BT 400-45

Installation – Operation Maintenance Instructions And Parts List

READ INSTRUCTIONS PRIOR TO STARTING HEATERS

WARNING!

EXPLOSION HAZARD

Do not operate heater in explosive vapor area.

EXHAUST FUMES

Do not operate heater in enclosed spaces. Adequate ventilation is required to prevent buildup of exhaust fumes which can be toxic in concentrated amounts.

GASOLINE

Gasoline used in operating this heater is explosive.

• Do not refuel during operation.

• Avoid open flame near fuel tank fuller neck.

• Make sure fire extinguisher is in easy reach.

HIGH TEMPERATURE

Heat exchanger casing, muffler, exhaust hose, and exhaust stack may become Dangerously hot.

• Do not touch heater parts during or immediately after operation.

• Perform maintenance only after heater has cooled.

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WARNING!

CARBON MONOXIDE

Exhaust gases from the combustion chamber and diesel engine contain poisonous carbon monoxide gas. Exhaust stack must always be properly installed during operation of heater to prevent exhaust gases from entering intake.

ELECTRICITY

Shock or injury may result from working on electrical components. Take care to ground parts and not make personal contact.

ROTATING PARTS

Serious injury may result from contact with rotating parts. Stand free of moving parts and possible pinch points prior to start-up and during operation.

NOISE HAZARD

Wear approved ear protection equipment within 10 feet (3.05 meters) of operating heater.

Failure to do so may result in impairment or loss of hearing.

COMPRESSES AIR

Death or severe injury might result when compressed air is used to blow dirt from skin or clothing.
Air entering body openings is extremely dangerous. Compresses air used for cleaning shall not exceed 30 psi (210 KPA). Use goggles or face shield for eye protection.

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Section 1 • Introduction

• • • • • • • • • • • • • • • •

1.1 General

1.2 Scope

1.3 These instructions are for use by personnel to whom the BT400-45 heater manufactured by ***AEROTECH HERMAN NELSON INC.*** has been issued. They contain the information on the operation and maintenance of the heater as well as the description of the major units and their functions in relation to other components of the heater. In addition, a list of repair parts which may be required for maintaining the heater, is provided in Section 6.

1.4 Safety Precautions

1.5 Precautionary measures to be taken during operation and maintenance of the heater are contained in the appropriate paragraphs of the manual. In addition, all safety precautions are listed in the front of this manual.

1.6 Below is a list of definitions to terms commonly used in this book.

DANGER: You will be subject to serious injury or death if you fail to follow instructions!

WARNING: You could be subject to serious injury or death if you fail to follow instructions!

CAUTION: You can be hurt if you fail to follow instructions!

NOTICE: Your heater or other property could be damaged if you fail to follow instructions!

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Section 2 • Description and Leading Particulars

• • • • • • • • • • • • • • • • •

2.1 General

2.2 Scope

2.3 The model BT400-45 heater ***(see figure 2-1 and 2-2)*** is a fully enclosed, portable, trailer mounted unit, intended for use in ground heating maintenance shelters, portable hangers, aircraft engines and fuselages, and other similar enclosures.

2.4 Power Unit

2.5 The model BT400-45 heater is supplied with a HONDA engine. The power unit supplies all the air necessary for operation of the heater. Air is drawn through the air inlet door ***(see figure 2-1)***, passes through and around the heat exchanger, and is discharged through ducts mounted on the duct adapter assembly ***(see figure 2-2)***. The engine has a coupling attached to the drive shaft. A drive coupling is connected to the driven coupling by a flexible rubber sleeve which mates with the two. The driven coupling drives the heater fan through a pulley which is an integral part of the driven coupling, a V-belt drives the fuel pump mounted ahead of the fuel service point on the right side, and the heater ignition magneto on the opposite side of the power unit.

2.6 Fuel System

2.7 The fuel system ***(see figure 2-4)*** supplies gasoline to the heater and to the gasoline engine. Fuel is drawn from a removable 16 gallon fuel tank suspended by straps in the base of the heater, through an automotive type fuel filter. An engine primer is provided for priming the gasoline engine when starting the heater. A belt-driven fuel pump draws fuel through the filter and delivers it under constant pressure to the heater combustor and gasoline engine. A burner fuel valve is provided to activate the combustors, and to automatically shut down the combustor in the event of dangerously high discharge air temperature. A temperature selector valve is provided to control discharge air temperatures between 150°F and 280°F. The fuel nozzle is contained in a holder with inlet and bypass fuel lines. Fuel flows through the nozzle and is atomized. As the fuel leaves the nozzle it is ignited by the igniter plug in the combustor. Fuel is also bypassed from the nozzle, through a check valve, to the temperature selector valve on the control panel. The check valve prevents a reverse flow of fuel to the nozzle.

2.8 Heat Exchanger

2.9 Fuel flowing from the nozzle is ignited in the combustor ***(see figure 2-3)***. The burring fuel strikes a plate or target in the combustor and is diffused into the heat exchanger. Air from the fan enters holes in the side of the combustor in a manner that will ensure proper fuel-air mixture. From the combustor, the burning fuel flows through the heat exchanger in a spiral path between the surfaces of the ventilating air tubes and is expelled through the parallel tubes and the space between the surfaces of the ventilating air tubes and is expelled through the exhaust opening at the top of the casing. Ventilating or heating air is forced through the parallel tubes and the space between the heat exchanger shell or casing. Heat is exchanged between the hot exhaust gases and the ventilation air. At the discharge end of the heat exchanger are the temperature sensing elements. The air control assembly consists of a baffle, a series of radial tubes, and an adjustable damper. Air traveling between the walls of the heat exchanger and the casing is directed radially inward behind the baffle where it is mixed with warmer air leaving the parallel tubes of the heat exchanger.

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Figure 2-1 • Right Front View

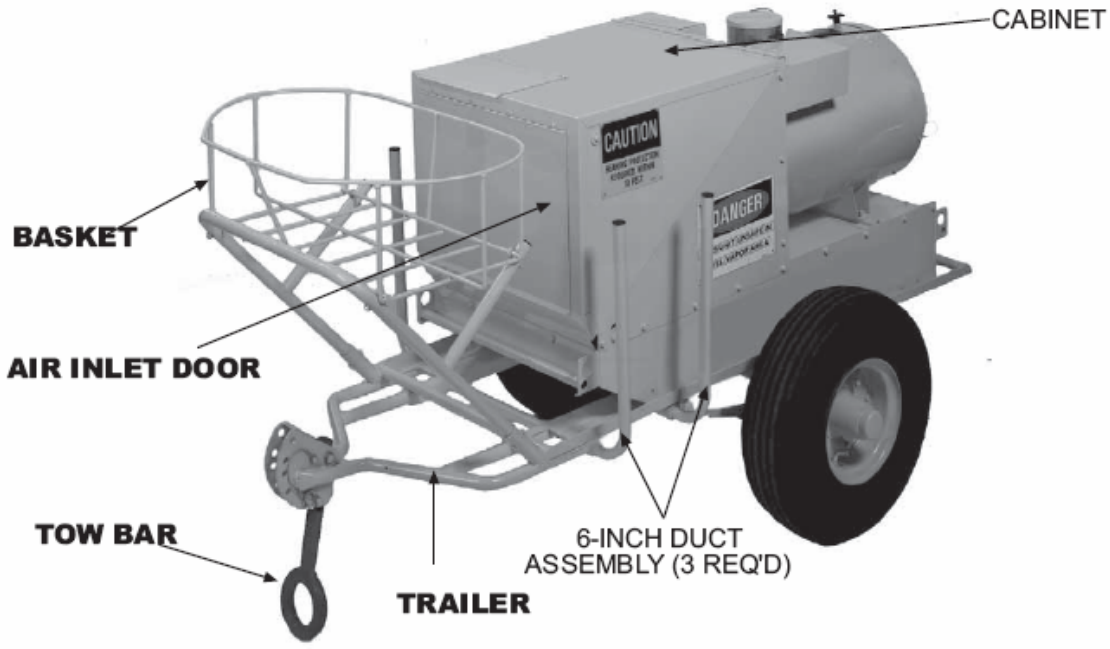
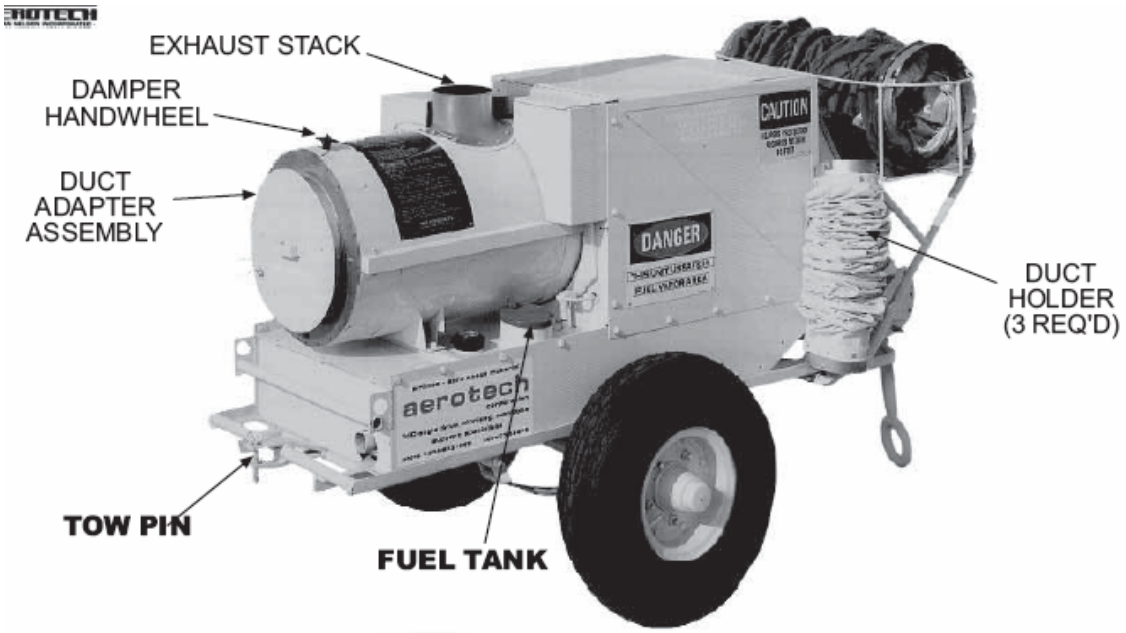


Figure 2-2 • Left Rear View



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Section 2

This mixing ensures a more uniform temperature throughout the discharge airstream. The shutter is controlled by a damper control which is locked by a handwheel mounted in a slot above the discharge and of the heater. The damper is used to reduce the heat output, without reducing the temperature, by reducing the air volume. Volume can be set between full and one half of full volume. A duct adapter assembly is installed on the discharge end of the heater to connect the flexible duct ***(see figure 2-2)***.

2.10 Cabinet

2.11 The prime mover is enclosed in a cabinet (see figure 2-1) which affords protection against the elements and prevents damage during storage or transit. The cabinet is hinged and is provided with cabinet supports. When the heater is in operation, the air inlet door of the cabinet must be open to allow air flow. The control box on the right of the heater has a hinged cover which opens to allow access to the controls.

2.12 Trailer

2.13 A two-wheeled trailer is provided to transport the heater when moving from worksite to worksite. Duct holder ***(see figure 2-1 and 2-2)*** hold the six-inch ducts when they are not in use. The 12-inch ducts and duct adapter are stored in the basket. An adjustable tow bar serves as a support when the trailer is at rest. DO NOT EXCEED 20 M.P.H. WHEN TOWING.

2.14 Leading Particulars.

2.15 The leading particulars for the Model BT400-45 heater are as follows:

A – Heater

Manufacturer	AEROTECH HERMAN NELSON INC.
Model	BT400-45
Fuel	Gasoline
Fuel Consumption	3.825 GPH at maximum output based on -65°F ambient temperature, 280°F discharge temperature.
Output	40,000 to 400,000 BTU/hr
Discharge air temperature range	150°F to 280°F

B – Engine

Manufacturer	Honda Power Equipment
Model	GX 160
Length x Width x Height	(12.0 x 14.4 x 13.2)
Dry Weight	15.0 KG (33.1 LB)
Engine Type	4-Stroke, overhead valve, single cylinder
Displacement	163 cc (9.9 cu. in.)
Maximum Output	4.0 KW (5.5 ps, 5.4 BHP) at 3.600 RPM
Maximum Torque	10.8 N• m (1.1 kg-m, 8.0 ft-lb) at 2,500 RPM
Fuel Consumption	310 g/kWh
Cooling System	Forced Air
Ignition System	Transistorized magneto
PTO Shaft Rotation	Counterclockwise
Spark Plug Cap	0.7 – 0.8 mm (0.028 – 0.031 in.)

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Section 2

C – Igniter Plug

Point Setting	0.1250 to 0.1876

D – Tires

Size	6.90-9
Ply	6
Pressure	20 psi

E – Fuel Tank

Capacity	16 Imperial gal.

F – Shipping Dimensions & Weight

BT400-45 on skid with MA-1		**BT400-45 on skid**	
Weight	526 lbs.	Weight	350 lbs.
+ ducts	37 lbs. (563)	+ ducts	37 lbs. (387)
Length	81”	Length	54”
Width	44”	Width	23”
Height	58”	Height	48”

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Figure 2-3 • Sectional View of Nozzle & Combustor

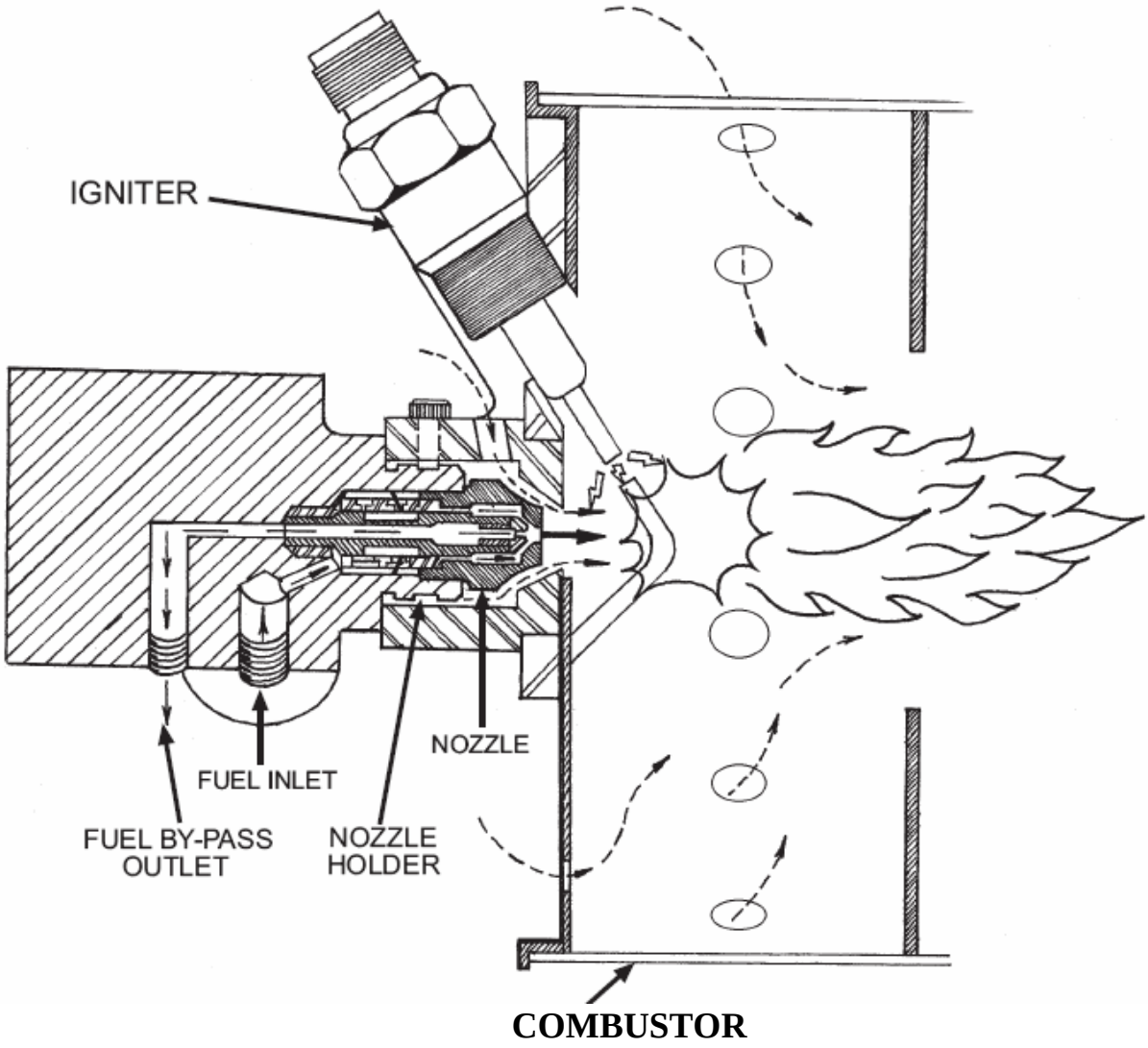

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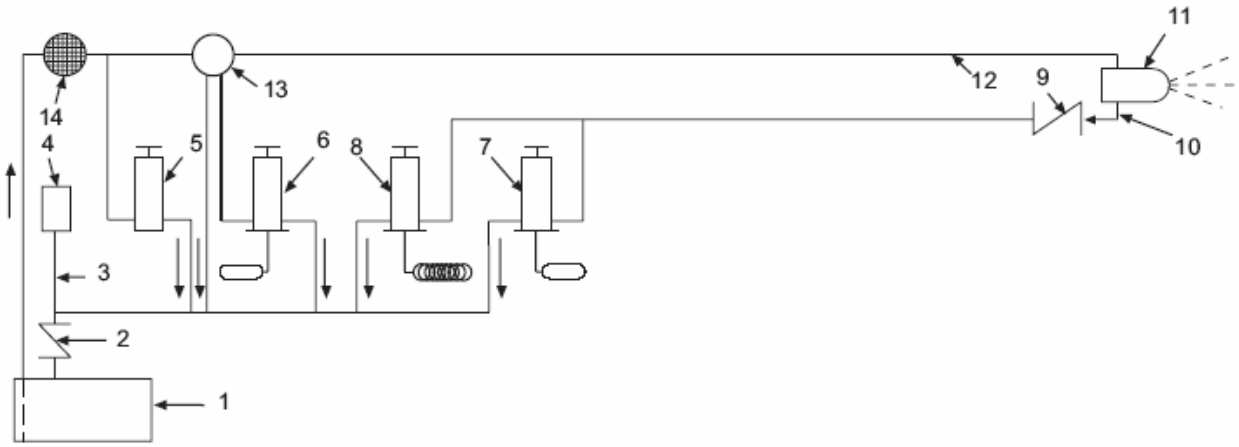
Figure 2-4 • Fuel System Flow Diagram



1 • TANK - FUEL
2 • CHECK VALVE - CARBURETOR PRESSURE.
3 • 2 TO 4 LB. PER SQ. INCH VARIABLE PRESSURE.
4 • CARBURETOR - ENGINE.
5 • PRIMER - ENGINE.
6 • BURNER FUEL VALVE.
7 • ALTITUDE COMPENSATOR. (NOT ON ALL MODELS)
8 • TEMPERATURE SELECTOR.
9 • CHECK VALVE - MINIMUM FUEL TO NOZZLE.
10 • 20 TO 90 LB. PER SQ. INCH VARIABLE PRESSURE.
11 • NOZZLE - FUEL.
12 • 150 LB. PER SQ. INCH CONSTANT PRESSURE.
13 • PUMP - FUEL.
14 • FILTER - FUEL.

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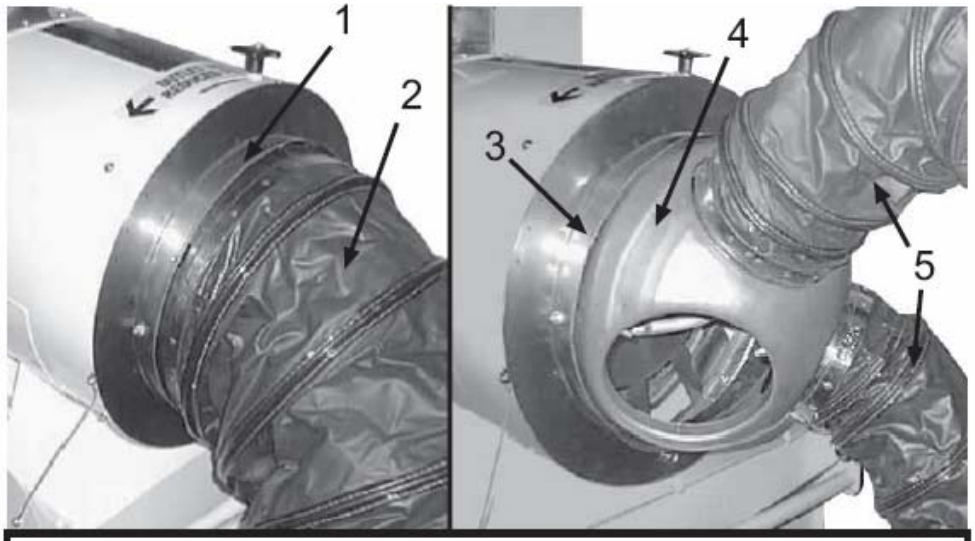
Figure 2-5 • Heater Ducts (Installed View)



1 • Adapter Assembly (12" inch)
2 • 12-Inch Duct
3 • Adapter Assembly (12" inch)
4 • Duct Adapter (6" inch)
5 • 6-Inch Duct (3 required)

6 • 12-Inch Duct
7 • 6-Inch Duct (3 required)
8 • Duct Adapter (6" inch)

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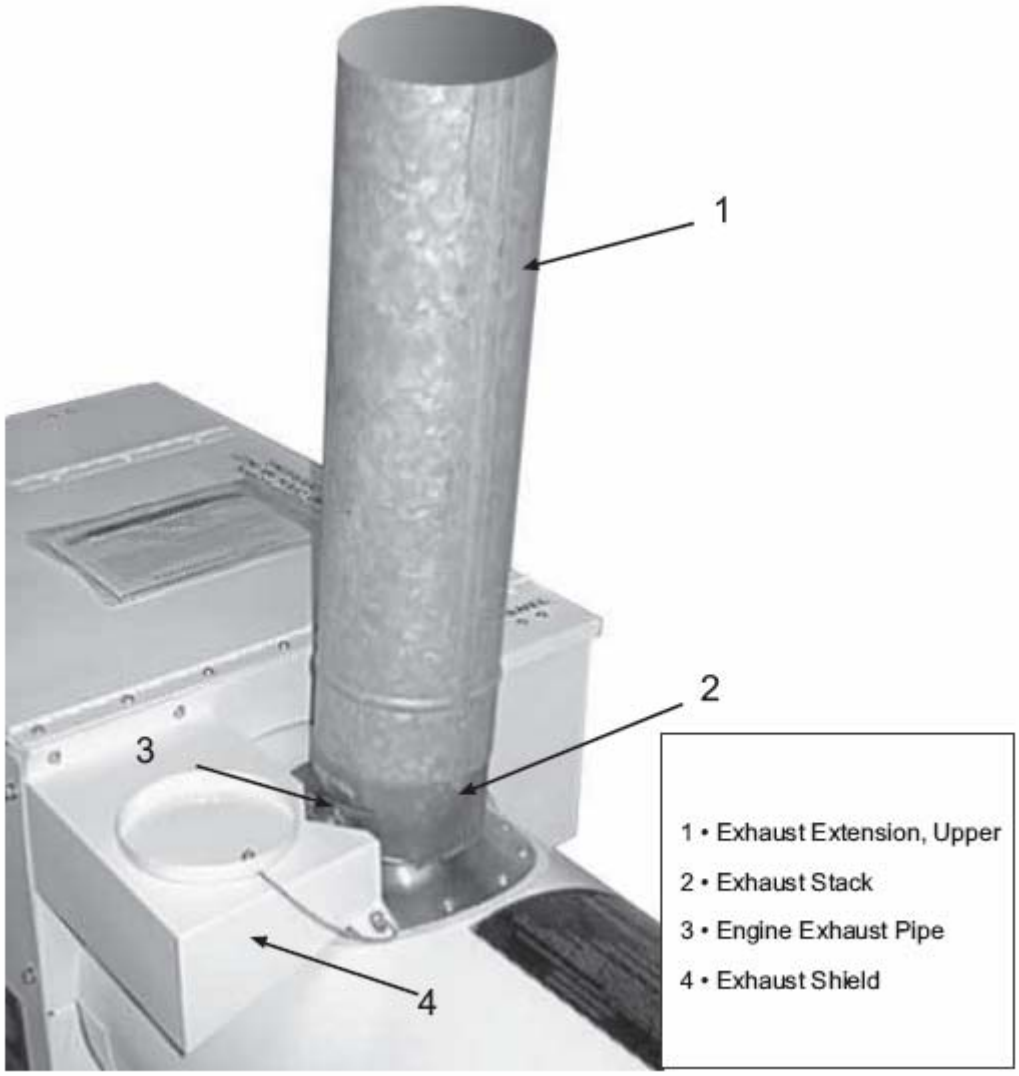
Figure 2-6 • Exhaust Extensions (Installed View)



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Section 3 • Preparation for Use & Storage

• • • • • • • • • • • • • • • • •

3.1 General

3.2 Scope

3.3 The heater unit is shipped in a wood packing crate. Unloading should be accomplished as follows:
(a) Remove all tiedowns and blocks securing packing crate to carrier.
(b) Use cable slings and hoist, with a capacity of 1,000 lbs., to lift heater from carrier.

!CAUTION!

Be careful when using crowbars, pinch bars, and hammers while uncrafting the equipment to prevent damage to the heater

!CAUTION!

Be careful when removing cardboard boxes from packing crate.

3.4 Inspection and Servicing of Equipment

3.5 Tires

3.6 Inspect tires for leaking valves, cuts, or improper inflation.

3.7 Trailer Frame and Cabinet

3.8 Perform the following:
(a) Inspect trailer frame and cabinet for broken welds, dents, and loose or missing hardware.
(b) Inspect cabinet to see that no damage has occurred during shipment.
(c) Inspect to see that air inlet door has not been sprung, and that door hinges are not bent or torn from fasteners.
(d) Inspect fuel tank for breaks or dents.

3.9 Gasoline Engine

3.10 Perform the following:
(a) Inspect for exterior damage and loose or missing hardware.
(b) Turn engine over several times with the recoil starter to ensure that piston moves

3.11 Heater

3.12 Inspection and servicing of the heater consists of the following:
(a) Performing the required preventive maintenance services. (Refer to section 5.)

! WARNING!

When filling the fuel tank, do not smoke or use an open flame in the vicinity. Always provide a metal-to-metal contact between fuel container and fuel tank to prevent a spark from being generated as the gasoline flows over the metallic surfaces.

(b) Fill fuel tank with the proper grade of gasoline.

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Section 3

3.13 Preparation for Storage

3.14 Proper storage preparation is essential for keeping the heater trouble-free and looking good. The following steps will keep rust and corrosion from impairing the heaters' function and appearance.

(a) Clean all exterior surfaces with a mild detergent and water.

NOTE

Water contacting a hot engine can cause damage. If the engine has been running, allow it to cool for at least half an hour before washing.

