

TECHNICAL MANUAL

**OPERATOR'S AND UNIT MAINTENANCE MANUAL  
(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LISTS)**

**SPACE HEATER, CONVECTIVE  
NSN 4520-01-431-8927**



DISTRIBUTION STATEMENT A – Approved for public release; distribution is unlimited.

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**HEADQUARTERS, DEPARTMENT OF THE ARMY  
29 JANUARY 2002**

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## WARNING SUMMARY

This warning summary contains general safety warnings and hazardous materials warnings that must be understood and applied during operation of this equipment. Failure to observe these precautions could result in serious injury or death to personnel. Also included are explanations of safety and hazardous materials icons used within this technical manual.

### EXPLANATION OF SAFETY WARNING ICONS



**ELECTRICAL** - electrical wire to arm with electricity symbol running through human body shows that shock hazard is present.



**HEAVY OBJECT** – human figure stooping over heavy object shows physical injury potential from improper lifting technique.



**CARBON MONOXIDE** – human figure showing gaseous substance being inhaled into respiratory system, demonstrating potential hazard.



**EXPLOSION** - rapidly expanding symbol shows that the material may explode if subjected to high temperatures, sources of ignition, or high pressure.



**FIRE** - flame shows that a material may ignite and cause burns.



**HOT AREA** - hand over object radiating heat shows that part is hot and can burn.



**CRYOGENIC** - hand in block of ice shows that the material is extremely cold and can injure human skin or tissue.



**CHEMICAL** - drops of liquid on hand shows that the material will cause burns or irritation to human skin or tissue.



**POISON** - skull and crossbones shows that a material is poisonous or is a danger to life.



**SHARP OBJECT** - pointed object in hand shows that a sharp object presents a danger to limb.

GENERAL SAFETY WARNINGS DESCRIPTION



**WARNING**

Carbon monoxide is without color or smell, but can kill you. Breathing carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, a sleepy feeling, and coma. Brain damage or death can result from heavy exposure. Carbon monoxide occurs in the exhaust fumes of fuel-burning heaters and internal combustion engines. Carbon monoxide can become dangerously concentrated under conditions of no ventilation.

Precautions must be followed to ensure operator's safety when the Space Heater, Convective is in operation.

- DO NOT operate Space Heater, Convective in an enclosed area without proper ventilation.
- BE ALERT at all times during operating procedures for carbon monoxide poisoning. If symptoms are present, IMMEDIATELY evacuate personnel to fresh air.
- BE AWARE the field protection mask used for nuclear-biological-chemical attack WILL NOT protect you from carbon monoxide poisoning.

THE BEST DEFENSE AGAINST CARBON MONOXIDE POISONING IS GOOD VENTILATION.



**WARNING**

Do not touch cold metal parts with bare hands. Frostbite can cause permanent injury to personnel.



**WARNING**

Fuels are toxic and flammable. Wear protective goggles and refuel only in a well-ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. If you become dizzy, get fresh air immediately and get medical aid. If contact with eyes or skin is made, immediately flush with clean water and get medical aid for eyes immediately.







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**WARNING**

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The Space Heater Convective weighs approximately 74 pounds (33.6 kg) without accessories. Two persons must carry the unit, lifting with legs, not back, to prevent injury.



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**WARNING**

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DO NOT MOVE THE HEATER ASSEMBLY WHILE ANY OF THE ADVISORY LIGHTS ARE LIT.

Small, portable, shelter heaters of this type are not designed to be moved during operation or before purge cycles are complete. Serious injury, burns, or death can occur if the heater assembly is moved while operating or before the HEATER ON/ON-HOLD advisory light goes OFF indicating the end of operation, post purge, and cool down cycle completion.

During operation, some metal components of the heater assembly, such as the louver on the outlet duct, the upper and lower heater housing assemblies, combustion exhaust pipe, etc., can cause severe burn injuries if contact with bare skin occurs.

During heater operation, air leaving the HEATED AIR OUTLET of the heater and passing through outlet duct with louver may exceed 220°F. Make sure tent personnel are aware of burn hazards and equipment hazards presented by the heated air and the louver.

Combustible material must be kept at least 2 feet away from the sides of the heater during operation.

Do not attempt service procedures on a burner that has recently been in operation. Let the burner cool down before performing these procedures to avoid the possibility of serious burns.



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**WARNING**

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Gasoline and JP-4 should NOT be used with the Space Heater, Convective under any circumstance. Only JP-8 or an approved alternate fuel as detailed in WP 0002 and WP 0001 Table 3, may be used. Failure to observe fuel requirements could cause damage to the heater assembly and injury or death to personnel within or around the tent and the heater assembly.

Always place fuel can and stand in well-ventilated area as far away from open flames and other potential ignition sources as possible. Fuel spills shall be cleaned up in accordance with local requirements.

Always switch heater ON/OFF control to the OFF position and wait until the green HEATER ON/ON-HOLD light is OFF before refueling.



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**WARNING**

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Some metal components of SHC may have sharp edges. Be careful when handling and assembling the SHC to prevent cuts.



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**WARNING**

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The heater has been designed to operate in dusty or sandy conditions. However, some forms of very fine dusts may be explosive (e.g., flour, chaff, coal, etc.). Before operation of the heater in dusty conditions, the type of dust shall be identified to insure that it is not explosive in nature.

**TM 10-4520-262-12&P**

INSERT LATEST CHANGED PAGES / WORK PACKAGES. DESTROY SUPERSEDED DATA

**LIST OF EFFECTIVE PAGES / WORK PACKAGES**

NOTE: The portion of text affected by the changes is indicated by a vertical line in the outer margins of the page. Changes to illustrations are indicated by miniature pointing hands. Changes to wiring diagrams are indicated by shaded areas.

Dates of issue for original and changed pages / work packages are:

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**TOTAL NUMBER OF PAGES FOR FRONT AND REAR MATTER IS 30 AND TOTAL NUMBER OF WORK PACKAGES IS 70 CONSISTING OF THE FOLLOWING:**

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\*Zero in this column indicates an original page or work package

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HEADQUARTERS,  
DEPARTMENT OF THE ARMY  
WASHINGTON, D.C., 29 January 2002

**OPERATOR’S AND UNIT MAINTENANCE MANUAL  
INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST**

**FOR**

**SPACE HEATER, CONVECTIVE (SHC)**

**NSN 4520-01-431-8927**

**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 together with DA Form 2028 (Recommended Changes to Publications and Blank Forms), located in the back of this manual, directly to: Commander, U.S. Army Soldier and Biological Chemical Command, ATTN: AMSSB-RIM-E(N), Kansas Street, Natick, MA 01760-5052. You may also send in your recommended changes via electronic mail directly to amssb-rim-e@natick-army.mil. A reply will be furnished to you. Instructions for sending an electronic 2028 may be found at the back of this manual immediately preceding the hard copy 2028.

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## TM 10-4520-262-12&P

### HOW TO USE THIS MANUAL

This manual contains General Information, Operating Instructions, Operator Preventive Maintenance Checks and Services (PCMS), Troubleshooting, and Maintenance/Repair instructions for the Convective Space Heater.

Chapter 1 contains introductory information on the SHC and its associated equipment as well as a Theory of Operation. Chapter 2 includes operating instructions under usual and unusual conditions. Chapter 3 contents include operator troubleshooting, PMCS, and service procedures. Chapter 4 contains Unit Maintenance instructions. Chapter 5 contains Direct Support Maintenance instructions. Chapter 6 contains references and other supporting information. Chapter 6 also includes the Repair Parts and Special Tools List (RPSTL) which identifies those parts or tools which are unique to the operation and maintenance of this equipment.

**Manual Organization and Page Numbering System.** The manual is divided into six major chapters that detail the topics mentioned above. Within each chapter are work packages covering a wide range of topics. Each work package is numbered sequentially starting at page 1. The work package has its own page numbering scheme and is independent of the page numbering used by other work packages. Each page of a work package has a page number of the form XXXX YY-ZZ where XXXX is the work package number (e.g. 0010 is work package 10) and YY is the revision number for that work package and ZZ represents the number of the page within that work package. A page number such as 0010 00-1/2 blank means that page 1 contains information but page 2 of that work package has been intentionally left blank.

**Text and Illustrations.** Descriptive text and procedures are always accompanied by one or more illustrations. The text or procedure will be annotated with find numbers such as "(1)" that correspond to a specific callout on the illustration. In this technical manual, the descriptive text or procedure will always precede the illustration. Therefore, when reading a section in the manual, always look for the accompanying illustration to follow the section.

**Finding Information.** The Table of Contents permits the reader to find information in the manual quickly. The reader should start here first when looking for a specific topic. The Table of Contents lists the topics contained within each chapter and the Work Package Sequence Number where it can be found.

Example: If the reader were looking for instructions on "Preventive Maintenance Checks and Services", which is an Operator Maintenance topic, the Table of Contents indicates that Operator Maintenance information can be found in Chapter 4. Scanning down the listings for Chapter 4, "Preventive Maintenance Checks and Services" information can be found in WP 0010 00 (i.e. Work Package 10).

An Alphabetical Index can be found at the back of the manual, and lists specific topics with the corresponding work package.

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**SPACE HEATER, CONVECTIVE (SHC)  
GENERAL INFORMATION**

**SCOPE**

Type of Manual. Operator's, Unit, and Direct Support Maintenance, including RPSTL.

Part Number and Equipment Name. Part Number 5-13-5600 U.S. Army Modular Command Post System Space Heater, Convective.

Purpose of Equipment. Heats a modular command post system (Tent) or other equivalent enclosure.

**MAINTENANCE FORMS, RECORDS, AND REPORTS**

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA Pam 738-750, Functional Users Manual for The Army Maintenance Management System; DA Pam 738-75 1, Functional Users Manual for The Army Maintenance Management System - Aviation (TAMMS-A); or AR 700-138, Army Logistics Readiness and Sustainability.

**DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE**

For destruction procedures for materiel, refer to TM 750-244-3.

**PREPARATION FOR STORAGE OR SHIPMENT**

See unit maintenance instructions (WP 0042) for procedures that insure safe storage or shipment of the heater.

**OFFICIAL NOMENCLATURE, NAMES, AND DESIGNATIONS.**

Shortened nomenclature is used in this manual to make procedures easier for you to read. A cross-reference between the shortened nomenclature and the official nomenclature is shown in the following table.

Table 1. Nomenclature Reference

Manual Nomenclature	Official Nomenclature
Heater	U.S. Army Modular Command Post System Space Heater, Convective
Tent	Modular Command Post System

**REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR).**

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 (Product Quality Deficiency Report). Mail it to Commander, U.S. Army Soldier and Biological Chemical Command, ATTN: AMSSB-RIM-E(N), Kansas Street, Natick, MA 01760-5052. We will send you a reply.

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## SAFETY, CARE, AND HANDLING

### General Safety

While in operation, the heater presents a potential burn and carbon monoxide hazard. Proper precautions should be observed while operating the heater.

Observe all warning and caution notes that appear before each maintenance operation. Refer also to the Warning Summary.

### Handling



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#### WARNING

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The Space Heater Convective weighs approximately 74 pounds (33.6 kg) without accessories. Two persons must carry the unit, lifting with legs, not back, to prevent injury.



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#### WARNING

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DO NOT MOVE THE HEATER ASSEMBLY WHILE ANY OF THE ADVISORY LIGHTS ARE LIT.

Small, portable, shelter heaters of this type are not designed to be moved during operation or before purge cycles are complete. Serious injury, burns, or death can occur if the heater assembly is moved while operating or before the HEATER ON/ON-HOLD advisory light goes OFF indicating the end of operation, post purge, and cool down cycle completion.

During operation, some metal components of the heater assembly, such as the debris grill on the outlet duct, the upper and lower heater housing assemblies, combustion exhaust pipe, etc., can cause severe burn injuries if contact with bare skin occurs.

During heater operation, air leaving the HEATED AIR OUTLET of the heater and passing through outlet duct with louver may exceed 220°F. Make sure tent personnel are aware of burn hazards and equipment hazards presented by the heated air and the louver.

Combustible material must be kept at least 2 feet away from the sides of the heater during operation.

Do not attempt service procedures on a burner that has recently been in operation. Let the burner cool down before performing these procedures to avoid the possibility of serious burns.

**CORROSION PREVENTION AND CONTROL (CPC)**

Corrosion Prevention and Control of Army materiel is a continuing concern. It is important that any corrosion problems with this item be reported so that the problem can be corrected and improvements can be made to prevent the problem in future items.

While corrosion is typically associated with rusting of metals, it can also include deterioration of other materials, such as rubber and plastic. Unusual cracking, softening, swelling, or breaking of the materials may be a corrosion problem.

If a corrosion problem is identified, it can be reported using Standard Form 368, Product Quality Deficiency Report. Use of key words such as "rust," "deterioration," "corrosion," or "cracking" will insure that the information is identified as a CPC problem. The form should be submitted to the address specified in DA Pam 738-750.

**LIST OF ABBREVIATIONS/ACRONYMS**

AAL	Additional Authorization List	MAC	Maintenance Allocation Chart
AMP	Ampere	MAX	Maximum
BII	Basic Issue Item	MCPS	Modular Command Post System
<sup>o</sup> C	Degrees Celsius	mm	millimeter
CAGEC	Commercial And Government Entity Code	MSDS	Material Safety Data Sheet
CFM	Cubic Feet per Minute	MTOE	Modified Table of Org and Equipment
cm	Centimeter	MWO	Modification Work Order
COEI	Component of End Item	NBC	Nuclear, Biological, Chemical
CPC	Corrosion Prevention Control	N-m	Newton Meters
DC	Direct Current	PMCS	Preventive Maintenance Checks and Services
ea	Each	POL	Petroleum, Oil and Lubricant
EIR	Equipment Improvement Recommendation	QD	Quick Disconnect
<sup>o</sup> F	Degrees Fahrenheit	Qty	Quantity
gal	Gallons	Ref	Reference
GFE	Government Furnished Equipment	Reqd	Required
hr	Hour	RPSTL	Repair Parts and Special Tools List
IAW	In Accordance With	TEG	Thermoelectric Generator
ID	Inside Diameter	TMDE	Test, Measurement, Diagnostic Equipment
Illus	Illustrated / Illustration	TOE	Table of Organization and Equipment
in	Inches	U/I	Unit of Issue
in.-lb	Inch-pound	U/M	Unit of Measure
Kg	Kilogram	UOC	Usable On Code
L	liter	V	Volt
lbs	Pounds	VDC	Volt Direct Current
lb-ft	Pound-foot	WP	Work Package

**EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES.**

The Modular Command Post System (MCPS), hereafter referred to as the tent, require a heat source. This heater fulfills the need for an independent, powerful, self-powered, self-sustaining, self-regulating, self-diagnostic heater.

The heater is set up for operation outside the tent. If operation inside the tent is desired, the optional items in WP 0002 are required. The tent control assembly (with controls, visual advisory lights, and an audible alarm) must be mounted inside the tent and a control cable (remote) used to connect the tent control assembly to the heater.

The operation of the heater is controlled by the ON-OFF switch, the LOWER-HIGHER control knob (both located on the control assembly), and the heater control assembly (located within the heater itself).

Manual movement of the ON/OFF switch to the ON position will cause the heater to automatically execute a series of steps that lead to heater operation. Manual movement of the ON/OFF switch to the OFF position will cause the heater to automatically execute a safe and orderly shutdown. The status of the heater assembly can be determined by looking at the advisory lights on the tent control assembly or by listening to the audible alarm. These lights and the related audible alarm are controlled by the heater control assembly, which monitors the normal operation of heater, and, when an abnormal operating condition is detected, cause the heater to shut off. Also, when an abnormal operating condition is detected, the SYSTEM FAULT advisory light and the integral audible alarm are activated and pulse out the following SYSTEM FAULT diagnostic codes:

Table 2. System Fault Diagnostic Codes

Number of Pulses and Audible Tones	System Fault
1	LOW VOLTAGE
2	COMBUSTION BLOWER
3	LOSS OF FLAME
4	BURNER MAINTENANCE
5	GLOW PLUG
6	TEG OVER TEMPERATURE
7	OVER VOLTAGE
8	TIP-OVER
9	FIN TEMP SENSOR
10	TENT OVER TEMPERATURE

The proper fuels to use at various ambient temperatures are listed in the table below.

Table 3. Approved Fuels At Various Temperatures

Ambient Temperature	Specification	Military Symbol
Above +20°F (-6,7°C)	VV-F-800	DF-2
Above -25°F (-33.3°C)	VV-F-800	DF-1
Above -25°F (-33.3°C)	MIL-T-83 133	JP-5
Above -60°F(-51.1°C)	VV-F-800	DF-A
Above -60°F(-51.1°C)	MIL-T-83133	JP-8

**TM 10-4520-262-12&P**

**CHAPTER 1**

**DESCRIPTION AND  
THEORY OF OPERATION**

**SPACE HEATER, CONVECTIVE**

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**SPACE HEATER, CONVECTIVE (SHC)**  
**LOCATION AND DESCRIPTION OF MAJOR COMPONENTS**

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The following are the major components of the Space Heater, Convective. A brief description of the function of each component and its location is detailed below.

**IN-TENT CONTROLLER ASSEMBLY (1).** The in-tent control assembly (1) contains the operator controls and advisory lights for the heater. The in-tent control assembly is a remotely wired, splashproof box that can be easily attached to the tent framework. The in-tent controller assembly is only intended for use inside the tent.

**IN-TENT CONTROLLER CABLE ASSEMBLY (2).** An in-tent controller cable assembly (2) is used to connect the in-tent controller assembly to the heater.

**BATTERY PACK ASSEMBLY (3).** The battery pack assembly consists of a 12-volt battery (3) with an electrical heating element. The battery pack assembly location is clearly marked and is located in a recess (4) below the lower housing assembly. Two fuse holders (5) carrying 20 amp fuses are incorporated into the side of the battery pack. Two spare fuses (6) are located at the breathable air inlet end of the heater.

The battery is used for burner ignition, and to power the control system until the thermoelectric generator (TEG) generates power. The battery is recharged during heater operation by the TEG. Depending on battery condition and temperature, the battery has a approximate 30-minute recharge time.

If battery temperatures are below 40°F (4.4°C), it is electrically heated by the heating element. When the battery reaches 60°F (15.6°C), the heating element is shut off by the controller. When battery heat is called for, only excess power is used for heating the tent.

**COMBUSTION AIR INLET ASSEMBLY (7).** The combustion air inlet assembly (7) is connected to the combustion air blower located inside the heater and is the source of outside air used for combustion by the burner assembly.

**UPPER HOUSING ASSEMBLY (8).** The upper housing assembly (8) consists of a compartment cover assembly having certain hardware and electrical wiring and connections mounted on it.

**LOWER HOUSING ASSEMBLY (9).** The frame and heater housing are welded together to form the lower housing assembly (9).

**FUEL SOLENOID VALVE ASSEMBLY (10).** The fuel solenoid valve assembly (10) has a normally closed valve which opens to allow fuel to enter the heater when the ON/OFF switch is in the ON position. The solenoid valve is closed when the switch is turned OFF or if heater control assembly detects a SYSTEM FAULT condition. This solenoid is independent of the fuel pump assembly described below.

**FUEL QUICK DISCONNECT (11).** A fuel quick disconnect (11) is located at the inlet side of the fuel solenoid valve assembly (10). This military style male fitting has a protective dust cap (12) chained to it for use when the heater is not connected to the fuel supply.

**OPERATING INSTRUCTIONS PLATE.** Operating instructions plate (13) is provided on the in-tent control assembly (1).

**AIR SUPPLY DUCT WITH DEBRIS GRILL (14).** The air supply duct with debris grill (14) conducts air from the tent to heater assembly for warming. This duct is 10.5 inches in diameter and has a debris grill (15) to prevent accidental entry of foreign objects into the heater assembly. A strap is used to connect the

duct to the heater inlet. Note that upon initial shipment, the debris grill is not installed in the duct. The debris grill must be installed in the duct prior to using the heater IAW WP 0005.

An airflow direction arrow tag (**16**) is permanently attached to the duct indicating that the flow of air moves from the debris grill end of the duct to the open end that connects to the heater.

**AIR RETURN DUCT WITH DEBRIS GRILL (17).**



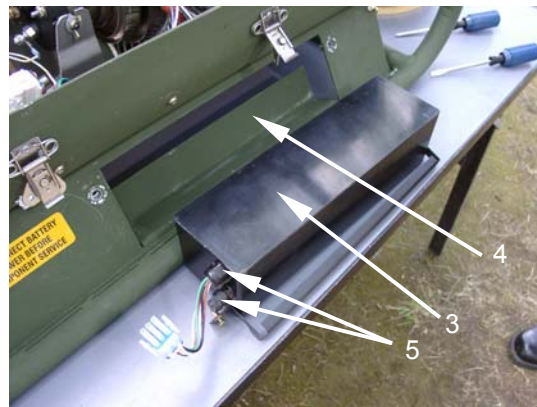
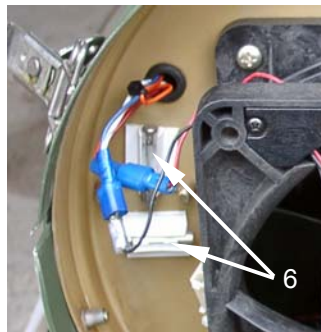
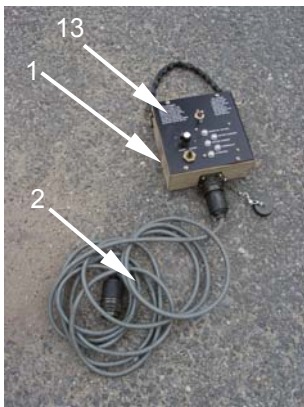
**WARNING**

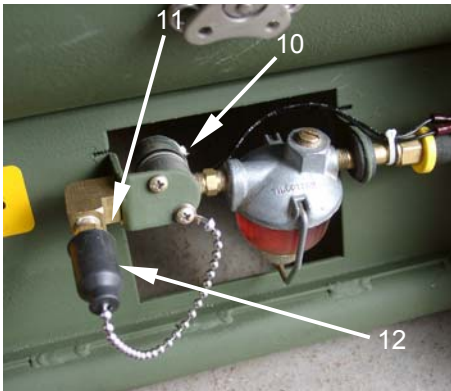
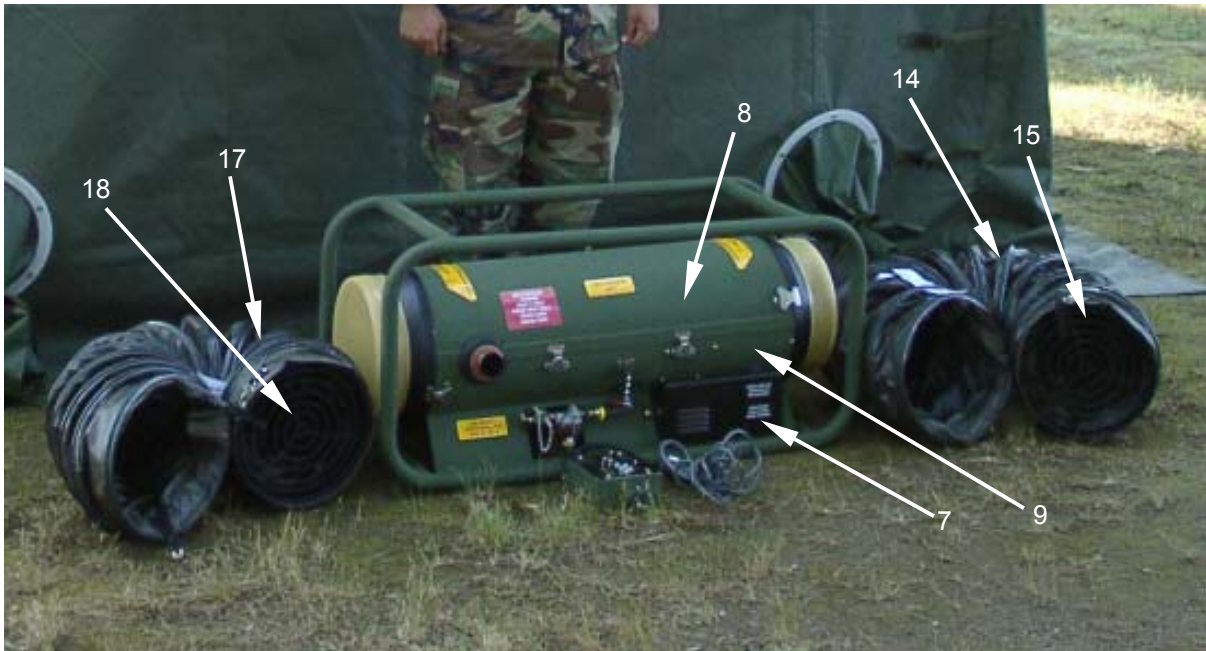
Do not touch the metal debris grill of the air return duct while the heater is running. During heater operation the metal debris grill and the heated air coming from it can be as hot as 220°F (104°C). Touching the metal debris grill may result in serious burns.

The air return duct with debris grill (**17**) conducts heated (breathable) air from the heater assembly to tent. This duct is 10.5 inches in diameter and has a debris grill (**18**) to prevent accidental entry of foreign objects into the heater assembly. A strap is used to connect the duct to the heater outlet duct adapter. Note that upon initial shipment, the debris grill is not installed in the duct. The debris grill must be installed in the duct prior to using the heater IAW WP 0005.

An airflow direction arrow tag is permanently attached to the duct indicating that the flow of air moves from the open end that connects to the heater to the debris grill end of the duct that is installed in the tent duct tunnel.

**ACCESSORY BAG (18).** An accessory bag is provided to permit stowage of all loose Space Heater Convective items such as the air inlet and return ducts, in-tent controller assembly and cable, battery charger, gravity feed adapter, fuel hose, and fuel can stand.





**BURNER ASSEMBLY (1).** The burner assembly (1) consists of a vaporization type burner. The burner assembly uses a glow plug (2) for starting and requires no power other than the combustion blower (3) and the fuel pump (4) to operate. During starting, an ignition pack (5) provides approximately 24 volts to the glow plug to improve cold weather performance. An external fuel drain (6) is also provided on the burner assembly to facilitate draining the fuel system.

**HEATER CONTROL ASSEMBLY (7).** The heater control assembly (7) uses information from the heater's sensors and the tent control assembly to determine the ideal firing rate. The air/fuel ratio is adjusted as needed to maintain the ideal firing rate.

The heater control assembly (7) is located on the inside lower housing opposite the battery compartment and is clearly marked. The heater control assembly controls all electrical functions, including system startup, shutdown, and safety checks. It includes temperature and tilt sensors and the control circuit. The control circuit analyzes information from the sensors to maintain the optimum firing rate for the heater. To maintain the firing rate, it controls the rates of fuel flow and air flow, and continuously monitors the in-tent control assembly settings to verify that the desired settings are reached.

The control system also controls system startup and shutdown, and monitors the heater safety systems. If a fault is detected, it immediately begins the shutdown procedure and signals the operator that a fault has occurred.

**COMBUSTION AIR BLOWER (3).** The combustion air blower assembly (3) integrates a 12-volt direct current (DC) combustion air fan (8). It is located in the lower heater housing directly below the control cable electrical connector and is clearly marked. The combustion air blower (3) draws air through the combustion air inlet (9) and passes it through flexible hoses (10) to the burner assembly (1).

**HEATED AIR BLOWER ASSEMBLY (11).** A heated air blower assembly (11) is mounted under the duct adapter (12). It features a 12-volt DC fan in series at the inlet end of the heater. The fan moves approximately 250 cubic feet per minute (CFM) of heated, breathable air when operating.

The heated air blower assembly (11) forces fresh air or air removed from the tent through the heater. This air passes across the TEG and the heat exchanger, where it absorbs heat and is directed into the tent.

Since the heater is designed to provide a variable British Thermal Units per hour (BTU/HR) output and still maintain internal generation of system and battery electricity, the heater needs to regulate between being a heater and being a generator of electricity as operational requirements change. This electronic marriage of components allows for a safe and smooth transition from generation of electricity to heating. The selection of a sophisticated controller reduces the amount of training required to operate the heater and provides continuous monitoring and control of the heater.

**FUEL PUMP (4).** The fuel pump (4) is controlled by frequency pulses from the heater control assembly and is responsible for supplying fuel in a vaporized state to the burner assembly.

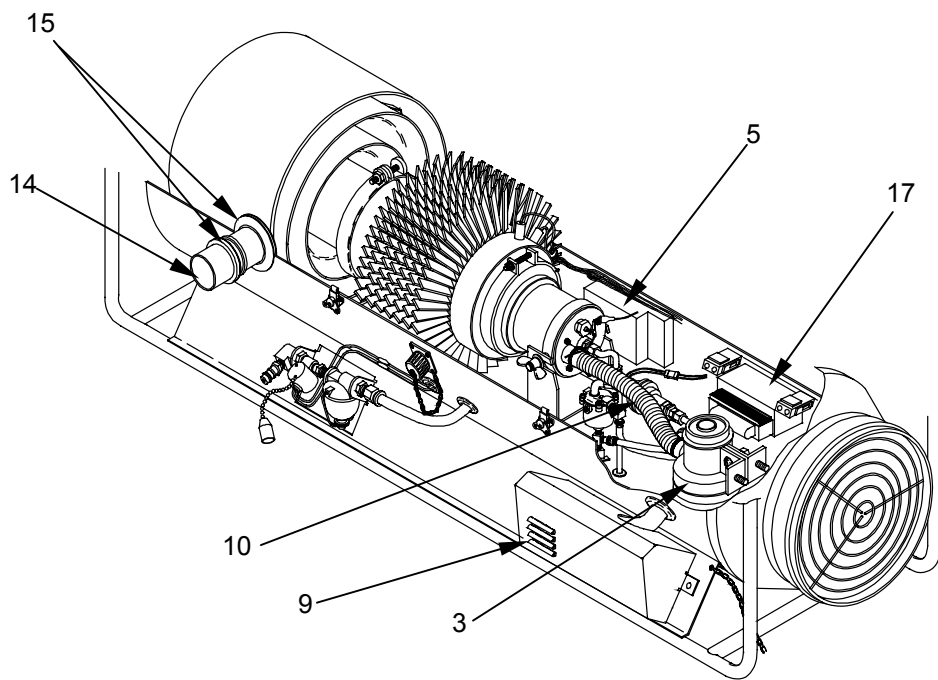
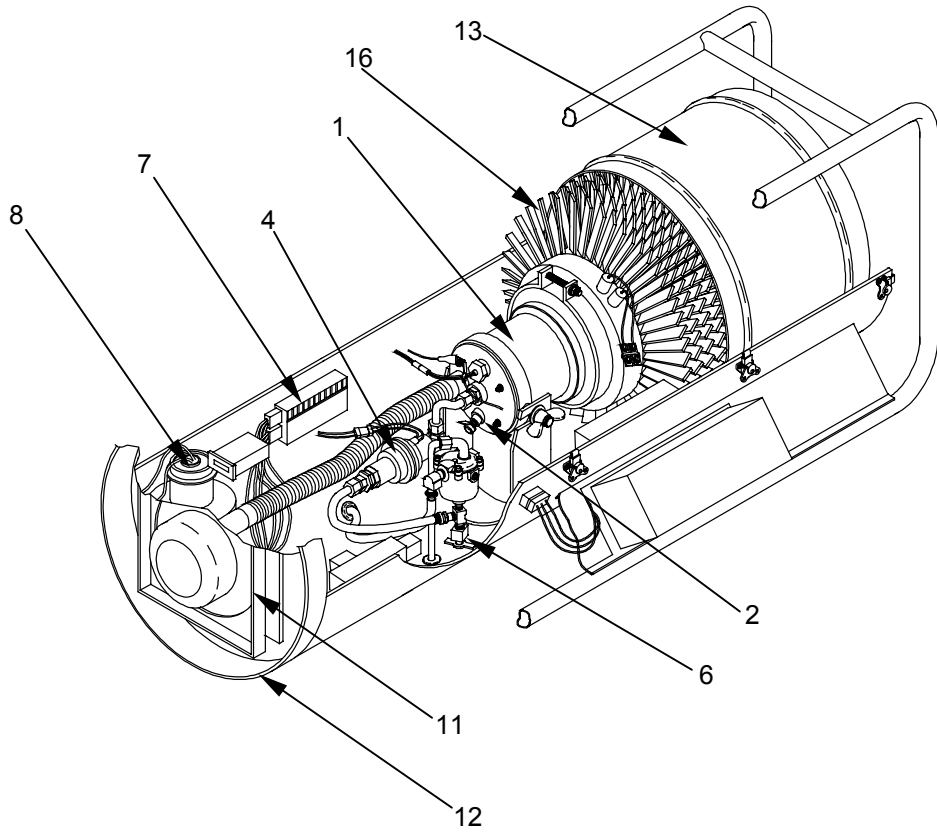
**HEAT EXCHANGER (13).** The heat exchanger (13) transfers heat from hot gases produced by the burner to the heated (breathable) air. The heat exchanger is sandwiched between the upper housing assembly and the lower housing assembly. The heat exchanger provides an outlet and mounting flange for the combustion exhaust pipe (14) and an O-ring seal and gasket (15). This heated (breathable) air is then used to heat the tent. The heated air runs over the outside of the heat exchanger to collect the heat. The hot gases, or combustion fumes, inside the heat exchanger are exhausted outside the enclosure throughout the combustion exhaust pipe (14).

**THERMOELECTRIC GENERATOR (16).** The thermoelectric generator (TEG) (16) provides heater system operating and battery recharging electrical power. Once the TEG is operating at full power, it supplies enough energy to operate the heater assembly and maintain a battery charging voltage of 14.5

volts. When the battery pack has been fully charged, the extra energy the TEG creates is converted into heat and used to heat the shelter.

The TEG includes a mantle which directs the hot gases exiting the burner assembly to evenly heat the inside diameter (ID) of the TEG. This improves the ability of the TEG to generate electrical power.

**POWER CONTROL ASSEMBLY (17).** The power control assembly is housed on a printed circuit board and mounted to the side wall of the lower housing assembly. The power control board manages the distribution of power throughout the Space Heater Convective.



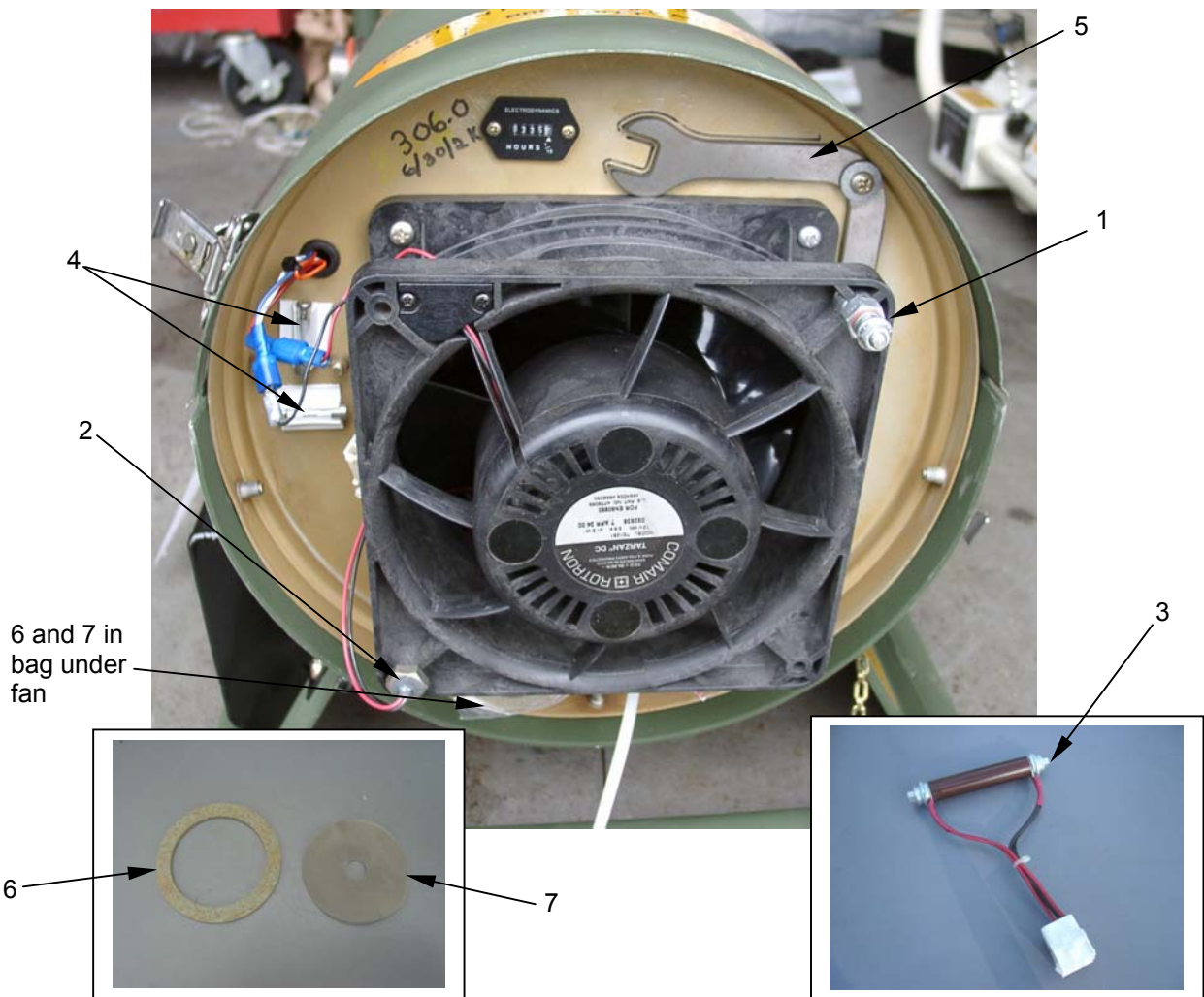


**ONBOARD SPARES AND TOOL.** In addition to the foregoing major components, each space heater, convective package includes onboard spares and/or tools listed in Table 1. All the spares and tool are stored behind the duct adapter at the end of the heater labeled “Breathable Air Inlet” with the exception of the battery charging adapter. The battery charging adapter is stored in the Accessory Bag.

Table 1. Onboard Spares and Tools

Item	Name	Qty	Item	Name	Qty
1	Glow plug	1	5	Wrench	1
2	Flame sensor	1	6	Sediment Strainer Gasket	1
3*	Battery charging adapter	1	7	Sediment Strainer Screen	1
4	Battery pack fuses 20 amp	2			

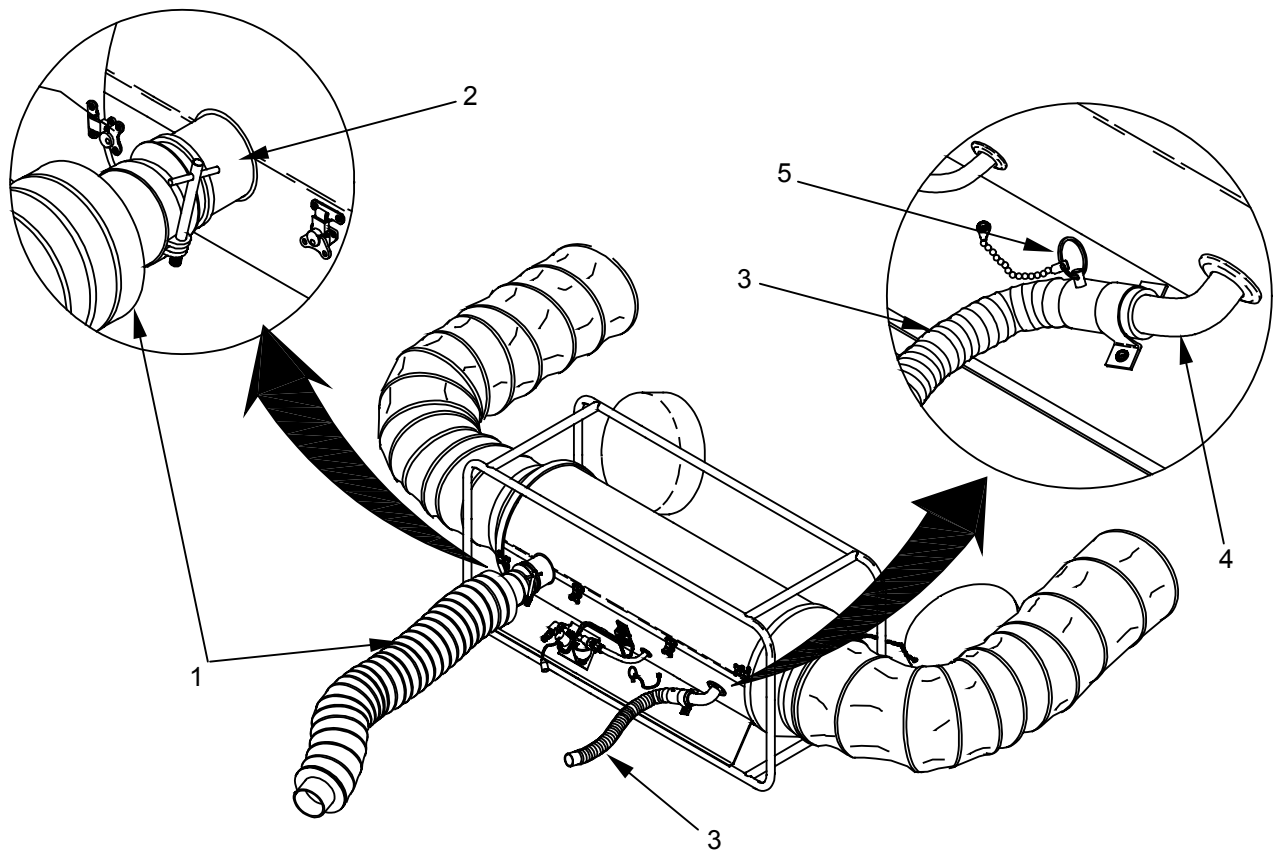
\* Battery charging adapter stored in accessory bag.



**OPTIONAL ITEMS (TO ENABLE OPERATION OF HEATER INSIDE TENT)**

**COMBUSTION EXHAUST KIT.** The combustion exhaust pipe (1) is flexible and must be used when the heater is used in its optional configuration inside the tent. This configuration is not supported by this technical manual. However, the combustion exhaust kit is available as an Additional Authorized Item. Its use outside the tent is suggested but optional. A "T"-handle clamp is chained to the heater end of the pipe and is used to clamp the pipe to the heat exchanger exhaust outlet (2). Instructions for use are included with the kit.

**COMBUSTION INLET PIPE.** The combustion inlet pipe (3) is flexible and is used when the Convective Space Heater is used in its optional configuration inside the tent. This configuration is not supported by this technical manual. However, the combustion inlet pipe (3) is available as an Additional Authorized Item. Stainless steel ends on this pipe are drilled and when either end is installed on the combustion air inlet (4) a retaining pin (5) is used to retain the pipe on the inlet. Instructions for use are included with the kit.

**ADDITIONAL EQUIPMENT REQUIRED FOR USE WITH THIS HEATER**

**FUEL CAN.** The 5 gallon (18.9 L) fuel can, listed on the AAL, provides a fuel source during heater operation.



Table 1. EQUIPMENT DATA

Manufacturer	Hunter Manufacturing Company
Part number	5-13-5600
Operating temperature range	+65°F(+18.3°C) -60°F (-51.1 °C)
BTU/Hr (automatically variable)	
Low	28,000
High	35,000
Efficiency	75-82%
Electrical system	10.50-14.75 volts DC
Glow plug	11.5 volts DC (Starting only)
Fuses, Spare Battery Pack – 20 amp	2 each
Battery Pack Fuses – 20 Amp	2 each
Combustion air fan	12 volt DC Rotron Revaflow
Air flow	
Heated air (breathable) high fire rate	250 CFM
Heated air temperature rise	140°F (60°C)
Maximum at duct debris grill	240°F (115°C)
Combustion air outlet temperature (exhaust)	400-600°F (204-316°C)
Heater dimensions (without accessories)	
Length	40.50 inches (102,87 cm)
Width	14.25 inches (36,19 cm)
Height	18.37 inches (46,66 cm)
Heater volume	6.202 cubic feet (0,1756 m <sup>3</sup> )
Heater weight (without accessories)	74 pounds
Fuel requirements:	
Above -60°F (-51.1°C)	MIL-T.83 133 (JP-8)
Above -60°F (-51.1°C)	VV-F-800 (DF-A)
Above -25°F (-33.3°C)	MIL-T-83133 (JP-5)
Above -25°F (-33.3°C)	VV-F-800 (DF-1)
Above +20°F (-6.7°C)	VV-F-800 (DF-2)
Fuel consumption	2 hours/gal. (maximum) 3.5 hours/gal. (average)
Minimum safe distance to combustibles	2 feet
Battery pack (with heater)	
Type	Starved electrolyte (gel cell)
Rating	
Burner assembly	
Glow plug	11.5-12 volts
All other electrical components	12-24 volts
Manufacturer	Gates
Battery Pack	1 each
Thermoelectric generator (TEG)	
Manufacturer	Global
Type	Lead telluride (vacuum sealed)
Rating	180 watts, 15 amps

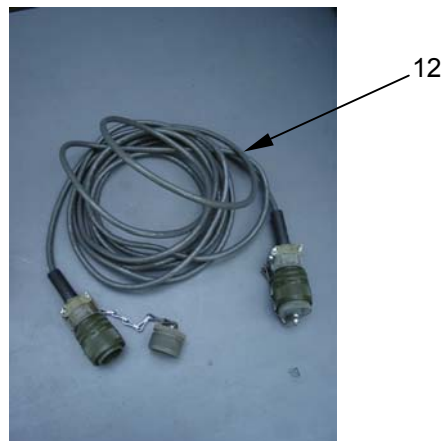
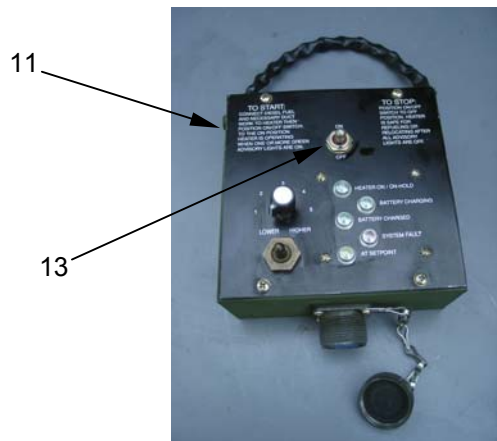
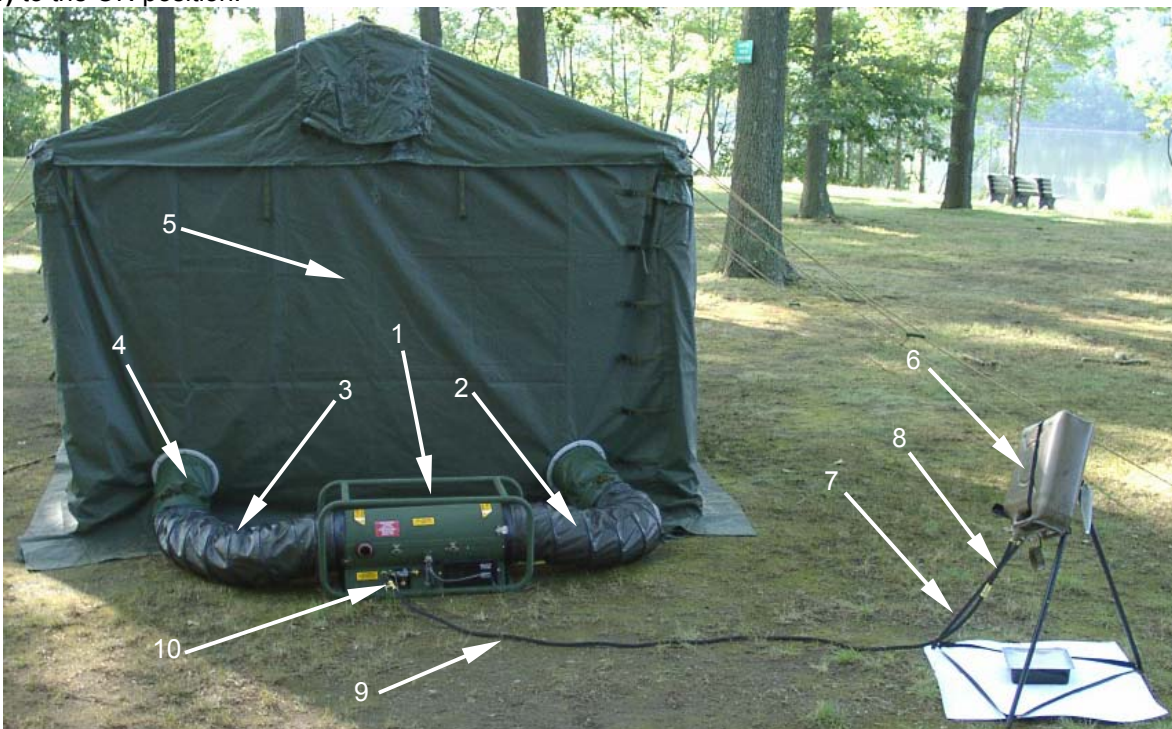
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**SPACE HEATER, CONVECTIVE (SHC)  
THEORY OF OPERATION**

The Space Heater, Convective (1) is installed outside the tent with its air supply (2) and return (3) ducts routed through passthrough sleeves (4) located in the side of the tent (5). A fuel can (6) mounted on a fuel can stand (7) feeds fuel to the space heater by means of a gravity feed adapter (8) and fuel hose (9). The fuel hose (9) is connected to the SHC by means of a quick disconnect connector (10).

All SHC functions are controlled via the in-tent controller assembly (11) which hangs inside the tent. An in-tent controller assembly cable (12) is connected between the in-tent controller assembly and the heater in order to control all heater operations from inside the tent.

An SHC operational cycle begins by switching the ON-OFF switch (13) on the in-tent controller assembly (11) to the ON position.



Placing the ON/OFF switch of the in-tent controller in the ON position sends a signal to the power control assembly (1) as well as to the heater control assembly (2) energizing the system. At this point the "heater on/on-hold" advisory light (3) on the in-tent controller will illuminate, indicating the heater has begun operation. After a wait of five seconds a visual audible function check of the in-tent controller is made. The battery charging light, battery charged light and system fault light are illuminated with the audible tone for approximately two seconds.

A battery pack (4) is used to supply power to the heater assembly (1) and facilitate burner ignition until the thermoelectric generator (TEG) (5) begins generating power. The power drawn from the batteries is replaced by the TEG while the heater delivers heat to the shelter.

Once power is applied to the system, the heater control assembly (2) sends a signal to the fuel solenoid valve assembly (6), opening the valve and allowing fuel to flow through the sediment strainer (7) to the float assembly (8). Power is supplied to preheat the glow plug (12). Fuel is then pumped in short pulsating bursts by the fuel pump (9) to the burner head assembly (10), where it is vaporized from the heat of the glow plug.

Air that is drawn through the combustion air inlet is mixed with the hot vaporized fuel providing oxygen for flame ignition. Heat produced from this combustion is converted to electrical power by the thermoelectric generator (TEG) (5). The TEG provides electricity which is used to recharge the batteries. When the batteries are charging, the "battery charging" advisory light (14) on the in-tent controller assembly illuminates. The heater continues to run as the batteries recharge.

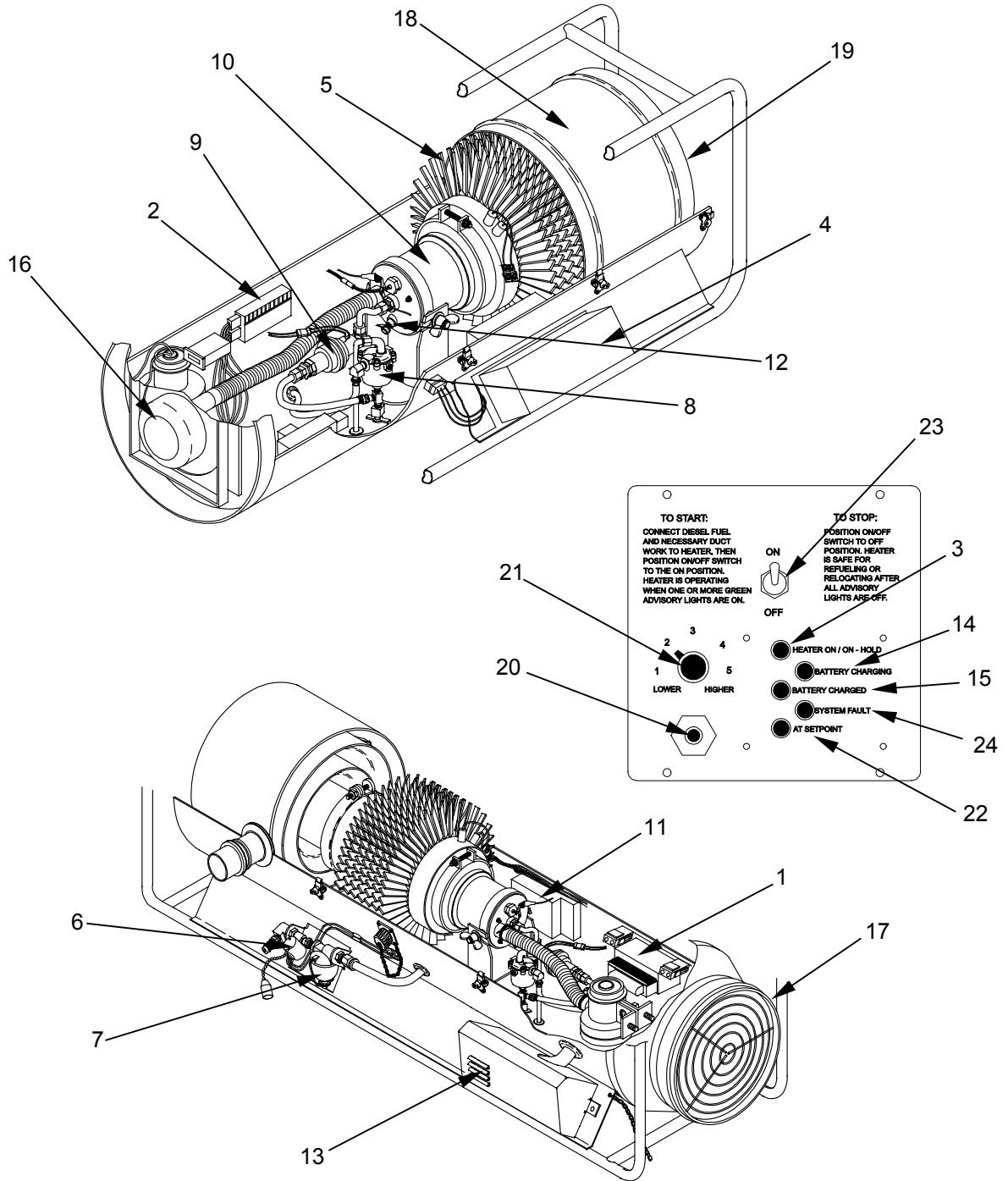
When the batteries (4) are fully recharged, the "battery charged" advisory light (15) on the in-tent controller assembly illuminates and the "battery charging" light (14) is extinguished. At a specified temperature measured at the TEG, the heated air blower assembly (16) is engaged and cold air is drawn from the shelter through the air supply duct (17) and forced through the heat exchanger (18) at the outlet end of the heater. The shelter air is heated and forced out the air return duct (19) into the shelter as heated air.

As heated air is supplied to the shelter, the temperature inside the shelter rises. This temperature is monitored by a sensor (20) on the in-tent controller assembly. When the shelter temperature reaches the value set on the "lower/higher" control (21) on the in-tent controller assembly, a signal is sent to the heater. The fuel pump and combustion air are slowed down reducing the heat supplied to the shelter. Air continues to circulate through the shelter via the heated air blower assembly (16) and the "At Setpoint" advisory light (22) illuminates.

If the shelter temperature exceeds approximately 90 degrees F, the in-tent controller will shut off the heater. The heater on/ on hold light will remain on. When the shelter cools the heater will begin a normal start cycle.

Heater operation is terminated by switching the ON/OFF switch (23) on the in-tent controller to the OFF position. The fuel solenoid valve (6) is closed and all fuel flow to the burner assembly (10) ceases. When all advisory lights are extinguished, the heater is shut down and can be moved or left in place for another operational cycle.

If a system fault occurs during operation, the heater control assembly (2) monitors this condition and sends a signal to the in-tent controller illuminating the "System Fault" advisory light (24) on the in-tent controller.



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**TM 10-4520-262-12&P**

**CHAPTER 2**  
**OPERATOR INSTRUCTIONS**  
**SPACE HEATER, CONVECTIVE**

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**SPACE HEATER, CONVECTIVE (SHC)  
CONTROLS, INDICATORS, AND LABELS/INSTRUCTION PLATES**

**GENERAL**

This section contains information on the controls, indicators, and label/instruction plates located on the Convective Space Heater.

Before operating the heater, the user should become familiar with the controls and indicators provided on the unit. The operating controls are installed on the in-tent control assembly (1) and on the lower housing assembly (2).



**HEATER CONTROLS AND INDICATORS**

The description and function of the controls and indicators of the in-tent controller assembly are detailed in Table 1. The manual reset thermostat located on the lower housing assembly is described in Table 2.

Table 1. In-Tent Control Assembly Controls and Indicators

Key	Name	Function
1	ON-OFF switch	Controls starting and stopping of the heater. Movement of the ON/OFF switch from one position to another initiates the step-by-step transition of the heater from one operating condition to another (the OFF condition to the ON condition, or the ON condition to the OFF condition). This step-by-step transition is controlled and timed by the heater control assembly, and not by the movement of the ON/OFF switch.
2	HEATER ON/ON-HOLD light (green)	When lit, indicates the heater assembly is in one of the following modes: 1) pre-purge, 2) normal operation, 3) on-hold. The on-hold mode means that the heater is not operating but it is ready to start in response to changes in the tent temperature or changes to the LOWER-HIGHER control settings.
3	LOWER/HIGHER control knob	Controls the setpoint that the heater is trying to reach, thereby controlling the heat output of the heater. Adjusting the control knob causes the heater assembly to provide higher or lower heat

Table 1. In-Tent Control Assembly Controls and Indicators

Key	Name	Function
4	BATTERY CHARGING light (green)	<p>outputs to the tent. When the temperature within the tent reaches the setpoint, an amber AT SETPOINT light glows. When the temperature sensor registers this temperature, the heater begins to regulate its output so that the temperature is maintained.</p> <p>When lit, indicates the heater assembly battery is being charged by the TEG. While this light is lit, the heater's electronic controller does not allow the heater to respond to the LOWER-HIGHER control knob settings unless all the electrical requirements of heater operation and battery charging are met.</p>
5	BATTERY CHARGED light (green)	<p>When lit, indicates the heater assembly battery is fully charged and the heater will respond fully to the changes in tent temperature or changes to the LOWER-HIGHER control knob settings. Once this light comes on, the heater can be turned off with assurance that the battery is fully charged and there will be enough power for the next startup.</p>
6	SYSTEM FAULT light (red)	<p>When this advisory light is pulsing and the related audible alarm (also located within the tent control assembly) is buzzing, it indicates the heater assembly sensors and the electronic heater control assembly have detected an unsafe operating condition and the heater has begun to shut itself off. This advisory light and audible alarm provide a sequence of from 1 to 10 pulses that correspond to diagnostic codes explaining the cause of SYSTEM FAULT. See back of the heater control assembly for diagnostic codes.</p>
7	AT SETPOINT light (amber)	<p>When lit, indicates the interior tent temperature is at or above the LOWER-HIGHER control setting.</p>

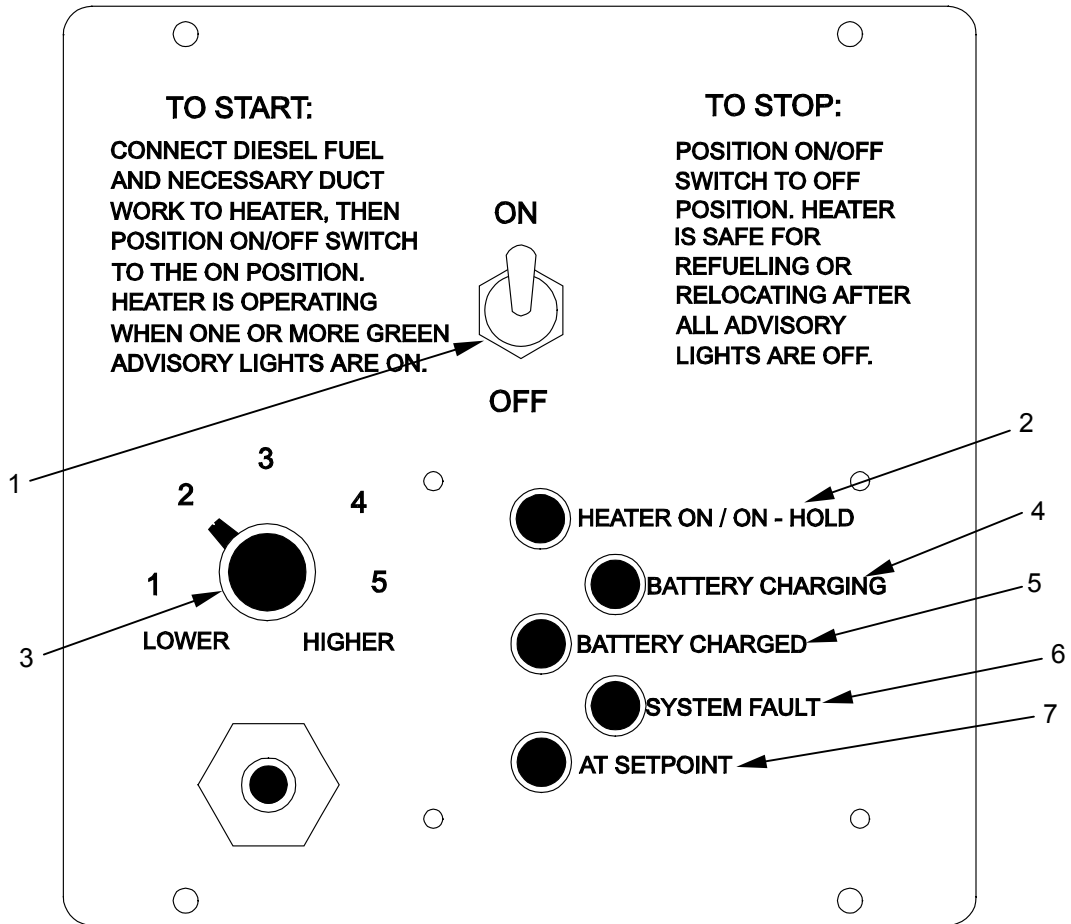


Table 2. Lower Housing Assembly Controls and Indicators

Key	Name	Function
8	Manual Reset Thermostat	A manual reset thermostat (1) comprising a high-temperature cutout with a built-in reset switch is located on the lower portion of the heater housing. Its purpose is to backup the temperature sensors of the heater control system. In a situation where the heat exchanger overheated and the heater controller did not shut down the heater, this manual reset thermostat would activate and cut off all electrical power to the heater, thus causing the heater to shut down; Once the heater is determined to be safe for operation, <b>the manual reset thermostat must be reset by pushing the reset switch button</b> located underneath the rubber protector that is located on the heat exchanger end of the heater.



**LABELS AND INSTRUCTION PLATES**

Table 3 illustrates the decals and information plates affixed to the heater assembly as well as the location of each decal or plate on the heater assembly.

Table 3. SHC Labels and Instruction Plates

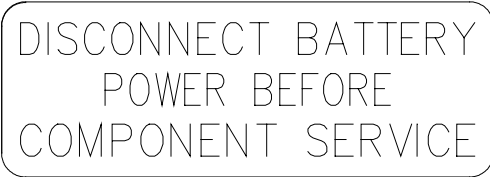
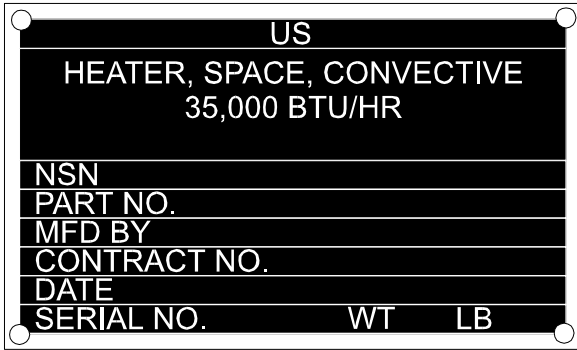



Label or Instruction Plate	Location Code
 <p>DISCONNECT BATTERY POWER BEFORE COMPONENT SERVICE</p>	1
 <p>US HEATER, SPACE, CONVECTIVE 35,000 BTU/HR NSN PART NO. MFD BY CONTRACT NO. DATE SERIAL NO. WT LB</p>	2
 <p>WARNING REMOVE BATTERIES BEFORE SHIPMENT OR INACTIVE STORAGE OF 30 DAYS OR MORE. MIL-STD-454N REQUIREMENT 27</p>	3
 <p>USE JP-8, DFA, DF-1, DIESEL, K-1</p>	4
 <p>CAUTION OUTLET SURFACE IS HOT ↓ HEATED AIR OUTLET ↓</p>	5

Table 3. SHC Labels and Instruction Plates

Label or Instruction Plate

Location Code

HOT EXHAUST  
FLANGE  
KEEP 2 FEET  
FROM TENT WALL

6

TWO PERSON  
LIFT

7

CAUTION KEEP INLET AREA CLEAR  
↑ BREATHABLE AIR ↑  
INLET

8

REMOVE COVER FOR  
COMBUSTION AIR  
PIPE ATTACHMENT

9

CLEAN AIR INLET  
AREA OF DEBRIS  
BEFORE OPERATION

10

Table 3. SHC Labels and Instruction Plates

Label or Instruction Plate

Location Code


**AUDIBLE DIAGNOSTIC CODES**

1. LOW VOLTAGE
2. COMBUSTION BLOWER
3. LOSS OF FLAME
4. BURNER MAINTENANCE
5. GLOW PLUG
6. TEG OVER TEMPERATURE
7. OVER VOLTAGE
8. TIP-OVER
9. FIN TEMP SENSOR
10. TENT OVER TEMPERATURE

11

**TO START:**  
CONNECT DIESEL FUEL AND NECESSARY DUCT WORK TO HEATER, THEN POSITION ON/OFF SWITCH TO THE ON POSITION. HEATER IS OPERATING WHEN ONE OR MORE GREEN ADVISORY LIGHTS ARE ON.

ON



OFF

**TO STOP:**  
POSITION ON/OFF SWITCH TO OFF POSITION. HEATER IS SAFE FOR REFUELING OR RELOCATING AFTER ALL ADVISORY LIGHTS ARE OFF.

