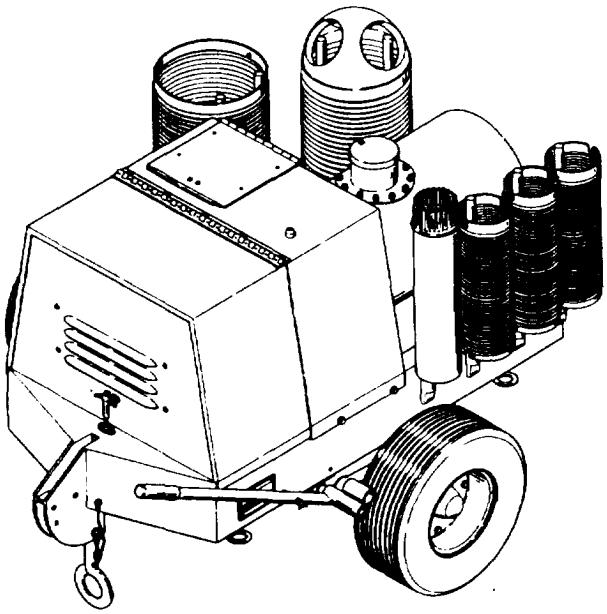
*TM 9-4520-251-14

TECHNICAL MANUAL

Operator's, Unit, Direct Support, and General Support Maintenance Manual



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HEATER, DUCT TYPE, PORTABLE, TRAILER MOUNTED, 400,000 BTU/HR
MODEL PH-400-G

NSN 4520-01-136-2139

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited

***This manual supersedes TM 5-4520-251-14, dated 15 Jan 88.**

HEADQUARTERS, DEPARTMENT OF THE ARMY
30 JUNE 1993

TECHNICAL MANUAL

NO. 9-4520-251-14

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON D.C., 30 June 1993

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HEATER, DUCT TYPE, PORTABLE, TRAILER MOUNTED
400,000 BTU/HR, MODEL PH-400-G

NSN 4520-01-136-2139

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, US Army Aviation and Troop Command, ATTN: AMSAT- I-MP, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798. A reply will be furnished directly to you.

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Chapter 1 INTRODUCTION

Section I. GENERAL INFORMATION

1-1 SCOPE.

Type of Manual: Operator's, Unit, Direct Support, and General Support Maintenance Manual.

Model Number and Equipment Name: Hunter Model PH-400-G, 400,000 Btu/Hr, Trailer Mounted, Portable Duct Type Heater.

Purpose of Equipment: Heats enclosed spaces. The unit covered by this manual is designed for heating air to a desired range and circulating the air to provide heating of equipment or personnel within an area.

1-2 MAINTENANCE FORMS AND RECORDS.

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-750, The Army Maintenance Management System (TAMMS).

1-3 HAND RECEIPT MANUAL.

This manual has a companion document with a TM number followed by HR (which stands for Hand Receipt). The TM 9-4520-251-14HR consists of preprinted hand receipts (DA Form 2062) that list end item related equipment (i.e., COEI, Bll, and AAL) you must account for. As an aid to property accountability, additional -HR manuals may be requisitioned from the following source in accordance with procedures in Chapter 3, AR 310-2:

The US Army Adjutant General Publications Center
2800 Eastern Blvd.
Baltimore, MD 21220-2896

1-4 REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR'S).

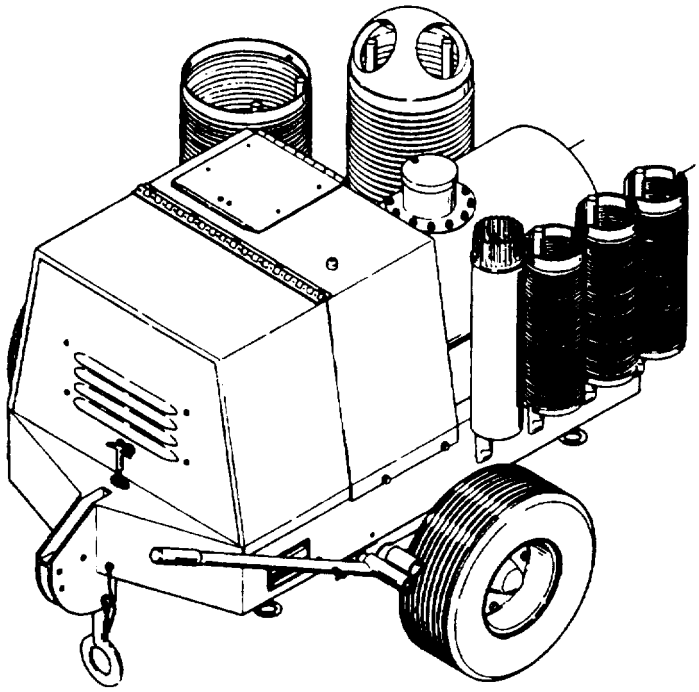
If your heater needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Quality Deficiency Report). Mail it to us at Commander, Headquarters, U.S. Army Aviation and Troop Command, Attention: AMSAT-I-MDO, 4300 Goodfellow Boulevard, St. Louis, Missouri 63120-1798. We will send you a reply.

