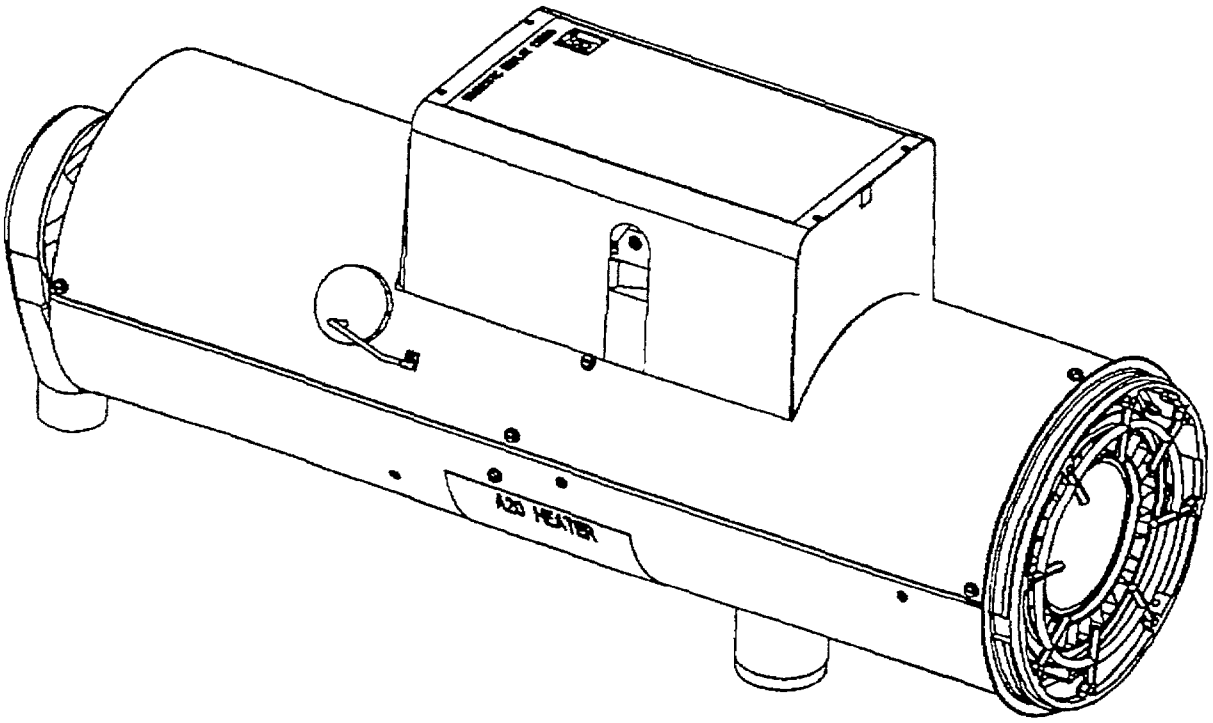
TECHNICAL MANUAL
UNIT, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR HEATER, VEHICULAR COMPARTMENT

NSN 2540-01-396-2826
MODEL A-20



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HEADQUARTERS, DEPARTMENT OF THE ARMY
1 APRIL 2001

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GLOSSARY OF TERMS

Ambient Temperature - This is the natural temperature of the environment surrounding the Heater.

BTU/Hr - An acronym for British Thermal Units per Hour, which is a measurement of heat flow.

Diagnostic - The process of identifying the cause of a fault by analyzing operating parameters.

Microprocessor - An integrated circuit that is used for the purpose of executing software instructions.

MS Connector - A five pin connector used to connect the Heater Control Box to the Heater. The connecting cable and Control Box are part of the vehicle equipped components.

PC Board - An electronic circuit board. The Heater has 5 PC boards: Power & Logic Controller (2), Vent Fan, Burner Fan, and Diagnostic Display.

PSI - An acronym for Pounds per Square Inch, which is a measure of pressure.

SCFM - An acronym for Standard Cubic Feet per Minute, which is a measure of air flow. Standard means that the air density has been corrected to standard pressure and temperature.

USG/Hr - An acronym for United States Gallons per Hour, which is a measure of liquid (fuel) flow.

Watts - A measure of electrical power which is calculated as the product of Voltage and Electrical Current (V x A).

SECTION 1
INTRODUCTION

1.1 THE A-20 GLOBAL HEATER

The model A-20 Global Heater is an electrically controlled fuel fired 60,000 BTU/Hr. Vehicle Personnel Heater. It is able to operate from any available 24 Volt dc power source, and produces heat through the combustion of Diesel or Jet grade fuels.

The A-20 Global Heater utilizes rotary atomization of fuel in conjunction with a heated wick to provide the rated output of 60,000 BTU/hr. Two separate fan systems are used: the vent fan system provides the heated air at a rate of 205 SCFM, while the burner fan supplies the combustion air. The heater can operate with combustion air drawn either from inside or outside the vehicle, with conversion between single and dual air modes quick and easy. The heater utilizes an on-board computer system for operation control, and to signal to the operator the occurrences of any operating faults or abnormal situations.

