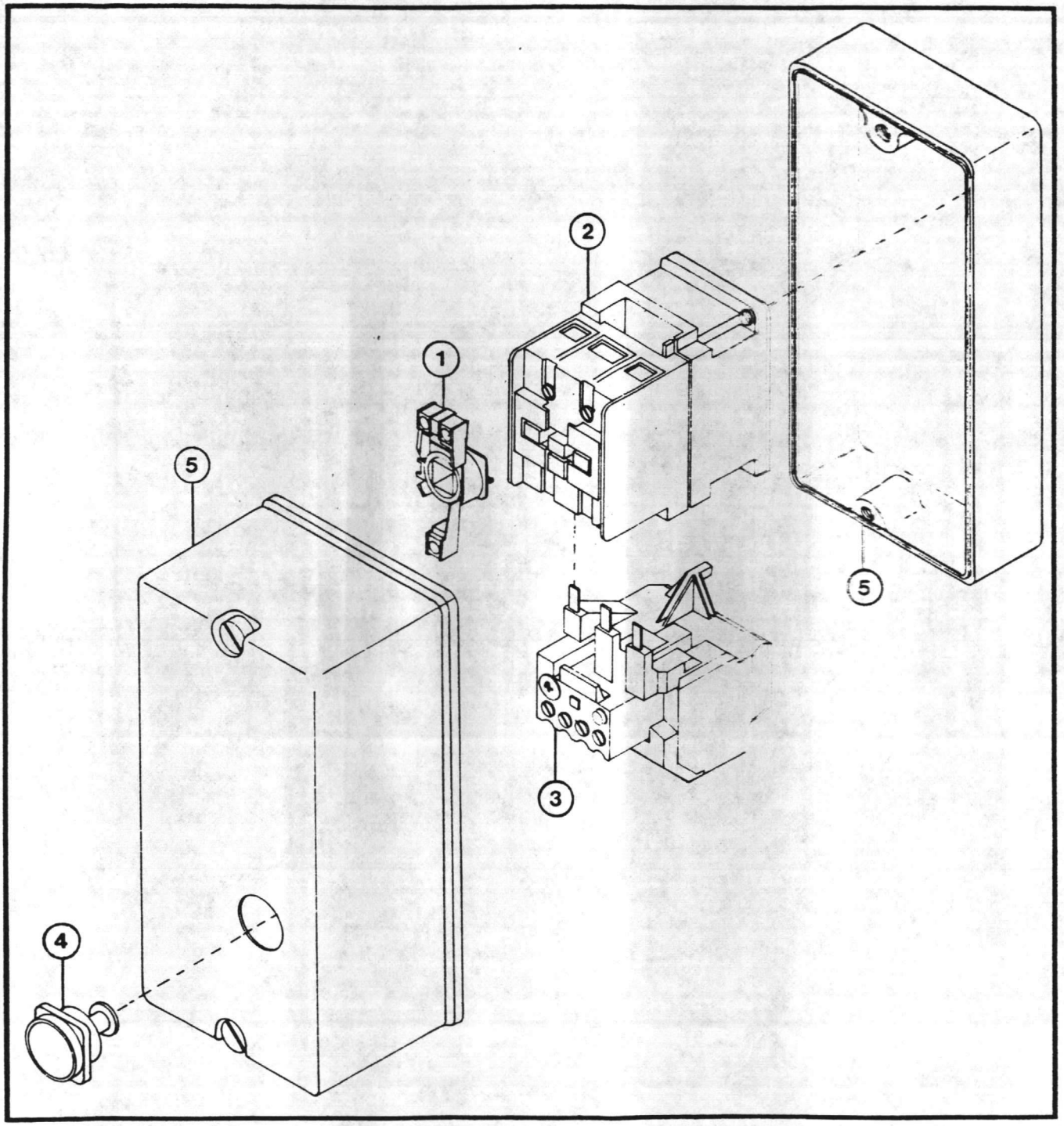
ILLUSTRATION #13



VACUUM SWITCH MANIFOLD ASSEMBLY

Ref. No.	Description	Part No.
1	Elbow, 1/2"MPT x 1/2" barb	23-0053
2	Cross, 1/2"F	23-0071
3	Nipple, 1/2"	23-0019
4	1/2"MPT x 1/2" barb	23-0045
5	Reducer, 1/4" x 1/2" barb	23-0056
6	Elbow, 1/4"MPT x 1/4" barb	23-0054
7	Nipple, 1/4"	23-0063
8	Vacuum switch	22-0031

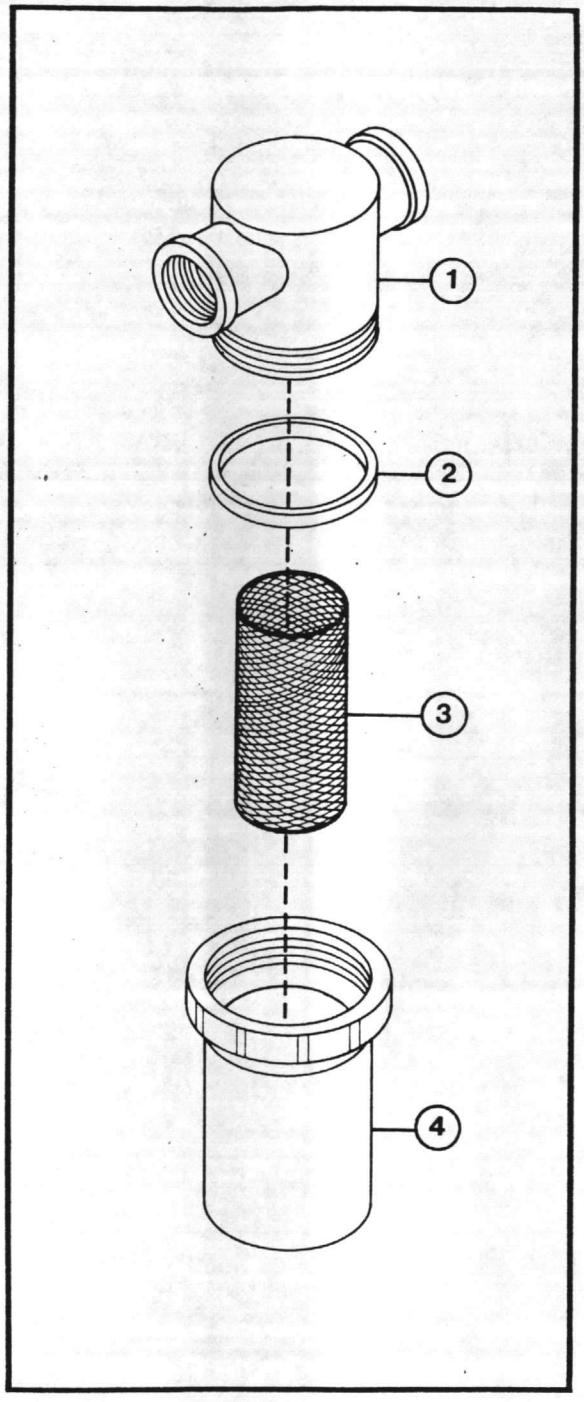
ILLUSTRATION #14



STARTER COMPONENT BREAKDOWN

Ref. No.	Description	Part No.
1	Coil, 120V	32-0202
2	Contractor	32-0197
3	Overload	32-0207
4	Reset Button	32-0199
5	Enclosure	32-0200

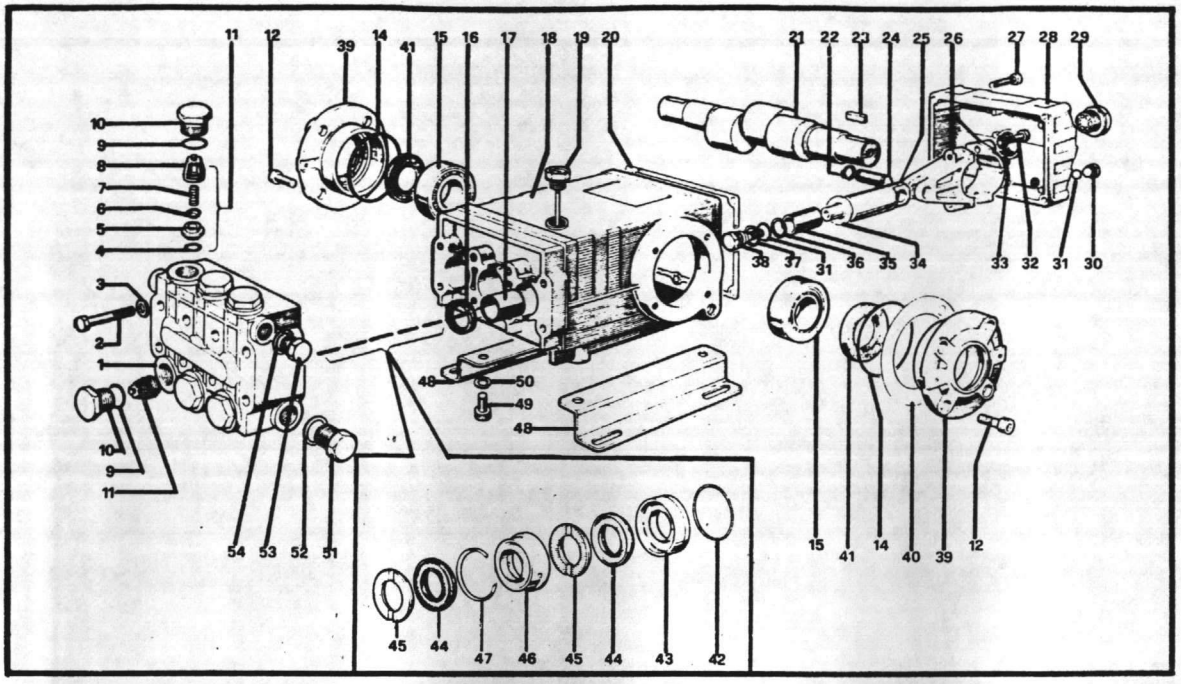
ILLUSTRATION #15



WATER STRAINER COMPONENT BREAKDOWN

Ref. No.	Description	Part No.
1	Cap	19-0024
2	Gasket	26-0072
3	80 mesh stainless steel screen	19-0015
4	Clear bowl	19-0025
	Complete strainer assembly	19-0004

ILLUSTRATION #16

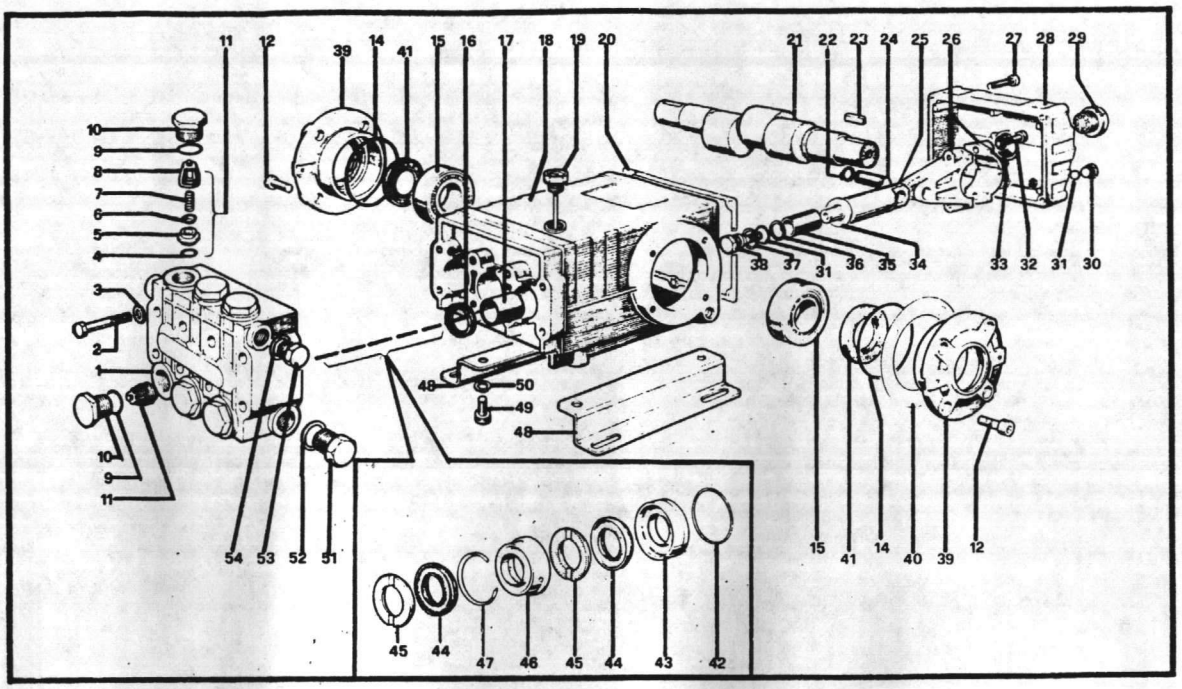


PUMP PARTS - 3-0009

Ref. No.	Description	Part No.
1	Pump head	46-0060
2	Screw	27-8185
3	Washer	28-0210
9	O-ring	25-0012
10	Cap	39-0020
11	Valve assembly	22-0056
12	Screw	27-8431
14	O-ring	25-0013
15	Tapered roller bearing	48-0004
16	Oil seal	26-0047
17	Bushing	9-0029
18	Crankcase	46-0144
19	Oil dipstick	46-0044
20	Cover gasket	26-0079
21	Crankshaft	46-0050
22	Retaining ring	46-0103
23	Key	43-0028
24	Piston pin	43-0032
25	Piston rod	46-0056
26	Connecting rod assembly	46-0051
27	Screw	27-8404
28	Crankcase cover	46-0065
29	Oil level indicator	46-0114
30	Cap	39-0017
31	O-ring	25-0014
32	Screw	27-8435
33	Washer	29-0154
34	Washer	46-0146
35	Plunger	46-0053
36	Anti-extrusion ring	46-0109
37	Washer	28-0400
38	Piston screw	46-0069
39	Crankcase open cover	46-0062
39	Crankcase closed cover	46-0063
40	Shim	46-0113
41	Oil seal	26-0049
42	O-ring	25-0015
43	Female adapter	46-0058
44	V-packing	26-0099
45	Male adapter	46-0108
46	Intermediate ring	46-0068
47	"Long life ring"	46-0111
48	Pump rails	46-0066
49	Screw	27-8471
50	Washer	29-0055
51	Cap	39-0019
52	Washer	28-0601
53	Cap	39-0018
54	Washer	28-0600

Complete pump for Models:
HW-2205-ME1, HW-2205-ME3.. 3-0009
Valve Kit (Includes 6 ea. #9 & #11)..... 852-0008
Packing Kit (Includes 6 ea. #44 & #45, 3 ea. #42 & #47).. 852-0010

