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# HCM-3G Hydraulic Power Unit

## User's Manual



E.H. Wachs Part No. 14-MAN-25  
Revision 2, October 2011

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## Chapter 1

# HCM-3G Hydraulic Power Unit

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The Wachs HCM-3G hydraulic power unit provides 14 gpm hydraulic flow at a maximum pressure of 1500 psi (59 l/min at 103 bar). The unit is powered by a gasoline engine.

The HCM-3G is designed to operate Type 1, Type 2, or Type 3 open-center tools.

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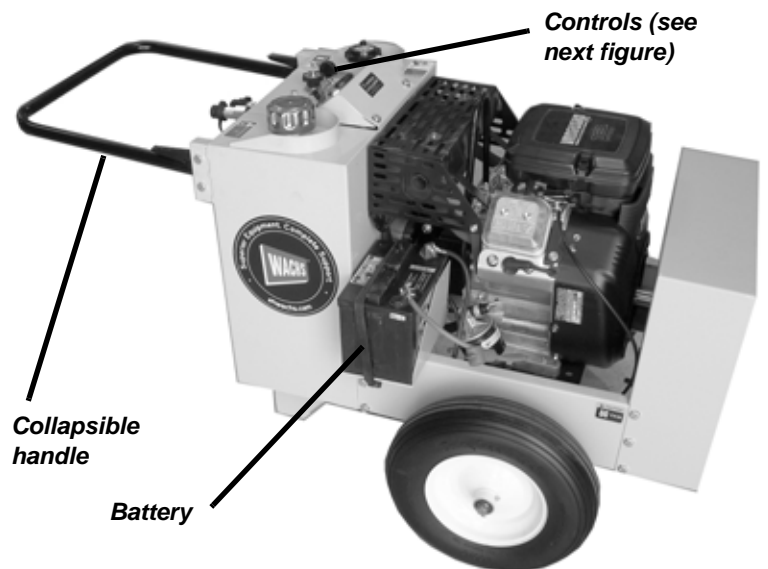
### FEATURES AND SPECIFICATIONS

- 18 HP gas combustion engine
- Enclosed hydraulic system with self-contained reservoir and filtration.
- Enclosed, high-capacity cooling system with shaft-mounted air-to-oil cooler and suction fan; meets or exceeds HTMA specifications.
- Hydraulic oil level sight gauge.
- HTMA quick disconnect couplers.
- Cart design with collapsible handles and large diameter tires.

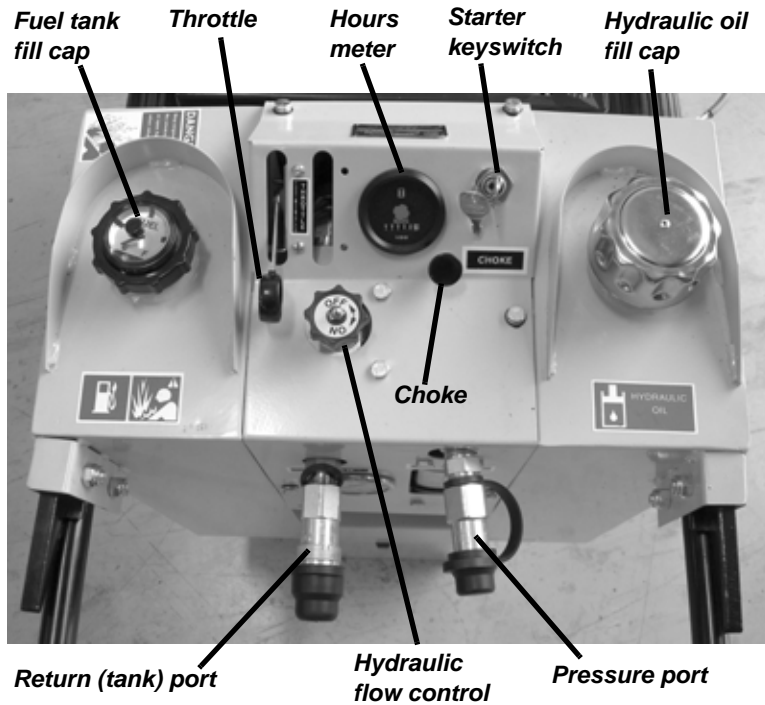
Table 1 and the following figures describe the HCM-3G gas-powered unit.