2      3      4      ○

1      ○      5

LOWER      HIGHER

○ HEATER ON / ON - HOLD

○ BATTERY CHARGING

○ BATTERY CHARGED

○ SYSTEM FAULT

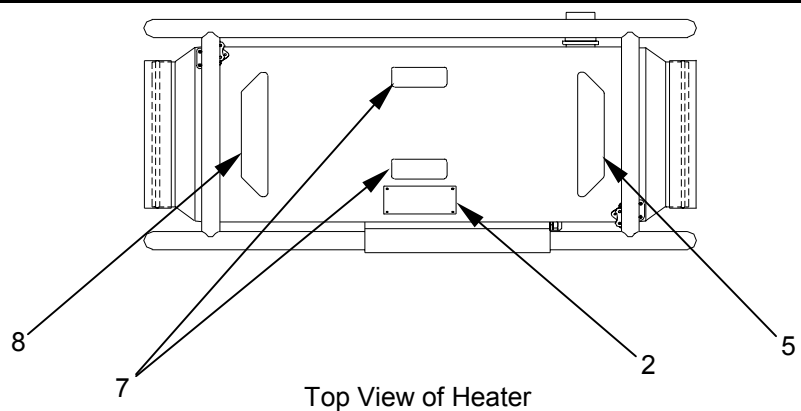
○ AT SETPOINT

○

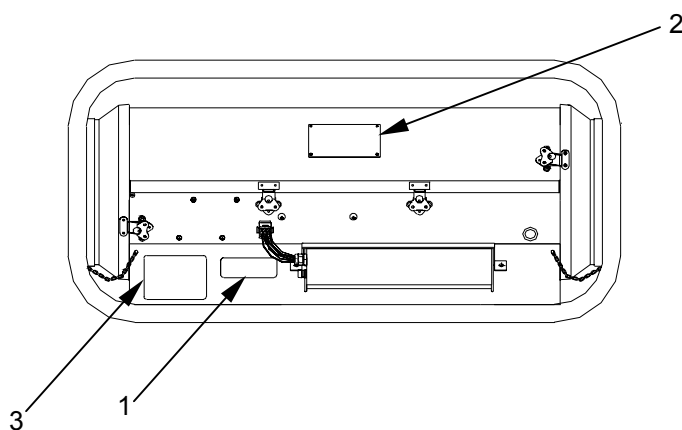
○

○

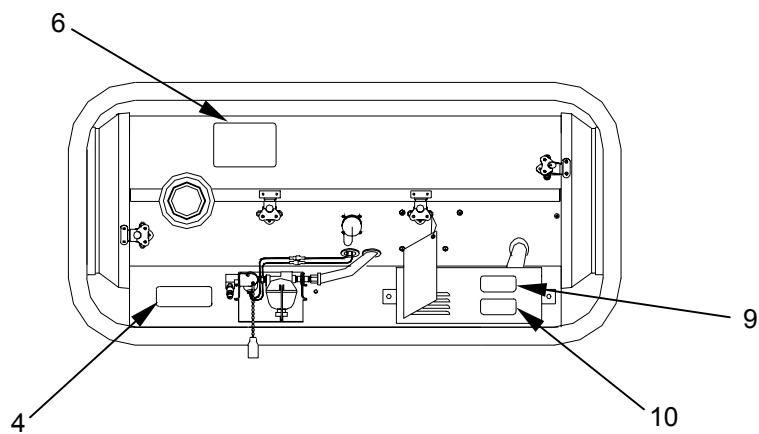
12



Top View of Heater

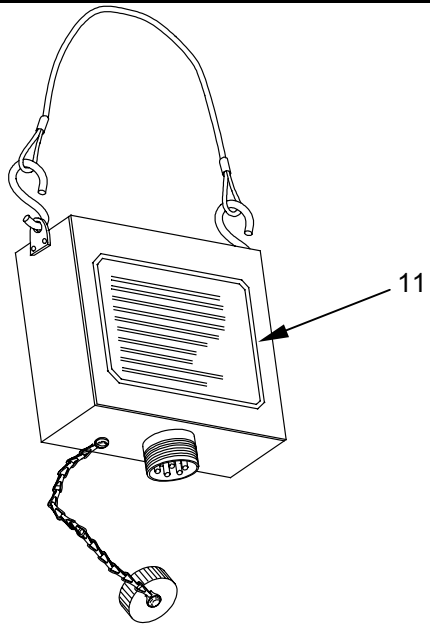
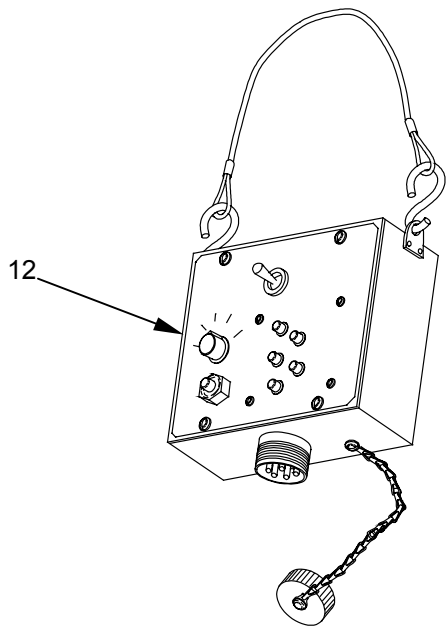


Side View of Heater (Battery Side)



Side View of Heater (Fuel Inlet Side)





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**SPACE HEATER, CONVECTIVE (SHC)  
OPERATION UNDER USUAL CONDITIONS**

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**PREPARATION FOR USE**

**Unpacking and Inspection Upon Receipt.** Inspect containers and packaging upon receipt for evidence of damage occurring in shipping. The heater package and its accessories were carefully inspected and securely packaged prior to shipment. If damage to the containers or packaging is found it is the shipper's responsibility.

Do not unpack a heater that is obviously damaged in shipment until the shipper is notified and has inspected the packaging. Notify your supervisor.

Remove heater package and accessories from shipping containers and packaging.

Inspect the heater package and accessories for completeness by comparing the contents against the description of the equipment found in the Components of End Item work package of this technical manual.

**NOTE**

Heater will not operate when tilt or grade is greater than 15 degrees, which is a 1.5 foot drop over a 10-foot span.

**SPACE HEATER CONVECTIVE (SHC) TENT WALL MODIFICATION KIT (TWMK) INSTALLATION**

In order to operate the Space Heater, Convective with the Command Post Shelter, tent duct tunnels must be present on one of the walls of the tent. The installation of the tent duct tunnels must be performed before using the Space Heater, Convective.

If these tunnels are not present on the shelter, the tent wall modification kit (NSN 4520-01-493-3215, Part Number 5-13-5627, CAGEC 92878) must be applied to the tent. Complete instructions for the installation of the tent wall modification are contained in the following section.

**Tools Required:**

- Cutting Tool (knife or razor blade).
- Marking Tool (pen, pencil, or marker).
- Philips Screwdriver.
- Punch (if available).

**Components included with kit:**

- 4 retaining rings [2 Cuff Rings (with fabric attached) and 2 Plain Rings].
- 9 bolts & 9 nuts.

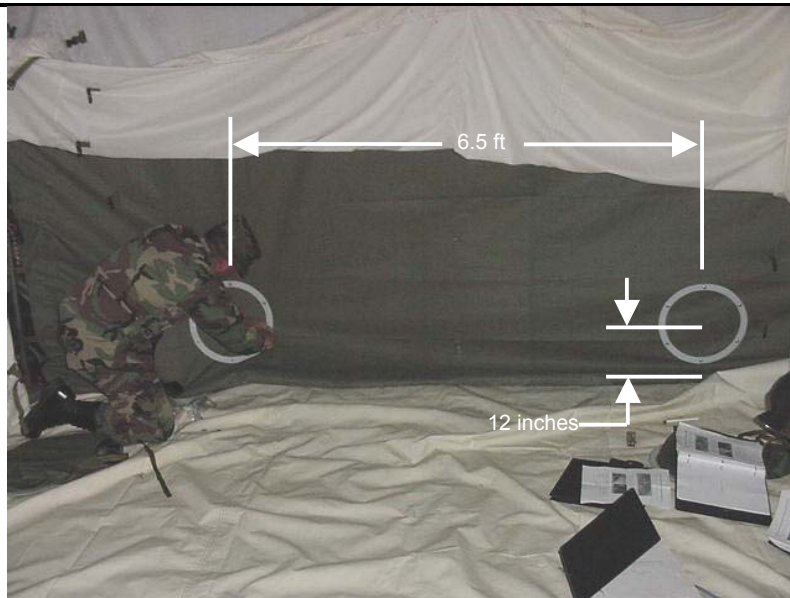


### Note

The entire assembly process can be done from inside the tent.

### Determine location to install TWMK

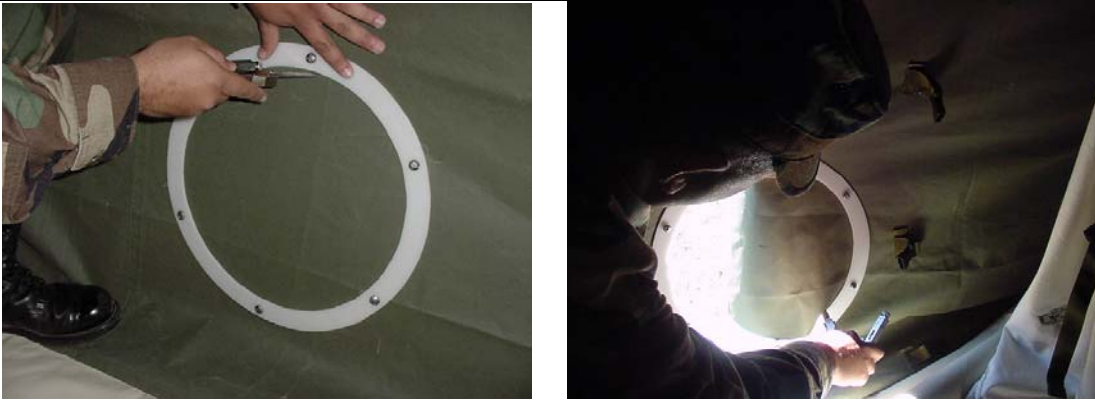
1. To determine the proper location for the installation of the Tent Wall Modification Kit (TWMK), enter the tent and lift up the tent liner (if present) to expose tent wall.
2. Measure approx. 3 ¼ feet from the center of the tent towards a side wall.
3. Measure approx. 12 inches up from the floor and mark an "X".



4. Repeat step 2 & 3 for other side.
5. The distance between the two marked X's should be approx. 6 ½ feet.
6. Place a plain ring around the marked "X" on one side, (center "X" inside Plain Ring).
7. Using a punch or a Philips screwdriver, punch a hole through the top hole of the Plain Ring thru the tent material.
8. Place a bolt through that hole to temporarily hold the plain ring in place onto the tent.
9. Continue to punch holes for the remaining five holes as you put in a bolt in each punched hole. (It's important that you put in a bolt after each punched hole to maintain alignment).



10. Once all bolts are in place, using the plain ring as a template, cut out a hole in the tent wall along the inside diameter of the ring (approximately 19" diameter hole).



11. Repeat steps 6 thru 10 for the other hole location.
12. Once the large holes have been cut out, remove the plain rings and hardware from the wall.
13. Install a cuff ring where the plain ring was previously located on the inside tent wall with the fabric cuff pushed through to the outside of the tent.



14. Line up and install the bolts through the cuff ring and the tent wall. Use the Philips screwdriver to help in screwing the bolts through the fabric to the outside.
15. Squeeze and push the plain ring through the cuff ring to the outside.



16. Line up the plain ring with the protruding bolts.
17. Place and tighten the nuts (9 total) on the protruding bolts outside of tent so as to sandwich the tent wall between the 2 rings.
18. Repeat steps 13 thru 17 for the other hole location.

**Note**

A successful completion should look comparable to the photo below.

**SITE SELECTION CRITERIA (OUTSIDE THE TENT)****WARNING**

The SHC weighs approximately 74 pounds (33.6 kg). Two persons must carry the SHC when lifting or lowering the unit from 3 feet or more. Be sure to lift with legs, not back, to prevent injury.

The space heater, convective site will be dictated by the location of the tent since the heater inlet **(1)** and outlet **(2)** ducts must be able to reach the tent duct tunnels **(3)**.

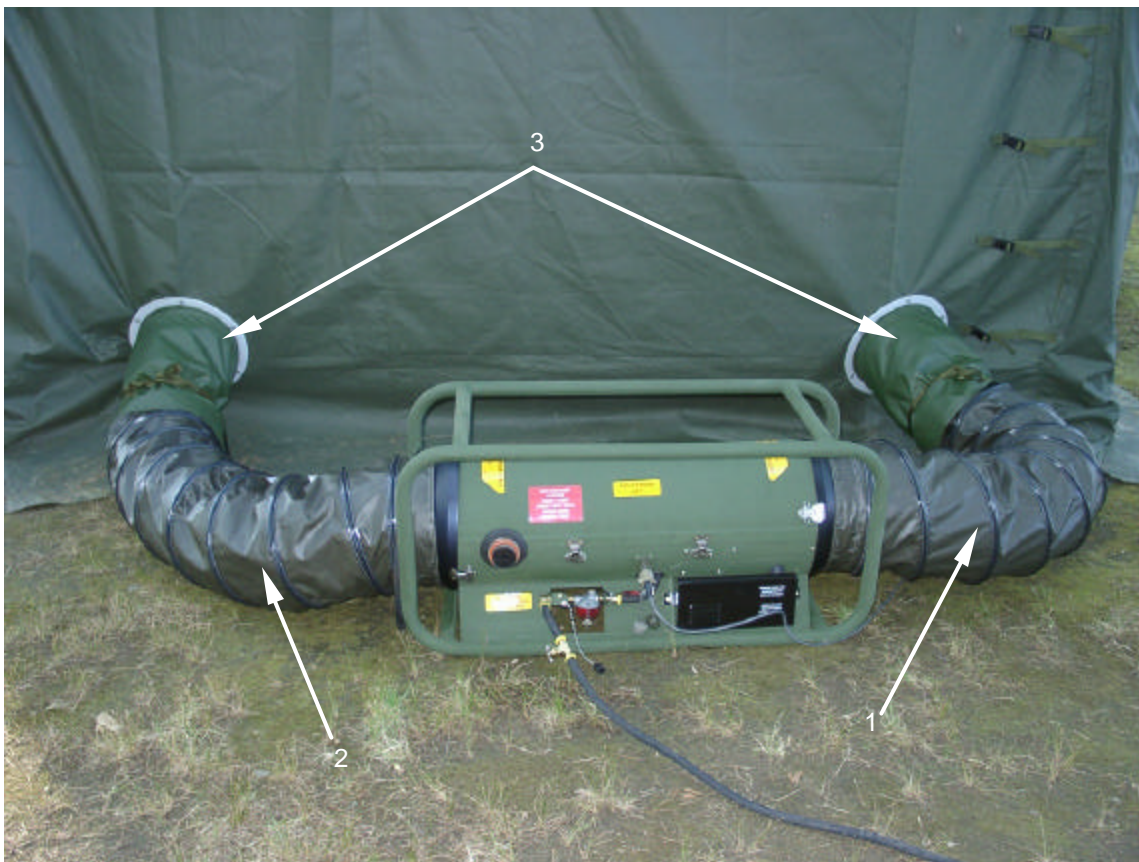
**NOTE**

Heater will not operate when tilt or grade is greater than 15 degrees, which is a 1.5 foot drop over a 10 foot span.

The heater site must be as level as possible (heater will not start or operate if the slope is greater than 15 degrees), and free of combustible material (e.g. dried twigs, leaves. etc.). If snow is present, it should be removed from the area immediately beneath and around the heater.

The site should be selected so that the heater will be positioned at least 2 feet (61 cm) from combustibles, including the tent wall.

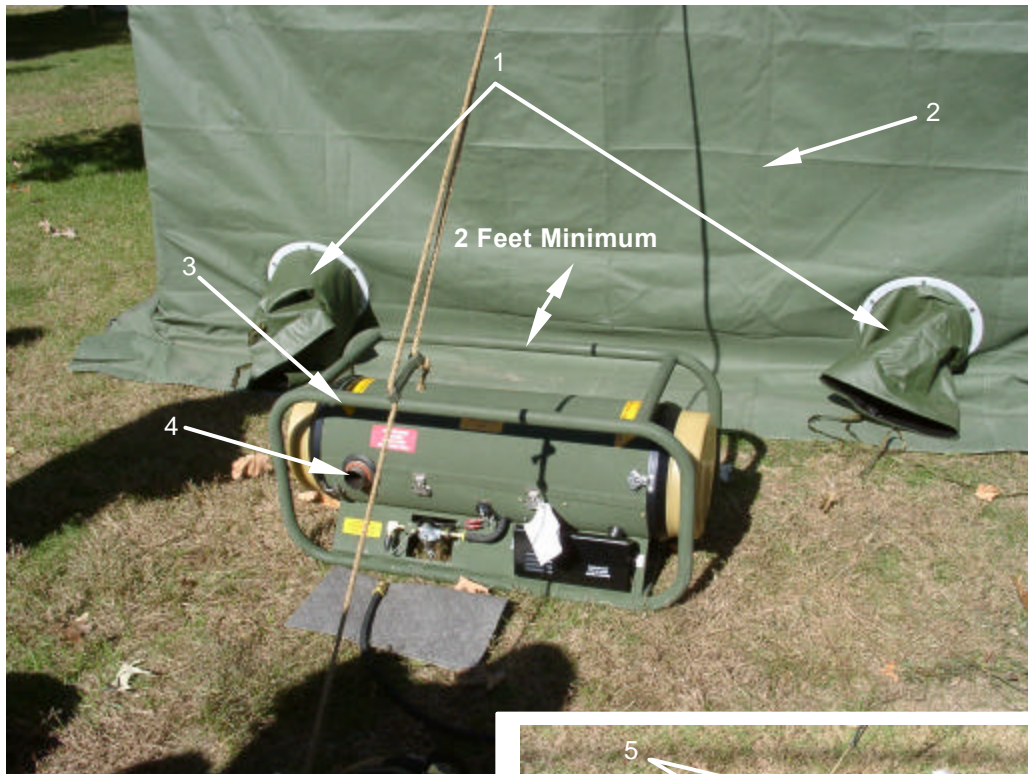


**BEFORE OPERATION PMCS**

Perform the "Before Operation PMCS" on all SHC system components as outlined in WP 0010, prior to preparing the heater for use. All scheduled maintenance must be performed on the heater and its associated equipment prior to use.



**Positioning the Heater Outside Tent.** Place heater on the side of the tent that has the tent duct tunnels (1). The heater should be a minimum of 2 feet (61 cm) from tent walls (2). Position the heater (3) so that the combustion exhaust outlet (4) is directed away from the tent wall (2) and the two supplied five foot (152 cm) long ducts (5) can be connected to both the heater (3) and the tent (2). **Do not install the ducts or connect the fuel supply at this time, simply place the heater in position.**



### PREPARING A FUEL SUPPLY SITE

Select a fuel supply site that is level, free of debris and open flame, at least seven feet (2.13 meters) from the tent, and a minimum of five feet from heater.

### NOTE

A piece of petroleum absorbent material should be placed where the fuel can and fuel can stand will be installed as well as under the fuel quick disconnect connector in order to catch any fuel that may spill. Additional commercial products are available to contain large spills. Soiled absorbent material should be discarded in accordance with local environmental regulations.

Route the fuel supply hose from the heater to the fuel supply location to gauge where the fuel supply site is best located. Place a petroleum absorbent mat where the fuel can stand will be set up.

**FILL FUEL CAN WITH FUEL AND INSTALL FUEL CAN ADAPTER**

**Heater Assembly Fuel Selection**



**WARNING**

Gasoline, JP-4, Used Motor Oil, Solvents or other unauthorized fuels should **NOT** be used with the SHC under any circumstance. Using unauthorized fuels in the SHC will create a fire danger and potential for explosion.

Refer to Table 1 to determine the appropriate fuel for the ambient temperature.

Table 1. Fuel Selection vs. Outside Temperature

Ambient Temperature	Specification	Military Symbol
Above -60 °F (-51.1 °C)	MIL-T-83133	JP-8
Above -60 °F (-51.1 °C)	VV-F-800	DF-A
Above -25 °F (-31.7 °C)	MIL-T-83133	JP-5
Above -25 °F (-31.7 °C)	VV-F-800	DF-1
Above +20 °F (-6.7 °C)	VV-F-800	DF-2

**Install Fuel Can Adapter.** At the fuel supply site, install a fuel can adapter on a full fuel can as follows:



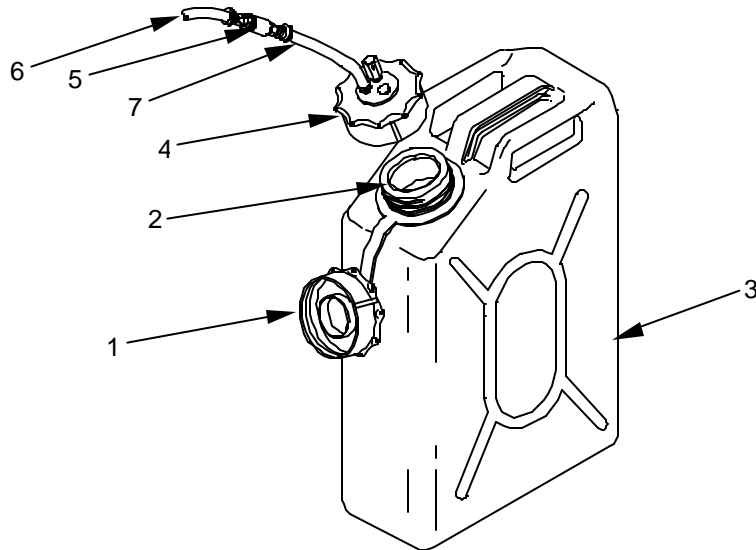
**WARNING**

Fuel can adapter kit must be fully seated to prevent fuel leakage and fire.

Remove cap (1) from mouth (2) of fuel can (3), and replace with gravity feed adapter (4). Screw the adapter into the fuel can securely.

Attach male end (5) of fuel supply hose (6) to gravity feed adapter fitting (7). Set the assembled fuel can aside.

At the fuel supply site, set up fuel can stand with fuel can (3) level or slightly above heater as detailed in the next section.



**Assemble Fuel Can Stand.** Select a site for the fuel can stand that is a minimum of 5 feet (1.5 m) but no more than 8 feet (2.4m) from the fuel quick disconnect connector on the heater.

No heat or flame sources, other than the heater, shall be within 8 feet (2.4 m) of fuel can stand. Set up the fuel can stand in accordance with the instructions detailed below. For convenience in the field, an instruction card is attached to the fuel can stand.

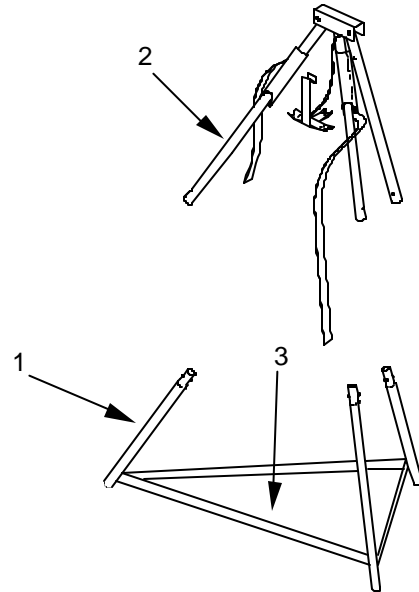


### **WARNING**

Death or serious injury may occur if fuel is not handled carefully. Always place fuel can and stand in well-ventilated area as far away from open flames and other potential ignition sources as possible. Fuel spills shall be cleaned up in accordance with local requirements.

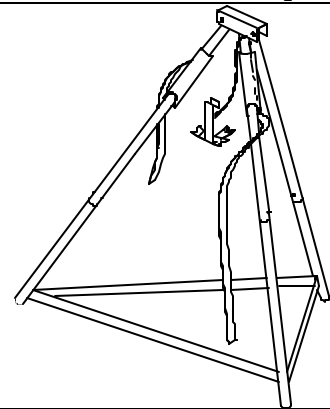
**STEP 1**

Insert the bottom leg assembly (1) into the top leg assembly (2) until each leg is locked in place. Be sure to orient each bottom leg so that the stabilizing straps (3) are positioned toward the inside of the stand. Ensure that the straps are not twisted.

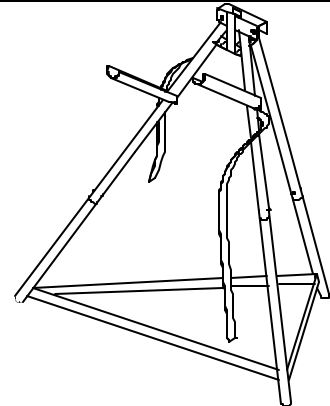
**STEP 2**

Spread the assembled leg assembly (4) until the stabilizing straps (3) are fully extended and the stand is stable.

The leg assembly straps are designed to ensure the stand is stable, but are also designed to prevent the stand from sinking into snow.

**STEP 3**

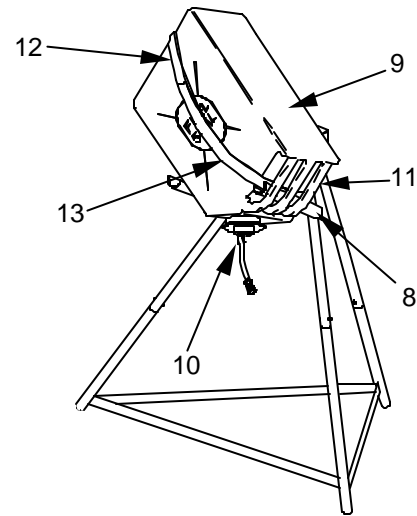
Lower the left (5) and right (6) support arms so that each is at a right angle to its attached leg. Place the tripod brace (7) under the top bracket (8) of the stand and clip into position over the front of the top bracket.



**STEP 4****NOTE**

Make sure that the gravity feed adapter is fully seated and secured to avoid leaking.

Invert the fuel can with installed fuel can adapter (9) and mount on the assembled fuel can stand so that the gravity feed adapter (10) faces the ground. Slide the right support arm (8) through the handle (11) of the fuel can. Wrap the left support strap (12) over the bottom of the fuel can (9). Feed the right support strap (13) through the fuel can handle (11), up across the front of the fuel can body, and over the left support strap (12). Secure the right strap (13) to the left strap. The strap helps secure a partially filled fuel can to the fuel stand during windy conditions.



If any fuel leaks occur, refer to WP 0009 entitled "Troubleshooting".

**HEATER SETUP****WARNING**

Carbon monoxide may cause permanent brain damage. Death can result from heavy exposure to carbon monoxide. All occupants of the tent shall be aware of the observable effects of carbon monoxide poisoning: headache, dizziness, sleepiness, slurred speech, loss of muscle control, or coma. If any personnel exhibit any of these effects, they and other personnel in the tent shall be removed from the tent and the tent ventilated.

**WARNING**

Combustible material must be kept at least 2 feet (61 cm) away from the heater during operation.

**WARNING**

During heater operation, air leaving the heated air outlet of the heater and passing through outlet duct with grill may exceed 220°F (93°C). Make sure tent personnel are aware of burn hazards and equipment hazards presented by the heated air and the debris grill.

**WARNING**

Use only those fuels identified in Table 1 in the heater. Failure to observe fuel requirements could cause damage to the heater and injury or death to personnel within or around the tent and the heater.

**CAUTION**

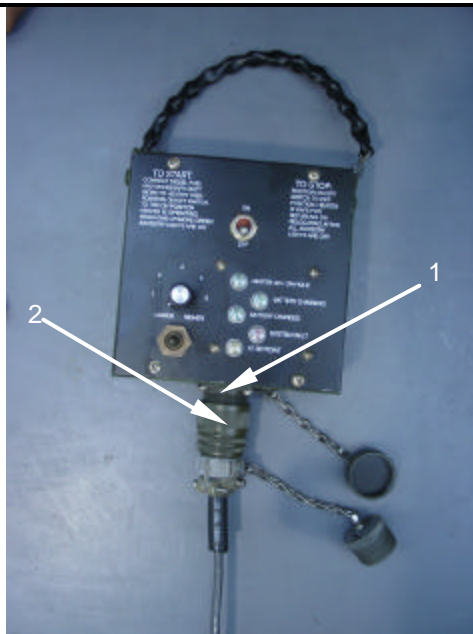
Always keep fuel lines and fuel cans clean and free of dust, dirt, and water. Make sure fuel lines lie flat without kinks or loops that could trap air in the lines and slow the fuel flow to the heater. Always make sure all ducts and pipes are clean and free of dirt or obstructions prior to attaching them to the heater.

**NOTE**

The heater should run for about 14 hours on five gallons (18.9 L) of fuel.

**Connect In-Tent Controller Assembly To In-Tent Controller Cable.** Make sure the in-tent controller assembly connector **(1)** and the in-tent controller assembly cable connectors **(2)** are clean and are not damaged. Connect the cable connector **(2)** to the in-tent controller assembly **(1)**. Remember that the two connectors are “keyed” together and will only fit together one way. Tighten connector securely.

**Ensure that the ON/OFF switch on the in-tent controller is in the OFF position.**



### Routing the In-tent Controller and Cable Through the Tent Duct Tunnel.

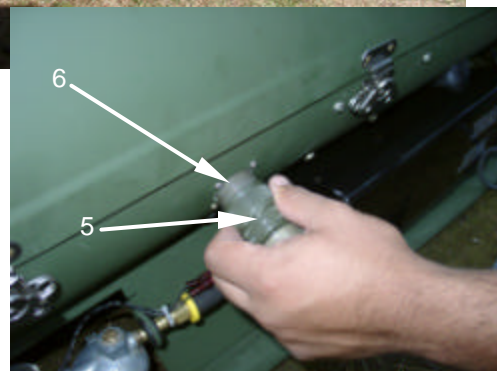
#### NOTE

Ensure that the ON/OFF switch on the in-tent controller assembly is in the OFF position before connecting the in-tent controller cable to the heater. If the switch is in the ON position, the heater will start as soon as the cable is connected to the heater.

The in-tent controller with attached cable **(1)** is routed through the tent duct tunnel **(2)** nearest the breathable air inlet end **(3)** of the heater from outside the tent. The breathable air inlet **(3)** is the end of the heater opposite the exhaust **(4)** and is labeled on the top of the heater.

To route the in-tent controller and cable **(1)** into the tent, open the end of the tent duct tunnel **(2)** nearest the breathable air inlet **(3)** of the heater and reach into the tent duct tunnel **(2)** placing the in-tent controller with attached cable **(1)** into the interior of the tent. Be sure that the cable is not crimped, tangled, or positioned in a way that could cause the cable to become damaged during heater operation.

Once the in-tent controller is positioned inside the tent, attach the connector **(5)** at the opposite end of the in-tent controller cable to the electrical connector **(6)** on the heater assembly. Tighten the connector securely.





**Positioning the In-tent Controller Inside the Tent.** Once inside the tent, locate a suitable place within the tent to hang the in-tent controller assembly (1).

A suitable location would be as far away from the outlet duct as possible and not be directly in line with either of the heater ducts openings (2). The In-tent Controller should also be placed at eye level if possible for ease of use and for accurate temperature recognition.

Hang the in-tent control assembly from a horizontal tent member or clip (3).





**CONNECT FUEL HOSE TO HEATER****WARNING**

Gasoline and JP-4 should NOT be used with the Space Heater, Convective under any circumstance. Only JP-8 or an approved alternate fuel as detailed in WP 0002 and WP 0001 Table 3, may be used. Failure to observe fuel requirements could cause damage to the heater assembly and injury or death to personnel within or around the tent and the heater assembly. Fuel spills shall be cleaned up in accordance with local requirements.

Before connecting the fuel hose (1) to the fuel quick disconnect connector (2), position a section of petroleum absorbent mat (3) under the fuel quick disconnect connector (2). Remove the protective dust cap and attach the quick disconnect connector (4) on the end of the fuel hose (1) coming from the fuel can (5) to the fuel quick disconnect (2) on the heater assembly. Make sure the hose lies flat and is not kinked or looped.

Ensure that the battery pack connector (6) is connected to the lower housing assembly battery connector (7).



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**INSTALLING THE AIR SUPPLY AND RETURN DUCTS**

**General.** Two air ducts, 8 feet in length and 10.5 inches in diameter, connect to the inlet and outlet ends of the heater and move air from the interior of the tent through the heater and back to the interior of the tent. Although the two ducts appear to be identical, they differ in that one is specifically designed to move unheated air from the tent to the heater (the air supply duct) and the other is designed to move heated air from the heater to the tent (the air return duct).

The two ducts can be differentiated from one another by observing the direction of the air flow tags and the location of the debris grill. The air supply duct (1), which conducts cool, breathable air from the tent to the breathable air inlet of the heater has an air flow tag with a directional arrow that points from the end of the duct with the debris grill toward the open end of the duct. An inspection of the interior of the air return duct shows that the end with the debris grill has a SILVER lining.

The air return duct (2), which conducts heated air from the Space Heater Convective to the tent, has an air flow tag with a directional arrow that points from the open end of the duct toward the end of the duct with the debris grill. An inspection of the interior of the air return duct shows that the end with the debris grill has a GREEN lining.

If the air flow tags are damaged or missing from the duct(s), one can also tell the difference between the two ducts by inspecting the interior. Looking in one end of a duct, it can be seen that the interior has a silver colored lining. Reversing the duct and looking in the opposite end of the duct, one will observe that the duct has a green colored lining. This is due to the fact that the interior of the duct is designed to promote air flow within the duct from the silver lined end to the green lined end. If the debris grills should ever be separated from the ducts, they can be properly assembled by placing one debris grill at the green end of the duct and one debris grill at the silver end of the other duct.





**Installing Debris Grills in Air Supply and Return Ducts.** When the heater is shipped initially, the debris grills (1, 2) are not installed in the end of the air supply (3) or air return (4) ducts but must be installed before the heater can be used. To install the debris grill in the air supply duct (3), inspect the interior of each duct and note that one end of the duct has a green lining and the other end has a silver lining as described in the previous section entitled "General".

Install a debris grill (2) (with the grill facing out) into the silver lining end of one of the ducts. Secure the debris grill in the end of the duct with the strap (5) at the end of the duct. This duct will be the air supply duct (3) that carries cool air from the tent into the breathable air inlet end of the heater.

Install a debris grill (1) (with the grill facing out) into the green lining end of the remaining duct (4). Secure the debris grill in the end of the duct with the strap (6) located at the end of the duct. This duct will be the air return duct (4) that carries heated air from the heated air outlet end of the heater and into the tent.



**Installing The Air Supply And Return Ducts.** Remove dust covers (1) from heater assembly duct adapters (2). Make sure that each of the duct adapter assemblies are securely attached to the heater housing assembly by two fasteners (3). The fasteners must be tightened securely and in the locked position.



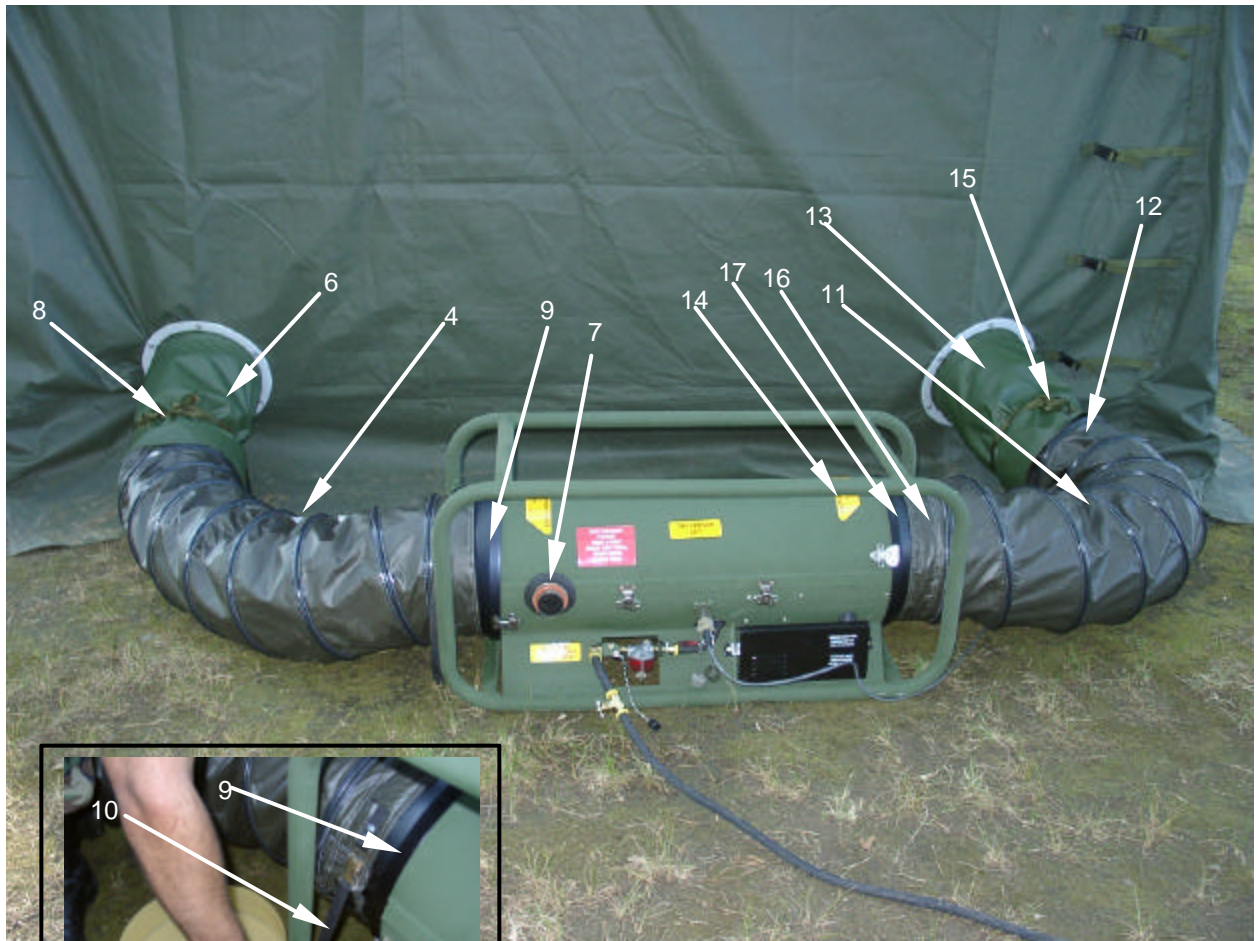
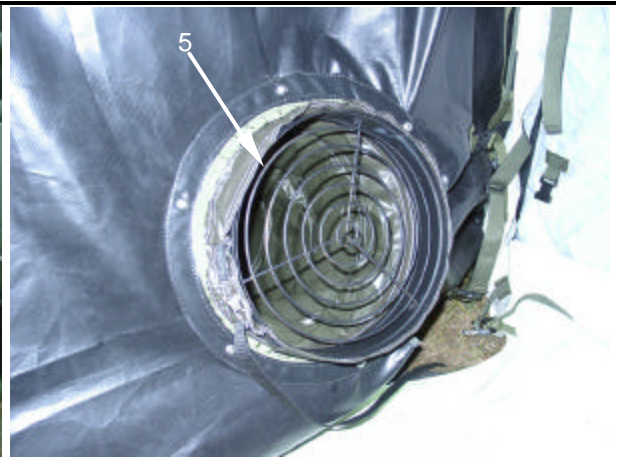
### **WARNING**

During heater operation, air leaving the heated air outlet of the heater and passing through the heated air inlet duct (with debris grill) may exceed 220°F (104°C). Make sure tent personnel are aware of burn hazards and equipment hazards presented by the heated air and the debris grill. To ensure proper air flow, air duct color code inspection is critical.

Locate the heated air return duct (4). The heated air return duct (4) will have an air flow arrow pointing toward the debris grill (5). Make sure inside and outside of duct and the debris grill are free of damage, dirt, and obstructions prior to attachment to the heater assembly. Insert the debris grill end (5) of the duct into the tent duct tunnel (6) closest to the exhaust outlet end (7) of the heater as indicated by the label "Heated Air Outlet" on the upper housing assembly. Secure the tent duct tunnel tie straps (8). Do not secure the straps so tightly that the air flow within the duct is restricted. Attach the open end of the duct to the duct adapter (9) on the outlet side of the heater. This is the end of the heater closest to the exhaust outlet (7). Tighten the duct strap (10) securely on the duct adapter (9).

Locate the air supply duct (11). The air supply duct (11) will have an air flow arrow pointing away from the debris grill. Make sure inside and outside of duct and the grill are free of damage, dirt, and obstructions prior to attachment to the heater assembly.

Insert the debris grill end (12) of the duct into the tent duct tunnel (13) closest to the breathable air inlet of the heater as indicated by the label "Breathable Air Inlet" (14) on the upper housing assembly. Secure the tent duct tunnel tie straps (15). Do not secure the straps so tightly that the air flow within the duct is restricted. Attach the open end of the duct (16) to the duct adapter (17) on the breathable air inlet side of the heater. This is the end of the heater farthest from the exhaust outlet (7). Tighten the duct strap securely on the duct adapter (17).





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**WARNING**

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Never use gasoline in this heater. Never use JP-4. The heater is designed to run only on DF-1, DF-2, DF.A, JP-5, and JP-8. Failure to use only authorized fuels may result in fire or explosion.

**FINAL CHECKS BEFORE OPERATION**

Make sure that the fuel hose leading from the fuel can to the heater is not kinked or looped and lies flat on the ground. Make sure all fuel connections are correct, secure, and do not leak at the gravity feed adapter or fuel quick disconnect connector at the heater.

The heater assembly is now ready for operation.



**SPACE HEATER, CONVECTIVE (SHC)  
OPERATING UNDER USUAL CONDITIONS**

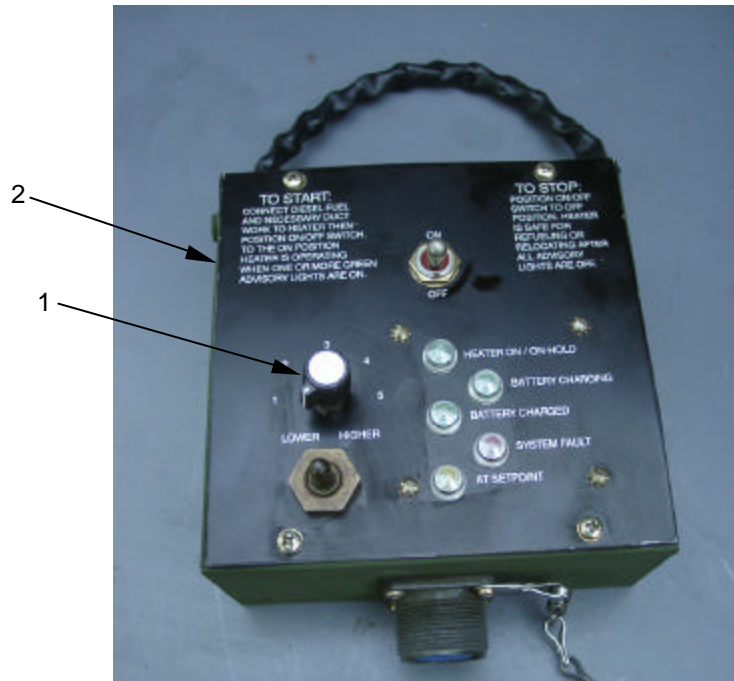
**OPERATING THE CONVECTIVE SPACE HEATER**

This work package has information and instructions for startup, operating, refueling, shutdown, and emergency shutdown of the heater.

**PREPARATION FOR STARTING**

Before operating the heater, you must be familiar with the heater controls. Refer to WP 0004 entitled "Controls, Indicators and Labels/Instruction Plates", to review the functions of controls and indicators before operating the heater.

This heater is designed to operate with minimal operator intervention. Once the heater has been put into operation, the only action required of the operator is adjusting the LOWER-HIGHER knob (1) (thermostat) on the in-tent controller assembly (2) if the temperature in the tent becomes too hot or too cold.



**WARNING**

Small, portable, shelter heaters of this type are not designed to be moved during operation or before purge cycles are complete. Serious injury, skin burns, or death can occur if the heater assembly is moved while operating or before the HEATER ON/ON-HOLD advisory light goes OFF and the blower fans stop.

During operation, some metal components of the heater assembly, such as the debris grill on the outlet duct, the upper and lower heater housing assemblies, combustion exhaust pipe (near heat exchanger), etc., can cause severe burn injuries if contact with bare skin occurs.

Make sure the heater assembly has been properly set up and the appropriate fuel selected as detailed in Table 1 of WP 0005.

Make sure the fuel can is full before starting. If the fuel can is empty, refer to the section of this work package entitled "Refueling the Convective Space Heater".

**STARTING THE HEATER.** To start the heater, switch the ON/OFF switch **(1)** on the in-tent controller **(2)** to the ON position. The green HEATER ON/ON-HOLD advisory light **(3)** will illuminate and the pre-purge cycle will begin.

### NOTE

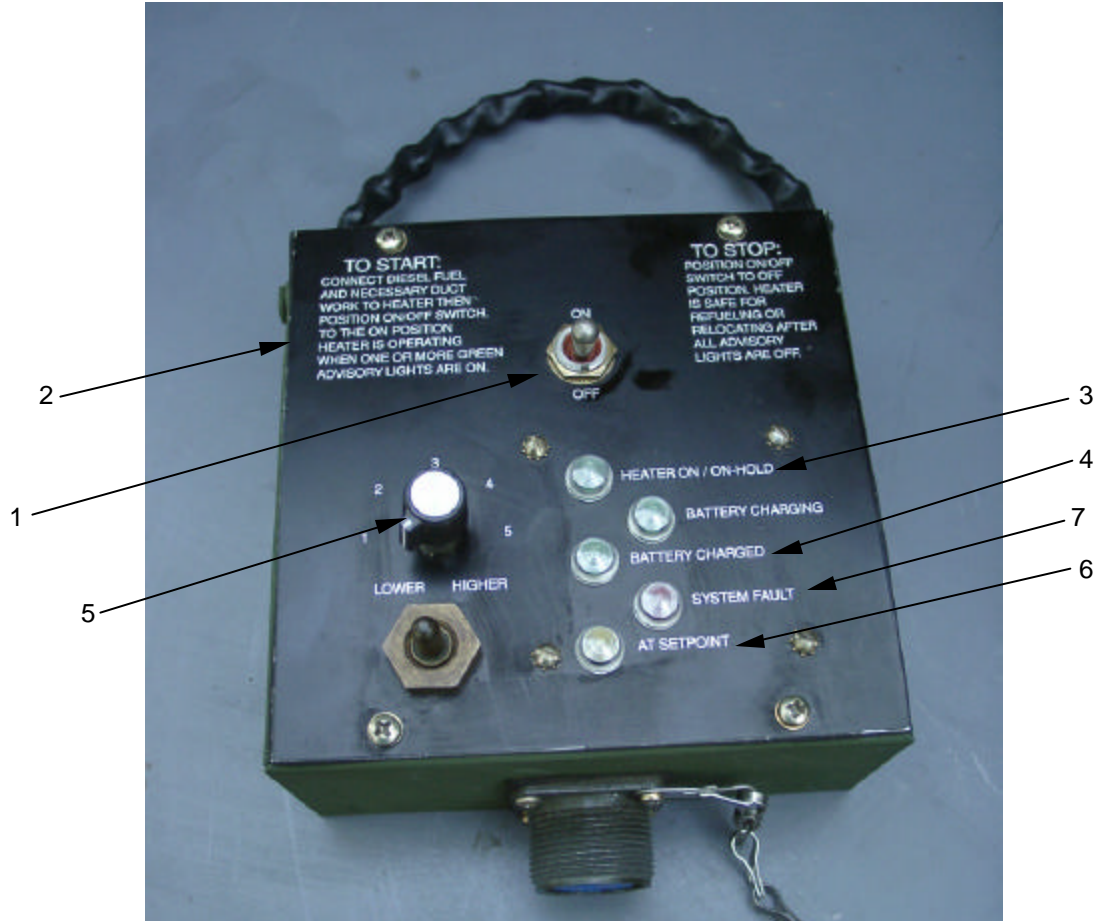
The heater assembly can be shut down in a normal manner at any time by placing the ON/OFF switch to the OFF position. However, to insure both a fully charged battery for subsequent operation and a longer battery life, the heater assembly, whenever possible, should be allowed to run until the green BATTERY CHARGED light **(4)** illuminates.

When first setting the LOWER-HIGHER control knob **(5)**, on the in-tent controller assembly **(2)**, it should be set it to its highest setting. When the tent has reached a comfortable temperature, turn the LOWER-HIGHER knob down until the amber AT SETPOINT light **(6)** illuminates. The heater control assembly will then regulate to this temperature.

The heater will run at full power until the battery charging light comes on. If the red SYSTEM FAULT light **(7)** illuminates, the heater will enter shut down mode and the SYSTEM FAULT light will flash from 1 to 9 times and an audible series of tones indicating a diagnostic code. These diagnostic codes provide the user with information regarding the nature of the fault. In some cases the problem may be corrected by the operator and a re-start may be attempted. If the problem is of a more serious nature and cannot be corrected by the operator, the heater should be referred to Unit Maintenance for repair. Refer to WP 0009 entitled "Troubleshooting" for a complete discussion of the various diagnostic codes.

**NOTE**

The heater will operate at full power until the Battery Charging Light illuminates. Once the light comes on, the LOWER-HIGHER control can be used to regulate heater output.



Once the ON/OFF switch on the in-tent controller assembly has been placed in the ON position, the HEATER ON/ON-HOLD advisory light is lit and the heater is in one of the following modes:

**Pre-purge.** During pre-purge, the combustion air blower assembly and the heated air blower assembly fan operate to clear any fumes from the heater.

**Normal operation.** The combustion air blower assembly and the heated air blower assembly fan continue to operate during normal operation to circulate the heated breathable air to the tent and to exhaust combustion fumes.

**On-hold.** In the HEATER ON/ON-HOLD mode, the heater does not heat but automatically begins heating in response to either changes in the tent temperature or changes to the LOWER/HIGHER setting on the in-tent controller assembly.

**STOPPING THE HEATER**

When the ON/OFF switch (1) is placed in the OFF position, the green HEATER ON/ON-HOLD advisory light (2) will go out and the fuel supply is shut off via the fuel solenoid valve; however, the combustion blower assembly and heated air blower fan continue to operate as the heater control assembly goes to the post-purge mode. The fans can be heard as they continue to run during the post-purge cycle.



**WARNING**

Do not move or refuel the heater, or remove ducts or pipes, until all fans have stopped running. Small, portable, shelter heaters of this type are not designed to be moved during operation or before purge cycles are complete. Serious injury, skin burns, or death can occur if the heater assembly is moved while operating or before the HEATER ON/ON-HOLD advisory light goes OFF and the blower fans stop.

During operation, some metal components of the heater assembly, such as the debris grill on the outlet duct, the upper and lower heater housing assemblies, combustion exhaust pipe (near heat exchanger), etc., can cause severe burn injuries if contact with bare skin occurs.

Complete heater shutdown is indicated by the stopping of the combustion blower assembly and heated air blower fan. The remaining advisory lights will extinguish as each heater sequence that the respective lights monitor ceases operation.



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**REFUELING WITH THE SAME FUEL****WARNING**

Death or serious injury may occur if fuel is not handled carefully. Always place fuel can and stand in well-ventilated area as far away from open flames and other potential ignition sources as possible. Fuel hoses shall not be located near the combustion exhaust outlet or under that end of the heater. Fuel spills must be cleaned up in accordance with local requirements.

Only those fuels identified in Table 3 of WP 0001 entitled "General Information" rated for the outside temperature where the heater will be operating should be used. Failure to observe fuel requirements could cause damage to the heater and injury or death to personnel within or around the tent and the heater.

Always switch heater control to the OFF position and wait until the blower fans stop and all advisory lights go out before beginning a refueling operation.

**CAUTION**

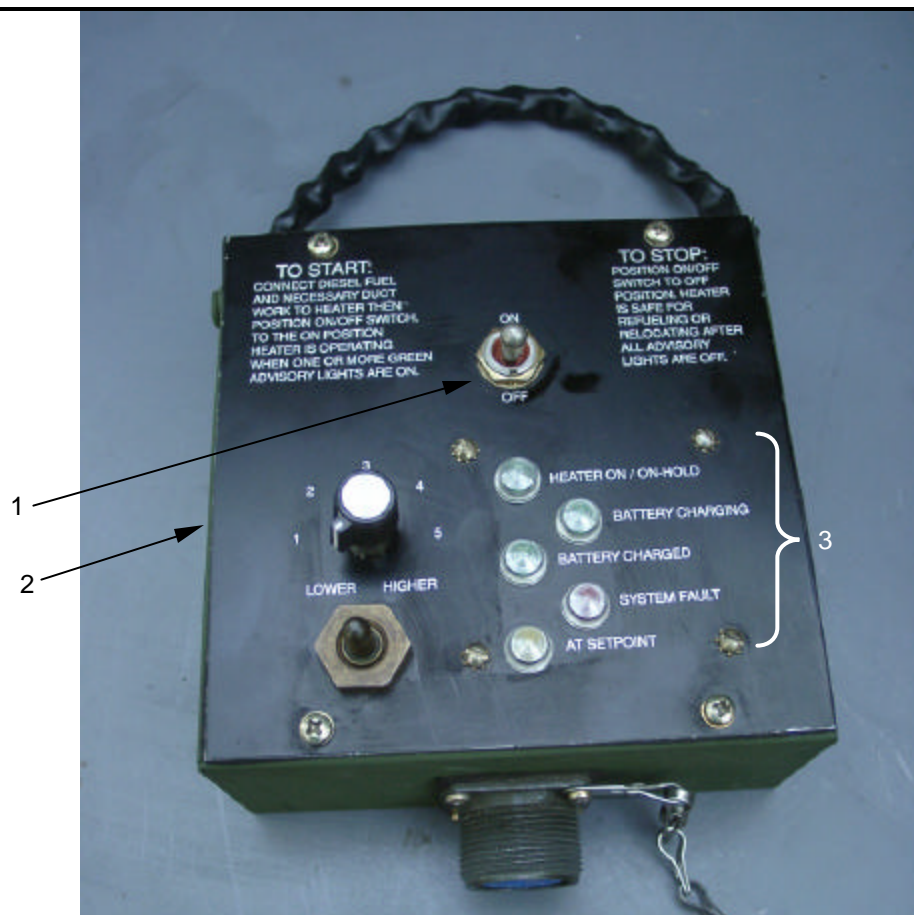
Always keep fuel hoses and fuel cans clean and free of dust, dirt, and water. Make sure fuel hoses lie flat without kinks or loops that could trap air in the lines and slow the fuel flow to the heater.

**NOTE**

The heater should run for about 14 hours on five gallons (18.9 L) of fuel.

Place the ON/OFF switch **(1)** of the in-tent controller assembly **(2)** in the OFF position or verify that it is in the OFF position.

If the heater assembly has been operating, allow it to complete the post-purge mode and make certain that all advisory lights **(3)** are off.



When the blower fans stop at the end of the post-purge mode, remove fuel can **(1)** from fuel can stand **(2)**.

Loosen and remove the fuel can adapter **(3)** and place it on the absorbent mat **(4)**.

Make sure all components of the fuel system are clean and free of dirt and damage that could contaminate the fuel supply or cause leakage.

If the expected ambient temperatures do not require a fuel change, fill the fuel can with the same fuel selected previously. Refer Table 3 of WP 0001 for fuel selection information. If the expected ambient temperatures require a fuel change, refer to the section of this work package entitled "Refueling with a Different Fuel".

Install fuel can adapter **(3)** onto fuel can **(1)**. Tighten securely.

Place fuel can onto fuel can stand assembly **(2)** and strap in place in accordance with tag attached to stand assembly or procedures outlined in WP 0005 entitled "Assemble the Fuel Can Stand".

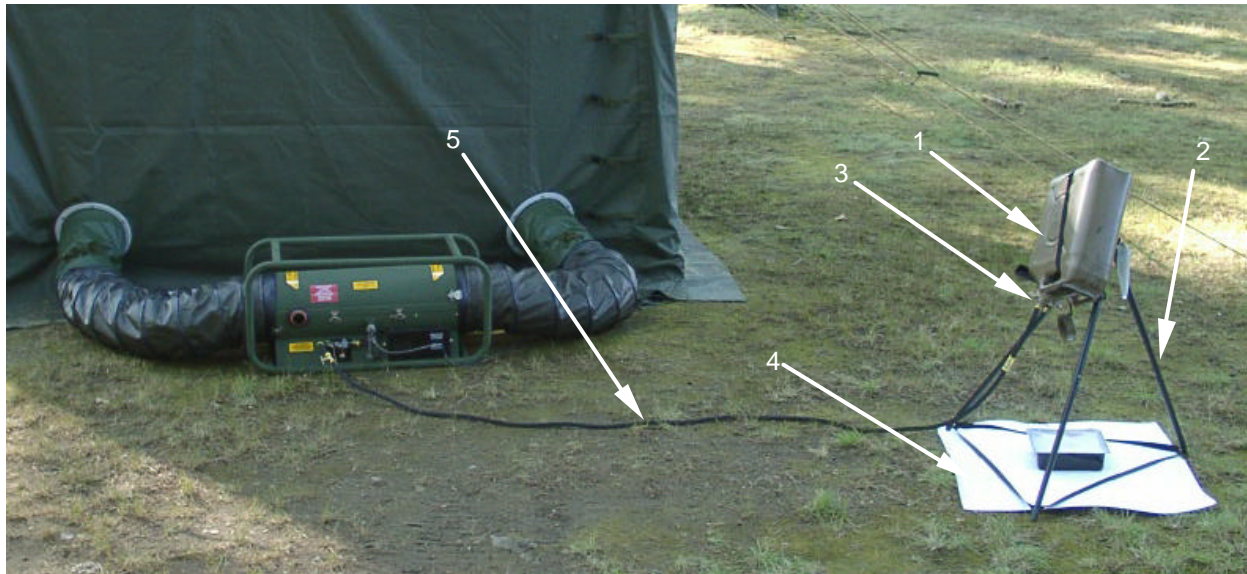
Make sure fuel connections are tight and that there are no fuel leaks.

Make sure fuel hose **(5)** lies flat on the ground and is not looped or kinked.



Heater assembly is now ready for operation. Make sure heater setup has not been changed, ducts and pipes are properly positioned, and heated air is directed in a safe manner. See applicable setup instructions in this section if in doubt as to existing setup.

If heat is desired, place heater ON/OFF switch in the ON position and verify that HEATER ON/ON-HOLD light is lit.



### REFUELING WITH A DIFFERENT FUEL

When changing fuel types, all existing fuel must be drained from the fuel supply system as detailed in the section to follow. Also, the heater must be operated through a minimum of one charging cycle to work the new fuel through the system. A charging cycle is performed **after** the system has been refueled with a different fuel.

A charging cycle starts when the heater ON/OFF switch **(1)** is moved to the ON position and ends when the BATTERY CHARGED light **(2)** comes on. This must be accomplished to make sure that all the old fuel is burned during heater operation and the only fuel remaining in the heater fuel system is the new fuel type.



**WARNING**

Death or serious injury may occur if fuel is not handled carefully. Always place fuel can and stand in well-ventilated area as far away from open flames and other potential ignition sources as possible. Fuel hoses shall not be located near the combustion exhaust outlet or under that end of the heater. Fuel spills must be cleaned up in accordance with local requirements.

Only those fuels identified in Table 3 of WP 0001 entitled "General Information" rated for the outside temperature where the heater will be operating should be used. Failure to observe fuel requirements could cause damage to the heater and injury or death to personnel within or around the tent and the heater.

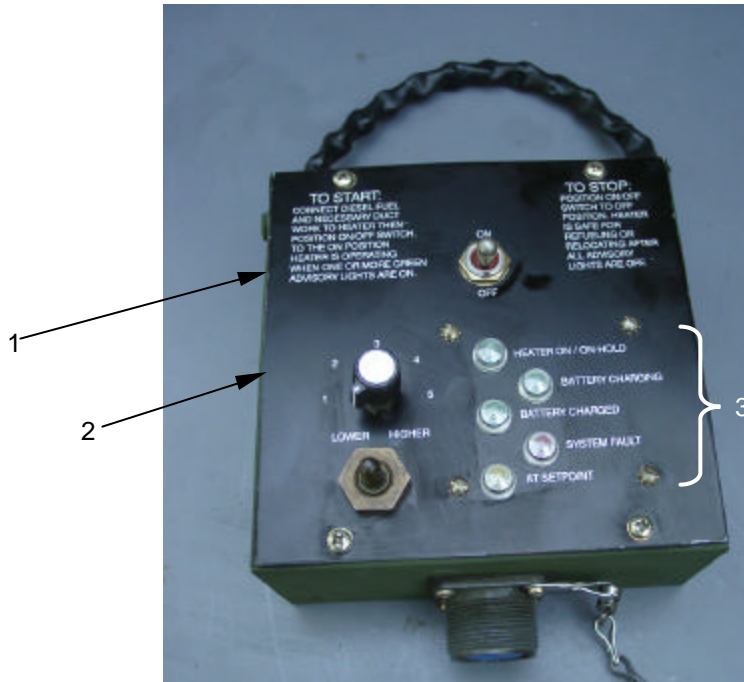
**CAUTION**

Always keep fuel hoses and fuel cans clean and free of dust, dirt, and water. Make sure fuel hoses lie flat without kinks or loops that could trap air in the lines and slow the fuel flow to the heater.



Place ON/OFF switch **(1)** on the in-tent controller assembly **(2)** in the OFF position or verify that it is in the OFF position and wait until the all fans stop and all advisory lights **(3)** have gone off.

If the heater assembly was operating, allow the heater assembly to complete the post-purge mode and ensure that all advisory lights on the in-tent controller assembly are off.



When the blower fans stop at the end of the post-purge mode, remove the fuel can **(1)** from the fuel can stand assembly **(2)**. Set the fuel can down in the upright position.

Place a petroleum absorbent material tray or mat under the heater fuel connector **(3)** to collect the small amount of fuel that may drain from heater and the fuel hoses.

Remove the fuel hose quick disconnect **(4)** from the heater fuel connector **(3)** and lift the hose **(5)** above the level of fuel can **(1)**. This will allow all the fuel to drain back into the fuel can. Place the end of the hose on the petroleum absorbent mat or tray.

Remove gravity feed adapter **(6)** from fuel can **(1)**. Make sure all components of the fuel system are clean and free of dirt and damage that could contaminate the fuel supply or cause leakage.

Obtain a fuel can full of the newly selected approved fuel. Remove fuel cap and install fuel can adapter **(6)** onto fuel can **(1)**. Tighten securely.

Attach fuel hose quick disconnect **(4)** to the heater fuel connector **(3)**.

Place fuel can **(1)** onto fuel can stand assembly **(2)** and strap in place in accordance with tag attached to stand assembly or the section of WP 0005 entitled "Assemble the Fuel Can Stand".

Make sure fuel connections are tight and that there are no fuel leaks.

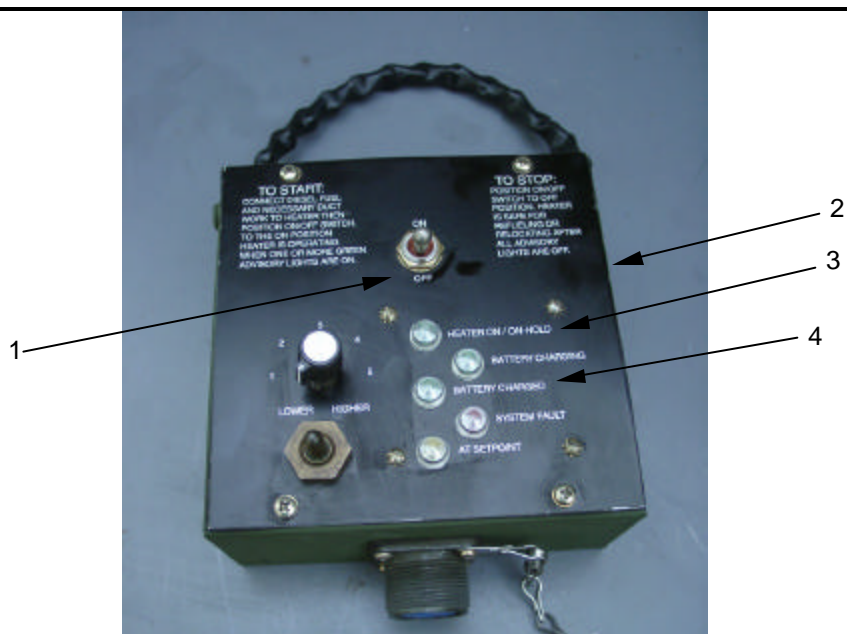
Make sure fuel hose **(5)** lies flat on the ground and is not looped or kinked.

Heater assembly is now ready for operation. Make sure heater setup has not been changed, ducts and pipes are properly positioned, and heated air is directed in a safe manner. See applicable setup instructions in this section to confirm correct setup.



Place the heater ON/OFF switch **(1)** of the in-tent controller assembly **(2)** in the ON position and verify that green HEATER ON/ON-HOLD light **(3)** is lit. (Refer to troubleshooting if light is not on). At a minimum, allow the heater to run through a complete charging cycle. A charging cycle starts when the heater ON/OFF switch is moved to the ON position and ends when green BATTERY CHARGED light **(4)** comes on.

If heat is no longer desired, place the heater ON/OFF switch **(1)** in the OFF position and verify that the blower fans stop after post-purge. Cool down is then complete.



**HEATER SHUTDOWN**

Place ON/OFF switch (1) on the in-tent controller assembly (2) in the OFF position.

Allow the heater assembly to complete the purge cycle.

When the blower fans stop and all advisory lights are off, the heater assembly is shut down.



## CHARGING THE BATTERY WITH A EXTERNAL CHARGER

Under normal conditions, the Space Heater, Convective is responsible for recharging the on-board battery pack. However, there may be some instances where it is required that the battery be recharged using a commercially available 115 VAC to 12 VDC charger. To accomplish this, a battery charging adapter has been supplied with the heater that permits the connection of a charger to the battery pack.



### WARNING

Do not allow the metal terminals of the battery charging adapter to come in contact with the metallic portion of the heater.

### CAUTION

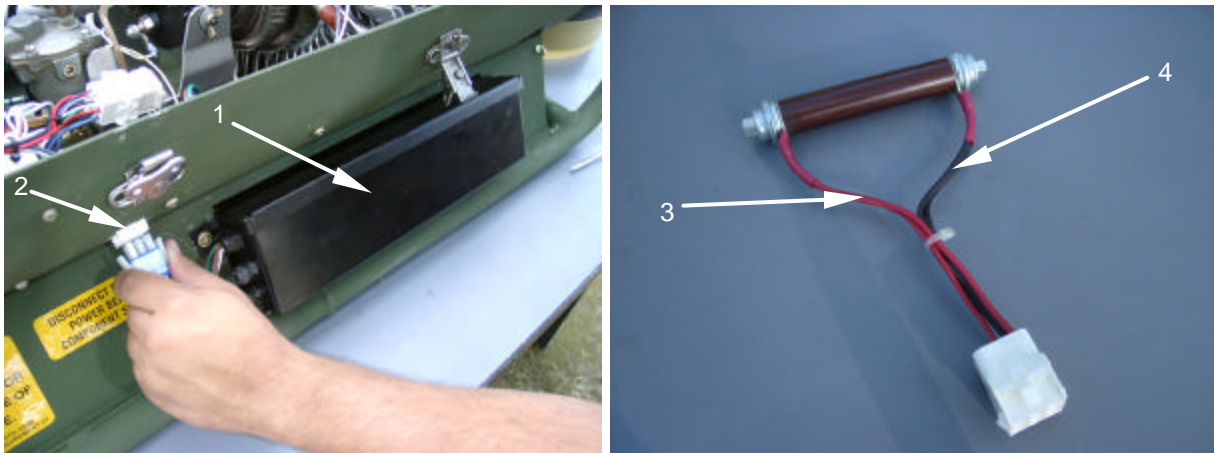
Do not permit the battery charger terminals to come in contact with the metal casing of the heater as this may cause damage to the battery pack assembly.

### NOTE

No grounding is necessary when using the battery charging adapter.

To charge the battery **(1)** with a commercial 115 VAC to 12 VDC battery charger, disconnect the battery connector **(2)** from the heater and engage the connector on the end of the battery charging adapter with the connector on the battery pack. Connect the positive (+) lead of the charger to the red (+) wire **(3)** of the battery charging adapter and the negative (-) lead of the charger to the black (-) wire **(4)** of the battery charging adapter. Once the charger is connected to the battery charging adapter properly, turn on the power to the charger.

Depending upon the battery temperature, recharge time for the battery will be approximately 30 minutes. The battery will take longer to recharge in cold weather conditions.



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**PREPARATION FOR MOVEMENT**

To break the system down in preparation for movement, ensure that the heater is off, the blower fans stopped, and all advisory lights off.

1. Remove the fuel can from the fuel can stand assembly. Set the fuel can down in the upright position.
2. Place a mat or tray containing petroleum absorbent material under the heater fuel quick disconnect to collect the small amount of fuel that may drain from heater and the fuel hose.
3. Disconnect the in-tent controller cable from the control connector on the front of the heater and immediately install the protective dust caps on the control connector and the cable connector.
4. Disengage the fuel hose from the fuel quick disconnect and lift the hose above the level of fuel can. This allows all fuel to drain back into the fuel can. Install the protective dust cap on the fuel quick disconnect.
5. Coil the fuel hose back to the fuel supply site and disconnect the fuel hose from the gravity feed adapter. Connect the two ends of the fuel hose together to keep dirt or contaminants from entering the fuel connectors. Place the fuel hose on the petroleum absorbent mat.
6. Loosen the gravity feed adapter and remove it from the fuel can. Place the gravity feed adapter on the petroleum absorbent mat. Install the cap on the fuel can and tighten securely.
7. Disassemble the fuel can stand by removing the clip, raising the two support arms, and separating the lower legs from the upper portion of the stand. Wrap the straps around the stand and secure.
8. Remove both the air supply and return ducts from the heater by releasing the strap and sliding off the duct adapter.
9. Untie both tent duct tunnel straps and remove both ducts from their respective tent duct tunnels.
10. Remove the in-tent controller and disconnect the in-tent controller cable. Install the protective caps on the connectors of the in-tent controller and cable.
11. Secure both tent duct tunnels by closing off with tie straps.
12. Compress both ducts and stow in accessory bag.
13. Install the dust covers over the inlet and outlet duct adapters.
14. Stow all components except the heater in the accessory bag.

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**SPACE HEATER, CONVECTIVE (SHC)  
OPERATION UNDER UNUSUAL CONDITIONS**

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**OPERATION IN EXTREME SAND, DUST, AND/OR HIGH WINDS**

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**WARNING**

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The heater has been designed to operate in dusty or sandy conditions. However, some forms of very fine dusts may be explosive (e.g., flour, chaff, coal, etc.). Before operation of the heater in dusty conditions, an attempt should be made to identify the dust type to insure that it is not explosive in nature.

If possible, the heater should be positioned to minimize the amount of dust, sand, or any other material in the area that could be pulled into the heater by the fans (air flow is 250 cubic feet per minute (CFM) during normal operation of the heater).