ILLUSTRATION #16

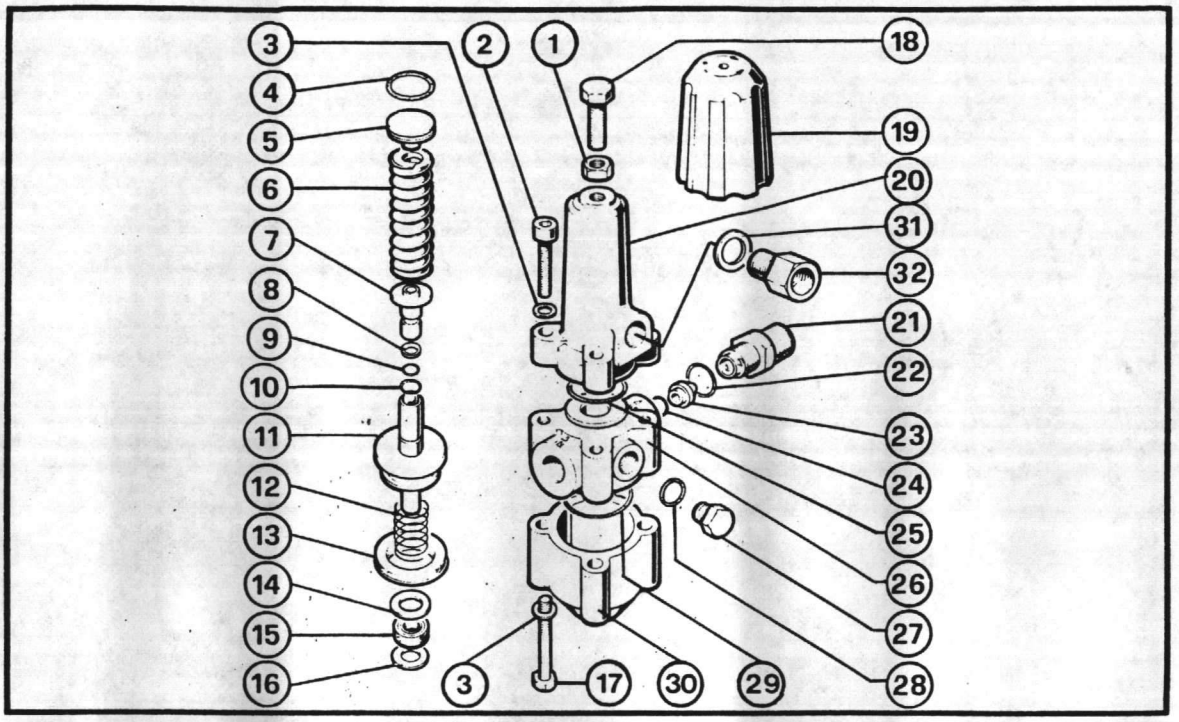


PUMP PARTS - 3-0011

Ref. No.	Description	Part No.
1	Pump head	46-0061
2	Screw	27-8185
3	Washer	28-0210
9	O-ring	25-0012
10	Cap	39-0021
11	Valve assembly	22-0056
12	Screw	27-8431
14	O-ring	25-0013
15	Tapered roller bearing	48-0004
16	Oil seal	26-0047
17	Bushing	9-0029
18	Crankcase	46-0046
19	Oil dipstick	46-0144
20	Cover gasket	26-0079
21	Crankshaft	46-0050
22	Retaining ring	46-0103
23	Key	43-0028
24	Piston pin	43-0032
25	Piston rod	46-0054
26	Connecting rod assembly	46-0051
27	Screw	27-8404
28	Crankcase cover	46-0065
29	Oil level indicator	46-0114
30	Cap	39-0017
31	O-ring	25-0014
32	Screw	27-8435
33	Washer	29-0154
34	Washer	46-0146
35	Plunger	46-0052
36	Anti-extrusion ring	46-0109
37	Washer	28-0400
38	Piston screw	46-0069
39	Crankcase open cover	46-0062
39	Crankcase closed cover	46-0063
40	Shim	46-0113
41	Oil seal	26-0049
42	O-ring	25-0015
43	Female adapter	46-0057
44	V-packing	26-0098
45	Male adapter	46-0059
46	Intermediate ring	46-0067
47	"Long life ring"	46-0111
48	Pump rails	46-0066
49	Screw	27-8471
50	Washer	29-0055
51	Cap	39-0019
52	Washer	28-0601
53	Cap	39-0018
54	Washer	28-0600

Complete pump for Models:
HW-3004-ME1, HW-3004-ME3.. 3-0011
Valve Kit (Includes 6 ea. #9 & #11)..... 852-0008
Packing Kit (Includes 6 ea. #44 & #45, 3 ea. #42 & #47).. 852-0010

ILLUSTRATION #17



UNLOADER VALVE

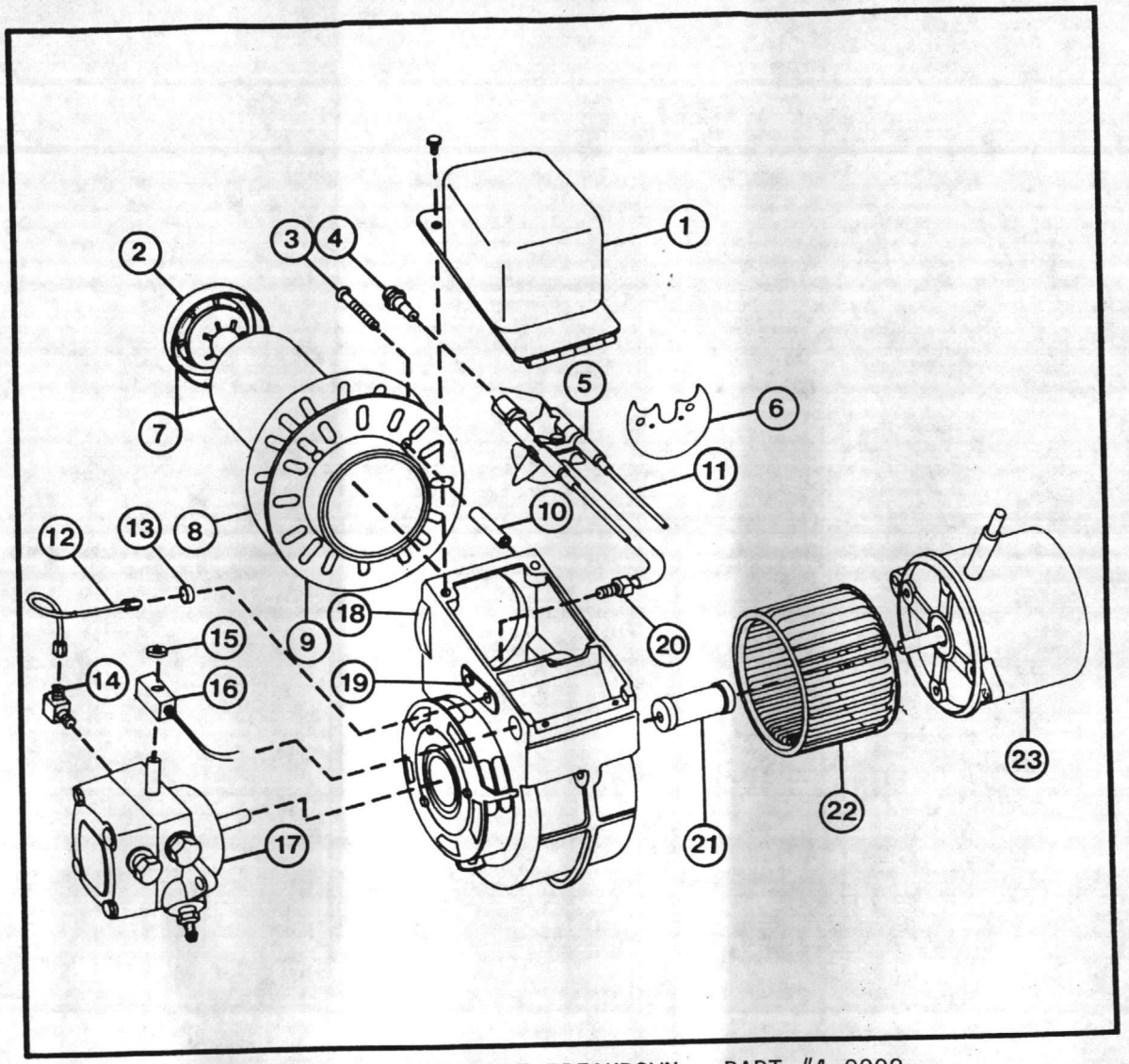
Ref. No.	Description	Part No.	Ref. No.	Description	Part No.
1	Locking nut	30-3010	17	Hex cap screw	27-8037
2	Screw	27-8434	18	Adjusting bolt	27-8077
3	Washer	29-0154	19	Knob (optional)	17-0025
4	O-ring guide (Buna-N)	25-0118	20	Upper body - brass	8-0138
5	Spring guide - brass	8-0135	21	Barb	(Specify Model)
6	Spring - SS	49-0026	22	O-ring (Buna-N)	25-0052
7	Piston guide - SS	8-0145	23	Flow balancer-SS	(Specify Model)
8	Backup ring (Teflon)	8-0141	24	O-ring (Buna-N)	25-0119
9	O-ring (Viton)	25-0121	25	O-ring - upper chamber	25-0117
10	O-ring (Buna-N)	25-0120	26	Fluid chamber	8-0137
11	Piston assembly	8-0136	27	Cap	39-0017
12	Spring - SS	49-0027	28	O-ring	25-0014
13	U-cup (Buna-N)	26-0104	29	O-ring - lower chamber	25-0056
14	Male adapter	8-0139	30	Lower body - brass	8-0134
15	Cup seal (Buna-N)	26-0105	31	Washer	28-0600
16	Washer	8-0140	32	Bypass restr.	(Specify Model)

Repair Kit (Includes #'s 4,7-13,15,16,22,24,25,28,29)(All Models). 8-0159

Barb & Restrictor Kit (Includes #'s 21,23,32)(Specify Model)
.....8-0012, 8-0013, 8-0014, 8-0044

	Item #21	Item #23	Item #32	Orifice Repair Kit (Includes items 21, 23 & 32)
8-0012	8-0130	8-0126	8-0125	852-0014
8-0013	8-0130	8-0128	8-0124	852-0015
8-0014	8-0131	8-0127	8-0123	852-0016
8-0044	8-0132	8-0129	8-0122	852-0017

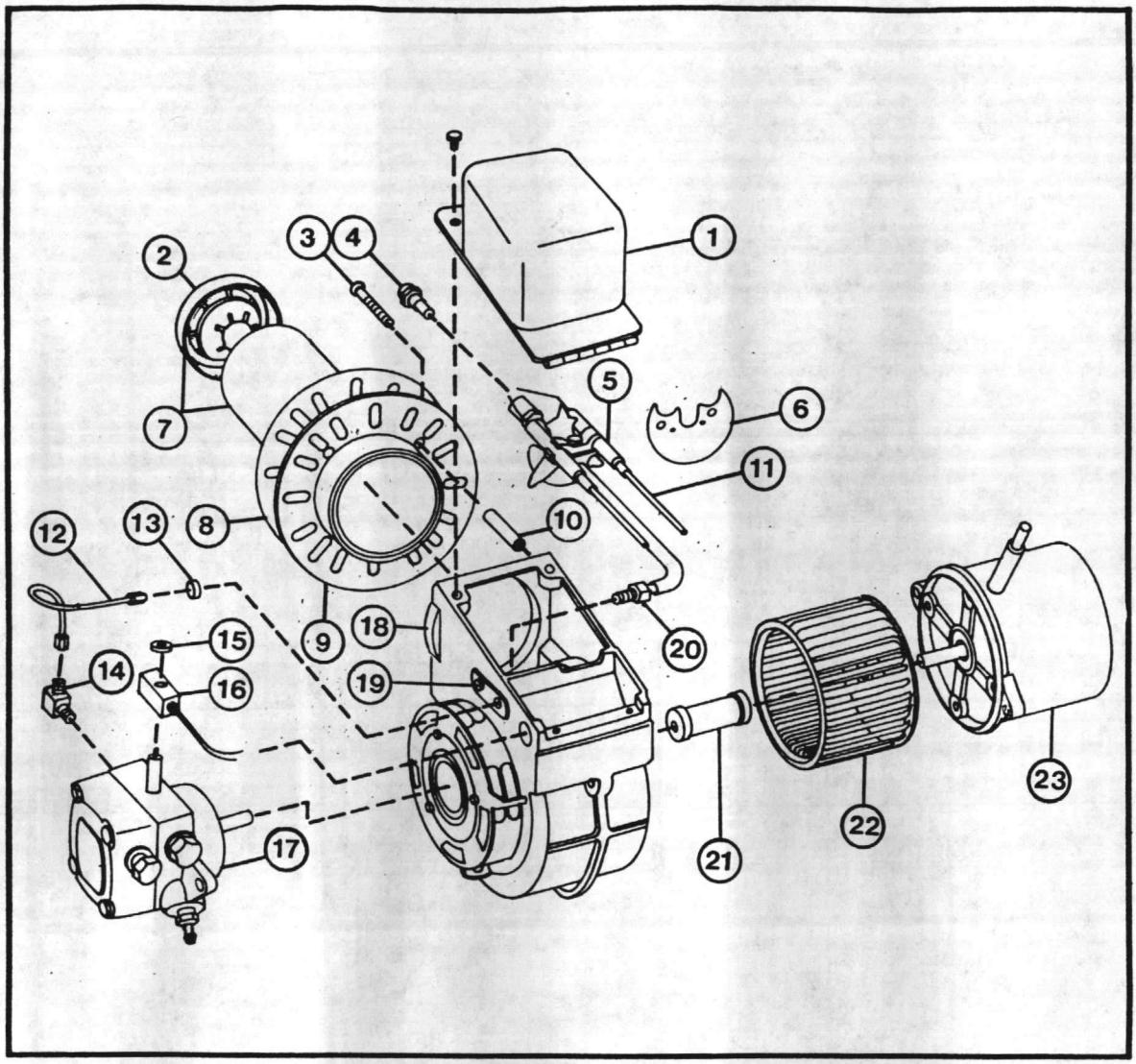
ILLUSTRATION #18



OIL BURNER COMPONENT BREAKDOWN - PART #4-0002
(MODEL HW-3004)

Ref. No.	Description	Part No.
1	Ignition transformer	44-0018
2	Head	44-0011
3	Screw	27-2335
4	Oil nozzle, 2.00 80°B	18-0091
5	Nozzle line assembly (Includes item 11)	44-0043
6	Static plate	Not used
7	Air tube assembly (Includes item 2	44-0042
8	Mounting gasket	26-0062
9	Flange	44-0023
10	Spacer	44-0028
11	Electrode kit	44-0030
12	Connector tube	44-0025
13	Thumb nut	44-0022
14	Pump outlet elbow	23-0083
15	Thumb nut	46-1002
16	220V solenoid coil	44-0001
17	Fuel pump complete (Refer to ILL. #20)	3-0035
18	Housing	44-0034
19	Escutcheon plate	44-0031
20	Bulkhead plate	44-0012
21	Coupler	44-0013
22	Blower wheel	44-0006
23	Motor	2-0029

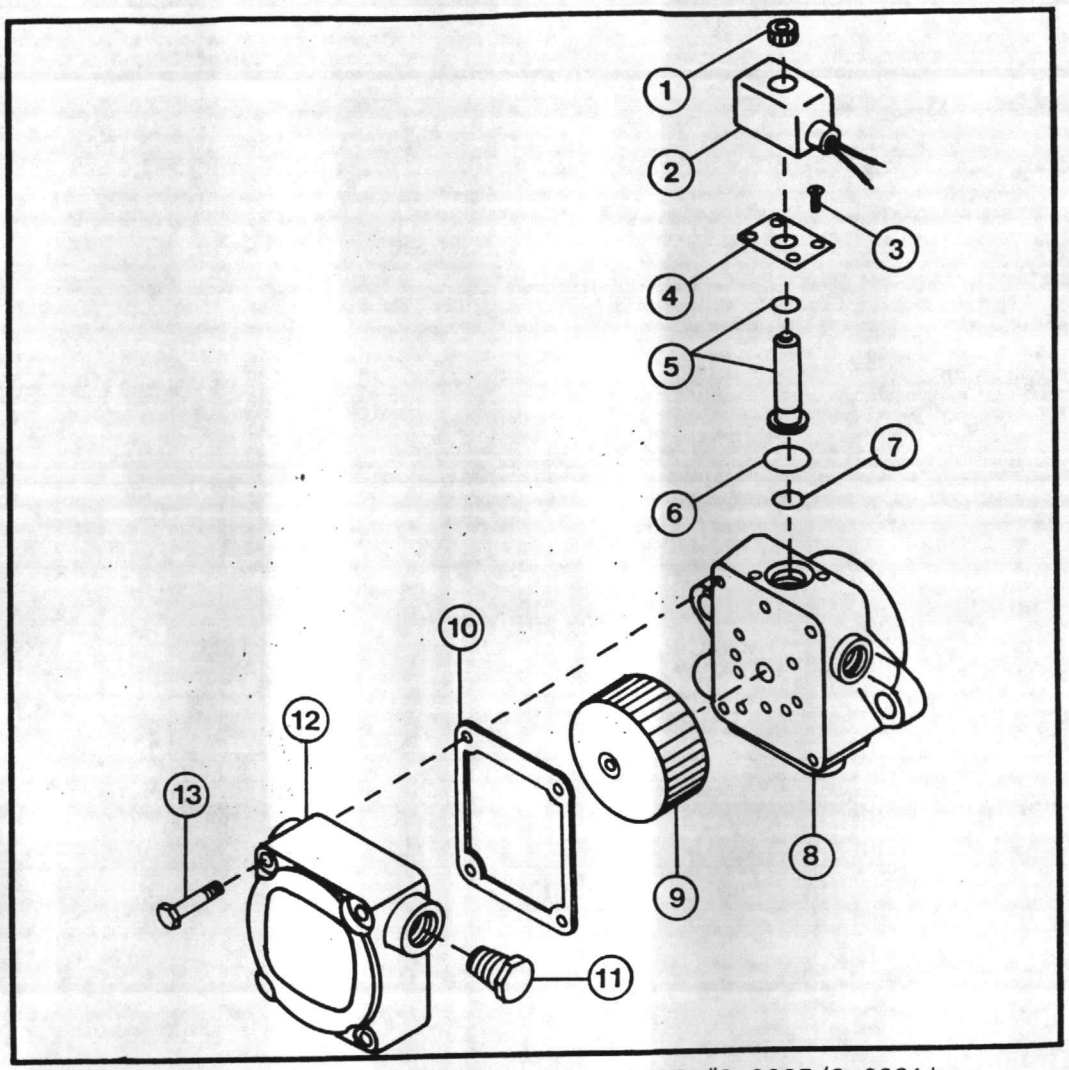
ILLUSTRATION #19



OIL BURNER COMPONENT BREAKDOWN - PART #4-0004
(MODEL HW-2205)