(b) Drain fuel from tank

NOTE

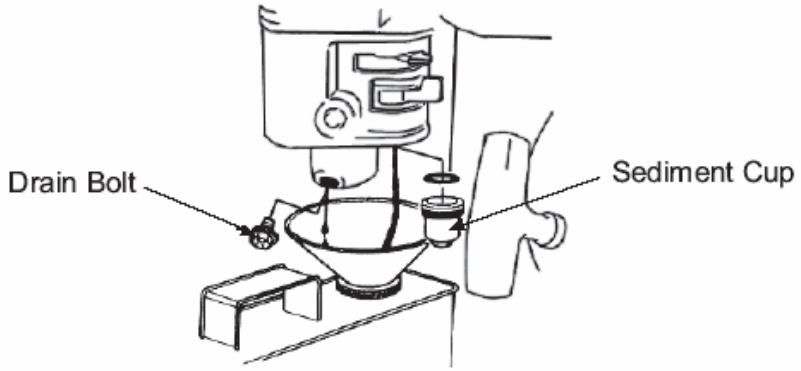
Old gasoline will cause hard starting, and it leaves gum deposits that clog the fuel system if the gasoline deteriorates during storage, you may need to have the carburetor and other fuel components serviced or replaced.

(c) Drain fuel from carburetor by removing the drain bolt and sediment cup, then move the fuel valve lever to the "ON" position. Reinstall the drain bolt and sediment cup after all the fuel has drained ***(see figure 3-1)***.

! WARNING !

Gasoline is highly flammable and explosive. You can be burned or seriously injured when handling fuel. Keep heat, sparks, and flame away. Handle fuel only outdoors. Wipe up spills immediately.

Figure 3-1



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Section 4 • Operation instructions

4.1 General

4.2 Scope

4.3 This section describes the theory of operation, operating controls and indicators and the operative procedures for the heater.

4.4 Theory of Operation

4.5 The description will be presented in two parts; (1) General Description and (2) Detailed Description. The general description explains the interrelationship of functional components at an operation level. Functions of individual components and unique assemblies are given in the detailed description.

4.6 General Theory

4.7 Fuel is drawn from the fuel tank through the fuel filter and delivered under constant pressure to the variable discharge combustion nozzle. Fuel pressure causes the temperature selector valve to open and bypass a metered amount of fuel back to the fuel tank. The ignition system produces a high voltage spark at the igniter plug to ignite the fuel and air mixture. The resultant flame heats the heat exchanger. Ambient air is forced through the heat exchanger by the fan assembly. As the ambient air passes through the heat exchanger it is heated to the desired temperature. When the heated air leaves the heat exchanger it is directed through the heat deflector to the heat exchanger outlet.

4.8 As the heated air leaves the heat exchanger outlet, it passes over the temperature selector valve and burner control valve sensing elements. The air temperature detected by the temperature selector valve's sensing elements determines the amount of fuel that is bypassed to the fuel tank thus maintaining the desired output air temperature. In the event of a high output temperature, the burner control valve sensing element detects this condition and turns off the burner.

4.9 Controls

4.10 Choke Controls

4.11 The choke control ***(see figure 4-3)***, installed on the gasoline engine, enables the operator to enrich the fuel mixture for cold weather starting. The choke control is attached to a leaver on the engine carburetor.

4.12 Engine Stop Switch

4.13 The engine "STOP" switch ***(see figure 4-3)*** is installed on the engine flywheel shroud. The switch is connected in the ignition circuit to enable the operator to stop the engine.

4.14 Engine Primer

4.15 The engine primer is installed on the heater near the gasoline engine. The primer is a small hand pump used to prime the engine carburetor prior to starting.

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Section 4

4.16 Starter Handle

4.17 The recoil starter and handle ***(see figure 4-3)*** are attached to the engine for the purpose of manual starting.

4.18 Burner Control

4.19 The burner control valve is used to turn the combustor on and off. The burner control valve knob (see figure 4-4) is mounted on the heater control box. When the knob is depresses, fuel flows to the nozzle. The fuel flow is stopped when the knob is pulled up.

4.20 Temperature Selector Valve

4.21 The temperature selector valve is used to maintain a selected discharge temperature, from approximately 150°F to 280°F. The temperature selector valve knob ***(see figure 4-4)*** is mounted in the center of the fuel control panel.

4.22 Damper Control

4.23 The damper control ***(see figure 4-5)*** controls a rotating damper at the discharge end of the heater. The control handwheel is mounted on the top of the casing. The damper control, attached to the damper, is secured by handwheel. To move the damper control, loosen the handweel. Moving the damper control as far as possible to the left (when facing discharge end) completely closes the damper. As the damper control is moved to the right, the damper opens, increasing the volume of discharge air leaving the heater. The air outlet cannot be completely closed, preventing accidental operation of the heater with no outlet for the air and possible damage from a heat buildup within the heater.

4.24 Discharge Air Temperature Gauge

4.25 The discharge air temperature gauge ***(see figure 4.4)*** is located in the control box. The temperature gauge is a dial-type instrument which indicates the actual temperature (+/- 10°F) of the discharge air in degrees Fahrenheit. A sensing element mounted in the discharge air outlet.

4.25 The discharge air temperature gauge ***(see figure 4.4)*** is located in the control box. The temperature gauge is a dial-type instrument which indicates the actual temperature (+/- 10°F) of the discharge air in degrees Fahrenheit. A sensing element mounted in the discharge air outlet.

4.27 The fuel gauge is mounted beneath the heat exchanger next to the fuel tank opening and cap. The fuel gauge is a needle-indicating type, direct reading gauge. Graduations on the gauge indicate “E” (empty), 1/4, 1/2, 3/4, and “F” (full).

4.28 Temperature Selector Indicator Knob

4.29 The temperature selector indicator knob ***(see figure 4-4)*** is mounted on the control panel next to the temperature selector knob. The approximate range of temperature selector valve is indicated by the pointer on the temperature selector knob. When the temperature selector knob is rotated, a pinion on the shaft engages a gear on the temperature selector indicator knob shaft and rotates the knob in direct relationship to the temperature selector valve knob. The heat range is from LOW corresponding to a discharge air temperature of slightly below 150°F to HIGH corresponding to approximately 280°F. Each number represents approximately 25°F, with 150°F being close to number “1” on the fuel control panel.

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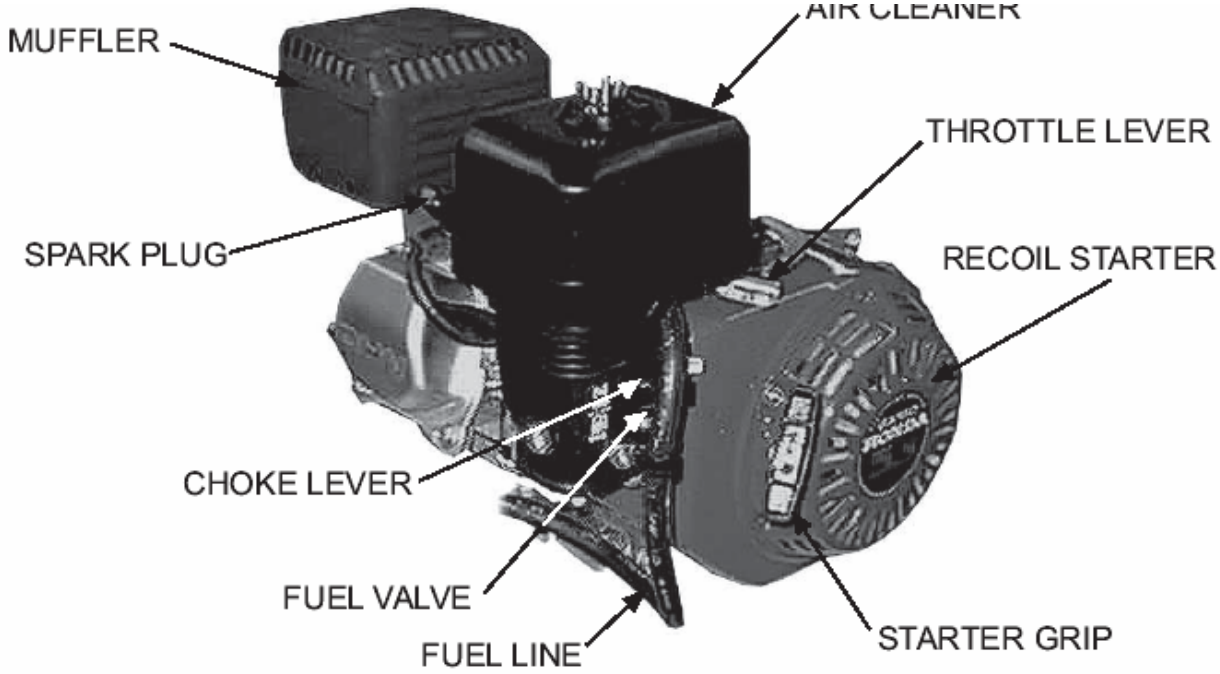
Figure 4-3 • Gasoline Engine Controls



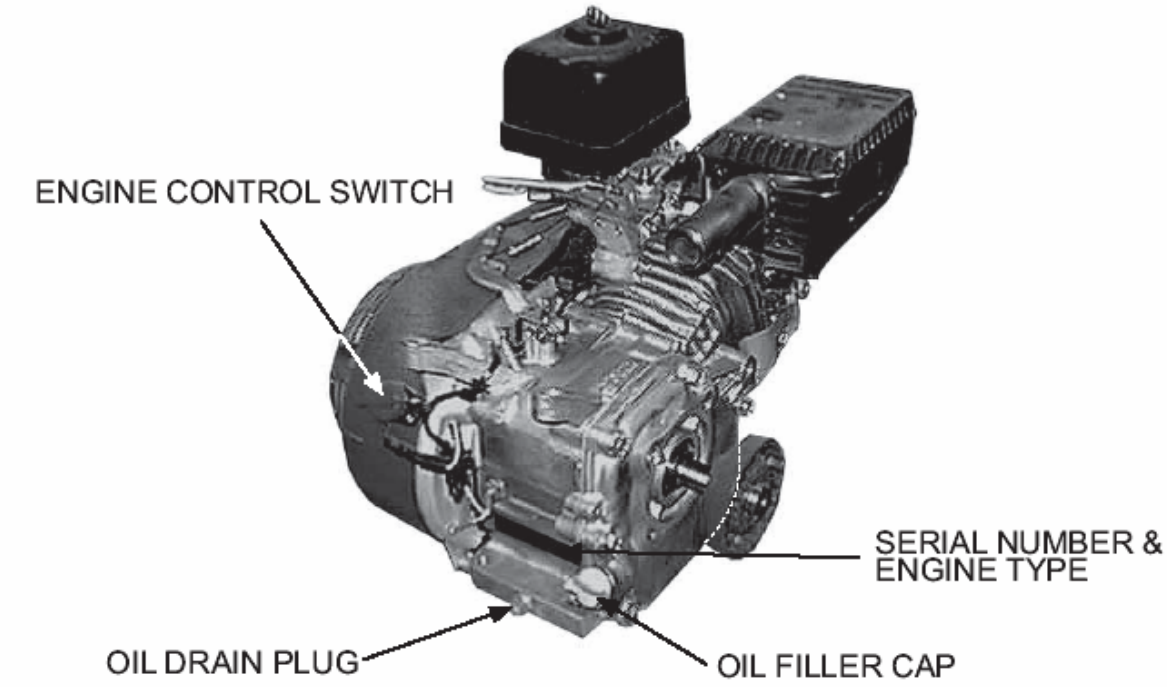


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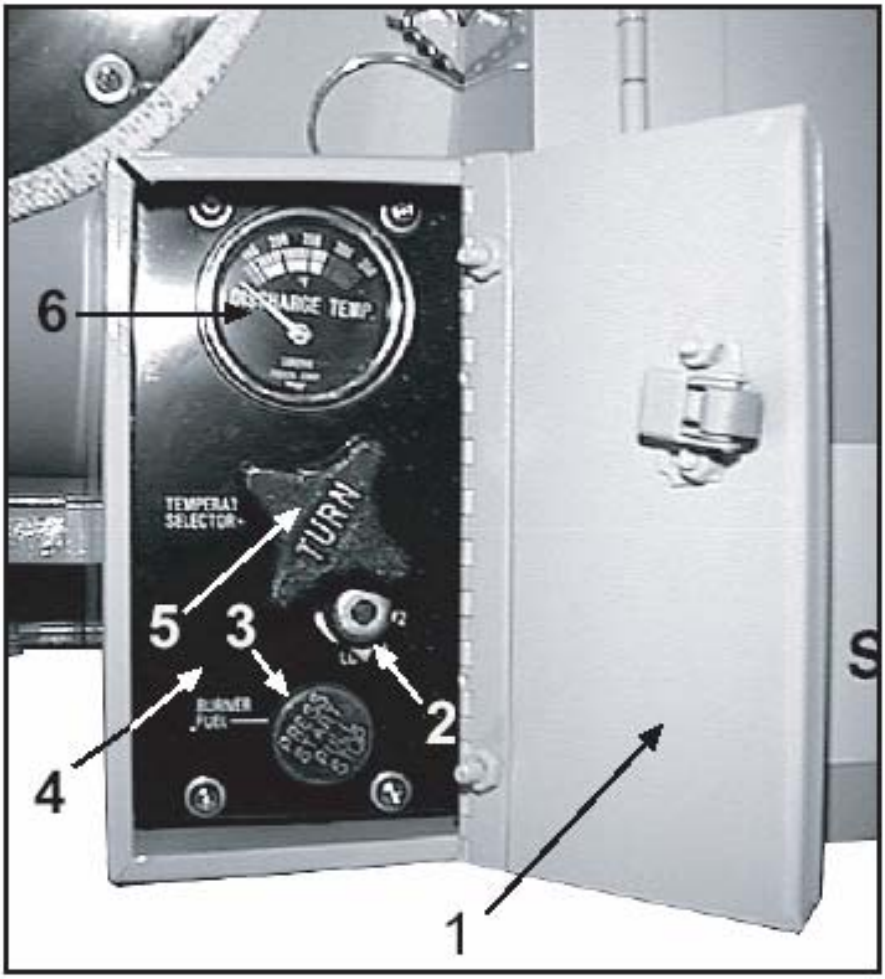
Figure 4-4 • Heater Fuel Controls



1 Access Door
2 Temperature Selector Indicator Knob
3 Burner Fuel Valve Knob
4 Information Plate
5 Temperature Selector Valve Handwheel
6 Discharge Temperature Gauge

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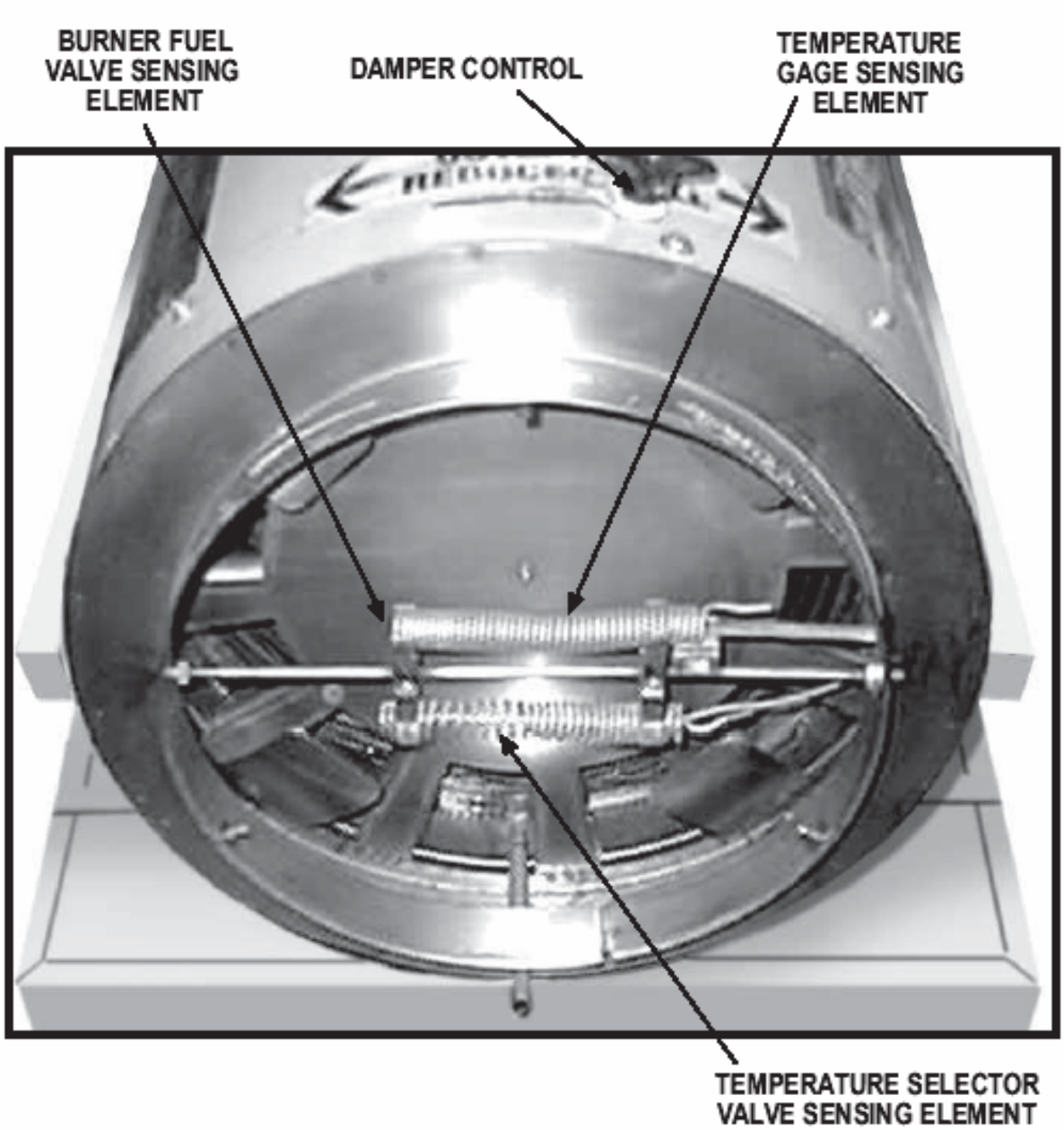
Figure 4-5 • Heater Discharge Air Controls



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Section 4

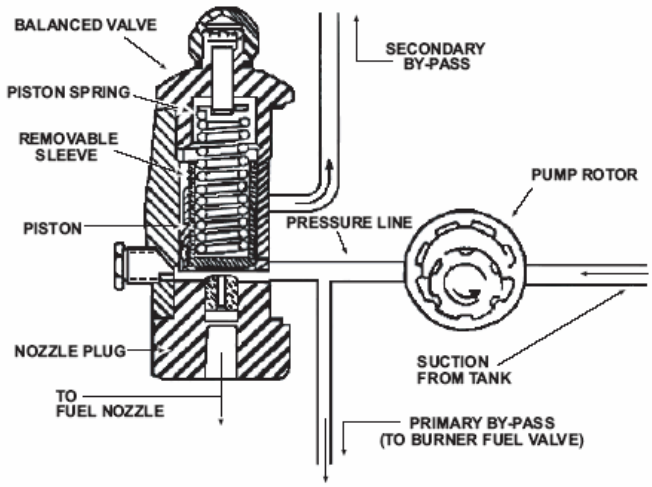
4.30 Detailed Theory

4.31 Fuel System

4.32 Fuel Pump

4.33 The fuel pump is mounted on a bracket opposite the magneto. The pump is belt driven by the gas engine. The pump has three outlets ***(see figure 4-6)***. A primary by-pass will handle all the flow if the balanced valve is closed. If the primary by-pass line is closed, the fuel will flow into the balanced valve and hence out through both the nozzle fuel line and the secondary by-pass line. The secondary by-pass supplies fuel to the diesel engine and returns surplus back to the fuel tank. The burner control valve, which is in the primary by-pass line, is closed to obtained fuel flow to the nozzle. When this valve is open the pump can not build up sufficient pressure to open the balanced valve and effect flow through the nozzle fuel line. Closing the burner control valve allows the pump to build up pressure to the point where the valve opens allowing fuel flow in the nozzle fuel line. The pressure at which the balanced valve opens is determined by the compression of the piston spring, normally the spring is adjusted to 150 psi. This pressure can be checked at the burner control valve. Since the pump delivers fuel in excess of the maximum nozzle capacity maximum nozzle capacity there will always be flow through the secondary by-pass line when burner control valve is on. Fuel from the secondary by-pass flows back into the tank through a check valve which opens under a pressure of about 5 psi, which is sufficient to divert adequate fuel to the engine.

Figure 4-6 • Schematic Diagram of Fuel Pump



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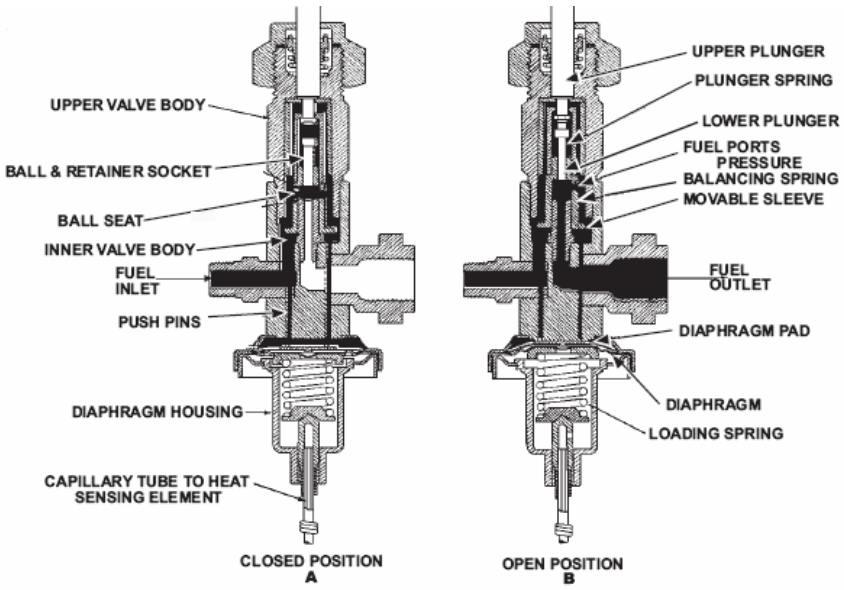
4.34 Burner Control Valve

4.35 The burner control valve ***(see figure 4-7)*** is not intended for manual heat regulation, the manual control knob serving only to either full close (burner on) or fully open (burner off) the primary by-pass line which returns fuel back to the tank. Pressing the knob downward seats a ball which seals the inner axial passage leading to the fuel outlet. At the same time, fuel under pump pressure flows into the area over the diaphragm, forcing the diaphragm downward against the loading spring. This allows the push pins to drop so that the pressure balancing spring may force the movable sleeve downward to hold the ball firmly in its seat, closing the outlet passage. Thus the fuel pressure acts to keep the valve closed. Lifting the knob raises the movable sleeve, permitting the lower plunger to be in turn raised by the plunger spring, freeing the ball from its seat. Fuel then flows through the inner valve body to the outlet. This relieves the fuel pressure on the diaphragm and the valve returns to the open position.

4.36 The burner control valve also serves as an overheat protection safety valve. This is achieved through the action of a sensing element in the discharge air system. When the discharge air temperature exceeds safe limits (about 350°F), the thermostatic medium in the sensing element will expend sufficient pressure to assist the loading spring so that together they force the diaphragm upward, opening the valve. This turns off the burner. The valve will not close again to permit subsequent burner operation until operated manually.

Figure 4-7 • Burner Control Valve



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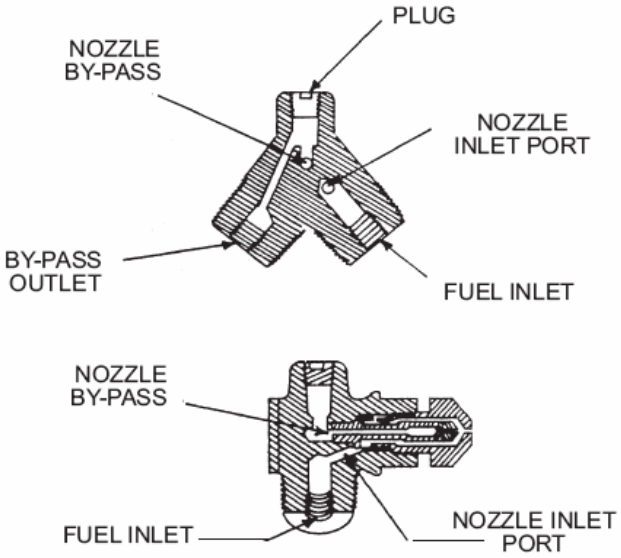
! CAUTION !

Beware of chips – Pipe, tubing and valve ends must be clean. System contaminants in any valve can foul valve seats and cause leakage. Back flush systems before putting in service whenever possible. Install screen or filters where required to protect valves. Pipe Dope – Goes on male thread carefully so nothing gets in valve and system. Strings of tape type sealants can foul valve seats.

4.37 Fuel Atomizing Head

4.38 The fuel nozzle screws into a nozzle holder, the combination being known as the fuel atomizing head. Fuel from the inlet line enters the nozzle supply chamber through a strainer screen ***(see figure 4-8)***, then flows through slots in the inner had through which impacts a whirling motion to the fuel so that it partially atomizes as it enters the swirl chamber. Atomization is completed as the fuel sprays through the discharge orifice into the combustor. A portion of the fuel is also forced into a by-pass chamber which leads to the by-pass outlet passage in the nozzle holder. A check valve connected between the outlet and by-pass fuel line prevents a reverse fuel flow to the nozzle from the by-pass line. Fuel is discharged from the nozzle at a fixed continuous rate and a continuous fixed flame is obtained. Changes in heat output is obtained by varying the volume of fuel discharged from the nozzle. This is accomplished indirectly by controlling the amount of fuel flowing through the by-pass fuel line through the action of the temperature selector valve.

Figure 4-8 • Fuel Atomizing Head



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4.39 Temperature Selector Valve

4.40 Manual adjustment of the temperature selector valves within the operating range (150°F to 280°F) applies motion through a pressure cone (see figure 4-4) to an inverted spring cup which forms the holder for the needle assembly. The resulting movement of the needle seat orifice gives a smooth, continuous regulation of fuel flow throughout the normal operating temperatures. A similar control of fuel is obtained by upward and downward movement of the diaphragm. The diaphragm is spring loaded to the point where a very slight additional upward pressure will result in further opening of the valve and increase the flow of fuel in the by-pass line. This additional pressure is supplied by the expansion of the thermostatic medium in the heat sensing element located in the discharge air stream. This pressure applied to the heat sensing element located in the discharge air stream. This pressure applied to the diaphragm balances the fuel flow to the selected temperature.

4.41 Adjustment of the valve for any discharge temperature results in an initial fuel discharge greater than needed to maintain the selected temperature. The resulting increased heat output of the combustor brings the heater up to the selected temperature rapidly. As the discharge temperature rises, the action of the temperature sensing element opens the valve further, increasing the fuel flow in the by-pass line, thereby decreasing the nozzle fuel discharge, consequently reducing the combustor heat output. The discharge air temperature overshoots the selected temperature, then cycles about this temperature until a stable condition is reached. Selecting a new temperature results in the same type of hunting action until stabilizing at the new temperature.