When operating in conditions of extreme sand or dust, it is recommended that the air supply **(1)** and return ducts **(2)** be secured to the heater and the ducts securely connected to the tent. It is further recommended that the optional combustion air inlet pipe **(3)**, and optional combustion exhaust pipe **(4)** be used if at all possible. Refer to WP 0066 entitled "Additional Authorized Items List" for specific information on these optional items. Instructions for the use of these optional items are included with the equipment.

If high winds are expected, the open ends of the optional combustion air inlet pipe **(3)** and optional combustion exhaust pipe **(4)** should be positioned next to each other, both pointed in the same direction, and pointed away from the prevailing wind. It should be noted that the combustion air inlet does not conduct breathable air into the tent. This pipe is only used to conduct air into the burner assembly for combustion. Therefore, placing the combustion air inlet pipe and combustion exhaust pipe side by side is not a safety concern.

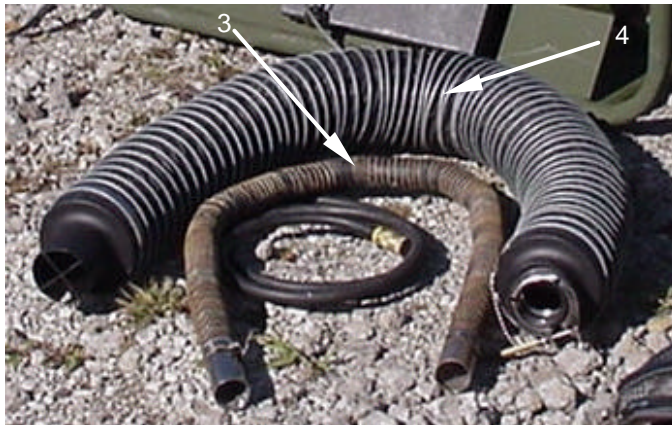
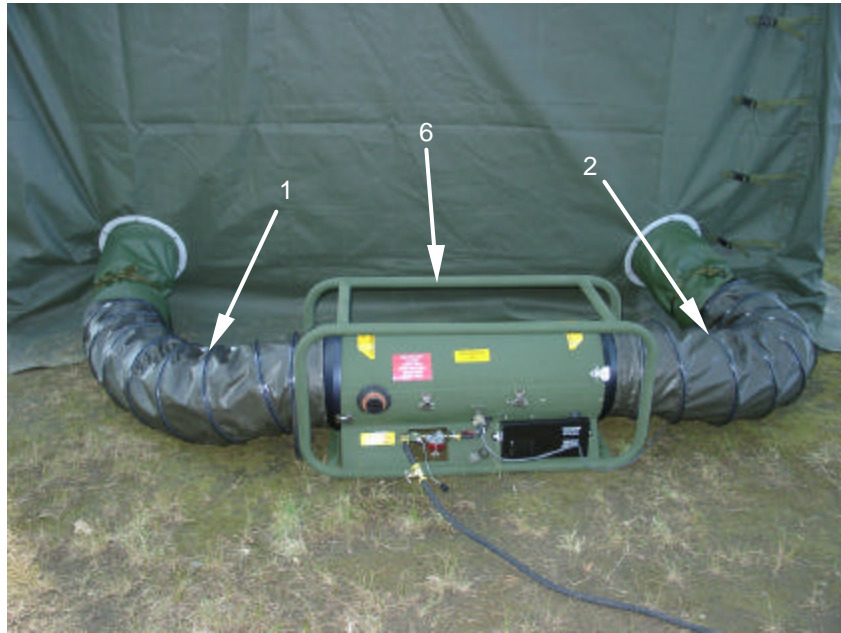
If high winds are expected, the fuel can stand **(5)**, ducts **(1)(2)**, optional combustion air inlet pipes **(3)**, optional combustion exhaust pipe **(4)**, and the heater itself **(6)** may require additional anchor or tiedowns to prevent high winds from shifting the equipment.

During refueling and at regular intervals between refueling, the heater **(6)**, its ducts **(1)(2)**, optional combustion air inlet pipe **(3)**, and optional combustion exhaust pipe **(4)** should be inspected for a buildup of dust or sand that would cover the heater or block the ducts or pipes.

During refueling and at regular intervals between refueling, the sediment strainer **(7)** should be visually checked for dirt or other contamination. If dirt or other contamination is present, the sediment strainer should be serviced in accordance with WP 0020 00 entitled "Solenoid Valve and Sediment Strainer Assembly."

Special care should be used during refueling to prevent sand or dust contamination of fuel, fuel can, and fuel hoses.







## OPERATION IN EXTREME RAIN OR HUMIDITY

When operating in conditions of extreme rain or humidity, it is recommended that the heated air outlet duct with louver **(1)** and air supply inlet duct with debris grill **(2)** be secured to the heater and the ducts securely connected to the tent. It is further recommended that the optional combustion air inlet pipe **(3)**, and optional combustion exhaust pipe **(4)** be used if at all possible. Refer to WP 0066 entitled "Additional Authorized Items List" for specific information on these optional items.

Under no circumstances should the heater be positioned in standing water. Heater site should be graded slightly, if necessary, to insure that water runs away from heater and tent.

## NOTE

Heater will not operate when tilt or grade is greater than 15 degrees, which is a 1.5 foot drop over a 10 foot span.

Ducts **(1)(2)**, pipes **(3)(4)**, and the heater **(5)** itself might need to be raised higher off the ground to prevent water from entering the heater, especially the base of the heater housing. The base contains three sealed compartments in which the battery, combustion blower, and electronic controller are located. These compartments must not be submerged in standing water. If the heater is to be raised above ground level, make sure that water cannot run along ducts or heater control assembly lead and find its way into the tent.

If high winds accompany rain or humidity, additional anchors or tiedowns may be required to prevent winds from shifting the equipment.

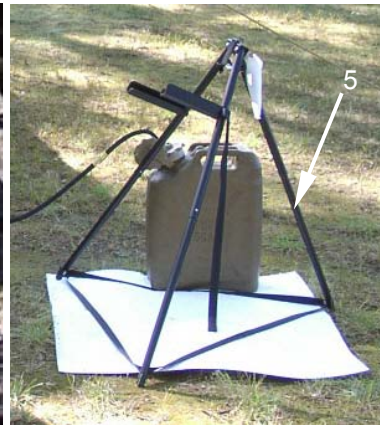
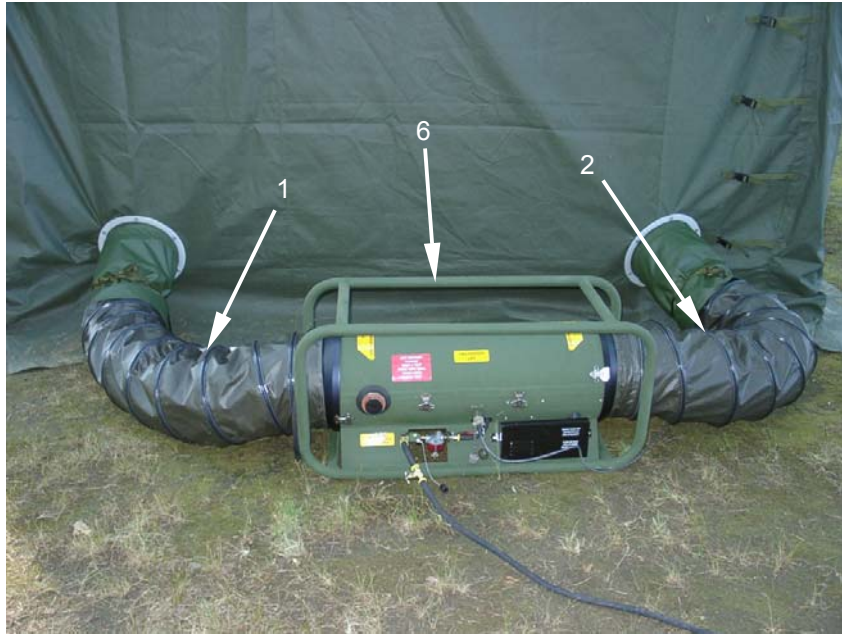
The open ends of the optional combustion air inlet **(3)** and optional combustion exhaust pipe **(4)** should be positioned next to each other, both pointed in the same direction, and pointed away from the prevailing wind. Under no circumstances should either pipe be allowed to sit in standing water, nor should they be positioned in such a way as to allow water to enter their open ends. This is most important for the combustion air inlet pipe **(3)**. Water entering the heater will be trapped in the baffles within the air inlet box and drain out into the pipe, but excessive amounts of water entering the heater could cause it to shut down and may damage the heater.

If high winds accompany the rain or humidity, the fuel can stand **(6)** should be firmly anchored to the ground. (Tent stakes and line can be used as an improvised anchor and tiedown.)

During refueling and at regular intervals between refueling, the heater **(5)**, its ducts **(1)(2)**, and pipes **(3)(4)** should be inspected for a buildup of snow, dust, or sand that would cover the heater or block the ducts or pipes. Any buildup should be removed.

During refueling and at regular intervals between refueling, the sediment strainer **(7)** of the heater should be visually checked for contamination. If dirt or other contamination is present, the sediment strainer should be serviced in accordance with WP 0020 00 entitled "Solenoid Valve and Sediment Strainer Assembly."

Special care should be used during refueling to prevent water, snow, sand, or dust contamination of fuel, fuel can, fuel hose, and fuel fittings.



**OPERATION IN EXTREME COLD (Temperatures Below -25°F [-31.7°C]).**

When operating in conditions of extreme cold, it is recommended that the heated air outlet duct with louver **(1)** and air supply inlet duct with debris grill **(2)** be secured to the heater and the ducts securely connected to the tent. If the optional combustion air inlet pipe **(3)**, and optional combustion exhaust pipe **(4)** are used, they should also be secured. Refer to WP 0066 entitled "Additional Authorized Items List" for specific information on these optional items. Under no circumstances should the heater or the ducts and pipes (especially pipe ends) be allowed to be covered with snow.

If operated outside of the tent, ducts **(1)(2)**, pipes **(3)(4)**, and the heater **(5)** itself may require that they be raised higher off the ground to prevent snow from entering the heater.

If high winds accompany extreme cold, additional anchors or tiedowns may be required to prevent winds from shifting the equipment. (Tent stakes and line can be used as an improvised anchor and tiedown.) The open ends of the optional combustion air inlet **(3)** and optional combustion exhaust pipes **(4)** should be positioned next to each other, both pointed in the same direction, and pointed away from the prevailing wind. Under no circumstances, should pipes be positioned in such a way as to allow snow to enter their open ends.

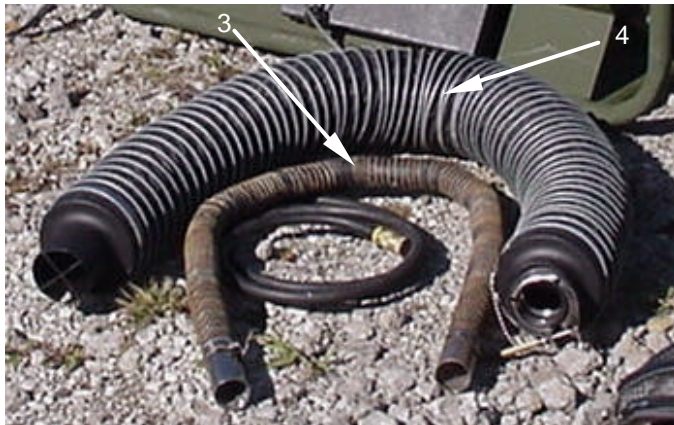
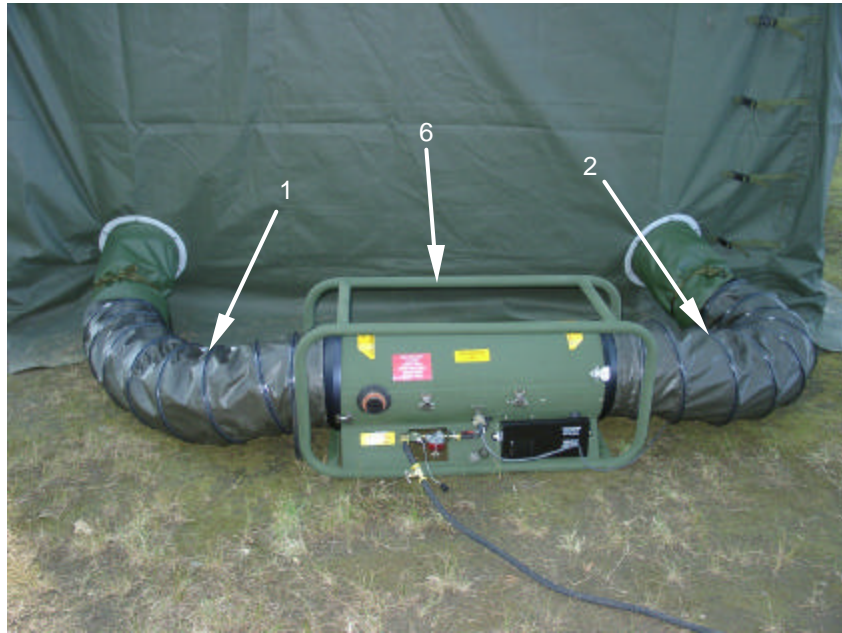
The combustion exhaust pipe **(4)** must be graded down to make sure that moisture contained within the exhaust cannot freeze and partially or totally block the exhaust gases. Blocking of exhaust gases will cause the heater to perform poorly or shut down.

If high winds accompany the snow, the fuel can stand **(6)** should be firmly anchored to the ground.

During refueling and at regular intervals between refueling, ducts **(1)(2)**, pipes **(3)(4)**, and the heater **(5)** itself should be inspected for a build up of snow, dust, or sand that would cover the heater or block the ducts or pipes. Any buildup should be removed.

During refueling and at regular intervals between refueling, the sediment strainer **(7)** of the heater should be visually checked for contamination. If dirt or other contamination is present, the sediment strainer should be serviced in accordance with WP 0020 00 entitled "Solenoid Valve and Sediment Strainer Assembly."

Special care should be used during refueling to prevent snow and ice from contaminating fuel, fuel can, fuel lines, and fuel fittings.



**NBC DECONTAMINATION PROCEDURES**

Perform immediate, operational or thorough decontamination procedures in accordance with FM 3-5 as the mission, resources and tactical situation permit.

**WARNING**

For "immediate decontamination procedures" use ONLY hot soapy water for deconning HOT surfaces of the heater and stack. Shut down and cool the heater for any additional decontamination procedures.

DO NOT SPRAY DS2 OR ANY OTHER COMBUSTIBLE DECONTAMINATION SOLUTIONS OR COMPOUNDS ON AN OPERATING HEATER OR STACK. (NOTE: DS2 has a flashpoint of 160 degrees F.)

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**CHAPTER 3**  
**TROUBLESHOOTING PROCEDURES**  
**SPACE HEATER, CONVECTIVE**

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**SPACE HEATER, CONVECTIVE (SHC)  
OPERATOR TROUBLESHOOTING MALFUNCTION SYMPTOM INDEX**

**TROUBLESHOOTING PROCEDURES**

Table 1 lists common malfunctions that you may encounter with your equipment along with the troubleshooting procedure related to that malfunction. Refer to the list and locate the particular problem you are experiencing. Once you have found the problem in the list, go to the specific troubleshooting procedure detailed in WP 0009 00 related to that problem. Perform the tests, inspections, and corrective actions in the order they appear in the troubleshooting procedure.

The fault codes listed in Table 1 refer to codes displayed visually via the System Fault advisory light and heard audibly through the in-tent controller assembly. For example, if the System Fault advisory light flashes 5 times accompanied by 5 audible tones, this indicates a Fault Code 5 which, by referring to Table 1, indicates an "Glow Plug" problem. You would then refer directly to Item Number 9 in the troubleshooting work package for detailed troubleshooting procedures on that subject.

This table cannot list all the malfunctions that may occur, all the tests and inspections needed to find the fault, or all the corrective actions needed to correct the fault. If the equipment malfunction is not listed or actions listed do not correct the fault, notify your supervisor and they will notify unit maintenance.

**MALFUNCTION SYMPTOM INDEX**

Table 1. Malfunction Symptom Index

<b>Malfunction</b>	<b>Troubleshooting Procedure</b>
Heater Fails to start	1
Smokes continuously	2
Battery charging light does not come on	3
Battery charged light does not come on	4
Fault code 1 - Low voltage	5
Fault code 2 - Combustion blower	6
Fault code 3 - Loss of flame	7
Fault code 4 – Burner Maintenance	8
Fault code 5 - Glow plug	9
Fault code 6 - TEG over temperature	10
Fault code 7 - Over voltage	11
Fault code 8 - Tip-over	12
Fault code 9 - Fin temp sensor	13
Fault code 10 - Tent over temperature	14

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**OPERATOR MAINTENANCE**  
**SPACE HEATER, CONVECTIVE**  
**(NSN 4520-01-431-8927)**

**OPERATOR TROUBLESHOOTING PROCEDURES**

**INITIAL SETUP**

**Tools**

Wrench (Table 2, Item 2, WP 0044 00)

**Materials/Parts**

Rags, Wiping, Clean (Item 5, WP 0067 00)

**Equipment Condition**

Heater shut down, all advisory lights off, fans stopped before attempting corrective action(s) (WP 0006 00)

**GENERAL**

**CAUTION**

When encountering a problem with the Space Heater, Convective, be sure to turn the ON/OFF switch on the in-tent controller to the OFF position, wait for all advisory lights to go off, and all fans to stop before performing the corrective actions detailed in the table that follows. Once the corrective action has been taken, attempt a restart of the heater and verify that the problem no longer exists. Failure to shut the heater off before taking some corrective actions may damage the heater.

The troubleshooting table that follows lists common malfunctions that you may encounter with your equipment. Perform the tests, inspections, and corrective actions in the order they appear in the table. Refer to the malfunction symptom index for a listing of all the problems that may be encountered and proceed to the troubleshooting procedure indicated in the index.

This table cannot list all the malfunctions that may occur, all the tests and inspections needed to find the fault, or all the corrective actions needed to correct the fault. If the equipment malfunction is not listed or actions listed do not correct the fault, notify your supervisor and they will refer the equipment to unit maintenance.

Table 1. Operator Troubleshooting Procedures

<b>MALFUNCTION</b>	<b>TEST OR INSPECTION</b>	<b>CORRECTIVE ACTION</b>
<p>1. Heater Fails to Start.</p>	<p>Step 1. Has the green ON/ON-HOLD light been lit for more than 3 minutes but the heater has still not started?</p> <p>Step 2. Does the ON/ON-HOLD advisory light come on momentarily but shut down followed by the system fault light flashing?</p> <p>Step 3. Check to make sure that the in-tent controller cable is securely connected to the in-tent controller and to the control connector at the lower housing.</p> <p>Step 4. Remove fuses from battery pack. Visually inspect the element inside the fuse to ensure both fuses are in good condition.</p> <p>Step 5. Is the battery pack connector securely engaged in the connector on the lower housing?</p>	<p>System could be in post purge mode. Allow up to 10 minutes before placing the ON/OFF switch in the OFF position and notify unit maintenance.</p> <p>Count the number of times the System Fault light flashes as well as the number of audible tones heard.</p> <p>Record the number of times the system fault advisory light flashes and refer to the troubleshooting instructions later in this section for that specific fault code.</p> <p>Make sure that the in-tent controller cable is securely connected to the control connector located on the lower housing.</p> <p>If the fuse(s) is/are bad or if in doubt, replace bad fuse(s) with spare fuse(s) located behind duct adapter at heater inlet assembly.</p> <p>Make sure that the battery pack connector is securely engaged in the connector on the lower housing. Make sure connector locks in place.</p>
<p>2. Heater smokes continuously during operation</p>	<p>Step 1. Check to make sure that vent openings on front of combustion air inlet cover are clear of snow or other obstructions.</p> <p>Step 2. Check to make sure that combustion exhaust pipe is clear of snow or other obstructions.</p> <p>Step 3. Check that the correct fuel being used for the outside temperature where the heater is being operated.</p>	<p>Clear combustion inlet area of snow or any other obstructions.</p> <p>Clear combustion exhaust pipe area of snow or any other obstructions.</p> <p>Refer to WP 0001 00, Table 3. Approved Fuels At Various Temperatures. Verify that fuel being used is appropriate for the temperature in which the heater is operating.</p>

Table 1. Operator Troubleshooting Procedures

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	<p>Step 4. Check to make sure that there is no water or other contaminants in the fuel supply.</p>	<p>Replace contaminated fuel with new can of clean, uncontaminated fuel.</p> <p>Notify unit maintenance.</p>
<p>3. Battery Charging Light Does Not Come On</p>	<p>Step 1. Remove fuses from battery pack. Visually inspect the element inside the fuse to ensure both fuses are in good condition.</p> <p>Step 2. Check to make sure that the battery connector is fully inserted.</p> <p>Step 3. Check to ensure that vent openings on combustion air inlet cover or the combustion exhaust pipe are clear of snow and other obstructions.</p> <p>Step 4. Check fuel supply. Is fuel can full of proper fuel for temperature conditions?</p> <p>Step 5. Is there a kink or loop in the fuel hose restricting the flow of fuel to the heater?</p> <p>Step 6. Look through the sediment strainer glass bowl and make sure that sediment strainer is free of water, ice, dirt, or other foreign material.</p> <p>Step 7. Remove upper housing assembly and verify that the leads going to the thermoelectric generator assembly are securely attached to the modular connector.</p>	<p>If one or more fuse is bad or if in doubt, replace bad fuse(s) with spare fuse(s) located behind duct adapter at heater inlet assembly.</p> <p>Push the battery pack assembly connector firmly into the connector on the lower housing assembly. Ensure that the locking clips on the connector have fully engaged.</p> <p>Clear inlet and exhaust areas of any obstructions</p> <p>Refer to WP 0001 00, Table 3. Approved Fuels At Various Temperatures. Verify that fuel being used is appropriate for the temperature in which the heater is operating.</p> <p>Remove any kinks or loops in the fuel hose and make sure that it lies flat along ground.</p> <p>Ensure that there are no kinks in the hose on the gravity feed adapter.</p> <p>Ensure that all fuel quick disconnect connectors are securely attached.</p> <p>Notify unit maintenance and schedule a servicing of sediment strainer.</p> <p>Ensure that TEG leads are installed in modular connector and that connector screws are secure.</p>

Table 1. Operator Troubleshooting Procedures

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>4. Battery Charged Light Does Not Come On</p>	<p>Step 1. Is the heater operating in extremely cold conditions? Did the battery pack possibly have a low charge before operation?</p> <p>Step 2. Has there been more than one startup attempt in cold weather?</p> <p>Step 3. Is fuel can full of proper fuel type for temperature conditions?</p> <p>Step 4. Is there a kink or loop in the fuel hose restricting the flow of fuel to the heater?</p>	<p>Wait for a longer period of time for the battery to charge. Battery should be fully charged within 60 minutes of heater operation.</p> <p>If there has been more than one startup attempt in cold weather, the battery may be severely depleted and may require up to 2 hours to recharge.</p> <p>Refer to WP 0001 00, Table 3. Approved Fuels At Various Temperatures. Verify that fuel being used is appropriate for the temperature in which the heater is operating.</p> <p>Remove any kinks or loops in the fuel hose and make sure that it lies flat along ground.</p> <p>Ensure that there are no kinks in the hose on the gravity feed adapter.</p> <p>Ensure that all fuel quick disconnect connectors are securely engaged.</p> <p>If the battery charged light does not go out after applying the above actions, notify unit maintenance.</p>
<p>The troubleshooting procedures that follow refer to the system fault advisory light on the in-tent controller. In the event of a system fault, this light will flash from one to ten times accompanied by the same number of audible tones. Take note of the number of flashes/tones and refer to the fault code listing below to troubleshoot the specific condition.</p>		
<p>5. Fault Code 1 – Battery Low Voltage</p>	<p>Step 1. This fault condition is caused by the battery having less than the required voltage to start or operate the heater.</p>	<p>Remove fuses from battery pack. Visually inspect the element inside the fuse to ensure both fuses are in good condition. If one or more fuse is bad or if you are in doubt, replace bad fuse(s) with spare fuse(s) located behind duct adapter at heater inlet assembly.</p> <p>If condition persists, notify unit maintenance.</p>

Table 1. Operator Troubleshooting Procedures

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	Step 2. Is the battery fully charged?	Charge battery using battery charging adapter IAW WP 0006 00.
6. Fault Code 2 – Locked Rotor, Combustion Blower Assembly (motor does not run)	Step 1. Is the fan rotor on the combustion air blower assembly locked by ice or snow?	<p>This fault condition is caused by a locked fan rotor within the combustion air blower assembly. It is possible for snow or ice to be ingested in the fan. The snow or ice melts and then refreezes, locking the rotor.</p> <p>If this problem should occur, notify unit maintenance and schedule the removal of the combustion air blower assembly to unlock the rotor.</p> <p>If rotor is not locked due to snow or ice ingestion, notify unit maintenance and schedule the replacement of the combustion air blower assembly.</p>
7. Fault Code 3 – Flame Loss	<p>Step 1. Was the heater running and then quit?</p> <p>Step 2. Has manual reset thermostat been tripped?</p> <p>Step 3. Is there a kink or loop in the fuel hose restricting the flow of fuel to the heater?</p> <p>Step 4. Look through the sediment strainer glass bowl and make sure that sediment strainer is free of water, ice, dirt, or other foreign material.</p>	<p>Check to make sure tha the fuel can is full of the proper fuel type for the temperature conditions. Refer to WP 0001 00, Table 3. Approved Fuels At Various Temperatures. Verify that fuel being used is appropriate for the temperature in which the heater is operating.</p> <p>Remove any obstructions from heater inlet and outlet to allow free air movement. Reset manual reset thermostat.</p> <p>Remove any kinks or loops in the fuel hose and make sure that it lies flat along ground.</p> <p>Ensure that there are no kinks in the hose on the gravity feed adapter.</p> <p>Ensure that all fuel quick disconnect connectors are securely engaged.</p> <p>Notify unit maintenance and schedule service for the sediment strainer.</p>

Table 1. Operator Troubleshooting Procedures

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	<p>Step 5. Are combustion air inlet cover vents and exhaust pipe clear of obstructions?</p>	<p>Clear combustion air inlet and exhaust pipe areas.</p> <p>If heater starts, shuts down after approximately 30 seconds, and generates a fault code 3, remove the flame sensor IAW WP 0012 00 and ensure that it is not iced over or covered with soot that would obscure the sensor. Re-install the flame sensor and attempt a restart.</p> <p>If the heater still fails to operate, replace flame sensor as detailed in WP 0012 00.</p> <p>If the heater fails to operate after replacing the flame sensor, notify unit maintenance.</p>
<p>8. Fault Code 4 – Burner maintenance required</p>	<p>Step 1. Does burner require maintenance?</p> <p>Step 2. Is fuel can full of proper fuel type for temperature conditions?</p> <p>Step 3. Is fuel can full?</p> <p>Step 4. Is there a kink or loop in the fuel hose restricting the flow of fuel to the heater?</p>	<p>This fault code is generated when the burner requires maintenance. It is caused by cinder material getting clogged with fuel byproducts as a result of use. Notify unit maintenance and schedule a burner assembly servicing.</p> <p>Refer to WP 0001 00, Table 3. Approved Fuels At Various Temperatures. Verify that fuel being used is appropriate for the temperature in which the heater is operating.</p> <p>Fill fuel can.</p> <p>Remove any kinks or loops in the fuel hose and make sure that it lies flat along ground.</p> <p>Ensure that there are no kinks in the hose on the gravity feed adapter.</p> <p>Ensure that all fuel quick disconnect connectors are securely engaged.</p> <p>Notify unit maintenance.</p>



Table 1. Operator Troubleshooting Procedures

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>9. Fault Code 5 – Glow Plug</p>	<p>Step 5. Is combustion air inlet and combustion exhaust pipe clear of snow and other obstructions?</p> <p>Step 1. Remove the upper housing assembly and verify that the wire leading to the glow plug is securely attached and not damaged in any way.</p>	<p>Clear combustion air inlet vent openings and exhaust pipe areas of any obstructions.</p> <p>If heater still does not operate or fault code persists, notify Unit Maintenance.</p> <p>Make sure that glow plug connector is securely attached to glow plug.</p> <p>If heater still does not operate or fault code persists, replace glow plug as detailed in WP 0013 00.</p> <p>If heater still does not operate after replacing the glow plug, notify unit maintenance.</p>
<p>10. Fault Code 6 – TEG Over Temperature</p>	<p>Step 1. Has the TEG overheated?</p>	<p>This fault is caused by the TEG overheating. Remove the upper housing assembly and inspect the fins on the TEG to ensure that there is no lint, grass, or other debris that would prevent air from flowing freely through the fins.</p> <p>Check to see if there are any obstructions at the heated air outlet duct and/or the heated air inlet duct restricting free air movement.</p> <p>Remove any obstructions at the heated air outlet or inlet duct.</p> <p>If problem persists, notify unit maintenance.</p>
<p>11. Fault Code 7 – Over Voltage</p>	<p>There is no test or inspection to be performed. This fault is caused by the battery being charged to a higher than rated voltage.</p>	<p>Notify unit maintenance and schedule power control assembly replacement.</p>

Table 1. Operator Troubleshooting Procedures

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
12. Fault Code 8 – Tip Over	Is the heater tipped in excess of 15 degrees?	<p>This fault code is caused by the heater being tipped more than 15 degrees in any direction. Check to see if the heater is located on an incline that slopes more than 1.5 feet in a 10 foot span. Move the heater to an area that slopes less than 1.5 feet in a 10 foot span.</p> <p>Check to make sure that any snow under the heater is packed down well. Melting snow under the heater can cause the heater to tip.</p>
13. Fault Code 9 – Fin Temperature Sensor	Is the temperature sensor on the TEG opened or shorted?	Remove the upper housing assembly and verify that the sensor connection is secure. If the sensor connection is secure and fault code 9 persists, notify unit maintenance.
14. Fault Code 10 – Tent Over Temperature.	Is the temperature in the interior of the tent greater than 90 degrees F?	<p>This fault is caused by the tent temperature climbing over 90 degrees F (32.2 degrees C). Open the door and cool the interior of the tent.</p> <p>If problem persists after cooling down interior of the tent, disconnect the air supply inlet duct from the tent duct tunnel and allow the heater to draw cooler outside air.</p> <p>If problem persists, notify unit maintenance.</p>

**TM 10-4520-262-12&P**

**CHAPTER 4**

**OPERATOR  
MAINTENANCE INSTRUCTIONS**

**SPACE HEATER, CONVECTIVE**

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**OPERATOR MAINTENANCE**  
**SPACE HEATER, CONVECTIVE**  
**(NSN 4520-01-431-8927)**

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**OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES**

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## INTRODUCTION

Preventive Maintenance Checks and Services (PMCS) are performed to keep the Space Heater, Convective in good operating condition. The checks are used to find, correct, or report problems. Operator personnel are to do the PMCS as shown in the PMCS table. PMCS are done every day a heater is operated, using the PMCS table. Pay attention to WARNING and CAUTION statements. A WARNING means someone could be hurt. A CAUTION means equipment could be damaged.

Before you begin using the Convective Space Heater, do **Before PMCS**.

During use of the Convective Space Heater, do **During PMCS**.

After using the Convective Space Heater, do **After PMCS**.

Once a week, do **Weekly PMCS** if the Space Heater, Convective has been in use.

Do **Monthly PMCS** once a month if the Space Heater, Convective has been in use.

If you find something wrong when performing PMCS, fix it using troubleshooting and/or maintenance procedures.

The right-hand column of the PMCS table lists conditions that make the Space Heater, Convective not fully mission capable. Write up the faults that cannot be repaired on DA Form 2404 for unit maintenance. For further information on how to use this form, see DA PAM 738-750.

If tools that are required to perform PMCS are not listed in procedures, notify your supervisor.

## OPERATOR LUBRICATION INSTRUCTIONS

Lubrication instructions are in WP 0068 of this TM. All lubrication instructions are mandatory.

## INSPECTION

Look for signs of trouble. Senses help here. You can feel, smell, hear, or see many problems that can be eliminated before they get worse. Inspect to see if items are in good condition. Are components correctly installed and secured? Is any damage to the frame or components visible? Correct any faults or notify unit maintenance.

## ASSOCIATED COMPONENTS

Perform PMCS on the fuel can in accordance with the publications specified in work package 0043 00.

**SPECIAL INSTRUCTIONS**

Perform "Weekly", as well as "Before", operations PMCS if:

1. The equipment has not been operated since the last weekly check, or has been stored for more than a week.
2. The equipment is being operated for the first time.
3. The equipment has been in longterm storage.

**LEAKAGE DEFINITION****NOTE**

Equipment operation is allowable with minor leakage (Class I or II). Of course, you must consider the fluid capacity in the item/system being checked/inspected. When operating with Class I, or II leaks, continue to check fluid levels as required in your PMCS. When in doubt, notify your supervisor.

**NOTE**

Class II leaks should be reported to your supervisor.

Class I. Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.

Class II. Leakage of fluid great enough to form drops but not enough to cause drops to drip from item being checked/inspected.

Class III. Leakage of fluid great enough to form drops that fall from the item being checked/inspected.

**GENERAL SERVICE PROCEDURES**

As you perform your PMCS, keep in mind the following:

**Bolts, Nuts, and Screws.** Check them all for obvious looseness and missing, bent, or broken condition. You cannot try them all with a tool, of course, but look for chipped paint, bare metal, or rust around bolt heads. If you find a problem, report it to your supervisor.

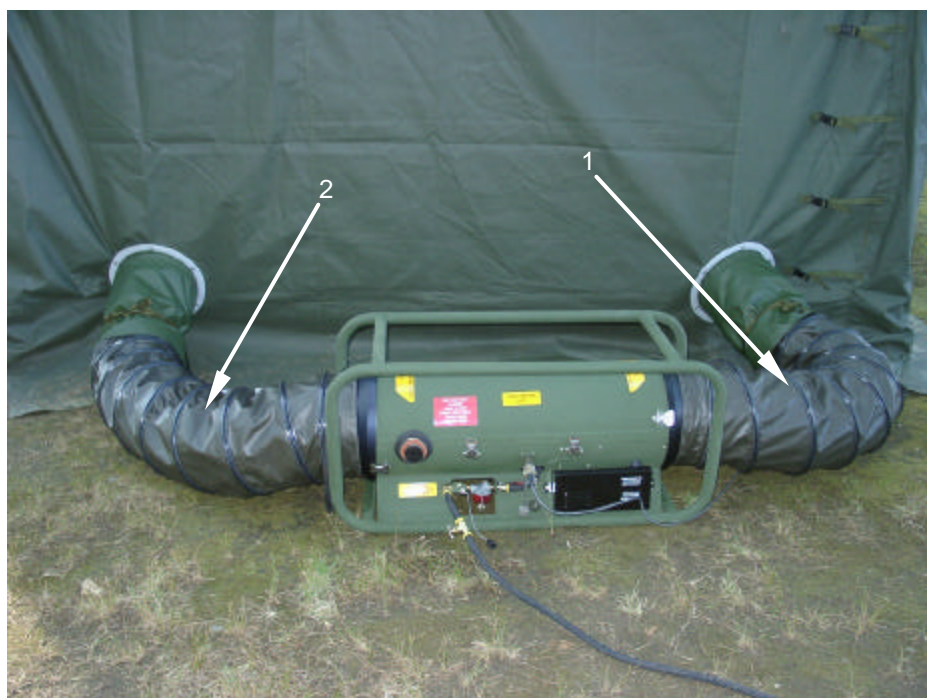
**Welds.** Look for loose or chipped paint, rust, or gaps where parts are welded together. If you find a bad weld, report it to your supervisor.

**Electrical Wires and Connections.** Look for cracked or broken insulation, bare wires, and loose or broken connectors. Tighten loose connections and make sure the wires are in good condition. If you find a bad wire or connector, report it to your supervisor.

**Fuel Lines and Fittings.** Look for wear, damage, and leaks. Make sure clamps and fittings are tight. Wet spots show leaks, but a stain around a fitting or connector can mean a leak. If a leak comes from a loose fitting or connector, or if something is broken or worn out, report it to your supervisor.

Table 1. Operator Preventive Maintenance Checks and Services

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable If:
1	Before	Air Supply and Return Ducts	<p>Check the air supply and return ducts (<b>1 and 2</b>) for holes and tears in the fabric. Repair damaged ducts if possible, replace duct if damage cannot be repaired.</p> <p>Check outside surface of duct for any dirt or debris. Clean dirt and debris from exterior of duct with a clean dry rag.</p> <p>Check for and remove any obstructions inside of ducts.</p> <p>Inspect straps (<b>3</b>) on ends of ducts for broken buckles, cuts, abrasions, or other damage that would prevent the ducts from having a tight seal to the duct adapter or debris grill.</p> <p>Inspect the debris grill (<b>4</b>) on the end of both ducts and ensure that the grills are not broken or otherwise damaged.</p>	<p>There are holes, tears, or other damage that cannot be repaired and that would permit air to enter or escape through the side walls of the duct.</p> <p>There are obstructions within the duct that cannot be cleared.</p> <p>Straps on ducts are broken.</p> <p>Debris grill missing or broken.</p>



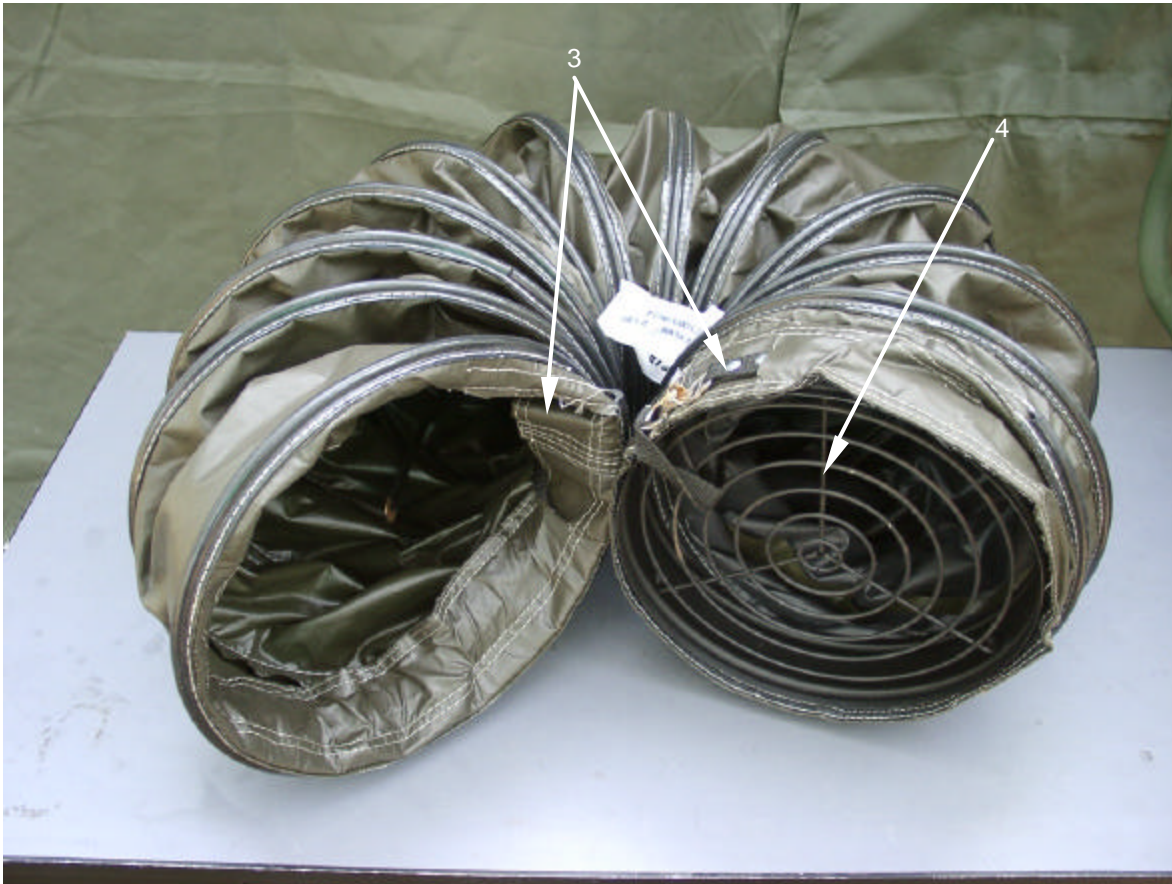




Table 1. Operator Preventive Maintenance Checks and Services

Item No.	Interval	Location Item to Check/ Service	Procedure	Not Fully Mission Capable If:
2	Before	Gravity feed adapter	<p>Check gravity feed adapter (1) and fuel hose assembly (2) for leaks.</p> <p>Inspect fitting (3) on gravity feed adapter (1) to ensure that it is not bent, dented, or damaged in any way that would prevent a good, leakproof, seal with the fuel hose (2).</p> <p>Inspect rubber seal (4) on underside of adapter and ensure that it has no cuts, tears or other damage.</p>	<p>Gravity feed adapter leaks.</p> <p>Quick disconnect fitting is damaged.</p> <p>Seal on underside of adapter is damaged or missing.</p>
3	Before	Fuel Can	<p>Check fuel can (5) and ensure that cap (6) seals properly and that there are no cracks in the can that would permit a fuel leak.</p>	<p>Can is damaged and leaking.</p>
4	Before	Fuel Can Stand	<p>Check fuel can stand (7) for bent leg (8), damaged or missing fuel can stand support arms (9). Check for frayed or broken strap (10). Check clip (11) to make sure it is not broken or missing. If fuel can stand is damaged and cannot support the weight of a full fuel can, replace stand.</p>	<p>Stand cannot securely support full fuel can.</p>



Table 1. Operator Preventive Maintenance Checks and Services

Item No.	Interval	Location Item to Check/ Service	Procedure	Not Fully Mission Capable If:
5	Before	In-Tent Controller Assembly	<p style="text-align: center;"><b>CAUTION</b></p> <p>Be sure to perform ONLY a visual check of the ON/OFF switch for damage. DO NOT flip the switch to the ON position.</p> <p>Perform a visual check of the in-tent controller assembly (1) and verify that the ON/OFF switch (2) and LOWER/HIGHER control (3) are undamaged.</p> <p>Check five advisory lights and ensure that none are damaged:</p> <p style="text-align: center;">HEATER ON/ON HOLD (4), BATTERY CHARGING (5), BATTERY CHARGED (6), SYSTEM FAULT (7), and AT SETPOINT (8).</p> <p>Verify that the ON/OFF switch (2) is in OFF position, and the LOWER/HIGHER control (3) is set at LOWER.</p> <p>Ensure that connector (9) and its threads are clean and undamaged, and protective cap (10) is firmly attached by the chain assembly (11).</p>	<p>ON/OFF switch is damaged.</p> <p>LOWER/HIGHER control is damaged.</p> <p>Advisory lights are broken.</p> <p>Connector is dented or has stripped threads.</p>
6	Before	In-Tent Controller Assembly Cable	<p>Check in-tent controller cable (12) and verify that insulation (13) and connectors (14) are clean and undamaged.</p>	<p>In-tent controller cable insulation is cut or otherwise damaged exposing wires.</p> <p>Connectors are dented, bent, or otherwise damaged, preventing a secure connection to the in-tent controller or heater.</p>

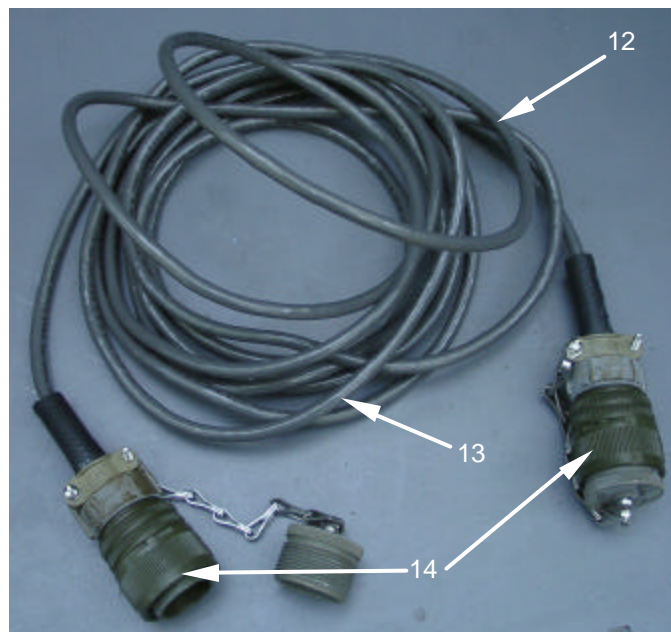
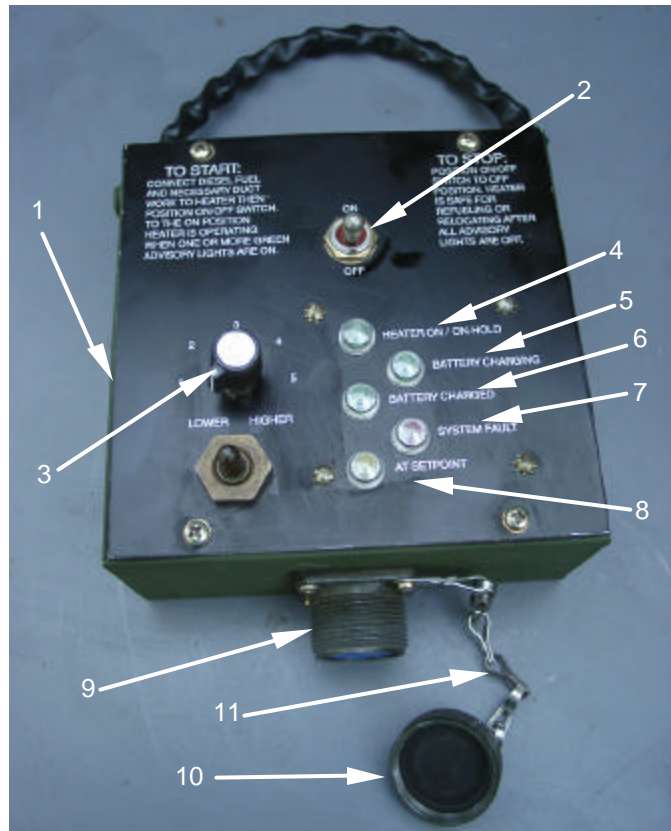


Table 1. Operator Preventive Maintenance Checks and Services

Item No.	Interval	Location Item to Check/ Service	Procedure	Not Fully Mission Capable If:
7	Before	Control Connector (Lower Housing)	<p>Check control connector <b>(1)</b> and ensure that it is not dented, bent, or otherwise damaged so as to prevent the in-tent controller cable from making a secure connection.</p> <p>Ensure that the connector <b>(1)</b> does not contain dirt. Verify that the connector does not have stripped threads.</p>	<p>Connector is damaged.</p> <p>Connector has stripped threads.</p> <p>Connector is dirty.</p>
8	Before	Battery Pack	<p>Verify that the battery pack <b>(2)</b> is securely connected to the lower housing connector <b>(3)</b>.</p> <p>Check wires <b>(4)</b> for cuts, breaks, or broken insulation.</p> <p>Check connector <b>(3)</b> for damage or dirt.</p>	<p>Battery pack connector broken or will not connect to lower housing connector securely.</p> <p>Wires leading from battery pack are cut, broken, or have cut insulation.</p>
9	Before	Upper Housing Assembly	<p>Make sure the upper housing <b>(5)</b> fits smoothly into the slot <b>(6)</b> on the circumference of the black exhaust grommet <b>(7)</b>. Ensure that all fasteners <b>(8)</b> engage properly and secure the upper housing assembly.</p>	<p>One or more fasteners are damaged and prevent the upper housing assembly from being secured.</p>
10	Before & During	External Fuel System	<p>Check external fuel system <b>(9)</b> for leaks or evidence of leaks, including fuel hose <b>(10)</b>, fuel quick disconnect <b>(11)</b>, sediment strainer <b>(12)</b> and connecting fittings <b>(13)</b>.</p> <p>Verify that fuel solenoid assembly wires <b>(14)</b> are undamaged and that connectors <b>(15)</b> are secure.</p>	<p>There is any leakage within the heater, or there is a Class III leak anywhere. Stop operation of the heater and report leak to unit maintenance.</p>
11	Before	Combustion Air Inlet Assembly	<p>Check combustion air inlet assembly <b>(16)</b> for dirt and debris that could be sucked into heater. Ensure that there are no obstructions.</p> <p>Verify that cover <b>(17)</b> can be removed easily.</p>	<p>Combustion Air Inlet is obstructed.</p> <p>Cover is damaged and cannot be secured to heater</p>



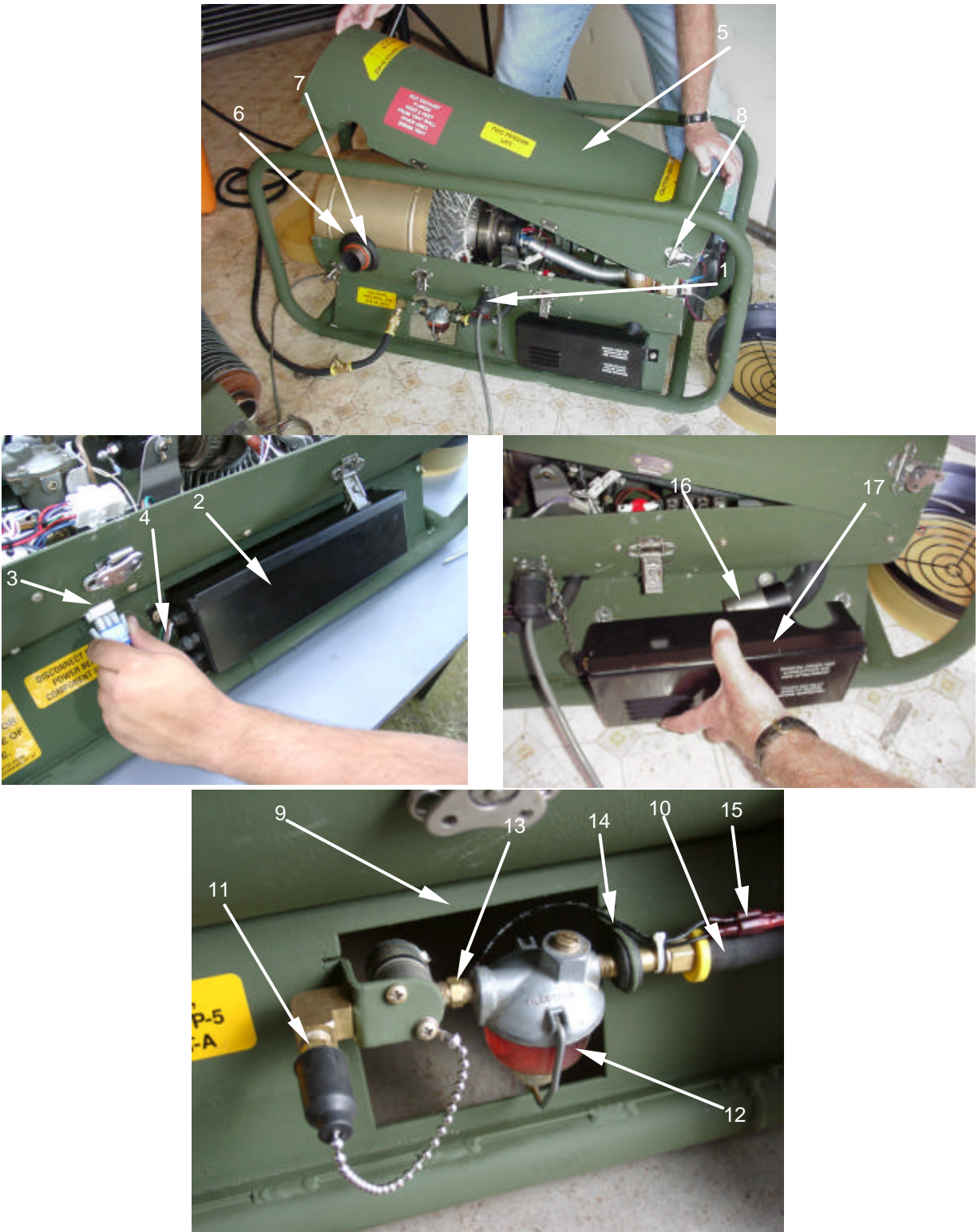


Table 1. Operator Preventive Maintenance Checks and Services

<b>Item No.</b>	<b>Interval</b>	<b>Location Item to Check/Service</b>	<b>Procedure</b>	<b>Not Fully Mission Capable If:</b>
12	Before	Manual Reset Thermostat	Remove rubber plug <b>(1)</b> and visually verify that the manual reset thermostat switch <b>(2)</b> is undamaged. Replace rubber plug <b>(1)</b> .	Manual reset thermostat switch is damaged.
13	Before	Fastener housing and keeper assemblies	Check that fasteners <b>(4)</b> and keeper plates <b>(5)</b> are tightly attached to duct adapters <b>(6)</b> and/or upper <b>(7)</b> and lower <b>(8)</b> housing assemblies.	Fasteners and keeper plates are broken and/or missing.

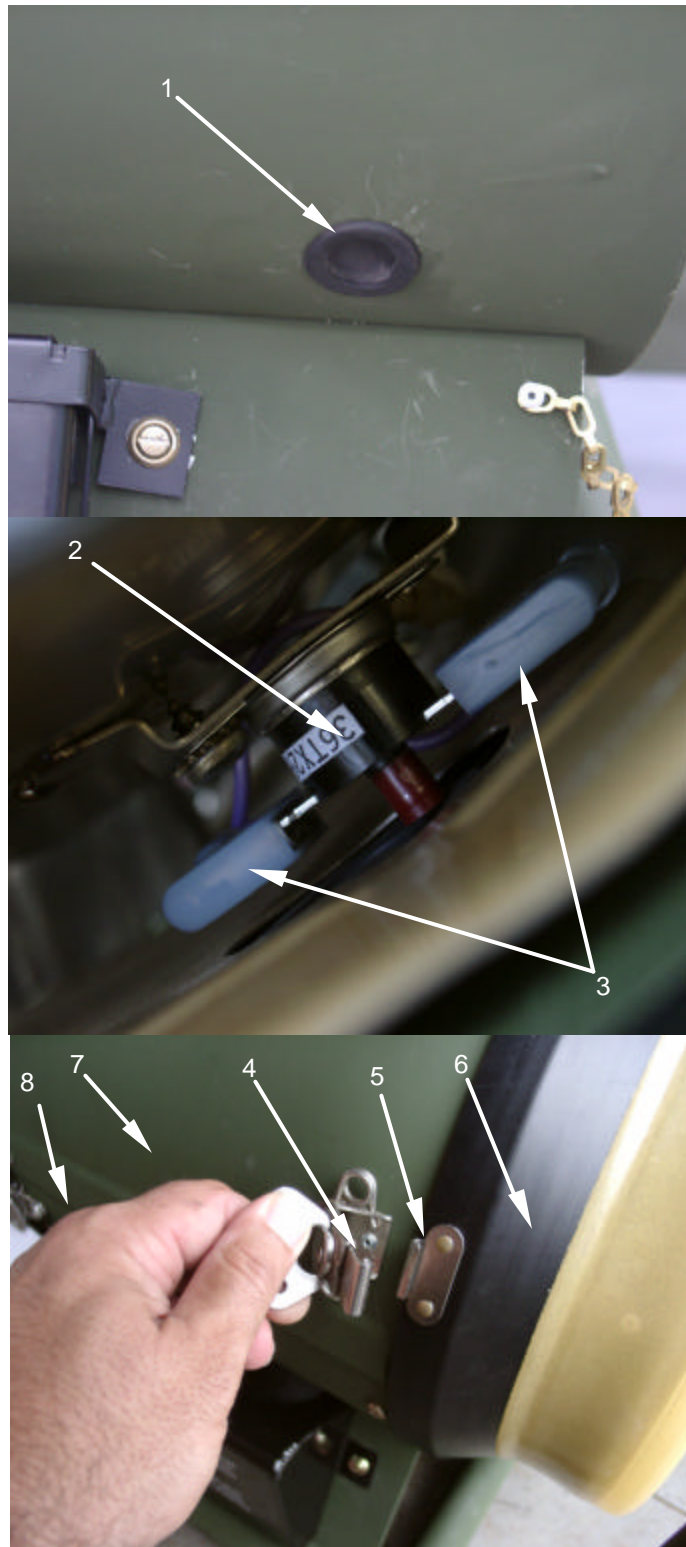




Table 1. Operator Preventive Maintenance Checks and Services

Item No.	Interval	Location Item to Check/ Service	Procedure	Not Fully Mission Capable If:
14	After	Fuel Drain Valve bottom of lower housing.	Check that fuel drain valve <b>(1)</b> is tightly closed.	Fuel Drain Valve leaks.
15	After	Dust Covers and Duct Adapters	Check that the two dust covers <b>(2)</b> and two duct adapters <b>(3)</b> at the ends of the heater are firmly attached to the heater.	Duct Adapters will not attach to heater.
16	Weekly	Battery Pack	Verify that the battery retainer <b>(4)</b> is not damaged and quarter turn screws <b>(5)</b> are secure.  Unscrew fuse caps <b>(6)</b> and remove fuses <b>(7)</b> . Visually verify that fuses are not blown.	Battery retainer is damaged.  Fuses are blown and there are no spares.



Table 1. Operator Preventive Maintenance Checks and Services

Item No.	Interval	Location Item to Check/ Service	Procedure	Not Fully Mission Capable If:
17	Weekly	Heater Interior	<p>Release eight fasteners (1) away from their corresponding keeper plate (2). Remove upper housing assembly (3). Inspect interior of heater for:</p> <p>Any dirt or debris that could be blown through heat exchanger (4) and into the tent. Remove dirt and debris using a clean rag. Pay special attention to cooling fins (5) on the TEG that could trap bits of paper or other combustibles.</p> <p>Check for any evidence for leaks. Notify Unit maintenance personnel based on leakage class described above.</p> <p style="text-align: center;"><b>NOTE</b></p> <p>The heater may be operated with Class I leaks within the heater, but they must be monitored to insure they do not get worse, pose a fire hazard, or cause the heated air being ducted to the tent to smell of fuel oil.</p>	<p>Dirt or other debris present inside heater.</p> <p>Class III Leaks present inside heater.</p>
18	Weekly	Electrical Wires and Components	Check electrical wires (6), connectors (7) and components for any evidence of overheating, arcing, or burning. Notify Unit maintenance personnel.	Any wires or connectors broken or otherwise damaged.
19	Weekly	Burner to TEG flange clamp	Check that the burner to TEG flange clamp with nut (8) is secure, and provides a leak proof seal between the burner and the TEG.	V-clamp with nut is loose or not secure on burner assembly and TEG. Notify unit maintenance.
20	Weekly	Wrap Cover	Check that the wrap cover (9) is properly installed and tightly fastened down.	Wrap cover is loose. Notify Unit maintenance.
21	Weekly	Exhaust Grommet	Check that black exhaust grommet (10) is present and properly installed around the combustion exhaust outlet (11) and is nestled in the cutout (12) on the lower housing assembly.	Grommet missing or not properly installed. Notify Unit maintenance.

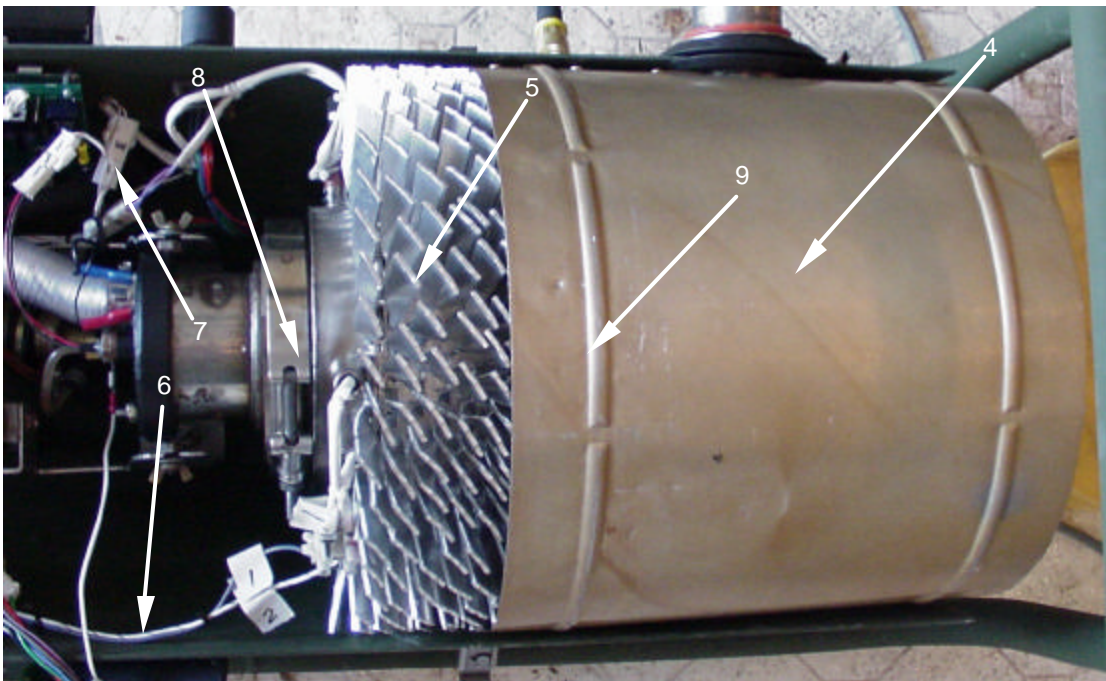
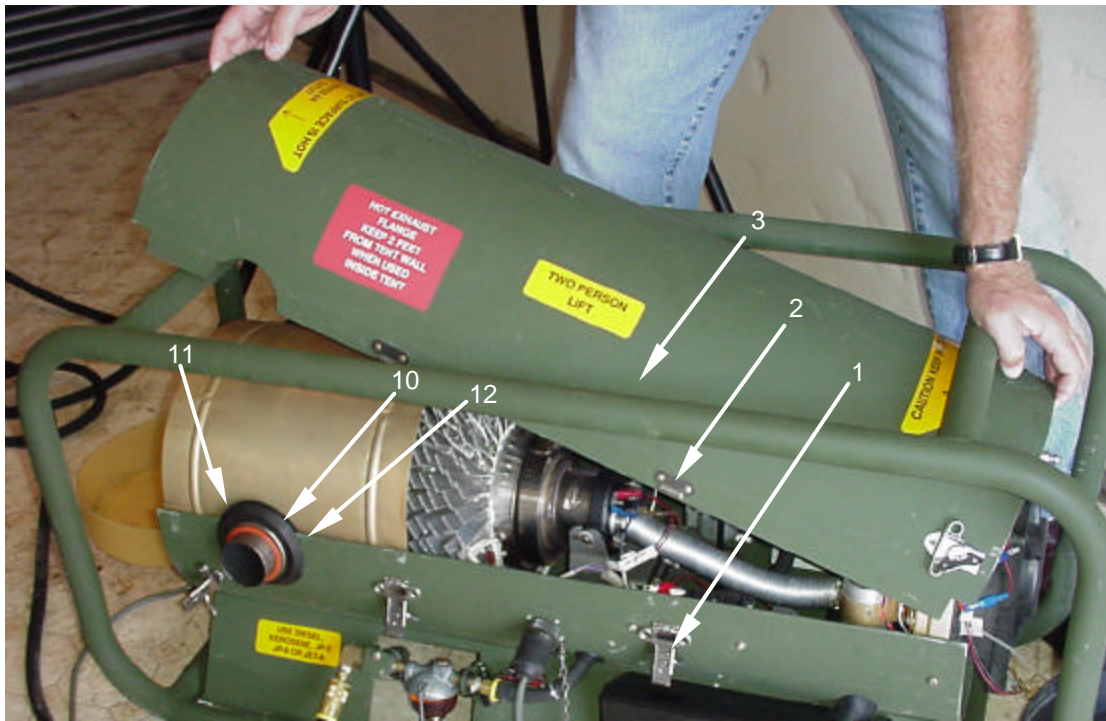
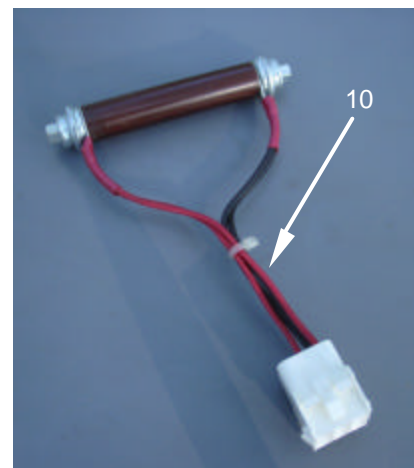
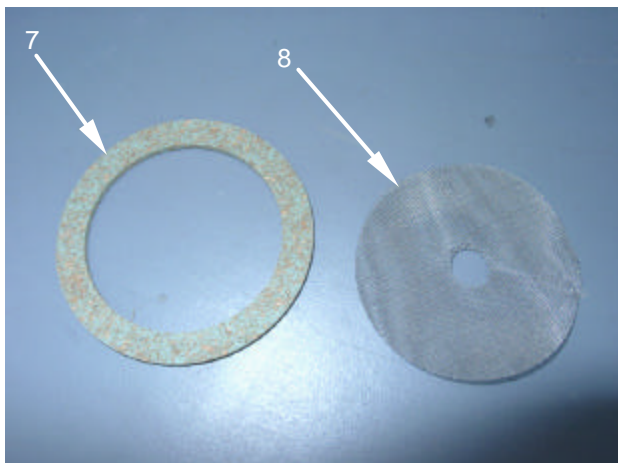
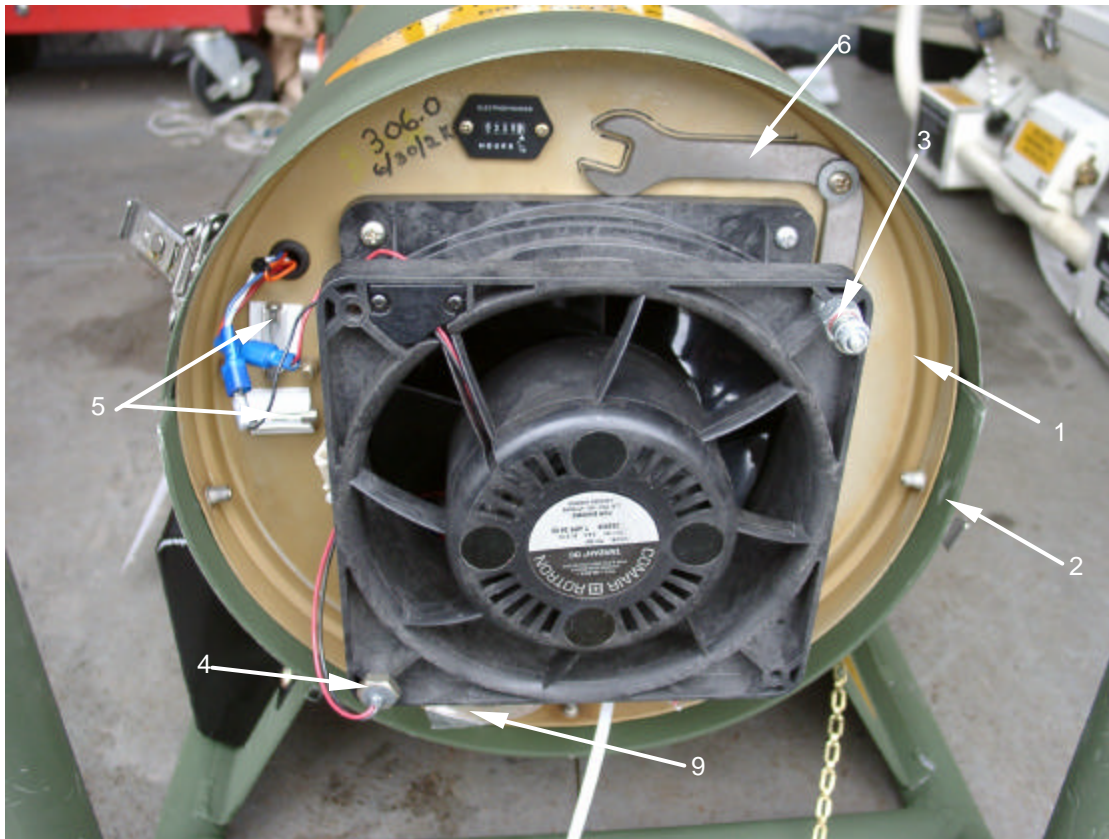


Table 1. Operator Preventive Maintenance Checks and Services

Item No.	Interval	Location Item to Check/ Service	Procedure	Not Fully Mission Capable If:														
23	Weekly	Onboard Spares and Tool	<p>Check the spares and tool stowage area <b>(1)</b> within the duct adapter at the inlet end <b>(2)</b> of the heater. Confirm that all of the onboard spares and tool listed below are present. Order replacements for those which are missing.</p> <table border="1" data-bbox="626 663 1130 879"> <thead> <tr> <th data-bbox="626 663 1047 695">Name</th> <th data-bbox="1047 663 1130 695">Qty</th> </tr> </thead> <tbody> <tr> <td data-bbox="626 695 1047 726">Glow Plug <b>(3)</b></td> <td data-bbox="1047 695 1130 726">1</td> </tr> <tr> <td data-bbox="626 726 1047 758">Flame Sensor <b>(4)</b></td> <td data-bbox="1047 726 1130 758">1</td> </tr> <tr> <td data-bbox="626 758 1047 789">Battery Pack Fuses (20 Amp) <b>(5)</b></td> <td data-bbox="1047 758 1130 789">2</td> </tr> <tr> <td data-bbox="626 789 1047 821">Wrench <b>(6)</b></td> <td data-bbox="1047 789 1130 821">1</td> </tr> <tr> <td data-bbox="626 821 1047 852">Sediment strainer gasket <b>(7)*</b></td> <td data-bbox="1047 821 1130 852">1</td> </tr> <tr> <td data-bbox="626 852 1047 879">Sediment strainer screen <b>(8)*</b></td> <td data-bbox="1047 852 1130 879">1</td> </tr> </tbody> </table> <p>* stored in plastic bag <b>(9)</b> below fan</p> <p>Ensure that the Battery Charging Adapter <b>(10)</b> is included with the other accessory items in the accessory bag.</p>	Name	Qty	Glow Plug <b>(3)</b>	1	Flame Sensor <b>(4)</b>	1	Battery Pack Fuses (20 Amp) <b>(5)</b>	2	Wrench <b>(6)</b>	1	Sediment strainer gasket <b>(7)*</b>	1	Sediment strainer screen <b>(8)*</b>	1	Heater may be operated without these spares and tool.
Name	Qty																	
Glow Plug <b>(3)</b>	1																	
Flame Sensor <b>(4)</b>	1																	
Battery Pack Fuses (20 Amp) <b>(5)</b>	2																	
Wrench <b>(6)</b>	1																	
Sediment strainer gasket <b>(7)*</b>	1																	
Sediment strainer screen <b>(8)*</b>	1																	





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**SPACE HEATER, CONVECTIVE (SHC)  
OPERATOR MAINTENANCE PROCEDURES**

---

**INTRODUCTION**

This section contains Operator Maintenance applicable to the SHC as authorized by the Maintenance Allocation Chart (MAC) in WP 0044 of this manual.