Ref. No.	Description	Part No.
1	Ignition transformer	44-0015
2	Head	44-0010
3	Screw	27-2335
4	Oil nozzle, 2.50 80°B	18-0093
5	Nozzle line assembly (Includes item 11)	44-0043
6	Static plate	Not used
7	Air tube assembly (Includes item 2)	44-0039
8	Mounting gasket	26-0062
9	Flange	44-0023
10	Spacer	44-0028
11	Electrode kit	44-0030
12	Connector tube	44-0026
13	Thumb nut	44-0022
14	Pump outlet elbow	23-0083
15	Thumb nut	46-1002
16	220V solenoid coil	44-0001
17	Fuel pump complete (Refer to ILL. #20)	3-0031
18	Housing	44-0033
19	Escutcheon plate	44-0032
20	Bulkhead fitting	44-0024
21	Coupler	44-0014
22	Blower wheel	44-0007
23	Motor	2-0028

ILLUSTRATION #20

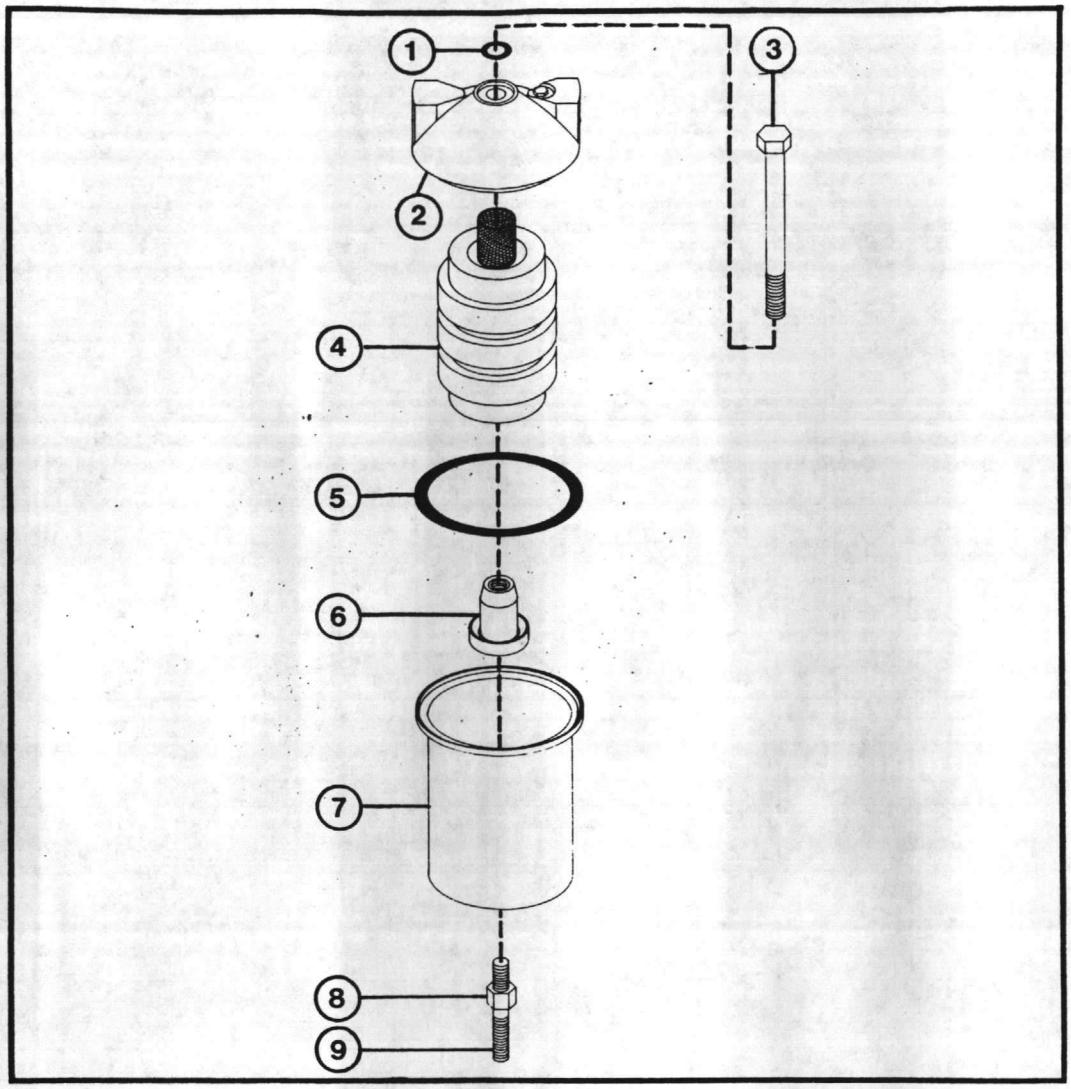


FUEL PUMP COMPONENT BREAKDOWN - PART #3-0035/3-0031*

Ref. No.	Description	Part No.
1	Knurl nut	46-1002
2	Coil 240V	44-0001
3	Screw	46-1003
4	Base plate	46-1004
5	Tube assembly (Includes o-ring)	46-1001
6	O-ring	25-0124
7	O-ring	25-0125
8	Body	NOT AVAILABLE
9	Strainer	19-0034
10	Cover gasket	26-0109
11	1/4"NPT plug	24-0044
12	Cover	46-1005
13	Cover screw	46-1006
	*Complete fuel pump assembly (Models: HW-3004)	3-0035
	*Complete fuel pump assembly (Models: HW-2205)	3-0031

Reference No. 2 not included in complete fuel pump assemblies

ILLUSTRATION #21

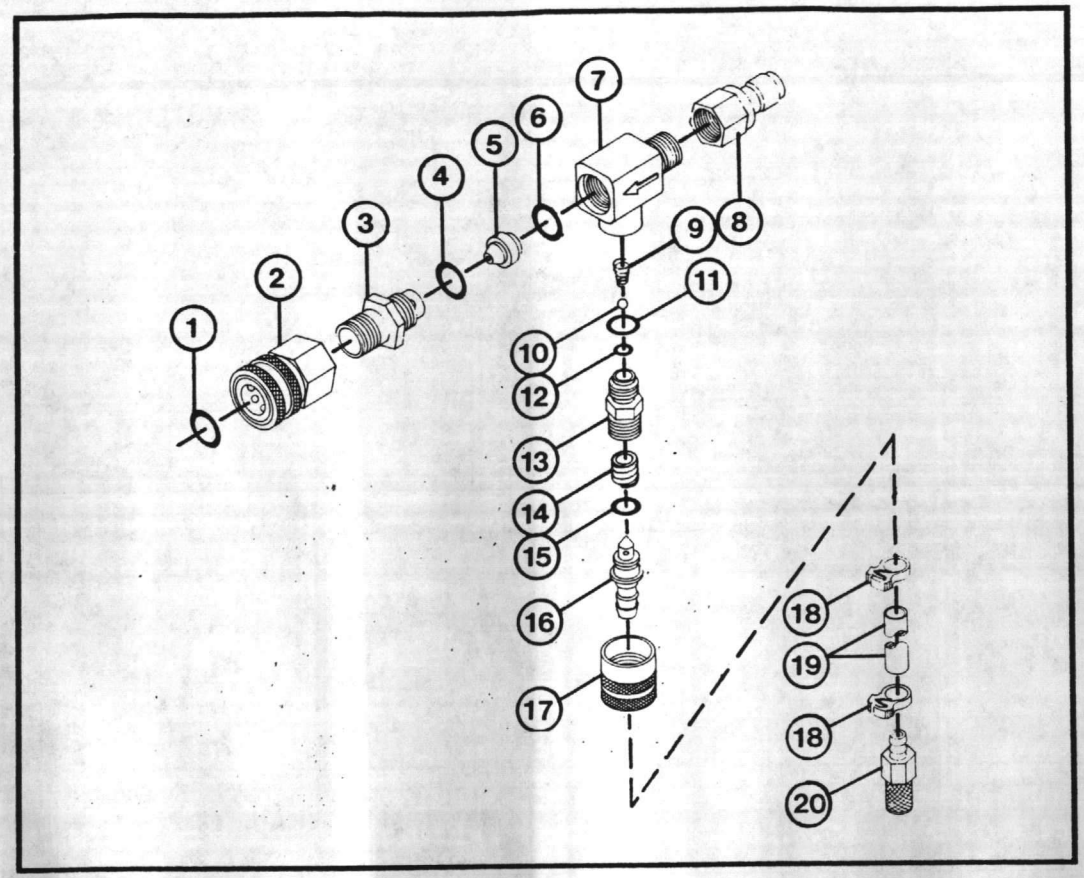


COMPLETE OIL FILTER ASSEMBLY

Ref. No.	Description	Part No.
1	Gasket	**
2	Cap	*
3	3/8"-16 x 3-1/2" HHCS	27-0127
4	Element	19-0010
5	Gasket	**
6	Coupler	*
7	Cup	*
8	3/8"-16 Hex nut 3	30-0006
9	Stud	31-3246
	Complete Oil Filter (Includes items 1, 2, 4-8)	19-0012

*Not available separately, must order complete filter assembly
**Not available separately, must order either complete filter assembly or #5 Element

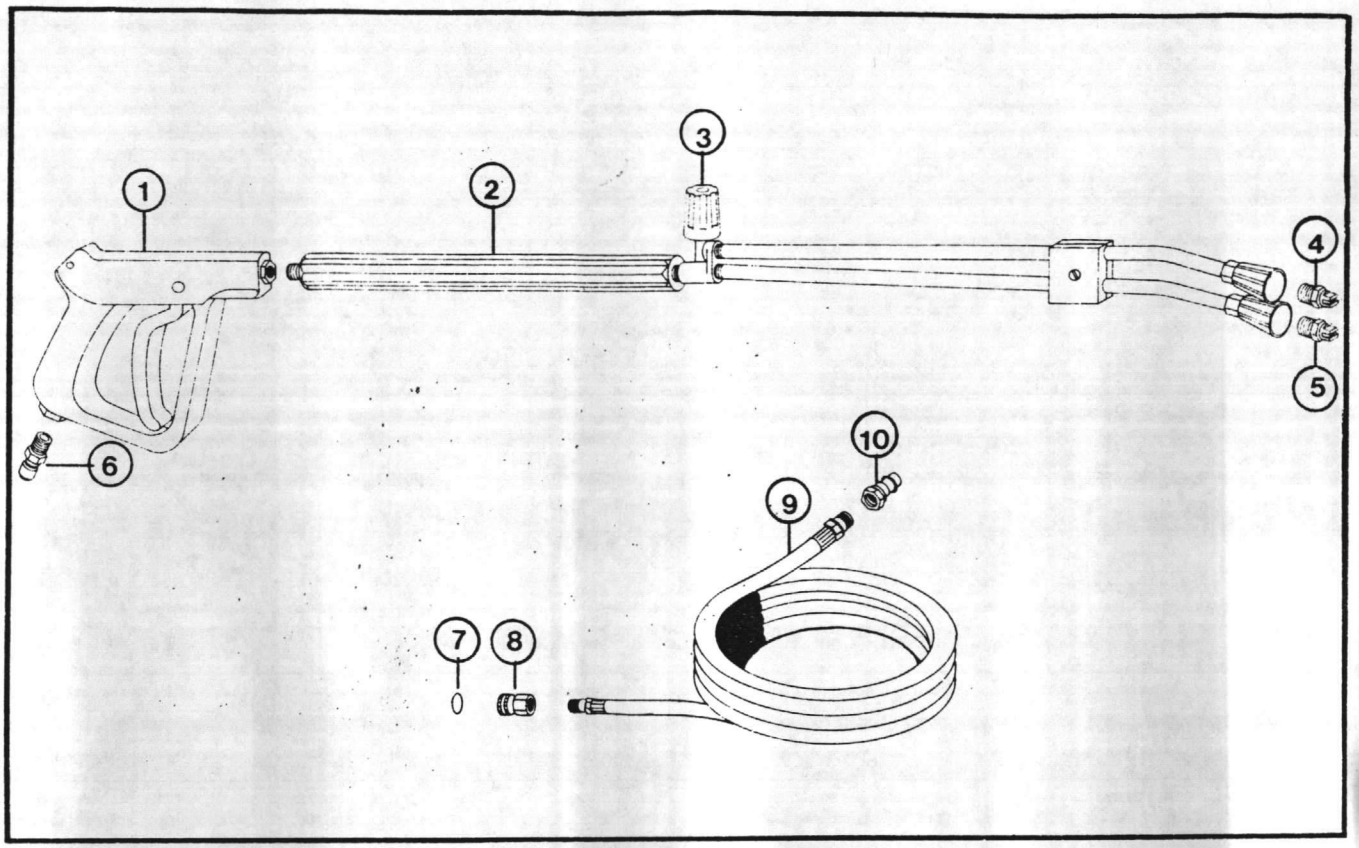
ILLUSTRATION #22



COMPONENTS FOR LOW PRESSURE CHEMICAL VENTURI ASSEMBLY

Ref. No.	Description	Part No.
1	O-ring for 3/8"F quick connect	25-0123
2	3/8"F x 3/8"F quick connect	17-0004
3	Nipple	8-0130
4	O-ring	25-0051
5	Orifice, 2.1mm	8-0121
6	O-ring	25-0050
7	Body	50-0015
8	3/8"F x 3/8"M quick connect	17-0006
9	Stainless steel tapered spring	49-0020
10	Stainless ball	50-0012
11	O-ring	25-0014
12	O-ring	25-0045
13	Valve seat	50-0014
14	Spring	49-0019
15	O-ring	25-0046
16	Shutter barb	50-0013
17	Adjusting knob	7-0024
18	Clamp	42-0001
19	Chemical hose (6 feet required)*	15-0021
20	Chemical strainer	19-0019
	Complete Low Pressure Chemical Siphon Injector Assembly (Includes all items shown above)	850-0021

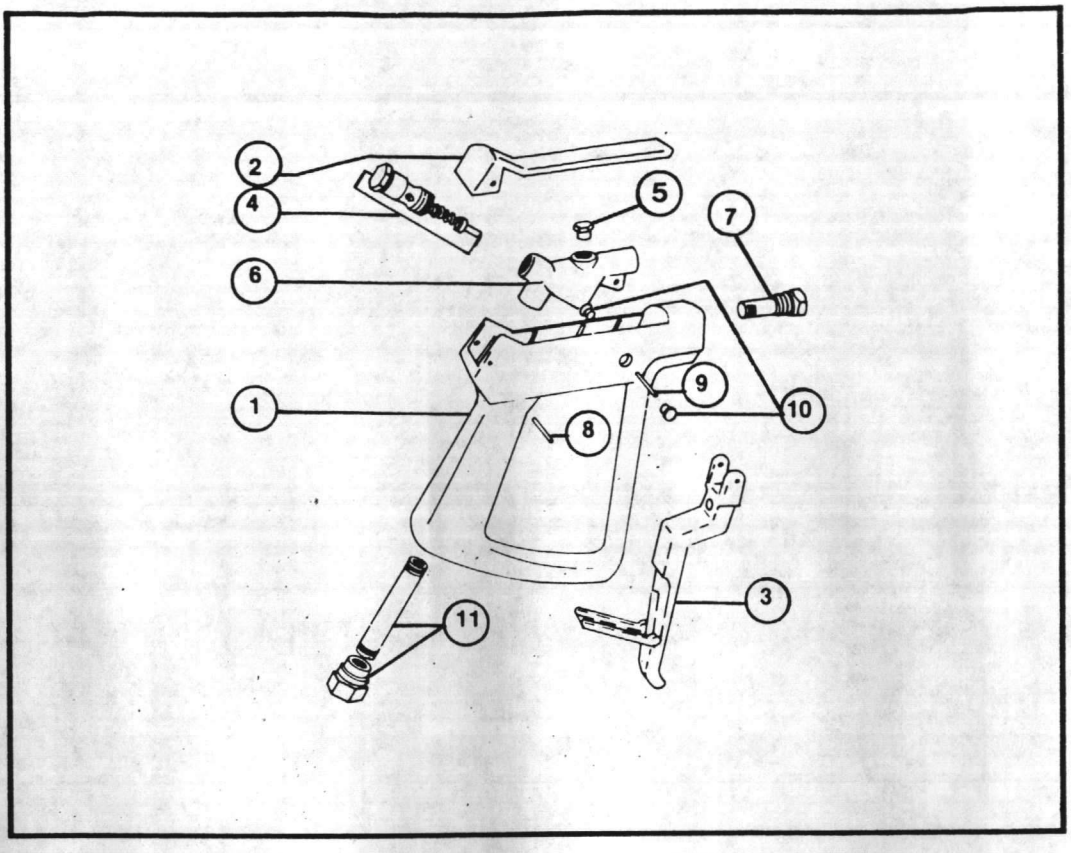
ILLUSTRATION #23



GUN, DUAL LANCE & HOSE ASSEMBLY

Ref. No.	Description	Part No.
1	Gun	16-0001
2	Dual lance (Includes items 3 & 4)	16-0035
3	Valve	22-0060
4	Chemical nozzle 40°, #60	18-0110
5	High pressure nozzle 15°, #4.5 (Models: HW-2004)	18-0024
5	High pressure nozzle 15°, #6 (Models: HW-2205)	18-0056
6	Quick connect 3/8"M x 3/8" Q.C. plug	17-0005
7	O-ring	25-0123
8	Quick connect 3/8"F x 3/8" Q.C. socket (Incl. item 7)	17-0004
9	50 feet high pressure hose (Includes items 7, 8 & 10) (Models: HW-2205)	851-0007
9	50 feet high pressure hose (Includes items 7, 8 & 10) (Models: HW-3004)	851-0006
10	Quick connect 3/8"F x 3/8" Q.C. plug	17-0006
	Complete Gun, Dual Lance and Hose Assembly	850-0012