**Table 1: HCM-3G Specifications**

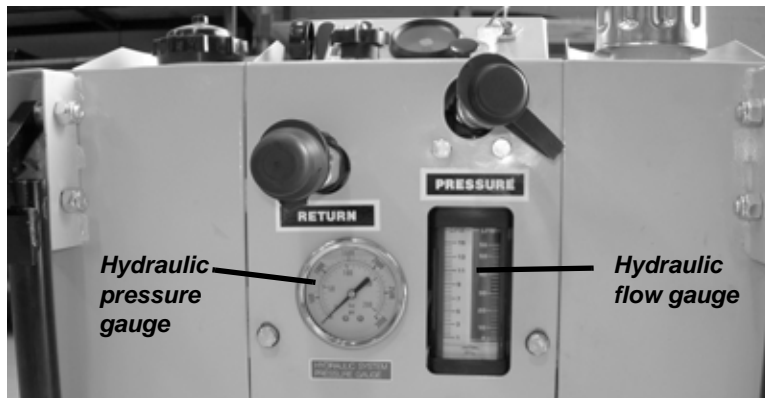
Hydraulic system	Open center
Frame type	2-wheel mobile unit
Engine	18 HP gasoline
Oil cooler	Air to oil with independent fan
Filtration	10 micron return
Hydraulic oil capacity	5.0 gallons (25.6 liters)
Rated flow (no pressure)	8 gpm (30 l/min)
Rated flow @ 1500 psi (103 bar)	14 gpm (56 l/min)
Rated (relief) pressure	1500 psi (103 bar)
Dimensions (L x W x H)	39.5" x 29" x 32" (1003 x 737 x 813 mm)
Weight	252 lb (115 kg)



*Figure 1-1. The photo shows the HCM-3G gas-powered hydraulic power unit.*



*Figure 1-2. The photo shows the controls for the power unit.*



*Figure 1-3. The hydraulic gauges are on the front panel of the power unit.*



*Figure 1-4. The hydraulic tank drain plug is at the bottom of the front panel.*

## Chapter 2

# Safety

E.H. Wachs takes great pride in designing and manufacturing safe, high-quality products. We make user safety a top priority in the design of all our products.

Read this chapter carefully before operating the hydraulic power unit. It contains important safety instructions and recommendations.

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### OPERATOR SAFETY

Follow these guidelines for safe operation of the equipment.

- **READ THE OPERATING MANUAL.** Make sure you understand all setup and operating instructions before you begin.
- **INSPECT MACHINE AND ACCESSORIES.** Before starting the machine, look for loose bolts or nuts, leaking lubricant, rusted components, and any other physical conditions that may affect operation. Properly maintaining the machine can greatly decrease the chances for injury.
- **ALWAYS READ PLACARDS AND LABELS.** Make sure all placards, labels, and stickers are clearly legible and in good condition. You can purchase replacement labels from E.H. Wachs Company.
- **KEEP CLEAR OF MOVING PARTS.** Keep hands, arms, and fingers clear of all rotating or moving parts.

### In This Chapter

#### OPERATOR SAFETY



Look for this symbol throughout the manual. It indicates a personal injury hazard.



Always turn machine off before doing any adjustments or service.

- **SECURE LOOSE CLOTHING AND JEWELRY.** Secure or remove loose-fitting clothing and jewelry, and securely bind long hair, to prevent them from getting caught in moving parts of the machine.
- **KEEP WORK AREA CLEAR.** Keep all clutter and nonessential materials out of the work area. Only people directly involved with the work being performed should have access to the area.

## Safety Symbols



This icon is displayed with any safety alert that indicates a personal injury hazard.

### WARNING

This safety alert indicates a potentially hazardous situation that, if not avoided, **could** result in **death or serious injury**.

### CAUTION

This safety alert, with the personal injury hazard symbol, indicates a potentially hazardous situation that, if not avoided, **could** result in **minor or moderate injury**.

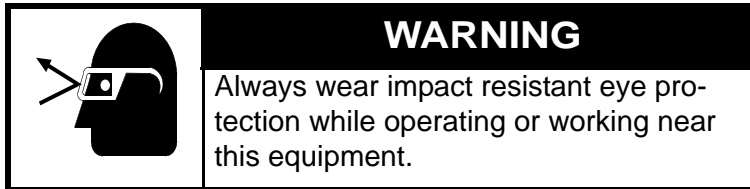
### NOTICE

This alert indicates a situation that, if not avoided, **will** result in **damage to the equipment**.

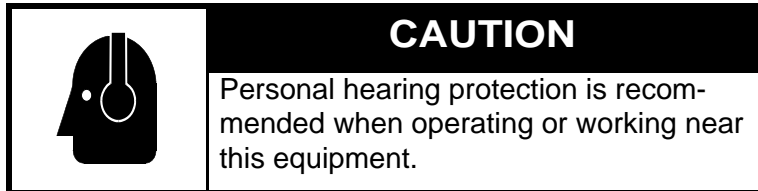
## IMPORTANT

This alert indicates a situation that, if not avoided, **may** result in **damage to the equipment**.

### Protective Equipment Requirements



For additional information on eye and face protection, refer to Federal OSHA regulations, 29 Code of Federal Regulations, Section 1910.133., Eye and Face Protection and American National Standards Institute, ANSI Z87.1, Occupational and Educational Eye and Face Protection. Z87.1 is available from the American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018.



Hearing protectors are required in high noise areas, 85 dBA or greater. The operation of other tools and equipment in the area, reflective surfaces, process noises, and resonant structures can increase the noise level in the area. For additional information on hearing protection, refer to Federal OSHA regulations, 29 Code of Federal Regulations, Section 1910.95, Occupational Noise Exposure and ANSI S12.6 Hearing Protectors.