All maintenance procedures in this section can be performed by one person unless otherwise indicated.

Read all **WARNINGS**, **CAUTIONS**, and **NOTES** carefully before attempting the procedures. This includes the warnings at the front of this manual.

Each maintenance item will include a heading which lists the action to be taken, the tools and parts/materials required, and the condition the equipment must be in to perform the action.

**END OF WORK PACKAGE**

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**OPERATOR MAINTENANCE**  
**SPACE HEATER, CONVECTIVE**  
**(NSN 4520-01-431-8927)**

**FLAME SENSOR**  
**REPLACE**

---

**INITIAL SETUP****Tools**

Wrench (Table 2, Item 2, WP 0044 00)

**Materials/Parts**

Flame sensor (Item 9, WP 0067 00)

**Equipment Condition**

Heater shut down and all advisory lights off. (WP 0006 00)

In-tent controller assembly disconnected from heater. (WP 0006 00)

Fuel supply disconnected. (WP 0006 00)

Battery disconnected. (WP 0018 00)



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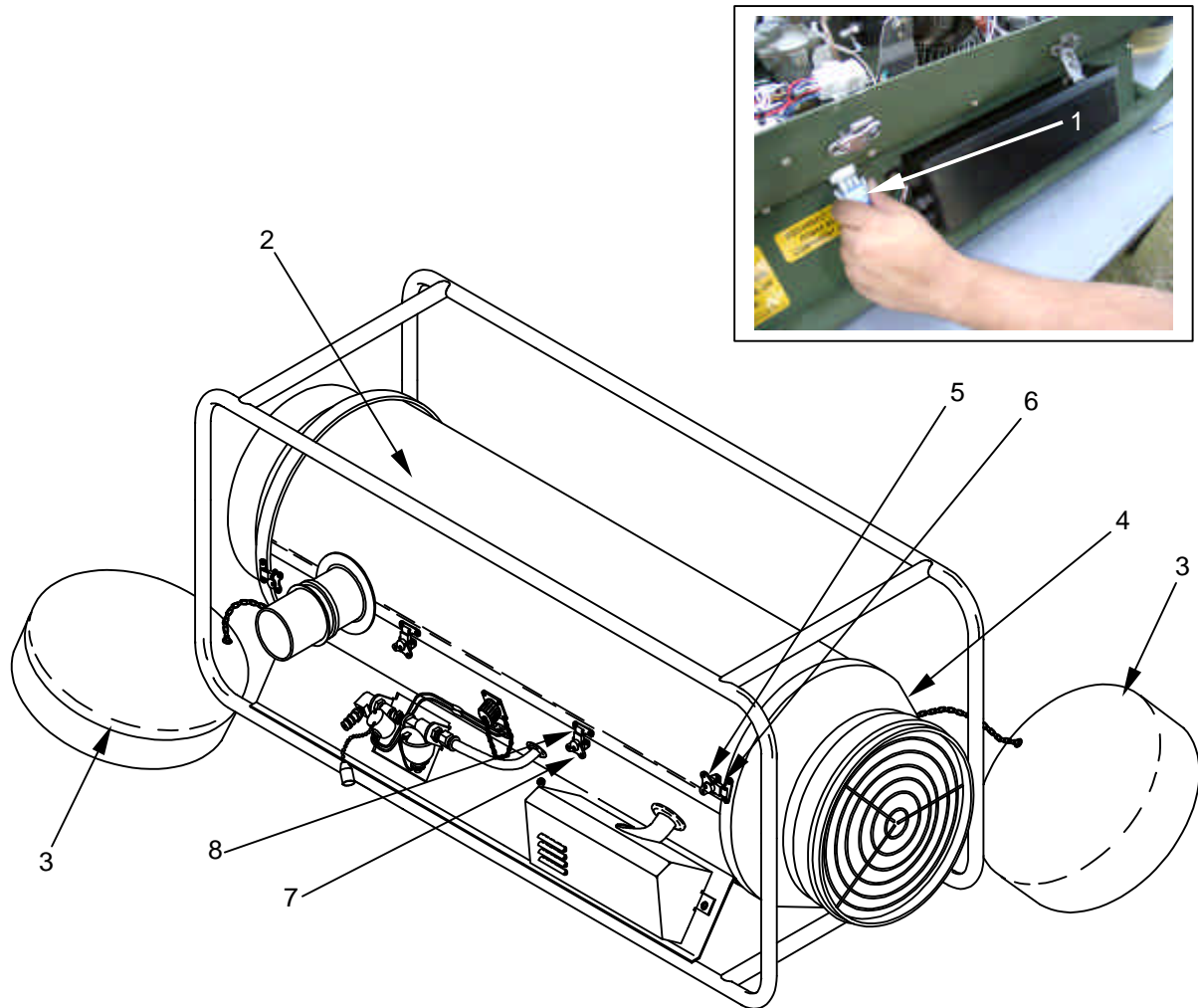
**WARNING**

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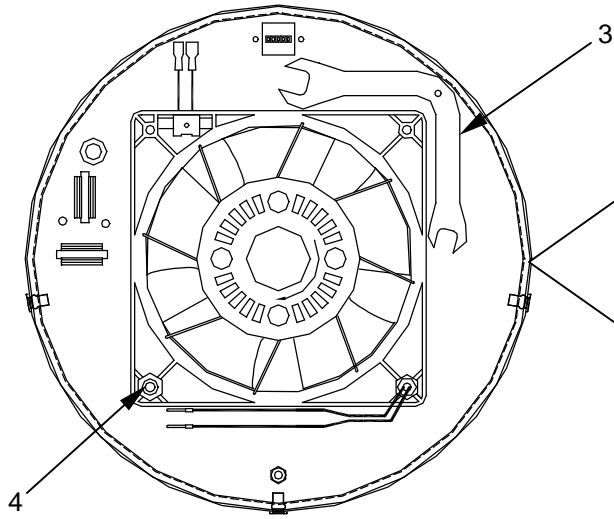
The ignition system of this heater contains dangerous voltages which can cause severe electrical shock. Be sure to disconnect battery connector before performing any maintenance actions.

**REPLACE**

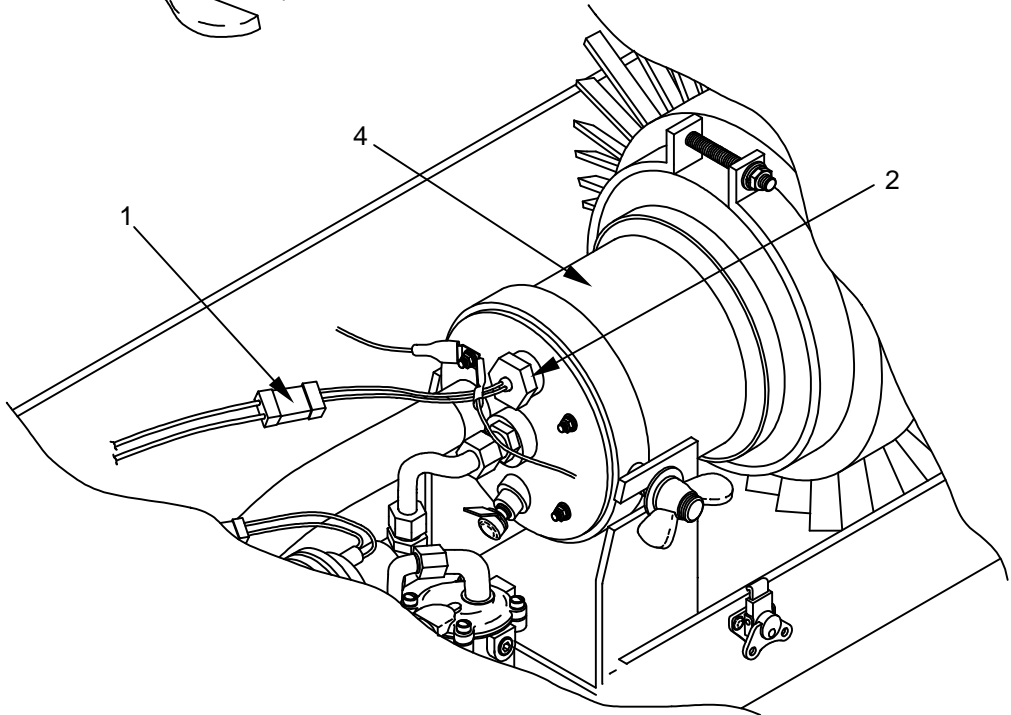
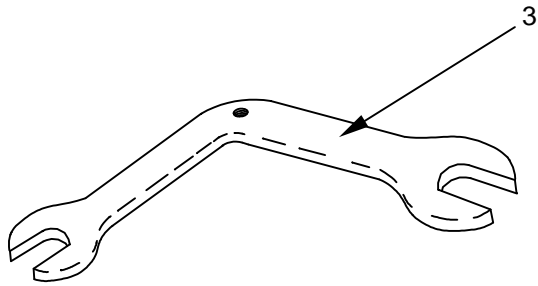
1. Disconnect battery pack connector **(1)** from lower housing assembly.
2. Remove the upper housing assembly **(2)** by first removing the two dust covers **(3)** at the inlet and outlet ends of the heater.
3. Remove the two duct adapters **(4)** at the inlet and outlet end of the heater by releasing the two fastener housings **(5)** from the fastener keepers **(6)**.
4. Remove the upper housing assembly **(2)** by releasing the remaining fastener housings **(7)** from their corresponding fastener keepers **(8)**. Lift and remove the upper housing assembly **(1)**. Set the upper housing assembly aside.



1. Disconnect electrical connector **(1)** from flame sensor **(2)**.
2. Using wrench **(3)** supplied with the heater, unscrew flame sensor **(2)** in counterclockwise direction from burner assembly **(4)**.
3. Locate and remove new flame sensor **(5)** from spare storage area at the breathable air inlet end of the heater.
4. Screw new flame sensor **(2)** in clockwise direction into burner assembly **(4)**.
5. Tighten securely with wrench **(3)**.
6. Reconnect electrical connector **(1)**.



**NOTE!**  
Spares and onboard tools are located inside the duct adapter located on the inlet side of the heater near the heated air blower assembly.



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**OPERATOR MAINTENANCE**  
**SPACE HEATER, CONVECTIVE**  
**(NSN 4520-01-431-8927)**

**GLOW PLUG  
REPLACE**

---

**INITIAL SETUP****Tools**

Wrench, (item 2, WP 0044 00)

**Materials/Parts**

Glow Plug, (item 10, WP 0067 00)

**Equipment Condition**

Heater shut down and all advisory lights off. (WP 0006 00)

In-tent controller assembly disconnected from heater. (WP 0006 00)

Upper housing assembly removed (WP 0030 00).

Fuel supply disconnected. (WP 0006 00)

Battery disconnected. (WP 0018 00)

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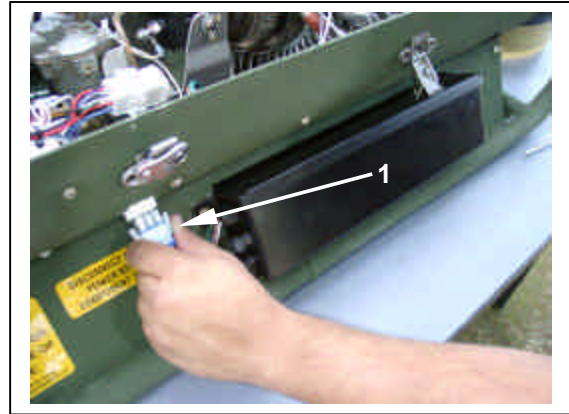
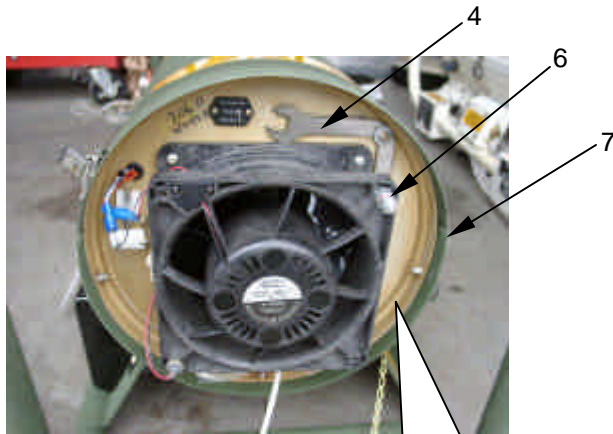
**WARNING**

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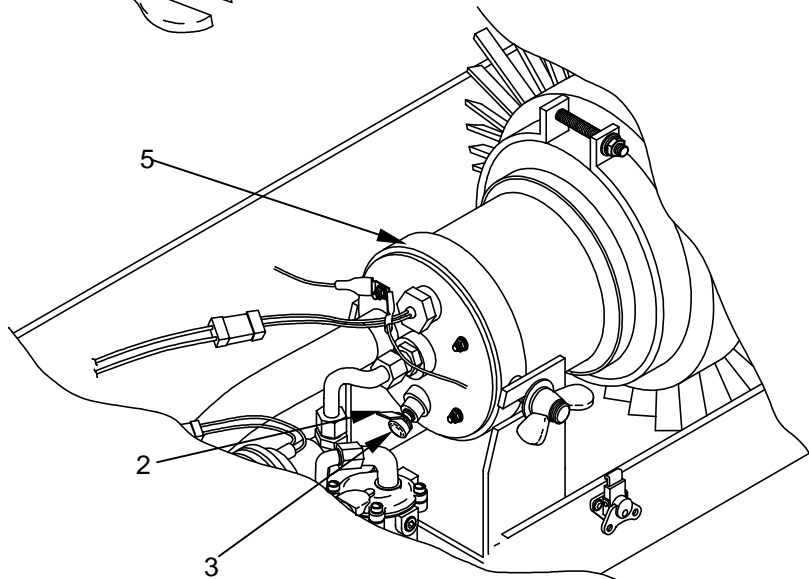
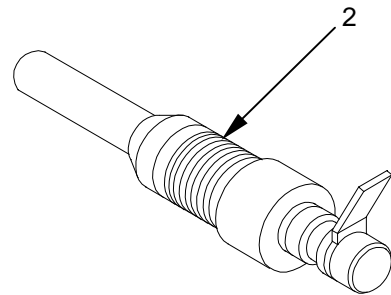
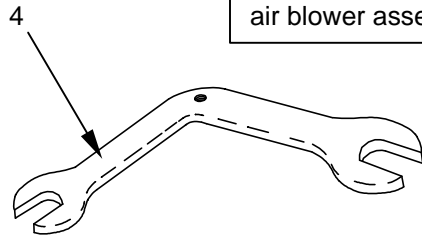
The ignition system of this heater contains dangerous voltages which can cause severe electrical shock. Be sure to disconnect battery before performing any maintenance actions.

**REPLACE**

1. Disconnect battery **(1)**.
2. Disconnect electrical lead **(2)** from glow plug **(3)**.
3. Using wrench **(4)** supplied with the heater, loosen and remove glow plug **(3)** from burner assembly **(5)** by turning in a counterclockwise direction.
4. Locate and remove a new glow plug **(6)** from the spare storage area **(7)** at the breathable air inlet end of the heater. Screw the replacement glow plug **(3)** in clockwise direction into burner assembly **(5)** and reconnect electrical lead **(2)**.



Spares and onboard tools are located inside the duct adapter located on the inlet side of the heater near the heated air blower assembly.



**END OF WORK PACKAGE**

**TM 10-4520-262-12&P**

**CHAPTER 5**  
**UNIT**  
**MAINTENANCE INSTRUCTIONS**  
**SPACE HEATER, CONVECTIVE**

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**SPACE HEATER CONVECTION (SHC)  
UNIT PREVENTIVE MAINTENANCE CHECKS AND SERVICES**

---

**GENERAL**

This section lists the preventive checks and services to be performed quarterly by Unit Maintenance personnel. Refer to Operator PMCS WP 0010 for an explanation of PMCS procedures.

**PMCS TABLE**

The accompanying table provides a listing of PMCS to be performed by Unit personnel. It includes the following:

**Item Number Column.** This column is a list of every check and service task in the PMCS. They are numbered in logical order of performance regardless of the interval. This column is to be used as a source of item numbers for the Th1 Number Column on DA Form 2404, Equipment Inspection and Maintenance Worksheet, in recording results of PMCS.

**Interval Column.** This column indicates the interval at which a specific item needs to be checked or serviced.

**Item To Be Checked or Serviced Column.** This column provides the name of the item to be checked or serviced.

**Procedure Column.** This column describes the procedures used to check or service an item. It includes all the information required to perform the checks or services.

**Not Fully Mission Capable If: Column.** This column indicates conditions under which the heater is not capable of performing its intended mission.

**LEAKAGE DEFINITIONS FOR UNIT PMCS**

It is necessary for you to know how fuel leaks affect the status of the heater. Following are classes of leaks you need to know to determine the operational status of the heater. Learn these leakage class definitions. Remember when in doubt, notify your supervisor.



**WARNING**

Leakage may present a fire and/or health hazard. No leakage of any type is permitted within the heater. No leakage of any type is permitted within the area or compartment being heated.

**NOTE**

Heater operation is allowed if:

Class I or Class II leaks occur in fuel supply lines external to the heater.

- And, such leakage does not present a fire or health hazard.
- Class III leaks shall be reported immediately to your supervisor.

CLASS I - Slight seepage of fuel, but not great enough to form a drop. Indicated by slight wetness or discoloration.

CLASS II - Seepage of fuel great enough to form drops but not great enough to cause drops to drip from the item being checked.

CLASS III - Leakage of fuel great enough to form drops that fall from the item being checked.

Unit Preventive Maintenance Checks and Services.

**NOTE**

If the equipment must be kept in continuous operation, do only the procedures that can be. Done without disturbing operation. Make complete checks and services when the equipment is shut down.

Table 1. Operator Preventive Maintenance Checks and Services

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable If:
			<p><b>NOTE</b></p> <p>All necessary PMCS may be accomplished by the operator.</p>	

**END OF WORK PACKAGE**

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**SPACE HEATER, CONVECTIVE (SHC)  
UNIT MAINTENANCE PROCEDURES**

---

**GENERAL**

The procedures in this section have been arranged in order in which the items appear in the Unit (0) Maintenance level column on the Maintenance Allocation Chart (MAC) which is provided in WP 0041. Step by step procedures have been provided for all actions authorized to be performed by the Unit in Chapter 4.

**WARNING**

High voltage is present on this equipment. Do not perform maintenance with power on. Death or serious injury to personnel may result to personnel.

**WIRING**

**General.** Preferred repair methods consist of replacing wires, terminals, connectors, etc. , rather than splicing wires, bending ends to form terminals, and other makeshift procedures, although the latter may be appropriate for emergency field repairs.

**Soldering Connections.** Wire connections must be made mechanically sound before they are soldered. Solder alone does not provide sufficient strength to prevent breakage. Joining surfaces of connections to be soldered must be clean and bright. If a separate flux is used, it should be rosin base flux and should be brushed onto the joint before soldering. If a flux-core solder is used, it should be a rosin core electrical solder. If uncored solder is used, it should be a lead-tin solder. Wires should always be heated to the point at which the solder will melt completely and flow into all parts of the joint. Excessive build up of solder "gobs" on the joint should be avoided or removed.

**Insulating Joints.** The preferred method of insulating electrical joints is by the use of heat-shrink tubing. To apply, cut a piece of heat-shrink tubing of suitable diameter to a one-inch length for covering joints at terminals or connectors, or to a length about 1/2 inch (1.3 cm) longer than the joint to be insulated, and slide the tubing over the wire before making the joint. After the joint is made, slide the tubing so that it covers the joint, and shrink in place with moderate heat.

**Splicing Wires.** To repair broken or cut wires that are otherwise sound, the mating ends can be stripped and spliced. A commercial butt splice can be crimped onto the ends to join them, or a "Western Union" wire splice can be made. The latter is made by stripping 1/4-1/2 inch (6.5-12.7 mm) of insulation from the wire ends, holding the ends parallel and facing opposite directions, then twisting each end around the other wire at least three turns. Solder and apply insulation as described above.

**Crimping Terminals.** To install a terminal on the end of a wire, strip 1/4-1/2 inch (6.5 12.7 mm) of insulation from the end of the wire, apply a one-inch piece of heat-shrinking tubing (if the terminals are of the uninsulated type) and insert wire end into the shank of the terminal. Crimp the shank, and install heat-shrink tubing, if necessary.

**CLEANING AND INSPECTION OF ANTIFRICTION BEARINGS**

Refer to TM 9-214, Inspection, Care, and Maintenance of Antifriction Bearings.

**CLEANING AND INSPECTION OF MECHANICAL PARTS****WARNING**

Drycleaning solvent is flammable and toxic to eyes, skin, and respiratory tract. Skin/eye protection is required. Avoid repeated/prolonged contact. Use only in well ventilated areas. Keep away from open flames or other sources of ignition.

Compressed air used for cleaning purposes will not exceed 30 psi (kPa). Use only with effective personal protective equipment.

Clean metal parts in drycleaning solvent. Thoroughly dry the parts with compressed air, observing all safety precautions.

Fibrous or rubber parts can generally be cleaned with warm, soapy water and dried with compressed air.

Inspect metal parts for cracks, breaks, bends, worn edges, and rough bearing surfaces. Damage that alters the part or its function is cause for replacement of that part.

**GENERAL REPAIR**

Repair the SHC to normal operating condition by replacing or repairing a defective component and/or by needed adjustments.

Cleaning and lubrication is sometimes all that is needed to return an item to operating condition.

Remove and replace only those items necessary to make repairs. After replacing the defective components, ensure that the SHC operates correctly.

To paint metal, sand bare metal areas with sandpaper and refinish with primer and olive drab paint. Refer to TM 43-0139 for proper painting instructions. Allow paint to dry between coats.

**END OF WORK PACKAGE**

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**UNIT MAINTENANCE****SPACE HEATER, CONVECTIVE****(NSN 4520-01-431-8927)****IN-TENT CONTROLLER ASSEMBLY  
INSPECT, TEST, REPLACE**

---

**INITIAL SETUP****Tools**

Tool Kit, General Mechanics (Item 1, WP 0044 00)

**Materials/Parts****Personnel Required**

One

**Equipment Condition**Heater shut down and all advisory lights off. (WP 0006 00)

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**INSPECT**

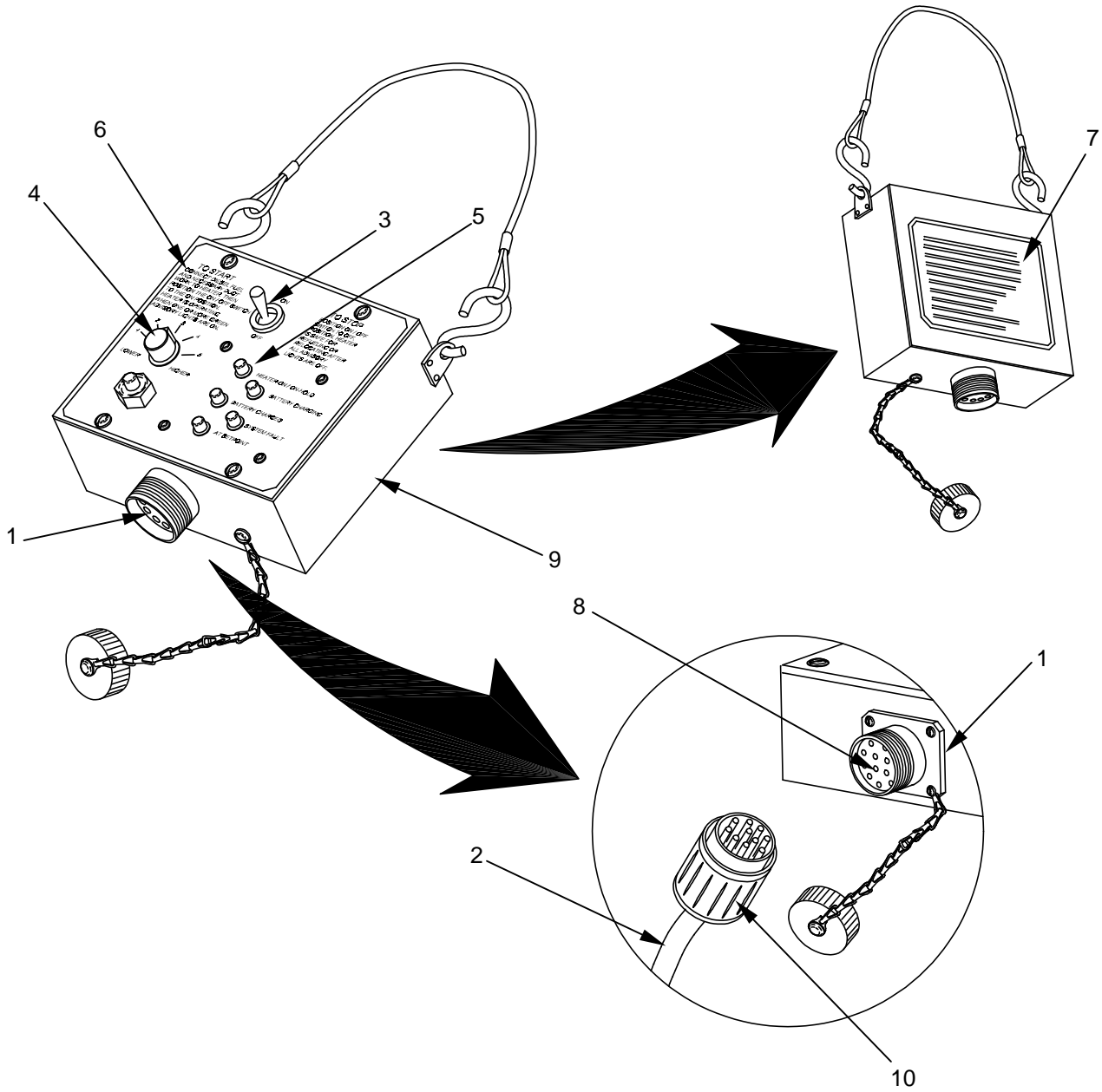
1. Inspect the In-tent Controller Assembly connector **(1)** for cracks, dents to the outer collar, dirt in the contacts, or any other damage that would prevent the connector **(1)** from making a good electrical connection with the in-tent controller cable assembly **(2)**.
2. Inspect the ON-OFF switch **(3)** and LOWER-HIGHER control **(4)** to ensure proper operation.
3. Ensure that each of the advisory lights **(5)** operate properly.
4. Ensure that all informational labels **(6 and 7)** are present and legible.

**TEST**

Using a multimeter, perform a short circuit test across all terminals **(8)** of the connector **(1)**. For example, pin A to pin B, A to C, A to D, etc. Followed by B to A, B to C, B to D, etc. There should not be shorts across any of the pins. If shorts exist, replace the in-tent controller assembly.

**REPLACE**

1. To replace the in-tent controller assembly **(9)**, unscrew the outer collar **(10)** of the in-tent controller assembly cable **(2)** and disconnect cable from in-tent controller assembly **(9)**.
2. Connect in-tent controller cable **(2)** to new in-tent controller assembly **(9)**.
3. Tighten outer collar **(10)** of in-tent controller assembly cable **(2)** securely.



END OF WORK PACKAGE

## UNIT MAINTENANCE

## SPACE HEATER, CONVECTIVE

(NSN 4520-01-431-8927)

IN-TENT CONTROLLER CABLE ASSEMBLY  
INSPECT, TEST, REPLACE

## INITIAL SETUP

Tools

Tool Kit, General Mechanics (Item 1, WP 0046 00)

Materials/PartsPersonnel Required

One

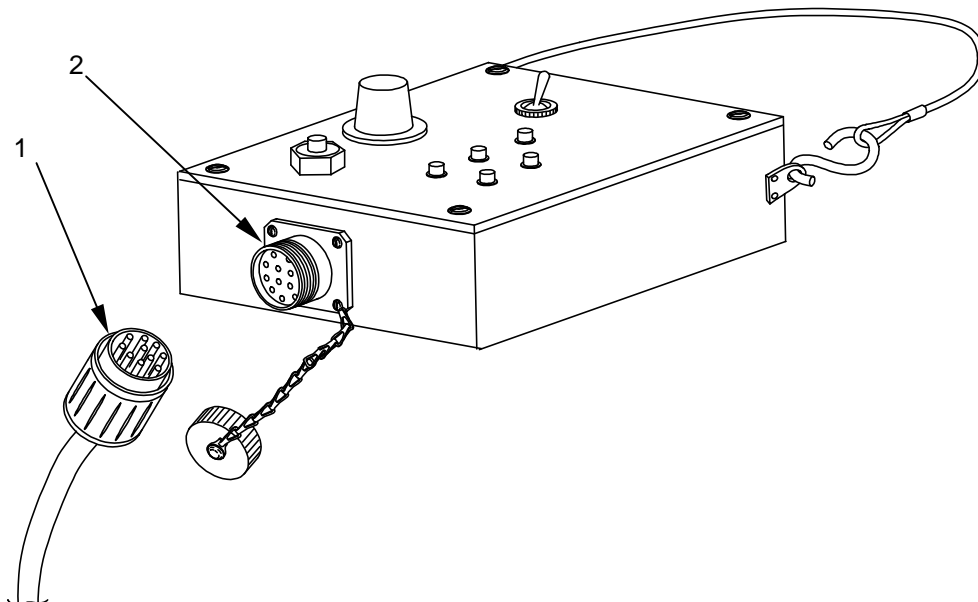
Equipment Condition

Heater shut down.

In-tent controller assembly cable disconnected from heater and in-tent controller assembly connector.

## INSPECT

Inspect the In-tent Controller Cable Assembly connector (1) for cracks, dents to the outer collar, dirt in the contacts, or any other damage that would prevent the connector (1) from making a good electrical connection with the in-tent controller assembly connector (2).



**TEST**

1. Using a multimeter, perform a continuity check from pin A at one end of cable to pin A at opposite end of cable. Repeat for all pins. Ensure that there is continuity through the cable.
2. Using a multimeter, perform a short circuit test across all terminals of the connector. For example, test from pin A to pin B, A to C, A to D, etc. Followed by B to A, B to C, B to D, etc. There should not be shorts across any of the pins. If shorts exist, replace the in-tent controller assembly cable.
3. If there is a lack of continuity through the cable or shorts within either of the connectors, replace the in-tent controller cable assembly.

**REPLACE**

1. Ensure that the in-tent controller cable assembly has been completely disconnected from the heater and the in-tent controller assembly.
2. Connect new cable to the heater and to the in-tent controller assembly. Secure connectors at both ends of in-tent controller assembly cable.

**END OF WORK PACKAGE**



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**UNIT MAINTENANCE**  
**SPACE HEATER, CONVECTIVE**  
**(NSN 4520-01-431-8927)**

**BATTERY PACK ASSY**  
**INSPECT, TEST, REPLACE**

---

**INITIAL SETUP****Tools**

Tool Kit, General Mechanics (Item 1, WP 0044 00)

**Materials/Parts****Personnel Required**

One

**Equipment Condition**

Heater shut down and all advisory lights off. (WP 0006 00)  
In-tent controller assembly disconnected from heater. (WP 0006 00)

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**WARNING**

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The ignition system of this heater contains dangerous voltages which can cause severe electrical shock. Be sure to disconnect the battery pack connector before any maintenance actions.

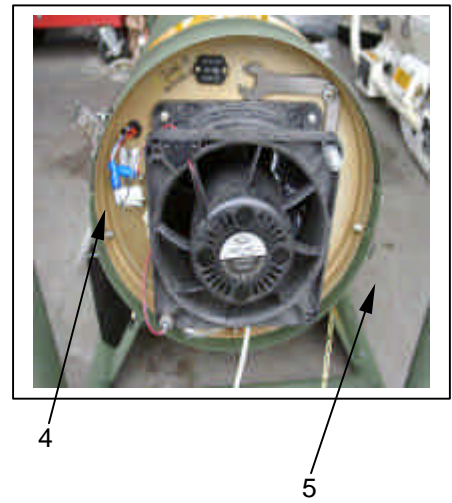
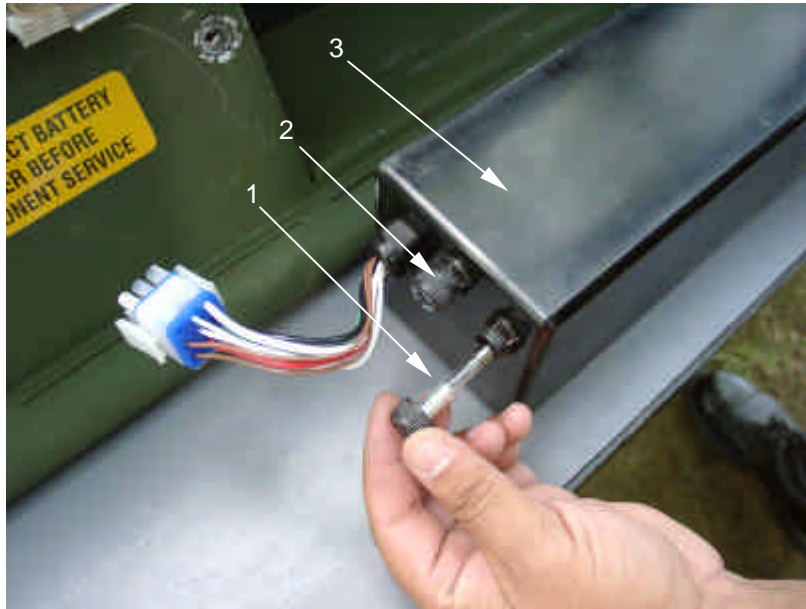
**INSPECT**

1. Disconnect battery pack assembly **(1)**.
2. Inspect battery pack electrical connector **(2)**. Ensure that connector **(2)** is not cracked or damaged in any way. Ensure that all wires **(3)** leading from battery pack **(1)** to connector housing are free of cuts, abrasions, or any other damage that would expose bare wire.
3. Inspect the two fuse holders **(4)** on the side of the battery pack **(1)** and ensure that there are no cracks or other damage that would prevent the fuse holders from securing the fuse and maintaining proper electrical contact.
4. Ensure that there are no cracks, cuts, or other damage to the outer casing of the battery pack **(1)**.
5. If there is any damage to the connector **(2)**, fuse holders **(4)**, or wiring **(3)**, the battery pack should be replaced.



**TEST**

Before replacing the battery pack, ensure that the two fuses (1) are in good electrical working order by removing them from the fuse holders (2) on the left side of the battery pack (3) and testing for continuity with a multimeter. Continuity through the fuse ensures that it is in good electrical working order. If there is no continuity through the fuse, replace it with a known good fuse from the on-board spare parts (4) located at the inlet end (5) of the heater. If the fuses are both in good electrical working order and the battery pack is not supplying power to the heater, replace the battery pack as detailed below.



## SERVICE

Under normal conditions, the Space Heater, Convective is responsible for recharging the on-board battery pack. However, there may be some instances where it is required that the battery be recharged using a commercially available 115 VAC to 12 VDC charger. To accomplish this, a battery charging adapter has been supplied with the heater that permits the connection of a charger to the battery pack.



### WARNING

Do not allow the metal terminals of the battery charging adapter to come in contact with the metallic portion of the heater.

### CAUTION

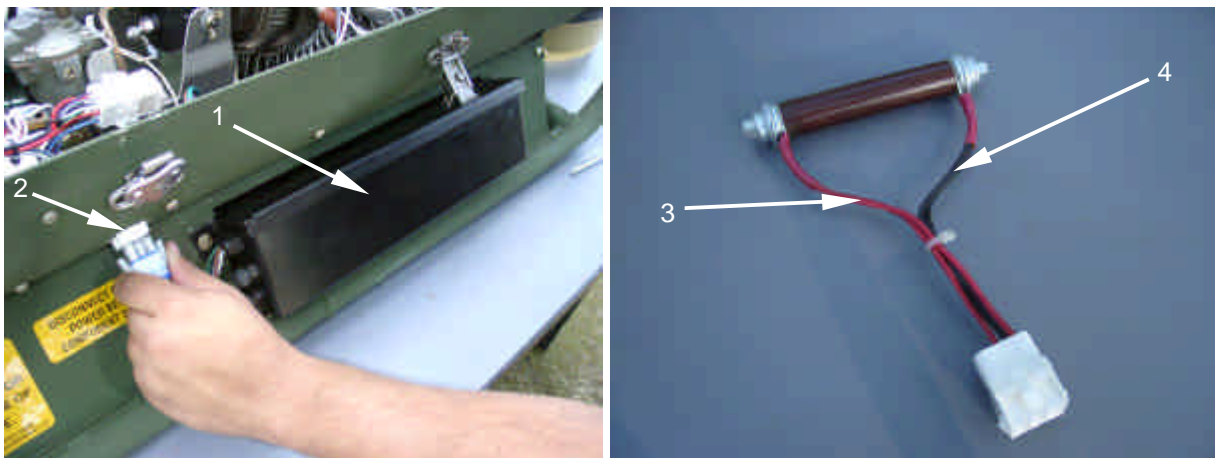
Do not permit the battery charger terminals to come in contact with the metal casing of the heater as this may cause damage to the battery pack assembly.

### NOTE

No grounding is necessary when using the battery charging adapter.

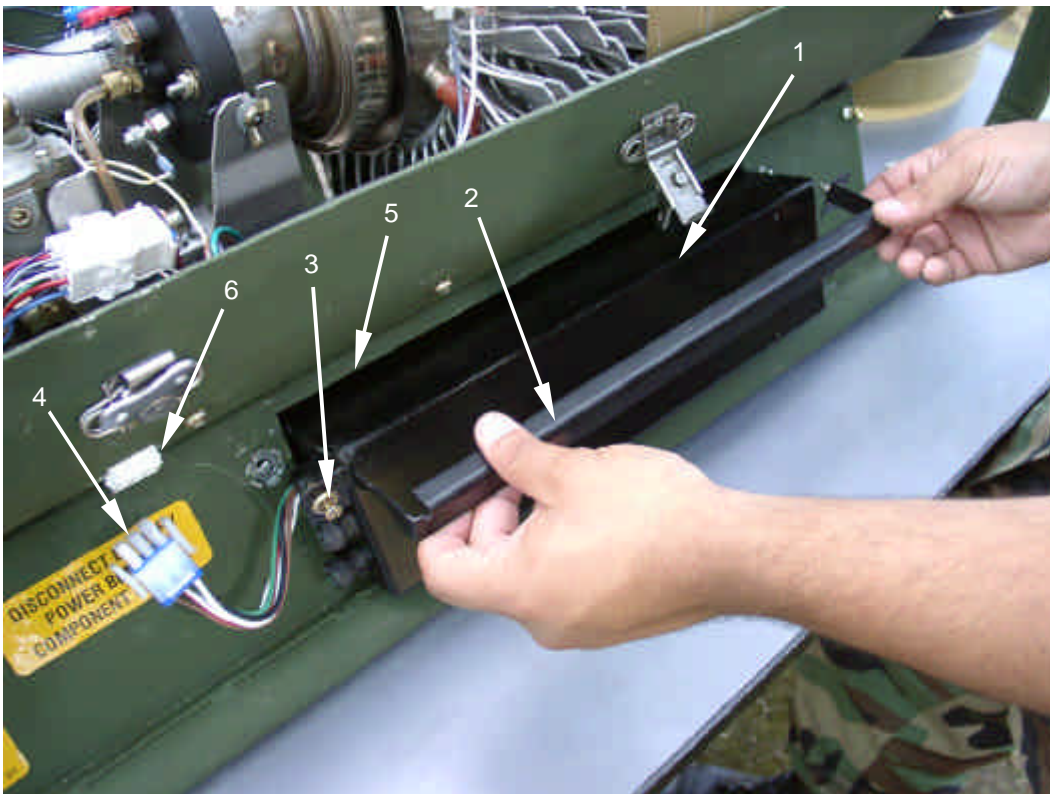
To charge the battery **(1)** with a commercial 115 VAC to 12 VDC battery charger, disconnect the battery connector **(2)** from the heater and engage the connector on the end of the battery charging adapter with the connector on the battery pack. Connect the positive (+) lead of the charger to the red (+) wire **(3)** of the battery charging adapter and the negative (-) lead of the charger to the black (-) wire **(4)** of the battery charging adapter. Once the charger is connected to the battery charging adapter properly, turn on the power to the charger.

Depending upon the battery temperature, recharge time for the battery will be approximately 30 minutes. The battery will take longer to recharge in cold weather conditions.



**REPLACE**

1. Before replacing the battery pack, an attempt should be made to recharge the battery pack in accordance with the Service section of this work package. If the battery is incapable of retaining a charge and will not start the heater, it should be replaced.
2. To remove the battery pack **(1)** , remove the battery pack retainer **(2)** by removing the two screws **(3)** on either side of the retainer **(2)**. Remove the retainer.
3. Disconnect the battery pack connector **(4)** by unplugging from portion of connector mounted in side of heater.
4. Slide the battery pack **(1)** out of the recess **(5)** on the side of the heater.
5. Dispose of the battery pack **(1)** in accordance with appropriate military and/or local regulations.
6. Install a new battery pack **(1)** into the recess **(5)** on the side of the heater. Be sure to orient the connector **(4)** on the side of the battery pack so that it aligns with the connector **(6)** installed on the side of the heater. Engage both halves of the connector and ensure that are firmly mated.
7. Install the retainer **(2)** in place over the battery pack **(1)** . Install and secure the two screws **(3)** that secure the retainer.

**END OF WORK PACKAGE**

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**UNIT MAINTENANCE****SPACE HEATER, CONVECTIVE****(NSN 4520-01-431-8927)****FUEL SUPPLY QUICK DISCONNECT  
INSPECT, REPLACE**

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**INITIAL SETUP****Tools**

Tool Kit, General Mechanics (Item 1, WP 0044 00)

**Personnel Required**

One

**Materials/Parts**

Rags (Item 5, WP 0067 00)

Sealant, thread (Item 3, WP 0067 00)

**Equipment Condition**

Heater shut down and all advisory lights off. (WP 0006 00)

In-tent controller assembly disconnected from heater. (WP 0006 00)

Battery disconnected. (WP 0006 00)

Fuel supply disconnected. (WP 0006 00)

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**WARNING**

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The ignition system of this heater contains dangerous voltages which can cause severe electrical shock. Be sure to disconnect power before any maintenance actions.

**INSPECT**

Inspect the fuel supply quick disconnect **(1)** to ensure there are no cracks, dents, or other damage that would prevent the external fuel hose from attaching securely to the quick disconnect. There should be no fuel leaks when the fuel hose is attached.

**REMOVE**

1. To remove the fuel supply quick disconnect **(1)**, use a wrench and loosen the fuel supply quick disconnect from the elbow fitting **(2)** that is attached to the fuel solenoid valve **(3)**.
2. Remove the fuel supply quick disconnect.

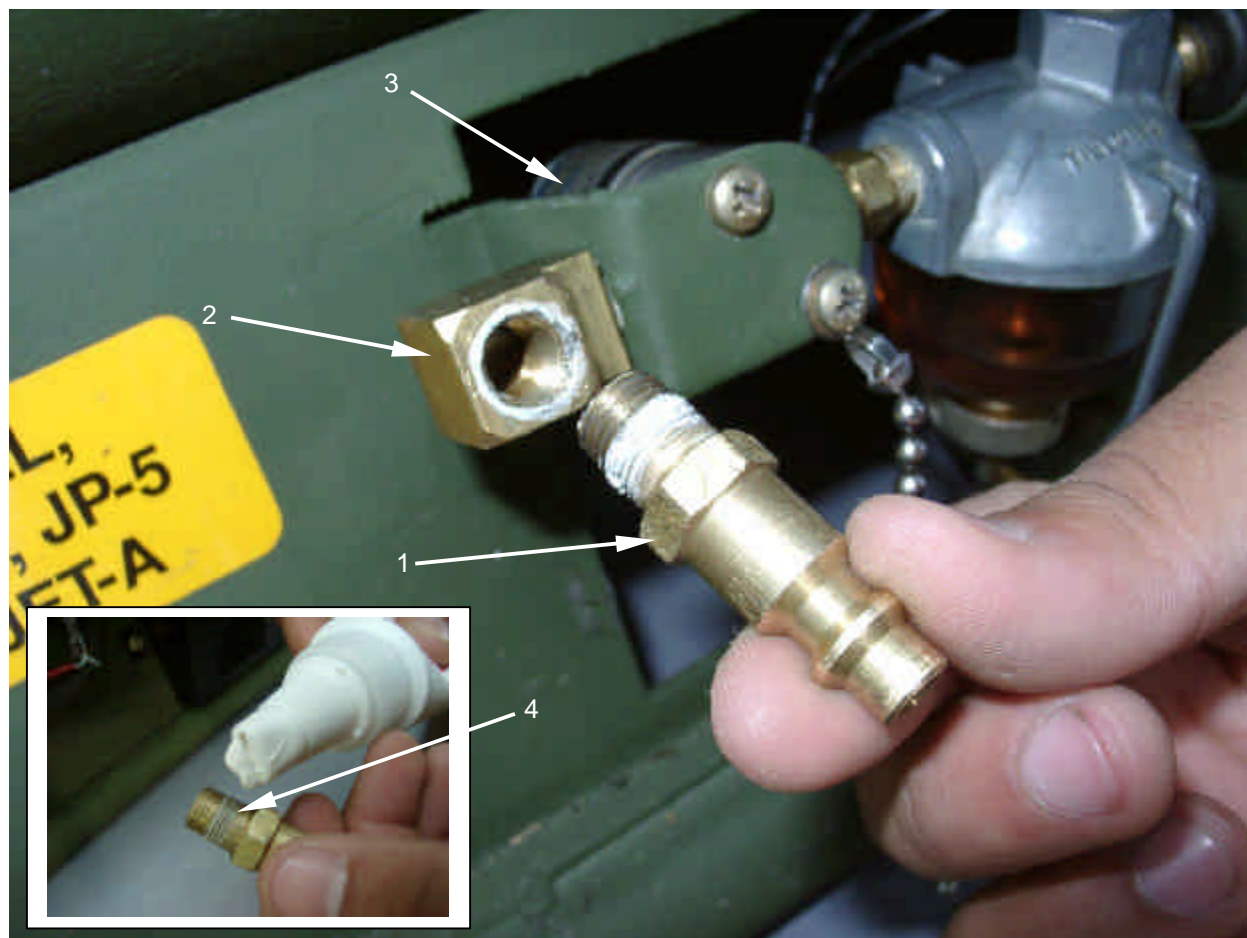


**REPLACE**

Clean all residual sealant that may be present inside the elbow **(2)**.

Apply new sealant to the threads **(4)** of the fuel quick disconnect **(1)**.

Install the fuel quick disconnect into the elbow fitting **(2)**. Tighten securely.



**END OF WORK PACKAGE**

## UNIT MAINTENANCE

## SPACE HEATER, CONVECTIVE

(NSN 4520-01-431-8927)

**FUEL SOLENOID VALVE AND SEDIMENT STRAINER ASSEMBLY  
INSPECT, SERVICE, REPLACE****INITIAL SETUP****Tools**

Tool Kit, General Mechanics (Item 1, WP 0044 00)

**Materials/Parts**

Gasket (Item 11, WP 0067 00)

Screen (Item 12, WP 0067 00)

Rags, Wiping, Clean (Item 5, WP 0067 00)

Sealant, Thread (Item 3, WP 0067 00)

Mat, Petroleum Absorbent (Item 15, WP 0067 00)

Wrap, Tie (Item 16, WP 0067 00)

**Personnel Required**

One

**Equipment Condition**

Heater shut down down all advisory lights off. (WP 0006 00).

In-tent controller assembly disconnected from heater. (WP 0006 00)

Battery disconnected. (WP 0018 00)

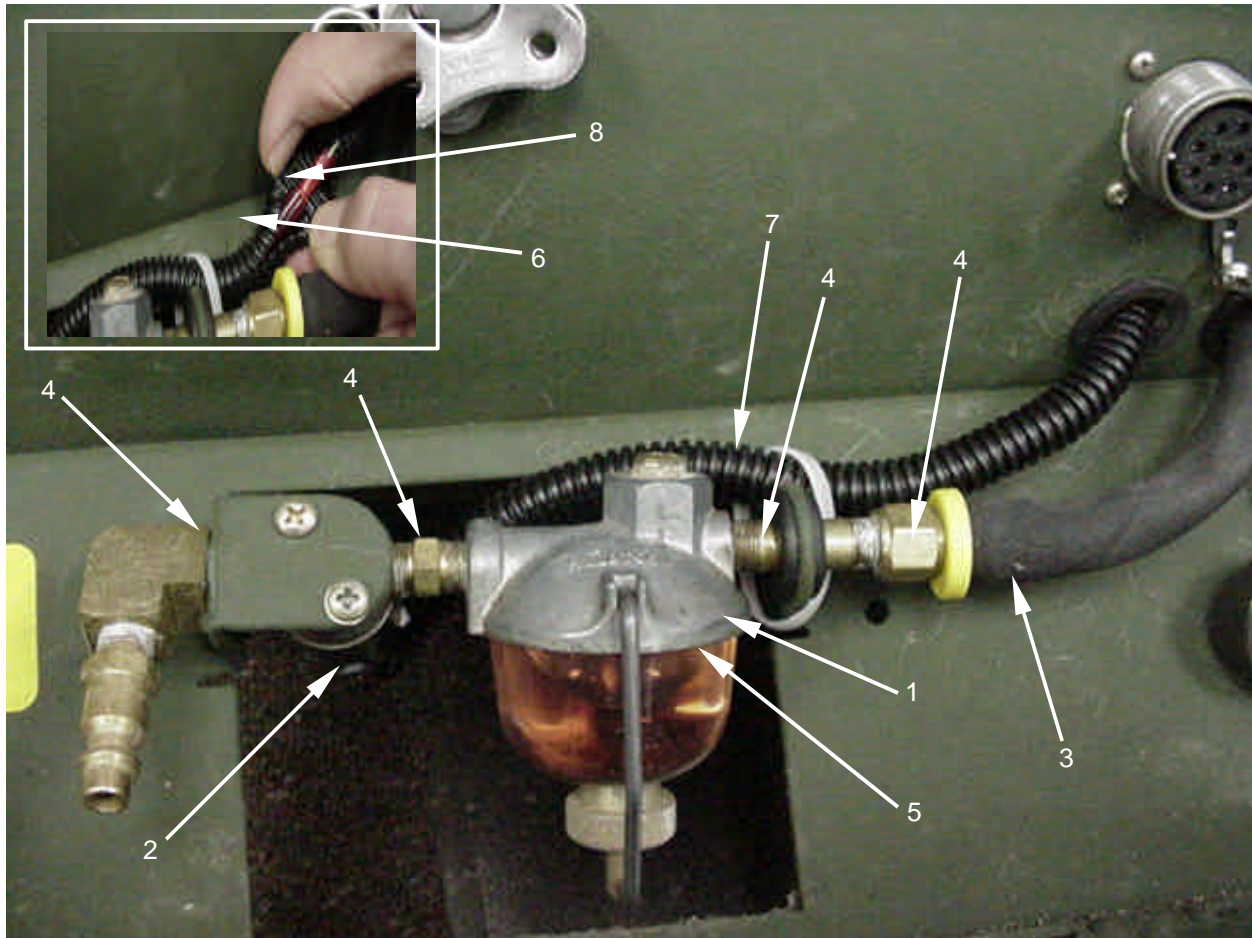
Fuel supply disconnected. (WP 0006 00)

**WARNING**

The ignition system of this heater contains dangerous voltages which can cause severe electrical shock. Be sure to disconnect the battery pack before any maintenance actions.

**INSPECT**

1. Inspect the sediment strainer **(1)** for any cracks, dents, or other damage that would restrict the flow of fuel from the fuel solenoid valve **(2)** to the fuel hose **(3)**.
2. Ensure that there are no fuel leaks at the fittings **(4)** or around the bowl area **(5)** of the strainer.
3. Inspect the fuel solenoid valve **(2)** for any cracks, dents, or other damage that would inhibit its proper operation or restrict the flow of fuel from the fuel solenoid valve **(2)** to the sediment strainer **(1)**.
4. Ensure that the wires **(6)** protected by the wire loom **(7)** and leading to the fuel solenoid valve **(1)** do not have any cuts or abrasions.
5. Inspect the connectors **(8)** for any cracks or other damage that would prevent the connectors from having a secure electrical connection.

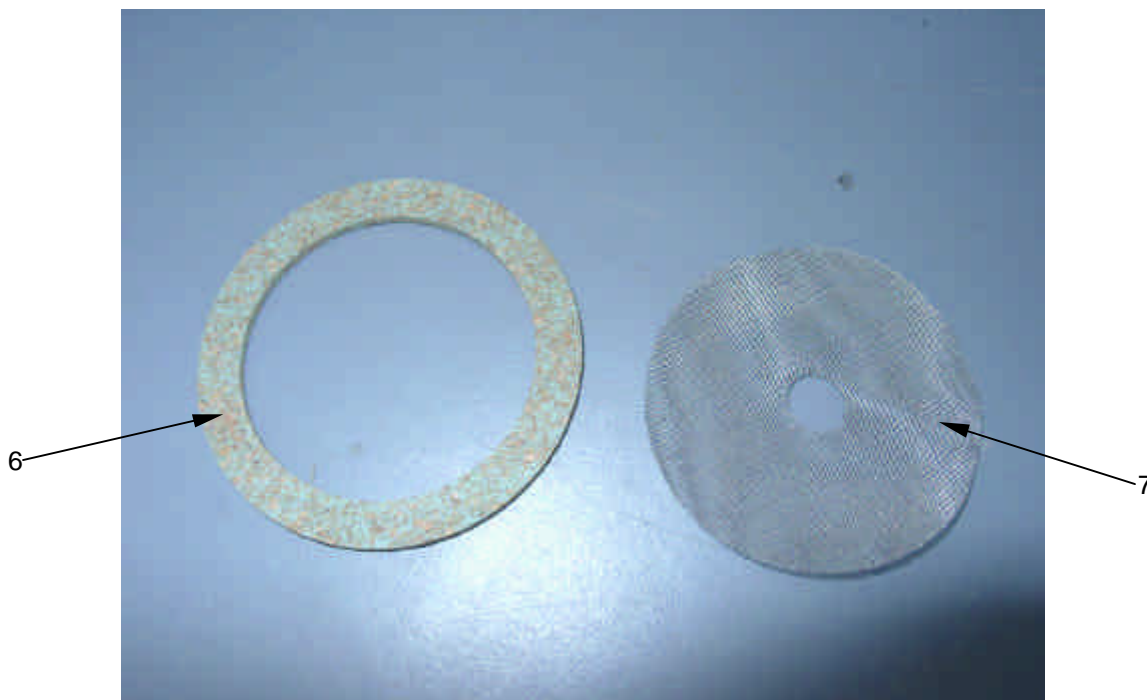
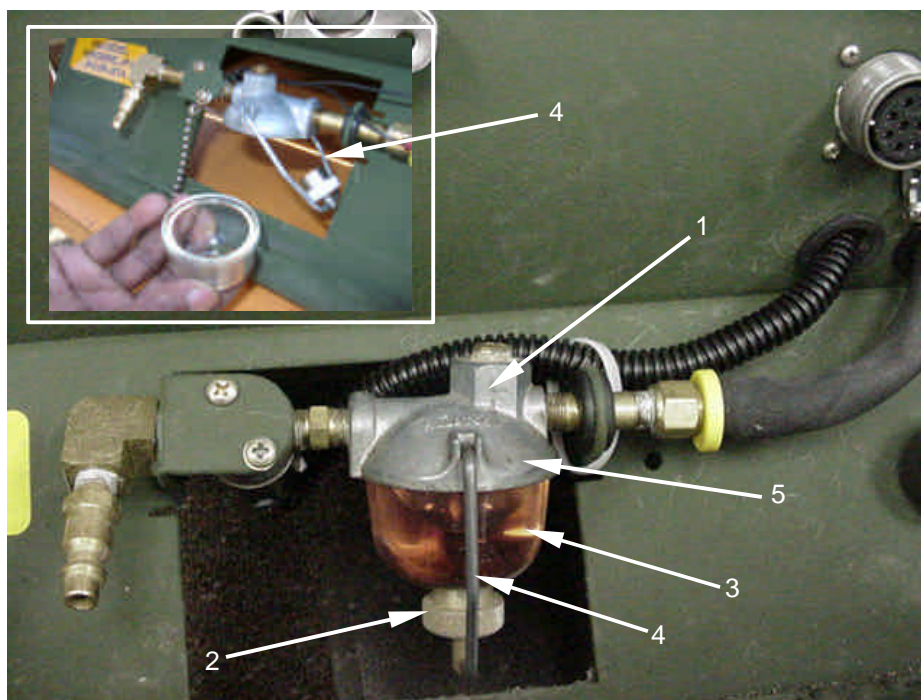


## SERVICE

1. To clean and service the sediment strainer (1), loosen the knurled nut (2) at the base of the sediment strainer bowl (3).
2. Rotate the bale (4) to the right and upward while supporting the bowl (3).
3. Rock the bowl (3) slightly and remove it from the sediment strainer top assembly (5).
4. Empty the fuel from the bowl (3) into an approved container and discard. Do not empty the fuel into a fresh fuel supply.
5. Remove the gasket (6) and screen (7) from the sediment strainer top assembly (5) and discard in an approved manner.
6. Install a new gasket (6) and screen (7) in position on the sediment strainer top assembly (5).
7. Replace the bowl (3) under the sediment strainer top assembly (5).
8. Rotate the bale (4) downward and center under the bowl (3).



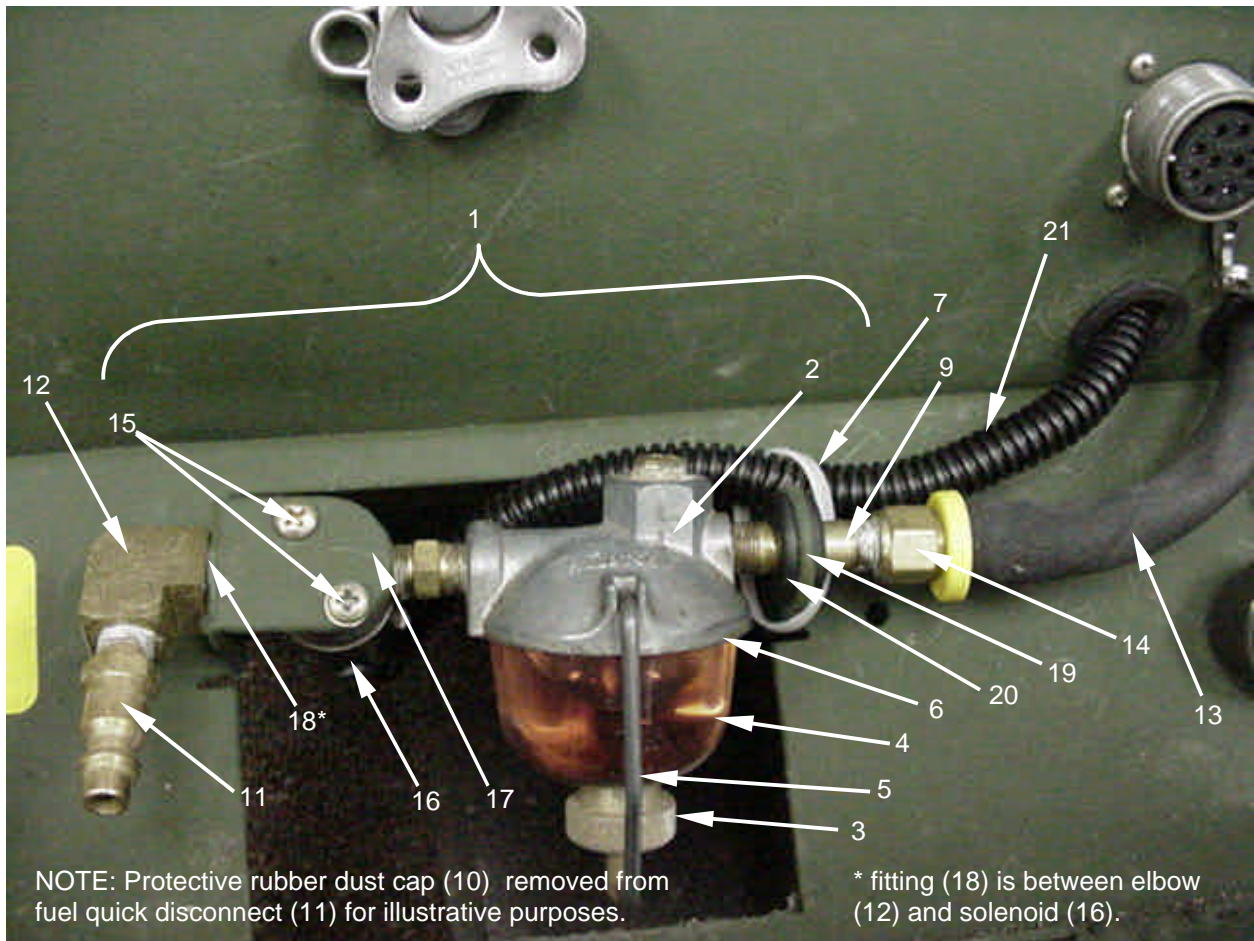
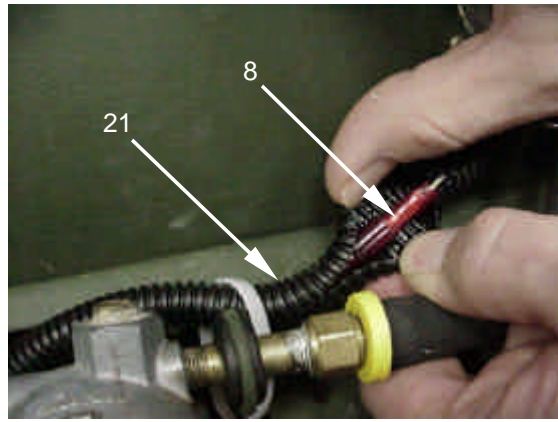
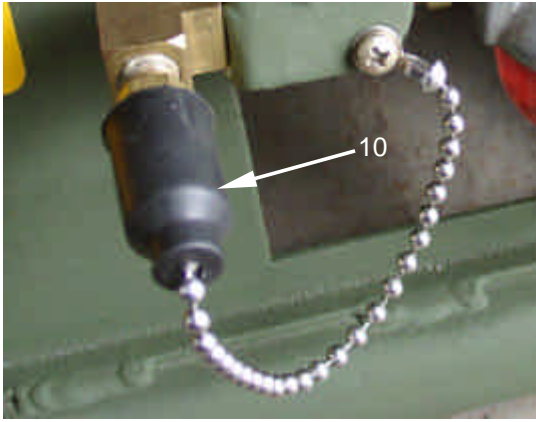
9. Tighten knurled nut (2) at base of sediment strainer bowl (3).



**REPLACE****CAUTION**

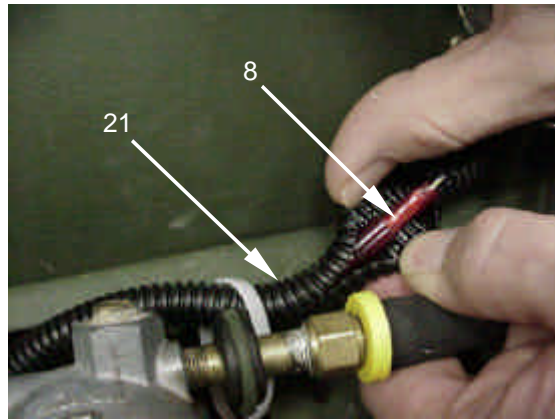
Thread sealant is used to seal the threads on the various fittings of the fuel solenoid and sediment strainer assembly. Once the sealant has set, it may require some force to break the sealant's bond. However, take care not to apply excessive force which could result in damage to the components.

1. Before removing the fuel solenoid valve and sediment strainer assembly **(1)**, drain the sediment strainer **(2)** of fuel by loosening the knurled nut **(3)** at the base of the sediment strainer bowl **(4)**.
2. Rotate the bale **(5)** upward while supporting the bowl **(4)**.
3. Rock the bowl **(4)** slightly and remove it from the sediment strainer top assembly **(6)**.
4. Empty the fuel from the bowl **(4)** into an approved container and discard. Do not empty the fuel into a fresh fuel supply. Replace the bowl **(4)**, rotate the bale **(5)** downward and center under the bowl. Tighten the knurled nut **(3)** taking care not to overtighten.
5. Cut the tie wrap **(7)** securing the wire loom **(21)** that protects the fuel solenoid valve electrical connectors and wires **(8)** to the sediment strainer outlet fitting **(9)**. Remove the wire loom **(21)** by separating at the seam and lifting off the wires. Disconnect the fuel solenoid valve connectors **(8)**.
6. Remove the protective dust cap **(10)** from the fuel quick disconnect **(11)**.
7. Remove the fuel quick disconnect **(11)** as detailed in WP 0020 and set aside.
8. Using a wrench, remove the fuel quick disconnect elbow fitting **(12)** and set aside.
9. Wrap a rag around the end of the fuel hose **(13)** and grasp the end of the fuel hose near the fuel hose fitting **(14)** with a pair of pliers. Be sure that the rag is between the hose and the pliers so as to protect the hose from damage.
10. While holding the fuel hose **(13)** securely, use a wrench to loosen the fuel hose fitting **(14)**. Remove the fuel hose fitting **(14)** from the sediment strainer outlet fitting **(9)**. Have a petroleum absorbment mat or tray with absorbent material nearby to collect any fuel that may be in the fuel hose.
11. Remove the two screws **(15)** and protective dust cap **(10)** that secure the fuel solenoid valve **(16)** to the external fuel system bracket **(17)**.
12. While rotating the fuel solenoid valve and sediment strainer assembly **(1)** back and forth slightly toward and away from the heater, slide the assembly **(1)** to the right until the solenoid valve inlet fitting **(18)** clears the external fuel system bracket **(17)**.
13. Drop the left end of the assembly with the solenoid valve inlet fitting **(18)** down below the bracket **(17)** and slide the assembly **(1)** to the left while rotating slightly as described above. Continue until the assembly **(1)** clears the sediment strainer bracket **(19)** and rubber grommet **(20)** to the right of the sediment strainer.