4.42 Damper Control

4.43 The damper control ***(see figure 4-5)*** controls a rotating damper at the discharge end of the heater. The control handwheel is mounted on the top of the casing. The damper control, attached to the damper, is secured by the handwheel. To move the damper control, loosen the handwheel. Moving the damper control as far as possible to the left (when facing discharge end) closes the damper reducing air volume without reducing the temperature. As the damper control is moved to the right, the damper opens, increasing the volume of discharge air leaving the heater. The air outlet cannot be completely closed, preventing accidental operation of the heater with no outlet for the air and possible damage from a heat buildup within the heater.

4.44 Discharge Air Temperature Gauge

4.45 The discharge air temperature gauge ***(see figure 4-4)*** is located in the control box. The temperature gauge is a dial-type instrument which indicates the actual temperature (+/- 10°F) of the discharge air in degrees Fahrenheit. A sensing element mounted in the discharge air outlet.

4.46 Fuel Gauge

4.47 The fuel gauge is mounted beneath the heat exchanger next to the fuel tank opening and cap. The fuel gauge is a needle-indicating type, direct reading gauge. Graduations on the gauge indicate “E” (empty), 1/4, 1/2, 3/4, and “F” (full).

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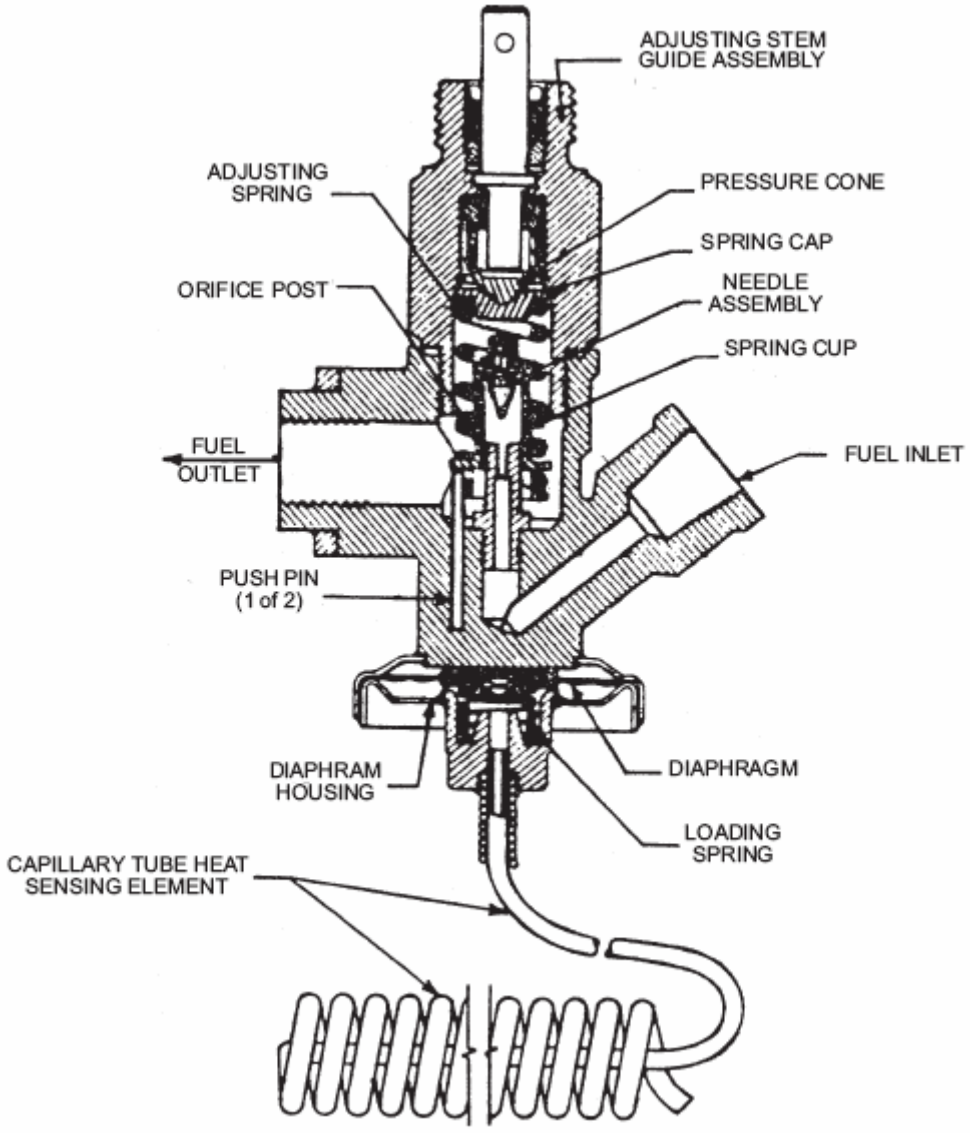
Figure 4-9 • Temperature Selector Valve

• • • • • • • • • • • • • • • • •



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4.48 Temperature Selector Indicator Knob

4.49 The temperature selector indicator knob (see figure 4-4) is mounted on the control panel next to the temperature selector valve knob. The approximate range of temperature selector valve is indicated by the pointer on the temperature selector indicator knob. When the temperature selector valve knob is rotated, a pinion on the shaft engages a gear on the temperature selector indicator knob shaft and rotates the knob in direct relationship to the temperature selector valve knob. The heat range is from "LOW" corresponding to a discharge air temperature of slightly below 150°F to "HIGH" corresponding to approximately 280°F. Each number represents approximately 25°F, with 150°F being close to number "1" on the fuel control panel.

4.50 Operation Under Normal Conditions

4.51 The instructions that follow are provided for personnel responsible for operation of the BT400-45 heater. The operator must know how to perform all of the operating procedures for which the hater is designed. Instructions are provided for starting and stopping the heater, heater operation, temperature regulation, and operation under unusual conditions.

WARNING!

Do not operate heater in explosive vapor area.

4.52 Preparation for Starting

4.53 Preparation for starting is accomplished as follows:

(a) Perform the required preventive maintenance services. (Refer to section 5)
(b) Open cabinet. Remove air outlet and exhaust stack covers.
(c) Remove fuel tank cap and ensure that the cap vent valve is set to "OPEN". Fill fuel tank with gasoline and install fuel tank cap.

NOTE!

For your safety, and to maximize the service life of your equipment, it is very important to take a few moments before you operate the engine to check its condition. Be sure to take care of any problems you find before you operate the engine. Before beginning your pre-operation checks, be sure the engine is level and the engine switch is in the "OFF" position.

WARNING!

Improperly maintaining this engine, or failing to correct a problem before operation, could cause a malfunction in which you could be seriously injurd. Always perform a pre-operation inspection before each operation, and correct any problem.

(d) Check the general condition of the engine.
1. Look around and underneath the engine for signs of oil or gasoline leaks.
2. Remove any excessive dirt or debris, especially around the muffler and recoil starter.
3. Look for signs of damage.
4. Check that all shields and covers are in place, and all nuts, bolts, and screws are tightened.

(e) Check the engine.
1. Check the engine oil level. Running the engine with a low oil level can cause engine damage.

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NOTE!

The oil alert system (applicable engine types) will automatically stop the engine before the oil level falls below safe limits. However, to avoid the inconvenience of an unexpected shutdown, always check the engine oil level before startup.

NOTE!

Check the equipment powered by this engine. Review the instructions provided for any precautions and procedures that should be followed before engine startup.

WARNING!

Carbon monoxide gas is toxic. Breathing it can cause unconsciousness and even kill you. Avoid any area or actions that expose you to carbon monoxide.

4.54 Starting Gasoline Engine

4.55 Start the gasoline engine as follows:

(a) Move the fuel valve lever to the "ON" position.

(c) Move the throttle lever away from the "SLOW" position, about 1/3 of the way toward the "FAST" position.

(d) Pump engine promer **(see figure 5-14)** to fill engine carburetor.

(e) Depress and lock engine primer.

!CAUTION!

Do not pull recoil starter so far that cable stops with a jerk. Do not allow cable and handle to snap back into place. Failure to comply may result in damage to recoil starter.

(f) Turn the engine switch to the "ON" position.

(g) Pull the starter grip lightly until you feel resistance, then pull briskly. Return the starter grip gently.

(h) ELECTRICAL STARTER (applicable types):
Turn the key to the START position, and hold it there until the engine starts.
If the engine fails to start within 5 seconds, release the key, and wait at least 10 seconds before operating the starter again.

NOTE!

Using the electric starter for more than 5 seconds at a time will overheat the starter motor and can damage it.

When the engine starts, release the key, allowing it to return to the ON position.

(i) If the choke lever has been moved to the CLOSED position to start the engine, gradually move it to the OPEN position as the engine warms up.

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(j) After engine is started. move throttle to the fast position, close cabinet and open air inlet door. Allow engine to warm up for 2-3 minutes.

4.56 Heater Operation

4.57 Start heater as follows:

(a) Set temperature selector valve knob ***(see figure 4-4)*** to "LOW". Start the heater combustor by depressing the burner fuel valve ***(see figure 4-4)***.

NOTE!

During initial operation of a new heater, white smoke may be observed coming from the exhaust stack. This will continue until the preservative compound is burned out.

NOTE

If combustion does not occur within 10 seconds, pull out burner fuel valve knob. Stop engine. Refer to table 5-3 to determine problem.

(b) Set the damper control ***(see figure 4-5)*** at full open position.

(c) Rotate temperature selector valve knob ***(see figure 4-5)*** until temperature selector indicator is set to the desired position. Each number represents approximately 25°F in the range from 150°F to 280°F with 150°F being close to the number "1".

(d) Regulate damper control for the desired volume of air.

4.58 Stopping

4.59 Heater Combustor

4.60 To stop combustor, pull up burner fuel valve knob ***(see figure 4-4)***.

!CAUTION!

Allow the gasoline engine to operate for two minutes after burner fuel valve is in "OFF" position or until temperature gauge reads 150°F.

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4.61 Gasoline Engine

4.62 To stop the gasoline engine under normal conditions, use the following procedure:

(a) Open access door.

NOTE!

To stop the engine in an emergency, simply turn the engine switch to the "OFF" position.

(b) Move the throttle lever to the "SLOW" position.
(c) Turn the engine switch to the "OFF" position.
(d) Turn the fuel valve lever to the "OFF" position.
(e) Perform the required preventative maintenance service. ***(Refer to section 5)***.
(f) Remove ducts and store on trailer.
(g) Close cabinet and install exhaust stack and air outlet covers.

4.63 Operation in Extreme Cold

4.64 General instructions for operation of the heater in extreme cold are as follows:

(a) Fill fuel tank daily to prevent condensation. Remove snow or ice from fuel tank cap and dispensing equipment before filling fuel tank.
(b) Use the proper lubricants as specified on lubrication chart ***(see figure 5-1)***.
(c) Check oil every five hours in operation above 0°F.
(d) Check oil every three hours in operations below 0°F.
(e) Change oil every 100 hours in operation.
(f) Operate heater a short time each day to prevent water from settling in heater controls.
(g) Cover heater with tarpaulin to protect it from the weather when not in use.
(h) Park heater in a sheltered spot out of the wind, or park indoors, if possible. For long shutdown periods, park on high dry ground or concrete. If ground is wet or thawing is imminent, park trailer on planks to prevent wheels from freezing in place.
(i) Clean all parts of heater of snow, ice, and mud as soon as possible after operation.

4.65 Operation in Dusty or Sandy Areas

4.66 General instructions for operation in dusty or sandy areas are as follows:

(a) Locate heater in an area free of sand, dust, or loose earth, if possible.
(b) Before operating, if water is available, wet the surrounding area with water to keep down the accumulation of dust.
(c) Take all necessary precautions to prevent dust or sand from entering the fuel tank while filling.
(d) Perform more frequent inspections and lubrication. Wipe off all excess lubricant.
(e) Remove accumulations of sand and dirt at frequent intervals.
(f) When not in operation, close air inlet door ***(see figure 2-2)*** and control box cover ***(see figure 4-4)*** and install exhaust stack and air outlet cover ***(see figure 2-2)***. Cover tarpaulin.

4.67 Operation in Salt Water and High Humidity Areas

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4.68 General instructions for operation in salt water and high humidity areas are as follows:

(a) Wipe all accessible exposed areas frequently.
(b) Coat all exposed machined surfaces with oil.
(c) Keep fuel tank cap tightly closed.
(d) Keep electrical connections dry.
(e) Grows of fungus is the major cause of failure in humid climates. Take every precaution to keep the equipment dry, and well ventilated. Replace any part attacked by fungus.

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Section 5 • Maintenance Instructions

• • • • • • • • • • • • • • • •

5.1 General

5.2 Scope

5.3 This section contains instructions for maintaining BT400-45. If performed on a regular basis, will insure proper operation and extend the life of the heater.

5.4 Cleaning

5.5 For access to the heater components for cleaning, proceed as follows:

(a) Open hood.

! Warning !

Compressed air used for cleaning will not exceed 30 psi and then only with approved personnel protective equipment such as safety goggles of face shield.

(b) Brush dirt and dust from the components with a soft bristle brush. Blow dirt and dust away using dry compressed air.

(c) With hood and access doors closed tightly, wash heater using a scrub brush to apply a solution of car wash detergent, or equal, in warm water. Remove the detergent solution with water dispensed from a garden hose. Avoid spraying water directly into the air flow outlet.

5.6 Flexible Ducts

5.7 Wash ducts with soap or detergent and water. Dry with a soft cloth. Ensure ducts are thoroughly dry before putting duct away.

5.8 Lubricating

5.9 Lubrication of the BT400-45 heater consists of greasing the wheel bearings, and changind the oil in the gasoline engine. Lubrication points, types of lubrication intervals for the heater are shown on ***figure 5-1***. The following information supplements that which is given in the lubrication chart**.**

5.10 Wheel Bearings

5.11 Lubrication of the whell bearings is accomplished as follows:

(a) Jack up trailer until tire is clear of surface. Block wheel to prevent movement.
(b) Remove grease cap form hub assembly.
(c) Remove cotter pin, nut and keyed washer from axle assembly.
(d) Pull wheel assembly out to loosen outer bearing cone and rollers from axle and remove bearing cone.
(e) Remove wheel and hub from axle.
(f) Remove inner bearing cone and rollers and seal from hub assembly.
(g) Clean all grease from hub and bearing cones with drycleaning solvent. Dry thoroughly.
(h) Inspect the bearing cones and cups for pitting, chipping, and broken rollers. Replace damaged bearings.
(i) First coat the bearing coat and rollers with lubricating oil and then pack with wheel bearing grease.
(j) Install seal and inner bearing cone and rollers in wheel assembly.
(k) Carefully install wheel and hub on axle. Do not damage inner bearing cone or seal when installing wheel.
(l) Install outer bearing cone and rollers over axle and into cup inside hub assembly.

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Figure 5-1

LUBRICATION CHART

HEATER, DUCT TYPE, PORTABLE: GASOLINE; 400,000 BTU/HR;
GASOLINE ENGINE DRIVEN BLOWER
(AMERICAN AIR FILTER CO., INC. MODEL BT400-45)

Intervals are based on normal operations. Reduce to compensate for abnormal and severe conditions. During inactive periods sufficient lubrication must be performed for adequate preservation.

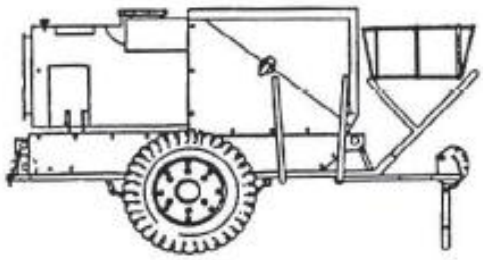
Clean fittings before lubricating.

Relubricate after washing or fording.

Dotted circle indicates drain.

Clean parts with SOLVENT, dry-cleaning, or with OIL, fuel, Diesel. Dry before lubricating.

LUBRICANT • INTERVAL



Wheel Bearings (Remove wheel, clean, inspect and lubricate bearings and reassemble.) GAA 1000

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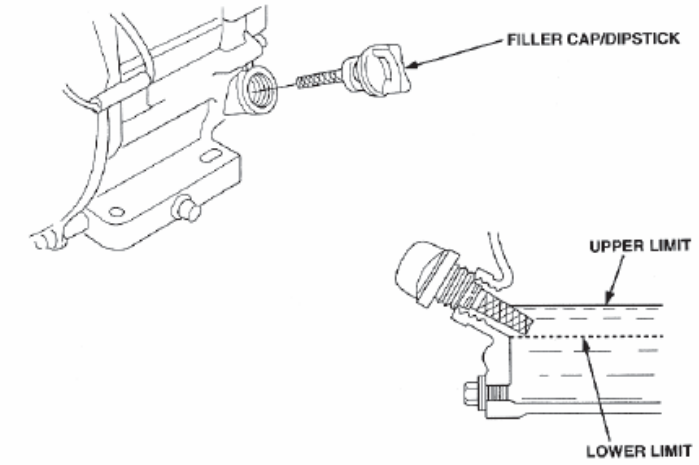
5.12 Engine Oil Level Check

5.13 Check the engine oil level with the engine stopped and in a level position.

(a) Remove the filter cap/dipstick and wipe it clean.
(b) Insert and remove the dipstick without screwing it into the filter neck. Check the oil level shown on the dipstick.
(c) If the oil level is low, fill to the edge of the oil filler hole with the recommended oil.
(d) Screw in the filler cap/dipstick securely.

Figure 5-2



NOTE

Running the engine with a low oil level can cause engine damage.
The Oil Alert system will automatically stop the engine before the oil level falls below safe limits However, to avoid the inconvenience of an unexpected shutdown, always check the engine oil level before startup.

5.14 Engine Oil Change

5.15 Drain the used oil while the engine is warm. Warm oil drains quickly and completely.

(a) Place a suitable container below the engine to catch the used oil, then remove the filler cap/dipstick and the drain plug.
(b) Allow the used oil to drain completely, then reinstall the drain plug, and tighten it securely.
(c) Please dispose of used motor oil in a manner that is compatible with the environment. We suggest you take used oil in a sealed container to your local recycling center or service station for reclamation. Do not throw it in the trash, pour it on the ground, or down a drain.

Section 5

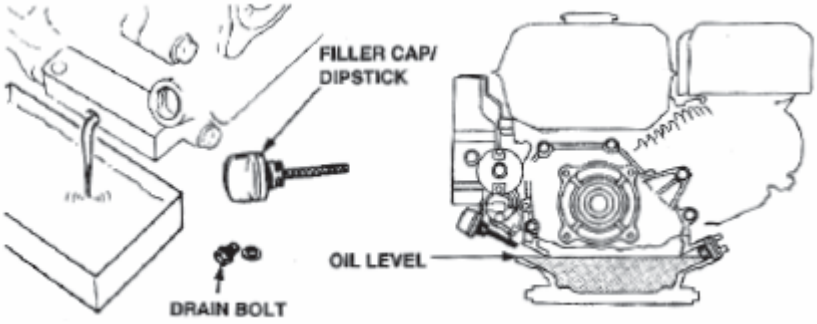
(d) With the engine in a level position, fill to the outer edge of the oil filler hole with the recommended oil. the recommended oil.

Engine oil capacity: 0.63 US qt (0.6 *l*)

(e) Screw in the filler cap/dipstick securely.

Figure 5-3

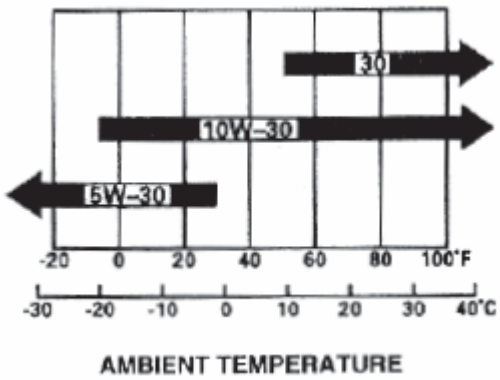
Screw in the filler cap/dipstick securely.



5.16 Engine Oil Recomendations

5.17 Oil is a major factor affecting performance and service life. Use 4-stroke automotive detergent oil. SAE 10W-30 is recommended for general use. Other viscosities shown in the chart may be used when the average temperature in your area is within the recommended range. The SAE oil viscosity and service classification are in the API label of the oil container. Honda recommends that you use API SERVICE category SF or SG oil.

Table 5-1



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5.18 Preventive Maintenance

5.19 The preventive maintenance checks for the BT400-45 heater are contained in ***table 5-2***. The intervals indicated are minimum requirements under normal operating conditions. If you operate your heater under unusual conditions, consult AEROTECH HERMAN NELSON INC. for recommendations applicable to your individual needs.

Table 5-2 • Inspection checks

COMPONENT	INSPECTION, CHECK OR SERVICE	INTERVAL
Heater unit	**Visually inspect for loose or missing hardware.**	**DAILY**
Air ducts	**Visually inspect for damage or wear. Replace as necessary.**	**DAILY**
Engine Crankcase	**Check oil level, add oil if necessary.**	**DAILY**
Engine Air Filter	**Check for dirt. Clean if necessary.**	**DAILY**
Tires	**Check for abnormal or uneven wear, cuts and embedded foreign material. Check for proper air pressure.**	**DAILY**
Controls & Instruments	**Visually inspect for damage. Replace if necessary.**	**DAILY**
Fuel Cap & Gauge	**Visually inspect for damage. Replace if necessary. Insure valve in cap is in the open position.**	**DAILY**
Exhaust system	**Inspect for secure mounting, cracks or dents. Inspect exhaust stack and extensions for damage. Check screen for damage. Clean or replace as necessary.**	**WEEKLY**
Fuel System	**Inspect for kinks, breaks, and loose connections. Tighten or replace as required.**	**WEEKLY**
Fan, Mounting Ring & Pulley	**Inspect for security, cracks, or other damage. Check for vibration during operation. Inspect flexible rubber sleeve for cracks, broken teeth or deterioration. Repair or replace defective parts.**	**MONTHLY**
V-belt	**Check for proper adjustment. Inspect for wear, fraying and stretching. Replace if necessary.**	**MONTHLY**
Engine Crackcase	**Change oil. Refer to *paragraph 5-14.***	**MONTHLY**
Fuel Filter	**Replace Filter**	**3 MONTH**
Fuel Pump	**Clean fuel pump strainer. Check pump for proper operation. Refer to *fuel pump, paragraph 5-111*.**	**3 MONTH**
Ignition System	**Check system for loose or bad connections, broken insulators, kinks, or breaks in shielding. Check point gap. Refer to *ignition system, paragraph 5.80*.**	**6 MONTH**
Heat Exchanger	**Inspect for carbon deposits or other defects. Clean or replace as necessary. Refer to *heat exchanger, paragraph 5-70*.**	**6 MONTH**
Ventilating Air	**Perform carbon monoxide test. Refer to *paragraph 5-75*.**	**6 MONTH**

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Section 5

5.20 Troubleshooting

5.21 Table 5-3 provides information useful in diagnosing unsatisfactory operation or failure of the BT400-45 heater and its components. Each trouble symptom stated is followed by a list of probable causes of the trouble. The possible remedy recommended is described opposite the probable cause.

Table 5-2 • Inspection checks

	TROUBLE	PROBABLE CAUSE	REMEDY
1	Engine will not start	1. Fuel valve OFF	Move lever to ON.
		2. Choke OPEN.	Move lever to CLOSED.
		3. Engine switch OFF.	Turn engine switch to ON.
		4. Insufficient fuel supply.	Re-fuel.
		5. Faculty spark plug.	Clean, gap, or replace spark plug.
2	Engine turns over but fails to start or starts then stops	1. Insufficient fuel supply.	Fill tank with appropriate fuel.
		2. Clogged filter.	Replace filter.
		3. Fuel return check valve dirty.	Clean or replace check valve.
		4. Faulty fuel pump.	Check fuel pump ***paragraph 5.99***.
		5. V-belt slipping	Adjust v-belt.
		6. Engine fault	Refer to engine supplement
3	Engine stops suddenly	1. Fuel tank empty.	Fill fuel tank with appropriate fuel
		2. Contaminated fuel.	Drain and flush tank. Refill and replace fuel filter
		3. Incorrect fuel supply.	Drain and flush tank. Fill with appropriate fuel.
4	Burner fails to ignite	1. Insufficient fuel supply.	***Refer to trouble 2 probable causes 2 and 3***.
		2. Defective fuel pump.	Check fuel pump ***paragraph 5.99***
		3. Fuel pump pulley slipping.	Tighten set screen on pulley.
		4. Defective burner control valve.	Replace burner control valve.
		5. Defective coil.	Replace with serviceable coil.
		6. Defective ignition cable.	Replace cable.
		7. Defective igniter plug.	Adjust igniter plug ***paragraph 5.97*** or replace.
		8. Fuel nozzle dirty or defective.	Clean nozzle or replace.
5	Burner ignites by itself	1. Defective burner control valve.	Replace burner control valve

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Section 5 • Troubleshooting Cont'd

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	TROUBLE	PROBABLE CAUSE	REMEDY
6	Excessive smoke emitted from exhaust	1. Air flow restricted	Remove restriction.
		2. Engine operating below normal speed.	Check engine speed.
		3. Incorrect nozzle spray pattern.	Clean or replace nozzle.
		4. Carbon buildup in exhaust system.	Clean exhaust system.
		5. Excessive fuel pressure.	Adjust pump pressure (see paragraph 5.99).
7	Combustor flame cuts out	1. Insufficient air supply.	Refer to trouble 2 probable causes 2 and 3.
		2. Discharge air restricted.	Remove restriction.
		3. Burner control valve sensor element improperly positioned in air stream.	Adjust sensor element to correct position.
		4. Defective burner control valve.	Replace valve.
		5. Defective temperature selector valve.	Replace valve.
		6. Clogged nozzle.	Clean or replace.
8	Combustor flame fails to go out or unit overheats	1. Defective burner control valve.	Replace valve.
		2. Defective temperature selector valve.	Replace valve.
9	Maximum heat output not obtainable	1. Fuel system leak.	Inspect fuel lines, tighten loose connections. Replace damaged fuel lines.
		2. Defective fuel pump.	Check pump (paragraph 5.100).
		3. Clogged fuel filter.	Inspect and replace filter.
		4. Defective temperature selector valve.	Replace valve.
		5. Heat exchanger clogged.	Clean heat exchanger.
10	After burning in combustion chamber	1. Nozzle check valve being held open by contaminant.	Clean or replace valve.
		2. Defective nozzle.	Clean or replace nozzle.
		3. Fuel leak in nozzle holder or fuel line at nozzle holder.	Tighten or replace fuel lines.

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Section 5

5.25 Air Cleaning Service

5.26 A dirty air filter will restrict air flow to the carburetor, reducing engine performance. If you operate the engine in very dusty areas, clean the air filter more often than specified in the MAINTENANCE SCHEDULE.

NOTE

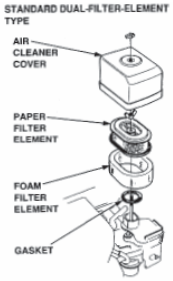
Operating the engine without an air filter, or with a damaged air filter, will allow dirt to enter the engine, causing rapid engine wear. This type of damage is not covered by the Distributor's Limited Warranty.

5.27 Dual-Filter-Element Types

(a) Remove the wing nut from the air cleaner cover, and remove the cover.
(b) Remove the wing nut from the air filter, and remove the filter.
(c) Remove the foam filter from the paper filter.
(d) Inspect both air filter elements, and replace them if they are damaged. Always replace the paper air filter element at the scheduled interval.
(e) Clean the air filter elements if they are to be reused.
1. Paper air filter element: Tap the filter element several times on a hard surface to remove dirt, or blow compressed air [not exceeding 30 psi (207 kPa, 2.1 kg/cm²)] through the filter element from the inside. Never try to brush off dirt; brushing will force dirt into the fibers.
2. Foam air filter element: Clean in warm soapy water, rinse, and allow to dry thoroughly. Or clean in nonflammable solvent and allow to dry. Dip the filter element in clean engine oil, then squeeze out all excess oil. The engine will smoke when started if too much oil is left in the foam.