### Safety Procedures

All safety requirements listed below are those generally applicable to hydraulically-powered machinery but are not intended to be an all-inclusive list. They are intended as guidelines only and will assist in avoiding risk of injury when followed by qualified, experienced personnel. These

**WARNING**

Many types of machinery have parts that may start moving as soon as the hydraulic circuit is filled and pressurized. This could result in injury to personnel or damage to machinery.



**WARNING**

Make sure all personnel are clear from the machinery being operated before shutting down the HPU.



precautions should be included in the comprehensive safety program for the particular machinery, equipment, plant or process and overseen by personnel capable of analyzing any hazards associated with operating and maintaining the equipment.

1. Return all movable parts of the machinery being operated to their normal startup condition, if possible, before starting unit.
2. Be sure all personnel, product, etc. are clear of machinery before starting hydraulic unit.
3. Check to make sure any hydraulic connections which may have been removed, replaced or disconnected during shut down have been reconnected securely before starting hydraulic unit.
4. Before starting the unit, perform all equipment checks described at the beginning of the operating instructions.
5. If there are tools or machinery being operated by the HPU that may move when hydraulic flow or pressure are turned off or turned on, block or lock these parts in position before shutting down the hydraulic unit.
6. Shut down the hydraulic unit and relieve pressure from all pressurized accumulators, actuators and lines before removing, tearing down or performing maintenance on any remotely-located actuators, hoses, filters, valves, piping, etc.
7. Any personnel observing or working on or adjacent to hydraulically-powered equipment must never place themselves in a location or position that could produce an injury in the event of:
  - a hydraulic line failure either with the unit running or shut down;
  - pump or motor failure or;
  - pin-hole leaks in hoses or fittings;
  - movement of machine components during normal operation or resulting from a component malfunction or failure.

8. Do not inspect hoses and fittings for leaks using your bare hands. A pin-hole leak can inject hydraulic fluid through the skin, with the potential for serious injury.
9. Avoid locating equipment in any environment for which it was not designed and which may create a dangerous operating condition such as an explosive atmosphere (e.g., gas, dust), high heat (e.g., molten metal, furnace), chemicals, extreme moisture, etc.
10. Avoid bodily contact with hydraulic fluids. Some hydraulic fluids may irritate or injure the eyes and skin. Check with your fluid suppliers to obtain this information.
11. Use only E.H. Wachs parts and materials when servicing the equipment. Substitute parts or materials could produce a hazardous operating condition.
12. When piping your equipment, use only materials of adequate size and strength to suit the flows and pressures of the system. Consider all safety factors when selecting the strength of materials to allow for shock and over-pressure conditions which could occur.



**WARNING**

The injection of hydraulic fluid under the skin can cause serious injury and even result in death. If an injection injury occurs, seek medical treatment immediately.



# Chapter 3

## Operating Instructions

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### HYDRAULIC SYSTEM

The hydraulic system consists of a hydraulic fluid reservoir, filter assembly, single pump, and flow controls. The filter is a spin-on element for easy replacement. The filter housing has a pressure bypass valve to divert fluid directly to the tank in the event of a restricted filter.

Refer to the specifications table in Chapter 1 for capabilities of the hydraulic system and pump.

Pressure hoses from the pump are connected directly to a control module, which contains a relief valve, a flow control valve, and pressure and return ports. Optional control modules may contain additional valves and ports.

### Hydraulic Fluid Requirements

The power unit is shipped from the factory empty. Oils meeting the specifications listed below will provide all-season operation if normal maintenance is performed.

The following fluids are recommended by E.H. Wachs. These fluids work well over a wide temperature range at start-up, allow moisture to settle out, and resist biological growth likely in cool operating hydraulic circuits. Other fluids that meet or exceed their specifications may also be used.

### In This Chapter

HYDRAULIC SYSTEM

SET-UP

OPERATION

- Mobil DTE 24
- Mobil SCH 524
- Mobil DTE 10 Excel 32
- Shell Tellus T-32
- Texaco Rando

**Table 1: Viscosity**

Temperature	Viscosity
50° F (10° C)	450 SSU max. (95 centistokes, C.S.)
100° F (38° C)	130-220 SSU (27-42 C.S.)
140° F (60° C)	85 SSU min. (16.5 C.S. min)

**Table 2: Hydraulic Fluid Properties**

Property	Specification
Pour point	-10° F (-23° C) min. (for cold startup)
Viscosity index	(ASTM D 2220) 140 min.
Demulsibility	(ASTM D 1401) 30 minutes max.
Flash point	(ASTM D 92) 340° F (171° C) min
Rust inhibition	(ASTM D 665 A&B) Pass
Oxidation	(ASTM D 943) 1000 hours min.
Pump wear test	(ASTM D 2882) 60 mg max.

### Tool Hose Recommendations

The following table lists recommended hydraulic hoses for a variety of applications.