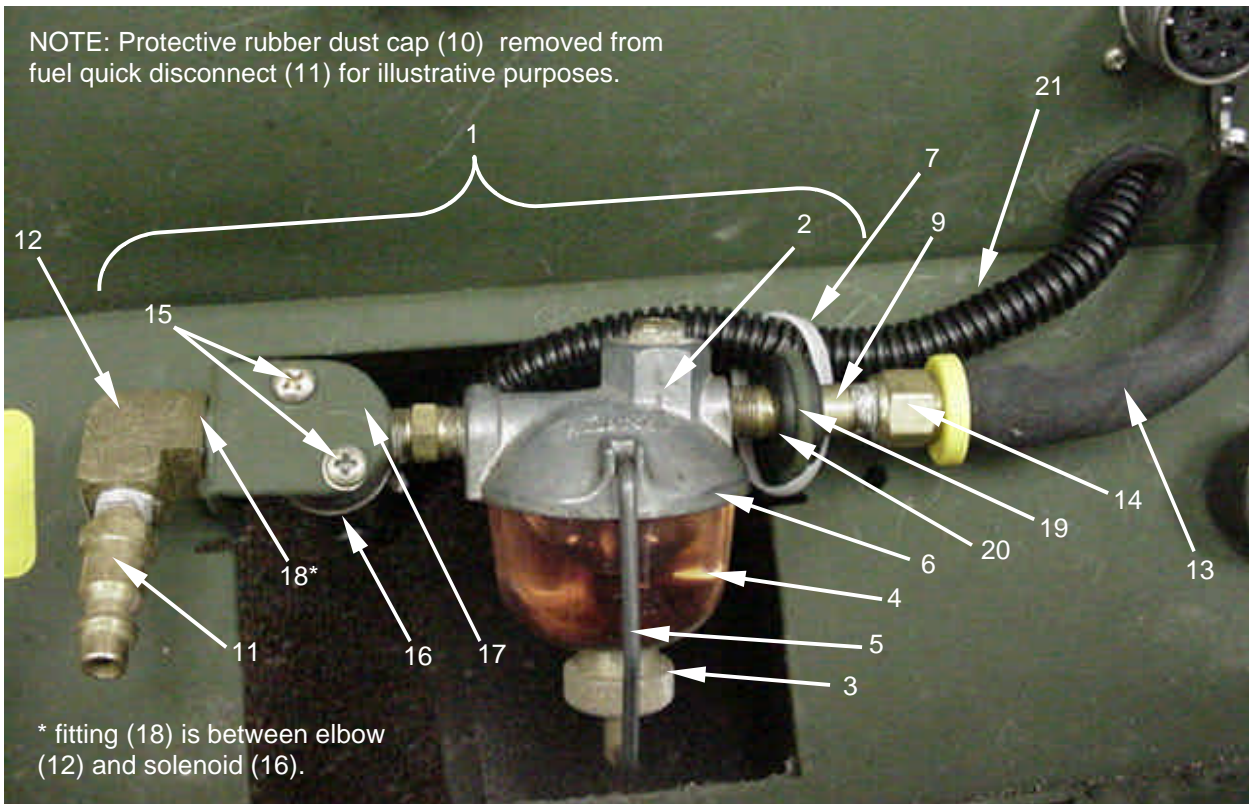


14. To install a new solenoid valve and sediment strainer assembly **(1)**, insert the sediment strainer outlet fitting **(9)** into the rubber grommet **(20)** on the sediment strainer bracket **(19)** closest the fuel hose **(13)**. Continue until the solenoid valve inlet fitting **(18)** has cleared the external fuel system bracket **(17)**.
15. Swing the left end of the assembly with the solenoid valve inlet fitting **(18)** under the external fuel system bracket **(17)** and insert the fuel solenoid inlet fitting **(18)** into the hole on the external fuel system bracket **(17)**.
16. Rotate the assembly **(1)** while sliding the assembly to the left until the holes on the top of the fuel solenoid valve **(16)** are aligned with the holes on the external fuel system bracket **(17)**.
17. Install the two screws **(15)** and protective dust cap **(10)** through the external fuel system bracket **(17)** and into the fuel solenoid valve **(16)**. Tighten securely.
18. Wrap a rag around the end of the fuel hose **(13)** and grasp the end of the fuel hose near the fuel hose fitting **(14)** with a pair of pliers. Be sure that the rag is between the hose and the pliers in order to protect the hose from damage.
19. While holding the fuel hose **(13)** securely, use a wrench to engage the fuel hose fitting **(14)** on the sediment strainer outlet fitting **(9)**. Make sure that the fittings **(9 and 14)** engage correctly and do not cross-thread. Tighten the fuel hose fitting **(14)** securely.
20. Clean any residual thread sealant from the threads of the fuel quick disconnect elbow fitting **(12)** that was removed and set aside earlier. Apply new thread sealant to the threads of the fuel solenoid inlet fitting **(18)**. Tighten the fuel quick disconnect elbow fitting **(12)** securely taking care to align the opening **(22)** on the elbow fitting **(12)** so that it faces outward.
21. Clean any residual thread sealant from threads of the fuel quick disconnect **(11)**.
22. Apply new thread sealant to the threads of the fuel quick disconnect **(11)**.
23. Install the fuel quick disconnect **(11)** into the fuel quick disconnect elbow fitting **(12)** and tighten securely.
24. Reconnect the fuel solenoid valve electrical connectors **(8)**. Install the wire loom **(21)** over the fuel solenoid wires and connectors **(8)**. Install a new tie wrap **(7)** over the wire loom **(21)** and bracket **(19)** to secure the wire loom to the sediment strainer outlet fitting **(9)**.





NOTE: Protective rubber dust cap (10) removed from fuel quick disconnect (11) for illustrative purposes.



\* fitting (18) is between elbow (12) and solenoid (16).



**END OF WORK PACKAGE**

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**UNIT MAINTENANCE****SPACE HEATER, CONVECTIVE****(NSN 4520-01-431-8927)****FUEL HOSE  
INSPECT, REPLACE****INITIAL SETUP****Tools**

Tool Kit, General Mechanics (WP 0044 00, Item 1)

**Materials/Parts**

Rags, Wiping, Clean (Item 5, WP 0067 00)

Mat, Petroleum Absorbent (Item 15, WP 0067 00)

Wrap, Tie (Item 16, WP 0067 00)

**Equipment Condition**

Heater shut down and all advisory lights off. (WP 0006 00)

In-tent controller assembly disconnected from heater. (WP 0006 00)

Fuel supply disconnected. (WP 0006 00)

Sediment strainer bowl empty of fuel. (WP 0020 00)

Battery disconnected. (WP 0018 00)

Upper housing assembly removed. (WP 0030 00)

**Personnel Required**

One

**WARNING**

The ignition system of this heater contains dangerous voltages which can cause severe electrical shock. Be sure to disconnect battery pack before any maintenance actions.

**INSPECT**

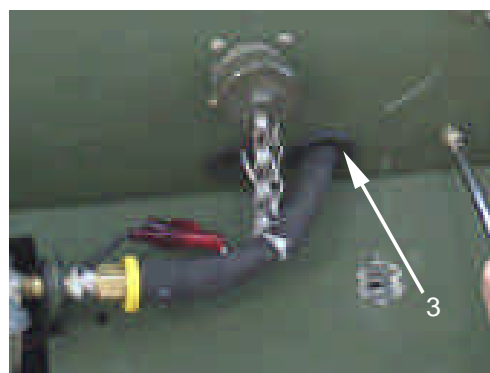
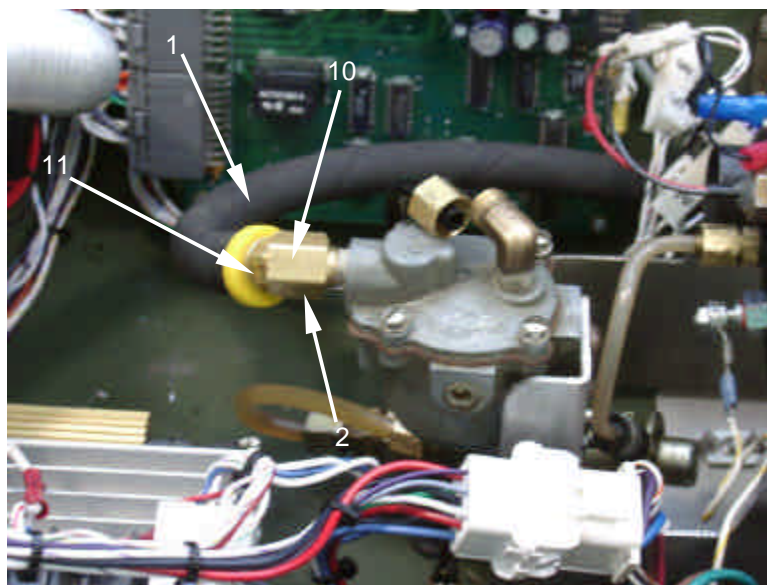
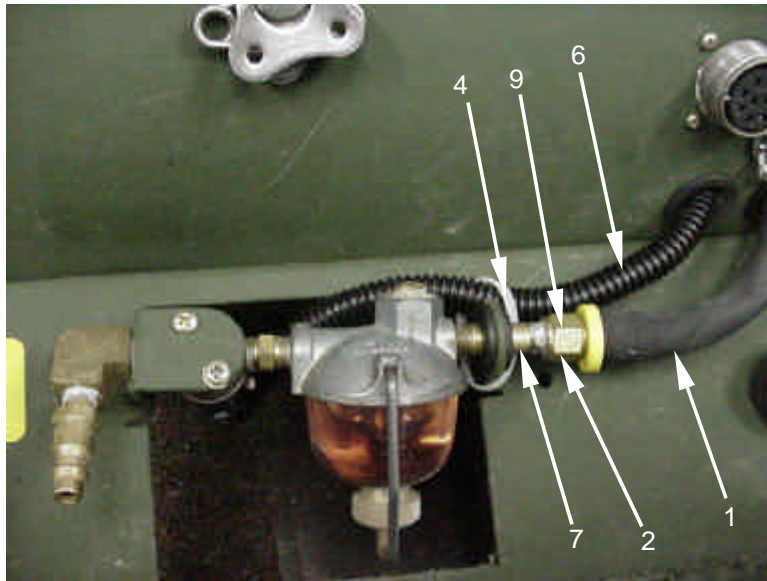
1. Inspect the fuel hose **(1)** and fittings **(2)** for any cuts, abrasions, dents, or other damage that may cause the fuel hose to leak.
2. Inspect the rubber grommet **(3)** where the fuel hose passes through the side of the lower housing assembly for any damage that would prevent it from protecting the fuel hose from the sheet metal edges of the lower housing assembly.

**REPLACE**

1. To remove the fuel hose **(1)**, cut and remove the tie wraps **(4)** that secure the wire loom **(6)** to the sediment strainer outlet fitting **(7)** and the fuel hose **(1)**.
2. Move the wire loom **(6)** and enclosed wires out of the vicinity of the fuel hose **(1)**.

3. Wrap a rag around the end of the fuel hose **(1)** connected to the sediment strainer outlet fitting **(7)** and grasp the end of the fuel hose near the fuel hose fitting **(9)** with a pair of pliers. Be sure that the rag is between the hose and the pliers to protect the hose from damage.
4. Holding the fuel hose **(1)** securely, use a wrench to loosen the fuel hose fitting **(9)**. Remove the fuel hose fitting **(9)** from the sediment strainer outlet fitting **(7)**. Have a petroleum absorbment mat or tray with absorbent material nearby to collect any fuel that may be in the fuel hose.
5. Wrap a rag around the end of the fuel hose **(1)** which is connected to the float assembly inlet fitting **(10)** and grasp the end of the fuel hose near the fuel hose fitting **(11)** with a pair of pliers. Be sure that the rag is between the hose and the pliers to protect the hose from damage.
6. Holding the fuel hose **(1)** securely, use a wrench to loosen the fuel hose fitting **(11)**. Remove the fuel hose fitting **(11)** from the float assembly inlet fitting **(10)**. Place a small section of petroleum absorbment mat at the base of the lower heater housing to collect any residual fuel that may be in the fuel hose.
7. Pull the fuel hose and rubber grommet **(3)** out through the opening in lower housing assembly. Remove the grommet from the hose and re-install it back in the lower housing assembly opening.
8. Install a new fuel hose by inserting the end of the fuel hose with the fitting that installs to the sediment strainer assembly through the rubber grommet **(3)** from the inside of the heater, guiding it out of the lower heater housing. It may be easier to insert the fuel hose through the grommet by wetting the inside surface of the grommet. Move the fuel hose fitting **(11)** into position near the float assembly inlet fitting **(10)**.
9. Wrap a rag around the end of the fuel hose **(1)** which is to be connected to the float assembly inlet fitting **(10)** and grasp the end of the fuel hose near the fuel hose fitting **(11)** with a pair of pliers. Be sure that the rag is between the hose and the pliers to protect the hose from damage.
10. Holding the fuel hose **(1)** securely, use a wrench to tighten the fuel hose fitting **(11)** securely.
11. Wrap a rag around the end of the fuel hose **(1)** which is to be connected to the sediment strainer outlet fitting **(7)** and grasp the end of the fuel hose near the fuel hose fitting **(9)** with a pair of pliers. Be sure that the rag is between the hose and the pliers to protect the hose from damage.
12. Holding the fuel hose **(1)** securely, use a wrench to tighten the fuel hose fitting **(9)** onto the sediment strainer outlet fitting **(7)**.
13. Install a new tie wrap **(4)** in the same location as before and secure the wire loom **(6)** to the sediment strainer outlet fitting **(7)** and the fuel hose **(1)**.





END OF WORK PACKAGE

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**UNIT MAINTENANCE**  
**SPACE HEATER, CONVECTIVE**  
**(NSN 4520-01-431-8927)**  
**HEATER CONTROL ASSEMBLY**  
**REPLACE**

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**INITIAL SETUP****Tools**

Tool Kit, General Mechanics (Item 1, WP 0044 00)

**Materials/Parts****Personnel Required**

One

**Equipment Condition**

Heater shut down and all advisory lights off. (WP 0006 00)  
In-tent controller assembly disconnected from heater. (WP 0006 00)  
Fuel supply disconnected. (WP 0006 00)  
Battery disconnected. (WP 0018 00)  
Upper housing cover removed. (WP 0030 00)

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**WARNING**

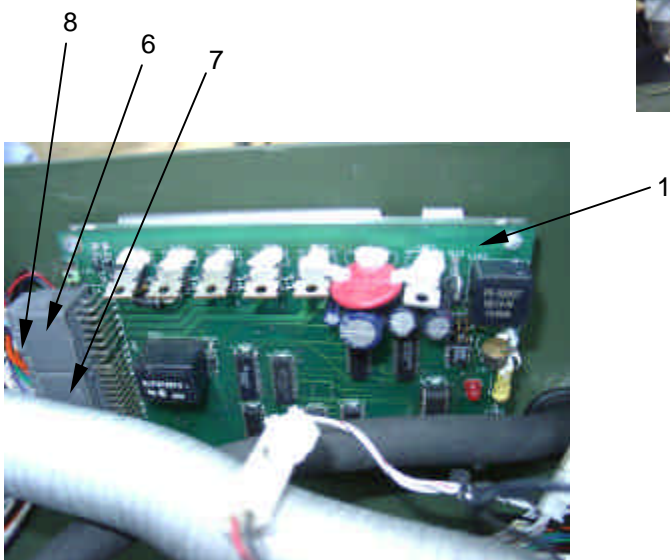
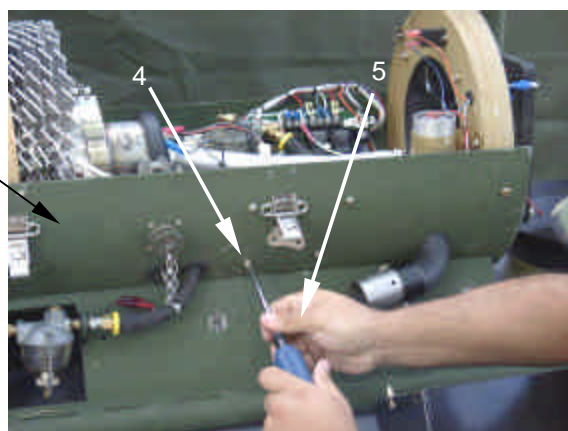
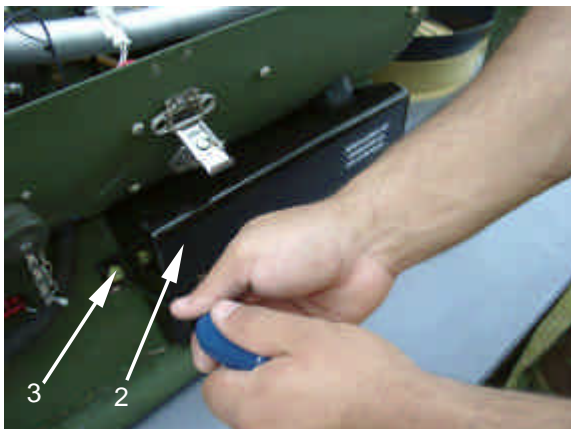
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The ignition system of this heater contains dangerous voltages which can cause severe electrical shock. Be sure to disconnect battery pack before any maintenance actions.

**REPLACE**

1. To replace the heater control assembly **(1)**, remove the combustion air inlet cover **(2)** by rotating the two quarter turn screws **(3)** until they release. Put the cover **(2)** aside.
2. Remove the four screws **(4)** that secure the heater control assembly **(1)** to the side wall of the lower housing assembly **(5)**.
3. Lift the heater control assembly **(1)** partially out of the heater and remove the two connectors **(6 and 7)** on the left side of the the heater control assembly by depressing the connector locks **(8)** and wiggling the connector back and forth while pulling outward.
4. Remove the heater control assembly from the lower housing assembly.
5. Install a new heater control assembly **(1)** by putting it into position on the lower housing assembly **(5)**.
6. Connect the two connectors **(6 and 7)** by engaging into the connectors on the heater control assembly **(1)** and pushing in until the connectors lock.

7. Install the four mounting screws (4) on the outside of the lower housing assembly (5) and secure.
8. Install the combustion air inlet cover (2) and secure by pushing in on the quarter turn screws (3) and rotating until they lock into position.



**END OF WORK PACKAGE**

---

**UNIT MAINTENANCE**  
**SPACE HEATER, CONVECTIVE**  
**(NSN 4520-01-431-8927)**

**WIRE HARNESS**  
**INSPECT, REPAIR**

---

**INITIAL SETUP****Tools**

Tool Kit., General Mechanics (Item 1, WP 0044 00)

**Materials/Parts**

Tape, Electrical (Item 7, WP 0067 00)

Wrap, Tie (Item 16, WP 0067 00)

**Equipment Condition**

Heater shut down and all advisory lights off. (WP 0006 00)

In-tent controller assembly disconnected from heater. (WP 0006 00)

Fuel supply disconnected. (WP 0006 00)

Battery disconnected. (WP 0018 00)

Upper housing assembly removed. (WP 0030 00)

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**WARNING**

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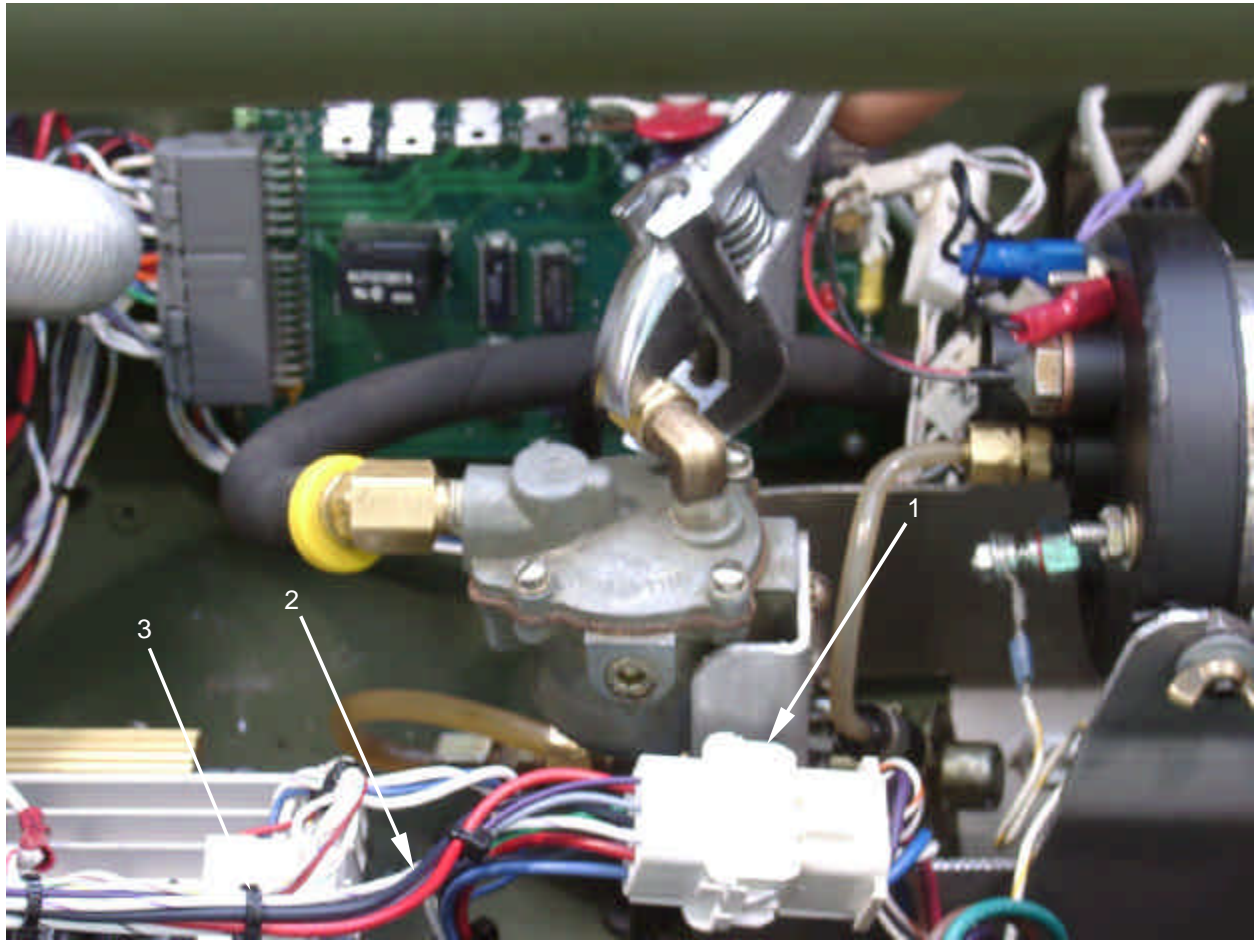
The ignition system of this heater contains dangerous voltages which can cause severe electrical shock. Be sure to disconnect power before any maintenance actions.

**INSPECT**

1. Inspect the connectors **(1)** on the wire harness to ensure that all connectors are securely mated and locked together.
2. Inspect the wire **(2)** for any cuts or abrasions to the insulation that would expose bare wire. Repair any breaks or abrasions as detailed below.
3. Inspect the tie wraps **(3)** and ensure that none are broken or cut. Replace any tie wraps that are damaged.

**REPAIR**

1. Repair any cuts or abrasions on the wires **(2)** with electrical tape, wrapping each repaired area with at least two layers of tape.
2. Repair tie wraps **(3)** by removing any broken pieces and installing a new tie wrap.



**END OF WORK PACKAGE**

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**UNIT MAINTENANCE**  
**SPACE HEATER, CONVECTIVE**  
**(NSN 4520-01-431-8927)**  
**POWER CONTROL ASSEMBLY**  
**REPLACE**

---

**INITIAL SETUP****Tools**

Tool Kit, General Mechanics (Item 1, WP 0044 00)

**Materials/Parts**

Tags, marking, MIL-T-12755 (Item 6, WP 0067 00)

**Equipment Condition**

Heater shut down and all advisory lights off. (WP 0006 00)

In-tent controller assembly disconnected from heater. (WP 0006 00)

Fuel supply disconnected. (WP 0006 00)

Battery disconnected. (WP 0018 00)

Upper housing assembly removed (WP 0030 00)



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**WARNING**

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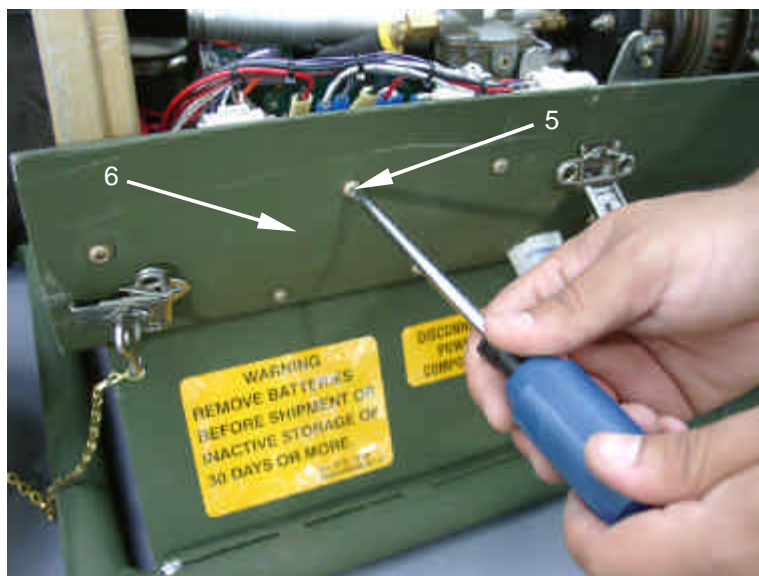
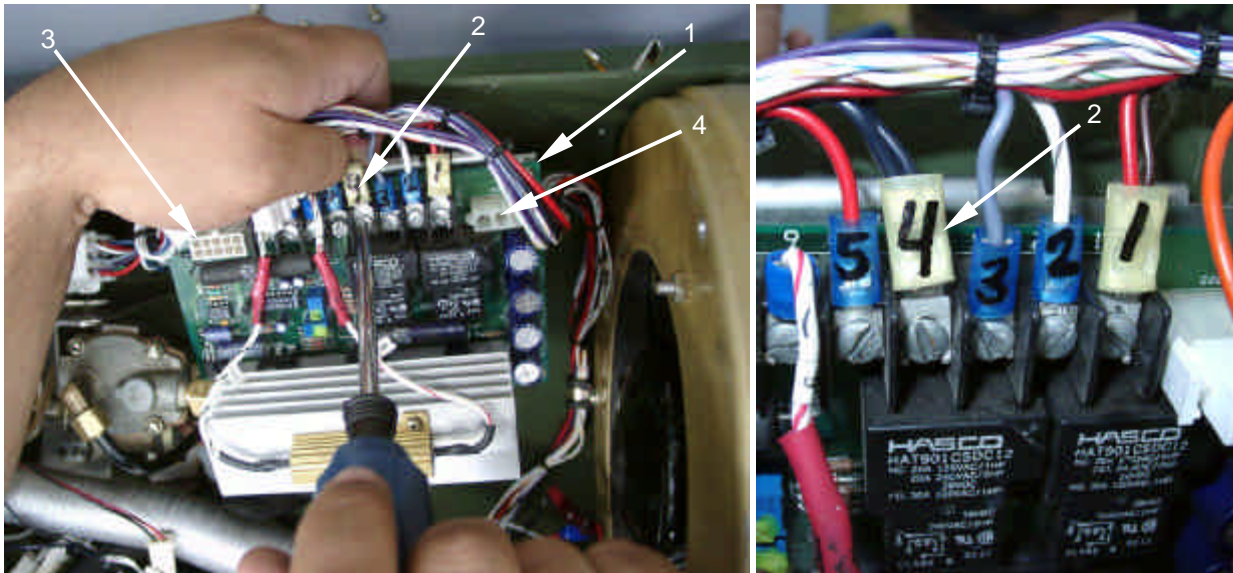
The ignition system of this heater contains dangerous voltages which can cause severe electrical shock. Be sure to disconnect battery pack before performing any maintenance actions.

**REPLACE**

1. To remove the power control assembly **(1)**, tag or mark the five wires **(2)** that are attached to the top edge of the power control assembly so that they match the numbers labeled on the heater control assembly printed circuit board.
2. Remove the two connectors **(3 and 4)** on the left and right side of the the power control assembly.
3. Loosen and remove each of the five wires **(2)** from the top edge of the power board assembly.
4. Remove the screws **(5)** that secure the power control assembly **(1)** to the lower housing assembly **(6)**.
5. Remove the power control assembly **(1)** from the heater housing.



6. Install a new power control assembly (1) by putting it into position on the lower housing assembly (6).
7. Install the four mounting screws (5) and secure.
8. Install the five wires (2) with spade lugs to their original position along the top edge of the power control assembly. Be sure that the number marked on each wire matches the number labeled on the heater control assembly board.
9. Install the two connectors (3 and 4) on the left and right side of the power control assembly (1).



END OF WORK PACKAGE



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**UNIT MAINTENANCE**  
**SPACE HEATER, CONVECTIVE**  
**(NSN 4520-01-431-8927)**  
**IGNITION PACK ASSEMBLY**  
**REPLACE**

---

**INITIAL SETUP****Tools**

Tool Kit., General Mechanics (Item 1, WP 0044 00)

**Materials/Parts****Equipment Condition**

Heater shut down and all advisory lights off. (WP 0006 00)

In-tent controller assembly disconnected from heater. (WP 0006 00)

Fuel supply disconnected. (WP 0006 00)

Battery disconnected. (WP 0018 00)

Upper housing assembly removed (WP 0030 00)

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**WARNING**

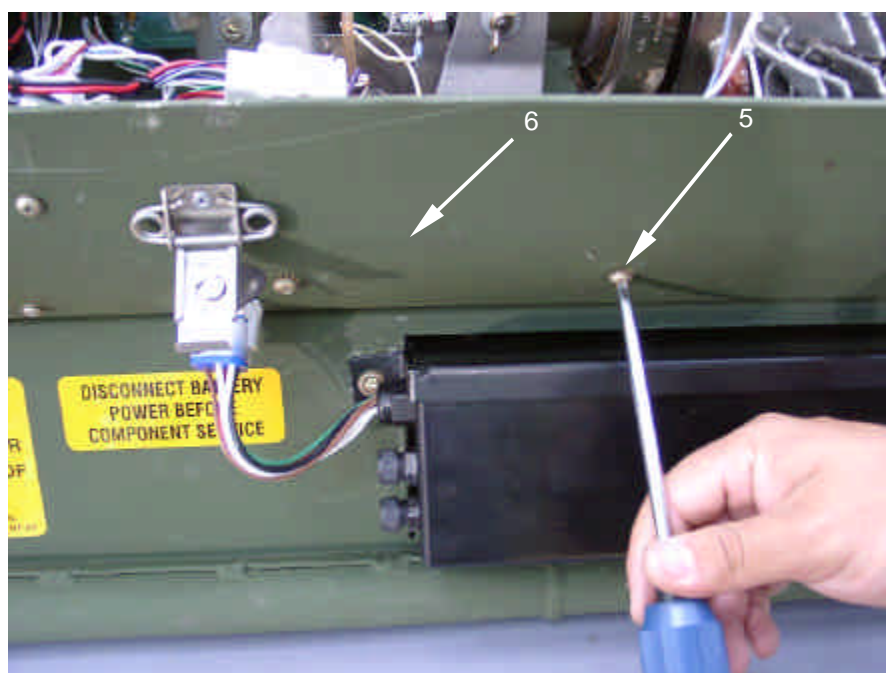
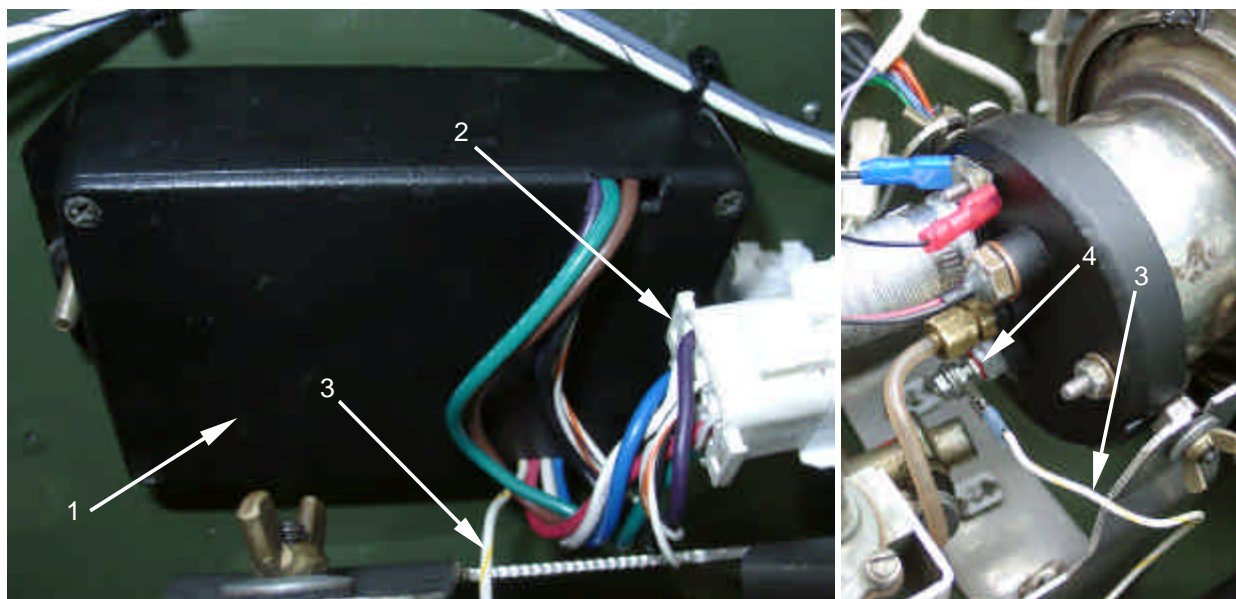
---

The ignition system of this heater contains dangerous voltages which can cause severe electrical shock. Be sure to disconnect power before any maintenance actions.

**REPLACE**

1. To remove the ignition pack assembly **(1)**, separate the two halves of the connector **(2)** exiting the top of the ignition pack assembly.
2. Remove the wire **(3)** connecting the ignition pack **(1)** to the glow plug **(4)**.
3. Remove the two screws **(5)** that secure the ignition pack assembly to the lower housing assembly **(6)**.
4. Remove the ignition pack assembly **(1)** from the heater.
5. Install a new ignition pack assembly **(1)** by placing it in position on the lower housing assembly **(6)**.
6. Install the two screws **(5)** and secure.
7. Mate and secure the two halves of the connector **(2)** going to the top of the ignition pack assembly **(1)**.

8. Connect the wire (3) connecting the ignition pack (1) to the glow plug (4).



END OF WORK PACKAGE

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**UNIT MAINTENANCE****SPACE HEATER, CONVECTIVE****(NSN 4520-01-431-8927)****DUST COVER ASSEMBLY  
INSPECT, REPLACE**

---

**INITIAL SETUP****Tools**

Tool Kit, General Mechanics (Item 1, WP 0044 00)

**Materials/Parts**

Alcohol (Item 2, WP 0067 00)

Rags (Item 5, WP 0067 00)

**Equipment Condition**Heater shut down and all advisory lights off. (WP 0006 00)

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**WARNING**

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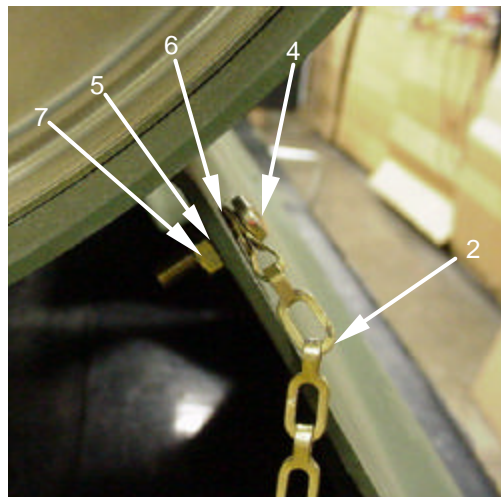
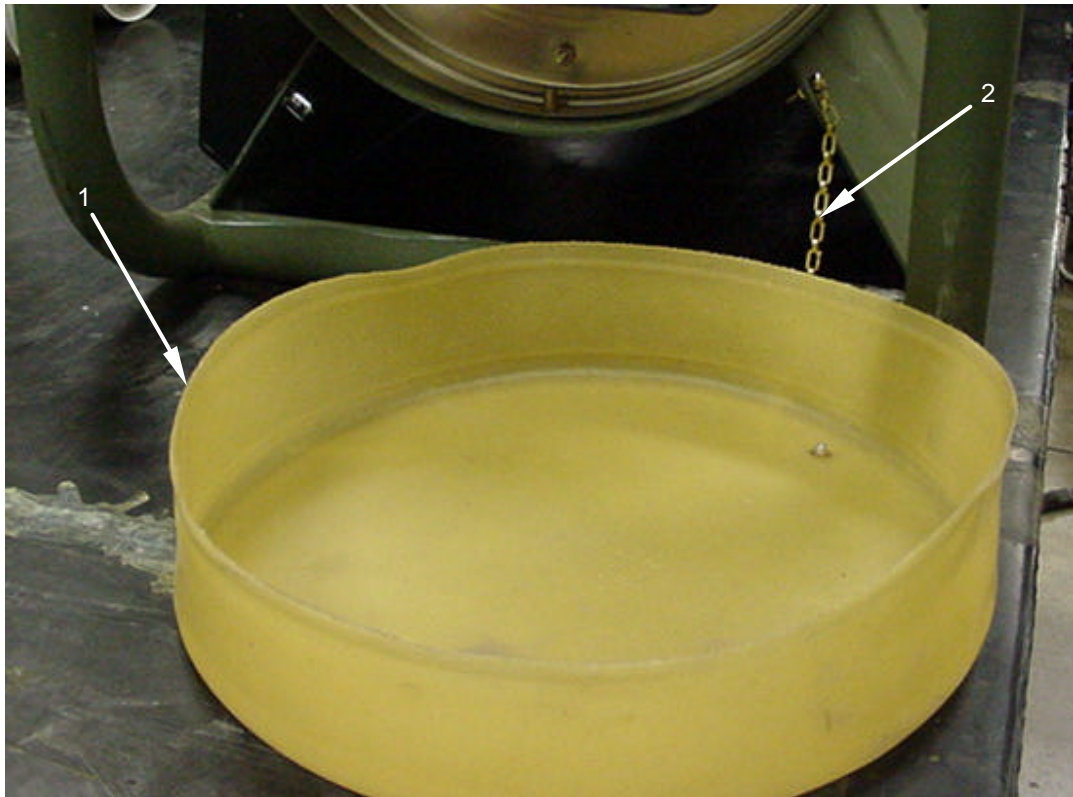
Clean parts in a well-ventilated area. Avoid inhalation of alcohol fumes. Alcohol is potentially dangerous to personnel. Do not use near open flame, excessive heat, or on very hot surfaces.

**INSPECT**

1. Inspect the dust cover **(1)** for any dents, cracks, cuts, or other damage that would prevent the dust cover from covering the duct adapter and properly protecting the heater from dust, sand, or other foreign matter.
2. Inspect the chain **(2)** for any cuts or breaks that would prevent it from securing the dust cover to the lower housing of the heater.
3. Wipe dust cover **(1)** thoroughly with a clean, dry rag. For oily or stubborn dirt, moisten rag with alcohol.

**REPLACE**

1. Pull dust cover **(1)** off duct adapter **(3)**.
2. Remove screw **(4)**, lockwasher **(5)**, flat washer **(6)**, nut **(7)**, chain **(2)**, and dust cover **(1)**. Discard damaged dust cover.
3. Position chain over hole in lower housing and install screw **(4)**, lockwasher **(5)**, flatwasher **(6)**, and nut **(7)**.
4. Install dust cover **(1)** on duct adapter **(2)**.



**END OF WORK PACKAGE**

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**UNIT MAINTENANCE**  
**SPACE HEATER, CONVECTIVE**  
**(NSN 4520-01-431-8927)**  
**COMBUSTION AIR BLOWER ASSEMBLY**  
**REPLACE**

---

**INITIAL SETUP****Tools**

Tool Kit, General Mechanics (Item 1, WP 0044 00)

**Materials/Parts****Equipment Condition**

Heater shut down and all advisory lights off. (WP 0006 00)

Fuel supply disconnected. (WP 0006 00)

Battery disconnected. (WP 0018 00)

Upper housing assembly removed (WP 0023 00)

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**WARNING**

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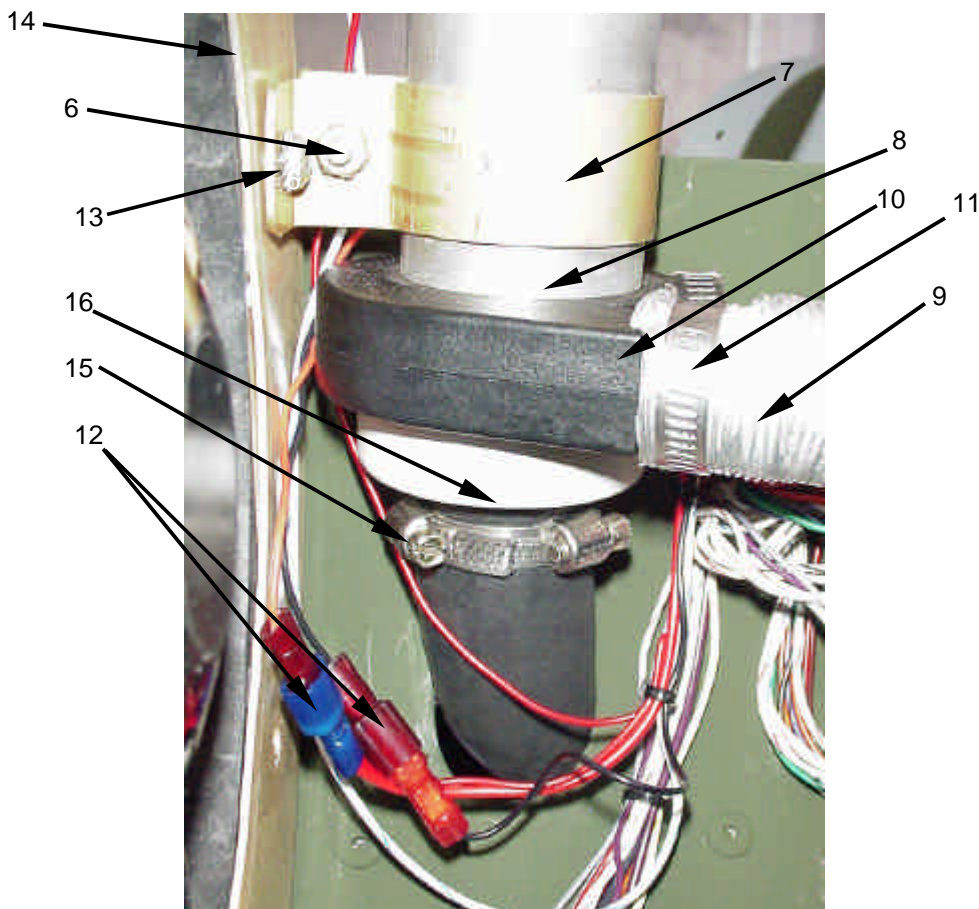
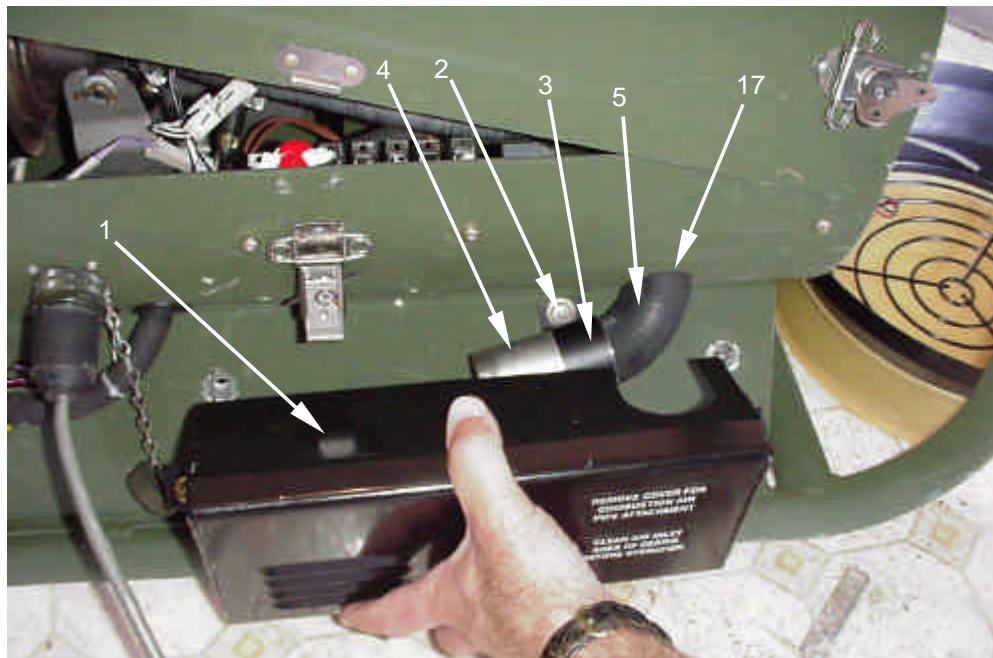
The ignition system of this heater contains dangerous voltages which can cause severe electrical shock. Be sure to disconnect power before any maintenance actions.

**REPLACE**

1. Remove the combustion air inlet cover **(1)** by releasing the two quarter turn screws at either end of the cover. Remove the cover **(1)** and set aside.
2. Remove the two screws **(2)** that secure the combustion air inlet end fitting bracket **(3)** to the lower housing assembly. Set the bracket aside.
3. Remove the combustion air inlet end fitting **(4)** from the combustion air inlet hose **(5)** and set aside.
4. Remove the two screws and lockwashers **(13)** that secure the combustion air blower assembly **(8)** to the heated air blower housing **(14)**.
5. Remove the screw **(6)** that secures the blower assembly clamp **(7)** around the body of the combustion air blower assembly **(8)**.
6. Disconnect the combustion air blower assembly duct **(9)** from the combustion air blower outlet **(10)** by loosening the hose clamp **(11)** and pulling the duct **(9)** from the combustion air blower outlet **(10)**.

7. Disconnect the two combustion air blower electrical connectors **(12)**.
8. Carefully lift the combustion air blower assembly **(8)** from the heater guiding the combustion air inlet hose **(5)** through the side wall of the lower housing.
9. Remove the blower assembly clamp **(7)** and set aside.
10. Disconnect the combustion air blower assembly **(8)** from the combustion air inlet hose **(5)** by loosening the hose clamp **(15)**.
11. Install a new combustion air blower assembly **(8)** by installing the combustion air inlet hose **(5)** on the intake **(16)** of the combustion air blower assembly. Tighten hose clamp **(11)** securely.
12. Install the blower assembly clamp **(7)** on the body of the combustion air blower assembly **(8)**.
13. Lower the combustion blower assembly **(8)** into the lower housing, guiding the combustion air inlet hose **(5)** through the hole **(17)** in the side wall of the lower housing.
14. Connect electrical connectors **(12)**.
15. Tighten the screw **(6)** that secures the clamp **(7)** to the body of the combustion air blower assembly.
16. Tighten the screws **(2)** that secures the clamp **(7)** to the heated air blower assembly **(8)**.
17. Install the combustion air blower duct **(9)** onto the outlet **(10)** of the combustion air blower assembly. Be sure that the rubber sleeve in the duct is installed on the outlet before installing the blower duct. Tighten the hose clamp **(11)** securely.
18. Install the combustion air inlet end fitting **(4)** on the end of the combustion air inlet hose **(5)**.
19. Install the combustion air inlet bracket **(3)**. Secure with two screws **(2)**.
20. Install the combustion air inlet cover **(1)**. Secure the two, quarter turn screws.





END OF WORK PACKAGE

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**UNIT MAINTENANCE**  
**SPACE HEATER, CONVECTIVE**  
**(NSN 4520-01-431-8927)**  
**COMBUSTION AIR BLOWER DUCT ASSEMBLY**  
**REPLACE**

---

**INITIAL SETUP****Tools**

Tool Kit, General Mechanics (Item 1, WP 0044 00)

**Materials/Parts****Personnel Required**

One

**Equipment Condition**

Heater shut down and all advisory lights off. (WP 0006 00)

In-tent controller cable assembly disconnected from heater. (WP 0006 00)

Fuel source disconnected. (WP 0006 00)

Battery disconnected. (WP 0006 00)

Upper housing assembly removed (WP 0030 00)



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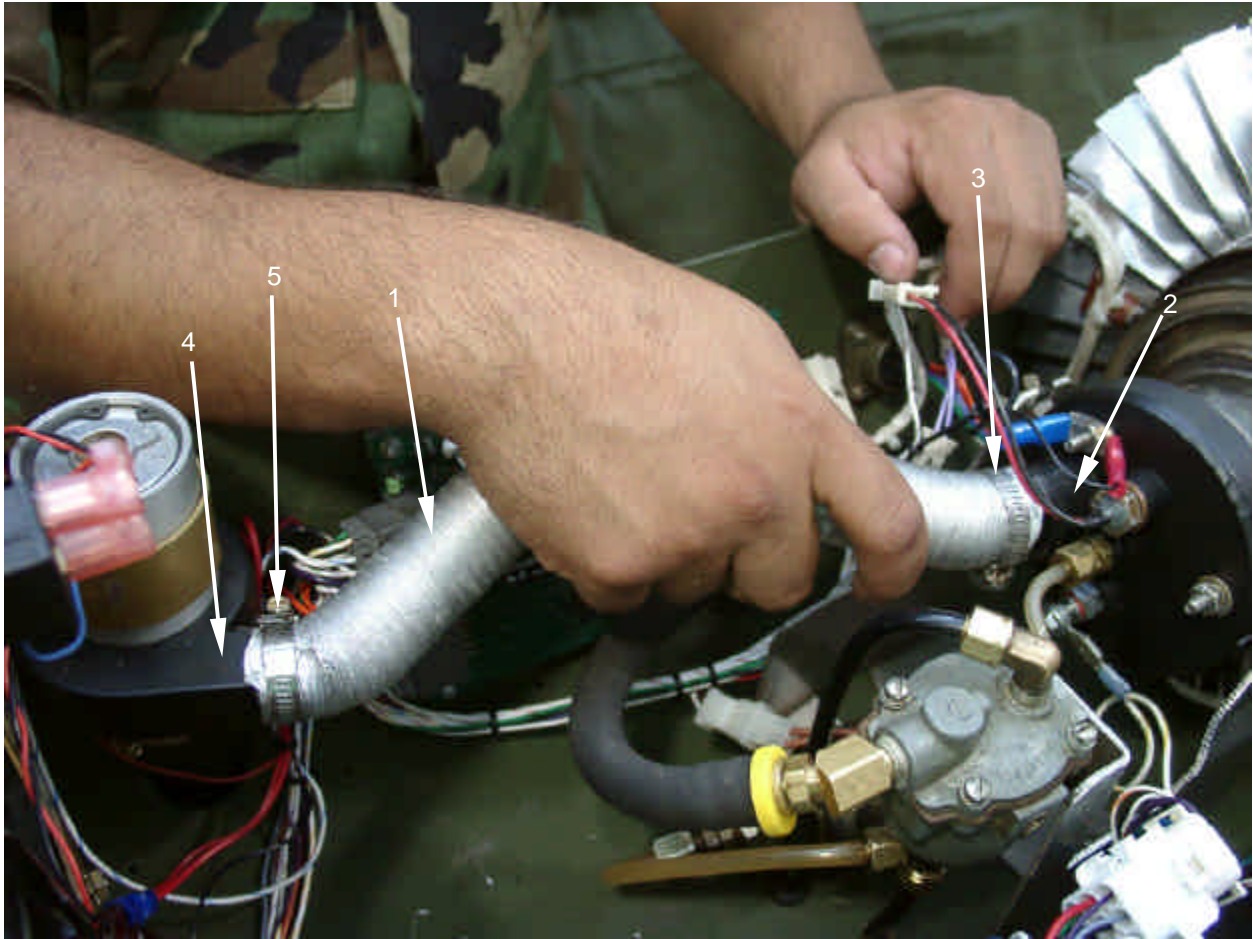
**WARNING**

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The ignition system of this heater contains dangerous voltages which can cause severe electrical shock. Be sure to disconnect power before any maintenance actions.

**REPLACE**

1. Disconnect the combustion air blower duct assembly **(1)** from the burner assembly **(2)** by first loosening the hose clamp **(3)** and sliding it onto the hose **(1)**.
2. Pull the end of the duct **(1)** from the burner assembly **(2)**.
3. Disconnect the end of the combustion air blower duct assembly **(1)** connected to the combustion air blower assembly outlet **(4)** by loosening the hose clamp **(5)** and sliding it onto the hose **(1)**.
4. Remove the combustion air blower duct assembly **(1)** from the heater. Be sure to remove the rubber spacer sleeve located inside the end of the duct assembly and reinstall it onto the combustion air blower assembly outlet **(4)**.
5. To install the combustion air blower assembly hose **(1)**, connect the combustion air blower duct assembly to the burner assembly **(2)** by sliding it onto the hose inlet on the burner assembly **(2)**. Tighten the hose clamp **(3)**.
6. Slide the end of the combustion air blower duct assembly onto the combustion air blower assembly outlet **(4)**. Slide the hose clamp **(5)** into position and tighten.



END OF WORK PACKAGE

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**UNIT MAINTENANCE**  
**SPACE HEATER, CONVECTIVE**  
**(NSN 5420-01-431-8927)**  
**COMBUSTION AIR INLET ASSEMBLY**  
**REPLACE**

---

**INITIAL SETUP****Tools**

Tool Kit, General Mechanics (Item 1, WP 0044 00)

**Materials/Parts****Equipment Condition**

Heater shut down and all advisory lights off. (WP 0006 00)

In-tent controller assembly disconnected from heater. (WP 0006 00)

Fuel source disconnected. (WP 0006 00)

Upper housing assembly removed (WP 0030 00)

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**WARNING**

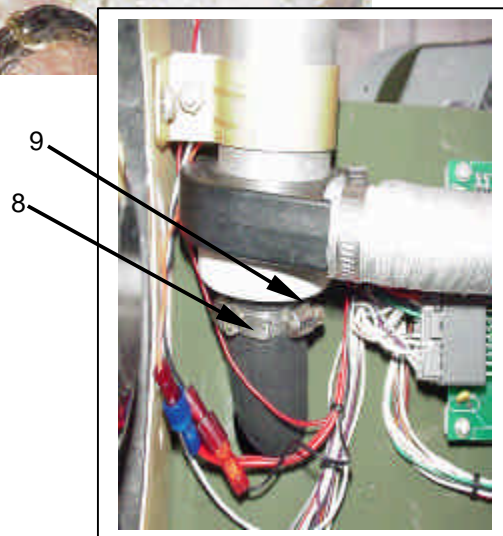
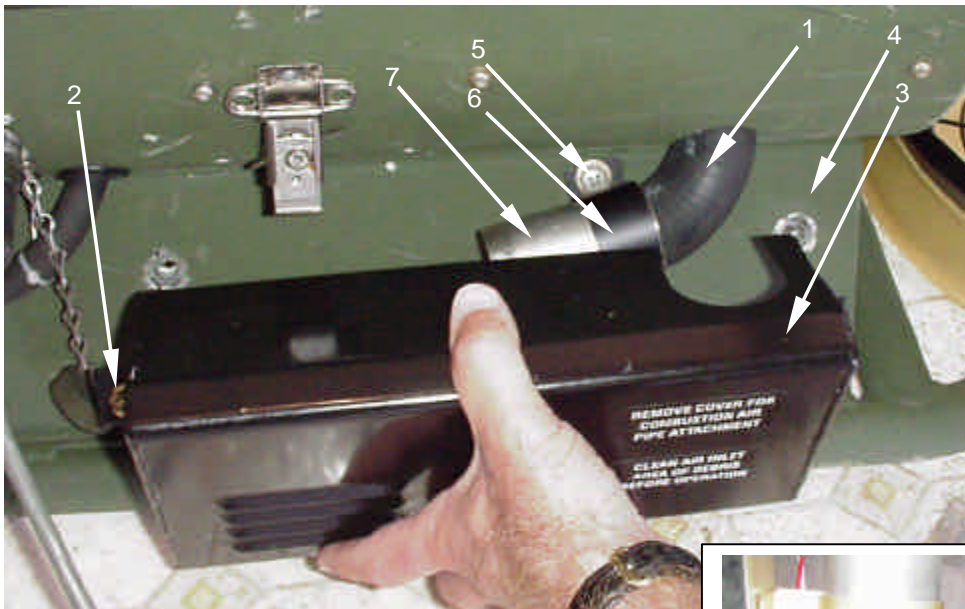
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The ignition system of this heater contains dangerous voltages which can cause severe electrical shock. Be sure to disconnect battery pack connector before performing any maintenance actions.

**REPLACE**

1. To replace the combustion air inlet assembly **(1)**, turn the two, quarter-turn screws **(2)** securing the combustion air inlet cover **(3)** until they release and remove the cover from the lower housing assembly **(4)**.
2. Remove the two screws **(5)** that secure the combustion air inlet assembly bracket **(6)** to the lower housing assembly **(4)**.
3. Grasp the combustion air inlet fitting **(7)** and pull it off the end of the combustion air inlet assembly **(1)**.
4. Loosen the hose clamp **(8)** on the end of the combustion air inlet assembly **(1)** that connects to the combustion air blower assembly inlet **(9)** located inside the heater and pull the combustion air inlet assembly off the combustion air blower assembly inlet **(9)**. Remove the clamp **(8)** from the combustion air inlet assembly **(1)** and set aside.
5. Pull the combustion air inlet assembly **(1)** out of the heater from the outside of the lower housing assembly **(4)**.

6. To install a new combustion air inlet assembly (1), insert the longer end of the assembly into the opening on the lower housing assembly (4) and rotate it into position under the combustion blower assembly inlet (9). Slide the hose clamp (8) over the end of the combustion air inlet assembly (1).
7. Install the combustion air inlet assembly (1) over the combustion air blower assembly inlet (9). Note that a slight back and forth rotating motion may be required. Tighten the hose clamp (8) securely.
8. Position the combustion air inlet assembly (1) against the lower housing assembly (4) and install the combustion air inlet fitting (7) over the end of the combustion air inlet assembly (1).
9. Position the bracket (6) over the end of the combustion air inlet (1). Secure with two screws (5).
10. Install the combustion air inlet cover (3) and secure with two quarter-turn screws (2).



**END OF WORK PACKAGE**

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**UNIT MAINTENANCE****SPACE HEATER, CONVECTIVE****(NSN 4520-01-431-8927)****UPPER HOUSING ASSEMBLY  
SERVICE, REPLACE**

---

**INITIAL SETUP****Tools**

Tool Kit, General Mechanics (Item 1, WP 0044 00)

**Materials/Parts**

Silicone lubricant (Item 4, WP 0067 00)

**Equipment Condition**Heater shut down and all advisory lights off. (WP 0006 00)

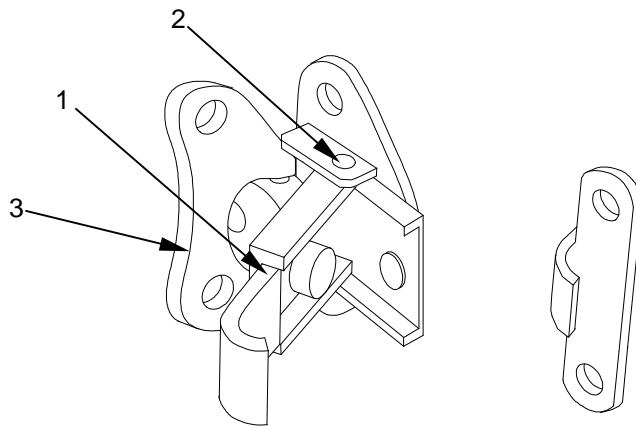
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**SERVICE**

Lubricate slide portion **(1)** and pivot **(2)** of adjusting handle **(3)** with silicone lubricant.

**REPLACE**

1. To replace the upper housing assembly **(4)**, remove the two dust covers **(5)** and set aside.
2. Release the fasteners **(6)** that secure the two duct adapters **(7)** to the heater housing **(8)**. Remove the two duct adapters **(7)** and set aside.
3. Release the four fasteners **(9)** that secure the upper housing assembly **(4)** to the lower housing assembly **(10)**.
4. Lift the upper housing assembly **(4)** up and off the lower housing assembly **(10)**.
5. Install a new upper housing assembly **(4)** and align with the lower housing assembly **(10)**. Align the four fasteners **(9)** with their corresponding keeper plates.
6. Secure all four fasteners **(9)**.



END OF WORK PACKAGE

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**UNIT MAINTENANCE**  
**SPACE HEATER, CONVECTIVE**

(NSN 5420-01-431-8927)

**EXHAUST GROMMET  
REPLACE**

---

**INITIAL SETUP**

**Tools**

Tool Kit, General Mechanics (Item 1, WP 0044 00)

**Materials/Parts**

**Personnel Required**

One

**Equipment Condition**

Heater shut down and all advisory lights off. (WP 0006 00)

In-tent controller assembly disconnected from heater. (WP 0006 00)

Fuel source disconnected.(WP 0006 00)

Battery disconnected. (WP 0018 00)

Upper housing assembly removed (WP 0030 00)

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**WARNING**

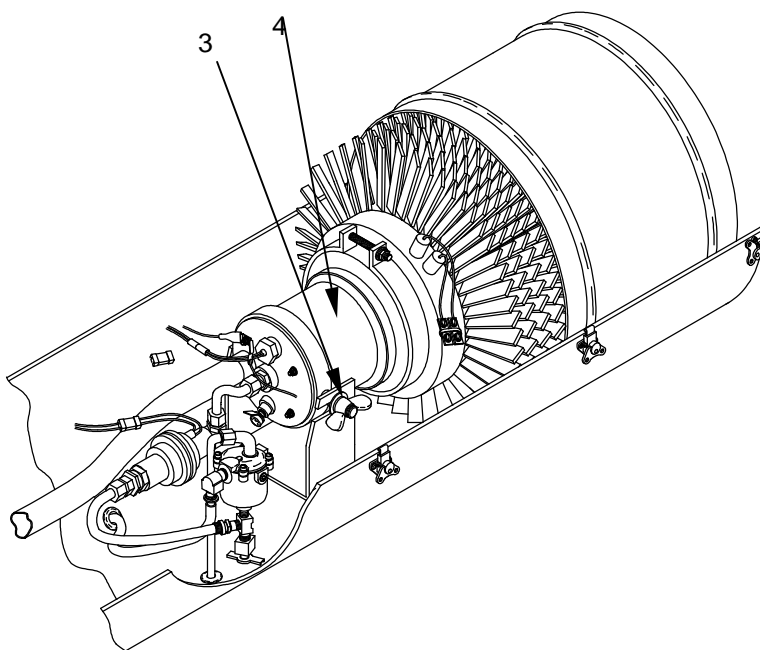
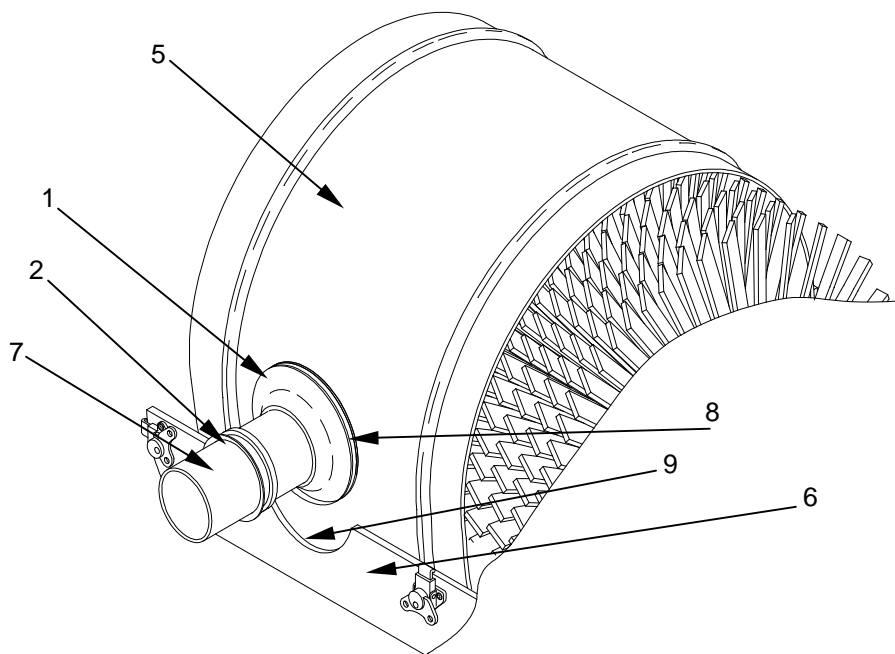
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The ignition system of this heater contains dangerous voltages which can cause severe electrical shock. Be sure to disconnect battery pack before performing any maintenance actions.

**REPLACE**

1. To remove the exhaust grommet **(1)** remove the exhaust O-ring **(2)** and set aside.
2. Loosen the two wingnuts **(3)** that secure the burner assembly **(4)**. Loosening the wingnuts will permit the heat exchanger **(5)** to be tilted upward to allow access to the grommet.
3. Tilt the end of the heat exchanger **(5)** upward and slide the grommet **(1)** up and out of the slotted recess on the lower housing assembly **(6)**.
4. Stretch the grommet **(1)** over the ridge on the combustion exhaust pipe and slide the grommet off the combustion exhaust pipe **(7)**.
5. Install a new exhaust grommet **(1)** by sliding the grommet over the combustion exhaust pipe **(7)**. Lift up slightly on the heat exchanger **(5)** and engage the slot **(8)** in the grommet **(1)** over the sheet metal recess **(9)** on the lower housing assembly **(6)**.
6. Press the exhaust grommet **(1)** down firmly.

7. Slide the grommet onto the combustion exhaust pipe (7) and stretch the grommet (1) over the ridge on the combustion exhaust pipe. Install the exhaust O-ring (2) removed and set aside earlier.
8. Retighten the two wingnuts (3) that secure the burner assembly (4).



**END OF WORK PACKAGE**



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**UNIT MAINTENANCE**  
**SPACE HEATER, CONVECTIVE**  
**(NSN 4520-01-431-8927)**

**DUCT ADAPTER**  
**REPLACE**

---

**INITIAL SETUP****Tools**

Tool Kit, General Mechanics (Item 1, WP 0044 00)

**Personnel Required**

One

**Materials/Parts****Equipment Condition**

Heater shut down and all advisory lights off. (WP 0006 00)

Dust covers removed. (WP 0026 00)

---

**REPLACE**

1. To remove the duct adapter **(1)**, lift and rotate the fastener housing **(2)**, releasing it from the fastener keeper **(3)** on the upper housing assembly **(4)**.
2. Repeat for the second fastener housing **(5)** and keeper on the opposite side of the duct adapter **(1)**.
3. Pull the duct adapter **(1)** from the heater body **(6)**.
4. To install a new duct adapter **(1)**, align it over the end of the heater body **(6)** and press it into position.
5. Engage the fastener housings and keepers **(2, 3 and 5)** on both sides of the duct adapter **(1)** and secure in place.



**END OF WORK PACKAGE**

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**UNIT MAINTENANCE****SPACE HEATER, CONVECTIVE****(NSN 4520-01-431-8927)****HEATED AIR BLOWER ASSEMBLY  
INSPECT, TEST, REPLACE**

---

**INITIAL SETUP****Tools**

Tool Kit, General Mechanics (Item 1, WP 0044 00)

**Personnel Required**

One

**Materials/Parts**

N/A

**Equipment Condition**

Heater shut down and all advisory lights off. (WP 0006 00)

In-tent control assembly disconnected from heater. (WP 0006 00)

Fuel supply disconnected. (WP 0006 00)

Battery disconnected. (WP 0018 00)

Upper housing assembly removed (WP 0030 00)

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**WARNING**

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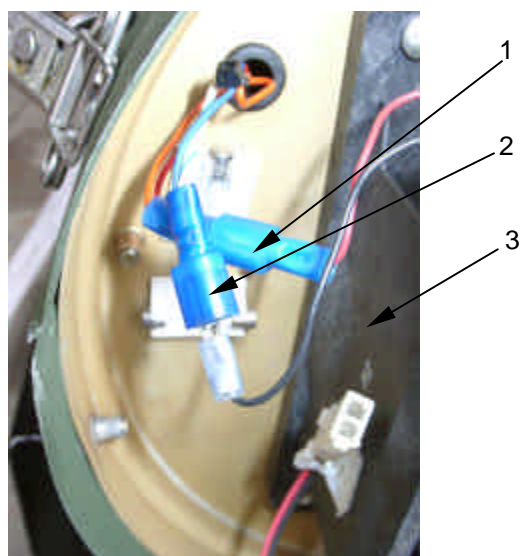
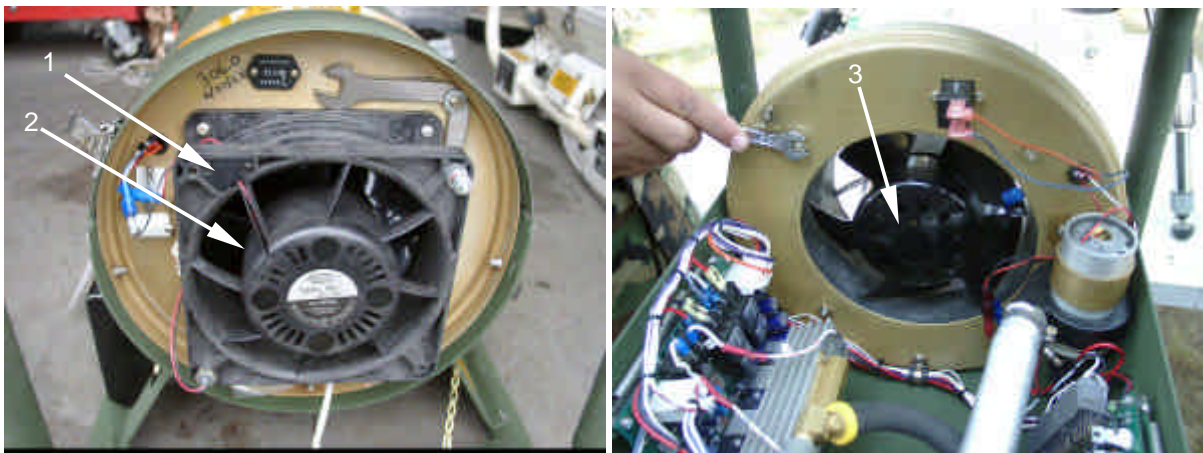
The ignition system of this heater contains dangerous voltages which can cause severe electrical shock. Be sure to disconnect battery pack before any maintenance actions.