ILLUSTRATION #24



GUN PART COMPONENT BREAKDOWN - PART #16-0001

Ref. No.	Description	Part No.
1	Plastic housing	16-0008
2	Plastic cover	16-0009
3	Trigger with safety pin	16-0010
4	Complete valve assembly	16-0059
5	Brass plug	39-0024
6	Brass housing	16-0012
7	Outlet	16-0013
8	Holding pin	43-0005
9	Pin for trigger	16-0063
10	Plastic cover for pin	16-0015
11	Inlet pipe	16-0016
	Gun complete	16-0001
	Repair Kit (Includes complete valve assembly #4)	16-0059

TAB PLACEMENT HERE

DESCRIPTION:

II. Heater

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Confidential Records Management, Inc.
New Bern, NC
1-888-622-4425
9/08

OPERATION AND MAINTENANCE INSTRUCTIONS

FOR

WASHRACK AT BUILDING 1450

MCB, CAMP LEJEUNE, NC

CONTRACT N62470-86-C-5420

DIVISION 15

MECHANICAL

HEATERS

TAB PLACEMENT HERE

DESCRIPTION:

N/A

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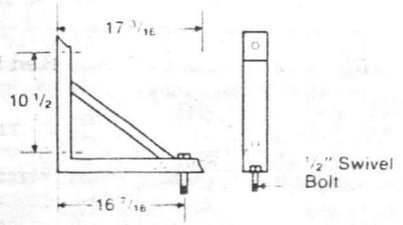
Confidential Records Management, Inc.
New Bern, NC
1-888-622-4425
9/08

Series EUH

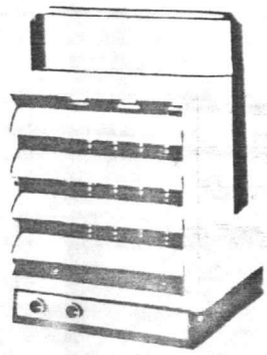
These heavy-duty heaters provide spot heating for hard-to-heat areas, or they can be used as the primary source of heat for areas not reached by an existing heating system.

The heart of each unit is the Electromode® exclusive cast aluminum heating grid — a feature which transfers heat with far more safety and efficiency than any other method. The fan and motor are carefully matched to insure quiet, trouble-free operation, and fan blades are precision-balanced before installation.

Heaters in all capacities (3, 5, 7½, 10 or 12 KW) have the same dimensions, and use the same mounting brackets. The rigid suspension bracket can be attached to the unit so that it can be positioned to provide either a horizontal mounting, or the entire unit can be angled downward at 15°, 30°, or 45°. In addition, a choice of mounting methods allows either fixed mounting to the ceiling, or wall mounting on an optional swivel bracket. All components and controls, including thermostat, transformers, relays and switches, are enclosed inside the case. And wiring is simple — all heaters can operate from a single power source. All the components are accessible from the removable bottom panel.



Hanger Bracket
For use with the unit heaters 3636



Features

Exclusive cast aluminum heating grids for unmatched safety and efficiency.

Matched motor and fan assembly for quiet operation.

Fan delay switch assures circulation of warm air only.

Thermal limit switches protect against excessive grid temperature.

Specifications

Capacity	Catalog Number	Supply Volts	Phase	Amps.	Control and Motor Volts	CFM	Air Temp. Rise	Air Throw Ft.	Mtg. Height Ft.
	EUH03L	120	1	25	120	350	30°	15	8
	EUH03V	208	1	14.4	208	350	30°	15	8
3 KW	EUH03N	240	1	12.5	240	350	30°	15	8
10,245	EUH03Y	277	1	10.8	277	350	30°	15	8
BTU	EUH03W	208	1-3	14.4/8.3	208	350	30°	15	8
	EUH03U	240	1-3	12.5/7.2	240	350	30°	15	8
	EUH03K	480	3	3.6	120	350	30°	15	8
	EUH05V	208	1	24.0	208	350	50°	15	8
	EUH05N	240	1	20.8	240	350	50°	15	8
5 KW	EUH05Y	277	1	18.0	277	350	50°	15	8
17,075	EUH05W	208	1-3	24.0/13.9	208	350	50°	15	9
BTU	EUH05U	240	1-3	20.8/12.0	240	350	50°	15	9
	EUH05K	480	3	6.0	120	350	50°	15	9
7.5 KW	EUH08W	208	1-3	36.0/20.8	208	600	46°	20	10
25,613	EUH08U	240	1-3	31.7/18.1	240	600	46°	20	10
BTU	EUH08K	480	3	9.0	120	600	46°	20	10
10 KW	EUH10W	208	1-3	48.0/27.8	208	600	60°	20	10
34,130	EUH10U	240	1-3	41.6/24.1	240	600	60°	20	10
BTU	EUH10K	480	3	12.0	120	600	60°	20	10
12 KW	EUH12W	208	1-3	NA/33.0	208	600	75°	20	10
42,000	EUH12U	240	1-3	NA/28.8	240	600	75°	20	10
BTU	EUH12K	480	3	14.4	120	600	75°	20	10

All units have a built-in thermostat. May be field reconnected to remote wall mounted line voltage thermostat or low voltage transformer/relay. See optional accessories.

For more details write for Product Bulletin EC-1000.

Optional Factory-Installed Accessories

On special order, the following optional accessories can be factory-installed. Contact factory for delivery information. Add the appropriate suffix to the basic catalog number.

01	Summer fan switch
02	24 volt transformer/relay
03	Summer fan switch plus 24 volt transformer/relay

Optional Field-Installed Accessories

EUAF	Fan-switch (continuous operation)
EUARL	24 volt control (transformer/relay for all 120 volt units) and 480 ΔK-Series
EUARW	24 volt control (transformer/relay for all 208 volt units)
EUARU	24 volt control (transformer/relay for all 240 volt units)

Recommended Remote Thermostats

Cat No.	For use with above heaters
5258	24 volts low voltage (for use with transformer/relay options)
1680	Line volt pilot duty

Unit Dimensions

15 ½" High x 13" Wide x 13 ¼" Depth.

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DESCRIPTION:

N/A

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9/08

INSTALLATION INSTRUCTIONS

5100 Series Unit Heaters

All electric unit heaters are shipped fully assembled. Installation includes hanging the unit, mounting the built-in and remote accessories, wiring of optional control devices, and electrical wiring to the unit.

To insure proper delivery of the heated air to desired areas, follow the mounting height and air projection tables included in these instructions. Follow Fig. 1 & 2 for minimum wall and ceiling clearances.

The wall and/or ceiling structure must be sufficient to support the combined weight of the heater and any mounting bracket and accessories.

Be sure power source is de-energized before installing heater. Check heater voltage and phase listed on heater data tape on back of unit to make sure they are the same as the electrical service supplied.

Certain units are adaptable from single to three phase service. Follow instructions noted on the unit wiring diagram for this conversion. Units that carry a dual voltage rating (HF) require specific wiring changes when converting from 240 to 208 volt service. Carefully follow the instructions on the unit wiring diagram.

Open the access panel (2 ¼ turn fasteners).

Remove the desired knock-out(s) on back of the heater.

Install any optional accessories following their installation instructions before mounting unit. Following the correct unit/accessory wiring diagram, connect the power supply, mechanical ground and accessories to the correct terminals or termination points using accepted practices.

Heaters may be mounted in the horizontal or vertical air discharge configuration using factory optional supplied accessory mounting equipment or using special hardware facilities supplied by others.

After the installation is complete, replace the access panel.

Set the controls (thermostat, switch) at their desired control point and apply power to the unit.

Check for correct operation.

HORIZONTAL AIR DISCHARGE MOUNTING

Swivel hanger brackets may be used to suspend unit heaters from either the wall (Fig. 5) or the ceiling (Fig. 6).

Attach hanger base "A" to top of heater with the four 5/16 x 18 cap screws and lockwashers (provided in envelope).

Attach main hanger frame "B" to wall or ceiling in desired location using lag screws "C" or other suitable attachments (supplied by others).

Lift heater into position inserting stud "D" through hole in main hanger frame and attach castle nut (provided in envelope) "E" tightening to within two turns of being tight.

Swivel heater to desired position, tighten castle nut and insert cotter pin "F" through appropriate hole in stud.

VERTICAL AIR DISCHARGE MOUNTING

(Fig. 7)

Attach short angle brackets "A" to back of heater with four 5/16 x 18 capscrews "B", lockwashers "F". Be sure vertical leg of angle brackets face top and bottom of heater.

Attach inverted U frames "D" to short angle brackets with four 5/16 x 18 capscrews "E", washers "F", lockwashers "G" and nuts "H".

Attach long angle brackets "J" to inverted frames "D" with four 5/16 x 18 capscrews "K", washers "L", lockwashers "M" and nuts "N".

Attach heater and bracket assembly to ceiling in desired location using customer supplied equipment sufficient to support the assembly.

NOTE: When mounting heater using 5/16" all thread rod (by others) do not screw the rod more than ½" beyond the inside of the case.

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Principles of

operation

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PRINCIPLES OF OPERATION

Upon a call for heat from the floor level or unit mounted optional accessory thermostat, the unit fan motor and heating elements shall be energized and remain on until temperature reaches setting of thermostat; at which time, the heating elements shall be deenergized. The fan motor shall continue to run and purge heater casing of residual heat until setting of fan override is reached, then the fan motor shall be deenergized. For those units with a factory installed two speed fan switch (25-50KW), the unit as shipped from the factory is set for the "low" speed fan position. Customer option to set to "high" speed. For those units available with subdivided circuits, the accessory two stage thermostat (optional) will, upon a call for heat, energize fan motor and the first stage heating element. Should temperature continue to fall, the thermostat shall energize the second stage heating element. Upon a rise in space conditions towards setting of the thermostat, the two stages of heating elements shall be deenergized in reverse sequence. The fan motor shall continue to run and purge heater casing of residual heat until setting of fan override is reached, then the fan motor shall be deenergized.

The accessory unit mounted stratification thermostat will energize the unit heater fan motor upon a rise in temperature above its setting. When the unit mounted stratification thermostat closes on a temperature rise and at the same time the floor thermostat calls for heat, the motor shall be energized immediately and the heating element shall be energized, as previously described.

The automatic reset safety high limit shall deenergize the heating elements and control circuits should the temperature exceed the setting of this device. The fan safety override shall energize fan motor any time the setting of this device is exceeded so as to purge heater casing of excess residual heat. When the accessory fan switch is placed in the ON position (for summer air circulation), the unit heater fan motor shall be energized.

NOTE: The wall thermostat is to be set to the OFF Position during this mode of operation (units with contactors).

For those accessory thermostats equipped with an integral fan switch, place the switch in the HEAT, or AUTO position for operation of the fan and elements which shall then be under control of the thermostat as described above. When switch is placed in the OFF position, the unit shall be deenergized. When switch is placed in the FAN position, elements shall be deenergized and fan shall be immediately energized.

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Safety

Warnings

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GENERAL SAFETY INFORMATION

CAUTION:

Follow all local electrical and safety codes, as well as the National Electrical Code (NEC) and the Occupational Safety and Health Act (OSHA).

To avoid possible electrical shock, be sure the electrical current is turned off at the main switch prior to wiring or servicing of unit.

If the power disconnect is not integral and is out-of-sight, lock it in the open position and tag to prevent unexpected application of power prior to performing any service or maintenance on the unit.

The unit when installed must be electrically grounded in accordance with the National Electric Code and standard industry practice.

Make certain that the power source conforms to the requirements of your equipment. See Table 2 for information as to wire size, circuit size, etc.

Check heater voltage and phase on rating label to confirm it is the same as the electric service supply.

Wiring diagrams of the heaters and supply connections are permanently attached to the inside of the heater access door. All terminals are coded in accordance with the wiring diagram. Accessory wiring are as shown on the unit wiring diagram and supporting literature.

The heater must be mounted at least 7' above the floor to prevent accidental contact with the fan blade which could cause injury. Install unit so there are no obstructions to the intake or discharge. Maintain clearances as shown on Table 1, 2, Fig. 1 & 2.

The wall/ceiling mounting structure and anchoring provisions must be of sufficient strength to support the combined weight of the heater and mounting bracket.

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Preventive

maintenance

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MAINTENANCE

CAUTION: Make certain that the power source is disconnected before attempting to service or disassemble any component. If the power disconnect is out of the line of sight, lock it in the OPEN position and tag to prevent the application of power.

ELECTRICAL

Once a year inspect the control panel wiring to make certain insulation is intact and all connections are tight. Inspect all heater and relay contacts. If the contacts appear badly pitted or burned, replace the contractor/relay.

For proper circuit protection during operation, the correct size fuse must be used. The parts list contains the fuse size for all units.

CLEANING

Clean the unit casing, fan and motor once a year. A dirty motor will tend to run hot and eventually will be damaged internally. Any rust spots on the casing should be cleaned and repainted.

LUBRICATION

All units up to 20KW have fan motors that are permanently lubricated so that only occassional cleaning is required. Units above 20KW have fan motors lubricated for 5 years of continuous duty or 10 years of intermittent operation. When required, remove the oil access plug on back of heater at motor intake grill, open oil cap, fill with S.A.E. No. 10 electric motor oil, replace plugs and access plug.

TAB PLACEMENT HERE

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Corrective

Maintenance

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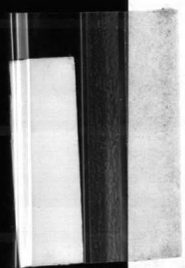
TROUBLE SHOOTING CHART

SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Thermostat calls for heat, but heater does not function	1. Open (blown) fuse.	1. Replace fuses, check for cause. (see Replacement Parts List for fuse size)
	2. INCORRECT WIRING.	2. CHECK WIRING CONNECTIONS
	3. Thermal cut-out open, de-energizing heater element and control circuit.	3. Check for the following: Correct supply volts & phase Correct control wiring (heater control must be thru thermostat control wiring section only) Power interruption to heater during heater operation Restriction of air around heater 1-5 minute fan purge after thermostat off
Fan motor runs "hot"	1. Dust accumulation or excessive dirt on motor	1. Clean fan motor and casing of grease and oil accumulation.
	2. Dirt accumulation	2. Clean louvers and between heating elements
	3. Motor needs lubrication.	3. See Maintenance.
Fan motor runs, but no heat.	1. Element contactor not operating correctly.	1. Check wiring for open circuit. Replace contactor if defective.
	2. Element fuse blown.	2. Replace fuses, check for cause. (See Replacement Parts List for fuse size.)

Except in case of emergency, do not open main disconnect while heater is in operation. This could result in the thermal cutout opening due to the inability of the fan override to operate the fan and purge the heater case of residual heat.



Markel Products Company

SERIES 5100

TASKMASTER

Horizontal or vertical mounting
industrial/commercial unit heater

INSTALLATION INSTRUCTIONS & PARTS LIST

ATTENTION: READ CAREFULLY **BEFORE** ATTEMPTING TO INSTALL, OPERATE OR SERVICE THE TASKMASTER UNIT HEATER. RETAIN THESE INSTRUCTIONS FOR FUTURE USE.

FEATURES

Forced air electric unit heater available in 208, 240/208, 277 or 480 volt as standard.

Ten standard heating capacities of 3.3 KW/11,260 BTUH thru 50.0 KW/170, 600 BTUH.

208 and 240/208 volt models are single phase field convertible to three phase on 3.3 thru 10.0 KW Models. (Single phase only available on 3.3, 5.0, 7.5 and 10 KW 277 volt models.

Specially designed inlet louver allows the fan to pull cool air evenly across the high mass all-steel element.

Outward drawn venturi and adjustable louver assembly further directs the outlet air in a uniform pattern to meet specific air pattern requirements in either the horizontal or vertical mounting position.

Optional wall/ceiling or vertical mounting brackets. (As required).

Four position weld nuts supplied in case top and back for field mounting by drill rods or eye bolt with chain. (Hardware supplied by others.)