**Table 3: Hydraulic Hose Recommendations**

FLOW PER CIRCUIT		LENGTH EACH HOSE		USE	INSIDE DIAMETER		SAE SPEC (WIRE BRAID)	SAE SPEC (FIBER BRAID)
GPM	LPM	FEET	METERS		INCH	MM		
5 to 8	19 to 30	to 50	to 15	Both	1/2	13	SAE100R1-8	SAE100R7-8
5 to 8	19 to 30	51-100	15 to 30	Both	5/8	16	SAE100R2-10	SAE100R8-10
5 to 8	19 to 30	100-300	30 to 90	Pressure Return	5/8 3/4	16 19	SAE100R2-10 SAE100R1-12	SAE100R7-12 SAE100R7-12
9 to 12	34 to 45	to 50	to 15	Both	5/8	16	SAE100R2-10	SAE100R8-10
9 to 12	34 to 45	51-100	15 to 30	Pressure Return	5/8 3/4	16 19	SAE100R2-10 SAE100R2-12	SAE100R8-10 SAE100R7-12
9 to 12	34 to 45	100-200	30 to 60	Pressure Return	3/4 1	19 25.4	SAE100R2-12 SAE100R1-16	SAE100R8-12 SAE100R7-16
13 to 16	49 to 60	to 25	to 8	Pressure Return	5/8 3/4	16 19	SAE100R2-10 SAE100R1-12	SAE100R8-10 SAE100R7-12
13 to 16	49 to 60	26 to 100	8 to 30	Pressure Return	3/4 1	19 25.4	SAE100R2-12 SAE100R1-16	SAE100R8-12 SAE100R7-16

## SET-UP

### Fuel Level

The power unit is shipped with only a small amount of fuel. The engine has been run at the factory to purge air from the fuel system. Fill the fuel tank before operating.

### Battery

The power unit is shipped without a battery installed. The following are the required battery specifications:

**Table 4: Battery Specifications**

Battery group size	U1
Dimensions	7-5/8" L x 5-1/8" W x 6-3/4" H



## OPERATION

### Pre-Operation Checklist

- Check the oil level in the hydraulic reservoir, and add oil if necessary.
- Check all hydraulic hoses for damage.
- Check all fittings and couplings to make sure they are tightly connected.
- Check the engine oil level, and add oil if required.
- Make sure there is adequate fuel in the engine fuel tank for the estimated operating time.
- Make sure the front of the motor is free of leaves, dirt, or other debris that may inhibit cooling or create a fire hazard.
- Check hydraulic connections as described in the following figure.
  - 1 = H.T.M.A. 3/8" male quick acting coupler with 1/2" NPT thread.
  - 2 = H.T.M.A. 3/8" female quick acting coupler with 1/2" NPT thread. (At the tool this may be H.T.M.A. 3/8" female quick acting coupler with 3/8" NPT thread.
  - 3 = H.T.M.A. 3/8" quick acting coupler with 1/2" NPT thread.
  - 4 = H.T.M.A. 3/8" male quick acting coupler with 1/2" NPT thread. (At the tool this may be H.T.M.A. 3/8" male quick acting coupler with 3/8" NPT thread.
  - A = Refer to Table 3 for hose recommendations.
  - B = Use adapters with threads that match the tool connectors.

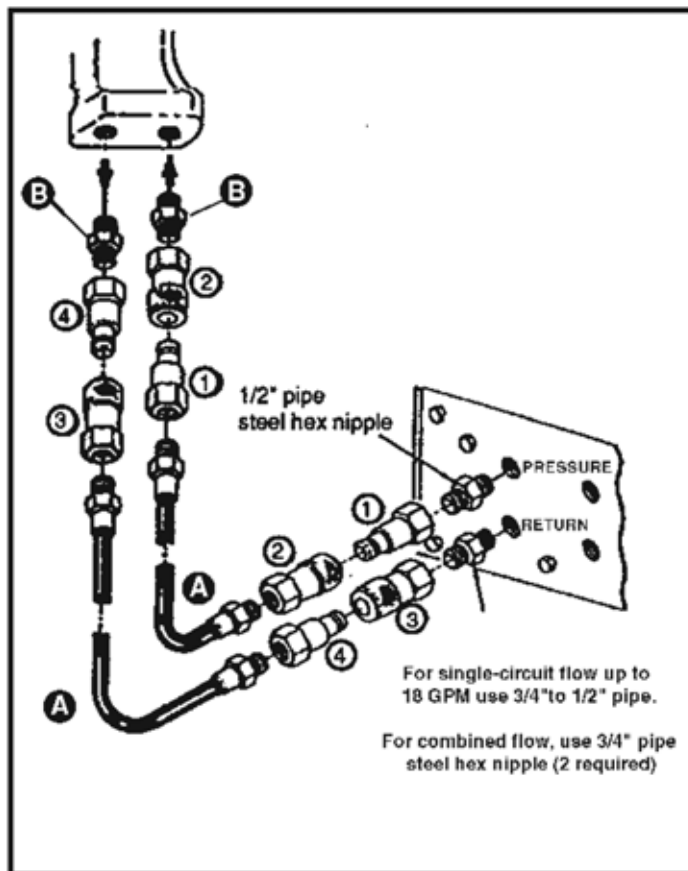


Figure 3-1. The diagram illustrates the hydraulic connectors.