1-5 DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE.

Command decisions, according to tactical situation, will determine when destruction of the heater unit will be accomplished. A destruction plan will be prepared by the using organization, unless one has been prepared by higher authority. For general destruction procedures for this equipment, refer to TM 750-244-3, Procedures for Destruction of Equipment to Prevent Enemy Use.

1-6 PREPARATION FOR STORAGE OR SHIPMENT.

Contact unit maintenance for heater unit preparation for storage or shipment.



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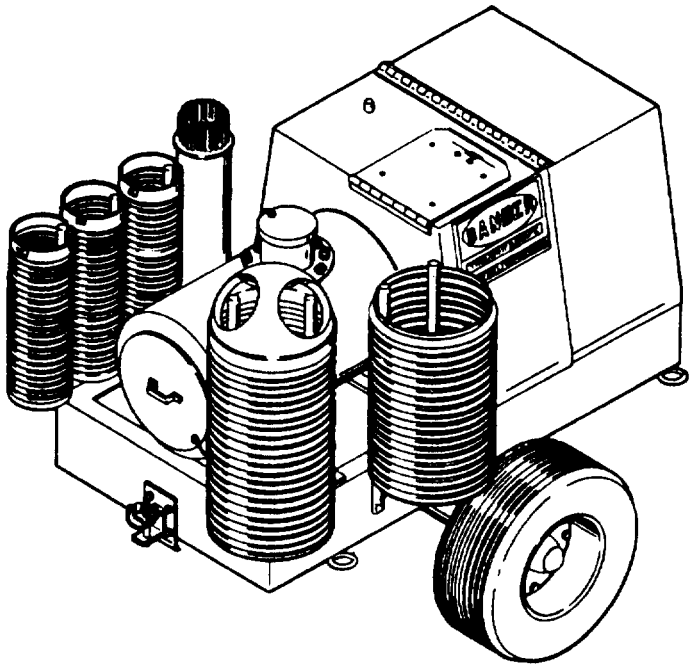


REAR

Model PH-400-G Heater

Section II. EQUIPMENT DESCRIPTION AND DATA

1-7 PURPOSE OF HEATER.

Model PH-400-G burns gasoline to generate fresh, uncontaminated heated air. The gasoline is pumped from a fuel tank, forced through a spray nozzle, ignited, and burned in the combustion chamber of a heat exchanger. A fan blows air through the heat exchanger where it is heated and delivered through ducts to the area to be heated. Model PH-400-G is used in the following applications:

a. To preheat aircraft engines and fuselage.

b. To heat ground vehicles.

c. To heat maintenance buildings, field shelters, and temporary structures.

d. To supply forced fresh air ventilation without heating.

1-8 CAPABIUTIES AND FEATURES.

a. Fully-enclosed, self-contained unit

b. Trailer mounted - ground portable

c. Gasoline fuel - gasoline engine driven

d. Variable temperature range

e. With exhaust properly vented, heater delivers uncontaminated air through the flexible duct

1-9 LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.

a. FRONT HALF HOOD. Open for access to prime mover.

b. FAN. Provides combustion air and ventilating air.

c. ENGINE. Gasoline engine to drive fan, fuel pump, and ignition armature.

d. FUEL PUMP. Pumps gasoline from fuel tank to combustor and engine.