**INSPECT**

1. Inspect the heated air blower assembly **(1)** for cracks, dents, or other damage that would prevent the heated air blower assembly from rotating freely.
2. Inspect the inlet **(2)** and outlet **(3)** side of the heated air blower assembly **(1)** for any debris or blockages that would restrict the flow of air through the heater.

**TEST**

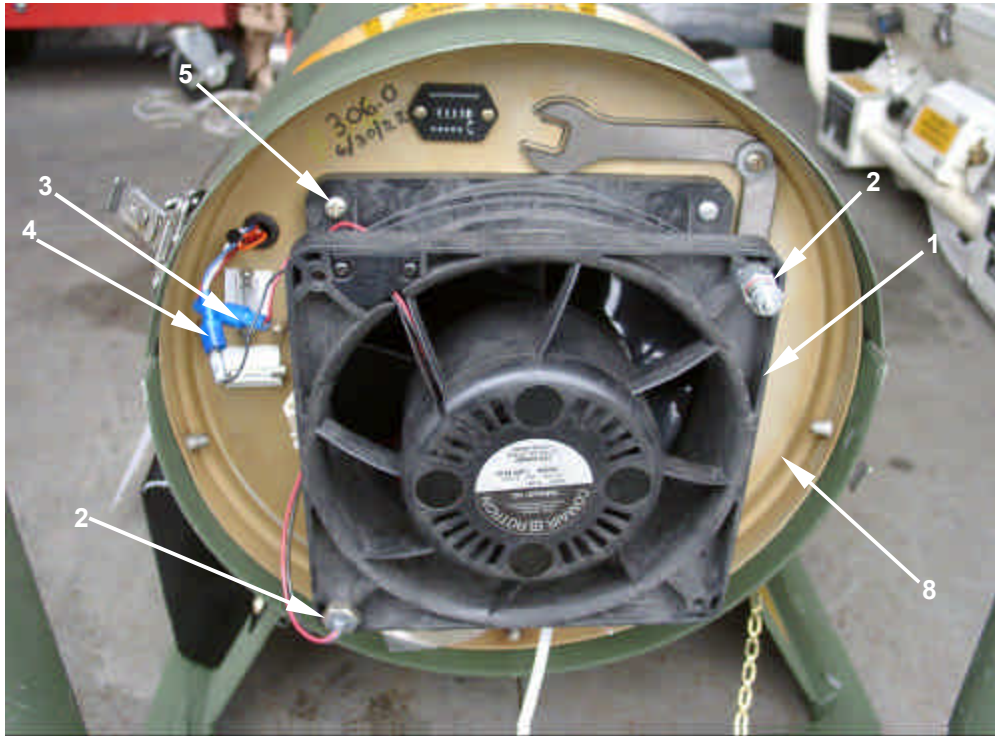
1. Separate the positive (+) **(1)** and negative **(2)** electrical connectors of the heated air blower assembly **(3)**.
2. Set multimeter to measure resistance.
3. Place probe No. 1 against positive terminal **(1)** and probe No. 2 against negative terminal **(2)**. Normal meter indication is a minimum of 5.2 megohms.
4. If meter reading indicates a short or an open circuit, replace heated air blower assembly **(3)**.
5. Reconnect the heated air blower assembly connector **(1)** and **(2)**.



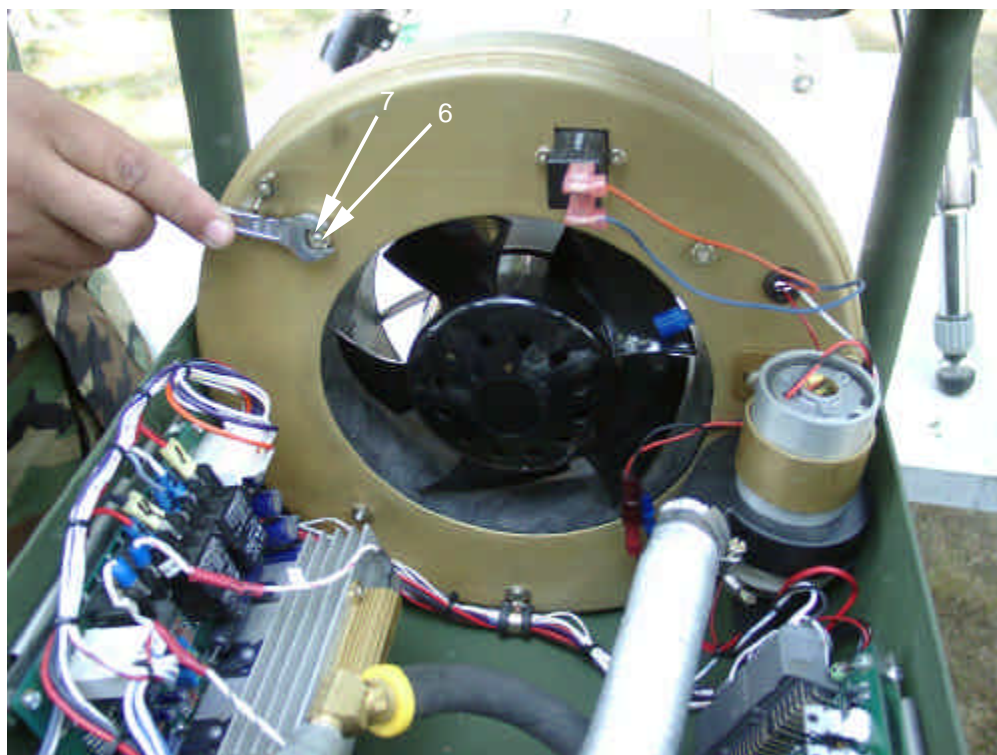
## REPLACE

1. To replace the heated air blower assembly (1), remove any spare parts (2) that may be stored in the corner holes of the vent fan and set aside.
2. Disconnect the heated air blower assembly connectors (3 and 4).
3. Loosen and remove the four screws (5), nuts (6), and lockwashers (7) that mount the heated air blower assembly (1) to the heater air blower assembly housing (8).
4. Remove the heated air blower assembly (1).
5. To install the heater air blower assembly (1), position over the four holes on the heated air blower assembly housing (8).

6. Install four screws (5), nuts (6), and lockwashers (7) at the four corners of the heated air blower assembly (1). Tighten securely.
7. Reconnect heated air blower assembly electrical connectors (3 and 4).







END OF WORK PACKAGE

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**UNIT MAINTENANCE**  
**SPACE HEATER, CONVECTIVE**  
**(NSN 4520-01-431-8927)**

**FUEL PUMP  
REPLACE**

---

**INITIAL SETUP****Tools**

Tool Kit, General Mechanics (Item 1, WP 0044 00)

**Materials/Parts**

Mat, Petroleum Absorbent (Item 15, WP 0067 00)  
Tray, Petroleum Absorbent (Item 17, WP 0067 00)

**Equipment Condition**

Heater shut down and all advisory lights off. (WP 0006 00)

In-tent controller assembly disconnected from heater. (WP 0006 00)

Fuel supply disconnected. (WP 0006 00)

Battery disconnected. (WP 0018 00)

Upper housing assembly removed. (WP 0030 00)

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**WARNING**

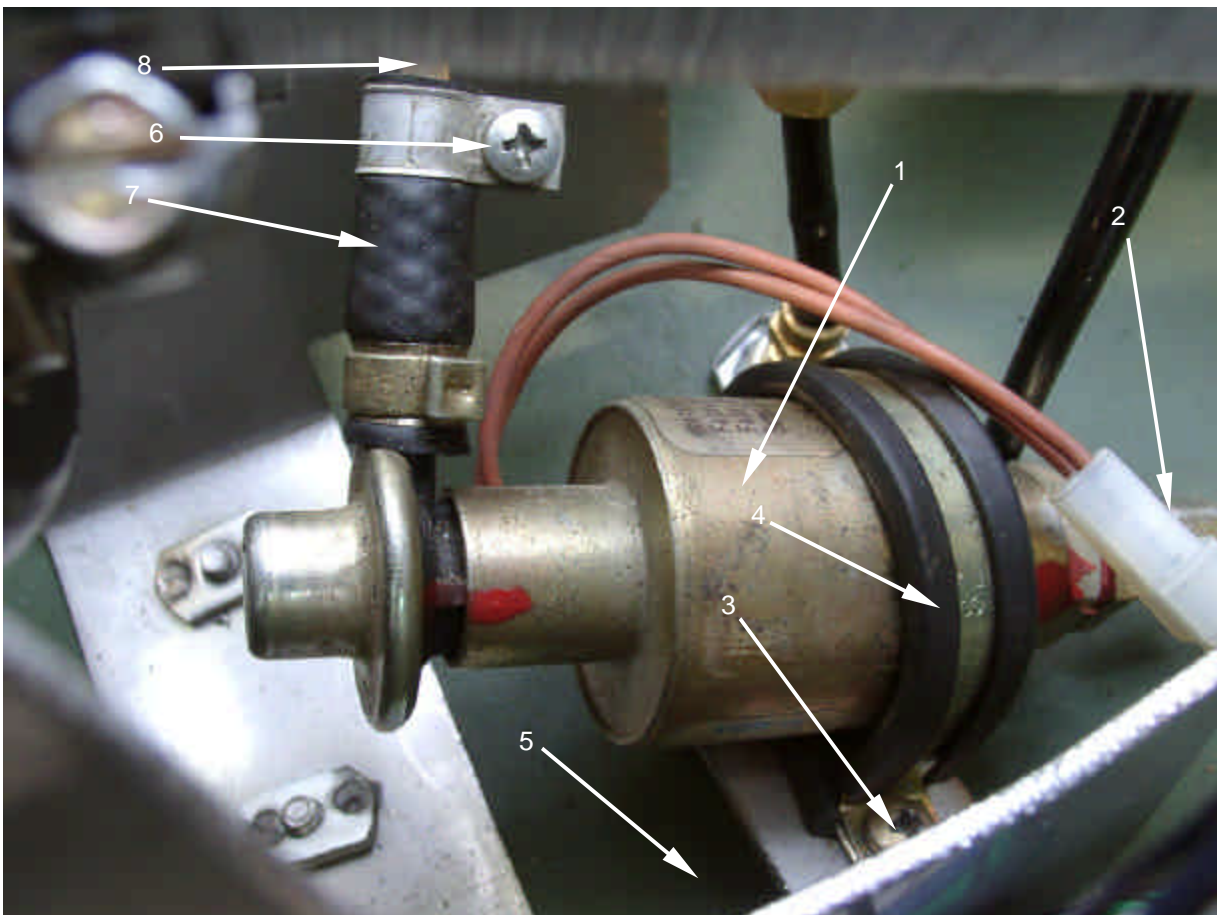
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The ignition system of this heater contains dangerous voltages which can cause severe electrical shock. Be sure to disconnect power before any maintenance actions.

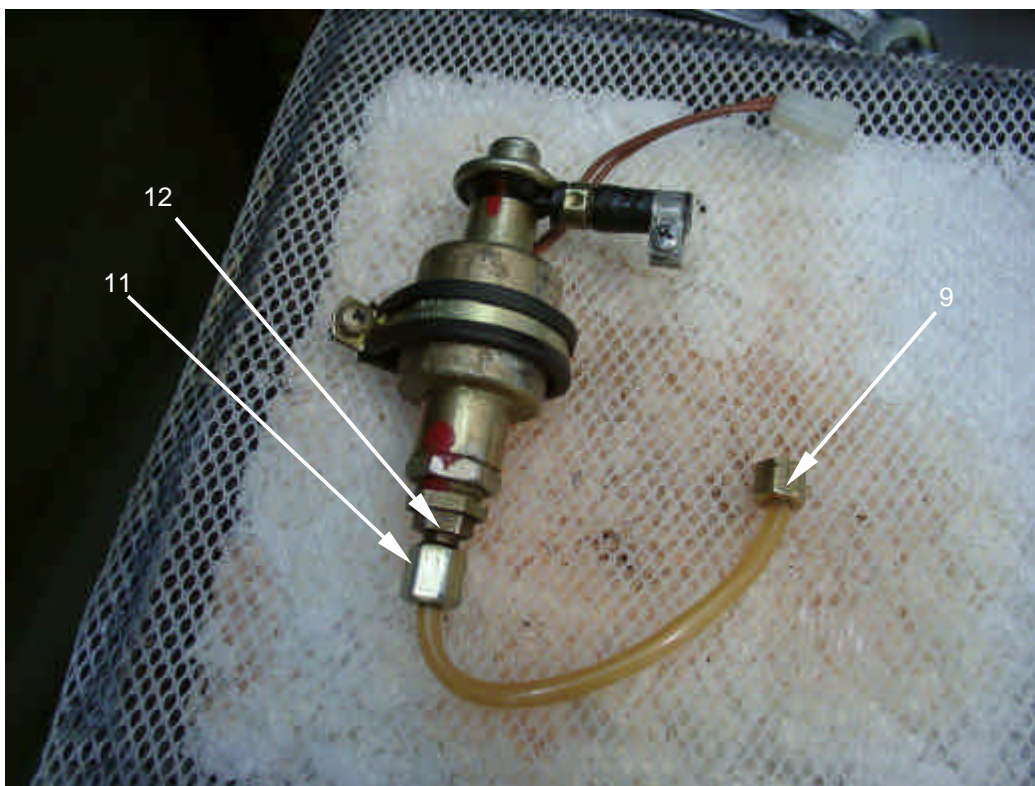
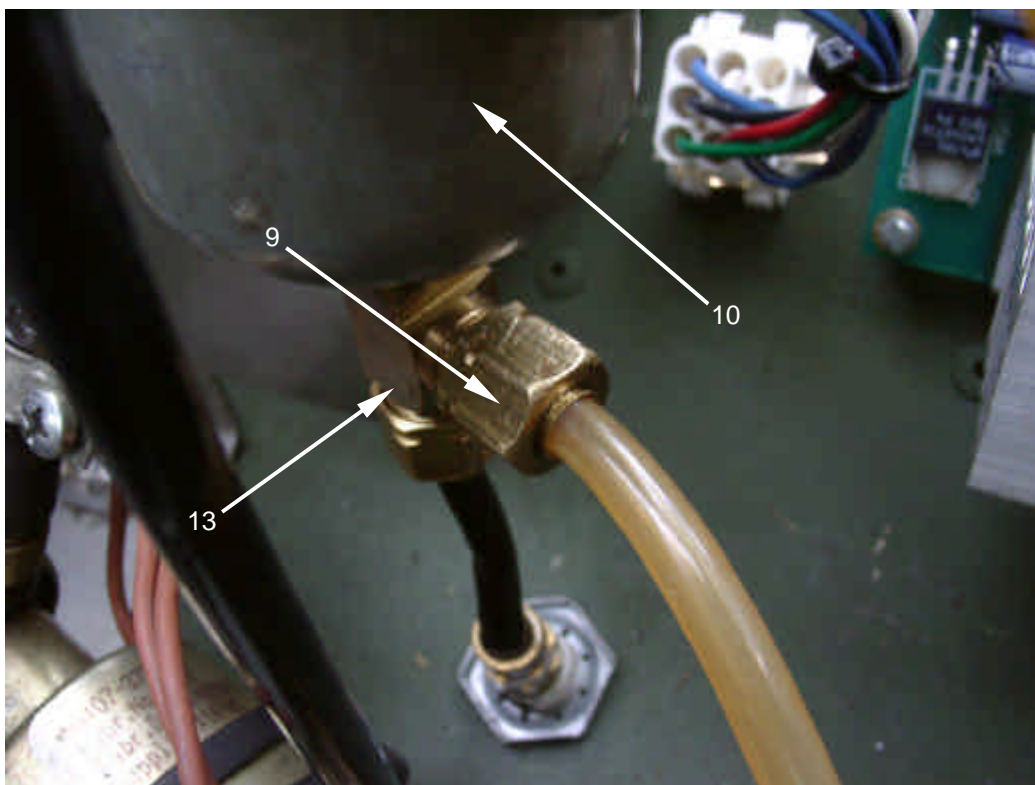
**REPLACE**

1. To remove the fuel pump **(1)**, disconnect the electrical connector **(2)**.
2. Remove the screw **(3)** that secures the fuel pump bracket **(4)** to the lower housing assembly **(5)**.
3. Loosen the screw **(6)** on the outlet hose **(7)** of the fuel pump **(1)** and pull the fuel line **(8)** out of the outlet hose **(7)**. Drain any fuel onto a petroleum absorbent mat or tray.
4. Loosen and remove the fitting **(9)** on the float assembly **(10)**. Drain any fuel onto a petroleum absorbent mat or tray.
5. Note the position of the fuel pump in the heater. The fuel pump must be reinstalled in the same position. Remove the fuel pump **(1)** from the heater and place on a petroleum absorbent mat or tray. Wipe up any fuel that may spill.
6. Remove the fuel pump bracket **(4)** and screw **(3)** and set aside.
7. While working on petroleum absorbent material, loosen and remove the fuel line **(11)** leading to the inlet end **(12)** of the fuel pump. Set the fuel line aside.

8. To install a new fuel pump, install the fuel line (11) to the inlet end (12) of the fuel pump. Tighten the fitting securely.
9. Slide the fuel pump bracket (4) over the new fuel pump and place the fuel pump (1) in position so that the fitting (9) on the end of the fuel line attached lines up with the "T" fitting (13) on the float assembly (10).
10. Position the fuel pump bracket (4) over the hole in the lower housing assembly (5) and install the screw (3). Tighten securely.
11. Engage the fitting (9) on the "T" fitting (13) of the float assembly (10) and tighten securely.
12. Install the fuel line (8) in the outlet hose (7) at the outlet end of the fuel pump and tighten the screw (6) on the hose clamp securely.
13. Install electrical connector (2).







END OF WORK PACKAGE

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**UNIT MAINTENANCE****SPACE HEATER, CONVECTIVE****(NSN 4520-01-431-8927)****INTERNAL FUEL LINES  
REPLACE**

---

**INITIAL SETUP****Tools**

Tool Kit, General Mechanics (Item 1, WP 0044 00)

**Materials/Parts****Equipment Condition**

Heater shut down and all advisory lights off. (WP 0006 00)

In-tent controller assembly disconnected from heater. (WP 0006 00)

Fuel source disconnected. (WP 0006 00)

Upper housing assembly removed. (WP 0030 00).

Battery disconnected. (WP 0018 00)

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**WARNING**

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The ignition system of this heater contains dangerous voltages which can cause severe electrical shock. Be sure to disconnect battery pack before performing any maintenance actions.

**REPLACE**

There are two internal fuel lines that are constructed of a heat formed plastic material (this does not include the fuel hose which is covered in WP 0021 00). One line extends from the outlet end of the fuel pump to the inlet of the burner assembly and the second extends from the "T" connector at the base of the float assembly to the inlet of the fuel pump. A third plastic fuel drain line extends from the top of the float assembly through the lower housing assembly. All internal fuel lines utilize brass compression fittings and all are removed and replaced in the same fashion.

1. To remove an internal fuel line **(1)**, loosen the fitting **(2)** at each end of the fuel line, taking care not to spill the fuel that may be contained in the line. Drain the fuel into an approved container. Wipe up any fuel that may spill in the lower housing assembly **(3)** or on any of the components.
2. Note the orientation of the fuel line in the heater, the replacement fuel line must be installed in the same orientation.
3. Remove the fuel line **(1)** from the heater.

4. Install a new fuel line (1) in the same position as the line being replaced.
5. Slide the fitting nut (2) over the fuel line followed by the compression fitting sleeve (4) (if used). Tighten the compression fitting nut (2) securely but do not overtighten.
6. Repeat for fitting on opposite end of fuel line.



**END OF WORK PACKAGE**

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**UNIT MAINTENANCE****SPACE HEATER, CONVECTIVE****(NSN 4520-01-431-8927)****FLOAT ASSEMBLY  
REPLACE**

---

**INITIAL SETUP****Tools**

Tool Kit, General Mechanics (Item 1, WP 0044 00)

**Materials/Parts**

Sealant, Thread (Item 3, WP 0067 00)

Rags, Wiping, Clean (Item 5, WP 0067 00)

**Equipment Condition**

Heater shut down and all advisory lights off. (WP 0006 00)

In-tent controller assembly disconnected from heater. (WP 0006 00)

Fuel supply disconnected. (WP 0006 00)

Sediment strainer emptied of fuel. (WP 0020 00).

Upper housing assembly removed. (WP 0030 00).

Battery disconnected. (WP 0018 00)

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**WARNING**

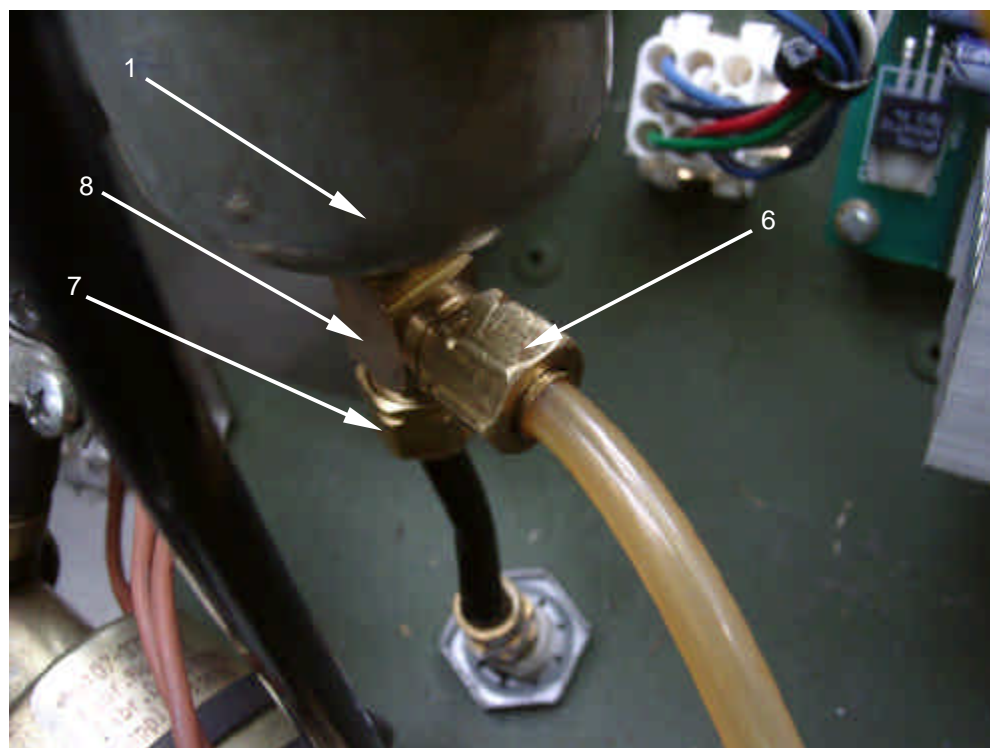
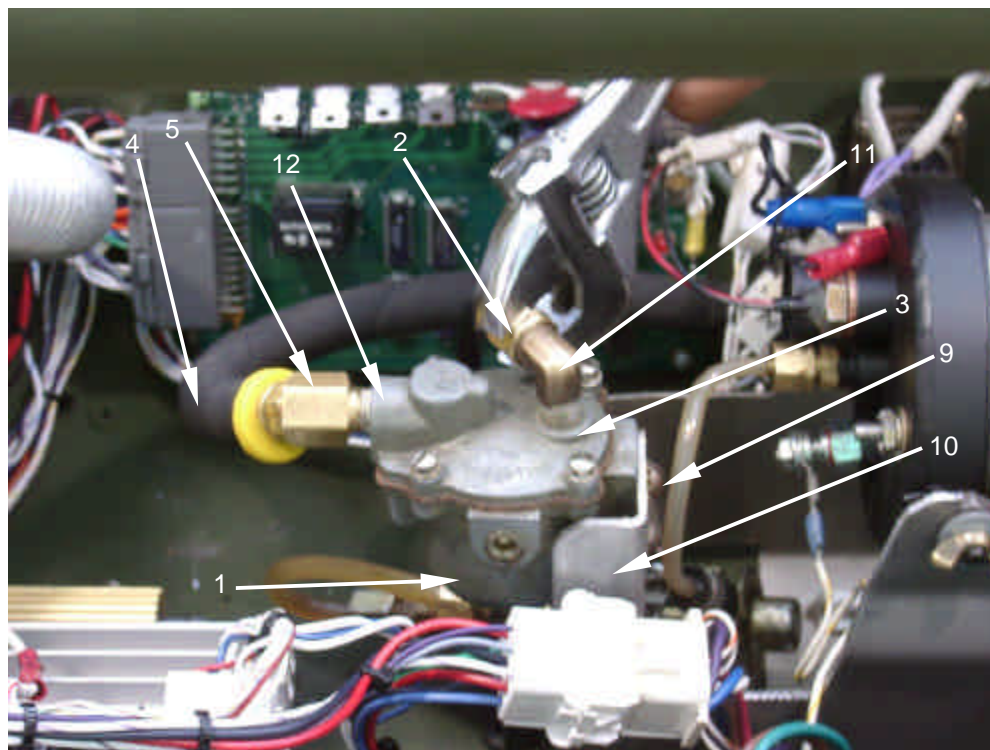
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The ignition system of this heater contains dangerous voltages which can cause severe electrical shock. Be sure to disconnect battery pack connector before performing any maintenance actions.

**REPLACE**

1. To replace the float assembly **(1)** loosen and remove the fuel drain line fitting **(2)** on the top assembly **(3)**.
2. Remove the fuel hose **(4)** from the float assembly inlet fitting **(5)** in accordance with WP 0021 00.
3. Remove the float assembly inlet fitting **(5)** and set aside. Take note of the orientation of the fitting as it will be installed on the new float assembly in the same orientation. Clean any residual thread sealant from the threads of the fitting **(5)** and set aside.
4. Loosen and remove the two fuel line fittings **(6 and 7)** that attach to the "T" connector **(8)** at the base of the float assembly **(1)**.
5. Loosen and remove the two screws **(9)** that secure the float assembly **(1)** to the float assembly bracket **(10)**.

6. Remove the float assembly **(1)** from the heater and move it onto a petroleum absorbent mat or tray. Wipe up any spilled fuel.
7. Take note of the orientation of the "T" connector **(8)** at the base of the float assembly **(1)**. Remove the "T" connector **(8)**, clean any residual thread sealant from the threads of the connector and set aside.
8. Take note of the orientation of the elbow connector **(11)** at the top of the float assembly **(1)**. Remove the elbow connector **(11)**, clean any residual thread sealant from the threads of the connector and set aside.
9. To install a new float assembly **(1)**, apply thread sealant on the threads at the base of the float assembly and install the "T" connector **(8)** removed earlier, making sure to orient the connector as it was on the defective float assembly.
10. Apply thread sealant on the threads of the elbow connector **(11)** removed earlier and install the elbow connector on the top of the new float assembly, taking care to orient the elbow connector **(11)** as it was on the defective float assembly.
11. Position the float assembly on the bracket **(10)** and secure with two screws **(9)**.
12. Install the two fuel lines fittings **(6 and 7)** on the "T" connector **(8)** at the base of the float assembly. Tighten fittings **(6 and 7)** securely.
13. Apply new thread sealant to the threads of the float assembly inlet fitting **(5)** and install at the inlet **(12)** of the float assembly **(1)** taking care to orient the opening of the fitting as it was on the defective float assembly.
14. Install the fuel hose **(4)** on the float assembly inlet fitting **(5)** IAW WP 0021 00.
15. Install and tighten the fuel drain fitting **(2)** on the top assembly **(3)**.



END OF WORK PACKAGE

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**UNIT MAINTENANCE****SPACE HEATER, CONVECTIVE****(NSN 4520-01-431-8927)****BURNER ASSEMBLY  
REMOVE, INSPECT, SERVICE, REPLACE****INITIAL SETUP****Tools**

Tool Kit, General Mechanics (Item 1, WP 0044 00)

**Materials/Parts**

Rags, Wiping, Clean (Item 9, WP 0067 00)

Kit, Burner (Item 19, WP 0067 00)

Tags, marking, (item 6, WP 0067 00)

**Personel Required**

One

**Equipment Condition**

Heater shut down and all advisory lights off. (WP 0006 00)

In-tent controller assembly disconnected from heater. (WP 0006 00)

Fuel source disconnected. (WP 0006 00)

Sediment Strainer emptied of fuel. (WP 0020 00)

Upper housing assembly removed. (WP 0023 00)

Battery disconnected. (WP 0018 00)

**WARNING**

The ignition system of this heater contains dangerous voltages which can cause severe electrical shock. Be sure to disconnect battery pack before any maintenance actions.

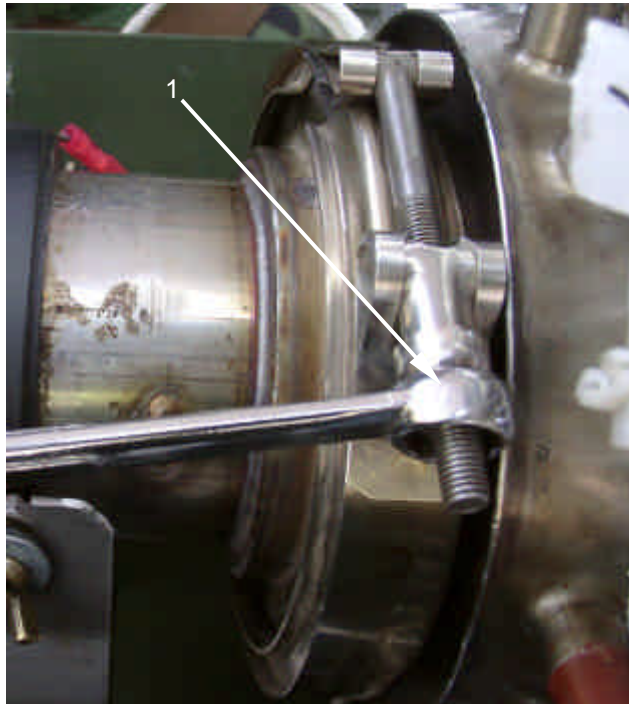
**WARNING**

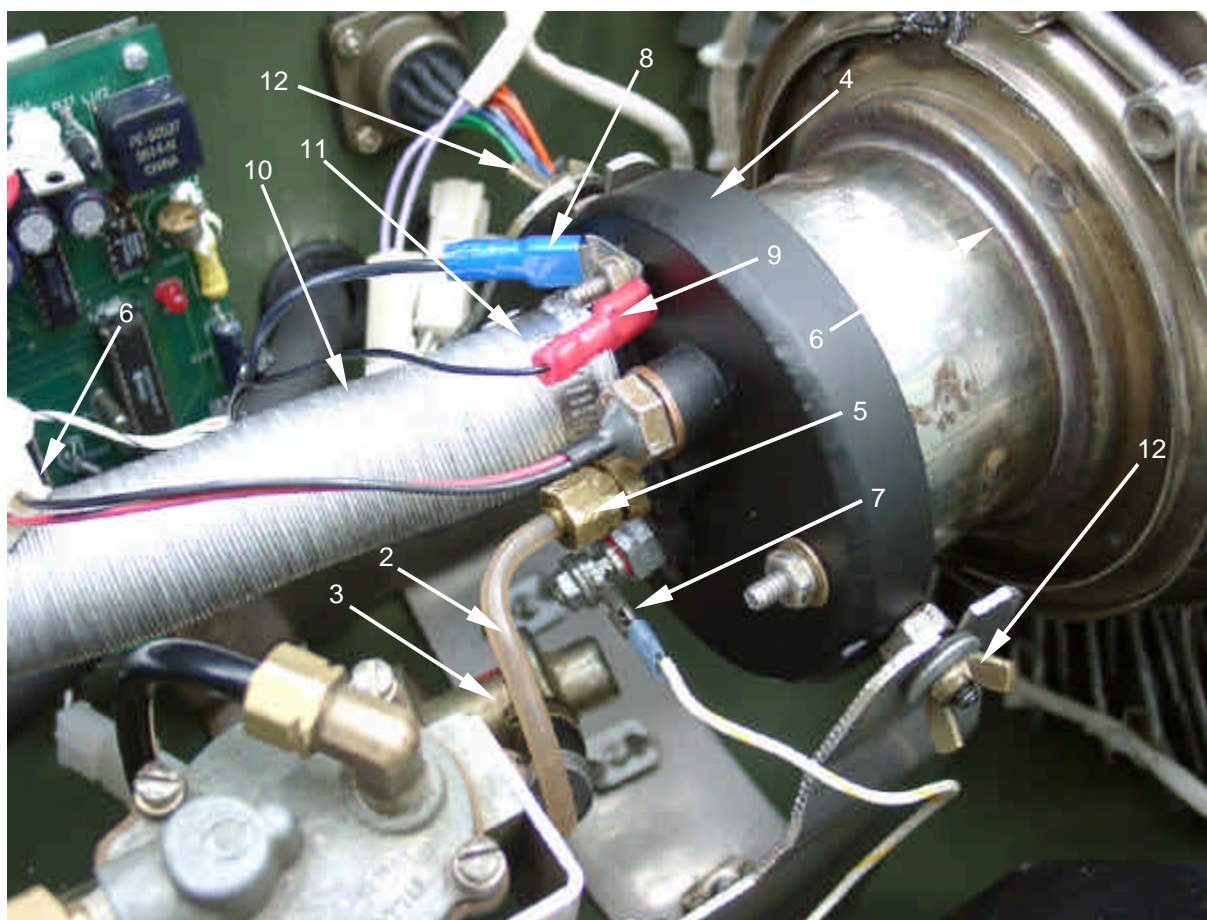
Catch and retain all residual fuel drained from disconnected conduits. Promptly wipe up any spilled fuel. Dispose of fuel in a safe manner.

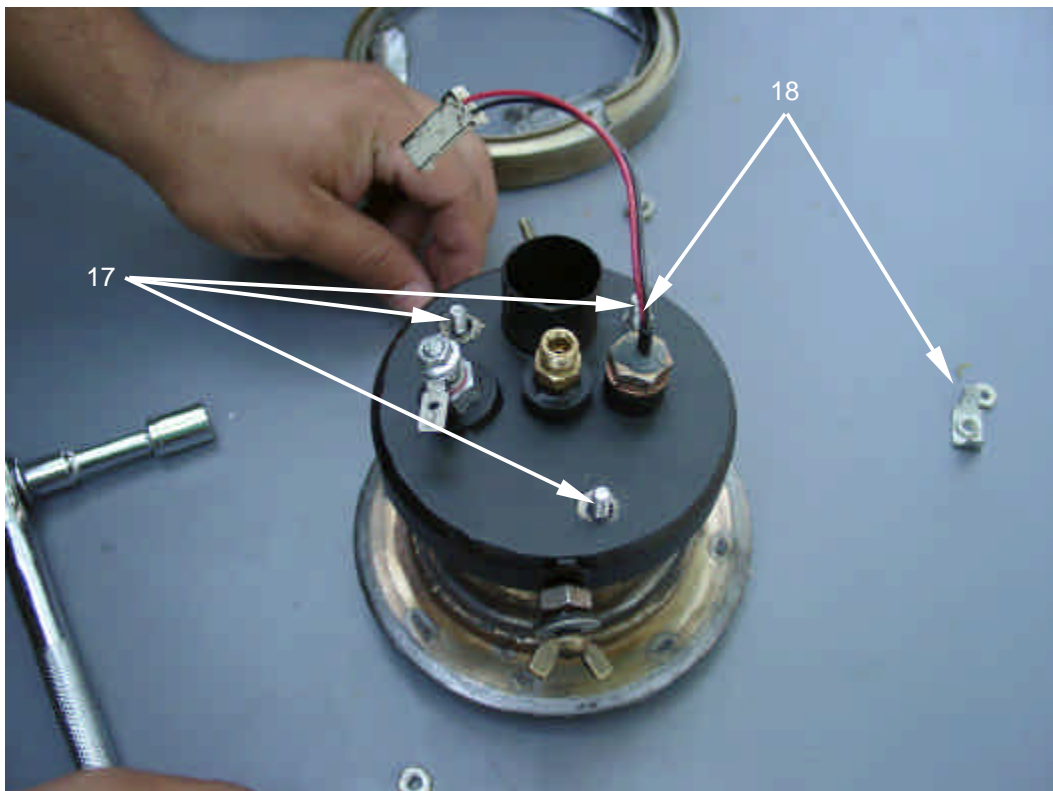
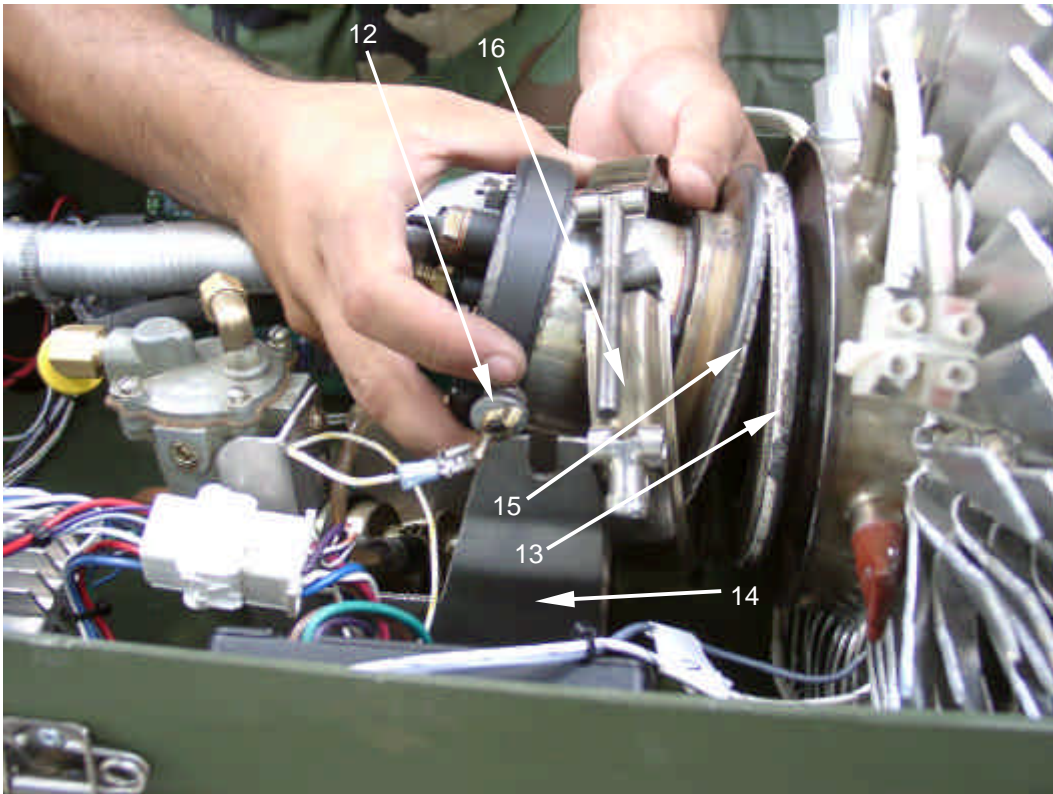
**REMOVE**

1. Place a petroleum absorbent mat under the burner assembly to catch any fuel that may spill.
2. Release and remove the burner to thermoelectric generator (TEG) V-clamp by loosening the two nuts **(1)**, opening the clamp, and moving it off the flanges between the TEG and burner assembly.

3. Disconnect fuel line **(2)** extending from the fuel pump **(3)** to the burner assembly **(4)** at fitting **(5)**. Carefully collect fuel which may spill from the hose. Wipe up any spilled fuel.
4. Tag and disconnect wire from flame sensor **(6)** and wire from glow plug **(7)**.
5. Tag and disconnect the two ground wires **(8 and 9)**.
6. Disconnect combustion air inlet duct **(10)** by loosening hose clamp **(11)** and sliding the clamp up the duct. Pull the combustion air inlet duct off the burner assembly air inlet and move off to the side.
7. Loosen the two wing nuts **(12)** on either side of the burner assembly bracket. Lift and pull burner assembly **(4)** up out of the burner bracket and away from TEG **(13)** (Note that this will tear the graphite ribbon tape and is normal; new graphite ribbon tape will be installed when the burner is replaced). When the screws have cleared slots in burner bracket **(14)**, lift out burner assembly **(4)** and place on suitable work surface.
8. Clean any residual graphite ribbon tape from the TEG flange **(13)**, burner assembly flange **(15)**, and the inside of the burner to TEG V-clamp **(16)**.
9. Remove the three nuts and lockwashers **(17)**, and quick connect tab **(18)** and set aside. Disassemble the burner assembly into its separate components.

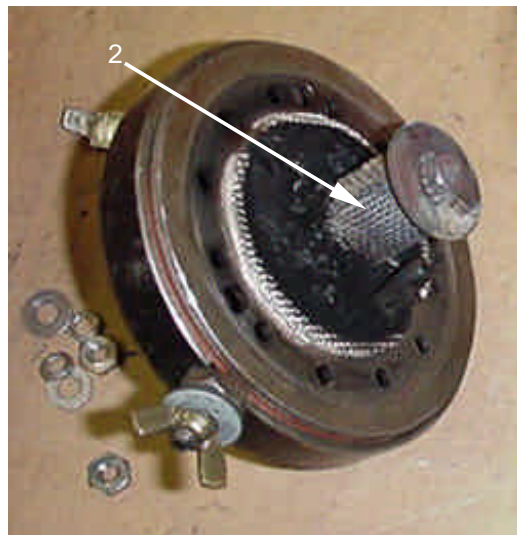
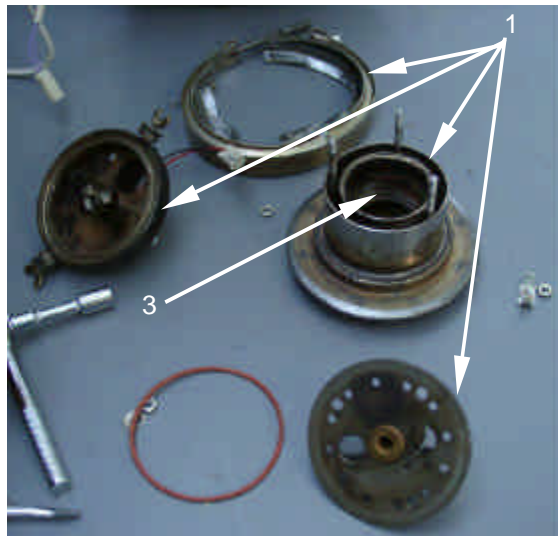






**INSPECT**

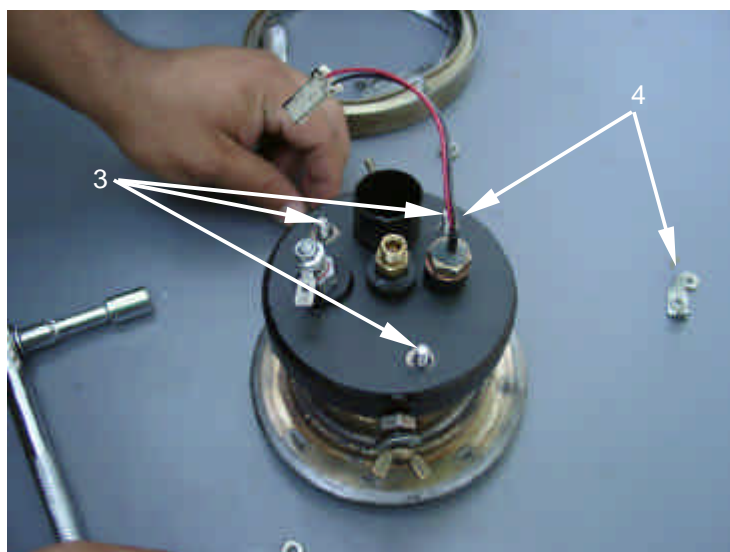
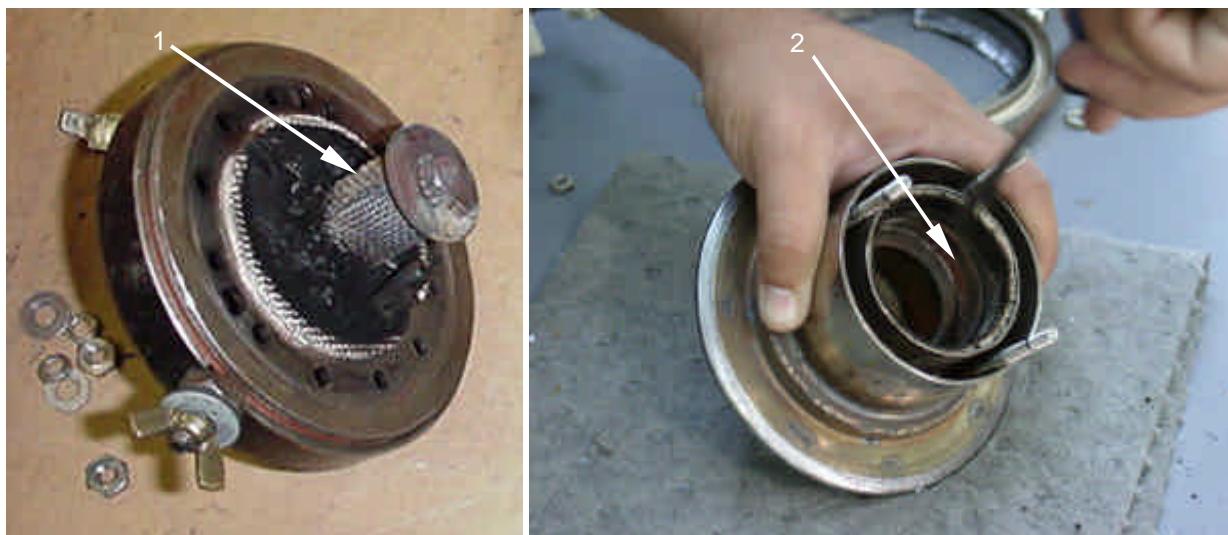
1. Inspect the burner assembly components **(1)** for any bends, dents, or other damage that would prevent the components from fitting together properly.
2. Inspect the wick assembly **(2)** to ensure that it does not have any holes. If the wick has holes, replace the entire burner assembly as detailed later in this work package.
3. Inspect the wick assembly **(2)** and ensure that it does not have a carbon buildup. If so, clean the wick assembly as described in SERVICE below.
4. Inspect the inside of the burner assembly **(3)** and ensure that it does not have a carbon buildup. If so, clean the inside of the burner assembly as described in SERVICE below.
5. After inspection, reassemble burner assembly components and install burner assembly as detailed in SERVICE below.





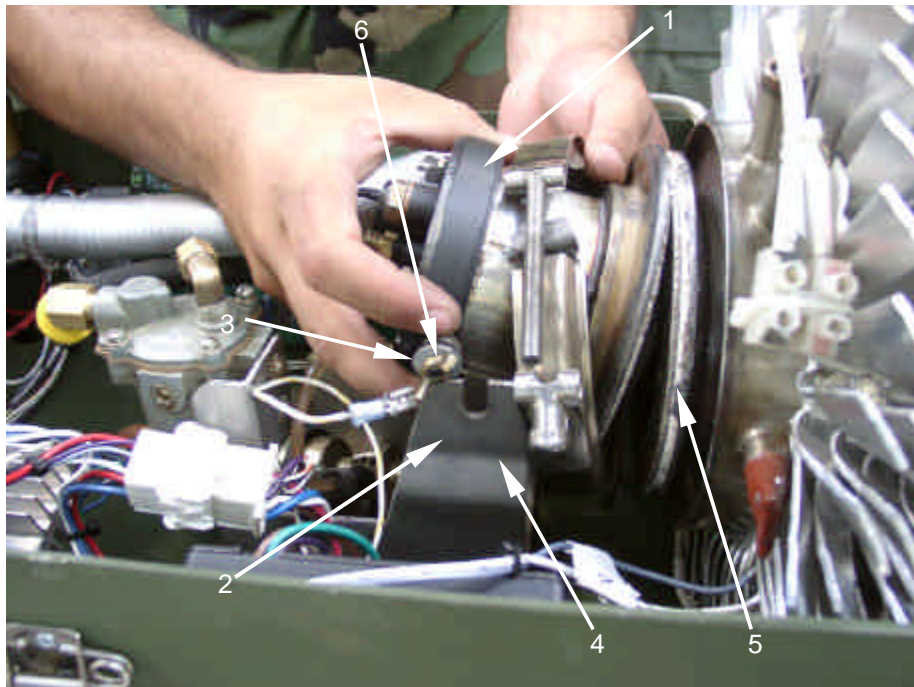
**SERVICE**

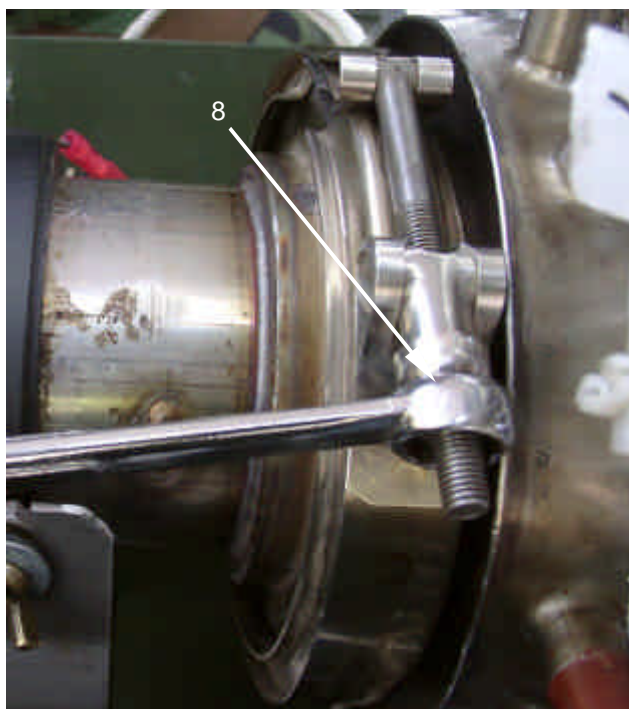
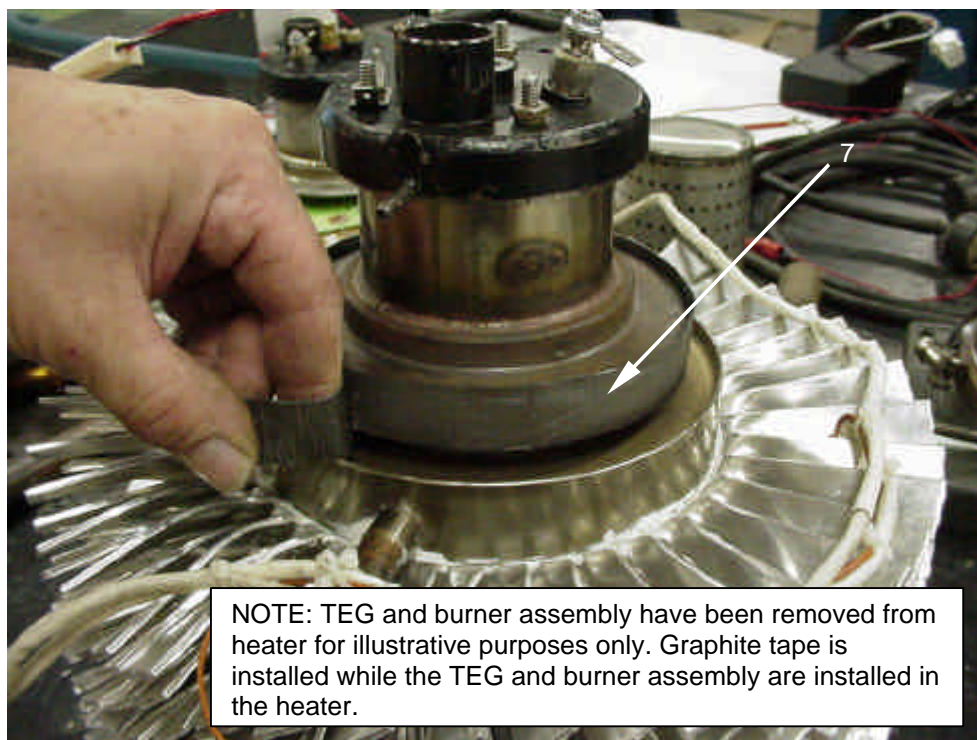
1. Clean the wick assembly **(1)** and the inside of the burner assembly **(2)** of carbon buildup with a wire brush. Brush gently and shake the carbon particles into a suitable container.
2. Reassemble burner assembly by engaging components and securing with three nuts and lockwashers **(3)**, and quick connect tab **(4)**.



**REPLACE**

1. To replace the burner assembly, remove the burner as described in the section of this work package entitled REMOVE.
2. Mount the new burner assembly (1) on burner bracket (2) by sliding screws (3) into burner bracket slots (4). Ensure that the flame sensor is positioned at the top.
3. Ensure that the fiberglass rope is in place in the groove on the front surface of the TEG flange. Ensure that the mantle is in place inside the TEG. Move the burner assembly (1) toward the mantle and TEG (5) and seat it against and aligned with the TEG. Tighten the two wings nuts (6) securely.
4. Install new graphite ribbon seal (7) around the TEG flange and the burner flange. Center the graphite ribbon tape so that it equally overlaps both flanges. Overlap the ends of the graphite ribbon tape by approximately 1 to 1 1/2 inches.
5. Install and secure the burner assembly (2) to the TEG with the V-clamp with nut (8). Do not rotate the clamp once it is over the graphite tape. Tighten the two nuts securely.
6. Connect fuel line (13) to burner assembly (2) at fitting (14).
7. Connect combustion air inlet pipe (9) to burner assembly (2) using hose clamp (10). Tighten clamp securely.
8. Connect the flame sensor connector (11) and connect the wire to the glow plug (12).
9. Reconnect ground wires (15 and 16).









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**UNIT MAINTENANCE****SPACE HEATER, CONVECTIVE****(NSN 4520-01-431-8927)****THERMOELECTRIC GENERATOR (TEG)  
REMOVE, INSPECT, TEST, REPLACE**

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**INITIAL SETUP****Tools**

Tool Kit, General Mechanics (Item 1, WP 0044 00)

**Materials/Parts**Rags, Wiping, Clean (Item 5, WP 0067 00)  
Mat, petroleum absorbent (Item 15, WP 0067 00)**Equipment Condition**Heater shut down and all advisory lights off. (WP 0006 00)  
In-tent controller assembly disconnected from heater. (WP 0006 00)  
Fuel supply disconnected. (WP 0006 00)  
Upper housing assembly removed. (WP 0030 00).  
Burner to TEG flange clamp removed. (WP 0037 00).  
Battery disconnected. (WP 0018 00)**WARNING**

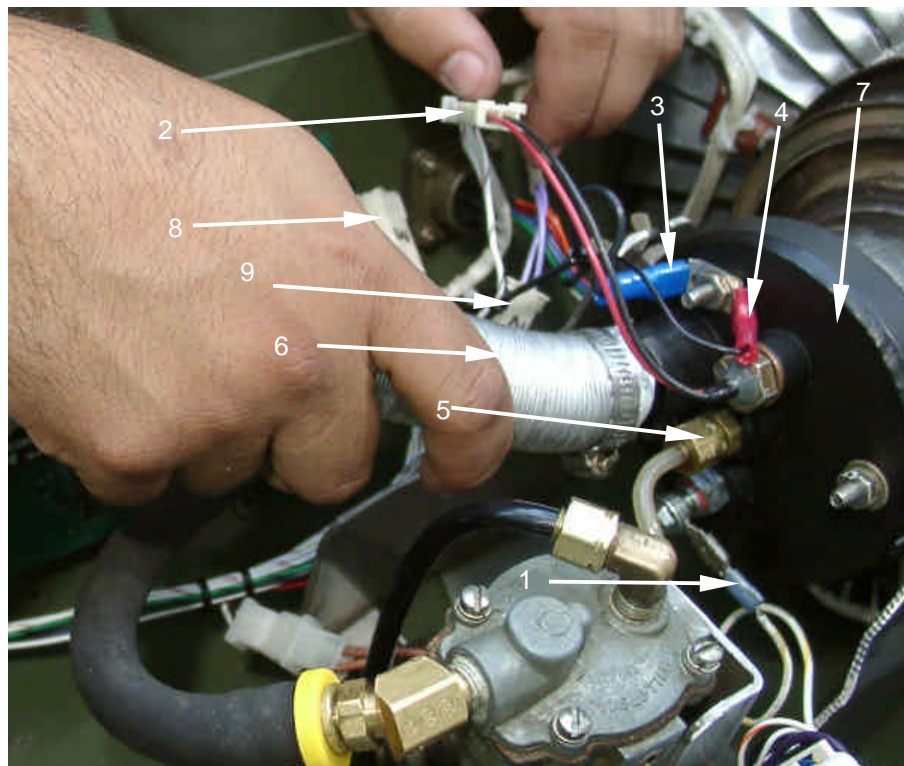
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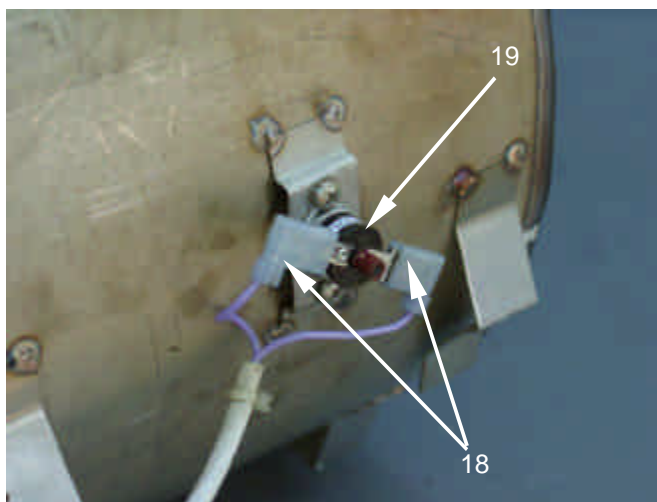
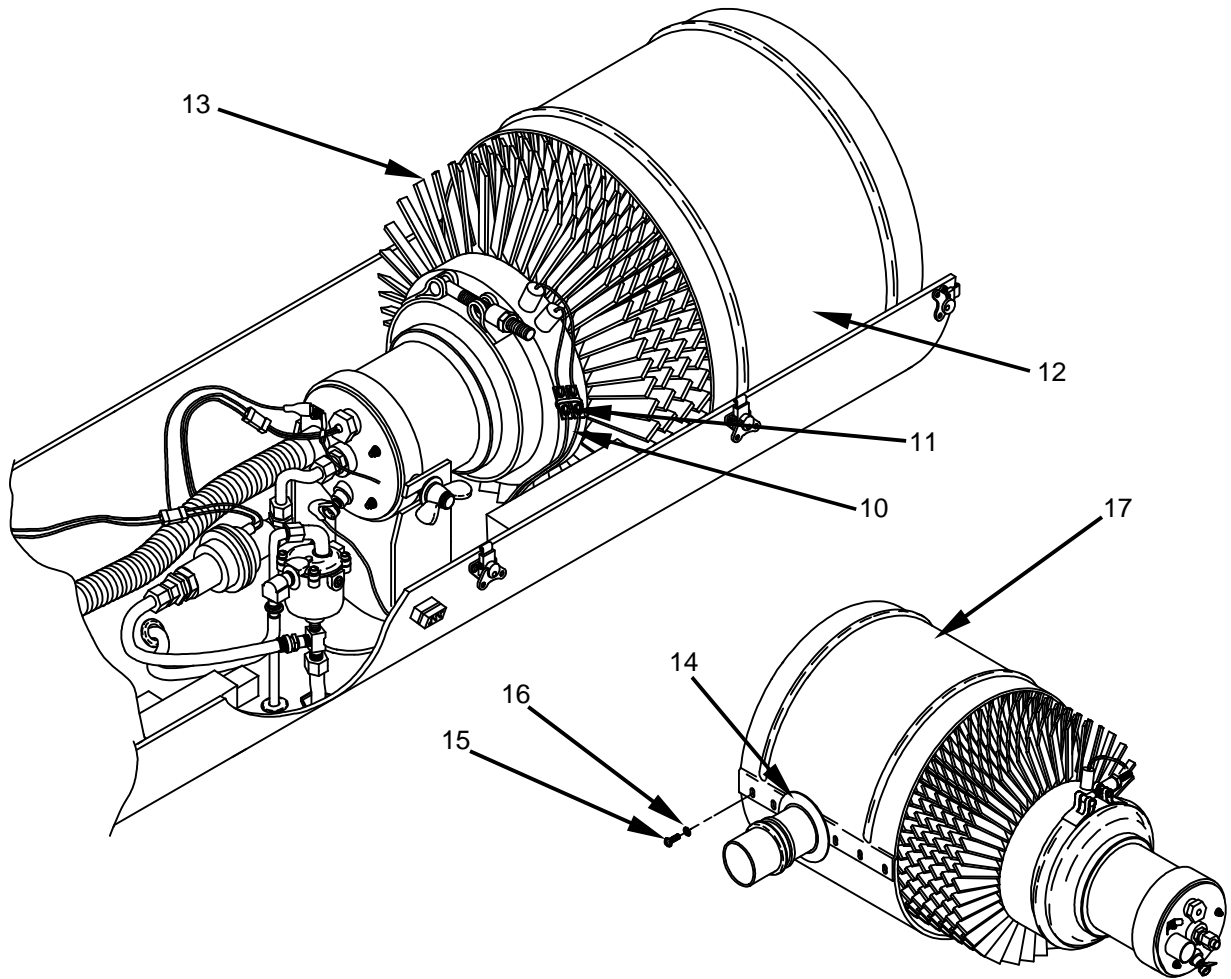
The ignition system of this heater contains dangerous voltages which can cause severe electrical shock. Be sure to disconnect battery pack connector before performing any maintenance actions.

**REMOVE**

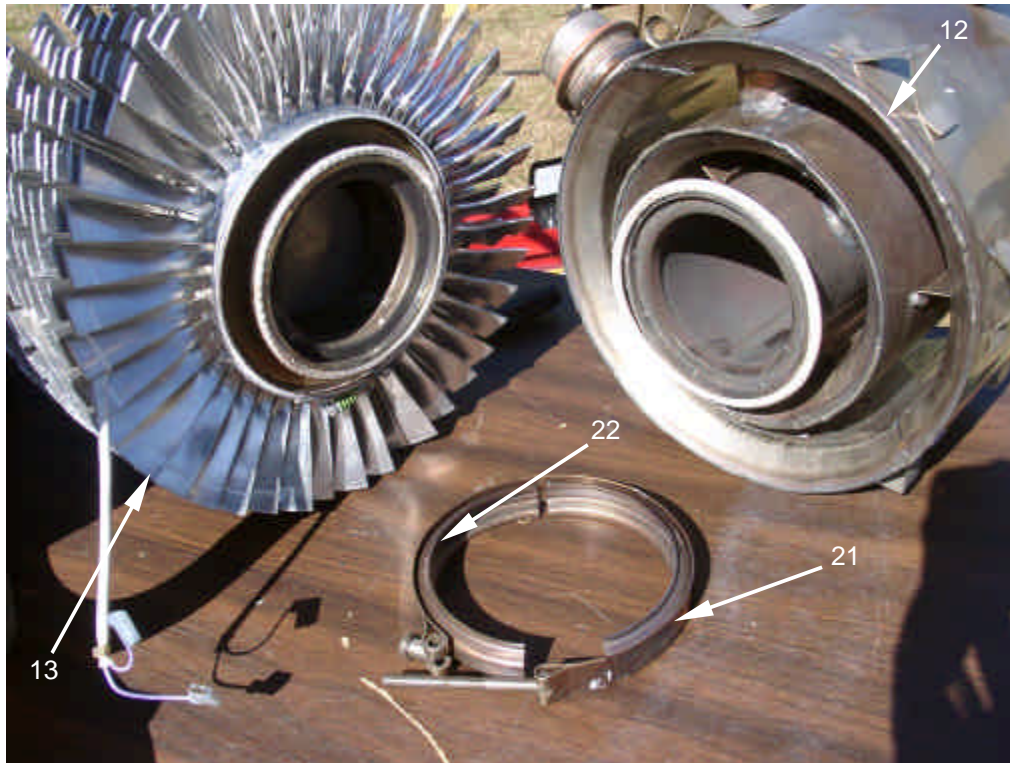
1. Place a section of petroleum absorbent mat in the bottom of the lower housing assembly under the burner assembly in order to catch any fuel that may spill. Wipe up any spilled fuel with a rag.
2. Tag and disconnect the glow plug wire **(1)**, flame sensor connector **(2)**, two ground wires **(3 and 4)**, fuel line **(5)**, and combustion air blower duct **(6)** from the burner assembly **(7)**.
3. Tag and disconnect the two TEG electrical connectors **(8 and 9)**.
4. Tag and disconnect the two wires **(10)** going into the modular connector **(11)** on the side of the TEG by loosening the two bottom screws. Do not loosen the top screws for the wires that enter the interior of the TEG.

5. Loosen wingnuts on side of burner assembly (7) and lift assembled heat exchanger (12) and TEG (13) and remove from heater. Place on an appropriate work surface. Take care not to bend any of the fins on the TEG.
6. Remove the exhaust grommet (14) by stretching the grommet over the ridge and sliding down and off the combustion exhaust outlet. Set the grommet aside.
7. Remove sheet metal screws (15) and washers (16) from wrap cover (17) and set aside.
8. Carefully remove the wrap cover (17) and set aside.
9. Tag and disconnect the connectors (18) for the manual reset thermostat (19).
10. Loosen and remove flange clamp (21) between the heat exchanger (12) and the TEG (13).
11. Separate TEG (13) and heat exchanger (12).
12. Loosen and remove the flange clamp between the burner assembly and the TEG. Separate the burner assembly from the TEG.
13. Remove and discard all pieces of old graphite ribbon tape (22) that may adhere to the inside surface of both flange clamps (21) and to the outside of the TEG, heat exchanger, and burner assembly flanges.



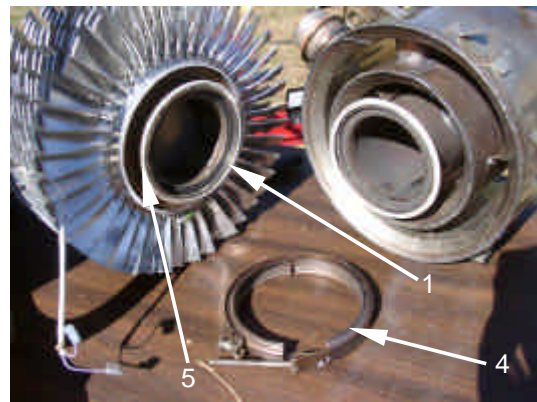






**INSPECT**

1. Check flanges **(1, 2, and 3)** for bends, breaks, and corrosion.
2. Inspect flange clamp **(4)** for distortion as well as stripped and otherwise damaged threads. Discard clamp if not fully functional.
3. Ensure that the fiberglass ropes **(5)** are positioned in the grooves of the TEG flange and that they are not frayed or damaged in any way.



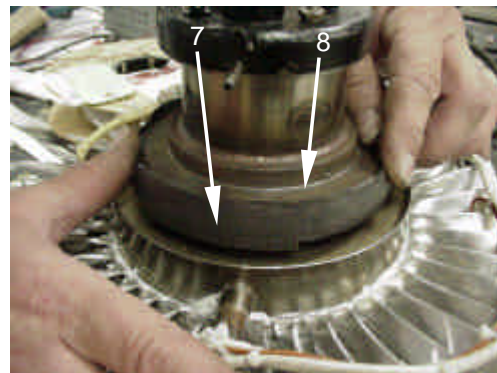
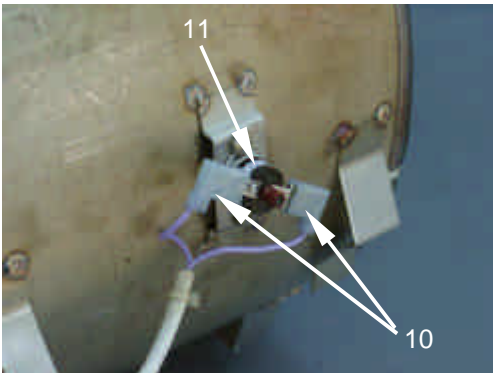
**TEST**

1. If necessary, set the multimeter to measure resistance in the 10 ohm range.
2. Place probe No. 1 in contact with TEG's grey wire and probe No.2 in contact with the TEG's white/grey wire. Meter should read between 1 and 5 Ohms. It should not read 0 (zero) Ohms or open.
3. Replace TEG if short or open is indicated.