### Starting the Power Unit

1. Make sure the flow control circuit is set at 0 or off.
2. Make sure the tool is off or deactivated.
3. Connect the hydraulic hoses to the couplers on the power unit.
4. Connect the hydraulic hoses to the couplers on the tool.



## IMPORTANT

Do not continuously crank the starter for more than 15 seconds at a time. Allow at least one minute for the starter to cool between start attempts.

5. Pull the throttle knob out slightly. Turn the ignition key to start the engine.
6. Allow the power unit to run without activating the tool until the engine and the hydraulic circuit warm up.

## Operating the Tool

1. With the power unit running, turn the hydraulic circuit to the ON position, or turn the flow setting control to enable flow.
  2. To pause or shut off the tool, return the circuit control to the OFF position, or set the flow control to 0.
  3. When finished, push the throttle knob in to idle the engine.
  4. Return the hydraulic circuit to the OFF position, or set the flow control to 0.
  5. Turn the ignition key to the OFF position.
  6. Disconnect the hydraulic hoses and store in a suitable location.
- Connect the couplers at the hose ends to prevent contamination from entering the hydraulic system.
  - Do not store the hoses in direct sunlight or in very warm locations. The fluid in the hoses will expand and cause a pressure build-up.

# Chapter 4

## Maintenance

**IMPORTANT:** Use on genuine E.H. Wachs parts or equivalent. Using replacement parts that are not of equivalent quality may damage the hydraulic power unit.

### HYDRAULIC SYSTEM MAINTENANCE

Observe the following for maximum performance and service life from the hydraulic system. See Table 1 at the end of this section for maintenance intervals.

- Use the correct hydraulic fluid at all times.
  - Keep the hydraulic system and fluids clean at all times.
  - Keep water out of the fluid.
  - Keep air out of the lines. Air is indicated by the hydraulic system overheating and foam at the hydraulic tank breather. Tighten all suction line fittings and clamps.
  - Hydraulic system wear is indicated by increased heat during tool operation, reduced tool performance, and eventual system breakdown.
1. Remove condensed moisture from the hydraulic fluid.
    - Condensation is a frequent problem with cool mobile hydraulic circuits. This condition occurs in moist or cold climates when warm air in the reservoir tank draws moisture from the cooler outside air. Water will then accumulate in the tank.
    - Check the suction hose from the hydraulic tank to the pump inlet to make sure it is not kinked and that

### In This Chapter

HYDRAULIC SYSTEM  
MAINTENANCE

ENGINE MAINTENANCE

TROUBLESHOOTING

the clamps are secure. This will reduce the risk of pump cavitation and sucking air into the system. All pump fittings must be tight.

- Approximately once each week (less often in hot, arid climates), take a small sample from the bottom of the hydraulic tank by removing the 1/2" NPT drain plug. If clear water appears, drain tank until clean oil is flowing. If fluid is milky, allow it to settle for about 48 hours before draining.
2. Check hydraulic fittings and lines. Check for leaks, loose fittings, etc. throughout the entire hydraulic circuit.
  3. Change the hydraulic filter.
    - To keep contaminants out of the hydraulic fluid and extend filter life, always connect the hose ends together when the tool is disconnected, and wipe off the connectors each time before connecting them.
  4. Fill the hydraulic tank.
    - Remove the filter cap at the top center of the tank to fill it. The tank is full when oil appears in the perforated basket at the bottom of the filler pipe.

**Table 1: Hydraulic Maintenance Schedule**

Service Item	Service Interval
Check fluid level	Each use or 8 hours
Check oil and filter	Every year or 300 hours
Remove condensation from fluid	Every 3 months or 50 hours
Inspect hydraulic system for leaks	Each use or 8 hours
Check pump coupling (replace if necessary)	Every 2 years*
Check internal hose assemblies (replace if necessary)	Every 2 years*
Test hydraulic flows and pressures (service as required)	Every 2 years*

\* These items should be serviced by a qualified hydraulics technician.

## ENGINE MAINTENANCE

Refer to the engine manufacturer's manual for maintenance schedule and instructions.