(f) Wipe dirt from the inside of the air cleaner base and cover, using a moist rag. Be careful to prevent dirt from entering the air duct that leads to the carburetor.
(g) Place the foam air filter element over the paper element, and reinstalled the assembled air filter. Be sure the gasket is in place beneath the air filter. Tighten the air filter wing nut securely.
(h) Install the air cleaner cover, and tighten the cover wing nut securely.

Figure 5-4



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Section 5

5.28 Prime mover

5.29 Remove the gasoline engine power unit as follows:

(a) Open heater cabinet.
(b) Remove three thumb screws securing gasoline engine to resilient mounts.
(c) Disconnect engine fuel line quick disconnect coupling.
(d) Remove gasoline engine with attached mounting brackets from heater.

5.30 Drive Coupling

5.31 Removal and repair of the drive coupling is described as follows.

5.32 Removal

(a) Remove drive coupling from crankshaft, using a suitable puller.
(b) Remove tapered bushing from drive coupling.

5.33 Cleaning, Inspection and Repair

(a) Clean all parts using drycleaning solvent and dry thoroughly.
(b) Check drive coupling for cracks and damaged teeth.
(c) Inspect tapered bushing for cracks and distortion.
(d) Replace all damaged parts.

5.34 Installation

(a) Install tapered bushing into drive coupling.
(b) Place key into engine crankshaft.
(c) Install assembled bushing and coupling onto engine crankshaft.

5.35 Brackets

5.36 Repair of the gasoline engine mounting brackets is described in paragraphs that follow.

5.37 Removal

(a) Remove drive coupling.
(b) Remove four nuts, washers, lockwashers and bolts securing mounting bracket to gasoline engine.
(c) Remove four bolts, washers and lockwashers securing front mounting bracket to gasoline engine.

5.38 Cleaning, Inspection and Repair

(a) Remove brackets using drycleaning solvent and dry thoroughly.
(b) Inspect brackets for cracks, bend, distorted screw holes, rust, and other damage.
(c) Weld cracks and straighten bent bracket. Paint exposed metal surfaces.
(d) Replace all damaged parts.

5.39 Installation

5.40 Installation is the reverse of removal

Section 5

5.41 Engine Installation

5.42 Install the gasoline engine by reversing the procedures of ***paragraphs 5.29***.

5.43 Heat Generator Air System

5.44 Part of the air forced into the heater by the fan passes into the combustor where it is mixed with atomized fuel from the nozzle forming a combustible fuel-air mixture. This mixture is ignited and bums to heat the exchanger. The major portion of the air entering the casing travels through longitudal passages within and around the heat exchanger. As the air passes through, it is heated by combustion gases which are forced through adjoining passages. A damper arrangement at the discharge end of the heat exchanger permits regulation of the heated air volume.

5.45 V-Belt

5.46 The v-belt encircles the driven coupling, and fuel pump pulley and magneto pulley.

5.47 Adjustment

5.48 Adjust the v-belt as follows:

(a) Open cabinet.
(b) Loosen two screws securing the fuel pump to the fuel pump mounting bracket.

NOTE
Do not overtighten v-belt.

(c) Move the fuel pump to the left to tighten v-bolt or to the right to place slack in the belt. The enlogated mounting slots in the bracket allow movement of the fuel pump.
(d) Check belt tension. Depress the v-belt between drive sheave and fuel .
(e) Tighten fuel pump mounting screws to secure adjustment.
(f) Install cabinet and secure latches.

5.49 Removal

5.50 Remove the v-belt ***(see figure 5-9)*** as follows:

(a) Remove gasoline engine. (***Refer to paragraph 5.29***)
(b) Remove v-belt from fuel pump pulley, then remove from magneto and fan drive coupling sheave.

5.51 Cleaning, Inspection and Repair

5.52 Clean v-belt with a clean, damp cloth. Check v-belt for wear, fraying, and stretching. Replace v-belt if worn, frayed or stretched.

5.53 Installation

5.54 Install the v-belt as follows:

(a) Install v-belt over the three sheaves by reversing removal procedure (***see paragraph 5.50***)
(b) Check v-belt tension, and adjust if necessary (***see paragraph 5.48***).
(c) Install gasoline engine by performing the procedures of ***paragraph 5.29in*** reverse order.

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Figure 5-5 • V-Belt & Fuel Pump Adjustment

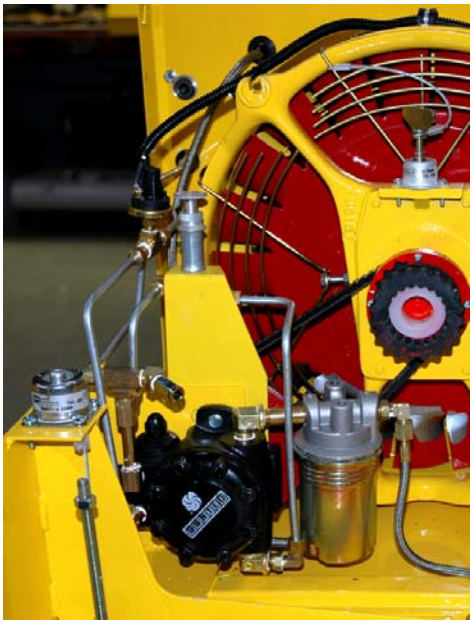
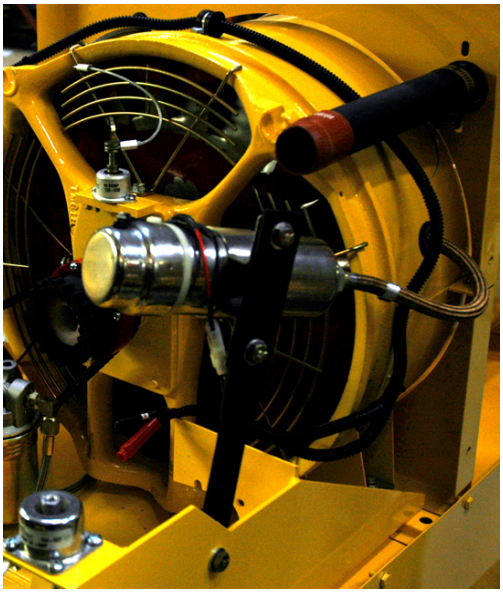


Figure 5-6 • Fan Mounting Ring – Removal Points



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Section 5

5.55 Vaneaxial Fan and Mounting Ring

5.56 The fan supplies all air necessary for heater operation. A cast aluminum mounting ring supports the fan and associated parts. Power for the fan is transmitted by a flexible rubber coupling sleeve (**see figure 5-10**) which mates with a drive coupling on the power unit and a driven coupling which is pressed on the fan bearing shaft. The fan hub is fastened to the fan and is pressed on the fan bearing shaft.

5.57 Removal

5.58 Remove the vaneaxial fan and mounting ring as follows:

(a) Remove the gasoline engine. (***Refer to paragraph 5.29***)
(b) Remove v-belt (***see figure 5-10***) from fan and bearing support assembly from heater.
(c) Remove mounting ring with attached fan and bearing support assembly from heater.
(d) Remove screws, self-locking nuts, and lockwashers and remove air straightening vane from mounting ring.
(e) Remove three screws and lockwashers and remove fan from fan hub.
(f) If guards, thumb screw or attaching parts are damaged, remove (as necessary) three screws, lockwashers, two nuts, two lockwashers, and remove three guards from mounting ring. Remove thumb screws.
(g) Remove four screws and lockwashers and remove bearing support from mounting ring.
(h) Remove four screws and lockwashers and remove two retainers. Remove flexible rubber coupling sleeve from driven coupling.
(i) Unless fan shaft bearing is to be replaced, proceed to ***paragraph 5.59***.

NOTE

Do not perform steps (j) through (m) unless fan shaft bearing is to be replaced. The removal procedure is destructive to the bearing

(j) Remove fan hub from fan shaft bearing, using a suitable puller.
(k) Remove driven coupling from fan shaft bearing, using a suitable puller.
(l) If resilient mount is to be replaced, remove two screws and remove resilient mount from bearing support.
(m) Remove fan shaft bearing from bearing support.

5.59 Cleaning, Inspection and Repair

5.60 Cleaning, inspection and repair are accomplished as follows:

(a) Clean all parts, except flexible rubber coupling sleeve using drycleaning solvent and dry thoroughly.
(b) Inspect fan for cracks or broken blades, distortion and other damage. Replace a damaged fan.
(c) Inspect fan hub for cracks and distortion. Replace a damaged hub.
(d) Inspect mounting ring for breaks, cracks, and other damage. Replace the mounting ring if it is damaged.
(e) Inspect air straightening vane for cracks or bent conditions. Replace if vanes are damaged.
(f) Inspect drive coupling for cracks and damaged teeth. Replace damaged coupling.
(g) Inspect flexible rubber sleeve coupling for broken teeth, distortion, deterioration, and cracks. Replace damaged coupling or insert.
(h) Inspect resilient mount for damage and hardening of cushion. Replace damaged or hardened resilient mount.

Section 5

5.61 Installation

5.62 Install the vaneaxial fan and mounting ring as follows:

NOTE

Perform steps (a) and (b) only if fan shaft bearing is being replaced; otherwise proceed to step (c).

(a) Press fan shaft bearing into fan bearing support. Do not involve shaft in any way. Support fan bearing support with ring fixture on closed lip end carefully press outer shell of bearing into position. Do not bottom outer bearing shell against lip end of bore.
(b) Press driven coupling and fan hub on shaft of fan shaft bearing.
(c) Position bearing support on mounting ring and secure with four screws and lockwashers.
(d) Install fan on hub and secure with three screws and lockwashers.
(e) Install air straightening vane with associated fastening hardware.
(f) Install fan and bearing support assembly reversing procedure of ***paragraph 5.58***.
(g) Position resilient mount on bearing support and secure with two screws. Install three guards and secure with three screws, three lockwashers, two lockwashers and two nuts.
(h) Install sleeve bushing in flexible rubber coupling sleeve and place flexible rubber coupling sleeve in driven coupling. Install two retainers and secure with four screws and lockwashers.
(i) Install mounting ring, with attached parts in casing and secure with three screws and lockwashers.
(j) Install gasoline engine by performing the procedures of ***paragraph 5.59*** in reverse order.

5.63 Heat Exchanger Assembly

5.64 Removal

5.65 To remove the heat exchanger assembly, proceed as follows:

(a) Remove hood assembly by removing the 16 bolts and washers that secure hood to heater. Remove capillary tube cover. Lift hood from heater.
(b) Remove the 4 bolts from mounting brackets of heat exchanger assembly.
(c) Remove clamps from flexible exhaust hose and remove hose.
(d) Remove v-belt by slipping belt from pulleys.
(e) Remove duct adapter at rear of heat exchanger assembly. Remove sensing elements.
(f) Remove heat exchanger assembly from trailer assembly.

5.66 Installation

5.67 To install heat exchanger assembly, proceed as follows:

(a) Place heat exchanger on trailer assembly and align with engine. Using shims under heat exchanger mounting brackets may be required to obtain proper alignment. Maximum parallel misalignment is 0.015 inches. Maximum angular misalignment is 0.056 inches.
(b) Tighten the 4 mounting bolts.
(c) Install sensing element in discharge air stream and install duct adapter.
(d) Install v-belt. Ensure proper belt tension.
(e) Install capillary tube cover. Lift hood heater and install the 16 bolts.

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5.68 Heat Exchanger

5.69 Removal

5.70 To remove the heat exchanger, proceed as follows:

(a) Remove heat exchanger assembly following procedures listed in ***paragraph 5.65***.
(b) Remove fun and mounting ring assembly following procedures listed in. ***paragraph 5.58***.
(c) Disengage clamp from notches in combustion chamber. Remove nozzle holder and combustor plate.
(d) Remove fuel lines from nozzle holder.
(e) Remove ignition cable from igniter plug.
(f) Remove exhaust stack and cover by removing the 12 screws and washers. Remove gasket.
(g) Remove heat exchanger from heat exchanger housing by pulling the heat exchanger from the front of housing.

5.71 Clean, Inspection and Repair

5.72 Cleaning, inspection and repair are accomplished as follows:

(a) Clean heat exchanger using HOTSY DETERGENT CARBON-ATE. Use full strength.
(b) Inspect for cracks, distortion and other damage. Replace damaged heat exchanger.

5.73 Installation

5.74 To assemble the heat exchanger, reverse the removal procedures.

5.75 Carbon Monoxide Test

5.76 To check the heaters' ventilating air stream for carbon monoxide contamination, proceed as follows:

NOTE

On units that are used on a seasonal basis, this test shall be preformed prior to the unit being put into service. A second test will be required if the heating season is longer than six month. Additional tests shall be preformed any time contamination is suspected or if maintenance has bee preformed on exhaust system.

(a) Attach one twelve inch duct to heater. Attach a duct adapter to the twelve inch duct and attach three six inch duct to adapter, ***see figure 2-5***. Ensure there is no kinks in ducts.
(b) Start heater using proper start procedures (***paragraph 4.45***). Rotate temperature selector valve to obtain a discharge temperature of 250°F.
(c) Using a carbon monoxide tester, measure the carbon monoxide level at one of the six inch ducts. The carbon monoxide level will not exceed 35 PPM.

5.77 Heater Ignition System

5.78 A sparking type igniter plug within the combustor ignites the atomized fuel. The flame, once established, is self-sustaining and ignition would normally be required only when the burner is started. As a safety precaution, constant spark ignition is provided to ensure re-ignition in the event of a momentary interruption of fuel flow. Components of ignition system are the coil, ignition cable, and igniter plug.

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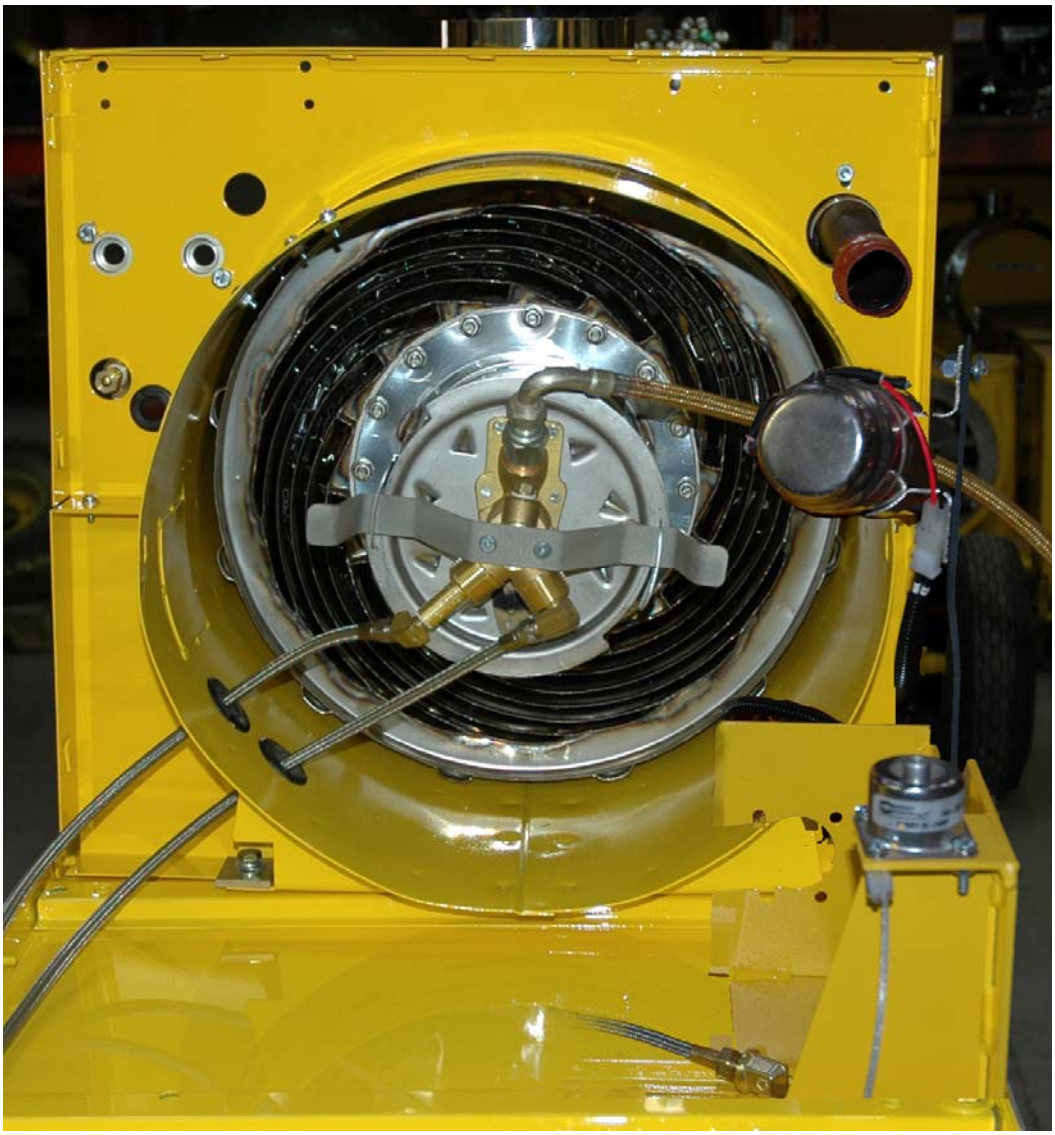
Figure 5-7 • Heater Ignition System Components



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5.79 Coil

5.80 The coil is mounted on a bracket installed opposite the fuel pump.

5.81 Ignition cable and igniter plug

5.82 The igniter plug produces the spark necessary for fuel ignition within the combustor. Electrical current flows from the coil to the igniter plug through the ignition cable.

5.83 Removal

5.84 Remove the ignition cable and igniter plug as follows:

(a) Remove vaneaxial fan and mounting ring. (***Refer to paragraph 5.60.)***
(b) Disconnect the ignition cable from igniter plug and coil.
(c) Remove grommet from casing and remove ignition cable.
(d) Remove igniter plug from combustor back plate.
(e) Disengage combustor clamp from notches in combustor. Remove clamp and nozzle holder from combustor back plate and remove plate**.**

5.85 Cleaning and Inspection

5.86 Cleaning and inspection are accomplished as follows:

(a) Clean the igniter plug and ignition cable with a cloth dampened in drycleaning solvent and dry thoroughly
(b) Inspect igniter plug for burning or pitting, cracks, or other damage. Clean the points with fine emery cloth and polish with crocus cloth. Replace a cracked or damaged igniter plug.
(c) Inspect ignition cable for breaks, damaged threads, or frayed or broken insulation. Replace damaged ignition cable.

5.87 Installation

5.88 Install igniter plug and ignition cable as follows:

(a) Install igniter plug in combustor back plate. Measure the point gap. The gap should be 1/8 to 3/16 inch. Bend electrode on combustor plate to obtain correct gap.

NOTE

Do not bend igniter plug electrode.

(b) Install combustor back plate on combustor. Insert nozzle holder with clamp attached in bore of plate. Install combustor clamp in notches on combustor to secure nozzle.
(c) Insert ignition cable through hole in casing, and secure grommet around cable. Connect ignition cable to igniter plug and magneto.
(d) Install the vaneaxial fan and mounting ring. (***Refer to paragraph 5.60.***)

5.89 Heater Fuel System

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5.90 The heater fuel system consists of a fuel tank mounted in the base, fuel filter, tube assemblies, hose assemblies, fuel pump, fuel control box, and combustor. The fuel pump draws fuel from the fuel tank, through the fuel filter, and delivers it under constant high pressure to the variable discharge fuel nozzle in the combustor. Unused fuel is bypassed at the pump and the nozzle and returned to the fuel tank.

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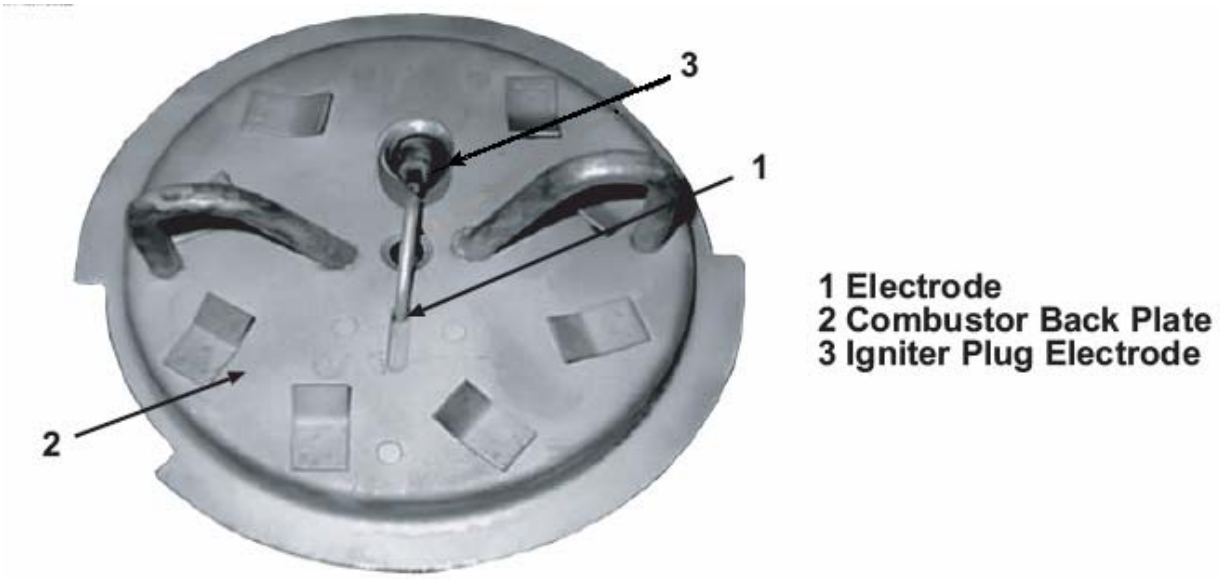
Figure 5-8 • Igniter Plug Adjustment Points



Section 5

5.91 Fuel Pump

5.92 The fuel pump is mounted on a bracket opposite the coil. The pump is belt driven by the power unit A flexible hose assembly delivers fuel, through the fuel filter, to the fuel pump. During the heating cycle, fuel travels from the pump to the nozzle and secondary bypass line. Bypass fuel is returned to the fuel tank from the nozzle and secondary bypass line.

5.93 Pressure Test and Adjustment

5.94 Pressure testing and adjustment should be performed as follows:

(a) Remove internal flare plug at burner control valve and replace with 1/4 inch internal flare tube connection with attached pressure gauge and needle valve. (***See figure 5-15***) Ensure that needle valve is closed.

(b) Start engine and allow to warm up. During warmup, observe pressure gauge; normal reading will be about 20 psi due to flow resistance in fuel piping system.

(c) Depress burner fuel valve. Test gauge should immediately show operating fuel pressure. If burner fires normally, adjust temperature selector valve knob to obtain an output of 250°F with damper control in fully open position.

(d) Check fuel pressure gauge. If pressure is not within 150 (+/-2) psig, adiust pump pressure to secure proper reading. Adjustment is performed by removing nut and turning adjustment screw clockwise to increase pressure, or counter-clockwise to decrease pressure.

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Figure 5-9 • Fuel Pump and Associated Fuel System Components

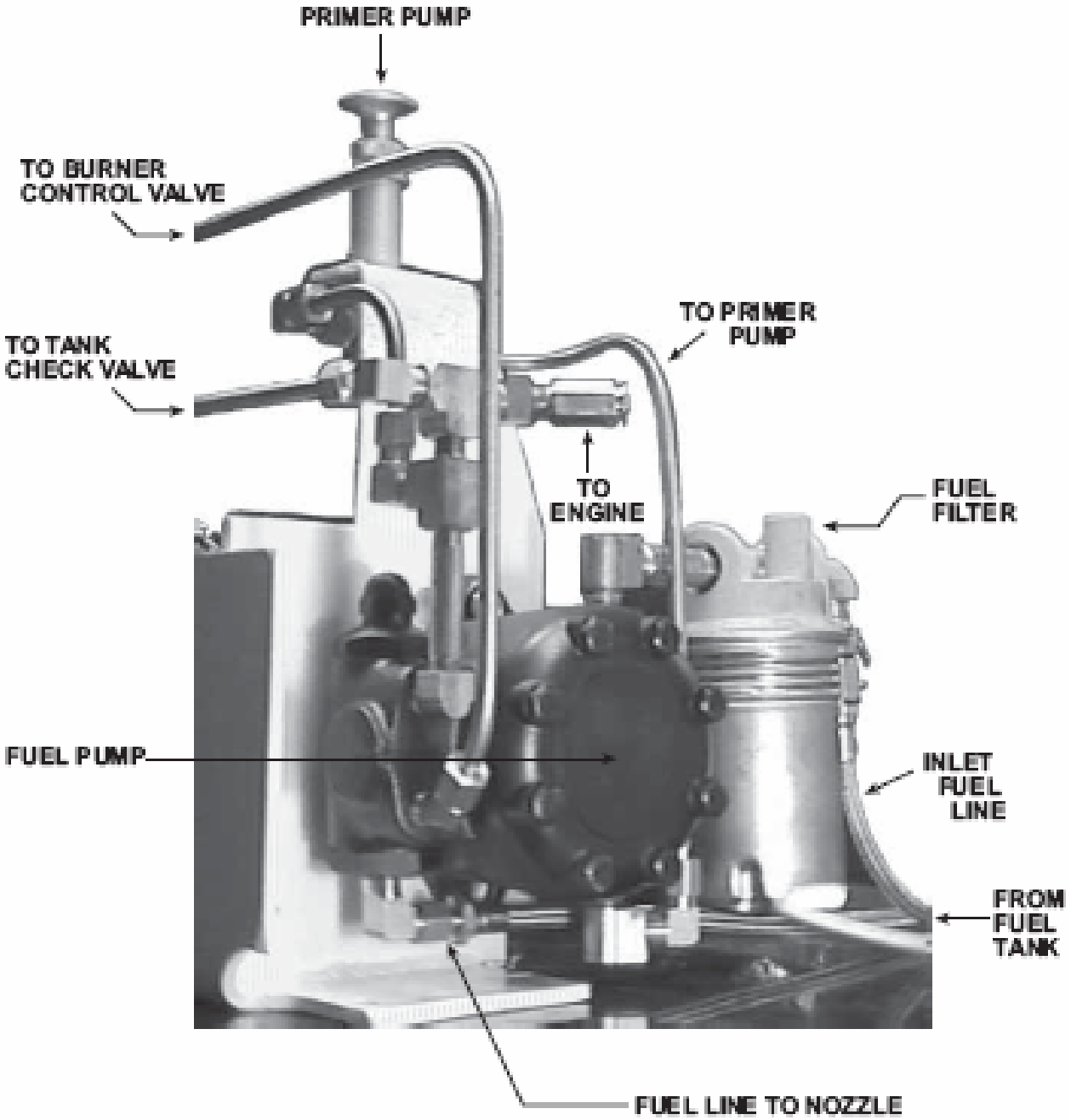

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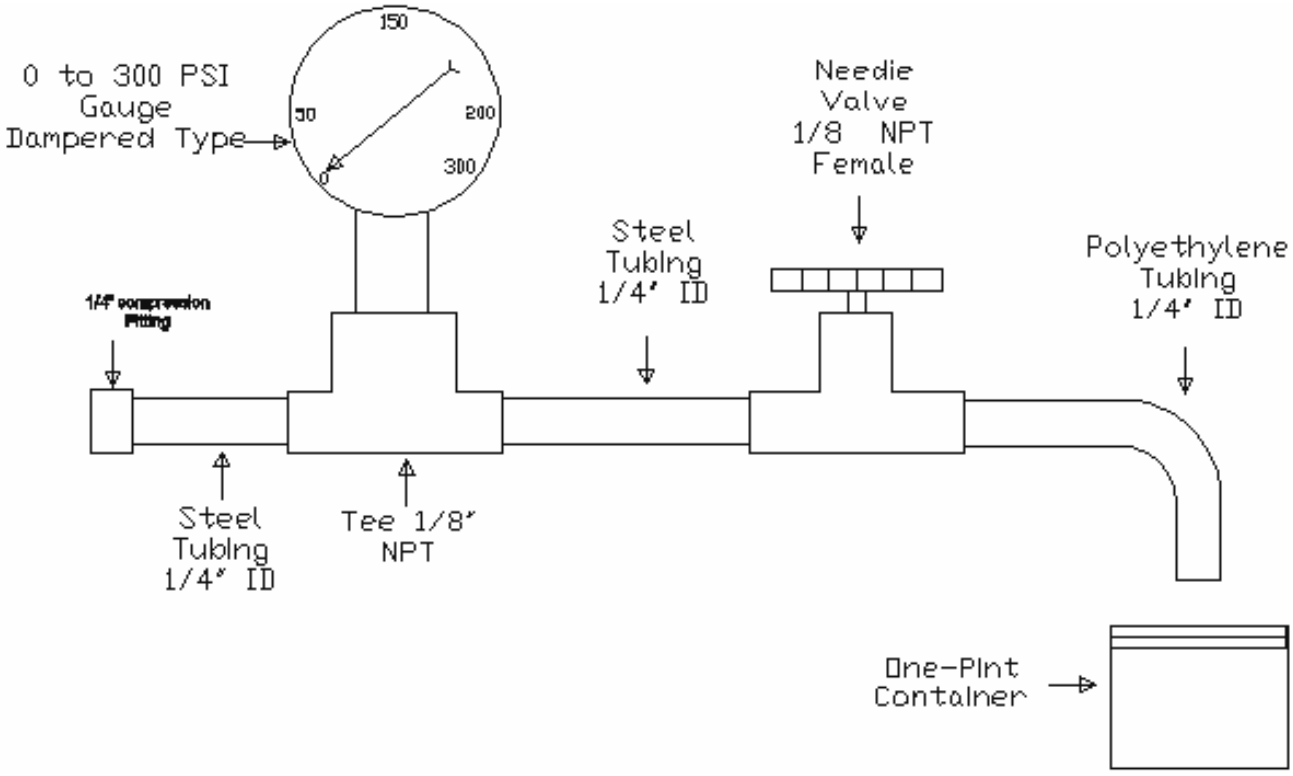
Figure 5-10 • Pump Pressure Testing Assembly



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5.95 Flow Test

5.96 To check fuel flow of pump proceed as follows:

(a) With heater set up as in pressure test ***paragraph 5.101***.