Optional radial or anemostat diffusers lending air pattern versatility when mounted vertically.

Modular control kits for field installation. Disconnect switch, thermostat, summer fan switch, heat recovery thermostat. All kits with spade terminals (Except disconnect switch).

Single point terminal board wiring of integral control kits.

24 volt low voltage control circuit standard on all contactor and transformer models.

Roomy control box with access door locked into position by two (2) ¼ turn fasteners for ease of installation.

PROPER LOCATION INSTRUCTIONS

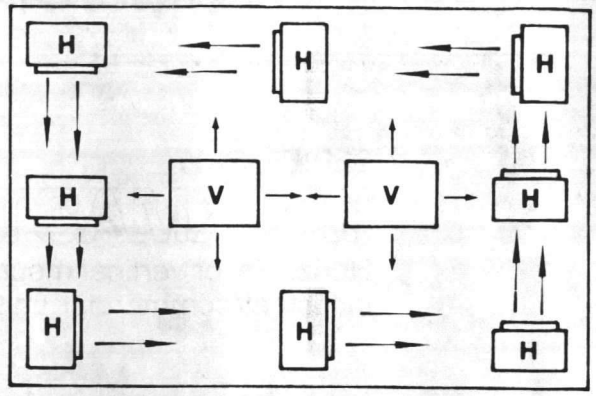
Once the total heating load is calculated, the quantity and capacity of the unit heaters must be determined. Because a large number of low-capacity heaters provides more uniform heat distribution, this approach is recommended when the area will be occupied by a relatively large number of sedentary personnel, perhaps working on production lines and at benches.

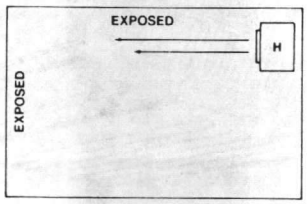
A large number of smaller capacity unit heaters tends to prevent hot drafts, reduces noise levels, and increases diversity of load to help reduce electrical demand and operating costs.

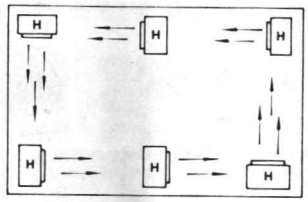
In warehouse areas where even heat distribution and constant temperature are less important, a smaller number of high capacity units can be used - in many cases reducing first cost. To maintain reasonable heat distribution and reduce severe stratification even in lower bay areas, the total air volume of the space should pass through the unit heaters about three times per hour. (Take total cubic feet and divide by 20 in order to determine proper total heater CFM rating.)

It is important that the rated voltage of the heating equipment match the supply voltage. Supply voltage in excess of the heater rated voltage can damage equipment. Supply voltage lower than the rated heater voltage will decrease heater output as well as run the risk of damaging some components.

Horizontal unit heaters are recommended in low bay areas with maximum 15 to 18 foot ceilings. These should be concentrated along outside walls or other areas of greatest heat loss, spaced to set up a generally circular air movement, each heater supporting the air stream of the other. Additional vertical down blow unit heaters with appropriate accessory diffusers can be located to counteract ceiling heat losses.







GENERAL SAFETY INFORMATION

CAUTION:

Follow all local electrical and safety codes, as well as the National Electrical Code (NEC) and the Occupational Safety and Health Act (OSHA).

To avoid possible electrical shock, be sure the electrical current is turned off at the main switch prior to wiring or servicing of unit.

If the power disconnect is not integral and is out-of-sight, lock it in the open position and tag to prevent unexpected application of power prior to performing any service or maintenance on the unit.

The unit when installed must be electrically grounded in accordance with the National Electric Code and standard industry practice.

Make certain that the power source conforms to the requirements of your equipment. See Table 2 for information as to wire size, circuit size, etc.

Check heater voltage and phase on rating label to confirm it is the same as the electric service supply.

Wiring diagrams of the heaters and supply connections are permanently attached to the inside of the heater access door. All terminals are coded in accordance with the wiring diagram. Accessory wiring are as shown on the unit wiring diagram and supporting literature.

The heater must be mounted at least 7' above the floor to prevent accidental contact with the fan blade which could cause injury. Install unit so there are no obstructions to the intake or discharge. Maintain clearances as shown on Table 1, 2, Fig. 1 & 2.

The wall/ceiling mounting structure and anchoring provisions must be of sufficient strength to support the combined weight of the heater and mounting bracket.

PRINCIPLES OF OPERATION

Upon a call for heat from the floor level or unit mounted optional accessory thermostat, the unit fan motor and heating elements shall be energized and remain on until temperature reaches setting of thermostat; at which time, the heating elements shall be deenergized. The fan motor shall continue to run and purge heater casing of residual heat until setting of fan override is reached, then the fan motor shall be deenergized. For those units with a factory installed two speed fan switch (25-50KW), the unit as shipped from the factory is set for the "low" speed fan position. Customer option to set to "high" speed. For those units available with subdivided circuits, the accessory two stage thermostat (optional) will, upon a call for heat, energize fan motor and the first stage heating element. Should temperature continue to fall, the thermostat shall energize the second stage heating element. Upon a rise in space conditions towards setting of the thermostat, the two stages of heating elements shall be deenergized in reverse sequence. The fan motor shall continue to run and purge heater casing of residual heat until setting of fan override is reached, then the fan motor shall be deenergized.

The accessory unit mounted stratification thermostat will energize the unit heater fan motor upon a rise in temperature above its setting. When the unit mounted stratification thermostat closes on a temperature rise and at the same time the floor thermostat calls for heat, the motor shall be energized immediately and the heating element shall be energized, as previously described.

The automatic reset safety high limit shall deenergize the heating elements and control circuits should the temperature exceed the setting of this device. The fan safety override shall energize fan motor any time the setting of this device is exceeded so as to purge heater casing of excess residual heat. When the accessory fan switch is placed in the ON position (for summer air circulation), the unit heater fan motor shall be energized.

NOTE: The wall thermostat is to be set to the OFF Position during this mode of operation (units with contactors).

For those accessory thermostats equipped with an integral fan switch, place the switch in the HEAT, or AUTO position for operation of the fan and elements which shall then be under control of the thermostat as described above. When switch is placed in the OFF position, the unit shall be deenergized. When switch is placed in the FAN position, elements shall be deenergized and fan shall be immediately energized.

VERTICAL DISCHARGE UNITS — AIR PATTERNS

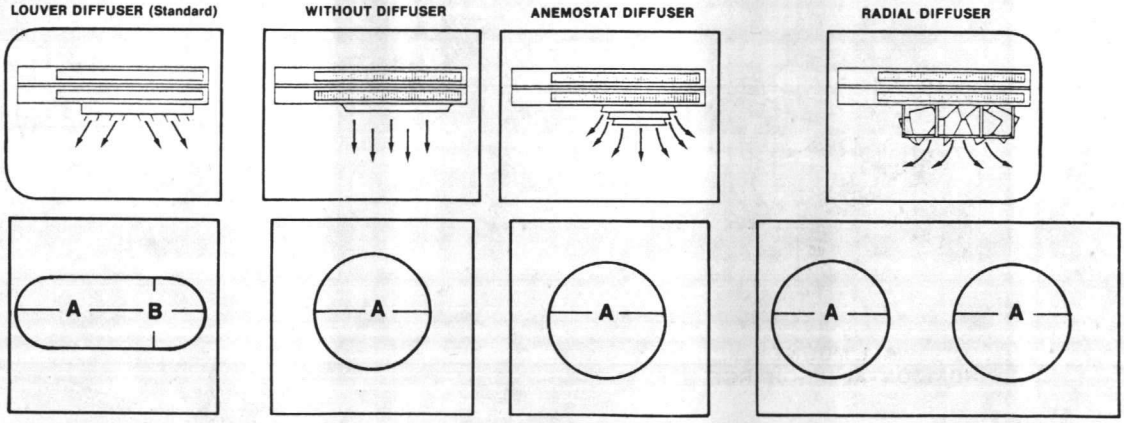
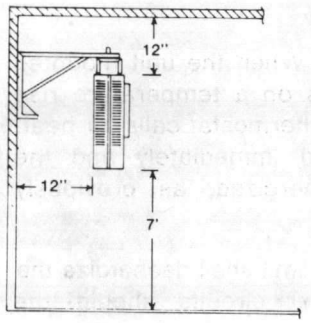


TABLE 1

USED ON	MAX MTG HT.	A	B	STOCK NO.	MAX MTG HT.	A	STOCK NO.	MAX MTG HT.	A	STOCK NO.	STOCK NO.	MAX. MTG HEIGHT		A	
												45°	OPEN	45°	OPEN
3.3 & 5.0 KW	9	20	10	STD	9	15	N/R	—	—	N/A	N/A	—	—	—	—
7.5 & 10.0 KW	12	40	22	STD	12	30	N/R	10	30	AD5120	RD5120	0	14	36	30
15.0 & 20.0 KW	18	52	30	STD	18	40	N/R	15	38	AD5120	RD5120	14	21	42	35
25.0 & 30.0 KW	22	75	42	STD	22	55	N/R	17	50	AD5150	RD5150	20	30	62	44
40.0 & 50.0 KW	24	84	47	STD	24	64	N/R	20	60	AD5150	RD5150	18	28	68	54

STD = Standard N/R = Not Required N/A = Not Applicable

Optional diffusers lend added air pattern versatility to individual vertical down blow installations. As shown in above illustrations.



MOUNTING CLEARANCE

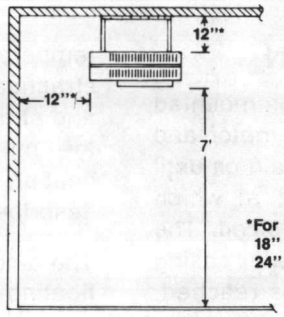


Fig. 1
HORIZONTAL DISCHARGE

Fig. 2
VERTICAL DISCHARGE

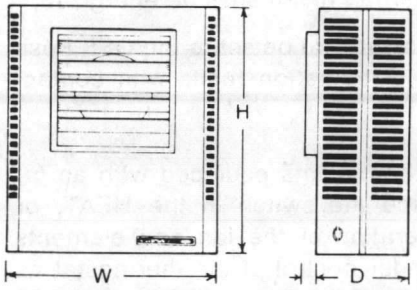


Fig. 3 DIMENSIONS (INCHES)

KW	H	W	D
3.3, 5.0	17-3/4	14-15/32	6-1/2
7.5, 10.0	24-5/16	21-1/2	6-1/2
15.0, 20.0	28-11/16	21-1/2	6-1/2
25.0, 50.0	34	29-1/4	10-1/16

Fig. 3A **3.3-5KW**

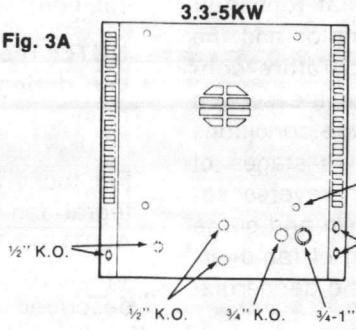


Fig. 3B **7.5-20KW**

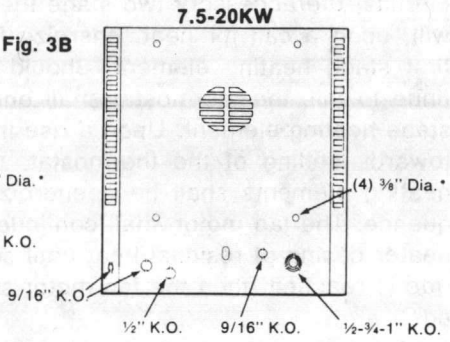
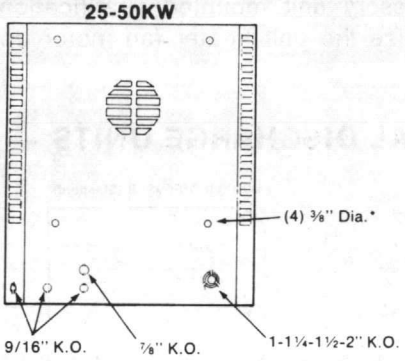


Fig. 3C **25-50KW**



*For vertical discharge mounting bracket

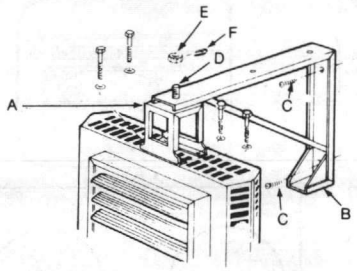


Fig. 5
WALL MOUNT
HORIZONTAL DISCHARGE

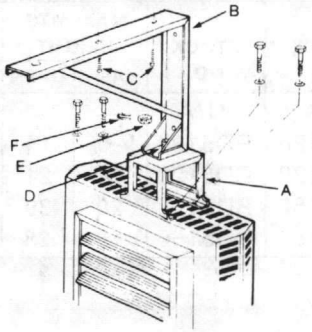


Fig. 6
CEILING MOUNT
HORIZONTAL DISCHARGE

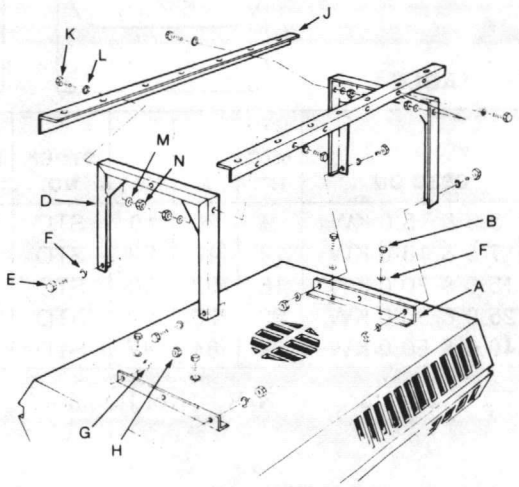


Fig. 7
CEILING MOUNT
VERTICAL DISCHARGE

INSTALLATION INSTRUCTIONS

5100 Series Unit Heaters

All electric unit heaters are shipped fully assembled. Installation includes hanging the unit, mounting the built-in and remote accessories, wiring of optional control devices, and electrical wiring to the unit.

To insure proper delivery of the heated air to desired areas, follow the mounting height and air projection tables included in these instructions. Follow Fig. 1 & 2 for minimum wall and ceiling clearances.

The wall and/or ceiling structure must be sufficient to support the combined weight of the heater and any mounting bracket and accessories.

Be sure power source is de-energized before installing heater. Check heater voltage and phase listed on heater data tape on back of unit to make sure they are the same as the electrical service supplied.

Certain units are adaptable from single to three phase service. Follow instructions noted on the unit wiring diagram for this conversion. Units that carry a dual voltage rating (HF) require specific wiring changes when converting from 240 to 208 volt service. Carefully follow the instructions on the unit wiring diagram.

Open the access panel (2 ¼ turn fasteners).

Remove the desired knock-out(s) on back of the heater.

Install any optional accessories following their installation instructions before mounting unit. Following the correct unit/accessory wiring diagram, connect the power supply, mechanical ground and accessories to the correct terminals or termination points using accepted practices.

Heaters may be mounted in the horizontal or vertical air discharge configuration using factory optional supplied accessory mounting equipment or using special hardware facilities supplied by others.

After the installation is complete, replace the access panel.

Set the controls (thermostat, switch) at their desired control point and apply power to the unit.

Check for correct operation.

HORIZONTAL AIR DISCHARGE MOUNTING

Swivel hanger brackets may be used to suspend unit heaters from either the wall (Fig. 5) or the ceiling (Fig. 6).

Attach hanger base "A" to top of heater with the four 5/16 x 18 cap screws and lockwashers (provided in envelope).

Attach main hanger frame "B" to wall or ceiling in desired location using lag screws "C" or other suitable attachments (supplied by others).

Lift heater into position inserting stud "D" through hole in main hanger frame and attach castle nut (provided in envelope) "E" tightening to within two turns of being tight.

Swivel heater to desired position, tighten castle nut and insert cotter pin "F" through appropriate hole in stud.

VERTICAL AIR DISCHARGE MOUNTING

(Fig. 7)

Attach short angle brackets "A" to back of heater with four 5/16 x 18 capscrews "B", lockwashers "F". Be sure vertical leg of angle brackets face top and bottom of heater.

Attach inverted U frames "D" to short angle brackets with four 5/16 x 18 capscrews "E", washers "F", lockwashers "G" and nuts "H".

Attach long angle brackets "J" to inverted frames "D" with four 5/16 x 18 capscrews "K", washers "L", lockwashers "M" and nuts "N".

Attach heater and bracket assembly to ceiling in desired location using customer supplied equipment sufficient to support the assembly.

NOTE: When mounting heater using 5/16" all thread rod (by others) do not screw the rod more than ½" beyond the inside of the case.