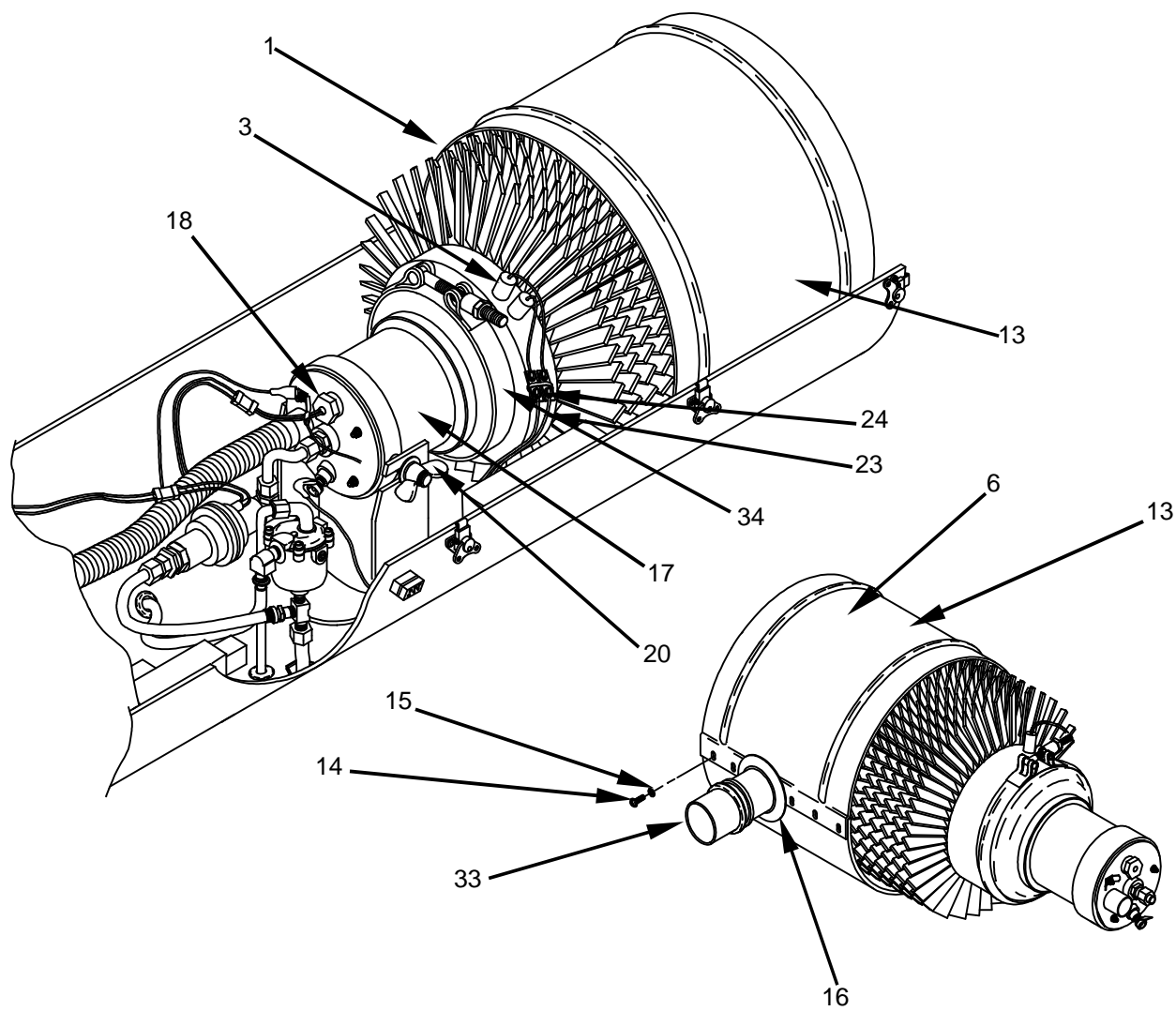
**REPLACE**

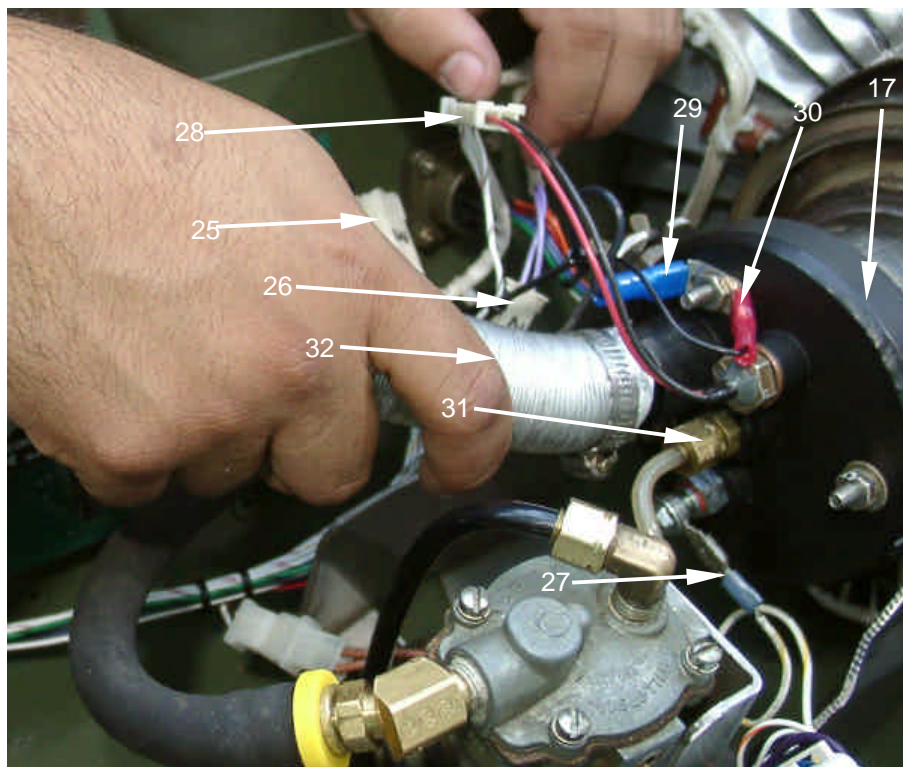
1. To install a new thermoelectric generator **(1)**, install fiberglass rope **(2)** in flange grooves on both ends of TEG.
2. While positioning the combustion exhaust outlet **(33)** of the heat exchanger at the 9 o'clock position, position the two input wires **(3)** exiting the TEG at the 1 o'clock position. Align the flanges **(4)** of the TEG **(1)** and heat exchanger **(6)**.
3. Install new graphite ribbon tape **(7)** around the outside of the TEG and heater exchanger flanges **(8)**. Be sure to overlap the tape by approximately 2 to 3 inches.
4. Install flange clamp **(9)** over flanges **(4)** taking care to position the top of the clamp so that it is aligned just to the left of the two input wires **(3)** exiting the TEG. Tighten the clamp securely.
5. Connect the two electrical connectors **(10)** of the thermostat reset switch **(11)**. Remove any tags.
6. Align cutouts in wrap cover **(13)** with the combustion exhaust outlet **(33)** and position around the heat exchanger **(6)**. Ensure that the wrap cover is positioned so that the thermostat reset switch **(11)** will be accessible through the hole in the lower housing assembly.
7. While holding the wrap cover **(13)** securely in position, install sheet metal screws **(14)** and washers **(15)**. Tighten all screws securely.
8. Install exhaust grommet **(16)** over combustion exhaust outlet **(33)**.
9. Install the burner assembly **(17)** in position on the TEG flange taking care to align the flame sensor **(18)** of the burner assembly with the two input wires **(3)** of the TEG. When properly positioned, the two wingnuts **(20)** on the side of the burner assembly will be aligned with the combustion exhaust outlet **(33)** of the heat exchanger **(6)**.
10. Install new graphite ribbon tape **(7)** around the burner assembly **(17)** and TEG flanges. Be sure to overlap the tape two to three inches.
11. Install flange clamp **(34)** over burner assembly and TEG flanges taking care to position the top of the clamp just to the left of the two input wires **(3)** exiting the TEG. Do not rotate clamp after installing new graphite ribbon tape. Tighten the flange clamp securely.
12. Place assembled heat exchanger, TEG, and burner assembly into heater and align combustion exhaust outlet **(33)** and grommet with exhaust cutout **(20)** in lower housing. Be sure to engage the groove **(21)** in the grommet with the cutout **(20)** in the lower housing assembly.
13. Tighten wingnuts **(20)** on side of burner assembly **(17)**.

14. Install exhaust o-ring (22).
15. Remove tag and connect wires (23) to TEG cooling fin temperature sensor modular connector (24).
16. Remove tag and connect two TEG connectors (25 and 26).
17. Remove tag connect the glow plug wire (27), flame sensor connector (28), ground wires (29 and 30), fuel line (31), and combustion air blower duct (32) to the burner assembly (17).









**END OF WORK PACKAGE**

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**UNIT MAINTENANCE****SPACE HEATER, CONVECTIVE****(NSN 4520-01-431-8927)****HEAT EXCHANGER  
REMOVE, INSPECT, TEST, REPLACE**

---

**INITIAL SETUP****Tools**

Tool Kit, General Mechanics (Item 1, WP 0044 00)

**Materials/Parts**

Rags, Wiping, Clean (Item 5, WP 0067 00)

Mat, petroleum absorbent (Item 15, WP 0067 00)

**Equipment Condition**

Heater shut down and all advisory lights off. (WP 0006 00)

In-tent controller assembly disconnected from heater. (WP 0006 00)

Fuel source disconnected. (WP 0006 00)

Upper housing assembly removed. (WP 0030 00)

Burner to TEG flange clamp removed. (WP 0037 00)

Battery disconnected. (WP 0018 00)

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**WARNING**

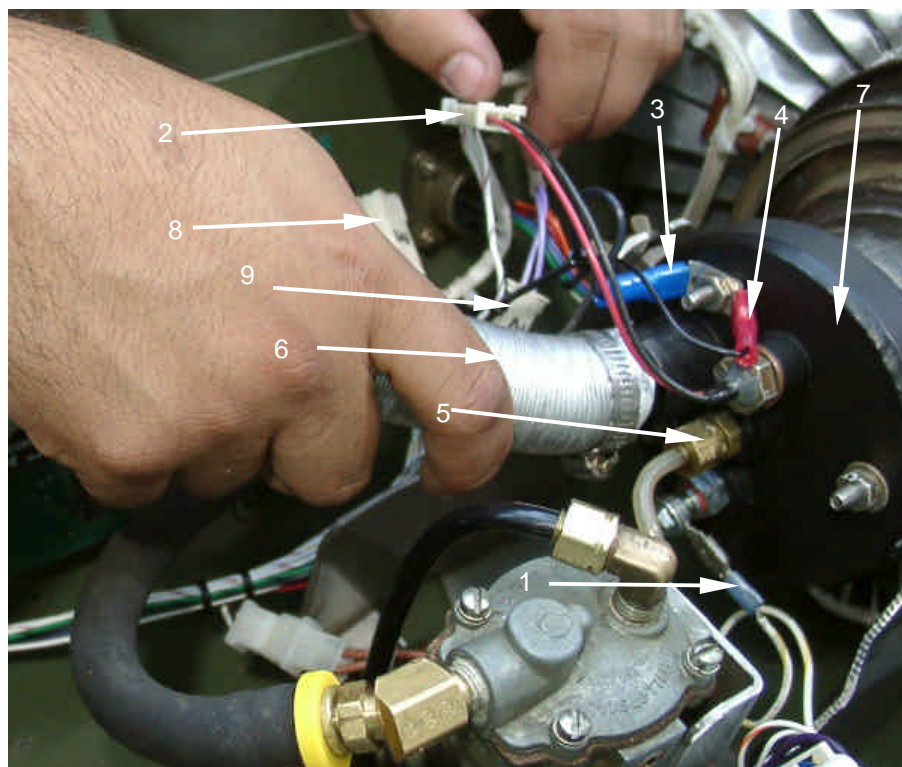
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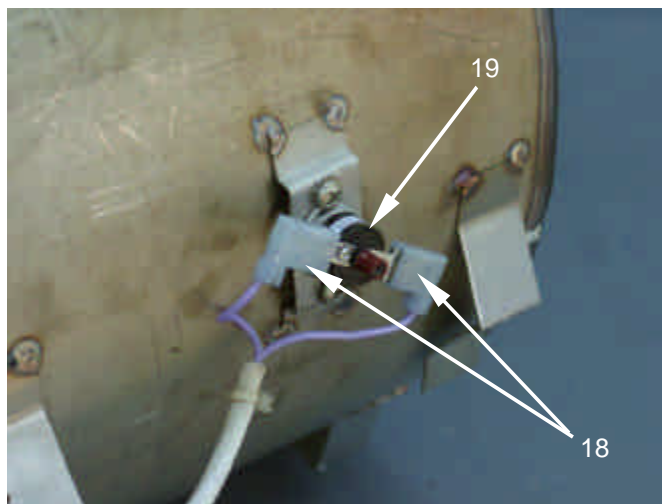
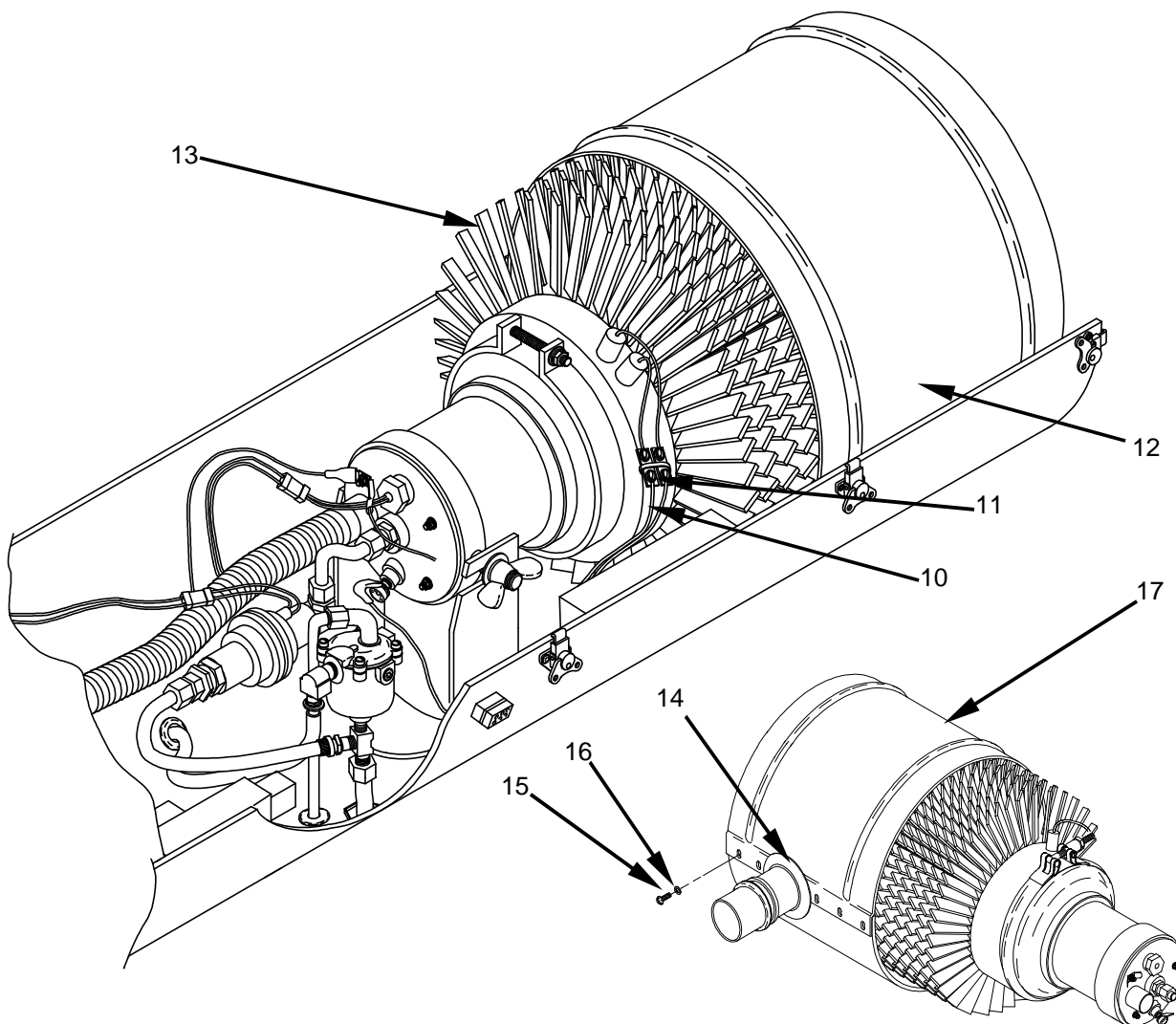
The ignition system of this heater contains dangerous voltages which can cause severe electrical shock. Be sure to disconnect battery pack before performing any maintenance actions.

**REMOVE**

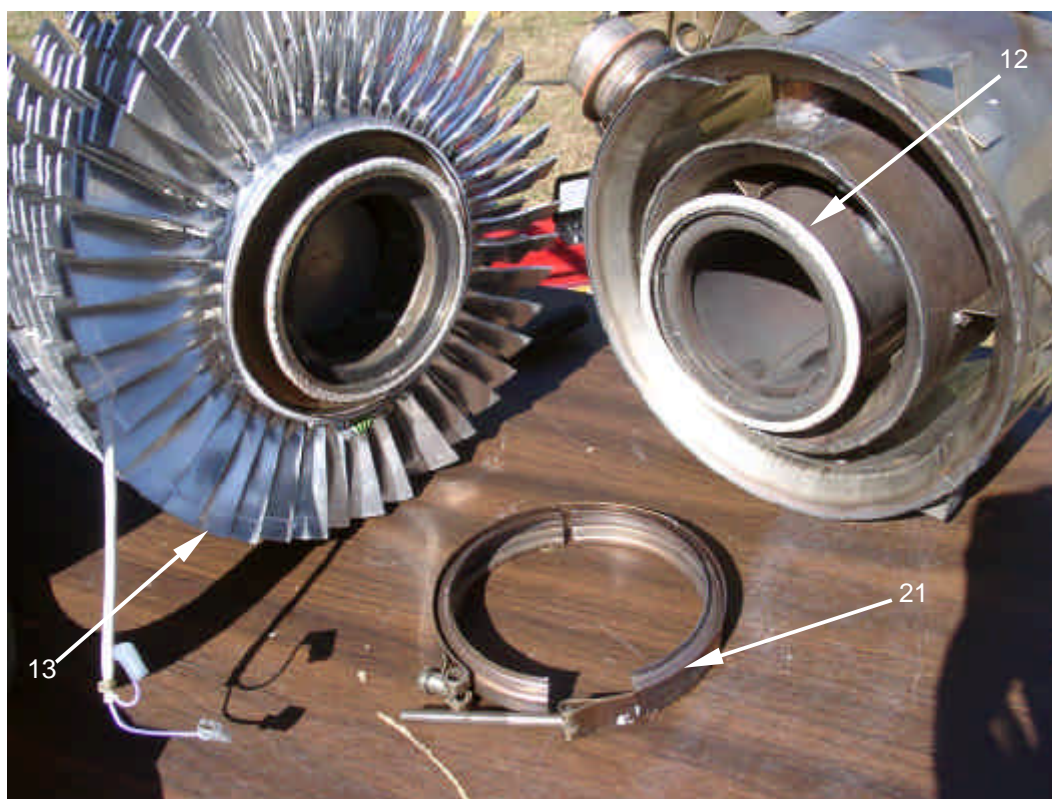
1. Place a section of petroleum absorbent mat in the bottom of the lower housing assembly under the burner assembly in order to catch any fuel that may spill. Wipe up any spilled fuel with a rag.
2. Tag and disconnect the glow plug wire **(1)**, flame sensor connector **(2)**, ground wires **(3 and 4)**, fuel line **(5)**, and combustion air blower duct **(6)** from the burner assembly **(7)**.
3. Tag and disconnect TEG electrical connectors **(8 and 9)**.
4. Tag and disconnect the two leads **(10)** going to the modular connector **(11)** for the TEG cooling fin temperature sensor.
5. Loosen wingnuts on side of burner assembly **(7)** and lift assembled heat exchanger **(12)**, TEG **(13)** and burner assembly **(7)** from heater. Place on an appropriate work surface.

6. Remove exhaust grommet (14).
7. Remove sheet metal screws (15) and washers (16) from wrap cover (17).
8. Remove wrap cover (17) and set aside.
9. Tag and disconnect the connectors (18) for the manual reset thermostat (19).
10. Loosen and remove flange clamp (21) between the heat exchanger (12) and the TEG (13).
11. Separate TEG (13) and heat exchanger (12).
12. Remove and discard all pieces of old graphite ribbon tape that may adhere to the inside surface of flange clamp (21) and to the outside of the TEG and heat exchanger flanges.









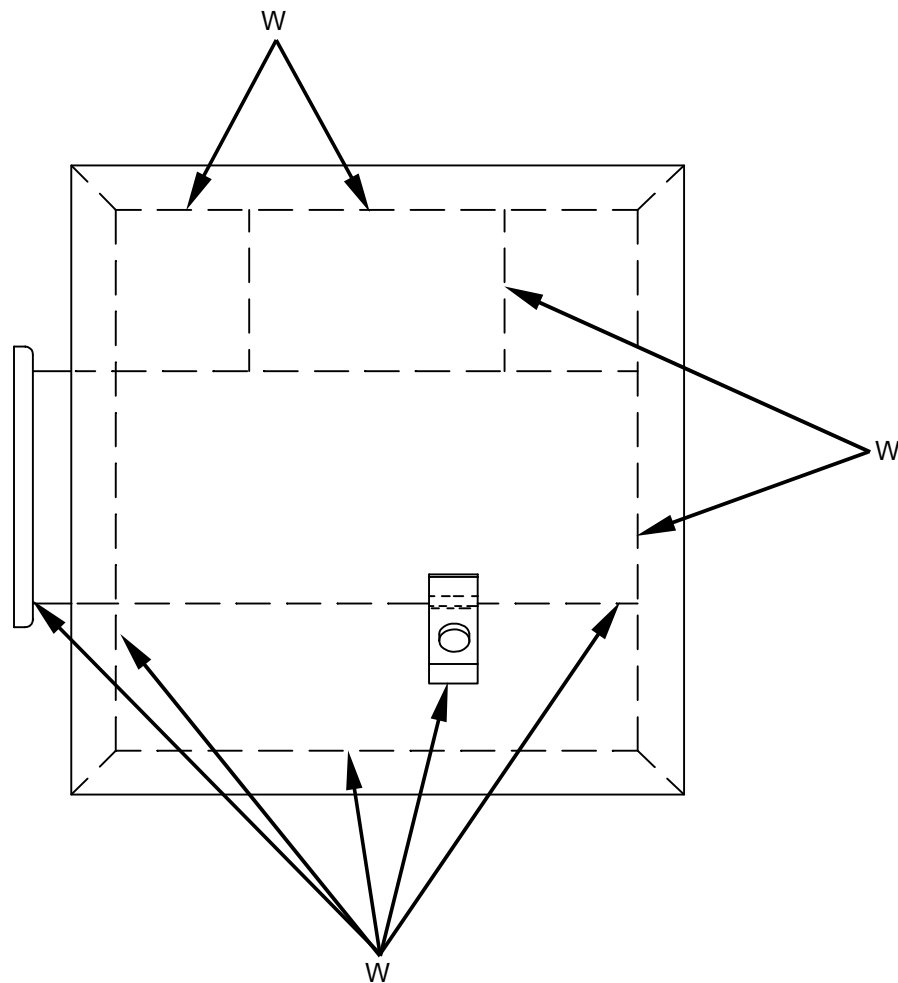
**SERVICE**

Using rags and alcohol, clean the exterior of all accessible features of the heat exchanger assembly (1).



**INSPECT**

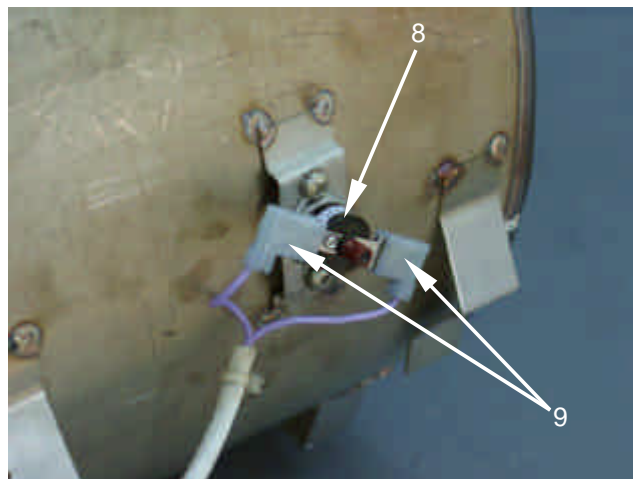
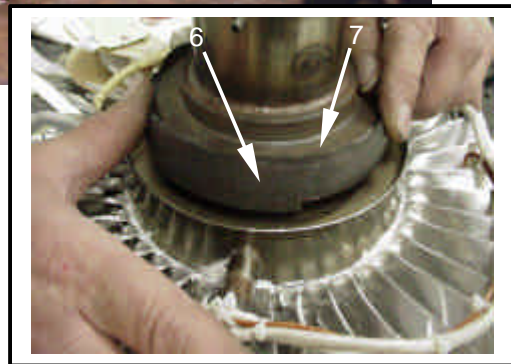
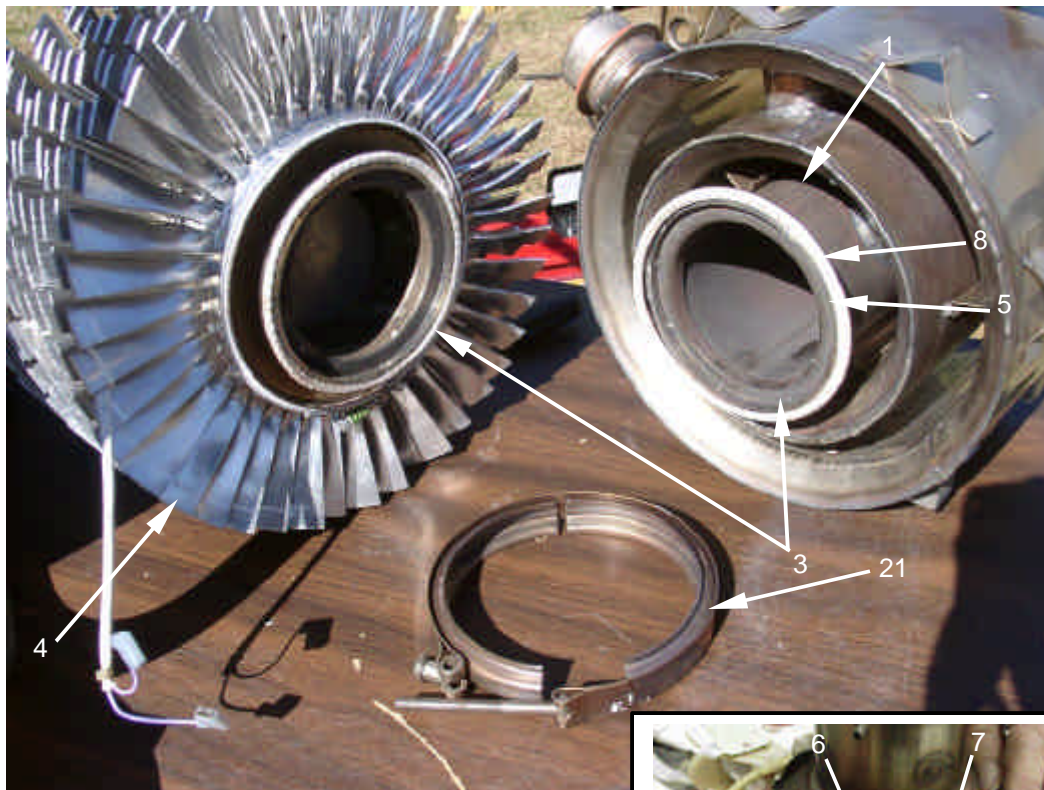
1. Using a flashlight or, if available, a 5X or 10X magnifier, inspect all surfaces of the heat exchanger for any indication of cracks or corrosion that penetrate parent metal.
2. All welds must be inspected thoroughly. Typical welded areas are indicated in the accompanying illustration and are represented by (W). A heat exchanger that leaks may present a hazard to personnel within the tent being heated.
3. Minor surface corrosion that does not penetrate the parent metal may be removed with a wire brush.
4. If any indication of cracks is found, replace the heat exchanger assembly.
5. If any corrosion appears to penetrate the parent metal, replace the heat exchanger assembly.

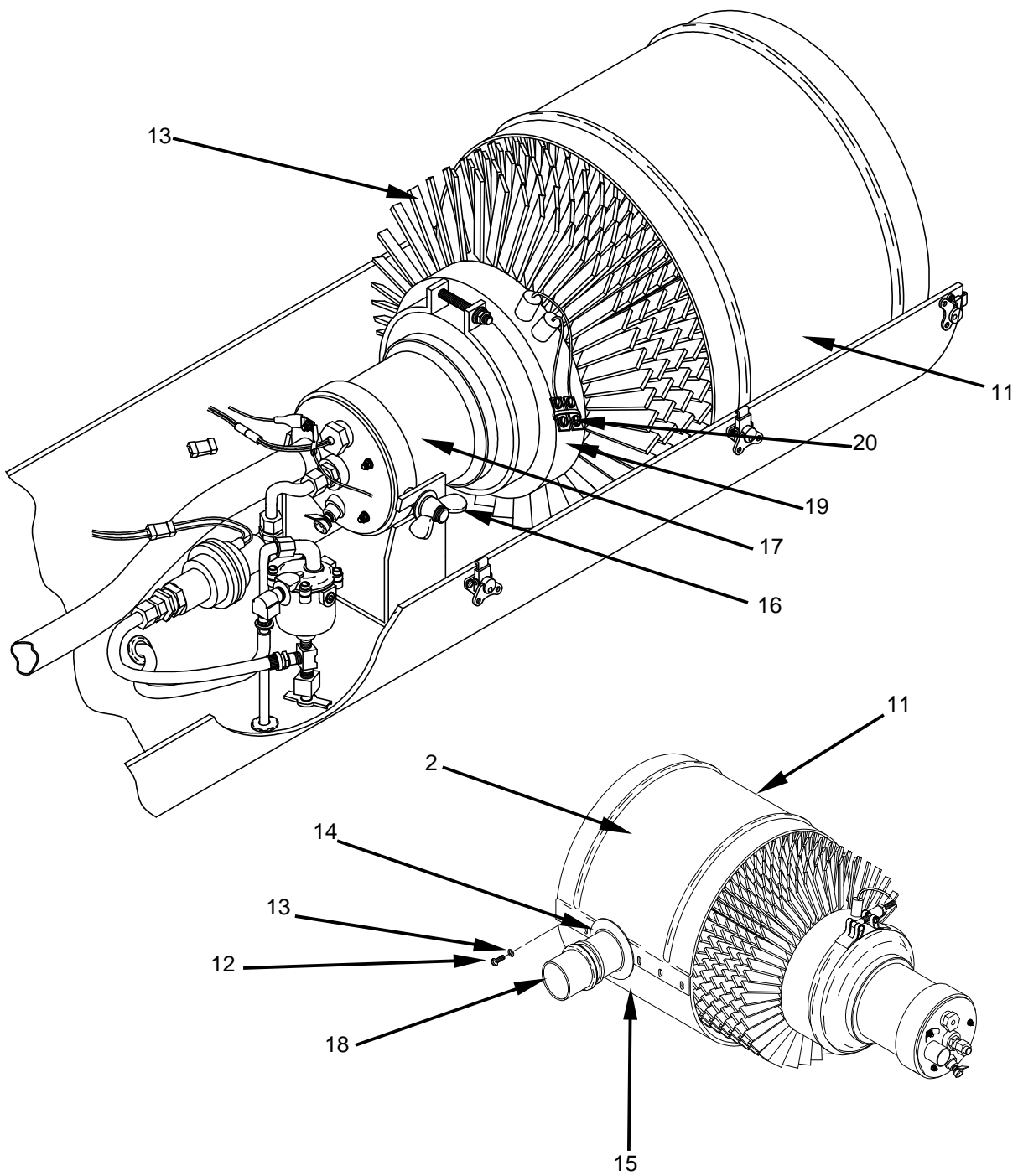


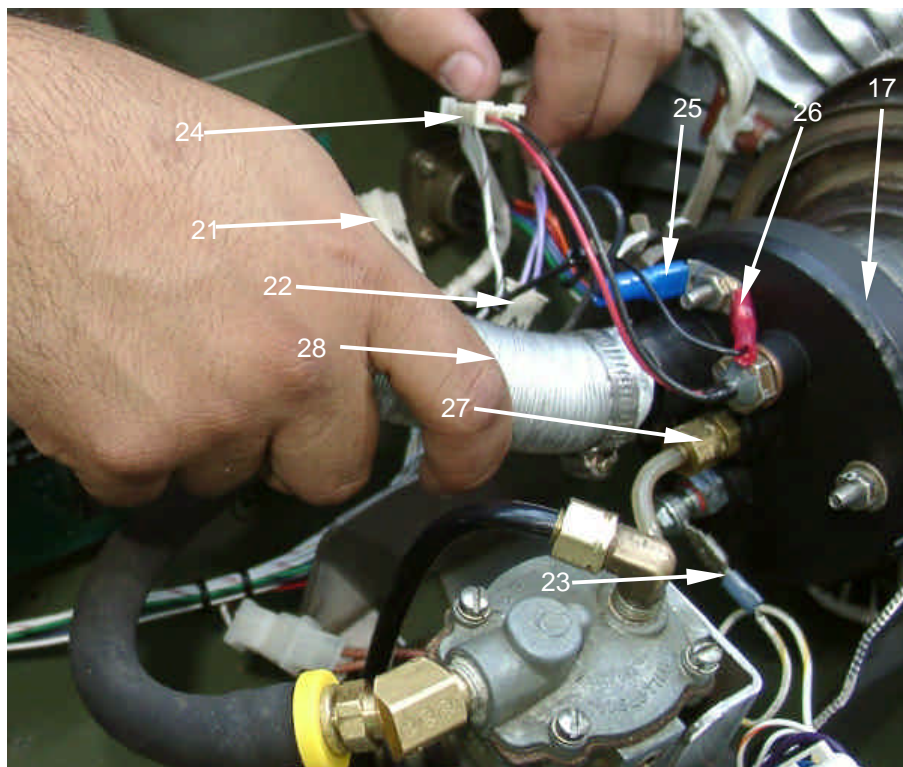


**REPLACE**

1. To install a new heat exchanger **(1)**, install fiberglass rope **(5)** in the groove of the heater changer flange.
2. Align the flanges **(3)** of the TEG **(4)** and heat exchanger **(1)** and press the TEG and heat exchanger together. Note that the combustion exhaust outlet on the side of the heat exchanger should be at the 9 o'clock position while the TEG input wires are positioned at the 1 o'clock position.
3. Install graphite ribbon seal **(6)** on the outside of the two flanges **(7)**. Be sure to overlap the ends of the tape approximately 2 to 3 inches.
4. Install flange clamp **(7)** over flanges **(3)** so that the top of the clamp is at the 12 o'clock position. Do not rotate the clamp after installing over the graphite ribbon tape. Tighten the clamp securely.
5. Remove tag and install thermostat reset switch **(8)** and connect electrical connectors **(9)**.
6. Align cutouts in wrap cover **(11)** and position around the heat exchanger **(2)**.
7. Install sheet metal screws **(12)** and washers **(13)**. Tighten securely.
8. Install grommet **(14)** over combustion exhaust outlet.
9. Place assembled heat exchanger, TEG, and burner assembly into heater and align combustion exhaust outlet and grommet with exhaust cutout **(15)** in lower housing.
10. Tighten wingnuts **(16)** on side of burner assembly **(17)**.
11. Install exhaust o-ring **(18)**.
12. Remove tag and connect wires **(19)** to TEG cooling fin temperature sensor modular connector **(20)**.
13. Remove tags and connect two TEG connectors **(21 and 22)**.
14. Remove tags and connect the glow plug wire **(23)**, flame sensor connector **(24)**, ground wires **(25 and 26)**, fuel line **(27)**, and combustion air blower duct **(28)** to the burner assembly **(17)**.







**END OF WORK PACKAGE**

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**UNIT MAINTENANCE**  
**SPACE HEATER, CONVECTIVE**  
**(NSN 4520-01-431-8927)**  
**LOWER HOUSING ASSEMBLY**  
**SERVICE**

---

**INITIAL SETUP**ToolsMaterials/Parts

Silicone lubricant (Item 4, WP 0067 00)

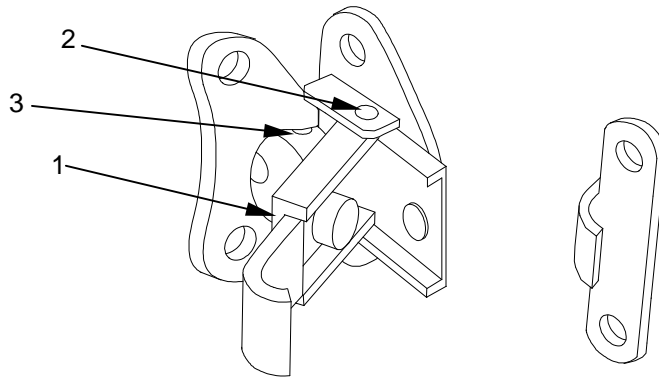
Equipment Condition

Heater shut down and all advisory lights off. (WP 0006 00)

---

**SERVICE**

Lubricate slide portion **(1)** and pivot **(2)** of adjusting handle **(3)** with silicone lubricant.

**END OF WORK PACKAGE**

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**UNIT MAINTENANCE****SPACE HEATER, CONVECTIVE****(NSN 4520-01-431-8927)****RETURN AND SUPPLY DUCTS WITH DEBRIS GRILLS  
INSPECT, REMOVE, REPAIR**

---

**INITIAL SETUP****Tools****Personnel Required**

One

**Materials/Parts**

Tape, Duct (Item 14, WP 0067 00)

**Equipment Condition**

Heater shut down and all advisory lights off. (WP 0006 00)

---

**NOTE**

The following procedures apply to both the return and/or supply ducts and debris grills.

**INSPECT**

1. Inspect the return and supply ducts **(1)** for cuts, abrasions, or other damage that would permit air to enter or exit the side walls of the ducts. Repair any rips or cuts in the duct before using.
2. Inspect the debris grills **(2)** for dents or other damage that would impair the free flow of air into or out of the duct. Replace any debris grills that are damaged.

**REMOVE**

1. To remove the return or supply duct **(1)** from the heater, release the strap **(3)** that secures the return or supply duct to the duct adapters **(4)** at the inlet or outlet end of the heater.
2. To remove the duct **(1)** from the tent duct tunnel **(5)**, untie the strap **(6)** that secures the duct inside the tent duct tunnel and pull out.

**REPAIR**

1. To repair rips, tears, or cuts in the fabric covering of the duct, cover with at least two layers of duct or similar tape, overlapping the edges of the cut or tear by at least two inches.
2. If damage to the duct is excessive and it is not practical to repair with tape, the duct should be replaced.



END OF WORK PACKAGE

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**UNIT MAINTENANCE**  
**SPACE HEATER, CONVECTIVE**  
**(NSN 4520-01-431-8927)**

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**PREPARATION FOR STORAGE OR SHIPMENT**

---

### REMOVAL FROM SERVICE

To break the system down in preparation for movement, ensure that the heater is off, the blower fans stopped, and all advisory lights off.

1. Remove the fuel can from the fuel can stand assembly. Set the fuel can down in the upright position.



**WARNING**

Drain fuel into a container and dispose of fuel in a safe manner.

2. Place a mat or tray containing petroleum absorbent material under the heater fuel quick disconnect to collect the small amount of fuel that may drain from heater and the fuel hose.
3. Disconnect the in-tent controller cable from the control connector on the front of the heater.
4. Disconnect the battery by disengaging the battery pack connector from the connector on the lower housing assembly.
5. Open the fuel drain valve at the base of the heater and drain fuel into a petroleum absorbent tray.
6. Remove the fuel hose from the fuel quick disconnect and lift the hose above the level of fuel can. Allow all fuel to drain back into the fuel can. Install the protective dust cap on the fuel quick disconnect.
7. Coil the fuel hose back to the fuel supply site and disconnect the fuel hose from the gravity feed adapter. Connect the two ends of the fuel hose together to keep dirt or contaminants from entering the fuel connectors.
8. Loosen the gravity feed adapter and remove it from the fuel can. Place the gravity feed adapter on the petroleum absorbent mat.
9. Disassemble the fuel can stand by removing the clip, raising the two support arm, and separating the lower legs from the upper portion of the stand. Wrap the straps around the stand and secure.
10. Remove the air outlet duct from the heater by releasing the strap and sliding off the duct adapter.
11. Untie the tent duct tunnel strap and remove the duct from the tent duct tunnel.

12. Secure the tent duct tunnel by closing off with the tie strap.
13. Compress the duct and secure using the interior strap.
14. Remove the air inlet duct from the heater by releasing the strap and sliding off the duct adapter.
15. Untie the tent duct tunnel strap and remove the duct from the tent duct tunnel.
16. Remove the in-tent controller and disconnect the in-tent controller cable. Install the protective caps on the connectors of the in-tent controller and cable.
17. Secure the tent duct tunnel by closing off with the tie strap.
18. Compress the duct and secure using the interior strap.
19. Install the dust covers over the inlet and outlet duct adapters.
20. Stow all components except the heater in the accessory bag.

## **PRESERVATION**

Make sure all fuel has been completely drained from the heater. Drain fuel into a petroleum absorbent tray.

## **PACKAGING**

1. Place heater assembly into heater storage case if available.
2. Make sure the following items are with the onboard spares and tools: glow plug, flame sensor, battery charger adapter (separate item not included with onboard spares and tools), spare fuses, and wrench.
3. Fold and stow fuel can stand assembly. Wrap hook and pile straps around fuel can stand to secure.
4. Compress the air supply and return ducts and secure with the inside strap.
5. Stow the fuel can stand inside one of the compressed ducts.
6. Stow the in-tent controller assembly and in-tent controller cable assembly inside the duct with the fuel can stand.
7. Drain any residual fuel from the gravity feed adapter and fuel hose assembly into an approved container. Wipe up any spilled fuel. Place gravity feed adapter and hose assembly inside the second compressed duct.
8. Stow the two ducts inside the accessory bag.
9. Stow the technical manual and battery charging adapter between the two duct inside the accessory bag.
10. Close and secure the accessory bag.

**ADMINISTRATIVE STORAGE**

1. Placement of equipment in administrative storage should be for short periods of time when a shortage of maintenance effort exists. Items should be in mission readiness within 24 hours or within the time factors as determined by the directing authority. During the storage period, appropriate maintenance records will be kept.
2. Before placing the equipment in administrative storage, current preventive maintenance checks and services should be completed, shortcomings and deficiencies should be corrected, and all Modification Work Orders (MWO) should be applied.
3. Inside storage is preferred for items selected for administrative storage. If inside storage is not available, trucks, vans, conex containers, and other containers may be used.

**END OF WORK PACKAGE**

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**TM 10-4520-262-12&P**

**CHAPTER 6**  
**SUPPORTING INFORMATION**  
**SPACE HEATER, CONVECTIVE**

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**SPACE HEATER, CONVECTIVE (SHC)**  
**REFERENCES**


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**SCOPE**

This work package lists all forms, field manuals, and technical manuals referenced in this manual.

**FORMS**

Recommended Changes to Publications and Blank Forms	DA Form 2028
Recommended Changes to Equipment Technical Manuals	DA Form 2028-2
Equipment Inspection and Maintenance Worksheet	DA Form 2404
Product Quality Deficiency Report	SF 368

**FIELD MANUALS**

Chemical and Biological Contamination Avoidance	FM 3-3
NBC Protection	FM 3-4
NBC Decontamination	FM 3-5
First Aid for Soldiers	FM 21-11

**TECHNICAL MANUALS**

Destruction of Army Materiel to Prevent Enemy Use	TM 750-244-3
Inspection, Care, and Maintenance of Antifriction Bearings	TM 9-214
Painting Instructions for Army Materiel w/C1-C3 encl.	TM 43-0139

**MISCELLANEOUS**

The Army Maintenance Management System (TAMMS)	DA Pam 738-750
Functional Users Manual for the Army Maintenance Management System	DA Pam 738-751
Expendable/Durable Items	CTA 50-970
Army Medical Dept. Expendable/Durable Items	CTA 8-100
Army Logistics Readiness and Sustainability	AR 700-138

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**UNIT MAINTENANCE**  
**SPACE HEATER, CONVECTIVE**  
**MAINTENANCE ALLOCATION CHART**

---

**INTRODUCTION****The Army Maintenance System MAC**

This introduction provides a general explanation of all maintenance and repair functions authorized at various maintenance levels under the standard Army Maintenance System concept.

The MAC (immediately following the introduction) designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component shall be consistent with the capacities and capabilities of the designated maintenance levels, which are shown on the MAC in column (4) as:

- Unit - includes two subcolumns, C (operator/crew) and O (unit) maintenance
- Direct Support - includes an F subcolumn
- General Support - includes an H subcolumn
- Depot - includes a D subcolumn

The tools and test equipment requirements (immediately following the MAC) list the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from the MAC.

The remarks (immediately following the tools and test equipment requirements) contain supplemental instructions and explanatory notes for a particular maintenance function.

**Maintenance Functions**

Maintenance functions will be limited to and are defined as follows:

**Inspect.** To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel).

**Test.** To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards.

**Service.** Operations required periodically to keep an item in proper operating condition, i.e. to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.

**Adjust.** To maintain or regulate, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

**Align.** To adjust specified variable elements of an item to bring about optimum performance.

**Calibrate.** To determine and cause corrections to be made, or to be adjusted on instruments, tests, measuring, and diagnostic equipment used in precision measurement. Consists of comparisons of two

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instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

**Remove/Install.** To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper function of equipment or system.

**Replace.** To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and is shown as the 3rd position code of the Source, Maintenance, and Recoverability (SMR) code.

**Repair.** The application of maintenance services, including fault location/troubleshooting, removal/installation, and disassembly/assembly procedures, and maintenance actions to identify troubles, and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

The following definitions are applicable to the Repair maintenance function:

Services - Inspect, test, service, adjust, align, calibrate, and/or replace.

Fault location/troubleshooting-The process of investigating and detecting the cause of equipment malfunctioning; the act of isolating a fault within a system or Unit Under Test (UUT).

Disassembly/assembly-The step by step breakdown (taking apart) of a spare/functional group coded item to the level of its least component, that is assigned an SMR code for the level of maintenance under consideration (i.e., identified as maintenance significant).

Actions-Welding, grinding, riveting, straightening, facing, machining, and/or resurfacing.

**Overhaul.** That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publications (i.e., Depot Maintenance Work Requirement [DMWR]). Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

**Rebuild.** Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of material maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/miles, etc.) considered in classifying Army equipment/components.

### **Explanation of Columns in the MAC**

**Column 1. Group Number.** Column 1 lists functional group code numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the next higher assembly. End item group numbers are "00".

**Column 2. Component/Assembly.** Column 2 contains the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

Column 3, Maintenance Function. Column 3 lists the functions to be performed on the item listed in Column 2. For detailed explanation of these functions, refer to the previous section entitled "Maintenance Functions".

Column 4, Maintenance Level. Column 4 specifies, by the listing of a work time figure (expressed as man-hours shown as whole hours or decimals) in the appropriate subcolumn(s), the level of maintenance authorized to perform the function listed in Column (3). This figure represents the active time required to perform that maintenance function at the indicated level of maintenance. If the number or the complexity of the tasks within the listed maintenance function vary at different maintenance levels, appropriate work time figures will be shown for each level. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes item preparation (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. The system designations for the various maintenance levels are shown below:

C	.....	Operator or crew
O	.....	Unit Maintenance
F	.....	Direct Support Maintenance
D	.....	Depot Maintenance
H	.....	General Support Maintenance

Column 5, Tools and Equipment. Column 5 specifies, by code, those common tool sets (not individual tools) common TMDE, and special tools, special Test, Measurement, Diagnostic Equipment (TMDE), and support equipment required to perform the designated function.

Column 6, Remarks. This column, when applicable, contains a letter code, in alphabetic order, which is keyed to the remarks contained in Table 3.

### **Explanation of Columns in the Tools and Test Equipment Requirements**

Column (1) - Tool or Test Equipment Reference Code. The tool or test equipment reference code correlates with a code used in column (5) of the MAC.

Column (2) - Maintenance Level. The lowest level of maintenance authorized to use the tool or test equipment.

Column (3) - Nomenclature. Name or identification of tool or test equipment.

Column (4) - National Stock Number (NSN). The NSN of the tool or test equipment.

Column (5) - Tool Number. The manufacturer's part number, model number, or type number.

### **Explanation of Columns in Remarks**

Column (1) - Remarks Code. The code recorded in Column (6) of the MAC.

Column (2) - Remarks. This column lists information pertinent to the maintenance function being performed as indicated in the MAC.

Table 1. MAINTENANCE ALLOCATION CHART for SPACE HEATER, CONVECTIVE

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			Unit		DS	GS	Depot		
			C	O	F	H	D		
<b>00</b>	<b>Convective Space Heater</b>								
<b>01</b>	<b>In-Tent Controller Assembly</b>	<b>Inspect</b>	<b>0.1</b>	<b>0.1</b>					
		<b>Test</b>		<b>0.2</b>			<b>1</b>		
		<b>Replace</b>		<b>0.1</b>			<b>1</b>		
0101	In-Tent Controller	Inspect	0.1	0.1					
		Test		0.2			1		
		Replace		0.1			1		
0102	In-Tent Controller Cable	Inspect	0.1	0.1					
		Test		0.2			1		
		Replace		0.1					
<b>02</b>	<b>Battery Pack Assy</b>	<b>Inspect</b>	<b>0.1</b>	<b>0.1</b>					
		<b>Test</b>		<b>0.1</b>			<b>1</b>	<b>A,B</b>	
		<b>Service</b>		<b>0.5</b>			<b>3</b>		
		<b>Replace</b>		<b>0.2</b>			<b>1</b>		
<b>03</b>	<b>External Fuel System</b>	<b>Inspect</b>	<b>0.3</b>	<b>0.3</b>					
		<b>Service</b>		<b>0.2</b>				<b>C</b>	
		<b>Replace</b>		<b>1.0</b>			<b>1</b>		
0301	Fuel Supply Quick Disconnect	Inspect	0.1	0.1					
		Replace		0.2			1		
0302	Fuel Solenoid Valve and Sediment Strainer Assembly	Inspect	0.1	0.1					
		Service		0.2				<b>A,C</b>	
		Replace		0.5					
0303	Fuel Hose	Inspect	0.1	0.1					
		Replace		0.3			1		
<b>04</b>	<b>Electronic Control System</b>	<b>Inspect</b>	<b>0.4</b>	<b>0.2</b>					
		<b>Repair</b>		<b>0.2</b>					
		<b>Replace</b>		<b>0.8</b>			<b>1</b>		
0401	Heater Control Assembly	Inspect	0.1						
		Replace		0.2			1		
0402	Wire Harness	Inspect	0.1	0.2					
		Repair		0.2			1		
0403	Power Control Board	Inspect	0.1						
		Replace		0.3			1		
0404	Ignition Pack Assembly	Inspect	0.1						
		Replace		0.3			1		
<b>05</b>	<b>Dust Cover Assembly</b>	<b>Inspect</b>	<b>0.1</b>	<b>0.1</b>					
		<b>Replace</b>		<b>0.2</b>			<b>1</b>		
<b>06</b>	<b>Combustion Blower Assembly</b>	<b>Inspect</b>	<b>0.2</b>						
		<b>Replace</b>		<b>0.5</b>			<b>1</b>		

Table 1. MAINTENANCE ALLOCATION CHART for SPACE HEATER, CONVECTIVE

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			Unit		DS	GS	Depot		
			C	O	F	H	D		
0601	Combustion Air Blower Assembly	Inspect Replace	0.1	0.3				1	
0602	Combustion Air Blower Duct Assembly	Inspect Replace	0.1	0.1 0.2				1	
<b>07</b>	<b>Combustion Air Inlet Assembly</b>	<b>Inspect Replace</b>	<b>0.1</b>	<b>0.3</b>				<b>1</b>	
<b>08</b>	<b>Upper Housing Assembly</b>	<b>Inspect Service Replace</b>	<b>0.1</b>	<b>0.1 0.1</b>					
<b>09</b>	<b>Exhaust Grommet</b>	<b>Inspect Replace</b>	<b>0.1</b>	<b>0.2</b>					
<b>10</b>	<b>Duct Adapters</b>	<b>Inspect Replace</b>	<b>0.1</b>	<b>0.1</b>					
<b>11</b>	<b>Heated Air Blower Assembly</b>	<b>Inspect Test Replace</b>	<b>0.1</b>	<b>0.1 0.2 0.3</b>				<b>1 1</b>	
<b>12</b>	<b>Internal Fuel System</b>	<b>Inspect Service Replace</b>	<b>0.2</b>	<b>0.5 0.7</b>				<b>1</b>	
1201	Fuel Pump Assembly	Inspect Replace	0.1	0.5				1	
1202	Internal Fuel Lines	Inspect Replace	0.1	0.2				1	
1203	Float Assembly	Inspect Replace	0.1	0.5				1	
<b>13</b>	<b>Burner Assembly and Related Components</b>	<b>Remove Inspect Service Replace</b>	<b>0.1</b>	<b>0.3 0.2 0.5 0.7</b>				<b>1 1 1 1</b>	<b>A</b>
1301	Burner Assembly	Remove Inspect Service Replace	0.1	0.3 0.2 0.5 0.7				1 1	
1302	Flame Sensor	Replace	0.2					2	A
1303	Glow Plug	Replace	0.2					2	A
<b>14</b>	<b>Thermoelectric Generator (TEG)</b>	<b>Inspect Test Replace</b>	<b>0.1</b>	<b>0.2 0.2 0.5</b>				<b>1 1</b>	<b>D</b>

Table 1. MAINTENANCE ALLOCATION CHART for SPACE HEATER, CONVECTIVE

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			Unit		DS	GS	Depot		
			C	O	F	H	D		
15	Heat Exchanger	Remove		0.5				1	D
		Service		0.2				1	
		Inspect		0.5				1	
		Replace		0.7				1	
16	Lower Housing Assembly	Inspect	0.1						
		Service		0.1					
17	Air Return and Supply Ducts With Debris Grill	Inspect	0.1						
		Repair		0.1					
18	Spares, Tools, and Accessories	Inspect	0.1						E

Table 2. TOOLS AND TEST EQUIPMENT for SPACE HEATER, CONVECTIVE

(1) Tool or Test Equipment Ref Code	(2) Maintenance Level	(3) Nomenclature	(4) National Stock Number	(5) Tool Number
1	O	Tool Kit, General Mechanics	5180-00-699-5273	SC 5180-90-CL05
2	C,O	Wrench, 9/16 in and 12 mm (included with on-board spares and tool at inlet end of heater)		
3	C,O	Battery Charging Adapter (included with heater and stowed in accessory bag).		

Table 3. REMARKS for SPACE HEATER, CONVECTIVE

Remarks Code	Remarks
A	Spare items and wrench are stored behind the duct adapter at the breathable air inlet end of the heater.
B	Two spare 20 amp fuses are mounted behind compartment cover.
C	A gasket and screen are supplied with rest of on-board spares and tools.
D	Visual inspection
E	Replace any spares that have been used.



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**UNIT MAINTENANCE**  
**SPACE HEATER, CONVECTIVE**  
**(NSN 4520-01-431-8927)**

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**REPAIR PARTS AND SPECIAL TOOLS LIST**

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## **INTRODUCTION**

### **SCOPE**

This RPSTL lists and authorizes spares and repair parts; special tools; special test, measurement, and diagnostic equipment (TMDE); and other special support equipment required for performance of operator, unit, and direct support maintenance of the Space Heater, Convective (SHC). It authorizes the requisitioning, issue, and disposition of spares, repair parts, and special tools as indicated by the source, maintenance, and recoverability (SMR) codes.

### **GENERAL**

In addition to the Introduction work package, this RPSTL is divided into the following work packages.

1. Repair Parts List Work Packages. Work packages containing lists of spares and repair parts authorized by this RPSTL for use in the performance of maintenance. These work packages also include parts which must be removed for replacement of the authorized parts. Parts lists are composed of functional groups in ascending alphanumeric sequence, with the parts in each group listed in ascending figure and item number sequence. Sending units, brackets, filters, and bolts are listed with the component they mount on. Bulk materials are listed by item name in FIG. BULK at the end of the work packages. Repair parts kits are listed separately in their own functional group and work package. Repair parts for reparable special tools are also listed in a separate work package. Items listed are shown on the associated illustrations.
2. Special Tools List Work Packages. Work packages containing lists of special tools, special TMDE, and special support equipment authorized by this RPSTL (as indicated by Basis of Issue (BOI) information in the DESCRIPTION AND USABLE ON CODE (UOC) column). Tools that are components of common tool sets and/or Class VII are not listed.
3. Cross-Reference Indexes Work Packages. There are 2 cross-reference indexes work packages in this RPSTL: the National Stock Number (NSN) Index work package, and the Part Number (P/N) Index work package. The National Stock Number Index work package refers you to the figure and item number. The Part Number Index work package refers you to the figure and item number.

**EXPLANATION OF COLUMNS IN THE REPAIR PARTS LIST AND SPECIAL TOOLS LIST WORK PACKAGES**

ITEM NO. (Column (1)). Indicates the number used to identify items called out in the illustration.

SMR CODE (Column (2)). The SMR code containing supply/requisitioning information, maintenance level authorization criteria, and disposition instruction, shown in the following breakout:

<u>Source Code</u>	<u>Maintenance Code</u>	<u>XX</u>	<u>Recoverability Code</u>
<u>XX</u> 1st two positions: How to get an item.	3rd position: Who can install, replace, or use the item.	<u>XX</u> 4th position: Who can do complete repair* on the item.	<u>X</u> 5th position: Who determines disposition action on unserviceable items.

\*Complete Repair: Maintenance capacity, capability, and authority to perform all corrective maintenance tasks of the "Repair" function in a use/user environment in order to restore serviceability to a failed item.

Source Code. The source code tells you how you get an item needed for maintenance, repair, or overhaul of an end item/equipment. Explanations of source codes follow:

<u>Source Code</u>	<u>Application/Explanation</u>
PA	Stock items; use the applicable NSN to requisition/request items with these source codes. They are authorized to the level indicated by the code entered in the 3rd position of the SMR code.
PB	
PC	
PD	
FE	
PF	
PG	
	<b>NOTE</b>
	Items coded PC are subject to deterioration.
	Items with these codes are not to be requested/requisitioned individually.
KD	They are part of a kit which is authorized to the maintenance level indicated in the 3rd position of the SMR code. The complete kit must be requisitioned and applied.
KF	
KB	
MO-Made at unit/ AVUM level	Items with these codes are not to be requisitioned/requested individually.
MF-Made at DS/ AVIM level	They must be made from bulk material which is identified by the P/N in the DESCRIPTION AND USABLE ON CODE (UOC) column and listed in the bulk material group work
MH-Made at GS level	
ML-Made at SRA	

MD-Made at depot	package of the RPSTL. If the item is authorized to you by the 3rd position code of the SMR code, but the source code indicates it is made at higher level, order the item from the higher level of maintenance.
AO-Assembled by unit/AVUM level AF-Assembled by DS/AVIM level AH-Assembled by GS level AL-Assembled by SRA AD-Assembled by depot	Items with these codes are not to be requested/requisitioned individually. The parts that make up the assembled item must be requisitioned or fabricated and assembled at the level of maintenance indicated by the source code. If the 3rd position of the SMR code authorizes you to replace the item, but the source code indicates the item is assembled at a higher level, order the item from the higher level of maintenance.
XA	Do not requisition an "XA" coded item. Order the next higher assembly. (Refer to NOTE below.)
XE	If an item is not available from salvage, order it using the CAGEC and P/N.
XC	Installation drawings, diagrams, instruction sheets, field service drawings; identified by manufacturer's P/N.
XD	Item is not stocked. Order an XD-coded item through normal supply channels using the CAGEC and P/N given, if no NSN is available.

**NOTE**

Cannibalization or controlled exchange, when authorized, may be used as a source of supply for items with the above source codes except for those items source coded "XA" or those aircraft support items restricted by requirements of AR 750-1.

Maintenance Code. Maintenance codes tell you the level(s) of maintenance authorized to use and repair support items. The maintenance codes are entered in the third and fourth positions of the SMR code as follows:

Third Position. The maintenance code entered in the third position tells you the lowest maintenance level authorized to remove, replace, and use an item. The maintenance code entered in the third position will indicate authorization to the following levels of maintenance:

**Maintenance**

<b><u>Code</u></b>	<b><u>Application/Explanation</u></b>
C —	Crew or operator maintenance done within unit/AVUM maintenance.
O —	Unit level/AVUM maintenance can remove, replace, and use the item.
F —	Direct support/AVIM maintenance can remove, replace, and use the item.
H —	General support maintenance can remove, replace, and use the item.
L —	Specialized repair activity can remove, replace, and use the item.
D —	Depot can remove, replace, and use the item.

Fourth Position. The maintenance code entered in the fourth position tells you whether or not the item is to be repaired and identifies the lowest maintenance level with the capability to do complete repair (perform all authorized repair functions).

**NOTE**

Some limited repair may be done on the item at a lower level of maintenance, if authorized by the Maintenance Allocation Chart (MAC) and SMR codes.

**Maintenance**

<b><u>Code</u></b>	<b><u>Application/Explanation</u></b>
O —	Unit/AVUM is the lowest level that can do complete repair of the item.
F —	Direct support/AVIM is the lowest level that can do complete repair of the item. H — General support is the lowest level that can do complete repair of the item.
L —	Specialized repair activity, Direct Support (DS) is the lowest level that can do complete repair of the item.
D —	Depot is the lowest level that can do complete repair of the item. Z — Nonreparable. No repair is authorized.
B —	No repair is authorized. No parts or special tools are authorized for maintenance of "B" coded item. However, the item may be reconditioned by adjusting, lubricating, etc., at the user level.

Recoverability Code. Recoverability codes are assigned to items to indicate the disposition action on unserviceable items. The recoverability code is shown in the fifth position of the SMR code as follows:

**Recoverability**

<b><u>Code</u></b>	<b><u>Application/Explanation</u></b>
Z —	Nonreparable item. When unserviceable, condemn and dispose of the item at the level of maintenance shown in the third position of the SMR code.
O —	Reparable item. When uneconomically repairable, condemn and dispose of the item at the unit level.
F —	Reparable item. When uneconomically repairable, condemn and dispose of the item at the direct support level.
H —	Reparable item. When uneconomically repairable, condemn and dispose of the item at the general support level.

- D — Repairable item. When beyond lower level repair capability, return to depot. Condemnation and disposal of item are not authorized below depot level.
- L — Repairable item. Condemnation and disposal not authorized below Specialized Repair Activity (SRA).
- A — Item requires special handling or condemnation procedures because of specific reasons (such as precious metal content, high dollar value, critical material, or hazardous material). Refer to appropriate manuals/directives for specific instructions.

NSN (Column (3)). The NSN for the item is listed in this column.

CAGEC (Column (4)). The Commercial and Government Entity Code (CAGEC) is a five-digit code which is used to identify the manufacturer, distributor, or Government agency/activity that supplies the item.

PART NUMBER (Column (5)). Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items.

#### NOTE

When you use an NSN to requisition an item, the item you receive may have a different P/N from the number listed.

DESCRIPTION AND USABLE ON CODE (UOC) (Column (6)). This column includes the following information:

1. The federal item name, and when required, a minimum description to identify the item.
2. P/Ns of bulk materials are referenced in this column in the line entry to be manufactured or fabricated.
3. Hardness Critical Item (HCI). A support item that provides the equipment with special protection from electromagnetic pulse (EMP) damage during a nuclear attack.
4. The statement END OF FIGURE appears just below the last item description in column (6) for a given figure in both the repair parts list and special tools list work packages.

QTY (Column (7)). The QTY (quantity per figure) column indicates the quantity of the item used in the breakout shown on the illustration/figure, which is prepared for a functional group, subfunctional group, or an assembly. A "V" appearing in this column instead of a quantity indicates that the quantity is variable and quantity may change from application to application.

**EXPLANATION OF CROSS-REFERENCE INDEXES WORK PACKAGES FORMAT AND COLUMNS**

## 1. National Stock Number (NSN) Index Work Package.

**STOCK NUMBER Column.** This column lists the NSN in National item identification number (NIIN) sequence. The NIIN consists of the last nine digits of the NSN.

NSN  
 (e.g., 5385-01-574-1476)  
 NIIN

When using this column to locate an item, ignore the first four digits of the NSN. However, the complete NSN should be used when ordering items by stock number.

**FIG. Column.** This column lists the number of the figure where the item is identified/located. The figures are in numerical order in the repair parts list and special tools list work packages.

**ITEM Column.** The item number identifies the item associated with the figure listed in the adjacent FIG. column. This item is also identified by the NSN listed on the same line.

2. Part Number (P/N) Index Work Package. P/Ns in this index are listed in ascending alphanumeric sequence (vertical arrangement of letter and number combinations which places the first letter or digit of each group in order A through Z, followed by the numbers 0 through 9 and each following letter or digit in like order).

**PART NUMBER Column.** Indicates the P/N assigned to the item.

**FIG. Column.** This column lists the number of the figure where the item is identified/located in the repair parts list and special tools list work packages.

**ITEM Column.** The item number is the number assigned to the item as it appears in the figure referenced in the adjacent figure number column.”

**REFERENCE DESIGNATOR Column.** Indicates the reference designator assigned to the item.

**FIG. Column.** This column lists the number of the figure where the item is identified/located in the repair parts list or special tools list work package.

**ITEM Column.** The item number is the number assigned to the item as it appears in the figure referenced in the adjacent figure number column.

## SPECIAL INFORMATION

UOC. The UOC appears in the lower left corner of the Description Column heading. Usable on codes are shown as "UOC: .." in the Description Column (justified left) on the first line under the applicable item/nomenclature. Uncoded items are applicable to all models. Identification of the UOCs used in the RPSTL are:

<u>Code</u>	<u>Used On</u>
FSB	Space Heater, Convective

Associated Publications. The publications listed below pertain to the Kitchen, Field, Trailer Mounted and its components:

<u>Publication</u>	<u>Short Title</u>
TM 10-4520-262-13&P	Operator's, Unit, and Direct Support Maintenance Manual Space Heater, Convective

Fabrication Instructions. Bulk materials required to manufacture items are listed in the bulk material functional group of this RPSTL. Part numbers for bulk material are also referenced in the Description Column of the line item entry for the item to be manufactured/fabricated. Detailed fabrication instructions for items source coded to be manufactured or fabricated are found in this TM.

Index Numbers. Items which have the word BULK in the figure column will have an index number shown in the item number column. This index number is a cross-reference between the NSN / P/N index work packages and the bulk material list in the repair parts list work package.

## HOW TO LOCATE REPAIR PARTS

### 1. When NSNs or P/Ns Are Not Known.

First. Using the table of contents, determine the assembly group to which the item belongs. This is necessary since figures are prepared for assembly groups and subassembly groups, and lists are divided into the same groups.

Second. Find the figure covering the functional group or the subfunctional group to which the item belongs.

Third. Identify the item on the figure and note the number(s).

Fourth. Look in the repair parts list work packages for the figure and item numbers. The NSNs and part numbers are on the same line as the associated item numbers.

### 2. When NSN Is Known.

First. If you have the NSN, look in the STOCK NUMBER column of the NSN index work package. The NSN is arranged in NIIN sequence. Note the figure and item number next to the NSN.

Second. Turn to the figure and locate the item number. Verify that the item is the one you are looking for.

3. When P/N Is Known.

First. If you have the PIN and not the NSN, look in the PART NUMBER column of the PIN index work package. Identify the figure and item number.

Second. Look up the item on the figure in the applicable repair parts list work package.