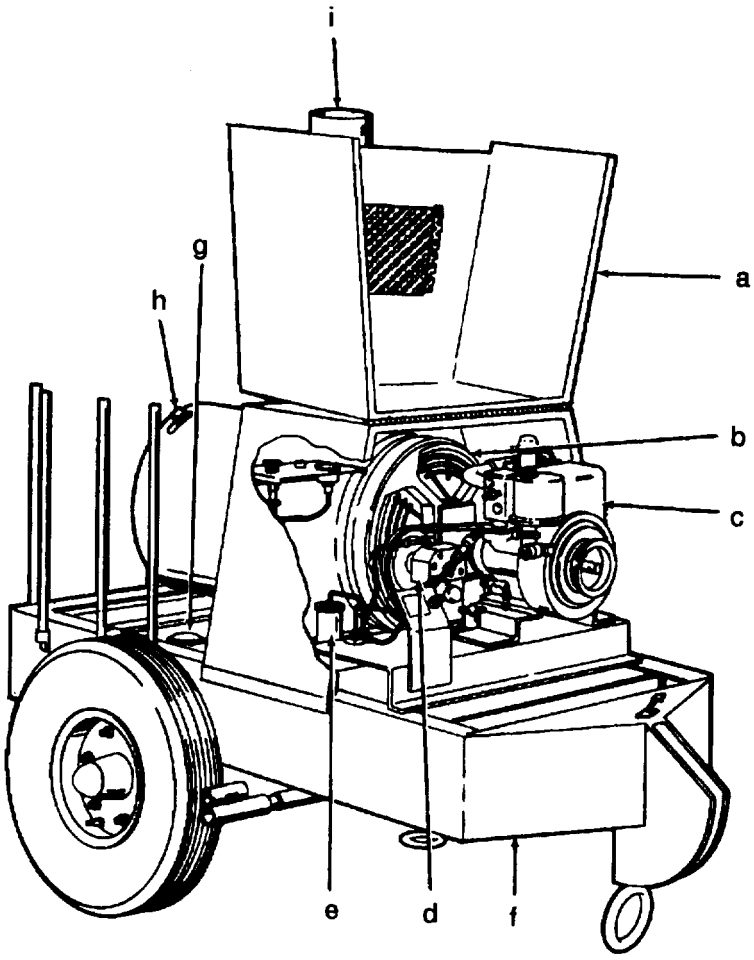
e. GASOLINE FILTER. Ensures that only dean fuel is fed to combustor and engine.

f. TRAILER. Provides mounting for heater assembly and a means of transporting heater.

g. FUEL TANK. Holds supply of gasoline for combustor flame and for operation of prime mover.

h. HEAT EXCHANGER. Fuel burns inside heat exchanger. Fan blows air over exterior of heat exchanger. Heated air is blown out of heat exchanger.

i. EXHAUST STACK. Expels burned gasoline fumes to exterior of heater.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1-10 EQUIPMENT DATA.

Manufacturer . . . . . Hunter Manufacturing Co.
Model PH--400-G
Heated air output:
Maximum . . . . . 400,000 Btu/hr @ -65°F (-54°C) ambient
Minimum . . . . . 100,000 Btu/hr @ 70°F (21°C) ambient
Heated air temperature range:
Maximum . . . . . 280°F(138°C)
Minimum . . . . . 150°F(65.6°C)
Air delivery rate:
Maximum . . . . . 1500 cfm (0.707 cu m/s)
Minimum . . . . . 600 cfm (0.28 cu m/s)
Fuel . . . . . Gasoline per MIL-G-3056
Fuel tank capacity (nominal) . . . . . 34.5 gal(131 liters)
Overall dimensions:
Length . . . . . 78 in. (1981 mm)
Height . . . . . 40 in. (1016 mm)
Width . . . . . 54 in. (1372 mm)
Shipping Cubit . . . . . 70.3 cu ft(1.99 cum)
Weight, empty . . . . . 675 lb(306kg)
Engine (gasoline) 1-HP2-4552
Engine speed, factory set . . . . . 3450 t0 3750 rpm

Section III. TECHNICAL PRINCIPLES OF OPERATION

1-11 HEATER OPERATING PRINCIPLES.

a. Engine (1) is set into operation by means of a starter rope. The engine speed is approximately 3600 rpm.