5100 SERIES TECHNICAL DATA

TABLE 2

ELECTRICAL DATA

CATALOG NUMBER	KW RATING	BTU/HR (000)	HEATER/ MOTOR VOLTAGE	HEATER	CONTROL VOLTAGE	AMPS PER PHASE	BRANCH CIRCUIT PROTECTION SIZE (A)	SUPPLY WIRE SIZE 60°C AWG **
F1F5103L	3.3	11.2	208	1	208	15.9	20	12
F2F5103L	3.3	11.2	208	1-3	208	15.9	20	12
HF1B5103L	3.3/2.5	11.2/8.5	240/208	1	240/208	13.7/11.9	20/15	12/14
HF2B5103L	3.3/2.5	11.2/8.5	240/208	1-3	240/208	13.7/11.9	20/15	12/14
G1G5103L	3.3	11.2	277	1	277	11.9	15	14
P3P5103CA1L	3.3	11.2	480	3	24	4.0	15	14
F1F5105L	5.0	17.1	208	1	208	24.1	35	8
F2F5105L	5.0	17.1	208	1-3	208	24.1	35	8
HF1B5105L	5.0/3.7	17.1/12.8	240/208	1	240/208	20.9/18.1	30/25	10/10
HF2B5105L	5.0/3.7	17.1/12.8	240/208	1-3	240/208	20.9/18.1	30/25	10/10
G1G5105L	5.0	17.1	277	1	277	18.1	25	10
P3P5105CA1L	5.0	17.1	480	3	24	6.1	15	14
F2F5107CA1L	7.5	25.6	208	1-3	24	36.1	50	6
HF2B5107CA1L	7.5/5.6	25.6/19.2	240/208	1-3	24	31.3/27.1	40/35	8/8
G1G5107CA1L	7.5	25.6	277	1	24	27.1	35	8
P3P5107CA1L	7.5	25.6	480	3	24	9.1	15	14
F2F5110CA1L	9.9	33.8	208	1-3	24	47.8	60	4
HF2B5110CA1L	10.0/7.5	34.1/25.6	240/208	1-3	24	42.2/36.1	60/50	4/6
G1G5110CA1L	10.0	34.1	277	1	24	36.1	50	6
P3P5110CA1L	10.0	34.1	480	3	24	12.1	20	12
F3F5115CA1L	15.0	51.2	208	3	24	41.7	60	4
HF3B5115CA1L	15.0/11.2	51.2/38.4	240/208	3	24	36.1/31.3	50/40	6/8
P3P5115CA1L	15.0	51.2	480	3	24	18.1	25	10
HF3B5120CA1L	19.7/14.8	67.2/50.5	240/208	3	24	47.8/41.1	70/60	4/4
P3P5120CA1L	20.0	68.3	480	3	24	24.1	35	8
F3F5125CA1L	25.0	85.3	208	3	24	69.5	90	2
HF3B5125CA1L	25.0/18.7	85.3/64.0	240/208	3	24	60.2/52.1	80/70	3/4
P3P5125CA1L	25.0	85.3	480	3	24	30.1	40	8
F3F5130CA1L	30.0	102.4	208	3	24	83.4	110	1
HB3B5130CA1L	30.0/22.5	102.4/76.8	240/208	3	24	72.3/62.5	100/80	1/3
P3P5130CA1L	30.0	102.4	480	3	24	36.2	50	6
F3F5140CA1L	40.0	136.5	208	3	24	111.2	150	1/0 *
HF3B5140CA1L	40.0/30.0	136.5/102.4	240/208	3	24	96.4/83.4	125/110	1/0/1
P3P5140CA1L	39.0	133.1	480	3	24	47.0	70	4
F3F5150CA1L	50.0	170.6	208	3	24	139.0	175	2/0 *
HF3B5150CA1L	50.0/37.5	170.6/128.0	240/208	3	24	120.5/104.3	175/175	2/0*/2/0
P3P5150CA1L	50.0	170.6	480	3	24	60.3	80	3*

**Use Copper Conductors on All Heaters *Use 75°C Wire

AIR DELIVERY DATA — FAN MOTOR DATA

CFM at OUTLET	FPM at OUTLET	AIR RISE °F	HP	MOTOR RPM	MAX MTG HEIGHT HOR	MAX MTG HEIGHT VERT	AIR THROW (HORIZ)	WEIGHT LBS.
400	1030	26	1/125	1550	9	9	12 Ft.	25
400	1030	26	1/125	1550	9	9	12 Ft.	25
400	1030	26	1/125	1550	9	9	12 Ft.	25
400	1030	26	1/125	1550	9	9	12 Ft.	25
400	1030	26	1/125	1550	9	9	12 Ft.	25
400	1030	26	1/125	1550	9	9	12 Ft.	27
400	1030	40	1/125	1550	9	9	12 Ft.	25
400	1030	40	1/125	1550	9	9	12 Ft.	25
400	1030	40	1/125	1550	9	9	12 Ft.	25
400	1030	40	1/125	1550	9	9	12 Ft.	25
400	1030	40	1/125	1550	9	9	12 Ft.	25
400	1030	40	1/125	1550	9	9	12 Ft.	27
700	1000	34	1/50	1550	10	12	22 Ft.	50
700	1000	34	1/50	1550	10	12	22 Ft.	50
700	1000	34	1/50	1550	10	12	22 Ft.	50
700	1000	34	1/50	1550	10	12	22 Ft.	50
700	1000	45	1/50	1500	10	14	22 Ft.	50
700	1000	45	1/50	1500	10	14	22 Ft.	50
700	1000	45	1/50	1500	10	14	22 Ft.	50
700	1000	45	1/50	1500	10	14	22 Ft.	50
1100	1580	43	1/20	1550	11	20	32 Ft.	65
1100	1580	43	1/20	1550	11	20	32 Ft.	65
1100	1580	43	1/20	1550	11	20	32 Ft.	65
1100	1580	57	1/20	1550	12	18	32 Ft.	65
1100	1580	57	1/20	1550	12	18	32 Ft.	65
2000/1800	1300/1100	40/44	1/12	1550/1250	12	22	45 Ft.	120
2000/1800	1300/1100	40/44	1/12	1550/1250	12	22	45 Ft.	120
2000/1800	1300/1100	40/44	1/15	1550/1250	12	22	45 Ft.	120
2000/1800	1300/1100	47/53	1/12	1550/1250	12	20	40 Ft.	120
2000/1800	1300/1100	47/53	1/12	1550/1250	12	20	40 Ft.	120
2000/1800	1300/1100	47/53	1/15	1550/1250	12	20	40 Ft.	120
3100/2800	2000/1800	40/45	1/4	1550/1310	15	25	55 Ft.	120
3100/2800	2000/1800	40/45	1/4	1550/1310	15	25	55 Ft.	120
3100/2800	2000/1800	40/45	1/5	1550/1310	15	25	55 Ft.	120
3100/2800	2000/1800	51/56	1/4	1550/1310	15	22	50 Ft.	120
3100/2800	2000/1800	51/56	1/4	1550/1310	15	22	50 Ft.	120
3100/2800	2000/1800	51/56	1/5	1550/1310	15	22	50 Ft.	120

TROUBLE SHOOTING CHART

SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Thermostat calls for heat, but heater does not function	1. Open (blown) fuse.	1. Replace fuses, check for cause. (see Replacement Parts List for fuse size)
	2. INCORRECT WIRING.	2. CHECK WIRING CONNECTIONS
	3. Thermal cut-out open, de-energizing heater element and control circuit.	3. Check for the following: Correct supply volts & phase Correct control wiring (heater control must be thru thermostat control wiring section only) Power interruption to heater during heater operation Restriction of air around heater 1-5 minute fan purge after thermostat off
Fan motor runs "hot"	1. Dust accumulation or excessive dirt on motor	1. Clean fan motor and casing of grease and oil accumulation.
	2. Dirt accumulation	2. Clean louvers and between heating elements
	3. Motor needs lubrication.	3. See Maintenance.
Fan motor runs, but no heat.	1. Element contactor not operating correctly.	1. Check wiring for open circuit. Replace contactor if defective.
	2. Element fuse blown.	2. Replace fuses, check for cause. (See Replacement Parts List for fuse size.)

Except in case of emergency, do not open main disconnect while heater is in operation. This could result in the thermal cutout opening due to the inability of the fan override to operate the fan and purge the heater case of residual heat.

MAINTENANCE

CAUTION: Make certain that the power source is disconnected before attempting to service or disassemble any component. If the power disconnect is out of the line of sight, lock it in the OPEN position and tag to prevent the application of power.

ELECTRICAL

Once a year inspect the control panel wiring to make certain insulation is intact and all connections are tight. Inspect all heater and relay contacts. If the contacts appear badly pitted or burned, replace the contractor/relay.

For proper circuit protection during operation, the correct size fuse must be used. The parts list contains the fuse size for all units.

CLEANING

Clean the unit casing, fan and motor once a year. A dirty motor will tend to run hot and eventually will be damaged internally. Any rust spots on the casing should be cleaned and repainted.

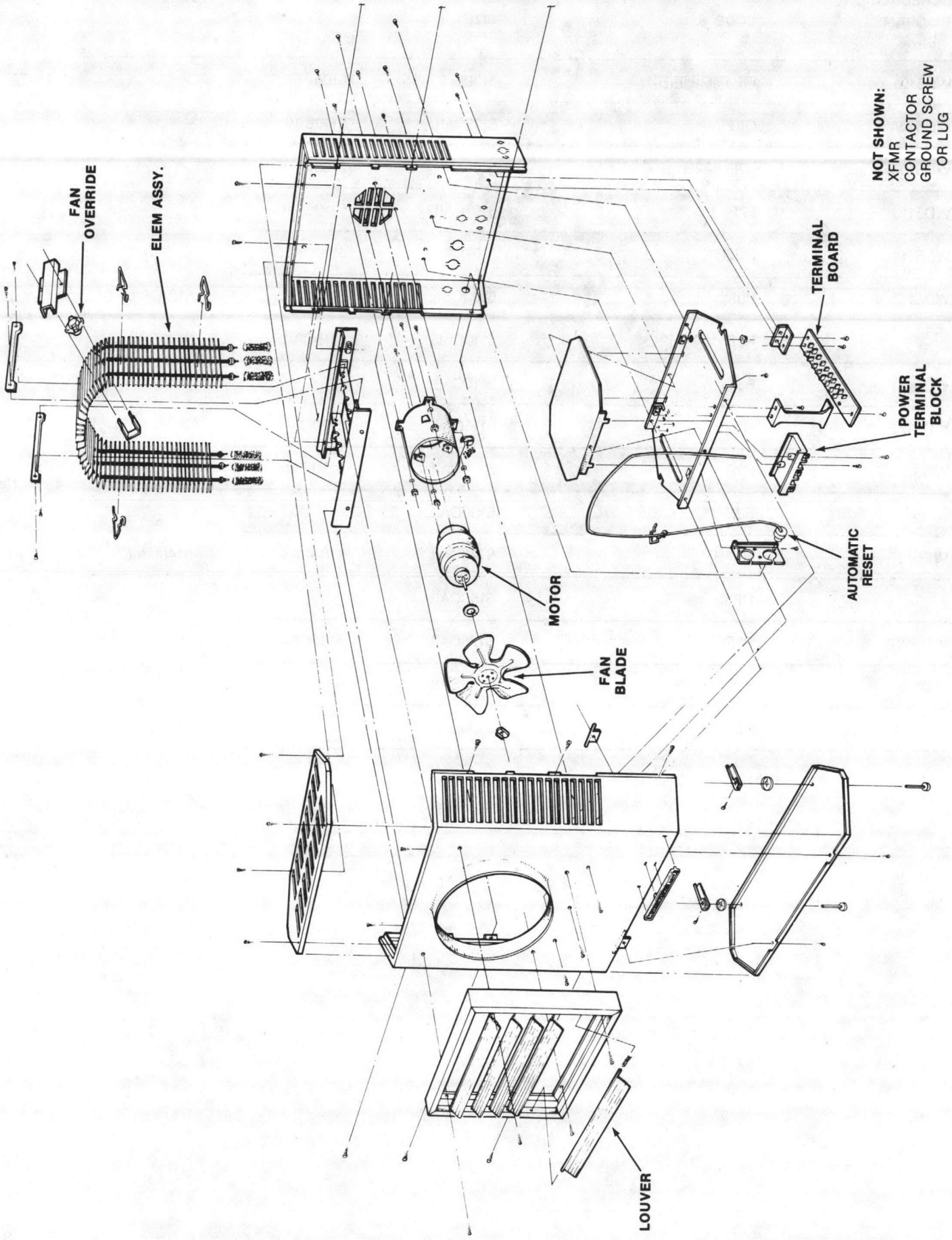
LUBRICATION

All units up to 20KW have fan motors that are permanently lubricated so that only occassional cleaning is required. Units above 20KW have fan motors lubricated for 5 years of continuous duty or 10 years of intermittent operation. When required, remove the oil access plug on back of heater at motor intake grill, open oil cap, fill with S.A.E. No. 10 electric motor oil, replace plugs and access plug.

WIRING DIAGRAM & SCHEDULE

SCHEDULE DIAGRAM	CODE	SIZE		
WD5101	FIF-GIG-HFIB	5130L	5105L	
WD5104	GIG	5107CAIL	5110CAIL	
WD5106	F2F-HF2B	5103L	5105L	
WD5113	F2F	5107CAIL	5110CA1L	
WD5114	HF2B	5107CAIL	5110CAIL	
WD5117	P3P	5103CAIL	5105CAIL	5107CAIL
	P3P	5110CAIL	5115CAIL	5120CAIL
WD5121	F3F	5115CAIL		
WD5122	HF3B	5115CAIL	5120CAIL	
WD5125	F3F	5125CAIL	5130CAIL	5140CAIL
	F3F	5150CAIL		
WD5126	HF3B	5125CAIL	5130CAIL	5140CAIL
	HF3B	5150CAIL		
WD5132	P3P	5125CAIL	5130CAIL	
WD5133	P3P	5125CAIL		
WD5135	P3P	5150CAIL		

PARTS DRAWING



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PARTS LIST CATALOG ITEMS

REVISED

8/8/85

	MOTOR	ELEMENT ASSY	AUTOMATIC RESET	FAN OVERRIDE	XFMR	CONTACTOR	POWER TERMINAL BLOCK
F1F5103	A8617-30	TE8775-1	A4388	A4306	—	—	A8785
F2F5103	A8617-30	TE8775-2	A4388(2)	A4306	—	—	A8785
HF1B5103	A8772-30	TE8776-1	A4388	A4306	—	—	A8785
HF2B5103	A8772-30	TE8776-2	A4388(2)	A4306	—	—	A8785
G1G5103	A8619-30	TE8782-1	A4388	A4306	—	—	A8785
P3P5103CA1	A8773-30	TE8782-2	A4388	A4306	A8793	A8796-24	A8785
F1F5105	A8617-30	TE8779-1	A4389	A4307	—	—	A8785
F2F5105	A8617-30	TE8779-2	A4389(2)	A4307	—	—	A8785
HF1B5105	A8772-30	TE8780-1	A4389	A4307	—	—	A8785
HF2B5105	A8772-30	TE8780-2	A4389(2)	A4307	—	—	A8785
GIG5105	A8619-30	TE8784-1	A4389	A4307	—	—	A8785
P3P5105CA1	A8773-30	TE8784-2	A4389	A4307	A8793	A8796-24	A8785
F2F5107CA1	A8804	E8203-1	A4390	A4306	A8789	A8797-24	A8786
HF2B5107CA1	A8805	E8204-1	A4390	A4306	A8789	A8796-24	A8786
G1G5107CA1	A8806	E8201-1	A4390	A4306	A8792	A8796-24	A8785
P3P5107CA1	A8807	E8201-2	A4390	A4306	A8793	A8796-24	A8785
F2F5110CA1	A8804	E8202-1	A4390	A4306	A8789	A8798-24	A8786
HF2B511CA1	A8805	E8203-1	A4390	A4306	A8789	A8798-24	A8786
GIG5110CA1	A8806	E8204-2	A4390	A4306	A8792	A8797-24	A8786
P3P5110CA1	A8807	E8204-3	A4390	A4306	A8793	A8796-24	A8785
F3F5115CA1	A8808	E8205-1	A4391	A4306	A8789	A8789-24	A8786
HF3B5115CA1	A8809	E8206-1	A4391	A4306	A8789	A8797-24	A8786
P3P5115CA1	A8810	E8207-1	A4391	A4306	A8793	A8796-24	A8785
HF3B5120CA1	A8809	E8208-1	A4391	A4308	A8789	A8789-24	A8786
P3P5120CA1	A8810	E8209-1	A4391	A4308	A8793	A8796-24	A8785

	MOTOR	ELEMENT ASSY 6 EA.	AUTOMATIC RESET	FAN OVERRIDE	XFMR	S.D. FUSE BLOCK 2 RQD	S.D. FUSE 6 RQD	CONTACTOR 2 RQD	POWER TERMINAL BLOCK	FAN SPEED SW
F3F5125CA1	A8823	E8746-1	A4392	A4307	A8814	A8364	A8584	A8816-24	A8480	A8812
HF3B5125CA1	A8824	E8747-1	A4392	A4306	A8814	A8364	A8583	A8816-24	A8480	A8812
P3P5125CA1	A8825	E8748-1	A4392	A4307	A8815			A8796-24	A8481	A8813
F3F5130CA1	A8823	E8750-1	A4392	A4307	A8814	A8415	A8585	A8816-24	A8480	A8812
HF3B5130CA1	ABB24	E8751-1	A4392	A4307	A8814	A8364	A8584	A8816-24	A8480	A8812
P3P5130CA1	A8825	E8752-1	A4392	A4307	A8815			A8796-24	A8481	A8813
F3F514CA1	A8826	E8754-1	A4392	A4307	A8814	A8415	A8587	A8816-24	A8480	A8812
HF3B5140CA1	A8827	E8755-1	A4392	A4307	A8814	A8415	A8586	A8816-24	A8480	A8812
P3P5140CA1	A8828	E8756-1	A4392	A4307	A8815			A8796-24	A8481	A8813
F3F5150CA1	A8826	E8758-1	A4392	A4308	A8814	A8415	A8588	A8817-24	A8480	A8812
HF3B5150CA1	A8827	E8759-1	A4392	A4308	A8814	A8415	A8587	A8816-24	A8480	A8812
P3P5150CA1	A8828	E8760-1	A4392	A4308	A8815	A8582	A8590	A8796-24	A8480	A8813

KW	FAN BLADE	TERMINAL BOARD	GROUND CONN.	MOTOR CAPICATOR	LOUVER
3.3-5	A4289	A4298	Q518N	—	S8891 (5)
7.5-10	A8288	A4298	Q518N	—	S8892 (7)
15-20	A8609	A4298	Q518N	—	S8892 (7)
25-30	A8391	A4298	A8361	A8388	S8893 (9)
40-50	A4294	A4298	A8361	A8388	S8893 (9)

MARKEL PRODUCTS CO.
LIMITED WARRANTY
Effective 7-1-83

Products manufactured by Markel Products Co. are warranted to the original consumer to be free from defects in material and workmanship for twelve (12) months from the original date of purchase. This does not cover products modified outside our factory, damage or failure caused by acts of God, abuse, misuse, use on other than rated voltage, abnormal usage, faulty installation, failure to provide suggested maintenance or any repairs other than those provided by an authorized Markel Products Co. service center.