(b) With heater maintaining a steady output of 250°F, damper in fully open position, and fuel pressure at 150 (+/- 2) psig, open needle valve slightly and catch bleed-of fuel in pint container.

(c) Open needle valve slowly until pressure drops to 140 psig. If burner stays on and operates normally, observe the time it takes to fill the pint container with bleed-off fuel, maintaining the fuel pressure at 140 psig. If the pint container fillsCatch bleed-off fuel in a container with one pint marked. The burner should stay on and operate normally. Observe the time it takes to fill one pint while maintaining the fuel pressure at 140 psi. If the pint container fills in 1-1/2 minutes or less, the pump has adequate reserve capacity. If it takes up to 2 minutes to fill pint container, the pump has lost some capacity but is still serviceable. If the time taken to fill the pint container is more than 2 but no more than 2-1/2 minutes, remove the fuel pump for a bench check. If the time is more than 2-1/2 minutes, replace the pump.

(d) If burner operates normally but pressure drops quickly when cracking needle valve, check for air leaks on pump inlet side.

5.97 Fuel Pump Air Leak Test

5.98 To check for air leaks, proceed as follows:

NOTE

Since the fuel flow on purge is about twice the fuel flow of a pressurized pump, test for air leak with the heater combustor not fired

(a) Remove plug on fuel control mounting block and install toggle valve ***(see figure 5-16)***.

(b) Start engine following proper start procedures. Do not engage burner control valve.

NOTE

Limit the time toggle valve is open to 30 seconds or less as fuel supply to engine is removed when toggle valve is open

(c) Open toggle valve and allow a 2 inch depth of fuel to collect in container. Submerge and of tubing below the surface of the fuel. If air leaks exist in supply hose, connections or fuel pump air bubbles will be visible in container. Repair any leaks found.

5.99 Fuel Pump Removal

5.100 To remove the fuel pump, proceed as follows:

(a) Remove the v-belt by slipping it off the fuel pump pulley.

(b) Remove the fuel lines on the pump.

(c) Remove the pulley by loosening the set screw.

(d) Remove the mounting two bolts from the fuel pump and remove the pump.

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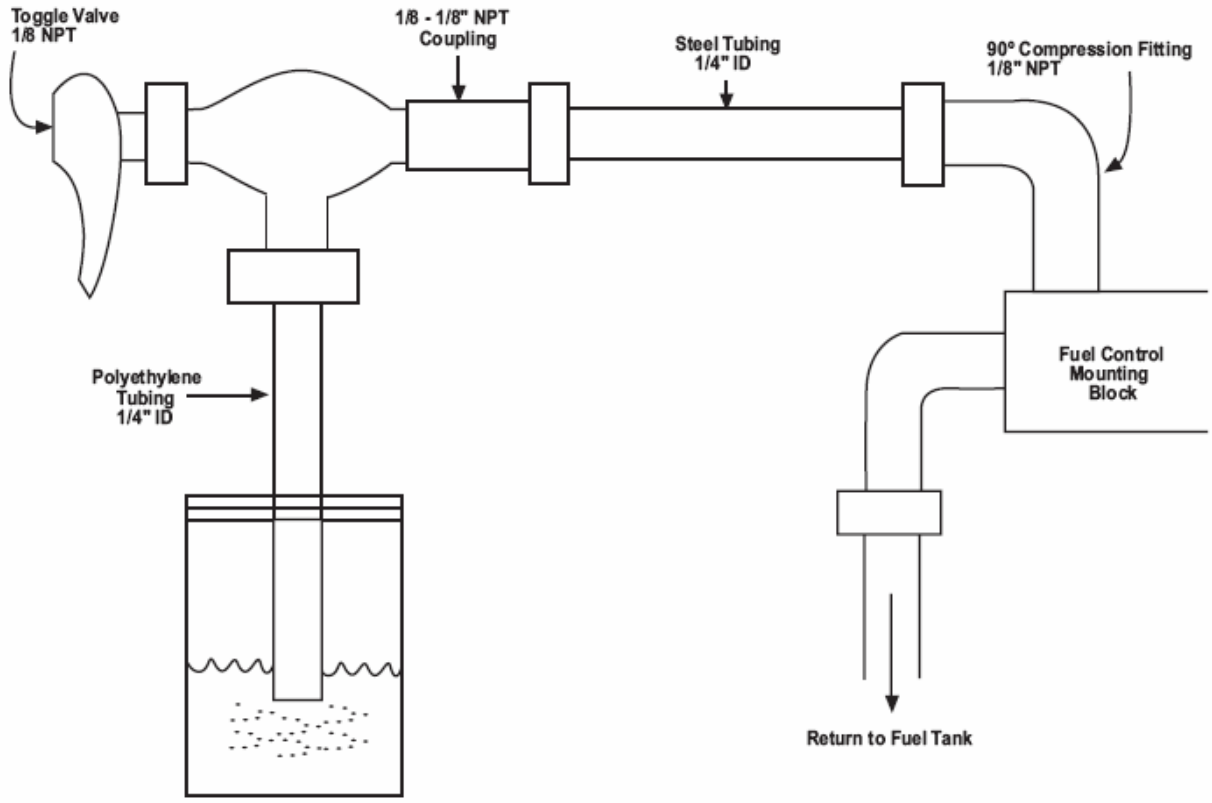
Figure 5-11 • Fuel System Air Leak Testing Assembly



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Section 5

5.101 Fuel Pump Installation

5.102 To install the fuel pump, reverse the removal procedures.

NOTE

Check belt tension after installing the fuel pump. Adjust following procedures listed in *paragraph 5.46.*

5.103 Fuel Pump Strainer

5.104 Cleaning

5.105 To clean the fuel pump strainer, proceed as follows:

(a) Remove the fuel pump from its mounting bracket. Follow procedures listed in ***pragraph 5.95.***

(b) Unscrew and remove the eight screws attaching cover to pump body. Remove over and gasket from pump body.

(c) Remove strainer from body. Wash strainer using an approved cleaning solvent. Allow strainer to air dry.

(d) Clean out any dirt remaining in body.

NOTE

If there is evidence of rust inside pump body, check fuel filter and fuel tank for water contamination.

5.106 Fuel Atomizing Nozzle

5.107 The fuel atomizing nozzle supplies fuel to the combustor. The atomized fuel is combined with air and ignited.

5.108 Removal

5.109 Remove the fuel atomizing nozzle as follows:

(a) Remove vaneaxial fan and mounting ring.

(b) Disengage combustor clamp from notches in combustor and remove nozzle holder.

(c) Remove fuel nozzle from nozzle holder.

5.110 Cleaning and Inspection

5.111 Cleaning and inspection are accomplished as follows:

(a) Clean all parts, except the igniter plug using drycleaning solvent and dry thoroughly.

(b) Inspect all parts for braks, cracks, obstructions, damaged threads, or other damage. Replace all damaged parts.

5.112 Installation

5.113 Install fuel atomizing nozzle by performing the procedures of ***paragraph 5.118*** in reverse order.

5.114 Heater Fuel Filter

5.115 Fuel from the tank passes through an automotive type filter before enetering the fuel pump. The filter has a replaceable element which should be removed and replaces at periodic intervals.

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Section 5

5.116 Fuel Filter

5.117 Servicing. Performing the following:

(a) Remove gasoline engine. (***Refer to paragraph 5.29.***)
(b) Unscrew metal bowl from top casting.
(c) Remove filter element and gasket.
(d) Replace filter element.
(e) Install gasket and filter element on top casting.
(f) Install metal bowl on top casting.
(g) Install gasoline engine.

5.118 Fuel Tank

5.119 The fuel tank is suspended within the heater base. Outlets are provided for the tube assemblies, and openings are provided for the fuel tank cap and for the fuel gauge. A drain plug is provided directly ahead of fuel service point near the bottom on the tank at the trailer bed level.

5.120 Removal

5.121 Remove the heater fuel tank as follows:

(a) Remove gasoline engine power unit.
(b) Disconnect block-to-check valve tube assembly from elbow.
(c) Disconnect return-to-pump tube assembly from connector.
(d) Disconnect fuel supply hose assembly from elbow.
(e) Remove elbow from coupling.
(f) Remove elbow, tee, connector, and check valve from coupling.
(g) Remove plug, couplings and gasket from fuel tank.
(h) Remove fuel tank cap from tank, disengage clip from tank. Remove gasket.
(i) Remove drain plug and drain fuel into a suitable container.
(j) Remove fuel gauge from tank.
(k) Remove three screws, lockwashers and nuts. Remove screws and lockwashers.
(l) Lift heater from skid base and set on supports to suspend fuel tank below heater.
(m) Remove four screws and lockwashers and remove fuel tank. Remove four nuts.

5.122 Cleaning and Inspection

5.123 Cleaning and inspections are accomplished as follows:

(a) Install drain plug and fill the tank on-half full with cleaning solvent. Agitate the solvent, immediately tip fuel drain end of tank as low as possible and drain, inspect for leaks for leaks. Run cleaning solvent through the tank until it comes out clean and clear.
(b) Wash the exterior of the fuel tank and other metal parts with drycleaning solvent and dry thoroughly.
(c) Inspect fuel tank for cracks, dents, damaged seams, and weak or rusted spots. Inspect fuel gauge parts for broken glass, deteriorated gaskets, inoperative float assembly, and other damage. Replace damaged fuel gauges.

5.124 Installation

5.125 Install the fuel tank by performing the procedures of paragraph 5.126 in reverse order.

NOTE

Care should be taken in assembling the fuel tank to skid base top and heater support, so that tightening cap screws in tank supporting nuts, does not distort skid base top. Distortion of skid base makes primer and fan alignment very difficult.

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Section 5

5.126 Trailer Components

5.127 The tubular framed trailer is designed to transport the heater. An adjustable tow bar is mounted on the front of the frame to be used in towing the trailer. A basket mounted on the front of the heater carries the 12-inch duct adapter. Duct holders on the sides support and store the 6-inch ducts when not in use.

5.128 Trailer Wheels

5.129 The two trailer wheels are mounted on the axle and are the pneumatic-tire type. The wheels are free running, with no driving or braking components attached.

5.130 Removal

5.131 Remove the trailer wheels as follows:

(a) Remove wheel bearing.

(b) Remove five nuts and lockwashers securing wheel to hub assembly. Remove wheel and tire.

5.132 Disassembly

5.133 Disassembly is accomplished as follows:

(a) Remove valve cap and valve core from valve stem and allow air to escape from inner tube.

(b) Remove eight inner rims and remove from tire and tube. Remove inner tube from tire.

5.134 Cleaning, Inspection and Repair

5.135 Cleaning, inspection and repair are accomplished as follows:

(a) Clean tire and tube with mild soap and water and dry thoroughly. Remove rust and scale from inside the tire with a wire brush.

(b) Clean all metal parts in drycleaning solvent and dry thoroughly.

(c) Install valve core, inflate tube, and submerge in water. Check for air bubbles which will indicate a leak in the tube. Repair the tube if it is leaking.

(d) Inspect tires for wear, holes, cuts, broken cords, deterioration, or other damage. Replace a worn or damaged tire.

(e) Inspect all metal parts for cracks, breaks, wear, damaged threads, corrosion, distortion, or other damage.

5.136 Reassembly

5.137 Reassembly is accomplished as follows:

(a) Install valve core in valve stem.

(b) Install five bolts in hub assembly.

(c) Install inner tube in tire and partially inflate inner tube.

(d) Position inner rim and outer rim on tire and tube, insert valve stem through hole in outer rim, and secure by installing eight bolts, lockwashers, and nuts.

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Section 5

5.138 Installation

5.139 Install the trailer wheels by reversing the procedure of ***paragraph 5.138***.

!CAUTION!

When inflating trailer tires, remain to one side of tire rather than directory in front of it. Serious injury may result if tire blows out.

5.140 Electric Motor Power Unit

5.141 Configuration Differences

5.142 The paragraphs that follow provide supplementary instructions for assembly and installation of electric motor assembly using 208/220 volt, 60 Hz, 3 phase electric motor, Part Number TM 3920.

5.143 Assembly

5.144 Assembly of the electric motor assembly is accomplished as follows:

(a) Install tapered bushing on drive coupling.
(b) Install tapered bushing on drive coupling.
(c) Position tapered bushing and drive coupling on motor shaft and tighten screws to secure taper lock.
(d) Install electric motor to mounting bracket using four bolts, eight washers, and four nuts.
(e) Install chains from dust plug and engine exhaust plug on bracket and secure with two screws, lockwashers, and nuts.

5.145 Installation

5.146 Install electric motor assembly as follows:

(a) Place assembly on resilient mounts and secure with three thumb screws.
(b) Insert dust plug into coupling.
(c) Insert engine exhaust plug into engine exhaust pipe.

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Section 6 • Parts List

Figure 6-1 • Group Assembly Parts List

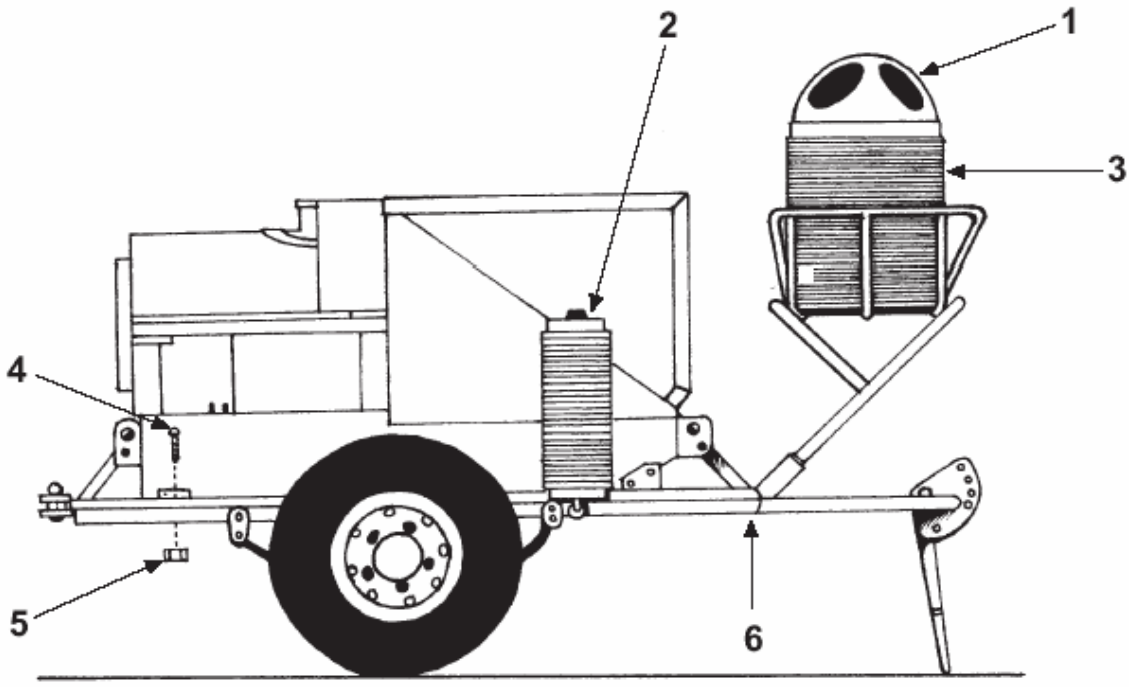

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Figure 6-1 • Group Assembly Parts List

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Fig. & Index #	Part #	Description	Units Per
6-1	BT400-45-1	Heater, Ground Portable – Fuel Burning W/ Accessories	Ref.
1	FT921	• ADAPTER, DUCT – 12 IN. TO 6 IN.	1
2	TD006	• DUCT, CANVAS – 6 IN. DIA.	3
3	TD012	• DUCT, CANVAS – 12 IN. DIA.	2
4	BL14X1	• BOLT, 1/4-20 X 1”	8
5	NT1420KEP	• NUT, KEPT 1/4-20	8
6	MA-1	• TRAILER	1

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Figure 6-2 • Cabinet Assembly

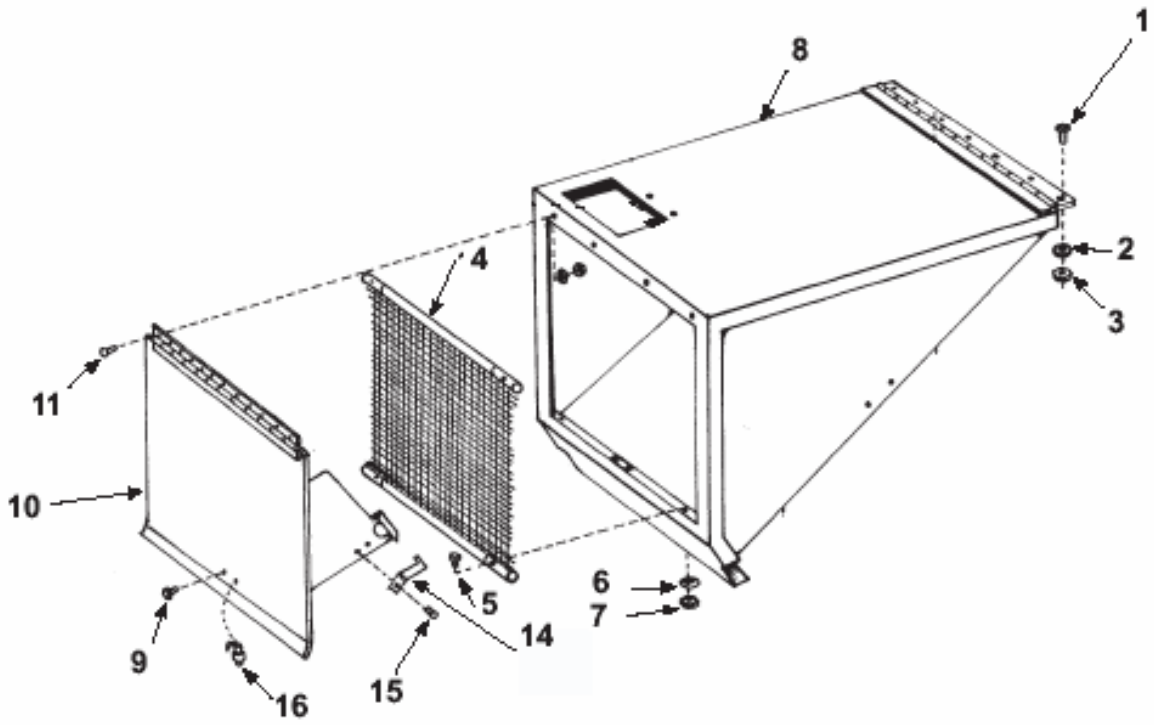

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Figure 6-2 • Cabinet Assembly

• • • • • • • • • • • • • • • • •

Fig. & Index #	Part #	Description	Units Per
6-2		Cabinet Assembly	Ref.
1	SC1024X34MS	• SCREW, MACHINE #10-24 x 3/4	11
2	WSSR10	• WASHER, LOCK #10	11
3	NT316HN	• NUT, KEPT #10-24	11
4	TCF3223	• SCREW, AIR INLET	1
5	SC1024X12MS	• SCREW, MACHINE #10-24 x 1/2	4
6	WSSR10	• WASHER, LOCK #10	4
7	NT316HN	• NUT, KEPT #10-24	4
8	TCF3265-100	• TOP, CABINET	1
9	SC632X12MS	• SCREW, MACHINE #6-32 x 1/2	2
10	TCF3227	• DOOR, AIR INLET	1
11	SC1024X12MS	• SCREW, MACHINE #10-24 x 1/2	4
12	WSSR10	• WASHER, LOCK	4
13	NT316HN	• NUT, KEPT #10-24	4
14	TC643	• CATCH	2
15	MS20450C8-8	• RIVET, TUBULAR	4
16	TC628	• CATCH	1

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Figure 6-3 • Gasoline Engine Primer Mover

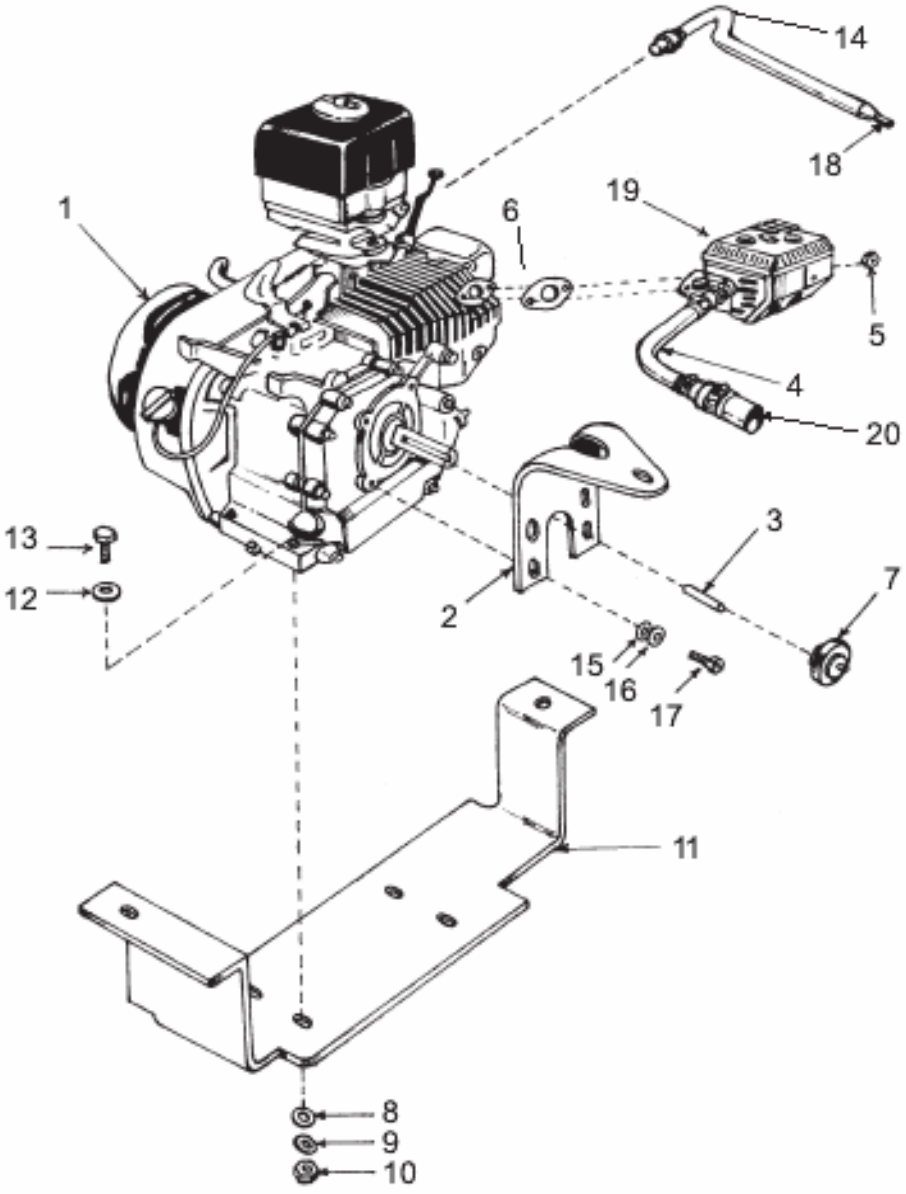

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Figure 6-3 • Gasoline Engine Primer Mover

• • • • • • • • • • • • • • • • •

Fig. & Index #	Part #	Description	Units Per
6-3		Primer Mover, Gasoline	Ref.
1	GX.160	• ENGINE, GASOLINE	1
2	TM4004-MOD.B	• BRACKET, ENGINE MOUNTING, FRONT	1
3	N/A	• KEY 3/16 X 1 1/4	1
4	TMF3232-MOD.B	• PIPE, ENGINE EXHAUST	1
5	N/A	• NUT, HEX, 8 MM	2
6	TM3958-MOD.8	• GASKET	1
7	TM3917-3MOD.B	• COUPLING, DRIVE, MOTOR SHAFT	1
8	WSFT516	• WASHER, FLAT, 5/16	4
9	WSSR516	• WASHER, LOCK, 5/16	4
10	NT51618HN	• NUT, HEX, 5/16	4
11	TMF3231-MOD.B	• BRACKET, ENGINE MOUNTING	1
12	WSFT516	• WASHER, FLAT, 5/16	4
13	BL516X112	• BOLT, FLANGE, 5/16 x 1 1/2	4
14	TMF3210-MOD.B	• HOSE ASSEMBLY, ENGINE FUEL	1
15	WSFT516	• WASHER, FLAT, 5/16	4
16	WSSR516	• WASHER, LOCK SPLITRING 5/16	4
17	SC632X12MS	• SCREW, MACHINE #6-32 x 1/2	4
18	T0657	• QUIK DISCONNECT	1
19	GX160MM	• MUFFLER	1
20	TAH-45	• FLEX TUBE	2