## TROUBLESHOOTING

**Table 2: Power Unit Troubleshooting**

Problem	Cause	Remedy
Starter will not crank engine	Engine working against the hydraulic pump pressure.	Make sure the circuit switches are off.
	Battery discharged or not properly connected.	Check condition of battery and cable connections. Replace battery if necessary.
	Starter defective.	Inspect starter and replace if necessary.
	Ignition switch or solenoid switch(es) defective.	Replace if necessary.
Engine cranks but will not start	Air injectors and/or injector pump.	Bleed injectors as described in engine manual.
	Water in fuel.	Empty water sediment trap. Bleed injectors as described in engine manual.
	Inadequate compression.	Check for clogged air cleaner, valves not properly seating, or cylinder compression loss. Repair as required.
Engine runs but hydraulic circuit will not drive tools	Circuit solenoid switches off or defective.	Set switches to ON. Replace if switch is defective.
	Tool not connected to power unit.	Connect tool. Check coupler.
	Hydraulic fluid reservoir low.	Check and fill as required.
	Tool hoses blocked.	Remove obstruction.
	Tool hoses incorrectly connected to circuit fittings.	Check that tool hose goes from top port and from tool return or out port to lower port; both ports on same side of the manifold.
	Relief valve(s) stuck open.	Adjust or replace valve(s).
	Tool is defective.	Repair as necessary.

**Table 2: Power Unit Troubleshooting**

Problem	Cause	Remedy
Tool runs too hot	Hoses too small.	Increase hose diameter. (Refer to hose specification table in Chapter 3.)
	Improper fluid.	Replace fluid.
	Cooler clogged, blocked air flow.	Clean cooler and straighten fins as necessary.
	Air injectors and/or injector pump.	Bleed injectors. (Refer to engine manual.)
	Thermal diverter valve defective.	Check that the valve is directing hot oil to the cooler by feeling the tubing at the cooler. Replace valve if defective.
	Hydraulic pump damaged.	Replace pump.
	Air flow through power unit blocked.	Remove obstruction.
	Fan belt loose or broken.	Replace or adjust as required.
	Flow control valves or priority valves have been added to circuit.	Some rotary tools must have flow controls. Adjust flow to match tool gpm to avoid forcing excess flow over relief.
	Closed center tools in use.	Use only open center tools.

## **Chapter 5**

# Parts List and Assembly

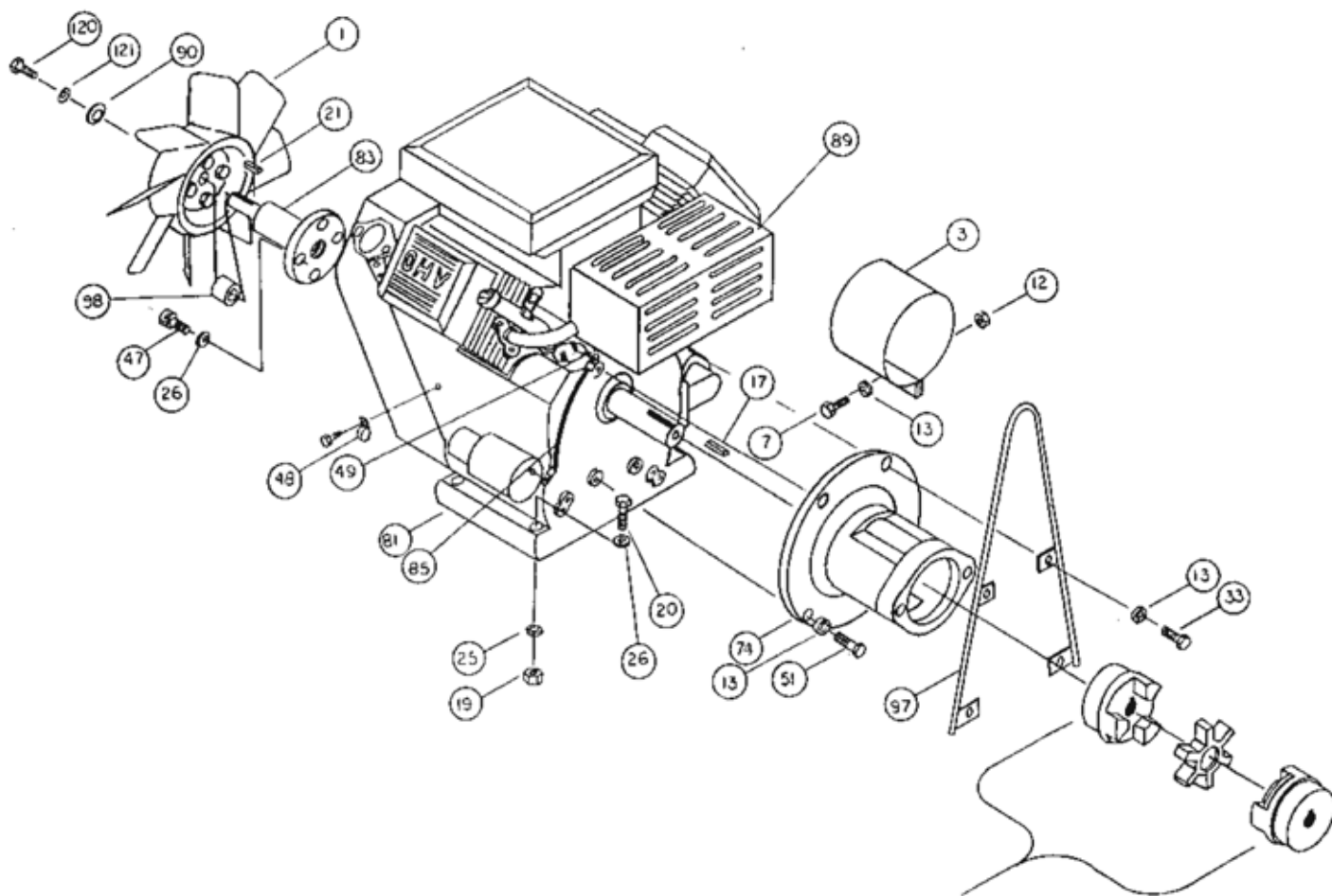
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The following tables list the parts for the HCM-3G power unit; the associated drawings identify the parts and illustrate the assembly.