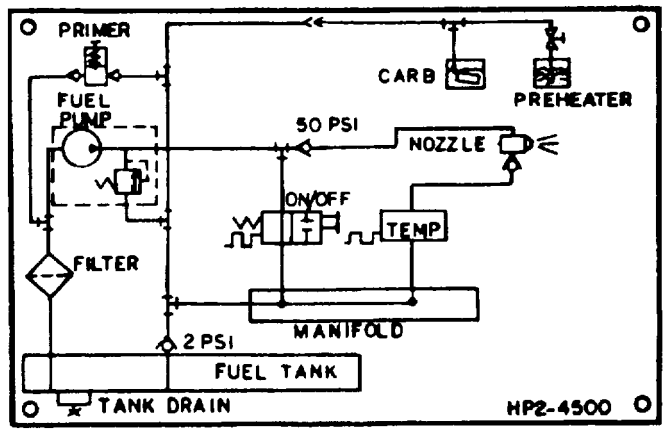
b. Engine (1) is direct-coupled to fan (2). A portion of the fan air is used for burning fuel,the remainder is heated and forced out as hot air.

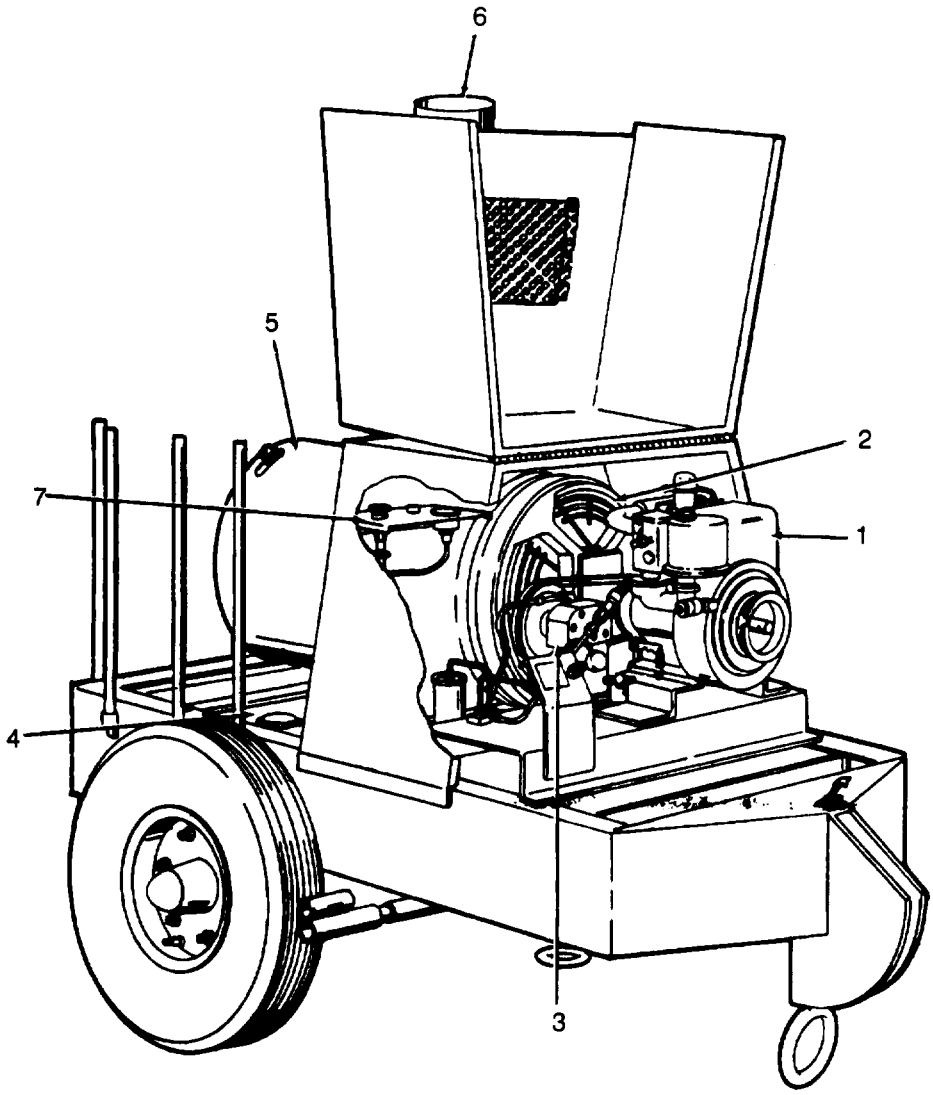
c. A belt from engine (1) drives fuel pump (3). The fuel pump pumps gasoline from fuel tank (4) into the combustor section of heat exchanger (5) and supplies fuel to the engine.