It is intended to re-circulate and heat air in the crew compartment of military vehicles. The A-20 Global Heater meets the requirements of the Class II heater described in specification sheet number: MIL-H-62550D(AT); "Heater Assembly, Combustion Vehicular Compartment, 8.8/17.6 kW (30,000/60,000 BTU/Hr) ".

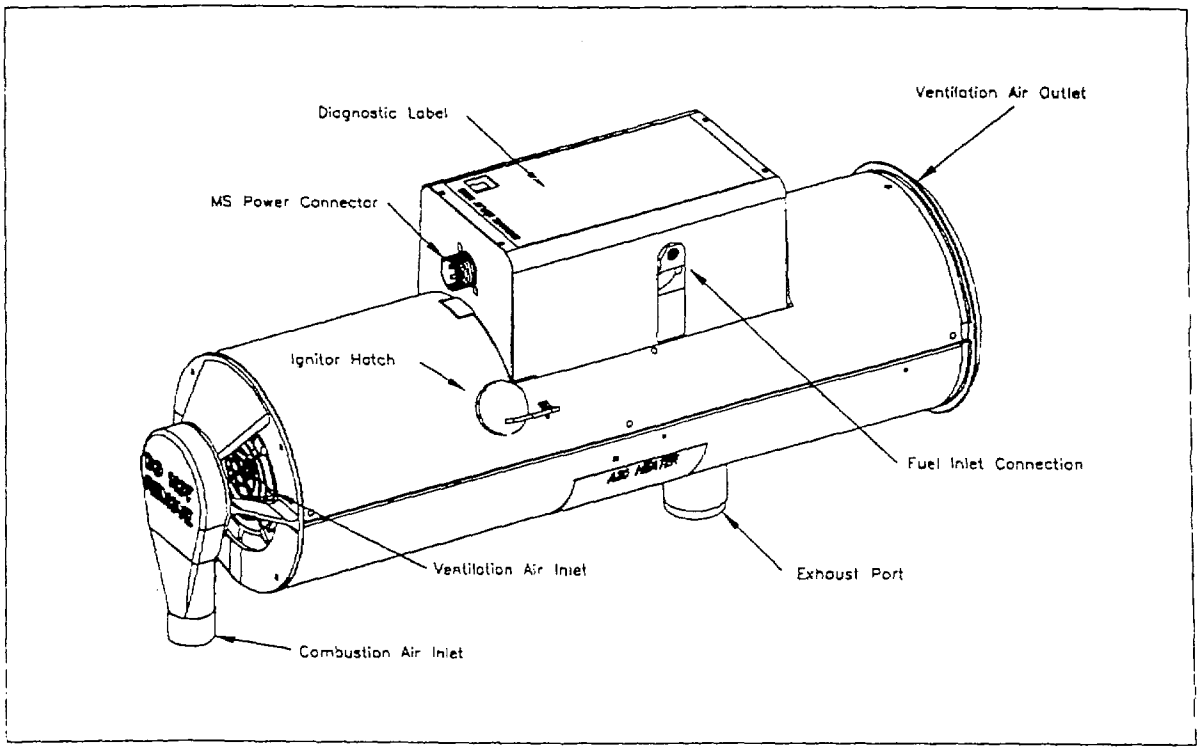

Figure 1-1. A-20 Global Heater

1.2 PRINCIPLES OF OPERATION

ELECTRONIC CONTROLLER

The Heater operation is controlled by an electronic micro controller (Programmed Controller) supported by hardware and software. The hardware is based on a microprocessor and power handling circuits that direct signals and power to and from all inputs and outputs. The microprocessor is programmed with software to receive input data, perform calculations, and send output signals and data. The software is a unique set of instructions that the microprocessor executes to perform calculations, store information, read input data, control output signals, and measure time.

Programmed Controller inputs are required to power the electronic controller board, and to provide input data to the micro-processor. Programmed Controller outputs are used to operate the Heater assemblies for ignition, air delivery, fuel delivery, safety, and self diagnosis.

BURNER

The Burner uses a fuel spinner that can atomize all types of diesel fuel; a sheathed glow plug ignitor is used to ignite the fuel; a Burner Temperature Sensor (Thermocouple) in the Burner, and another in the Heat Exchanger exhaust monitor operating temperatures. During the Heater start up, the Ignitor is energized, and a small amount of fuel is then introduced (approximately one minute after the Ignitor is turned on). When ignition of the fuel happens, the Programmed Controller will sense a rapid Burner temperature increase. When this temperature increase is detected, the Programmed Controller will output signals to deliver more combustion air and fuel to the primary burner. Fuel is pumped through a spinning shaft spraying the fuel into a mist, which is then ignited. As the Burner temperature steadily increases, so does the air and fuel delivery rates. If at any time during this ramp-up phase a flame-out should occur, the Programmed Controller will reduce air and fuel delivery until the Burner temperature sensor detects that ignition has been re-established.

During start up, about 10 to 20 percent of the normal fuel quantity is delivered for ignition purposes. This ensures a safely controlled start and prevents the Burner from flooding with fuel. This allows the operator to restart the Heater without excessive fuel build up inside the Burner and the Heat Exchanger.

Note: The operator should not try more than three (3) consecutive start attempts without referring to the Diagnostic Display code displayed, and commencing Troubleshooting and any recommended maintenance actions.