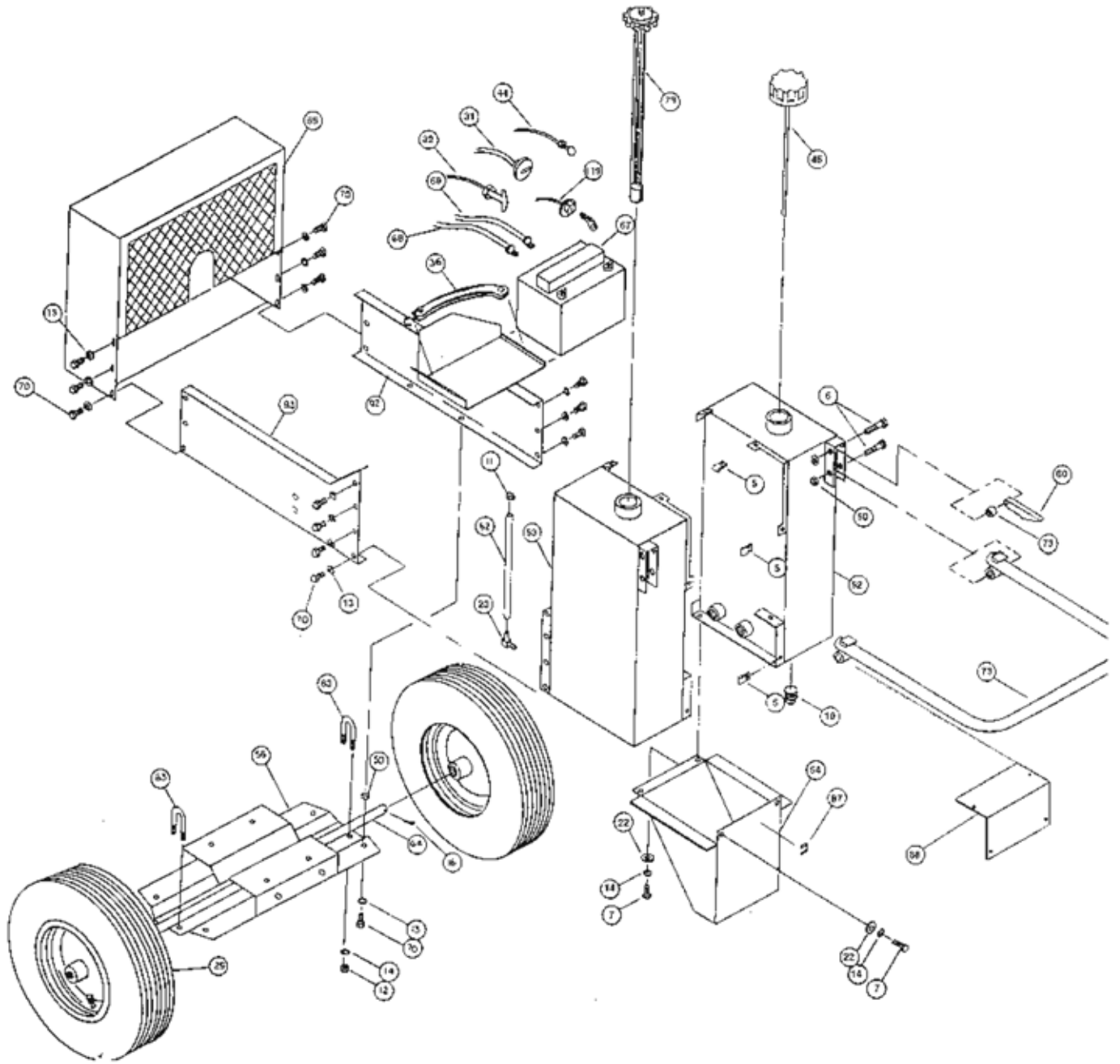
REF.	QTY.	DESCRIPTION
1	1	FAN
2	1	FILTER
3	1	COUPLING, GUARD
4	30"	HOSE
5	12	NUT, JAM
6	4	BOLT, 3/8 x 1-3/4"
7	18	BOLT, 1/4"X3/4"
8	2	BOLT, 1/4 x 2-1/4"
9	1	FITTING
10	1	PLUG
11	2	CLAMP, HOSE
12	17	NUT, 1/4"
13	22	WASHER, LOCK 3/8"
14	31	LOOKWASHER 1/4"
15	4	BOLT, 3/8 x 1-1/2"
16	2	PIN, COTTER
17	1	KEY 1/4x 1"
18	4	CLAMP, .750
19	4	NUT, 5/16
20	1	BOLT, 5/16 x 1-3/4"
21	1	KEY, 3/16 X 1-1/2"
22	12	WASHER, 1/4" FLAT
23	1	FITTING
24	1	VALVE, RELIEF
25	6	WASHER, LOCK
26	4	WASHER, FLAT