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Figure 6-4 • Fan Hub Assembly

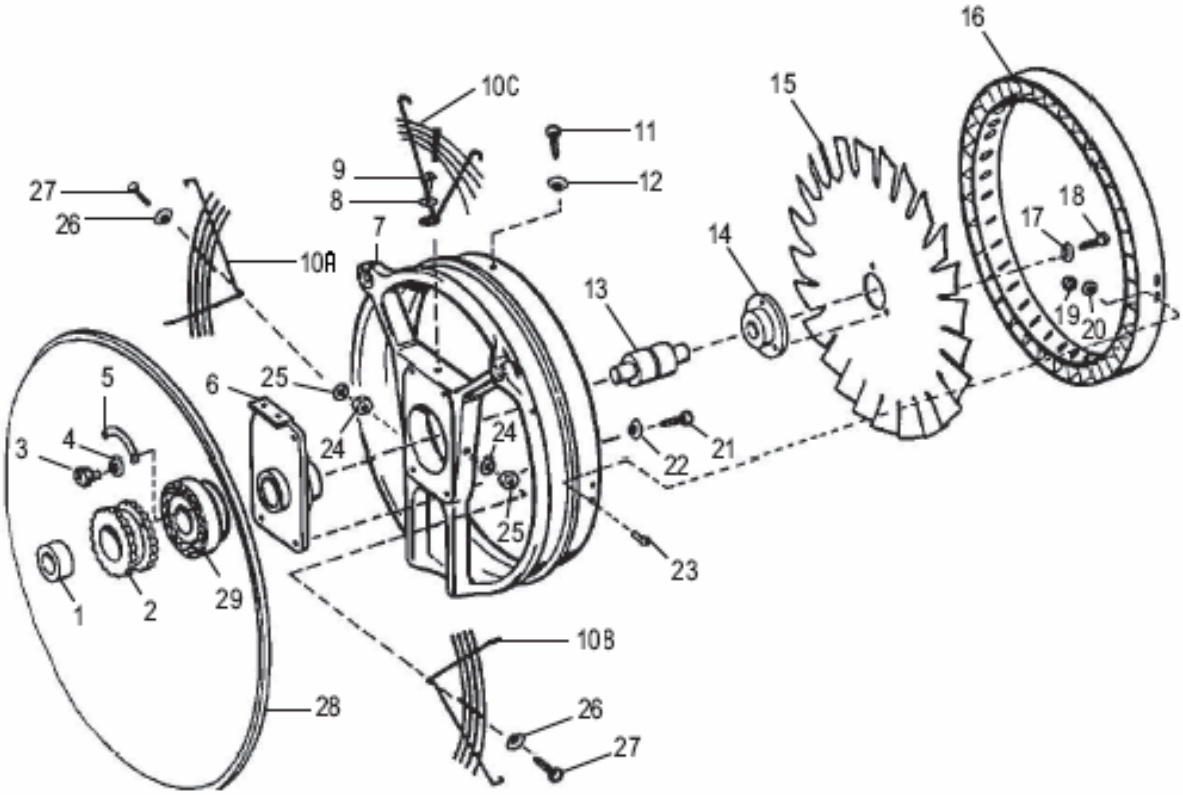

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Figure 6-4 • Fan Hub Assembly

Fig. & Index #	Part #	Description	Units per
6-4		Fun Hub Assembly	Ref.
1	TM3927	• BUSHING SLEEVE	1
2	TM3917-2	• SLEEVE, COUPLING FLEX	1
3	SC632X14MS	• SCREW 6-32 x 1/4 in.	4
4	WSSR06	• WASHER, FLAT #6	4
5	TM3959	• RETAINER, COUPLING SLEEVE	2
6	04030002	• SUPPORT, FAN BEARING (TM3924)	1
7	04010017	• FAN RING (TM3925)	1
8	WSFT14	• WASHER FLAT 1/4 in.	1
9	BL14X34	• BOLT 1/4-20 x 3/4 in.	1
10a	04020173	• RIGHT FAN GUARD	3
10b	04020174	• LEFT FAN GUARD	1
10c	TMF106	• CENTER FAN GUARD	1
11	SC832X12FH	• SCREW, FLAT HEAD #8-32 x 1/2 in.	3
12	WSFT08	• FLAT WASHER #8	3
13	TM3916/2M10	• BEARING, FAN SHAFT	1
14	TM3921	• HUB, FAN	1
15	04040018	• FAN, VANEAXIAL	1
16	04040022	• VANE, AIR STRAIGHTING	1
17	WS1NT14	• WASHER, LOCK 1/4	3
18	BL14X12	• SCREW, CAP, HEX HD 1/4-20 x 1/2 in.	3

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Figure 6-4 • Fan Hub Assembly

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Fig. & Index #	Part #	Description	Units per
6-13		**Fun Hub Assembly**	**Ref.**
19	NT832KEP	• NUT #8-32	3
20	WSFT08	• WASHER, LOCK #8	3
21	MS16997-80	• SCREW, CAP HEX HD 5/16-18 x 1”	4
22	WSSR516	• WASHER LOCK 5/16	4
23	SC832X12FH	• SCREW, MACHINE 8-32 x 1/2	3
24	WS1NT14	• WASHER, LOCK 1/4	3
25	NT1420KEP	• NUT, PLAIN HEX 1/4-20	3
26	WSFT14	• WASHER FLAT 1/4	3
27	BL14X114	• SCREW, MACHINE 1/4-20 x 1 1/4”	3
28	MS15290	• V-BELT	1
29	TM3917-1	• COUPLING, DRIVEN	1

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Figure 6-5 • Ignition System

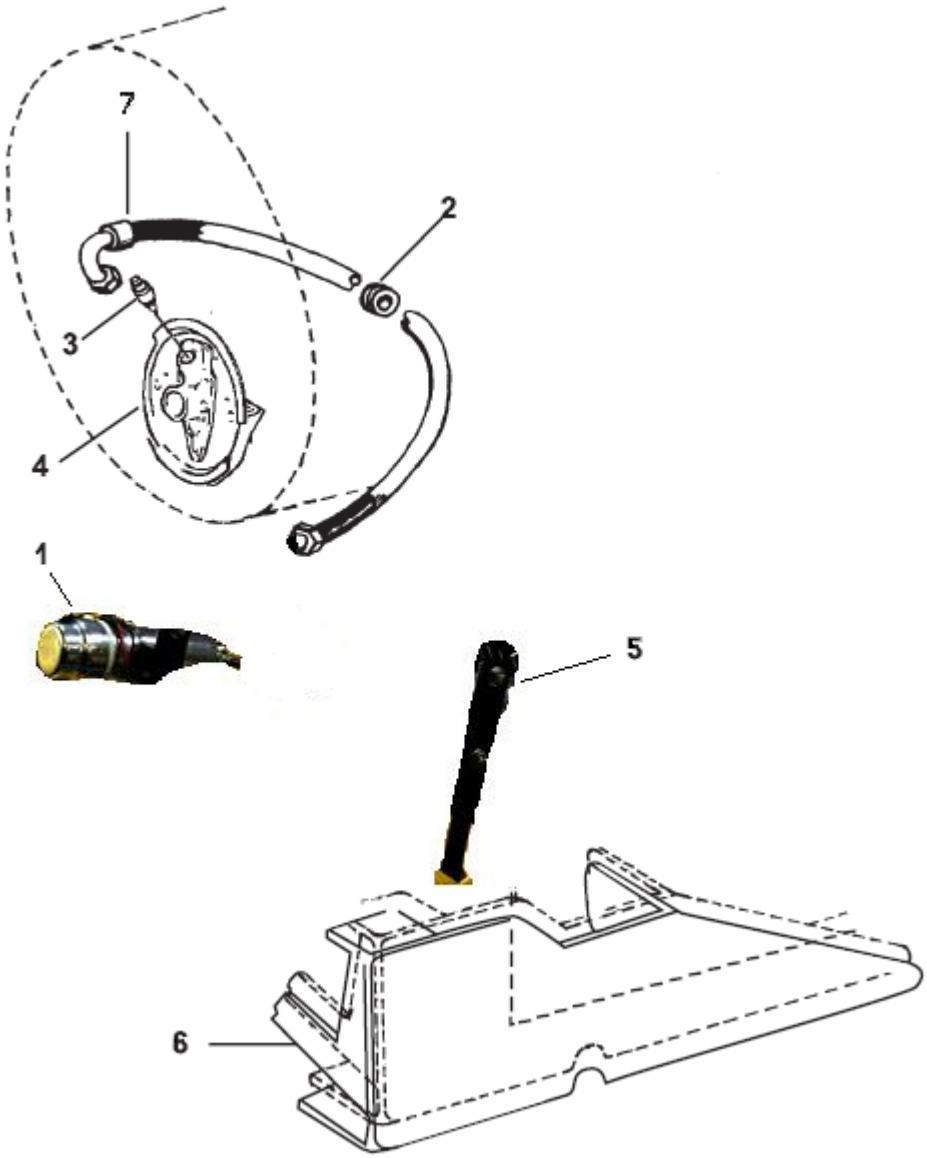

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Figure 6-5 • Ignition System

• • • • • • • • • • • • • • • • •

Fig. & Index #	Part #	Description	Units per
6-5		**Ignition System**	**Ref.**
1	04100112	• COIL	1
2	TE1305	• GROMMET	1
3	TE1010B	• PLUG, IGNITER	1
4	TRF762	• PLATE, COMBUSTOR	1
5	05000152	• COIL MOUNTING BRACKET	1
6	TMF3230-100	• SUPPORT, PRIME MOVER	1
7	04100156	• CABLE, IGNITION	1

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Figure 6-6 • Combustor Assembly

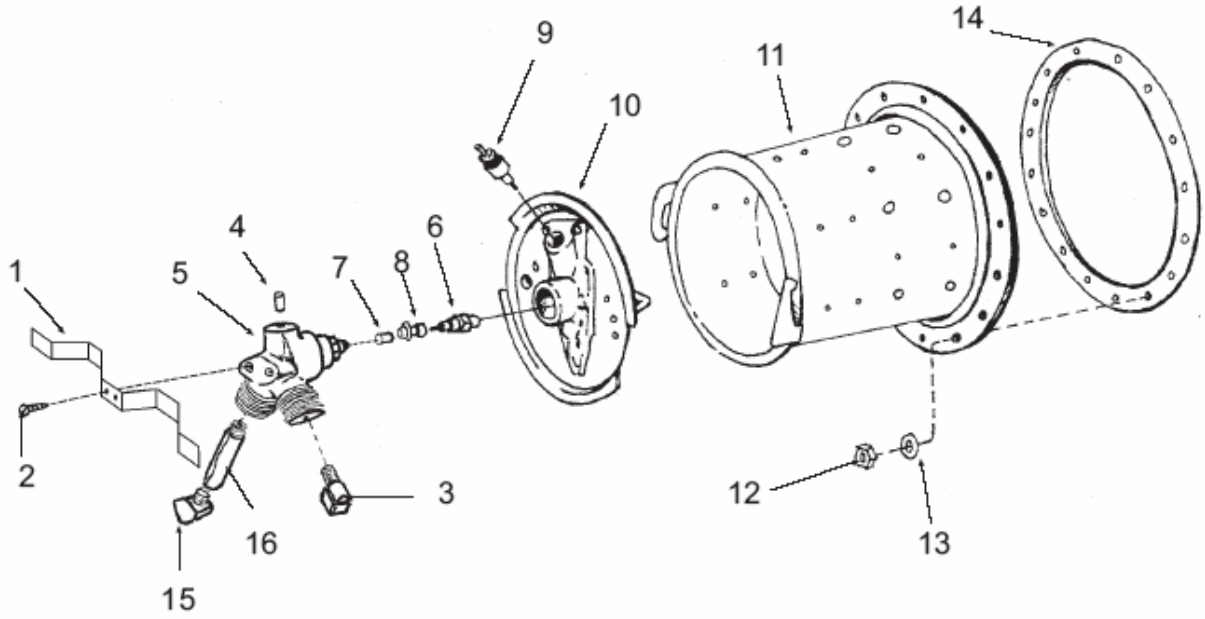

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Figure 6-6 • Combustor Assembly

• • • • • • • • • • • • • • • • •

Fig. & Index #	Part #	Description	Units per
1	T0553C	• CLAMP	1
2	SC1032X14FHMS	• SCREW, FLATHEAD #10-32 x 1/4	2
3	BF-7808	• ELBOW, PIPE	1
4	BF-7820	• PLUG, PIPE	1
5	04010144	• HOLDER, NOZZLE	1
6	TR774	• NOZZLE, FUEL	1
7	234	• SEAL, NOZZLE	1
8	614	• STRAINER, NOZZLE	1
9	TE1010B	• PLUG, IGNITER	1
10	TRF762	• PLATE, COMBUSTOR	1
11	TRF763	• COMBUSTOR	1
12	NT1428NFSLN	• NUT, STOVE 1/4-28	16
13	WSFT14	• WASHER, FLAT 1/4	16
14	TR776A	• GASKET, COMBUSTOR	1
15	BF-7814	• 45° ELBOW	1
16	TO655A	• CHECK VALVE (5 PSI)	1

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Figure 6-7 • Fuel Tank & Skid Base Assembly

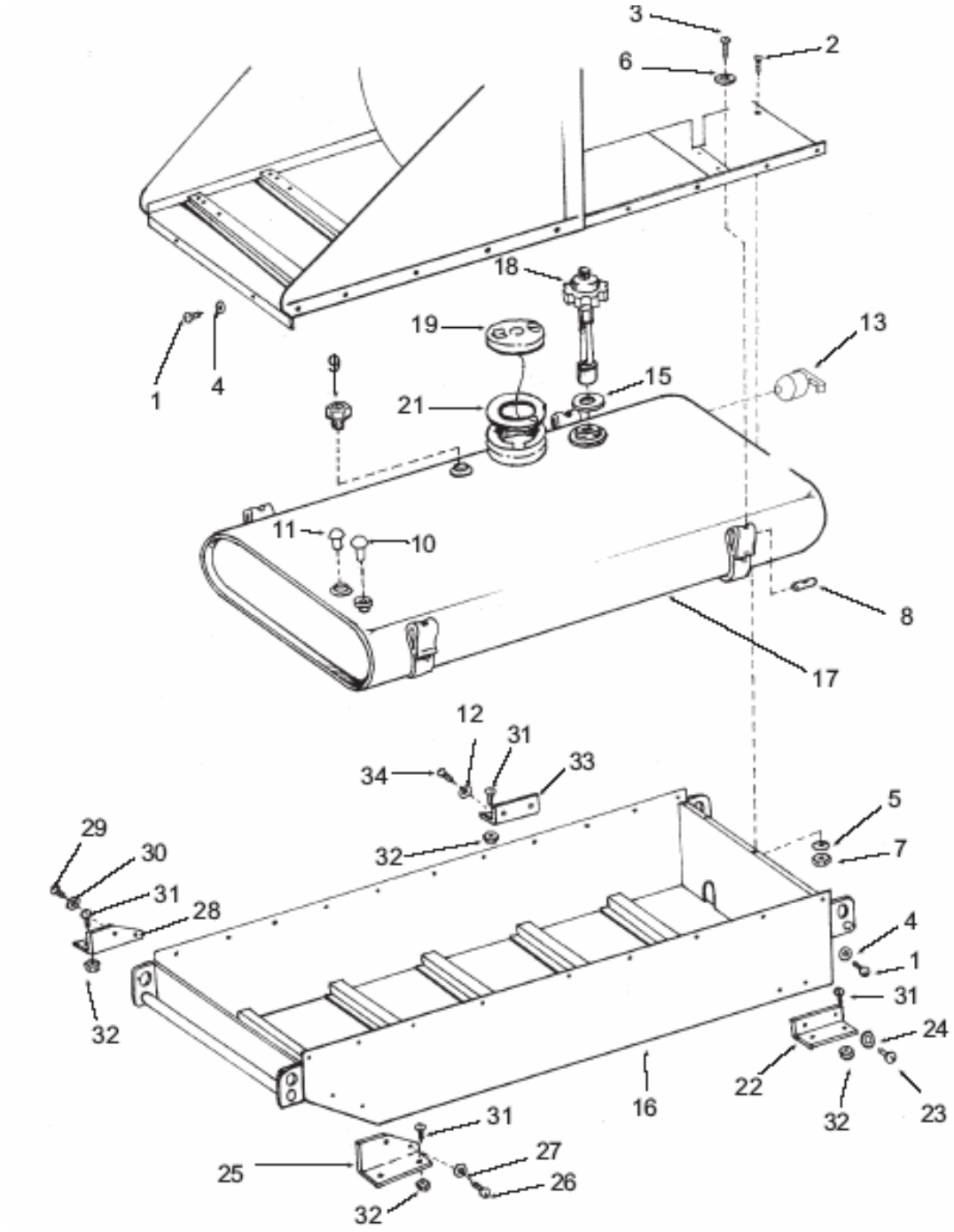

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Figure 6-7 • Fuel Tank & Skid Base Assembly

• • • • • • • • • • • • • • • • •

Fig. & Index #	Part #	Description	Units per
6-7		**Fuel Tank & Skid Base Assembly**	**Ref.**
1	BL14X12	• BOLT, 1/4-20 x 1/2	20
2	WSFT14	• WASHER, FLAT 1/4	3
3	BL38X112	• BOLT, 3/8-16 x 1 1/2	4
4	WSFT14	• WASHER, FLAT 1/4	20
5	WSFT10	• WASHER, LOCK #10	3
6	WSFT38	• WASHER, FLAT 3/8	4
7	NT1024KEP	• NUT, KEPT NUT	3
8	TT403	• NUT, BARREL	41
9	BF7824	• FLARE ADAPTER	1
10	BF7809	• ELBOW	1
11	BF7823	• PLUG, PIPE	1
12	WSSR516	• WASHER, LOCK, SPITRING 5/16	2
13	BF7825	• TANK DRAIN	1
14	MS29513-114	• PACKING, PREFORMED	1
15	TT3016-2	• GASKET, FUEL TANK – GAUGE	1
16	TCF3221	• SKID BASE ONLY	1
17	TTF3000-1	• TANK, FUEL	1
18	969-6-1/4	• GAUGE, FUEL	1

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Figure 6-7 • Fuel Tank & Skid Base Assembly

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Fig. & Index #	Part #	Description	Units per
6-7		**Fuel Tank & Skid Base Assembly**	**Ref.**
19	MS34645-1	• CAP, FUEL TANK	1
20		Not required	
21	MS35643-1	• GASKET, CAP	1
22	TC4149-1	• BRACKET,MOUNTING	1
23	BL516X34	• BOLT, 5/16-18 x 3/4	1
24	WSSR516	• WASHER, LOCK, SPLIT RING 5/16	1
25	TC4150-1	• BRACKET, MOUNTING	1
26	BL516X34	• BOLT, 5/16-18 x 3/4	1
27	WSSR516	• WASHER, LOCK, SPLIT RING 5/16	4
28	TC4150-2	• BRACKET, MOUNTING	1
29	BL516X34	• BOLT, 5/16-18 x 3/4	1
30	WSSR516	• WASHER, LOCK, SPLIT RING 5/16	1
31	BL14X1	• BOLT, 1/4-20 x 1	8
32	NT1420KEP	• NUT, KEPT 1/4-20	8
33	TC4149-2	• BRACKET, MOUNTING	1
34	BL516X34	• BOLT, 5/16-18 x 3/4	1

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Figure 6-8 • Fuel System

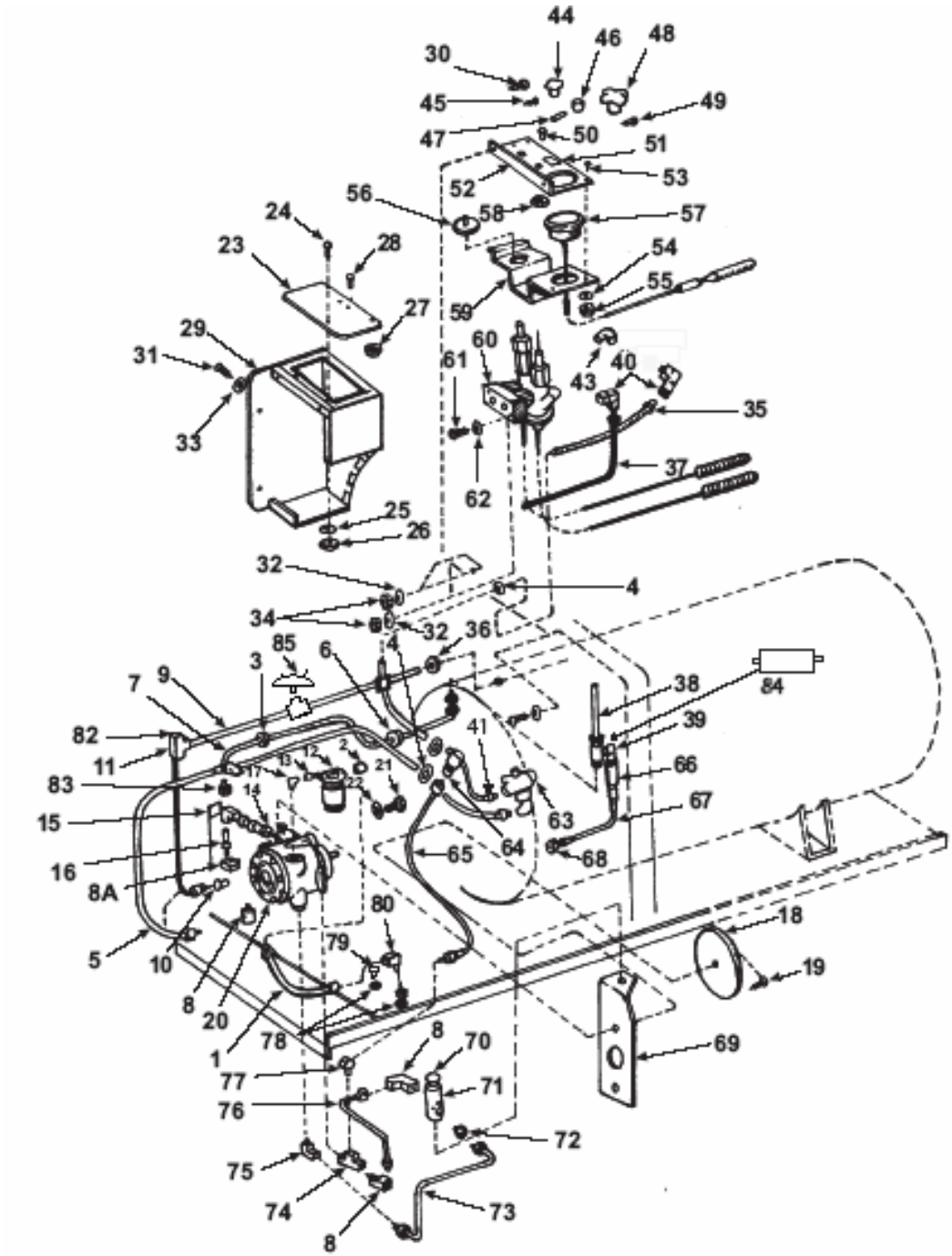

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Figure 6-8 • Fuel System

Fig. & Index #	Part #	Description	Units per
6-8		**Fuel System (**see Fig 6-11 for detailed breakdown)	**Ref.**
1	T0555A	• HOSE ASSEMBLY, FUEL SUPPLY	1
2	49W5/16X1/8	• ELBOW, PIPE	1
3	WH7TIEBLK	CABLE TIE	2
4	TE1305	• GROMMET, SPLIT	3
5	04100157-1	• HOSE ASSEMBLY, PUMP TO NOZZLE	1
6	TE1305	• GROMMET, SPLIT	1
7	TRA3049-100	• TUBE ASSEMBLY, RETURN TO PUMP	1
8	400X4X4	• ELBOW, PIPE TO TUBE	3
9	TRA3048-100	• TUBE ASSEMBLY, PUMP TO COUPLING	3
10	BF7877	• ADAPTER, STRAIGHT	3
11	702X2	• TEE, UNION 1/4 INV.	1
12	TRA3056-100	• FILTER, FUEL (SEE FIG. 6-13 FOR BREAKDOWN)	1
13	123B1/4X1/8	• REDUCER	1
15	TM3866	• TEE, PIPE	1
16	3327X2	• NIPPLE, PIPE	1
17	116B-1/4	• ELBOW, PIPE	1
18	TM3919	• PULLEY, GROOVE, FUEL PUMP	1
19	MS51963-67	• SETSCREW	1
20	TR3277	• PUMP, FUEL (SEE FIG. 6-14 FOR BREAKDOWN)	1
21	MS90725-108	• SCREW	2
22	MS15795-218	• WASHER	2

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Figure 6-8 • Fuel System

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Fig. & Index #	Part #	Description	Units per
6-8		**Fuel System (**see Fig 6-11 for detailed breakdown)	**Ref.**
23	TCF3228	• DOOR, ACCESS	1
24	SC1024X12MS	• SCREW, MACHINE #10-24 x 1/2	2
25	WSFT10	• WASHER, FLAT #10	2
26	NT1024KEP	• NUT, KEP #10-24	2
27	TC628	• CATCH	1
28	SC632X12MS	• SCREW, MACHINE #6-32 x 1/2 w. #6-32 KEPT NUT	2
29	TCF3224	• BOX, CONTROL	1
30	SC1024X12MS	• SCREW, MACHINE #10-24 x 1/2	2
31	BL14X12	• BOLT, 1/4-20 1/2	2
32	WSFT10	• WASHER, FLAT #10	2
33	WSFT14	• WASHER, FLAT 1/4	2
34	NT1024KEP	• NUT, KEP #10-24	10
35	04100157-1	• FUEL LINE	1
36	TE1305	• GROMMET	1
37	TRA3047-100	• TUBE ASSEMBLY, Coupling to BURNER FUEL Valve	1
38	TRA3058-100	• TUBE ASSEMBLY	1
39	BF7808	• ELBOW, 90° 1/8 NPT	1
40	BF7813	• ELBOW, PIPE TO TUBE (BOTTOM)	2
40	BF7808	• ELBOW, PIPE TO TUBE (TOP)	1
41	T0655A	• VALVE, CHECK	1
42	BF7810	• NIPPLE, PIPE	1

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Figure 6-8 • Fuel System

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Fig. & Index #	Part #	Description	Units per
6-8		**Fuel System (**see Fig 6-11 for detailed breakdown)	**Ref.**
43	BF7808	• ELBOW, PIPE	1
44	T0587C	• KNOB, BURNER FUEL VALVE	1
45	T0653A	• SETSCREW	1
46	T0586E	• KNOB, INDICATOR	1
47	T0653A	• SETSCREW	1
48	T0574C	• HANDWHEEL, TEMPERATURE SELECTOR VALVE	1
49	T0653A	• SETSCREW	1
50	TB3300	• RIVET, INDICATOR STOP 1/8 x 1/2	1
51	TR3318	• PLATE, INFORMATION	1
52	TR3268	• PANEL, CONTROL MOUNTING	1
53	SC1024X12MS	• SCREW, MACHINE #10-24 x 1/2	4
54	WSFT10	• WASHER, FLAT #10	4
55	NT1024KEP	• NUT, KEP #10-24	4
56	T0F64C	• GEAR, TEMPERATURE INDICATOR	1
57	TR3276	• GAUGE, DISCHARGE TEMPERATURE	1
58	T0539A	• NUT, STAMPED	1
59	TRF3081	• BRACKET, CONTROL MOUNTING	1
60	TR3269	• VALVE & BLOCK ASSEMBLY (SEE FIG. 6-15)	1
61	BL14X34	• BOLT, 1/4-20 x 3/4	2
62	WSSR14	• WASHER, LOCK SPLIT RING 1/4	2