d. In the combustor section of heat exchanger (5), fuel is sprayed through a nozzle. Alongside the nozzle is an igniter, which is similar to a spark plug. An altemator delivers high voltage to the igniter to produce an electric arc. The arc keeps the-gasoline burning at the nozzle.

e. A combustion chamber in heat exchanger (5) isolates air used for burning fuel from space heating air. Burning fuel fumes and the gasoline engine exhaust are expelled through exhaust stack(6). Clean, heated air blows out of heat exchanger (5). Air duct hoses carry heated air to the location to be heated.

f. Controls (7) allow adjustment of the combustion flame for various outlet air temperatures. Gauges indicate air temperature and fuel level in the fuel tank.

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Chapter 2 OPERATING INSTRUCTIONS

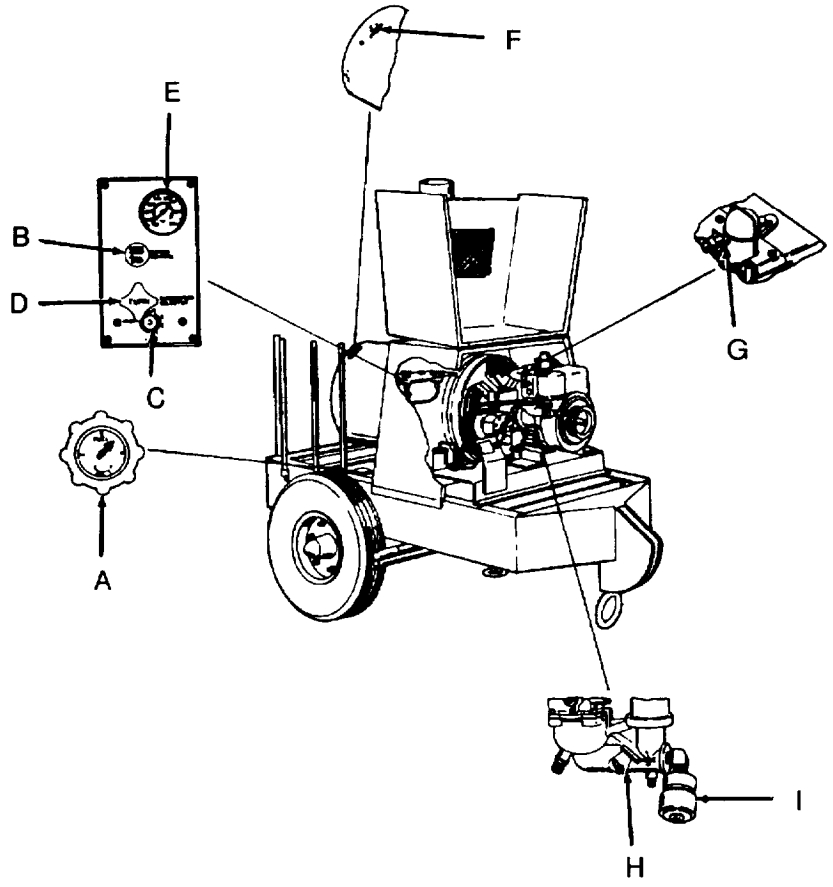
Section I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

2-1 GENERAL.

The Model PH-400-G Heater is designed for a variety of installations and for operation under a wide range of climatic conditions. It is also designed for continuous or intermittent operation as a self-contained unit. Heaters may be used to heat warehouses and for shop applications if personnel exposure is limited to not more than 8 hours and ventilation is adequate.

2-2 OPERATOR'S CONTROLS AND INDICATORS.

A FUEL GAUGE (Located on fuel tank). Needle indicates E (empty), 1/4, 1/2, 3/4, and F (full).

B BURNER CONTROL KNOB. When dosed (up) fuel goes to tank, when open (down) fuel goes to nozzle.

C TEMPERATURE INDICATOR KNOB. Pointer on knob indicates selected temperatures in 25-degree steps from low to 150°F (65.6°C) to high of 280°F (138°C).