THERE ARE NO OBLIGATIONS OR LIABILITIES ON THE PART OF MARKEL PRODUCTS CO. FOR CONSEQUENTIAL DAMAGES ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THE PRODUCT OR OTHER INDIRECT DAMAGES WITH RESPECT TO LOSS OF PROPERTY, REVENUES, OR PROFIT, OR COSTS OF REMOVAL, INSTALLATION OR REINSTALLATION.

ALL IMPLIED WARRANTIES WITH RESPECT TO MARKEL PRODUCTS, INCLUDING IMPLIED WARRANTIES FOR MERCHANTABILITY AND IMPLIED WARRANTIES FOR FITNESS, ARE LIMITED IN DURATION TO TWELVE (12) MONTHS FROM ORIGINAL DATE OF PURCHASE, EXCEPT THOSE PRODUCTS OR PARTS OF PRODUCTS WHICH ARE WARRANTED FOR LONGER PERIODS. ON SUCH PRODUCTS OR PARTS OF PRODUCTS ALL IMPLIED WARRANTIES FOR MERCHANTABILITY AND FITNESS ARE LIMITED TO THE DURATION OF THE EXTENDED WARRANTY PERIOD THEREON.

Some states do not allow the exclusion or limitation of incidental or consequential damages and some states do not allow limitations on how long an implied warranty lasts, so the above exclusions or limitations may not apply to you.

During the warranty period, Markel Products Co. will, at its sole option, repair or replace any defective parts or products returned, freight prepaid, to the Markel Products Co. factory or such other location as Markel Products Co. may designate. Returned Products must be packaged carefully and Markel Products Co. shall not be responsible for damage in transit. When returning parts, the owner must provide the model number of the product and nature of difficulty being experienced. This warranty does not obligate Markel Products Co. to bear the cost of labor in replacing any assembly, unit or component part thereof, nor does the company assume any liability for secondary charges, expenses for installing or removal, freight or damages. There will be charges rendered for product repairs made after our warranty period has expired. Proof of purchase, including date, must accompany request for in-warranty service. In any event, Markel Products Co. maximum liability shall not in any case exceed the list price for the product claimed to be defective. This warranty gives you specific legal rights and you may have other rights which may vary from state to state. For the name of your nearest authorized Markel Products Co. service center, please write to Markel Products Co., 726-740 Young, Tonawanda, N.Y., 14150, P.O. Box 340, Buffalo, N.Y., 14223.

In addition to the Limited Warranty stated above covering general products, Markel Products Co. extends this warranty on the following listed products, which are warranted to the original consumer from the original date of purchase for the total time periods indicated hereinbelow:

1. Elements in models 198TS and 358TN	Life of product
2. Elements in 2200 and 2300	10 years
3. Elements in 3100, 680, 690, 5100 3800 Series & 483T, 484T	5 years
4. Entire Heaters in the 770, 780, 870, 3200 and 3400 Series	5 years
5. Elements in 4100, 4500, 4600 Series	10 years

Markel Products Company
726-740 Young, Tonawanda, New York 14150
P.O. Box 340, Buffalo, New York 14223

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MARKEL PRODUCTS CO.
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ALL IMPLIED WARRANTIES WITH RESPECT TO MARKEL PRODUCTS, INCLUDING IMPLIED WARRANTIES FOR MERCHANTABILITY AND IMPLIED WARRANTIES FOR FITNESS, ARE LIMITED IN DURATION TO TWELVE (12) MONTHS FROM ORIGINAL DATE OF PURCHASE, EXCEPT THOSE PRODUCTS OR PARTS OF PRODUCTS WHICH ARE WARRANTED FOR LONGER PERIODS. ON SUCH PRODUCTS OR PARTS OF PRODUCTS ALL IMPLIED WARRANTIES FOR MERCHANTABILITY AND FITNESS ARE LIMITED TO THE DURATION OF THE EXTENDED WARRANTY PERIOD THEREON.

Some states do not allow the exclusion or limitation of incidental or consequential damages and some states do not allow limitations on how long an implied warranty lasts, so the above exclusions or limitations may not apply to you.

During the warranty period, Markel Products Co. will, at its sole option, repair or replace any defective parts or products returned, freight prepaid, to the Markel Products Co. factory or such other location as Markel Products Co. may designate. Returned Products must be packaged carefully and Markel Products Co. shall not be responsible for damage in transit. When returning parts, the owner must provide the model number of the product and nature of difficulty being experienced. This warranty does not obligate Markel Products Co. to bear the cost of labor in replacing any assembly, unit or component part thereof, nor does the company assume any liability for secondary charges, expenses for installing or removal, freight or damages. There will be charges rendered for product repairs made after our warranty period has expired. Proof of purchase, including date, must accompany request for in-warranty service. In any event, Markel Products Co. maximum liability shall not in any case exceed the list price for the product claimed to be defective. This warranty gives you specific legal rights and you may have other rights which may vary from state to state. For the name of your nearest authorized Markel Products Co. service center, please write to Markel Products Co., 726-740 Young, Tonawanda, N.Y., 14150, P.O. Box 340, Buffalo, N.Y., 14223.

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1. Elements in models 198TS and 358TN	Life of product
2. Elements in 2200 and 2300	10 years
3. Elements in 3100, 680, 690, 5100 3800 Series & 483T, 484T	5 years
4. Entire Heaters in the 770, 780, 870, 3200 and 3400 Series	5 years
5. Elements in 4100, 4500, 4600 Series	10 years

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OPERATION AND MAINTENANCE INSTRUCTIONS

FOR

WASHRACK AT BUILDING 1450

MCB, CAMP LEJEUNE, NC

CONTRACT N62470-86-C-5420

DIVISION 15

MECHANICAL

FANS

Model SD

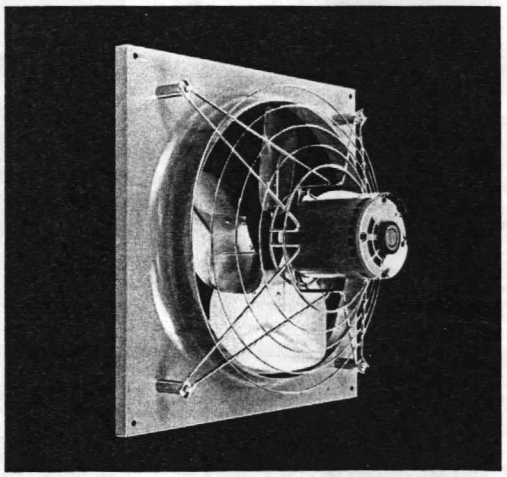
Greenheck Model SD direct drive sidewall propeller fans are designed for economy and reliability in light duty, clean air applications. Efficient propeller, venturi and motor support designs result in low sound levels and minimal restriction to airflow.

Model SD sidewall fans are offered in both exhaust (Model SDE) and supply (Model SDS) versions with equal performance. Performance capabilities range from 200 cfm to 4500 cfm with up to ½ inch of static pressure. The seven fan sizes available range from 8" in propeller diameter to 20". Each fan size is thoroughly tested in Greenheck's modern, AMCA licensed research and development facility to insure complete and accurate performance ratings. Model SD sidewall propeller fans are licensed to bear the AMCA ratings seal for air performance.

A complete line of accessories is available to reduce installation time and cost while adding to safety and installation flexibility.

Model SDS — Supply

The Model SDS supply fan is designed with an inlet venturi and propeller which allow the motor side of the fan to be mounted toward the interior of the building. Model SDS performance is equal to the exhaust version.



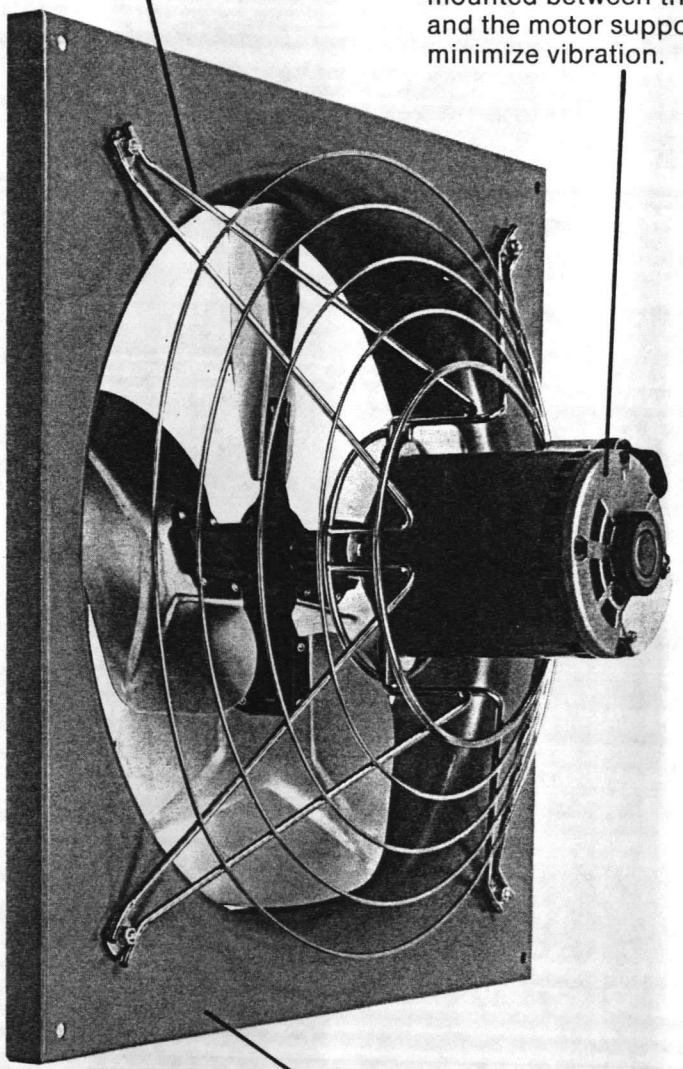
Greenheck Fan Corporation certifies that the Models SDE and SDS shown herein are licensed to bear the AMCA seal. The ratings are based on tests made in accordance with AMCA standard 210 and comply with the requirements of the AMCA certified ratings seal.

The AMCA Certified Ratings Seal applies to air capacities only. Performance shown is for SDE and SDS fans without ducts.

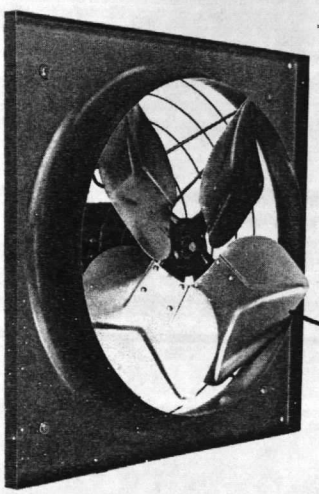
Construction Features

The motor support serves as a protective guard over the fan blades. It is constructed of rigid, heavy gauge wire and is zinc plated.

Motors are permanently lubricated and carefully matched to the fan load. Neoprene isolators are mounted between the motor and the motor support to minimize vibration.

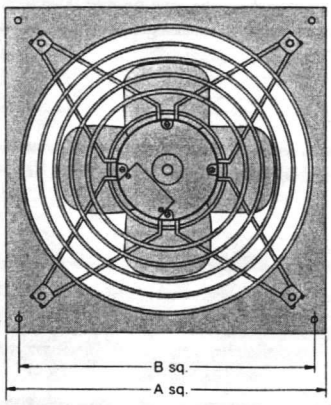


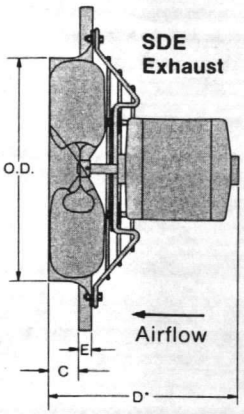
The Fan panel is of steel construction with formed flanges and a deep spun inlet venturi. Mounting holes are prepunched for ease of installation. Panels are coated with Greenheck's Perma-Tector™ epoxy coating to provide a long lasting finish.

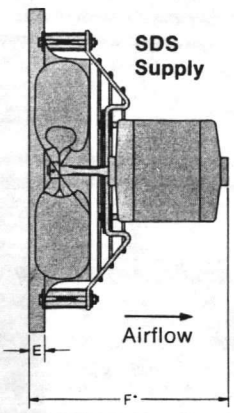


Propellers are constructed of die formed aluminum blades riveted to a steel hub. Hubs are attached securely to motor shafts with set screws. Propellers are statically and dynamically balanced.

Dimensional Data







MODEL SIZE	A SQ	B SQ	C	D*	E	F*	O.D.	DAMPER SIZE	WEIGHT
SDE-8	13⅛	12	1	7	1	8	8⅜	10x10	12
SDE-10	15⅛	13½	1⅛	7	1	8	10⅜	12x12	16
SDE-12	18⅛	16½	1½	10¾	1	11¾	12⅜	14x14	20
SDE-14	20⅛	18½	1¾	11¼	1	12¼	14⅜	16x16	27
SDE-16	22⅛	20½	1⅞	11¾	1	12¾	16⅜	18x18	30
SDE-18	24⅛	22½	2⅛	14	1	15	16⅜	20x20	35
SDE-20	26⅛	24½	2¼	14¼	1	15¼	20½	22x22	39

*Varies w/motor selection.