REF.	QTY.	DESCRIPTION
27	1	COOLER
28	1	FITTING
29	2	WHEEL
30	4	FITTING
31	1	GAUGE, HR METER
32	1	CABLE, THROTTLE
33	2	BOLT, 3/8x1"
34	2	BOLT, 5/16 x1"
35	2	CLAMP, HOSE
36	1	STRAP
37	1	PUMP, HYD.
38	1	FITTING
39	6	TIE, 8"
40	1	SHIPPING CONTAINER
41	1	"
42	1	"
43	1	"
44	1	CHOKE CABLE
45	1	CAP, HYD. TANK
46	3	PAINT, WHITE
47	4	BOLT, 5/16x1"
48	1	CLAMP
49	1	STARTER, SOL
50	4	NUT, 3/8"
51	2	BOLT, 3/8 x 1-1/4"
52	1	TANK, HYD.
53	1	TANK, FUEL



REF.	QTY.	DESCRIPTION
54	1	FOOT, REAR
55	1	SHROUD, COOLER.
56	1	BRACKET, ENGINE MNT
57	1	FITTING
58	1	FITTING
59	1	HANDLE
60	2	LATCH, HANDLE
61	1	HOSE, 50"
62	1	HOSE, 45"
63	2	"U" BOLT
64	2	AXLE
65	1	HOSE, 11-1/2"
66	6	CLAMP, HOSE IDEAL
67	1	BATTERY, GUI-220
68	1	CABLE, POS.. RED
69	1	CABLE, NEG. BLACK
70	18	BOLT, 3/8 x 3/4"
71	1	HOSE, 15-1/2"
72	1	MANIFOLD
73	2	SPACER, HANDLE
74	2	MOUNT, PUMP
75	2	OIL, ENGINE
76	3	OIL, HYDRAULIC
77	2	GAS, REGULAR
78	4	BOLT, 1/4x 1-1/4"
79	1	CAP, FUEL GAUGE
80	1	FITTING PLUG

REF.	QTY.	DESCRIPTION
81	1	ENGINE
82	1	SWITCH, PRESSURE
83	1	SHAFT, FAN
84	1	WIRING, COMPLETE
85	1	CABLE, BATTERY RED
86	1	VALVE, FLOW
87	1	BUMPER, HOOD
88	1	COVER, PLATE
89	1	MUFFLER, V-TWIN
90	1	WASHER, FAN
91	1	COUPLER, PUMP
92	1	FRAME, SIDE - RIGHT
93	1	FRAME, SIDE - LEFT
94	1	LEVER, ASSEMBLY
95	1	HOSE, INNER SUPPORT
96	1	PANEL, CONTROL - LOWER
97	1	LIFTING EYE
98	1	SPACER, FAN
99-115	1	GRAPHIC SET
116	1	HOSE, RETURN
117	1	FITTING
118	1	SWITCH, IGNITION
119	1	SWITCH, IGNITION
120	1	BOLT, 6 MM
121	1	WASHER, 6 MM
122	1	PLUG, CONTROL VALVE





# Chapter 6

## Ordering Information

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To place an order, request service, or get more detailed information on any E.H. Wachs products, call us at one of the following numbers:

U.S.                800-323-8185  
International: 847-537-8800

You can also visit our Web site at:

[www.ehwachs.com](http://www.ehwachs.com)

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### ORDERING REPLACEMENT PARTS

When ordering parts, refer to the drawings and parts lists in Chapter 8. Please provide the part description and part number for all parts you are ordering.

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### REPAIR INFORMATION

Please call us for an authorization number before returning any equipment for repair or factory service. We will advise you of shipping and handling. When you send the equipment, please include the following information:

- Your name/company name
- Your address
- Your phone number
- A description of the problem or the work to be done.

### In This Chapter

ORDERING REPLACEMENT PARTS

REPAIR INFORMATION

WARRANTY INFORMATION

RETURN GOODS ADDRESS

Before we perform any repair, we will estimate the work and inform you of the cost and the time to complete it.

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### **WARRANTY INFORMATION**

Enclosed with the manual is a warranty card. Please fill out the registration card and return to E.H. Wachs. Retain the owner's registration record and warranty card for your information.

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### **RETURN GOODS ADDRESS**

Return equipment for repair to the following address.

E.H. Wachs  
600 Knightsbridge Parkway  
Lincolnshire, Illinois 60069 USA