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Figure 6-8 • Fuel System

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Fig. & Index #	Part #	Description	Units per
6-8		**Fuel System (**see Fig 6-10 for detailed breakdown)	**Ref.**
63	04010144	• HOLDER, NOZZLE	1
64	T0657	• SOCKET, QUICK DISCONNECT	1
65	TR3392-1	• HOSE ASSEMBLY, ENGINE FUEL	1
66	TO3027	• VALVE, CHECK	1
67	TRA3059-100	• TUBE ASSEMBLY	1
68	49X4X4	• ELBOW, MALE	1
69	TM4005-1	• SUPPORT, ENGINE PRIMER	1
70	T0533A	• PRIMER, ENGINE	1
71	TR3371-1	• SPACER, ENGINE PRIMER	1
72	BF7810+BF7812	• ADAPTER, PIPE TO TUBE	3
73	TRA3045-100	• TUBE ASSEMBLY, PUMP TO PRIMER	1
74	3700X2	• TEE, PIPE, FEMALE	1
75	400X4	• ELBOW, PIPE TO TUBE	1
76	TRA3046-100	• TUBE ASSEMBLY, PRIMER TO PUMP	1
77	3350X2	• ELBOW, PIPE	1
78	TT3016-1	• GASKET, FUEL TANK	3
79	C3159X4	• PLUG, PIPE	1
80	434X5	• ELBOW, PIPE TO TUBE	1
81	3200X4	• COUPLING, PIPE	1
82	131X4	• PLUG, STEEL	1
83	250X4	• CONNECTOR, PIPE TO TUBE	1
84	TRA3057-100	FILTER, IN-LINE	1
85	04100115	• SWITCH, PRESSURE	1

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Figure 6-9 • Heater Fuel Filter

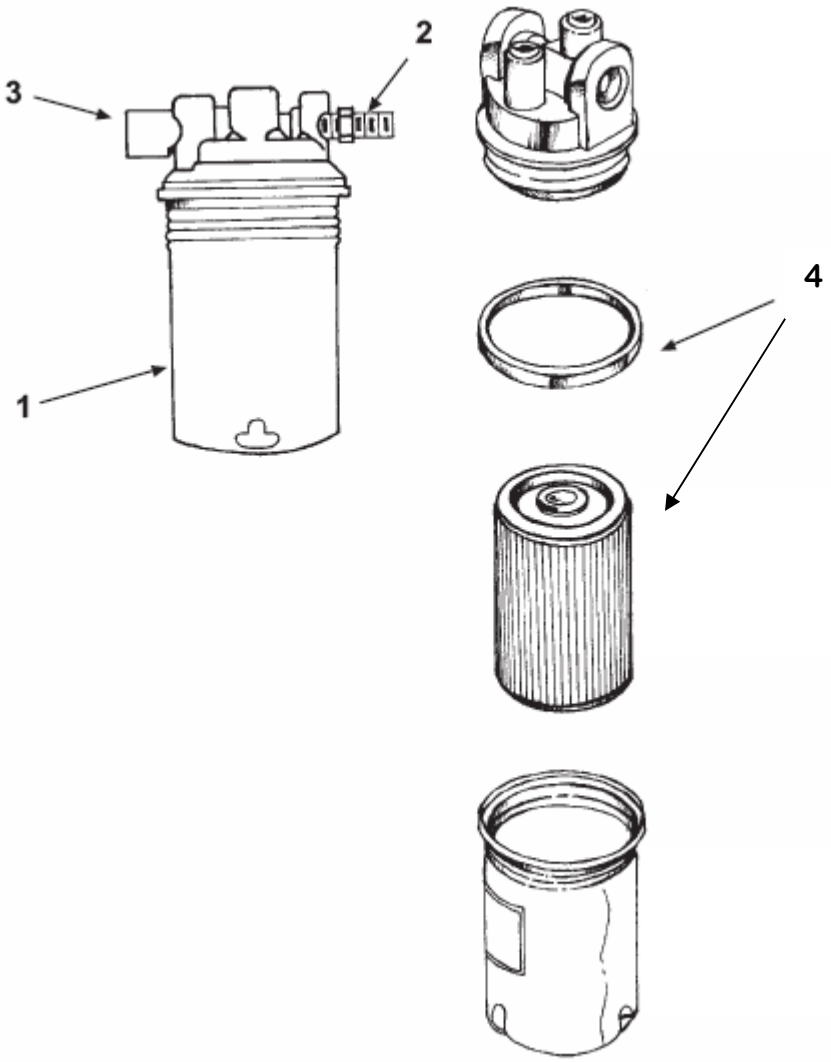

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Figure 6-9 • Heater Fuel Filter

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Fig. & Index #	Part #	Description	Units per
6-9		**Filter Assembly**	**Ref.**
1	TRA3056-100	• FILTER, FUEL (Complete)	1
2	BF-7822	• REDUCER	1
3	BF-7809	• ELBOW	1
4	5650960	• FILTER ELEMENT w/Gasket	1

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Figure 6-10 • Heater Pump Assembly

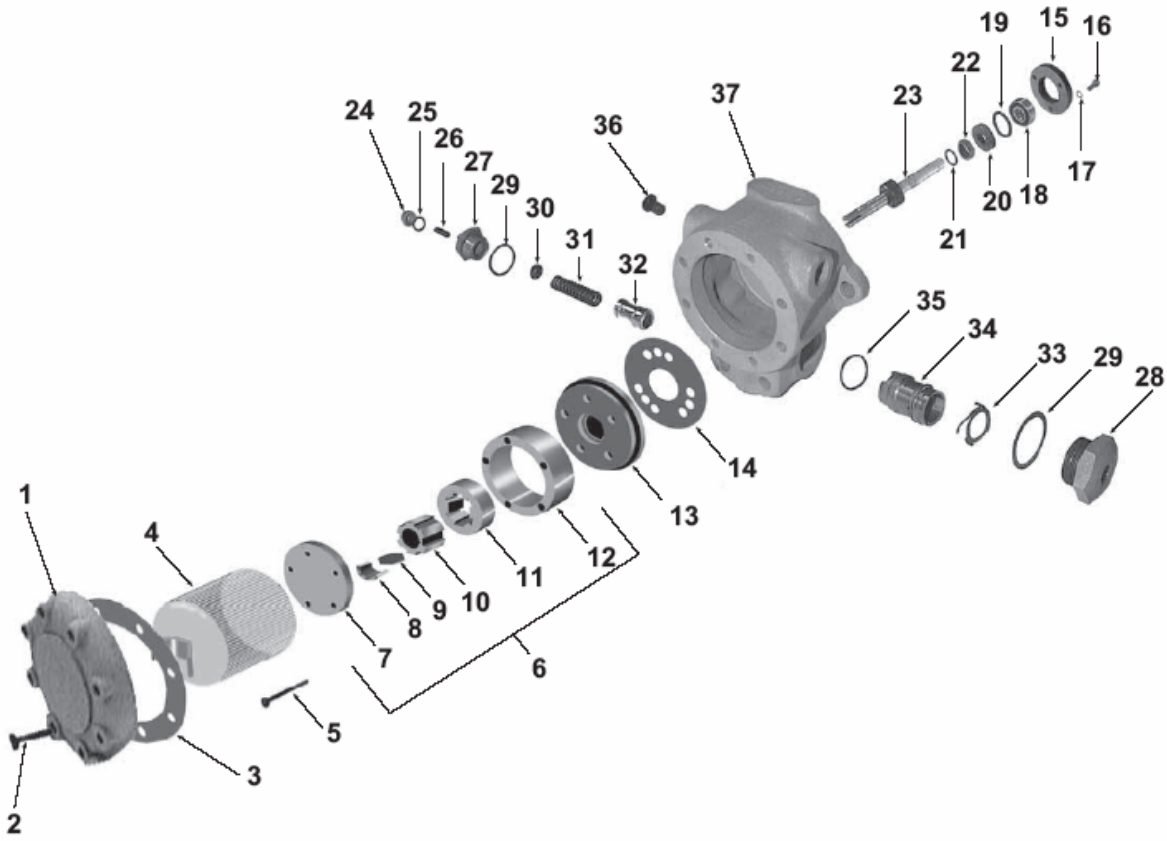

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Figure 6-10 • Fuel Pump Assembly

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Fig. & Index #	Part #	Description	Units per
6-10	TR3277	**Fuel Pump**	**Ref.**
1	117463	• COVER, PUMP (attaching parts)	1
2	111401	• BOLT, COVER	8
3	110441	• GASKET, COVER	1
4	111302	• STRAINER, FUEL PUMP	1
5	105021	• BOLT, END PLATE	1
6	127297	• PLATE, END includes items 7,8,9,10,11 and 12	1
7	127297	• PLATE, END	1
8	127297	• CRESCENT	1
9	1271131	• KEY, DRIVE	1
10	127297	• ROLLER	1
11	127297	• ROTOR	1
12	127297	• HOUSING, ROTOR	1
13	131201	• HOUSING, PORT	1
14	113331	• GASKET, PORT HOUSING	1
15	118732	• RETAINER, BEARING (attaching parts)	1
16	51295	• BOLT, RETAINER	3
17	MS35333-9	• WASHER, LOCK	3
18	1615DC	• BEARING, BALL, ANNULAR	1
19	123632	• PACKING, SEAL O'RING	1

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Figure 6-10 • Fuel Pump Assembly

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Fig. & Index #	Part #	Description	Units per
6-10	TR3277	**Fuel Pump**	**Ref.**
20	115462	• FACE, SEAL	1
21	123652	• PACKING, PREFORMED SEAL	1
22	127562	• HOUSING, SEAL	1
23	131199	• SHAFT, PUMP	1
24	100241	• NUT, END CAP	1
25	100371	• GASKET, END CAP	1
26	101001	• SCREW, ADJUSTING	1
27	103379	• PLUG, END	1
28	114227	• PLUG, END	1
29	100901	• WASHER, NONMETALLIC GASKET, END PLUG	2
30	100931	• SEAT, SPRING	1
31	101641	• SPRING, HELICAL COMPRESSION	1
32	116106	• PISTON, FUEL PUMP	1
33	121732	• RETAINER, SPRING SLEEVE	1
34	121222	• SLEEVE, PISTON	1
35	28778	• PACKING, PREFORMED O'RING	1
36	BF7823	• PLUG, PIPE	1
37	131196	• BODY, PUMP	1

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Figure 6-11 • Valve & Block Assembly

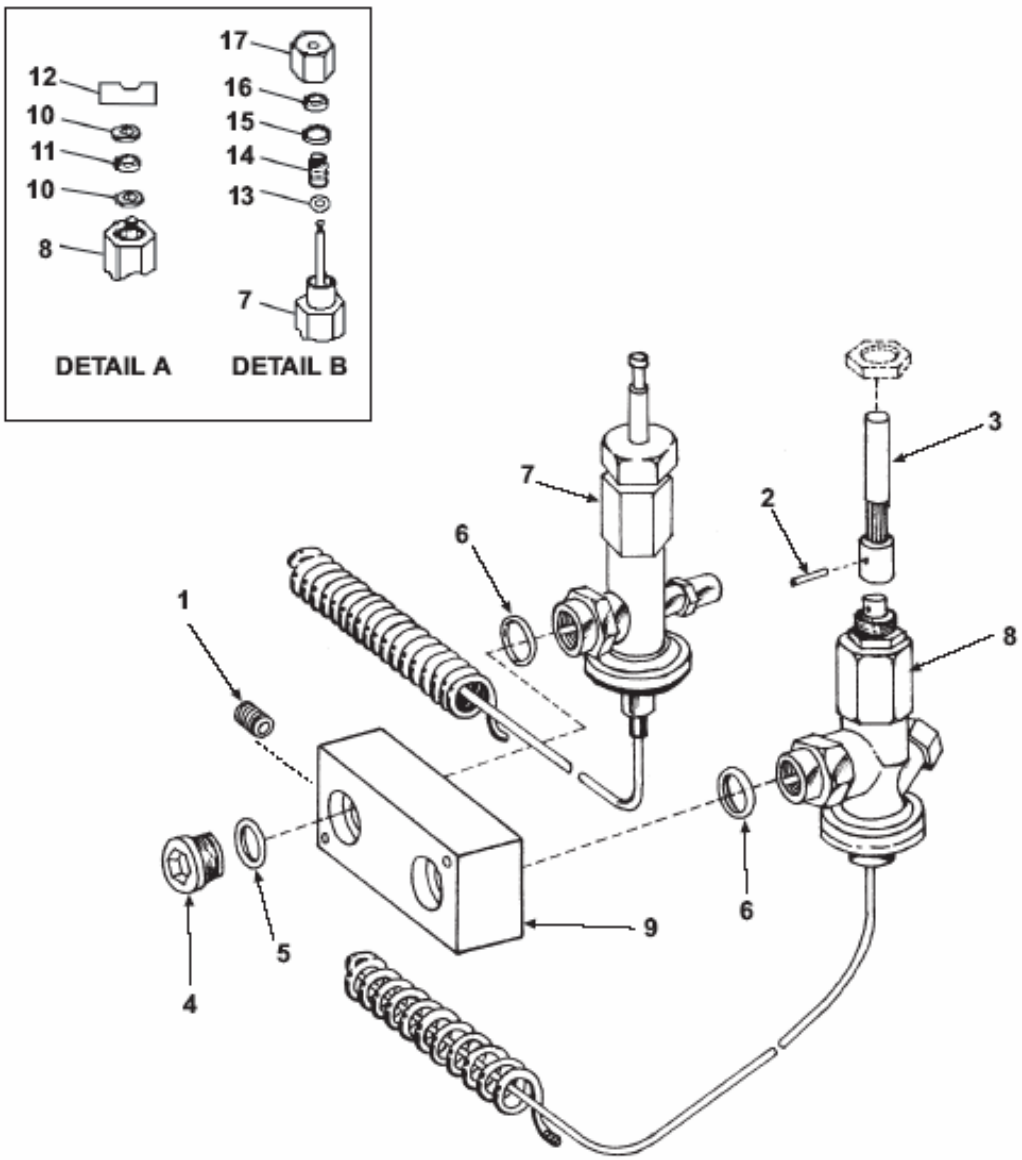

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Figure 6-11 • Valve & Block Assembly

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Fig. & Index #	Part #	Description	Units per
6-11		Valve & Block Assembly	Ref.
1	BF7819	• PLUG, PIPE	1
2	MS171494	• PIN, ROLL	1
3	T0540A	• STEM, VALVE	1
4	T0542	• BOLT, FLUID PASSING	2
5	MS29513-112	• PACKING, PREFORMED	2
6	MS29513-016	• PACKING, PREFORMED	2
7	TR3275	• VALVE, BURNER FUEL	1
8	TR3274	• VALVE, TEMPERATURE SELECTOR	1
9	TR3269	• BLOCK, FUEL VALVE	1
10	EVL-42310	• WASHER, BRASS	1
11	EVL-54165	• PACKING, PREFORMED	1
12	EVL-63224	• PACKING SCREW	1
13	EVL-22772	• WASHER, COPPER	1
14	EVL-18080	• SPRING, PACKING	1
15	EVL-13483	• PACKING EXPANDER	1
16	EVL-14260	• PACKING, PREFORMED	1
17	EVL-13484	• PACKING NUT	1

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Figure 6-12 • Heater Exchanger & Air Control Installation

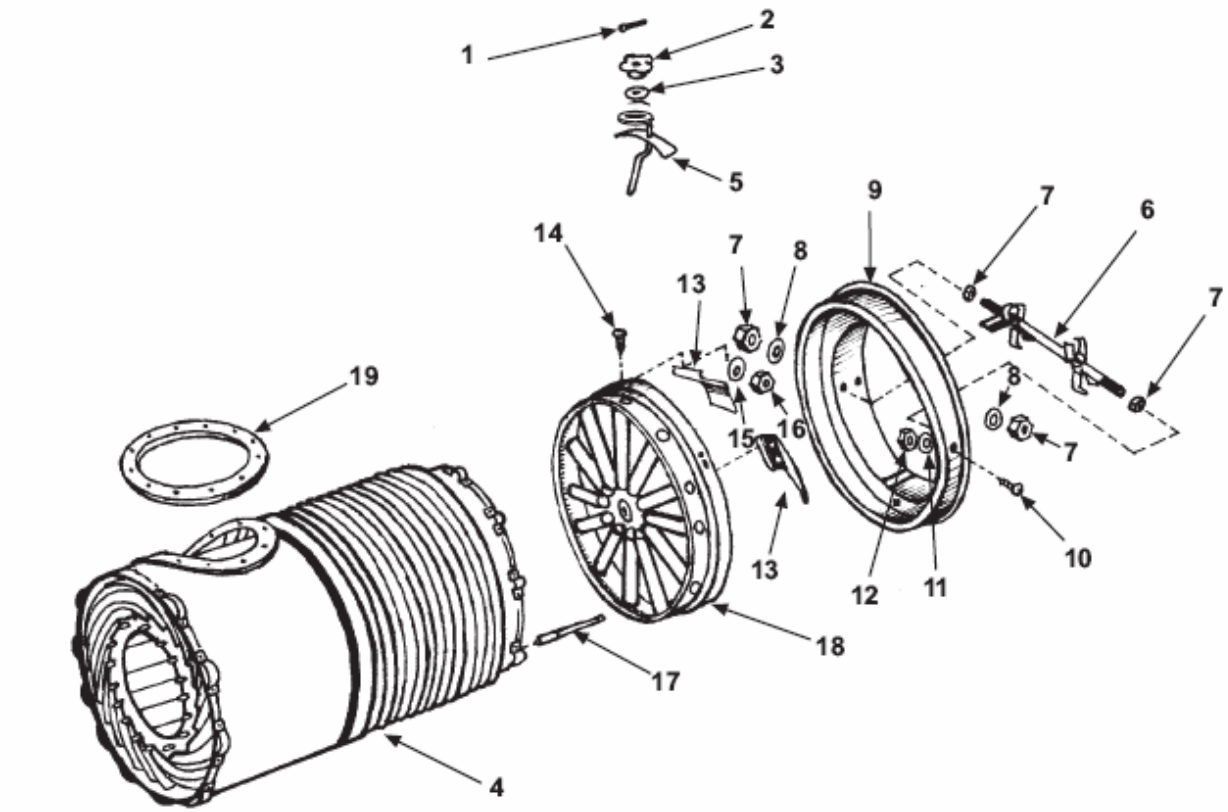

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Figure 6-12 • Heater Exchanger & Air Control Installation

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Fig. & Index #	Part #	Description	Units per
6-12		Heat Exchanger & Air Control Installation	Ref.
1	MS24665-132	• PIN, COTTER	1
2	TR3343	• HAND WHEEL	1
3	TA3314-1	• WASHER, TEFLON	1
4	TRF3082	• HEAT EXCHANGER	1
5	TAF3158	• CONTROL, DAMPER	1
6	04040019	• SUPPORT, BULB AND COIL	1
7	NT1024KEP	• KEP NUT #10-24	4
8	WSFT10	• WASHER, FLAT #10	2
9	04040020	• ADAPTER, DISCHARGE DUCT	1
10	SC1024X12MS	• SCREW, MACHINE #10-24 x 1/2	3
11	WSFT10	• WASHER FLAT #10	3
12	NT316HN	• NUT #10-24	3
13	TA235	• BAFFLE, AIR DEFLECTOR	4
14	SC1024X12MS	• SCREW MACHINE #10-24 x 1/2	4
15	WSFT10	• WASHER, FLAT #10	4
16	NT316HN	• NUT #10-24	4
17	TRF3094	• TUBE, DRAIN	1
18	TAF3154	• CONTROL, AIR VOLUME	1
19	TX595	• GASKET, HEAT EXCHANGER	1

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Figure 6-13 • Panels, Bulkhead & Casing Installation

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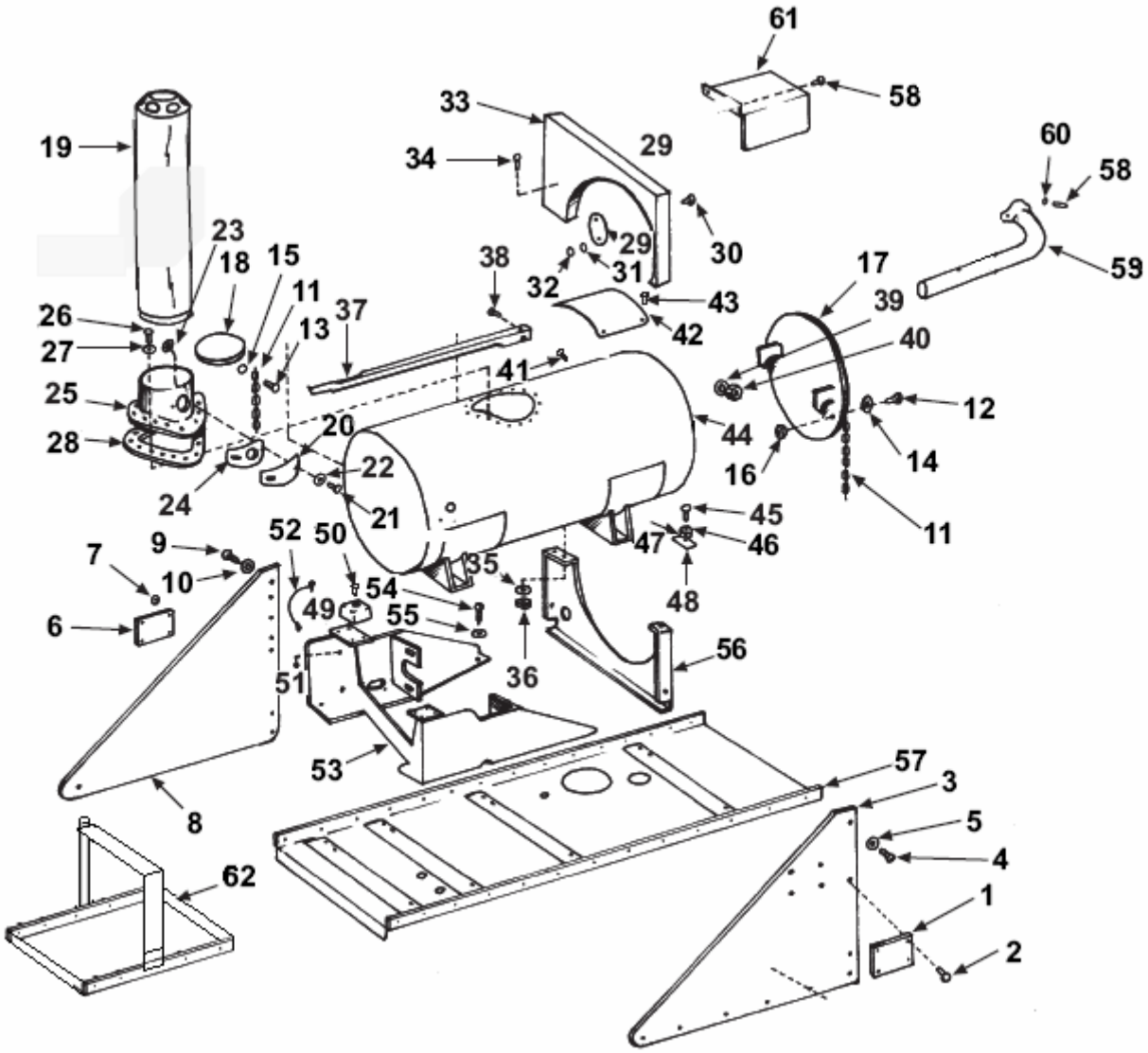

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Figure 6-13 • Panels, Bulkhead & Casing Installation

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Fig. & Index #	Part #	Description	Units per
6-13		**Panels, Bulkhead & Casing Installation**	**Ref.**
1	04010152	• PLATE, DANGER IDENTIFICATION	1
2	AD34ABS	• RIVET, BLIND	4
3	TCF3266-101	• PANEL, SIDE, CABINET	1
4	BL14X12	• BOLT 1/4 x 20 x 1/2	8
5	WSFT14	• WASHER, FLAT 1/4”	8
6	04010152	• PLATE, DANGER IDENTIFICATION	1
7	MS16535-155	• RIVET, BLIND	4
8	TCF3266-100	• PANEL, SIDE, CABINET	1
9	BL14X12	• BOLT 1/4 x 20 x 1/2	8
10	WSFT14	• WASHER, FLAT	8
11	04010165	• CHAIN	2
12	SC1024X12MS	• SCREW MACHINE #10-24 x 1/2	1
13	MS20450C8-8	• RIVET, TUBULAR	1
14	WSFT10	• WASHER, FLAT #10	1
15	WSFT10	• WASHER, FLAT #10	1
16	NT316HN	• NUT #10-24	1
17	04040011	• COVER, HEATER OUTLET	1
18	TR3313	• COVER, EXHAUST STACK	1
19	04040016	• PIPE, EXHAUST	1

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Figure 6-13 • Panels, Bulkhead & Casing Installation

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Fig. & Index #	Part #	Description	Units per
6-13		**Panels, Bulkhead & Casing Installation**	**Ref.**
20	TM4010-1	• PLATE, HOLE COVER	1
21	SC1024X12MS	• SCREW, MACHINE #10-24 x 1/2	2
22	WSFT10	• WASHER, FLAT #10	2
23	NT316HN	• NUT #10-24	2
24	TM4008-1	• GASKET, HOLE COVER	1
25	TR3304	• STACK, EXHAUST	1
26	SC832X34MS	• SCREW, MACHINE #8-32 x 3/4	12
27	WSFT08	• WASHER FLAT #8	12
28	TX592	• GASKET, EXHAUST STACK	1
29	TM4031-1	• FLANGE, EXHAUST PIPE	1
30	SC1024X12MS	• SCREW, MACHINE #10-24 x 1/2	2
31	WSFT10	• WASHER, FLAT #10	2
32	NT316HN	• NUT #10-24	2
33	TCF3264-100	• BULKHEAD, TOP	1
34	SC1024X12MS	• SCREW MACHINE #10-24 x 1/2	3
35	WSFT10	• WASHER FLAT #10	3
36	NT316HN	• NUT #10-24	3
37	TA3300	• SHIELD, CAPILARY TUBE	1
38	SC1024X12MS	• SCREW MACHINE #10-24 x 1/2	3
39	WSFT10	• WASHER, FLAT #10	3
40	NT316HN	• NUT #10-24	3
41	TE1305	• GROMMET	1
42	TC1625C	• PLATE, INSTRUCTION	1

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Figure 6-13 • Panels, Bulkhead & Casing Installation