Performance Data

MODEL NUMBER	HP	RPM	TS	STATIC PRESSURE											
				0.000		0.100		0.125		0.250		0.375		0.500	
				CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
SDE-8-24-E	1/80	1050	2199	206	.002	48	.004	27	.004						
SDE-8-24-D	1/80	1550	3246	305	.007	204	.009	117	.010						
SDE-8-32-E	1/80	1050	2199	265	.004	66	.006	51	.006						
SDE-8-32-D	1/80	1550	3246	392	.011	267	.013	229	.014						
SDE-10-24-E	1/25	1050	2748	402	.005	172	.009	145	.010						
SDE-10-24-D	1/25	1550	4056	594	.017	466	.022	429	.025						
SDE-10-32-E	1/25	1050	2748	519	.010	260	.014	210	.015						
SDE-10-32-D	1/25	1550	4056	765	.030	632	.036	588	.038	332	.047				
SDE-12-24-E	1/20	1050	3299	707	.011	494	.016	419	.018	195	.027				
SDE-12-24-B	1/6	1140	3581	768	.014	572	.020	521	.021	269	.032				
SDE-12-24-D	1/20	1550	4869	1044	.035	901	.044	865	.046	678	.054				
SDE-12-24-A	1/4	1725	5419	1162	.048	1034	.059	1001	.061	838	.071	599	.086		
SDE-12-32-C	1/8	860	2702	726	.011	363	.017	288	.020						
SDE-12-32-B	1/6	1140	3581	962	.026	753	.033	683	.035	347	.048				
SDE-12-32-A	1/4	1725	5419	1456	.092	1316	.100	1281	.100	1101	.120	813	.130		
SDE-12-40-C	1/8	860	2702	840	.018	401	.024	358	.025						
SDE-14-24-C	1/8	860	3150	925	.013	528	.021	419	.024						
SDE-14-24-B	1/6	1140	4176	1227	.029	998	.042	942	.046	519	.060	388	.073		
SDE-14-24-A	1/4	1725	6319	1856	.100	1702	.120	1663	.120	1479	.150	1263	.160		
SDE-14-32-C	1/8	860	3150	1143	.025	801	.033	572	.035	337	.050				
SDE-14-32-B	1/6	1140	4176	1515	.057	1288	.070	1226	.073	709	.088	570	.10		
SDE-14-32-A	1/4	1725	6319	2292	.200	2148	.210	2112	.220	1915	.240	1672	.260		
SDE-16-24-C	1/8	860	3601	1335	.024	1015	.037	844	.035	534	.056				
SDE-16-24-B	1/6	1140	4774	1770	.060	1536	.070	1479	.080	962	.078	773	.120		
SDE-16-24-A	1/4	1725	7224	2679	.190	2523	.220	2485	.230	2293	.260	2104	.290	1703	.280
SDE-16-32-C	1/8	860	3601	1663	.041	1311	.056	1111	.058	699	.077				
SDE-16-32-B	1/6	1140	4774	2205	.100	1944	.120	1876	.120	1281	.140	976	.170		
SDE-16-32-A	1/3	1725	7224	3336	.330	3164	.360	3121	.370	2903	.410	2679	.440	2240	.470
SDE-18-24-C	1/8	860	4053	2012	.054	1680	.074	1590	.079	942	.100	676	.120		
SDE-18-24-B	1/6	1140	5372	2667	.120	2430	.150	2365	.160	1969	.190	1375	.220	1197	.250
SDE-18-32-C	1/8	860	4053	2539	.096	2151	.110	2045	.120	1262	.140				
SDE-20-24-C	1/8	860	4504	2679	.086	2348	.100	2266	.110	1777	.140	1242	.170		
SDE-20-24-B	1/4	1140	5970	3551	.200	3302	.230	3240	.240	2927	.270	2565	.320	2092	.36
SDE-20-32-C	1/4	860	4504	3412	.150	3002	.170	2891	.180	2269	.220	1617	.260		
SDE-20-32-B	1/2	1140	5970	4523	.340	4218	.380	4141	.390	3730	.440	3267	.490	2733	.530

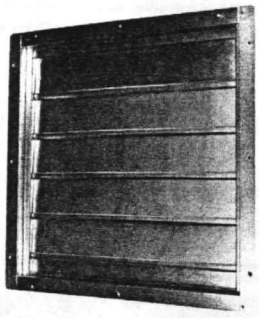
Performance shown is for Model SDE and SDS without ducts.
Numbers printed in color indicate next larger motor size is recommended for these selections.

Accessories

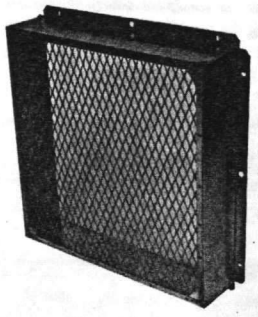
A complete line of accessories is available for safety, ease of installation and weather protection. Consult the Greenheck catalog **Accessories for Sidewall Propeller Fans** for details.

Special Finishes

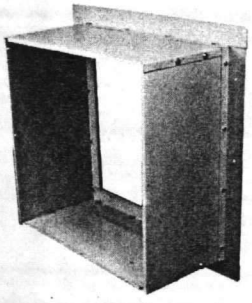
Special coatings are available for protective or decorative purposes. Protection from corrosive atmosphere requires individual consideration. Consult your representative or the factory for more information.



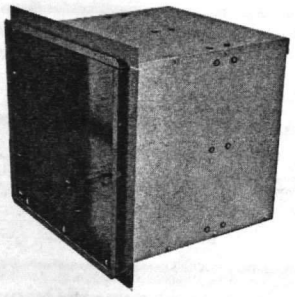
Dampers



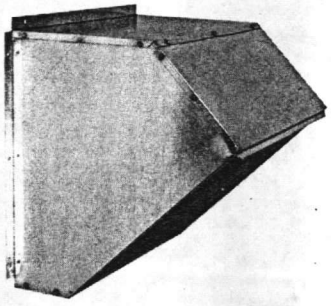
Damper Guard



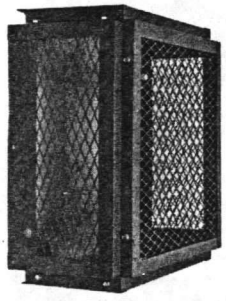
Wall Mount Collar



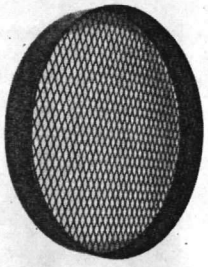
Wall Mount Housing



Weatherhood



OSHA Motor Side Guard



Opposite Motor Side Guard

OSHA Opposite Motor Side Guard

Speed Control

Speed controls are available for use with shaded pole and open permanent split capacitor motors (115 volt single phase only). Two sizes are available.

Model 5W — For applications up to 5.0 amps (requires 2x4 handy box by others)

Model 10W — For applications up to 10.0 amps (requires 4x4 handy box by others)

Typical Specifications

Sidewall fans shall be direct driven axial type.

Propeller construction shall be of die formed aluminum blades riveted to a steel hub. Hubs shall be securely attached to motor shafts with set screws.

Motors shall be permanently lubricated, heavy duty type carefully matched to the fan load and furnished at the specified voltage, phase and enclosure.

The fan panel shall be steel construction with prepunched mounting holes, formed flanges and a deep spun venturi. Panels shall be coated with Perma-Tector™ to provide a lasting finish. Motor supports shall be heavy gauge welded wire, zinc plated. Four neoprene vibration isolators shall be installed between the motor support and the motor mounts.

The axial exhaust or supply fans shall bear the AMCA certified ratings for air performance.

Fans shall be model SDE for exhaust and SDS for supply as manufactured by Greenheck Fan Corporation of Schofield, Wisconsin.

Warranty

Greenheck Fan Corporation warrants this equipment free from defects in material and workmanship for a period of one year from the purchase date.

Any units or parts which prove to be defective during the warranty period will be replaced at our option when returned to our factory, transportation prepaid.

The motor is warranted by the motor manufacturer for a period of one year. Should the motor prove defective during this period, it should be returned to the nearest authorized motor service station.

Greenheck Fan Corporation will not be responsible for any installation or removal costs.

GREENHECK
P.O. BOX 128 SCHOFIELD, WISCONSIN 54476
PH. 715-359-6171

TAB PLACEMENT HERE

DESCRIPTION:

Installation

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Read and save these instructions

GREENHECK
P.O. BOX 128 SCHOFIELD, WISCONSIN 54476
PH. 715-359-6171

DIRECT DRIVE SIDEWALL PROPELLER FANS

INSTALLATION, OPERATING AND MAINTENANCE MANUAL

INSTALLATION

Upon receiving the unit, check for any damage and report it immediately to the shipper. Also assure all accessory items are accounted for.

Move fan to the desired location and determine the method by which the fan is to be mounted as shown below in figures 1, 2 and 3. Optional wall mount housings (Fig. 2) and wall mount collars (Fig. 3) provide a convenient means of mounting sidewall fans while maintaining the proper distance between propeller and damper.

Attach the fan to the wall by inserting a suitable fastener through each of the pre-punched mounting holes in the fan panel. Care should be taken not to bend or distort the fan panel or propeller during installation.

The motor voltage and amperage rating must be checked for compatibility with the electrical supply. Supply wiring to the fan must be properly fused and conform to local and national electrical codes.

TYPICAL INSTALLATIONS

Wall opening size and propeller-to-damper distance are two important dimensions for fan installation. Fans mounted to the wall require a different opening (W.O.) size than those mounted in collars or wall housings. Propeller-to-damper distance (M) is important to reduce turbulence and resulting damper flutter which may lead to premature damper failure.

Fig. #1 shows the recommended wall opening (W.O.) and the minimum distance suggested between the fan and damper for direct installations.

Figs. #2 and 3 show the wall opening (W.O.) required for installations with either a wall housing or collar.

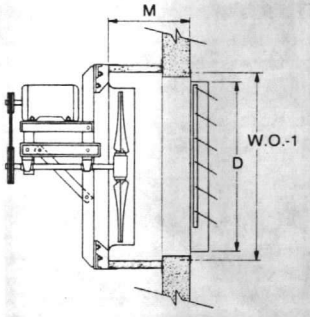

Fig. #1

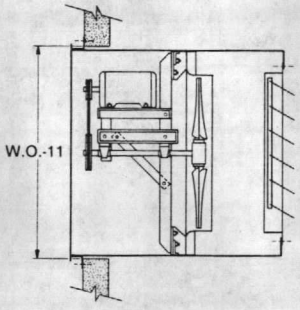

Fig. #2

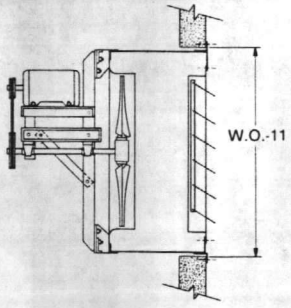

Fig. #3

Fan Size	D Damper Size	M Min.	WO-I Sq.	WO-II Sq.
8	10 x 10	13	10½	14¼
10	12 x 12	13	12½	16¼
12	14 x 14	13	14½	19¼
14	16 x 16	13	16½	21¼
16	18 x 18	13	18½	23¼
18	20 x 20	13	20½	25¼
20	22 x 22	13	22½	27¼
24	26 x 26	13	26½	33¾
30	32 x 32	13	32½	39¾
36	38 x 38	14	38½	45¾
42	44 x 44	15	45½	51¾
48	50 x 50	16	50½	57¾

PRE-STARTING CHECKS

Check all fasteners and set screws for tightness. The propeller should rotate freely and not rub on the fan panel venturi. Rotation direction of the propeller should be checked by momentarily turning the unit on. Rotation should be in the same direction as the rotation decal affixed to the unit or as shown in Fig. 4. For 3-phase installations, fan rotation can be reversed by simply interchanging any two of the three electrical leads. For single phase installations follow the wiring diagram located on the motor.

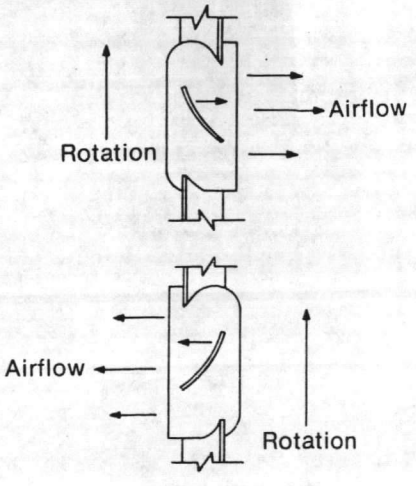

Fig. #4

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ROUTINE MAINTENANCE

****

WARNING

DISCONNECT AND SECURE TO THE "OFF" POSITION ALL ELECTRICAL POWER TO THE FAN PRIOR TO INSPECTION OR SERVICING. FAILURE TO COMPLY WITH THIS SAFETY PRECAUTION COULD RESULT IN SERIOUS INJURY OR DEATH.

****

Once the fan has been put into operation, a periodic maintenance program should be set up to preserve the reliability and performance of the fan. Items to be included in this program are:

—LUBRICATION
—FASTENERS
—REMOVAL OF DUST/DIRT

MOTOR LUBRICATION

Many fractional horsepower motors installed on the smaller fans are lubricated for life and require no further lubrication. Motors equipped with oil holes should be oiled in accordance with the manufacturers instructions printed on the motor. Use a high grade SAE 20 machine oil and use caution not to over lubricate. Motors supplied with grease fittings should be greased according to directions printed on the motor.

FASTENERS

Any fan vibration has a tendency to loosen mechanical fasteners. A periodic inspection should include checking all fasteners for tightness. Particular attention should be paid to set screws or taper-lock bushings attaching the propeller to the motor shaft. In addition, check all fasteners attaching the motor to the motor plate.

REMOVAL OF DUST AND DIRT

Dirt clogs cooling openings on the motor housing, contaminates bearing lubricant and collects on propeller blades causing severe imbalance if left unchecked. The exterior surface of the motor, fan panel and entire propeller should be thoroughly cleaned periodically. Use caution and do not allow water to enter the motor or bearings. Under no circumstances should motors or bearings be sprayed with steam or water.

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Corrective

Maintenance

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TROUBLESHOOTING

PROBLEM	CAUSE	CORRECTIVE ACTION
Reduced airflow	System resistance is too high.	Check backdraft dampers for proper operation. Remove obstructions in ductwork. Clean dirty filters. Check for adequate supply air for exhaust fans or exhaust air for supply fans.
	Fan too close to damper.	Increase distance between fan and damper.
	Unit running backwards.	See pre-starting checks.
	Excessive dirt on propeller.	Clean propeller.
Excessive Noise	Vibration	Clean dirt build-up from propeller. Check all fasteners for tightness. Check for loose dampers, guards or ductwork.
	Defective motor.	Replace motor.

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DESCRIPTION:

Tool

accessories

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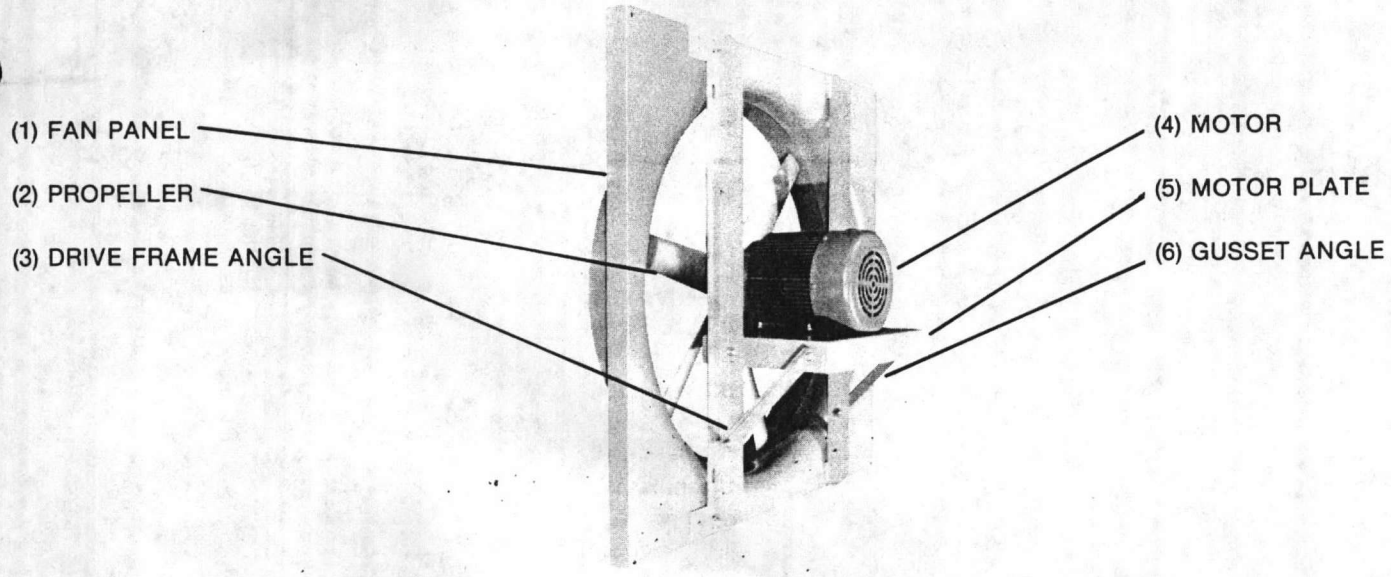
PARTS LIST



DIRECT DRIVE SIDEWALL PROPELLER FAN (TYPICAL)

REPLACEMENT PARTS

Always provide the unit serial number when requesting parts or information.

JOB WASH RACK @ BLDG 1450, Camp LEJEUNE

MODEL SDE-16-24-B SERIAL NO. _____

GREENHECK PRODUCTION ORDER NO. 11279

SALES OFFICE _____ CITY _____

PART DESCRIPTION	QUANTITY	REMARKS
(1) FAN PANEL		
(2) PROPELLER		
(3) DRIVE FRAME ANGLE		
(4) MOTOR		
(5) MOTOR PLATE		
(6) GUSSET ANGLE		