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Fig. & Index #	Part #	Description	Units per
6-13		**Panels, Bulkhead & Casing Installation**	**Ref.**
43	MS16535-155	• RIVET, BLIND	4
44	TAF3166-100	• CASING	1
45	BL516X34	• BOLT, 5/16-18 x 3/4	4
46	WSSR516	• WASHER, SPLIT RING 5/16	4
47	WSFT516	• WASHER, FLAT 5/16	4
48	TA218A	• WASHER, SPECIAL	4
49	TR3375-1	• MOUNT, RESILIENT	2
50	SC1024X34MS	• SCREW, MACHINE #10-24 x 3/4	8
51	NT316HN	• NUT, KEP #10-24	8
52	TC4021	• THUMBSCREW	2
53	TMF3230-100	• SUPPORT, PRIME MOVER	1
54	BL516X34	• BOLT 5/15-18 x 3/4	6
55	WSSR516	• WASHER, SPLIT RING 5/16	6
56	TCF3235-100	• BULKHEAD, BOTTOM	1
57	TCF3222	• COVER, SKID TOP	1
58	SC1024X12MS	• SCREW, MACHINE #10-24 x 1/2	2
59	TMF3240	• PIPE, EXHAUST	1
60	NT316HN	• NUT, KEP #10-24	2
61	TCF3267-100	• HEAT SHIELD	1
62	13215	• BATTERY TRAY	1

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Figure 6-14 • HT100 Trailer

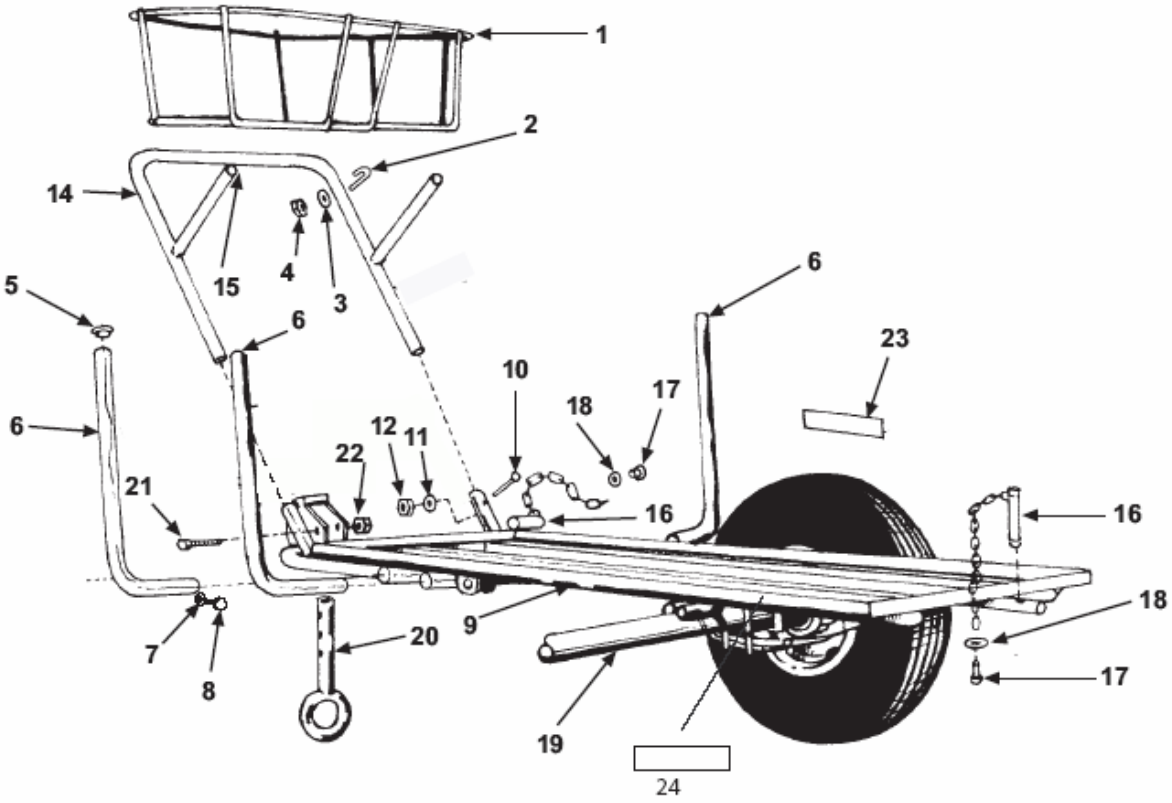

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Figure 6-14 • HT100 Trailer

• • • • • • • • • • • • • • • • •

Fig. & Index #	Part #	Description	Units per
6-14		**Panels, Bulkhead & Casing Installation**	**Ref.**
1	TR150	• BASKET, DUCT	1
2	TR152	• U-BOLT	4
3	WSFT12	• WASHER, FLAT #12	4
4	MS35690-1224	• NUT #12-24	4
5	HS51248	• PLUG, BUTTON	5
6	TR101	• HOLDER, DUCT	3
7	WSFT14	• WASHER, FLAT 1/4	5
8	NT1420KEP	• NUT KEP 1/4-20	5
9	TR200	• FRAME, TRAILER	1
10	BL14X134	• BOLT 1/4-20 x 1 3/4	5
11	WSFT14	• WASHER, FLAT 1/4	5
12	NT1420KEP	• NUT KEP 1/4-20	5
14	TR280-1	• HANDLE, RIGHT & LEFT SIDE	1
15	TR281	• HANDLE, HORIZONTAL	1
16	TR8	• PIN ASSEMBLY	1
17	BL14X12	• BOLT 1/4-20 x 1/2	1
18	MS35338-25	• WASHER, LOCK 1/4	1
19	N/A	• SPRING & WHEEL ASSEMBLY	1
20	TR260	• BAR ASSEMBLY, TOW	1
21	BL12X212	• BOLT 1/2-20 x 2 1/2	1
22	MS51922-37	• NUT 1/2-20	1
23	04010212	• DECAL, TIRE PRESSURE	2
24	04010211	• DECAL, MAX SPEED	2

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Figure 6-15 • Spring & Wheel Assembly

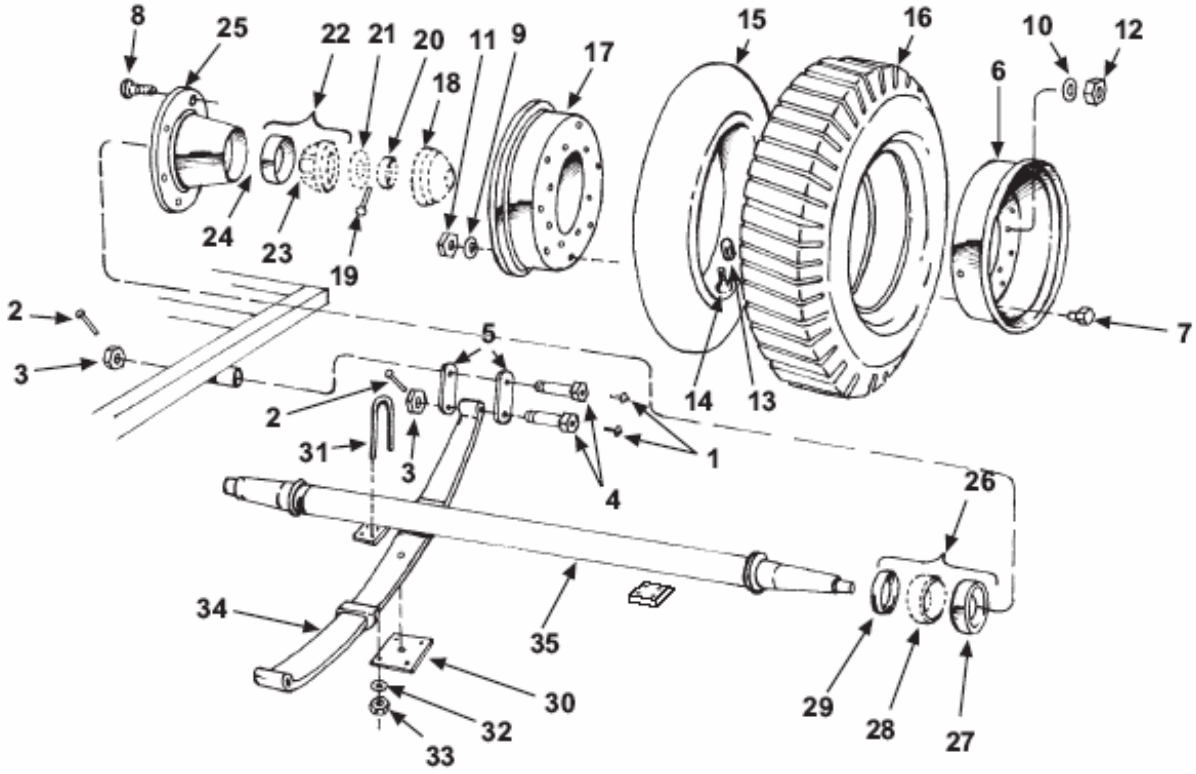

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Figure 6-15 • Spring & Wheel Assembly

• • • • • • • • • • • • • • • • •

Fig. & Index #	Part #	Description	Units per
6-15		**Spring & Wheel Assembly**	**Ref.**
1	MS15003-1	• FITTING, LUBRICATION	6
2	MS24665-353	• PIN, COTTER	6
3	MS35692-922	• NUT, SLOTTED	6
4	TR26	• BOLT SHACKLE	6
5	TR105	• SHACKLE, SPRING	6
6	R9-4.00-1	• RIM, OUTER	6
7	60-6-6	• BOLT, RIM 3/8-16 x 1	4
8	G661A	• BOLT, SHOULDER	2
9	WSSR38	• WASHER, LOCK, SPLIT RING 3/8	16
10	WSSR12	• WASHER, LOCK, SPLIT RING 1/2	10
11	MS35690-622	• NUT 3/6-16	16
12	AN325-8	• NUT 1/2-20	10
13	1714AM	• CAP, VALVE CORE	2
14	N/A	• CORE, TUBE VALVE	2
15	6909	• TUBE, INNER	2
16	690-9	• TIRE, PNEUMATIC	2
17	R9-4.00-2	• RIM, INNER	2
18	9-10-C-102	• CAP, GREASE	2
19	AN380-4-7	• PIN, COTTER	2
20	AN320-16	• NUT, SLOTTED	2

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Figure 6-15 • Spring & Wheel Assembly

• • • • • • • • • • • • • • • • •

Fig. & Index #	Part #	Description	Units per
6-15		**Spring & Wheel Assembly**	**Ref.**
21	13108	• WASHER, KEYED	2
22	A18393	• BEARING, ROLLER, TAPERED	2
23	15123	• CONE AND ROLLERS	2
24	15245	• CUP, OUTER	2
25	MS24328-2	• HUB, WHEEL	2
26	A10322	• BEARING, ROLLER, TAPERED	2
27	24720	• CUP, INNER	2
28	24780	• CONE AND ROLLERS	2
29	9-10-C-104	• SEAL, PLAIN, ENCASED	2
30	TR108	• PLATE, SPRING	2
31	TR109	• U-BOLT	4
32	WSFT14	• WASHER, FLAT 1/4	8
33	NT1420KEP	• NUT, KEP 1/4-20	8
34	TR22	• SPRING	2
35	TR21	• AXLE	1

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Figure 6-16 • Electric Prime Mover Assembly

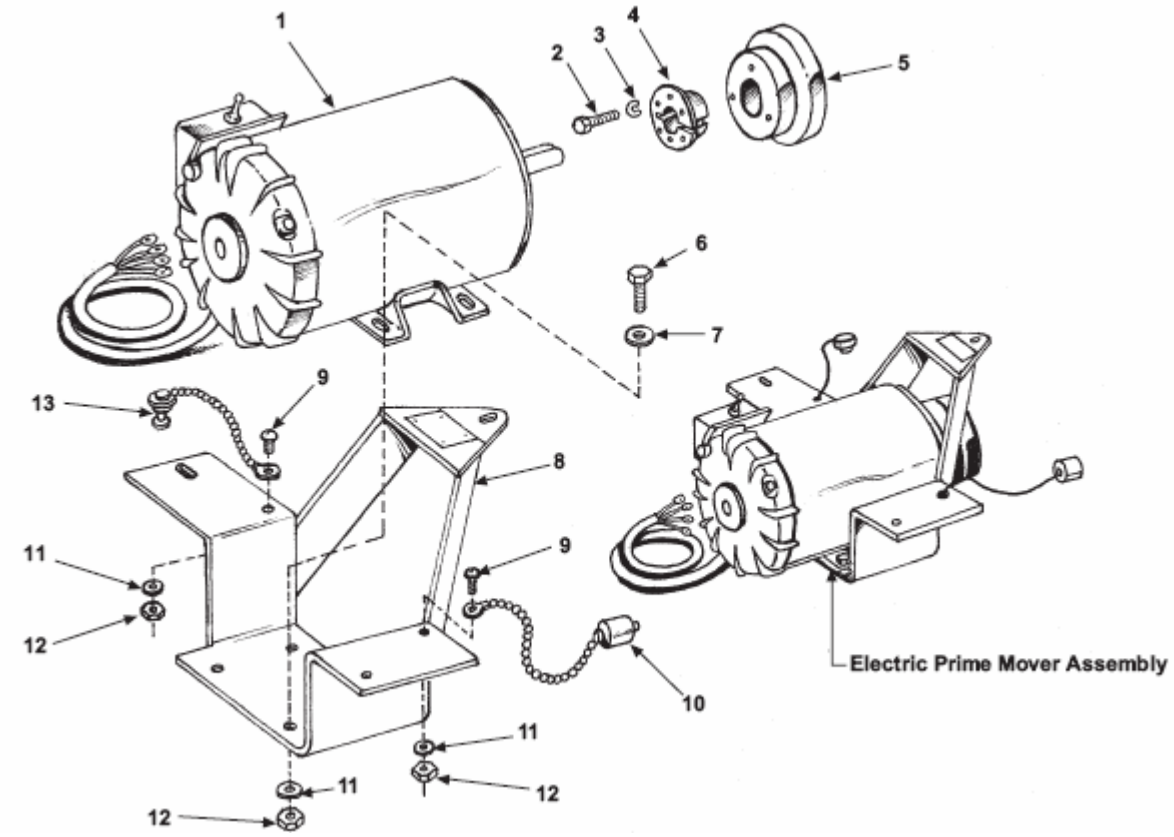

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Figure 6-16 • Electric Prime Mover Assembly

• • • • • • • • • • • • • • • • •

Fig. & Index #	Part #	Description	Units per
6-16	**TMA3018**	**Prime Mover, Electric**	**Ref.**
1	MTR110402	• MOTOR, ELECTRIC	1
2	N/A	• BOLT #10-24 x 1	3
3	N/A	• WASHER, LOCK, SPLIT RING #10	3
4	TM3917-5	• BUSHING, TAPERED, MOTOR SHAFT	1
5	TM3917-3	• COUPLING, DRIVE, MOTOR SHAFT	1
6	BL516X1	• BOLT, MACHINE, MOTOR MOUNTING 5/16-18 x 1	4
7	WSFT516	• WASHER, FLAT, 5/16	8
8	TMF3221	• BRACKET, ELECTRIC MOTOR	1
9	SC1024X12MS	• SCREW, MACHINE #10-24 x 1/2	2
10	TMA3020	• PLUG, ENGINE EXHAUST	1
11	WSFT10	• WASHER, FLAT, PLUGS #10	2
12	NT316HN	• NUT, PLAIN, HEXAGON #10-24	2
13	TR3346	• PLUG, DUST, ENGINE FUEL LINE	1

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Section 7

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Part #	Fig. & Index #	Units per	Part #	Fig. & Index #	Units per
04010017	14-6	1	100901	10-29	2
04010144	8-63	1	100931	10-30	1
04010152	13-6	1	101001	10-26	1
04010152	13-1	1	101641	10-31	1
04010165	13-11	2	103379	10-27	1
04010211	14-24	2	105021	10-5	1
04010212	14-23	2	110441	10-3	1
04020173	14-10	3	111302	10-4	1
04020174	14-10	1	111401	10-2	8
04040011	13-17	1	113331	10-14	1
04040016	13-19	1	114227	10-28	1
04040018	14-15	1	115462	10-20	1
04040019	12-6	1	116106	10-32	1
04040020	12-9	1	116B-14	8-17	1
04040022	14-16	1	117463	10-1	1
04100112	5-1	1	118732	10-15	1
04100115	8-85	1	121222	10-34	1
04100156	5-7	1	121732	10-33	1
04100157-1	9-5	1	123632	10-19	1
04100157-1	8-35	1	123652	10-21	1
04100157-1	8-5	1	123B14X18	8-13	1
05000152	5-5	1	1271131	10-9	1
100241	10-24	1	127297	10-12	1
100371	10-25	1	127297	10-11	1

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Part #	Fig. & Index #	Units per	Part #	Fig. & Index #	Units per
127297	10-10	1	400X4X4	8-8	3
127297	10-8	1	434X5	8-80	1
127297	10-7	1	49W516X18	8-2	1
127297	10-6	1	49X4X4	8-68	1
127562	10-22	1	51295	10-16	3
13108	15-21	2	60-6-6	15-7	4
131196	10-37	1	6909	15-15	2
131199	10-23	1	690-9	15-16	2
131201	10-13	1	702X2	8-11	1
131X4	8-82	1	9-10-C-102	15-18	2
13215	13-62	1	9-10-C-104	15-29	2
15123	15-23	2	969-6-14	8-18	1
15245	15-24	2	A10322	15-26	2
1615DC	10-18	1	A18393	15-22	2
1714AM	15-13	2	AD34ABS	13-2	4
24720	15-27	2	AN320-16	15-20	2
24780	15-28	2	AN325-8	15-12	10
250X4	8-83	1	AN380-4-7	15-19	2
28778	10-35	1	BF7808	8-43	1
3200X4	8-81	1	BF7808	8-40	1
3327X2	8-16	1	BF7808	8-39	1
3350X2	8-77	1	BF7809	8-10	1
3700X2	8-74	1	BF-7809	9-3	1
400X4	8-75	1	BF7810	8-42	1

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Part #	Fig. & Index #	Units per	Part #	Fig. & Index #	Units per
BF7810BF7812	8-72	3	BL516X112	3-13	4
BF7813	8-40	2	BL516X34	13-54	6
BF7819	11-1	1	BL516X34	13-45	4
BF-7822	9-2	1	BL516X34	8-34	1
BF7823	10-36	1	BL516X34	8-29	1
BF7823	8-11	1	BL516X34	8-26	1
BF7824	8-9	1	BL516X34	8-23	1
BF7825	8-13	1	C3159X4	8-79	1
BF7877	8-10	3	EVL-13483	11-15	1
BL12X212	14-21	1	EVL-13484	11-17	1
BL14X1	8-31	8	EVL-14260	11-16	1
BL14X1	1-4	8	EVL-18080	11-14	1
BL14X114	13-27	3	EVL-22772	11-13	1
BL14X12	14-17	1	EVL-42310	11-10	1
BL14X12	13-9	8	EVL-54165	11-11	1
BL14X12	13-4	8	EVL-63224	11-12	1
BL14X12	8-31	2	FT921	1-1	1
BL14X12	8-1	20	G661A	15-8	2
BL14X12	14-18	3	GX160	3-1	1
BL14X134	14-10	5	GX160MM	3-19	1
BL14X34	8-61	2	HS51248	14-5	5
BL14X34	14-9	1	MA-1	1-6	1
BL38X112	8-3	4	MS15003-1	15-1	6
BL516X1	16-6	4	MS15290	13-28	1

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Part #	Fig. & Index #	Units per	Part #	Fig. & Index #	Units per
MS15795-218	8-22	2	NT1024KEP	12-7	4
MS16535-155	13-43	4	NT1024KEP	8-55	4
MS16535-155	13-7	4	NT1024KEP	8-34	10
MS16997-80	13-21	4	NT1024KEP	8-26	2
MS171494	11-2	1	NT1024KEP	8-7	3
MS20450C8-8	13-13	1	NT1420KEP	15-33	8
MS20450C8-8	2-15	4	NT1420KEP	14-12	5
MS24328-2	15-25	2	NT1420KEP	14-8	5
MS24665-132	12-1	1	NT1420KEP	8-32	8
MS24665-353	15-2	6	NT1420KEP	13-25	3
MS29513-016	11-6	2	NT1420KEP	1-5	8
MS29513-112	11-5	2	NT316HN	16-12	2
MS29513-114	8-14	1	NT316HN	13-60	2
MS34645-1	8-19	1	NT316HN	13-51	8
MS35333-9	10-17	3	NT316HN	13-40	3
MS35338-25	14-18	1	NT316HN	13-36	3
MS35643-1	8-21	1	NT316HN	13-32	2
MS35690-1224	14-4	4	NT316HN	13-23	2
MS35690-622	15-11	16	NT316HN	13-16	1
MS35692-922	15-3	6	NT316HN	12-16	4
MS51922-37	14-22	1	NT316HN	12-12	3
MS51963-67	8-19	1	NT316HN	2-13	4
MS90725-108	8-21	2	NT316HN	2-7	4
MTR110402	16-1	1	NT316HN	2-3	11

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Part #	Fig. & Index #	Units per	Part #	Fig. & Index #	Units per
NT51618HN	3-10	4	SC832X12FH	13-23	3
NT832KEP	13-19	3	SC832X12FH	14-11	3
R9-400-1	15-6	6	SC832X34MS	13-26	12
R9-400-2	15-17	2	T0533A	8-70	1
SC1024X12MS	16-9	2	T0539A	8-58	1
SC1024X12MS	13-58	2	T0540A	11-3	1
SC1024X12MS	13-38	3	T0542	11-4	2
SC1024X12MS	13-34	3	T0555A	8-1	1
SC1024X12MS	13-30	2	T0574C	8-48	1
SC1024X12MS	13-21	2	T0586E	8-46	1
SC1024X12MS	13-12	1	T0587C	8-44	1
SC1024X12MS	12-14	4	T0653A	8-49	1
SC1024X12MS	12-10	3	T0653A	8-47	1
SC1024X12MS	8-53	4	T0653A	8-45	1
SC1024X12MS	8-30	2	T0655A	8-41	1
SC1024X12MS	8-24	2	T0657	8-64	1
SC1024X12MS	2-11	4	T0657	3-18	1
SC1024X12MS	2-5	4	T0F64C	8-56	1
SC1024X34MS	13-50	8	TA218A	13-48	4
SC1024X34MS	2-1	11	TA235	12-13	4
SC632X12MS	8-28	2	TA3300	13-37	1
SC632X12MS	3-17	4	TA3314-1	12-3	1
SC632X12MS	2-9	2	TAF3154	12-18	1
SC632X14MS	14-3	4	TAF3158	12-5	1

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Part #	Fig. & Index #	Units per	Part #	Fig. & Index #	Units per
TAF3166-100	13-44	1	TD006	1-2	3
TAH-45	3-20	2	TD012	1-3	2
TB3300	8-50	1	TE1010B	5-3	1
TC1625C	13-42	1	TE1305	13-41	1
TC4021	13-52	2	TE1305	9-6	1
TC4149-1	8-22	1	TE1305	9-4	1
TC4149-2	8-33	1	TE1305	8-36	1
TC4150-1	8-25	1	TE1305	8-6	1
TC4150-2	8-28	1	TE1305	8-4	3
TC628	8-27	1	TE1305	5-2	1
TC628	2-16	1	TM3866	8-15	1
TC643	2-14	2	TM39162M10	14-13	1
TCF3221	8-16	1	TM3917-1	13-29	1
TCF3222	13-57	1	TM3917-2	14-2	1
TCF3223	2-4	1	TM3917-3	16-5	1
TCF3224	8-29	1	TM3917-3MODB	3-7	1
TCF3227	2-10	1	TM3917-5	16-4	1
TCF3228	8-23	1	TM3919	8-18	1
TCF3235-100	13-56	1	TM3921	14-14	1
TCF3264-100	13-33	1	TM3925	14-7	1
TCF3265-100	2-8	1	TM3927	14-1	1
TCF3266-100	13-8	1	TM3958-MOD8	3-6	1
TCF3266-101	13-3	1	TM3959	14-5	2
TCF3267-100	13-61	1	TM4004-MODB	3-2	1

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Part #	Fig. & Index #	Units per	Part #	Fig. & Index #	Units per
TM4005-1	8-69	1	TR260	14-20	1
TM4008-1	13-24	1	TR280-1	14-14	1
TM4010-1	13-20	1	TR281	14-15	1
TM4031-1	13-29	1	TR3268	8-52	1
TMA3020	16-10	1	TR3269	11-9	1
TMF106	14-10	1	TR3269	8-60	1
TMF3210-MODB	3-14	1	TR3274	11-8	1
TMF3221	16-8	1	TR3275	11-7	1
TMF3230-100	13-53	1	TR3276	8-57	1
TMF3230-100	5-6	1	TR3277	8-20	1
TMF3231-MODB	3-11	1	TR3304	13-25	1
TMF3232-MODB	3-4	1	TR3313	13-18	1
TMF3240	13-59	1	TR3318	8-51	1
TO3027	8-66	1	TR3343	12-2	1
TR101	14-6	3	TR3346	16-13	1
TR105	15-5	6	TR3371-1	8-71	1
TR108	15-30	2	TR3375-1	13-49	2
TR109	15-31	4	TR3392-1	8-65	1
TR150	14-1	1	TR8	14-16	1
TR152	14-2	4	TRA3045-100	8-73	1
TR200	14-9	1	TRA3046-100	8-76	1
TR21	15-35	1	TRA3047-100	8-37	1
TR22	15-34	2	TRA3048-100	8-9	3
TR26	15-4	6	TRA3049-100	9-7	1

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TRA3049-100	8-7	1	WSFT10	13-35	3
TRA3056-100	9-1	1	WSFT10	13-31	2
TRA3056-100	8-12	1	WSFT10	13-22	2
TRA3057-100	8-84	1	WSFT10	13-15	1
TRA3058-100	8-38	1	WSFT10	13-14	1
TRA3059-100	8-67	1	WSFT10	12-15	4
TRF3081	8-59	1	WSFT10	12-11	3
TRF3082	12-4	1	WSFT10	12-8	2
TRF3094	12-17	1	WSFT10	8-54	4
TRF762	5-4	1	WSFT10	8-32	2
TT3016-1	8-78	3	WSFT10	8-25	2
TT3016-2	8-15	1	WSFT10	8-5	3
TT403	8-8	41	WSFT12	14-3	4
TTF3000-1	8-17	1	WSFT14	15-32	8
TX592	13-28	1	WSFT14	14-11	5
TX595	12-19	1	WSFT14	14-7	5
WH7TIEBLK	8-3	2	WSFT14	13-10	8
WS1NT14	13-24	3	WSFT14	13-5	8
WS1NT14	14-17	3	WSFT14	8-33	2
WSFT08	13-27	12	WSFT14	8-4	20
WSFT08	13-20	3	WSFT14	8-2	3
WSFT08	14-12	3	WSFT14	13-26	3
WSFT10	16-11	2	WSFT14	14-8	1
WSFT10	13-39	3	WSFT38	8-6	4

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Part #	Fig. & Index #	Units per	Part #	Fig. & Index #	Units per
WSFT516	16-7	8			
WSFT516	13-47	4			
WSFT516	3-15	4			
WSFT516	3-12	4			
WSFT516	3-8	4			
WSSR06	14-4	4			
WSSR10	2-12	4			
WSSR10	2-6	4			
WSSR10	2-2	11			
WSSR12	15-10	10			
WSSR14	8-62	2			
WSSR38	15-9	16			
WSSR516	13-55	6			
WSSR516	13-46	4			
WSSR516	8-30	1			
WSSR516	8-27	4			
WSSR516	8-24	1			
WSSR516	8-12	2			
WSSR516	13-22	4			
WSSR516	3-16	4			
WSSR516	3-9	4			

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