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UNIT MAINTENANCE  
SPACE HEATER, CONVECTIVE  
(NSN 4520-01-431-8927)  
IN-TENT CONTROLLER ASSEMBLY  
REPAIR PARTS LIST

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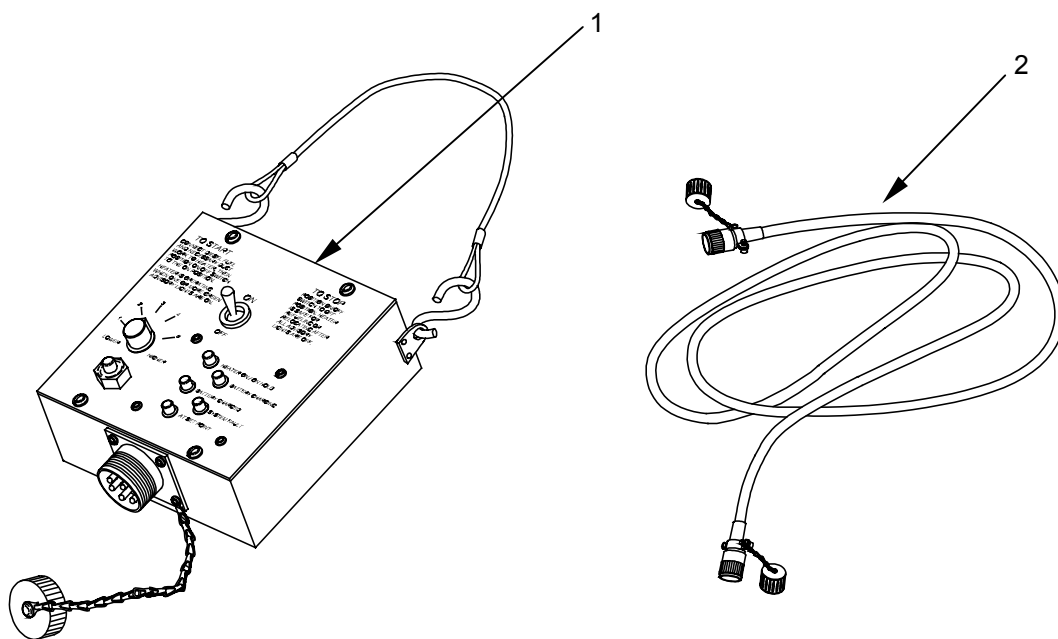


Figure 1. In-tent Controller Assembly

(1)	(2)	(3)	(4)	(5)	(6)	(7)
ITEM NO	SMR CODE	NATIONAL STOCK NUMBER	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
					GROUP 1 FIG. 1 IN-TENT CONTROLLER ASSY	
1	PAOZZ	4520-01-493-2800	92878	5-13-5506	. IN-TENT CONTROLLER ASSY .....	1
2	PAOZZ	4520-01-493-2807	92878	5-13-5577	. REMOTE IN-TENT CONTROLLER ASSY CABLE .....	1
					END OF FIGURE	

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UNIT MAINTENANCE  
SPACE HEATER, CONVECTIVE  
(NSN 4520-01-431-8927)  
BATTERY PACK ASSEMBLY  
REPAIR PARTS LIST

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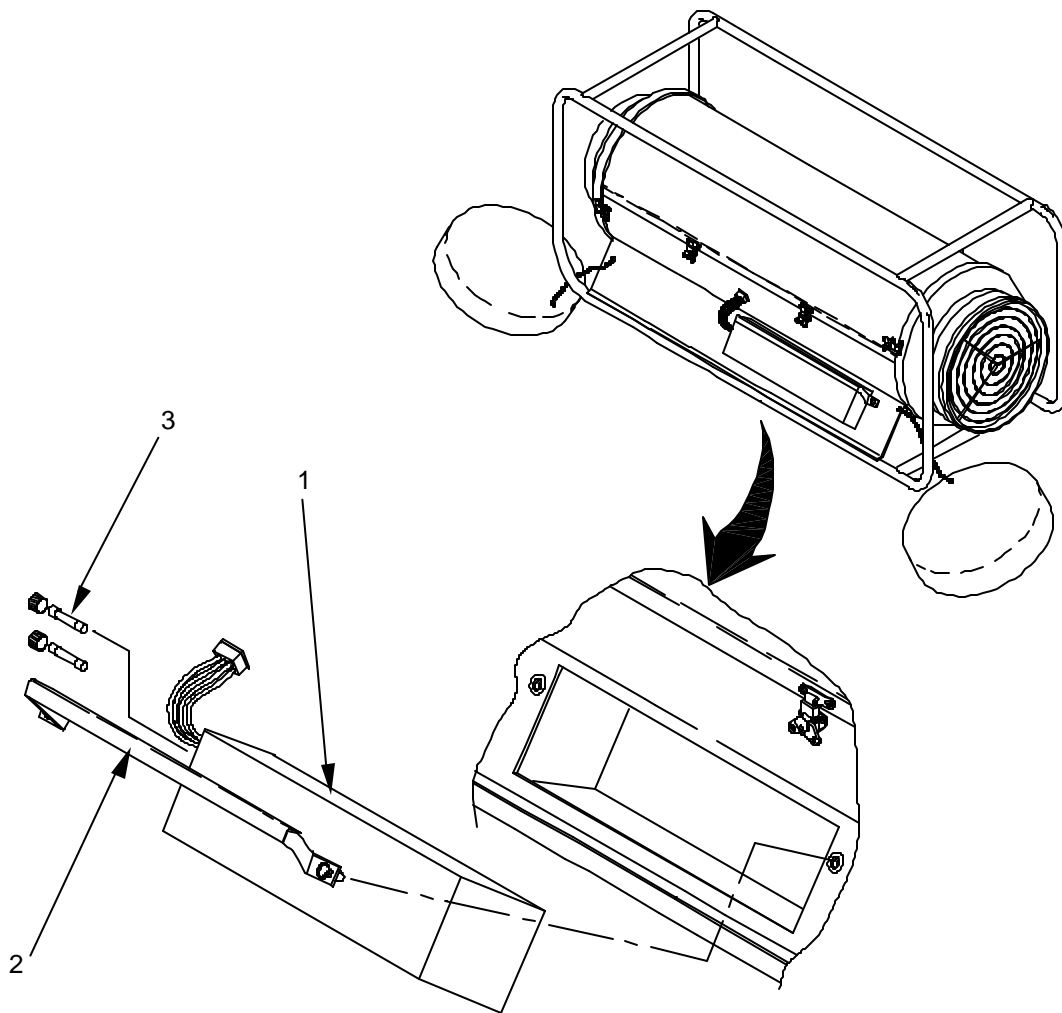


Figure 2. Battery Assembly

(1)	(2)	(3)	(4)	(5)	(6)	(7)
ITEM NO	SMR CODE	NATIONAL STOCK NUMBER	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
					GROUP 2 FIG. 2 BATTERY ASSY	
1	PAOZZ	4520-01-493-2796	92878	5-13-5469	. BATTERY PACK MODIFIED .....	1
2	PAOZZ	4520-01-493-2794	92878	5-13-5468	.. RETAINER, BATTERY.....	1
3	PAOZZ	4520-01-493-2777	92878	46273	.. FUSE, 20 AMP .....	2
					END OF FIGURE	

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**UNIT MAINTENANCE**  
**SPACE HEATER, CONVECTIVE**  
**(NSN 4520-01-431-8927)**  
**EXTERNAL FUEL SYSTEM**  
**REPAIR PARTS LIST**

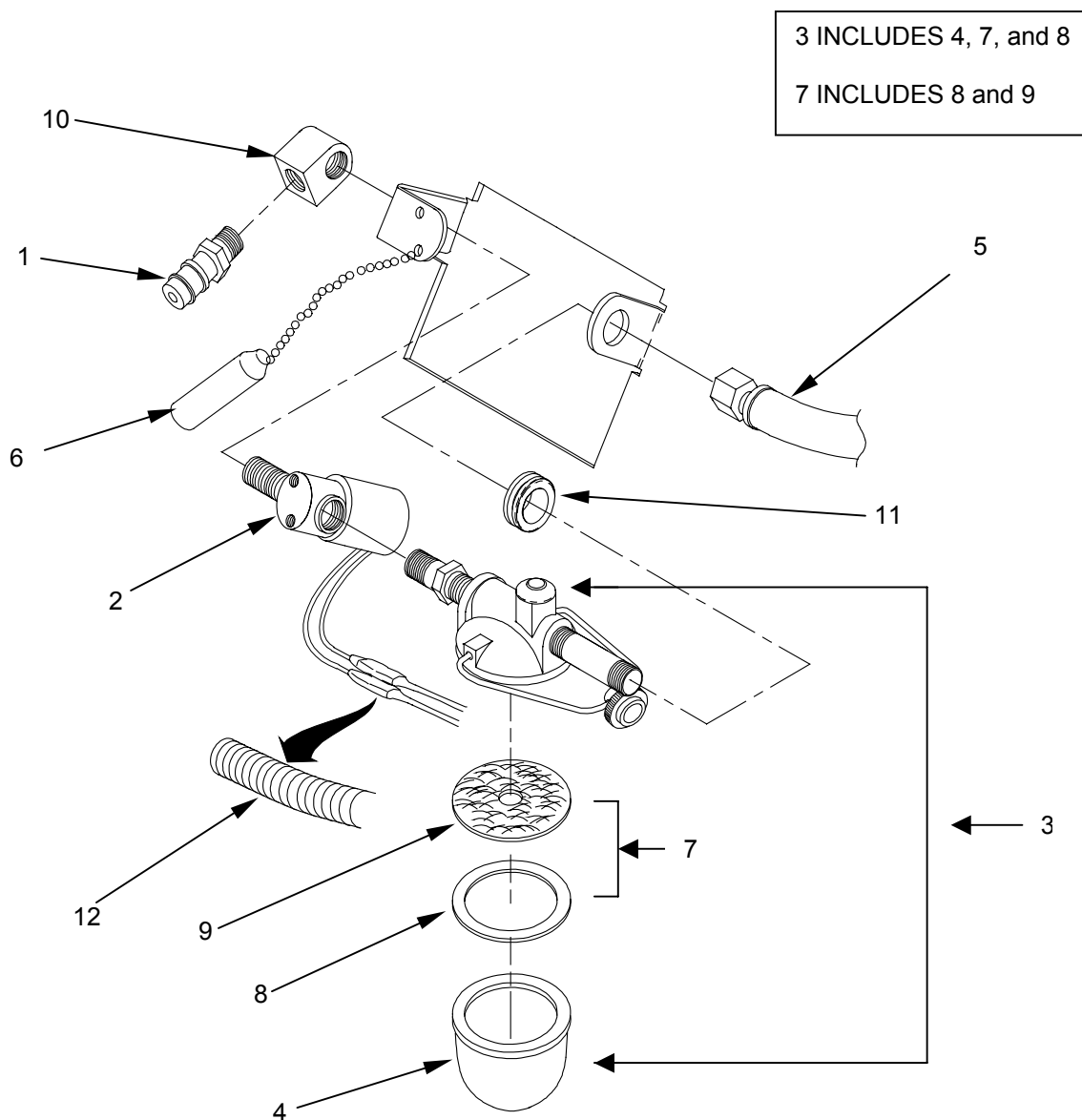


Figure 3. External Fuel System Components

(1)	(2)	(3)	(4)	(5)	(6)	(7)
ITEM NO	SMR CODE	NATIONAL STOCK NUMBER	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
					GROUP 3 FIG. 3 EXTERNAL FUEL SYSTEM COMPONENTS	
1	PAOZZ	4730-01-206-8726	92878	HP2-4374	. FUEL QUICK DISCONNECT .....	1
2	PAOZZ	4520-01-493-2790	92878	5-13-5439	. FUEL SOLENOID VALVE	1
3	PAOZZ	4520-01-493-2814	92878	5-13-5637	SEDIMENT STRAINER ASSY	1
4	XAOZZ		92878	4782401	. SEDIMENT BOWL.....	1
5	PAOZZ	4520-01-493-2782	92878	60478	. FUEL HOSE ASSY.....	1
6	PAOZZ	4520-01-493-2785	92878	5-13-5616	. FUEL CAP ASSEMBLY.....	1
7	PAOZZ	4520-01-493-2816	92878	5-13-5638	.KIT, FUEL STRAINER	1
8	KFOZZ		92878	5-13-5530	....GASKET, FUEL STRAINER.....	1
9	KFOZZ		92878	5-13-5531	....SCREEN, FUEL STRAINER.....	1
10	PAOZZ		92878	1366	. ELBOW FEMALE .....	1
11	PAOZZ	4520-01-492-9125	92878	5914	. GROMMET .....	1
12	PAOZZ	4520-01-493-2813	92878	52417-9	WIRE LOOM END OF FIGURE	1 AR

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**UNIT MAINTENANCE**  
**SPACE HEATER, CONVECTIVE**  
**(NSN 4520-01-431-8927)**  
**ELECTRONIC CONTROL SYSTEM**  
**REPAIR PARTS LIST**

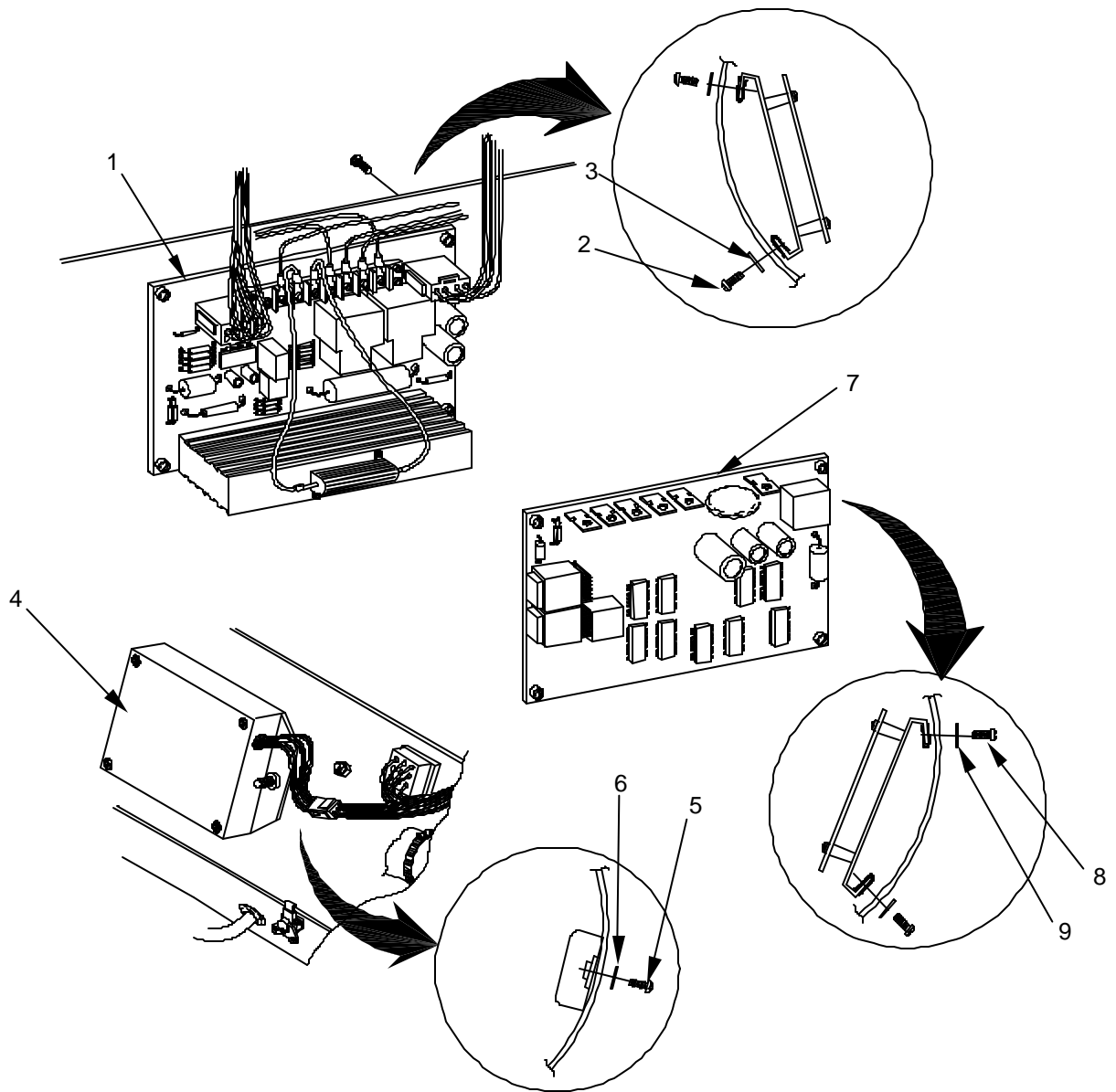


Figure 4. Electronic Control System

(1)	(2)	(3)	(4)	(5)	(6)	(7)
ITEM NO	SMR CODE	NATIONAL STOCK NUMBER	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
					GROUP 4 FIG. 4 ELECTRONIC CONTROL SYSTEM	
1	PAOZZ	4520-01-493-2806	92878	5-13-5565	. POWER CONTROL ASSY.....	1
2	PAOZZ	5305-00-432-4171	96906	MS51861-36	SCREW, TAPPING #8 .....	4
3	PAOZZ	5310-00-193-7577	96906	MS35333-36	. . WASHER, INT LOCK	4
4	PAOZZ	4520-01-493-2779	92878	60468	. IGNITION PACK .....	1
5	PAOZZ	5305-00-988-1728	96906	MS35206-287	SCREW, ¼ 20x2.00 .....	2
6	PAOZZ	5310-00-209-0786	96906	MS35335-19	. WASHER, EXT LOCK ¼ .....	4
7	PAOZZ	4520-01-493-2805	92878	5-13-5568	. HEATER CONTROL ASSY.....	1
8	PAOZZ	5305-00-432-4171	96906	MS51861-36	. SCREW, TAPPING #8 .....	4
9	PAOZZ	5310-00-559-0070	96906	MS35333-38	. . WASHER, INT LOCK.....	4
10	PAOZZ	4520-01-493-2808	92878	5-13-5579	WIRE HARNESS	1
					END OF FIGURE	

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UNIT MAINTENANCE  
SPACE HEATER, CONVECTIVE  
(NSN 4520-01-431-8927)  
DUST COVER ASSEMBLY  
REPAIR PARTS LIST

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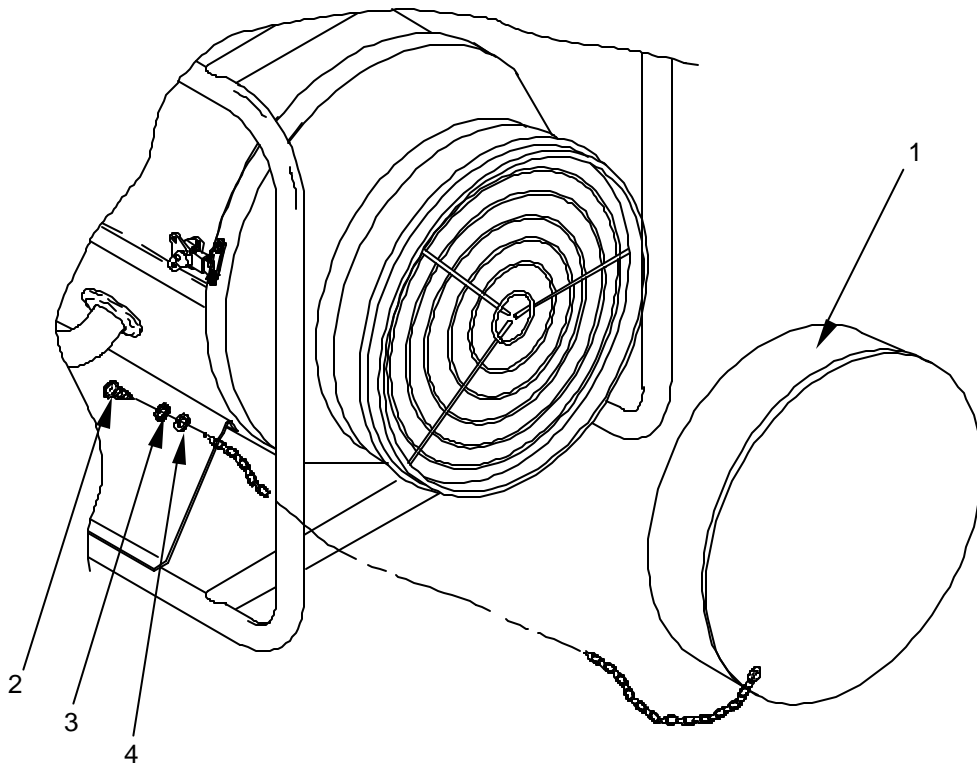


Figure 5. Chain and Dust Cover Assembly  
0050 00-(1 Blank)/2

(1)	(2)	(3)	(4)	(5)	(6)	(7)
ITEM NO	SMR CODE	NATIONAL STOCK NUMBER	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
					GROUP 5 FIG. 5 CHAIN AND DUST COVER ASSY	
1	PAOZZ	4520-01-493-2793	92878	5-13-5461	. DUST COVER ASSY.....	2
2	PAOZZ	5305-00-432-4171	96906	MS51861-36	.. SCREW .....	2
3	PAOZZ	5310-00-193-7577	96906	MS35333-36	.. WASHER, INT LOCK	2
4	PAOZZ	5310-00-014-5850	96906	MS27183-42	.. WASHER, FLAT 7/32 ID .....	2
					END OF FIGURE	

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UNIT MAINTENANCE  
SPACE HEATER, CONVECTIVE  
(NSN 4520-01-431-8927)  
COMBUSTION BLOWER ASSEMBLY  
REPAIR PARTS LIST

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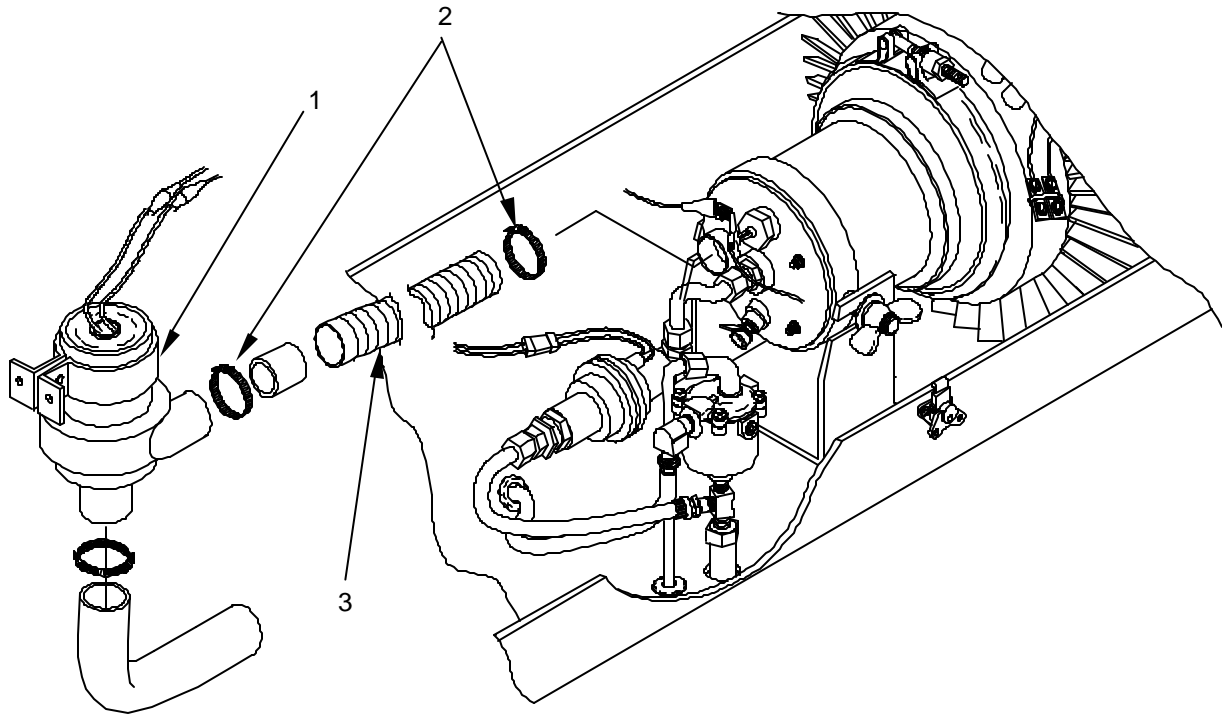


Figure 6. Internal Combustion Air System

(1)	(2)	(3)	(4)	(5)	(6)	(7)
ITEM NO	SMR CODE	NATIONAL STOCK NUMBER	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
					GROUP 6 FIG. 6 INTERNAL COMBUSTION AIR SYSTEM	
1	PAOZZ	4520-01-493-2804	92878	5-13-5564	. COMBUSTION AIR BLOWER ASSY.....	1
2	PAOZZ		92878	49602	. CLAMP HOSE MICRO GEAR .....	2
3	PAOZZ		92878	5-13-5511	. DUCTING, 1" I.D.....	1
					END OF FIGURE	

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UNIT MAINTENANCE  
SPACE HEATER, CONVECTIVE  
(NSN 4520-01-431-8927)  
COMBUSTION AIR INLET ASSEMBLY  
REPAIR PARTS LIST

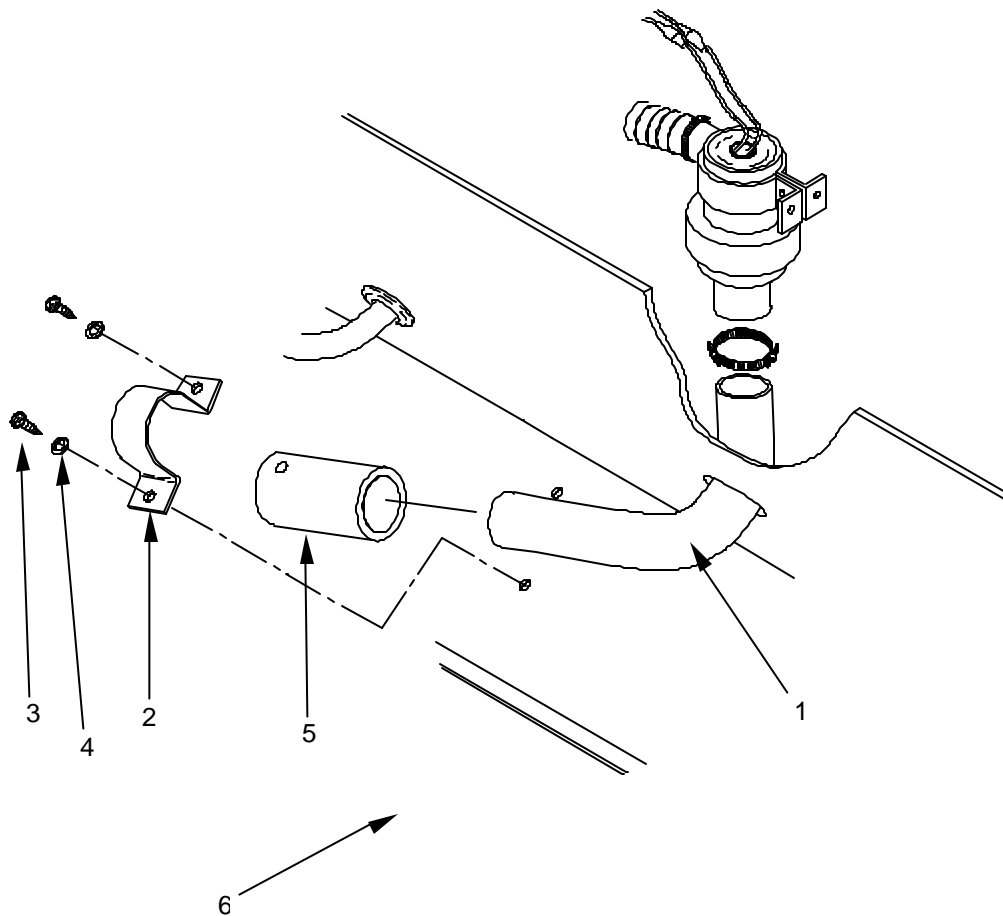


Figure 7. Combustion Air Inlet Assembly

(1)	(2)	(3)	(4)	(5)	(6)	(7)
ITEM NO	SMR CODE	NATIONAL STOCK NUMBER	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
					GROUP 7 FIG. 7 EXTERNAL AIR COMBUSTION SYSTEM	
1	PAOZZ	4520-01-493-2795	92878	5-13-5490	. COMBUSTION AIR INLET ASSY.....	1
2	PAOZZ		92878	5-13-5162	. CLAMP COMBUSTION AIR TUBE.....	1
3	PAOZZ	5305-00-989-7434	96906	MS35207-263	. SCREW PHM 10-32 X 1/2 .....	2
4	PAOZZ	5310-00-067-6357	96906	MS45904-69	. WASHER LK INT EXT 1/4 .....	2
5	PAOZZ		92878	5-13-5489	. TUBE, ADAPTER .....	1
6	PAOZZ		92878	5-13-5422	. COVER COMBUSTION TUBE INTAKE ..	1
					END OF FIGURE	

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UNIT MAINTENANCE  
SPACE HEATER, CONVECTIVE  
(NSN 4520-01-431-8927)  
UPPER HOUSING ASSEMBLY  
REPAIR PARTS LIST

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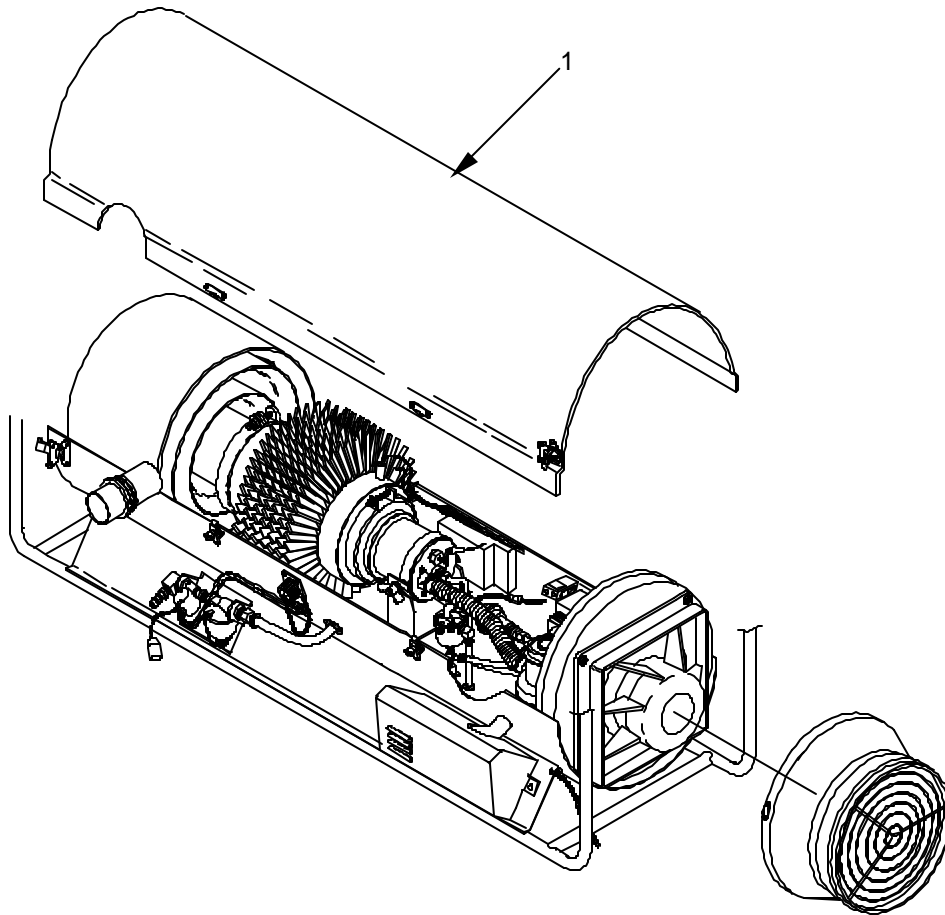


Figure 8. Upper Housing Assembly

(1)	(2)	(3)	(4)	(5)	(6)	(7)
ITEM NO	SMR CODE	NATIONAL STOCK NUMBER	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
1	PAOZZ	4520-01-493-2788	92878	5-13-5634	GROUP 8 FIG. 8. UPPER HOUSING ASSY . UPPER HOUSING ASSY..... END OF FIGURE	1

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UNIT MAINTENANCE  
SPACE HEATER, CONVECTIVE  
(NSN 4520-01-431-8927)  
EXHAUST GROMMET  
REPAIR PARTS LIST

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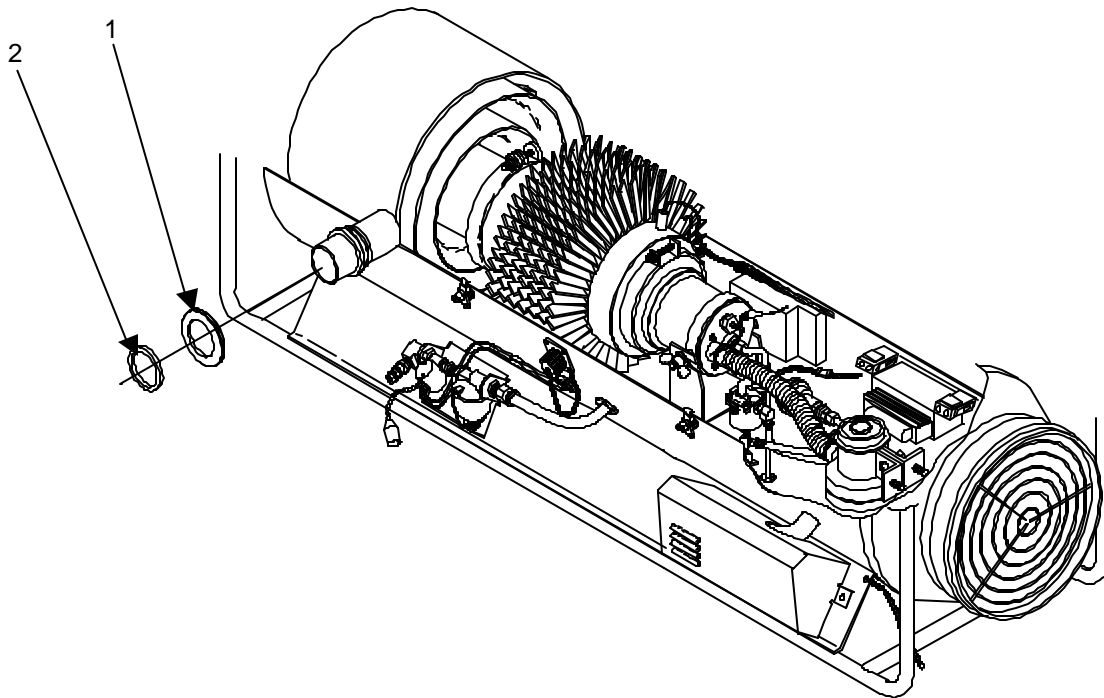


Figure 9. Exhaust Grommet

(1)	(2)	(3)	(4)	(5)	(6)	(7)
ITEM NO	SMR CODE	NATIONAL STOCK NUMBER	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
					GROUP 9 FIG. 9 EXHAUST GROMMET	
1	PAOZZ	4520-01-493-2801	92878	5-13-5519	. EXHAUST GROMMET .....	1
2	PAOZZ	4520-01-493-2803	92878	5-13-5539	. SEAL, EXHAUST .....	1
					END OF FIGURE	

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UNIT MAINTENANCE  
SPACE HEATER, CONVECTIVE  
(NSN 4520-01-431-8927)  
DUCT ADAPTERS  
REPAIR PARTS LIST

---

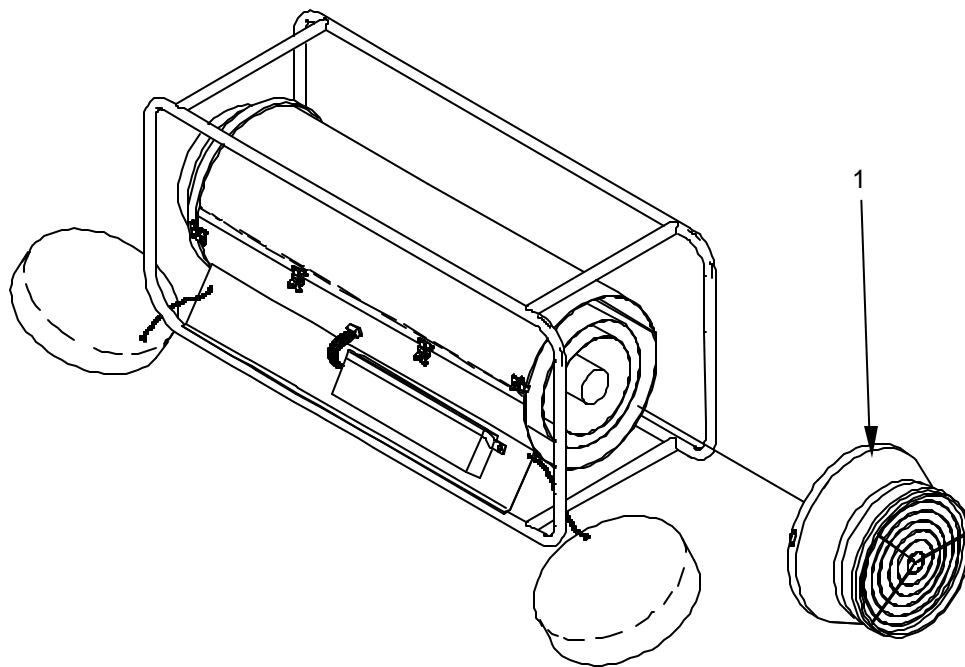


Figure 10. Duct Adapters

(1)	(2)	(3)	(4)	(5)	(6)	(7)
ITEM NO	SMR CODE	NATIONAL STOCK NUMBER	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
1	PAOZZ	4520-01-493-2787	92878	5-13-5435	GROUP 10 FIG. 10 DUCT ADAPTERS . DUCT ADAPTER .....	2
END OF FIGURE						

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UNIT MAINTENANCE  
SPACE HEATER, CONVECTIVE  
(NSN 4520-01-431-8927)  
HEATED AIR BLOWER ASSEMBLY  
REPAIR PARTS LIST

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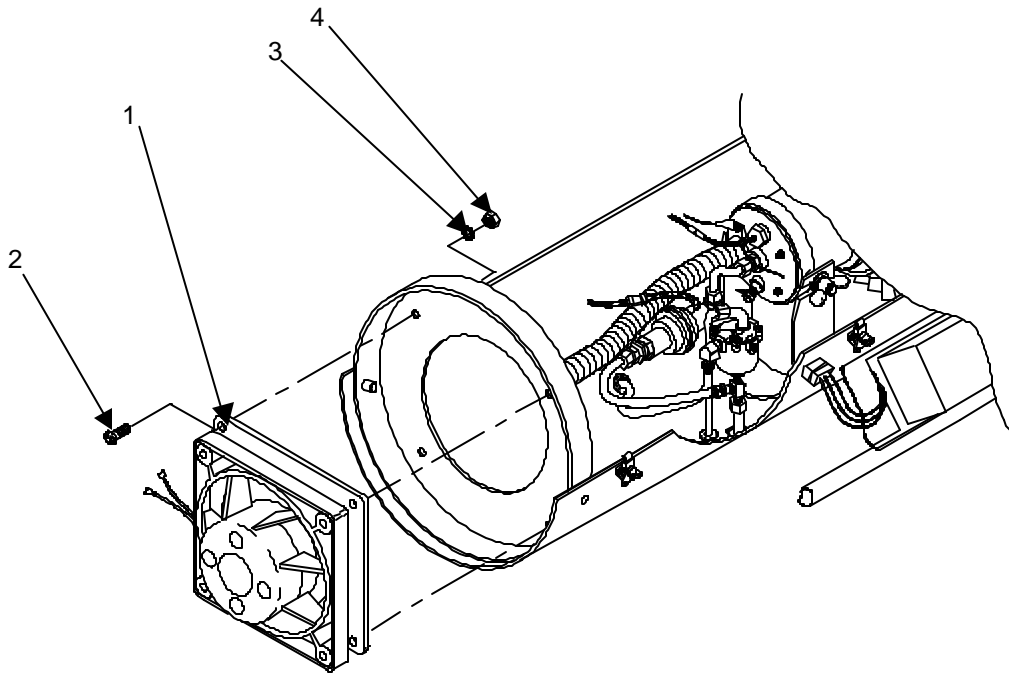


Figure 11. Heated Air Blower Assembly

(1)	(2)	(3)	(4)	(5)	(6)	(7)
ITEM NO	SMR CODE	NATIONAL STOCK NUMBER	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
					GROUP 11 FIG. 11 HEATED AIR BLOWER ASSY	
1	PAOZZ	4520-01-493-2862	92878	5-13-5425	. HEATED AIR BLOWER ASSY.....	1
2	PAOZZ	5305-00-989-7435	96906	MS35207-264	. SCREW PHM 10/32 X 5/8 .....	4
3	PAOZZ	5310-00-596-7691	96906	MS35335-32	. WASHER, LOCK, EXT #10.....	4
4	PAOZZ	5310-00-789-0398	19207	7951286	. NUT HEX KEP 10-32.....	4
					END OF FIGURE	

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UNIT MAINTENANCE  
SPACE HEATER, CONVECTIVE  
(NSN 4520-01-431-8927)  
INTERNAL FUEL SYSTEM  
REPAIR PARTS LIST

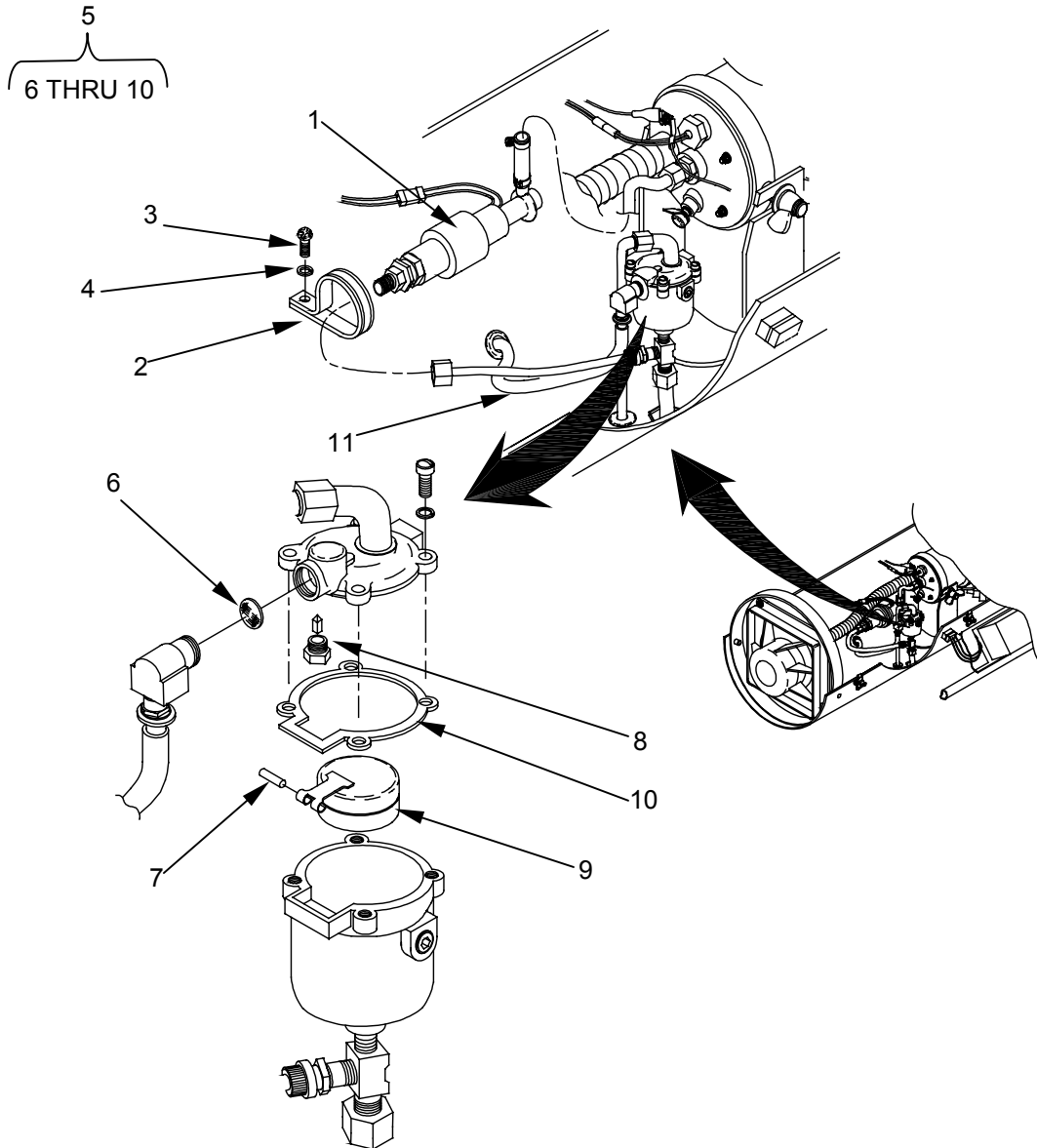


Figure 12. Internal Fuel System

(1)	(2)	(3)	(4)	(5)	(6)	(7)
ITEM NO	SMR CODE	NATIONAL STOCK NUMBER	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
					GROUP 12 FIG. 12 INTERNAL FUEL SYSTEM	
1	PAOZZ	4520-01-493-2778	92878	60481	. FUEL PUMP .....	1
2	PAOZZ	5340-00-904-3705	96906	MS21333-82	. CLAMP, LOOP .....	1
3	PAOZZ	5305-00-989-7435	96906	MS35207-264	. SCREW PHM .....	1
4	PAOZZ	5310-00-596-7691	96906	MS35335-32	. WASHER LK EXT #10.....	1
5	PAOZZ	4520-01-493-2784	92878	60499	. FLOAT ASSY .....	1
6	XAOZZ		92878	26370	. . INLET SCREEN.....	1
7	XAOZZ		92878	1591	. . PIN.....	1
8	XAOZZ		92878	48389	. . NEEDLE AND SEAT .....	1
9	XAOZZ		92878	48390	. . FLOAT .....	1
10	XAOZZ		92878	1601	. . GASKET .....	1
11	PAOZZ	4520-01-493-2786	92878	60477	TUBING PARFLEX	AR
					END OF FIGURE	

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UNIT MAINTENANCE  
SPACE HEATER, CONVECTIVE  
(NSN 4520-01-431-8927)

BURNER ASSEMBLY AND RELATED COMPONENTS

REPAIR PARTS LIST

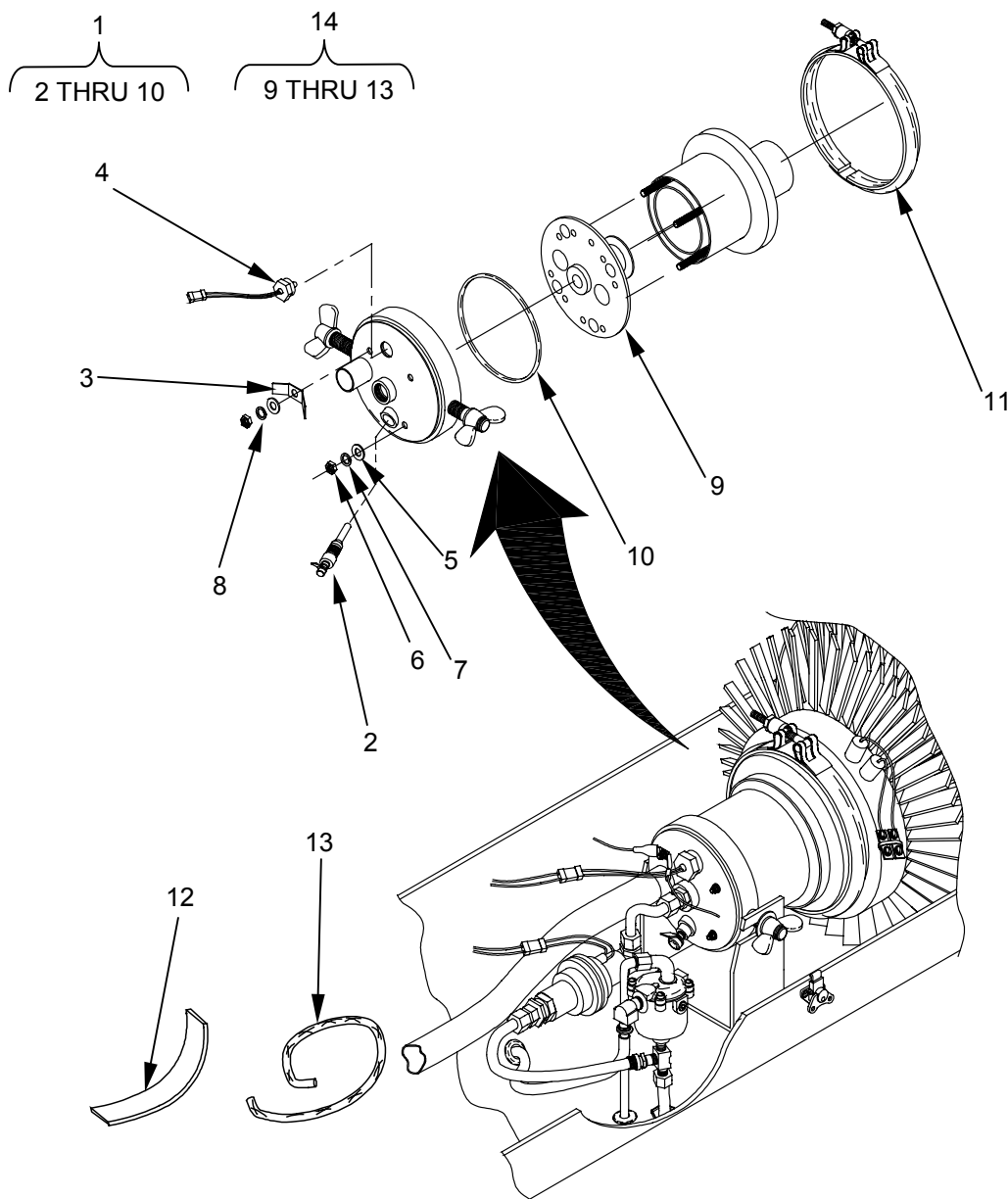


Figure 13. Burner Assembly

(1)	(2)	(3)	(4)	(5)	(6)	(7)
ITEM NO	SMR CODE	NATIONAL STOCK NUMBER	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
					GROUP 13 FIG. 13 BURNER ASSY	
1	PAOZZ	4520-01-493-2817	92878	60490	. BURNER ASSY .....	1
2	PAOZZ	4520-01-493-2783	92878	60480	.. GLOW PLUG.....	1
3	PAOZZ		92878	60469	.. TAB, QUICK CONNECT.....	1
4	PAOZZ	4520-01-493-2781	92878	60470	.. SENSOR, FLAME.....	1
5	PAOZZ	5310-00-014-5850	96906	MS27183-42	.. WASHER FLAT .....	2
6	PAOZZ	5310-00-934-9758	96906	MS35649-202	.. NUT, HEX #10-24 THD .....	3
7	PAOZZ	5310-00-045-3296	96906	MS35338-43	.. LOCKWASHER, SPLIT .....	3
8	PAOZZ	5310-00-596-7691	96906	MS35335-32	.. LOCKWASHER, EXT. TOOTH.....	1
9	XAOZZ		92878	60472	.. VAPORIZER ASSY .....	1
10	PAOZZ		92878	60458	.. SEAL, O-RING .....	1
11	PAOZZ	4520-01-493-2792	92878	5-13-5457	.. CLAMP, V-BAND WITH NUT .....	1
12	PAOZZ	4520-01-493-2812	92878	5-13-5594	.. SEAL, GRAPHITE RIBBON TAPE .....	1
13	PAOZZ	4520-01-493-2811	92878	5-13-5599	.. ROPE, FIBERGLASS .....	1
14	PAOZZ		92878	5-13-5628	. KIT, BURNER.....	1
					END OF FIGURE	

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UNIT MAINTENANCE  
SPACE HEATER, CONVECTIVE  
(NSN 4520-01-431-8927)  
THERMOELECTRIC GENERATOR (TEG)  
REPAIR PARTS LIST

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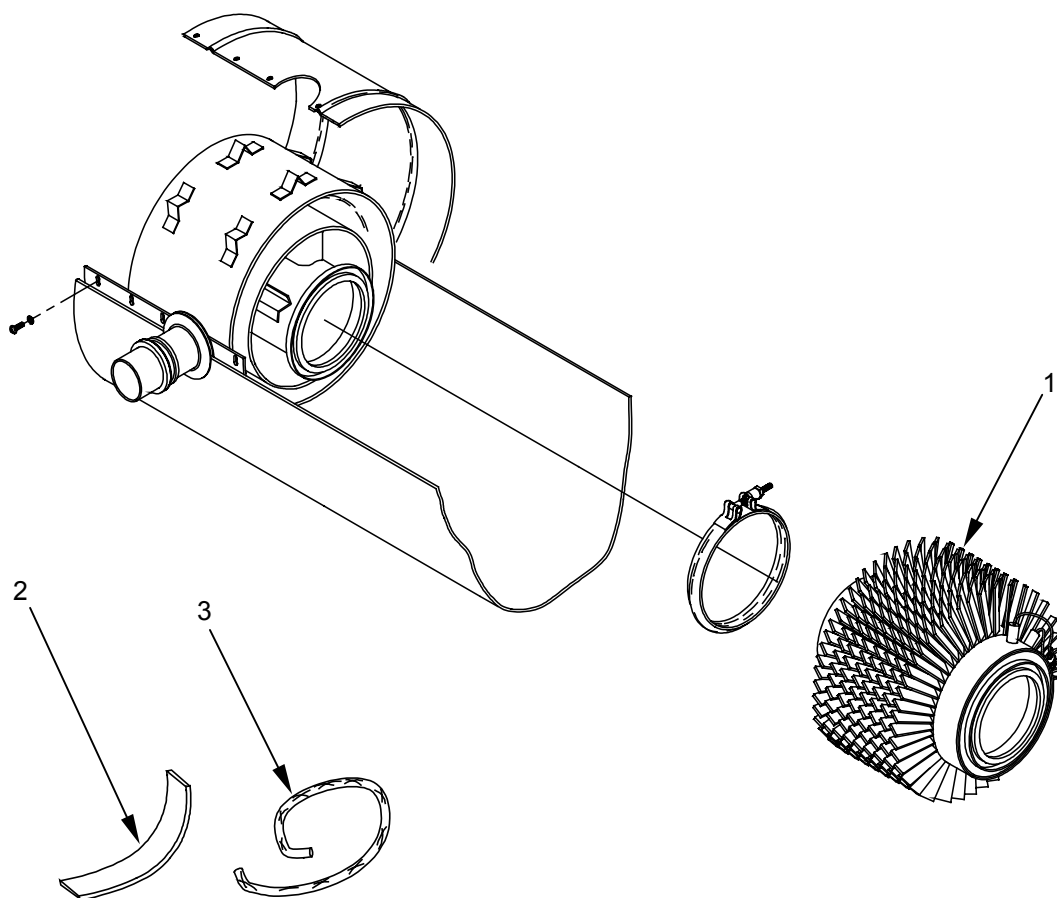


Figure 14. Thermoelectric Generator (TEG)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
ITEM NO	SMR CODE	NATIONAL STOCK NUMBER	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
					GROUP 14 FIG. 14 THERMOELECTRIC GENERATOR	
1	PAOZZ	4520-01-493-2791	92878	5-13-5635	. THERMOELECTRIC GENERATOR.....	1
2	PAOZZ	4520-01-493-2812	92878	5-13-5594	. SEAL, GRAPHITE RIBBON TAPE .....	AR
3	PAOZZ	4520-01-493-2811	92878	5-13-5599	. ROPE, FIBERGLASS .....	1
					END OF FIGURE	

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UNIT MAINTENANCE  
SPACE HEATER, CONVECTIVE  
(NSN 4520-01-431-8927)  
HEAT EXCHANGER  
REPAIR PARTS LIST

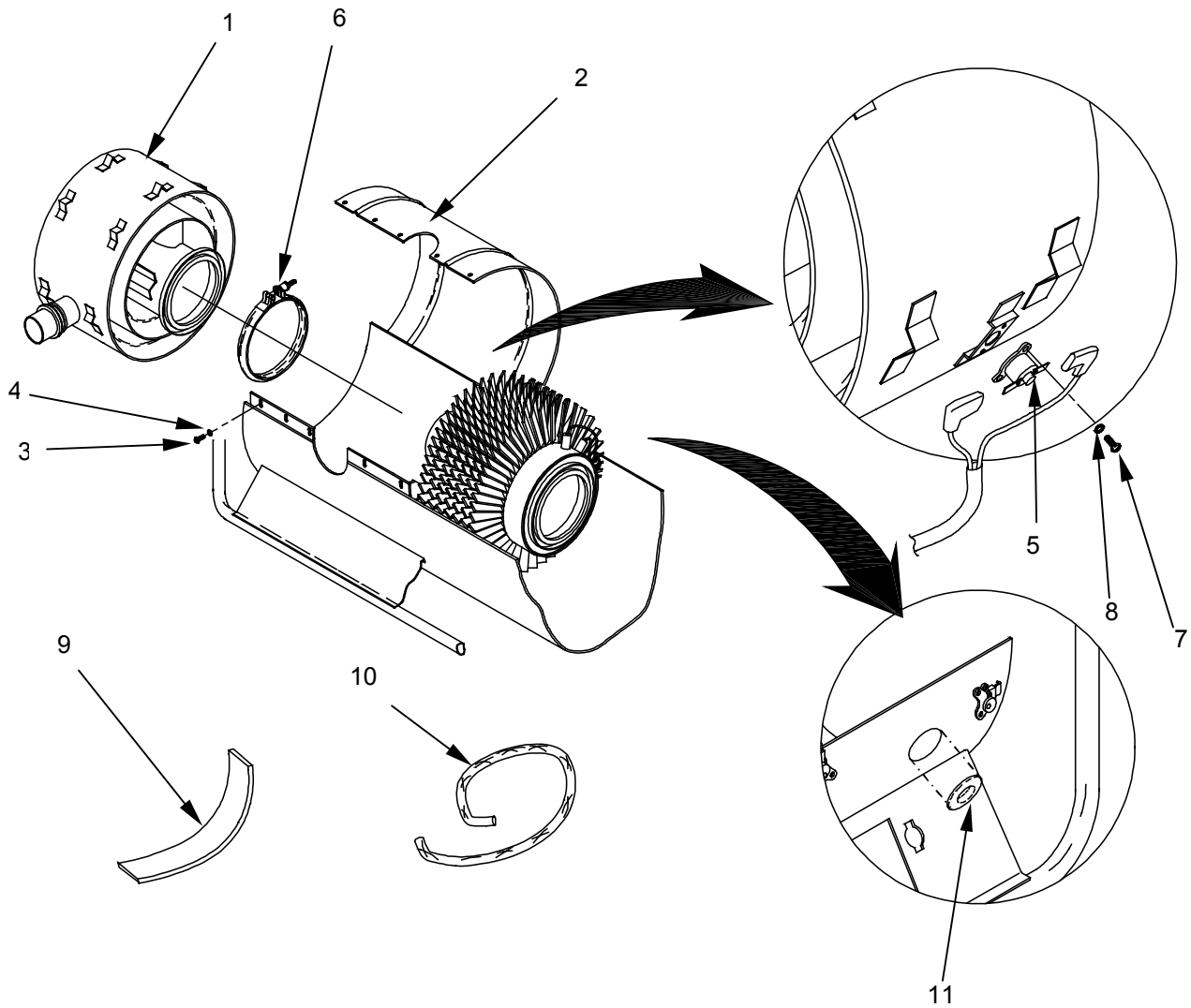


Figure 15. Heat Exchanger

(1)	(2)	(3)	(4)	(5)	(6)	(7)
ITEM NO	SMR CODE	NATIONAL STOCK NUMBER	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
					GROUP 15 FIG. 15 HEAT EXCHANGER	
1	PAOZZ	4520-01-493-2799	92878	5-13-5636	. HEAT EXCHANGER .....	1
2	PAOZZ		92878	5-13-5431	. COVER, WRAP .....	1
3	PAOZZ	5305-00-969-6914	96906	MS24617-10	. SCREW PHTF#6 X 3/8.....	5
4	PAOZZ	5310-00-209-0788	96906	MS35335-30	. WASHER LOCK #6 EXT .....	5
5	PAOZZ	4520-01-493-2802	92878	5-13-5520	. THERMOSTAT, MANUAL RESET .....	1
6	PAOZZ	4520-01-493-2792	92878	5-13-5457	. CLAMP, V-BAND WITH NUT .....	1
7	PAOZZ	5305-00-432-8027	96906	MS24617-9	. SCREW PHTF #6 X 1/4.....	2
8	PAOZZ	5310-00-209-0788	96906	MS35335-30	. WASHER LOCK #6 EXT .....	2
9	PAOZZ	4520-01-493-2812	92878	5-13-5594	. SEAL, GRAPHITE RIBBON TAPE .....	AR
10	PAOZZ	4520-01-493-2811	92878	5-13-5599	. ROPE, FIBERGLASS .....	1
11	PAOZZ	5325-00-809-8867	92878	23824	.GROMMET, RUBBER	1
					END OF FIGURE	

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**UNIT MAINTENANCE**  
**SPACE HEATER, CONVECTIVE**  
**(NSN 4520-01-431-8927)**  
**AIR RETURN AND SUPPLY DUCTS WITH DEBRIS GRILL**  
**REPAIR PARTS LIST**

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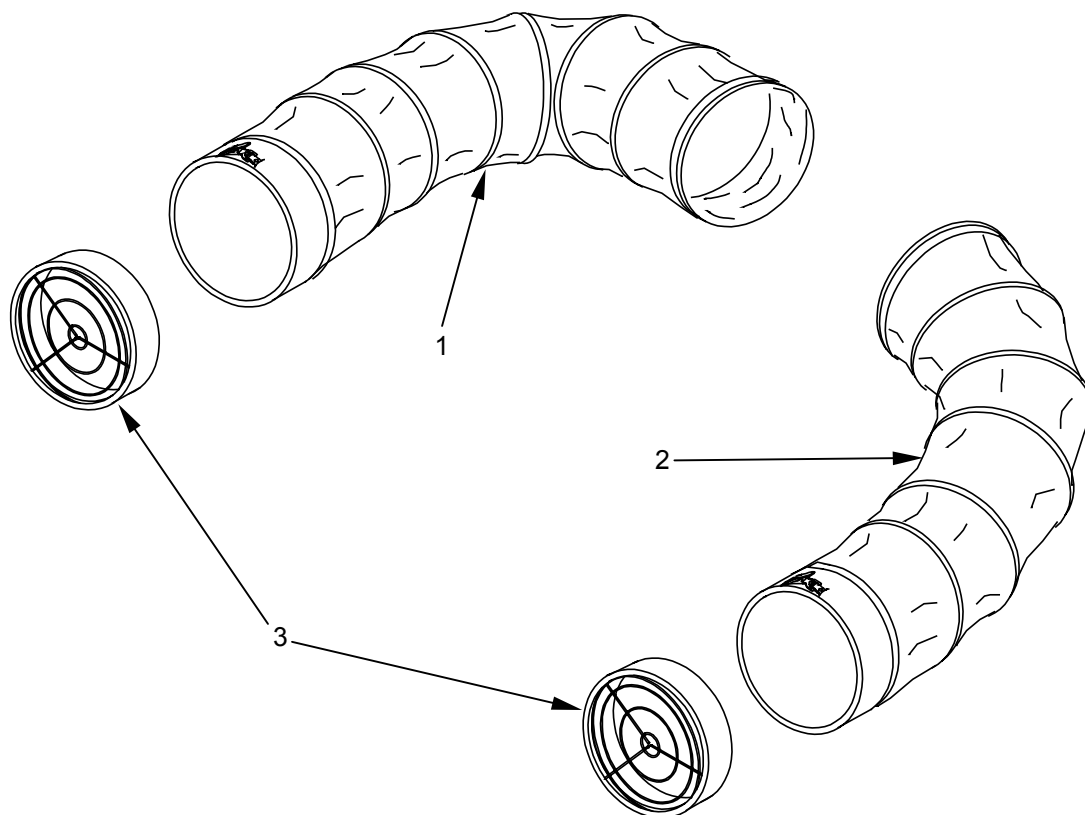


Figure 16. Air Return And Supply Ducts With Debris Grill

(1)	(2)	(3)	(4)	(5)	(6)	(7)
ITEM NO	SMR CODE	NATIONAL STOCK NUMBER	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
					GROUP 17 FIG. 16 DUCT ASSEMBLY	
1	PAOZZ	4520-01-493-2863	92878	5-13-5429	. HOSE, INLET AIR .....	1
2	PAOZZ	4520-01-493-2864	92878	5-13-5430	. HOSE, HEATED AIR .....	1
3	PAOZZ	4520-01-493-2798	92878	5-13-5497	. DEBRIS GRILL (FINGER GUARD ASSEMBLY) .....	2
					END OF FIGURE	

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**UNIT MAINTENANCE**  
**SPACE HEATER, CONVECTIVE**  
**(NSN 4520-01-431-8927)**

**SPARES, TOOLS, AND ACCESSORIES**  
**REPAIR PARTS LIST**

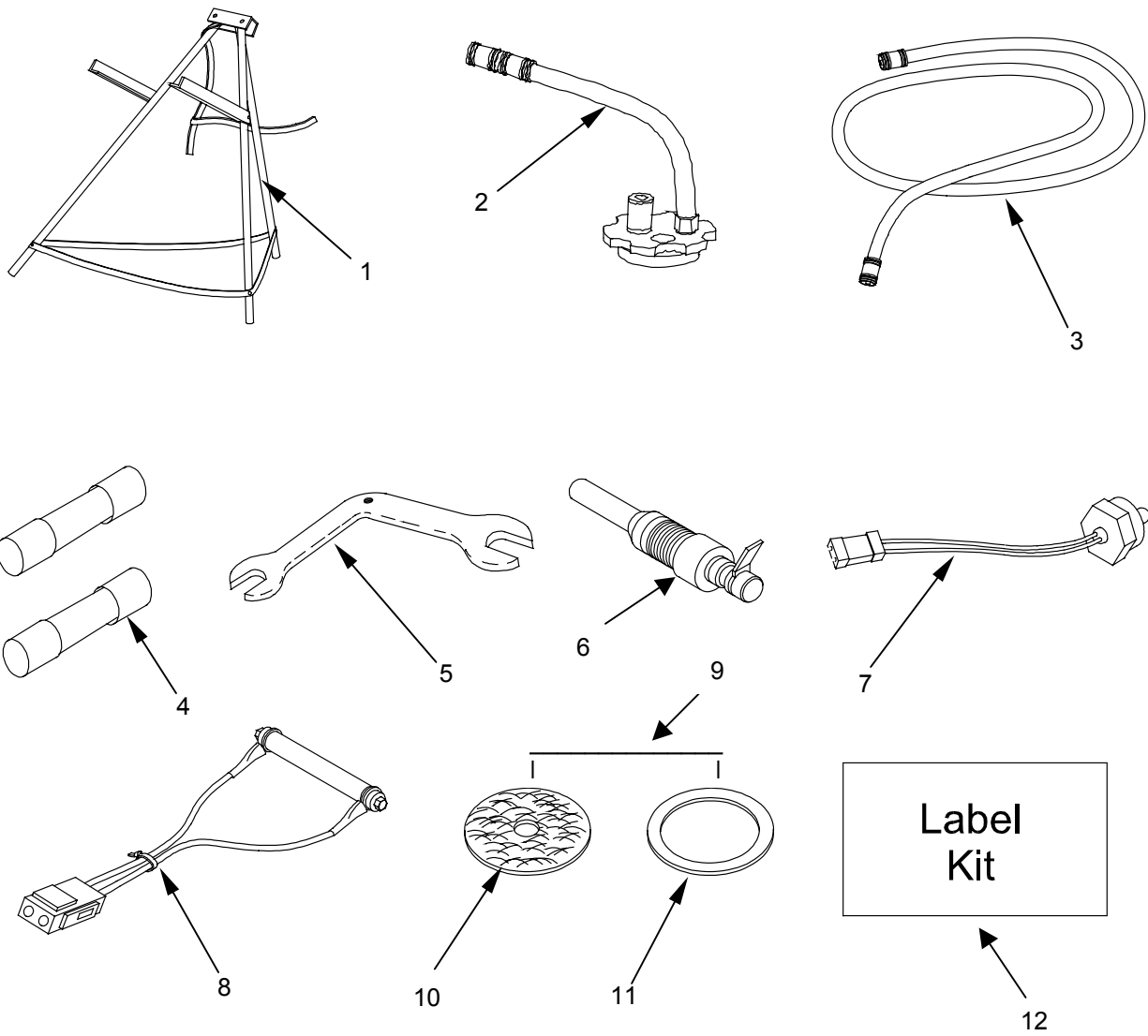


Figure 17. Spares, Tools, and Accessories

(1)	(2)	(3)	(4)	(5)	(6)	(7)
ITEM NO	SMR CODE	NATIONAL STOCK NUMBER	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
					GROUP 18 FIG. 17 ACCESSORIES	
1	PAOZZ	4520-01-465-4430	92878	106369	. HEATER CAN STAND .....	1
2	PAOZZ	4520-01-469-5775	92878	171230	. CAP GRAVITY FEED ASSY .....	1
3	PAOZZ		92878	47632	. FUEL HOSE .....	1
4	PAOZZ	4520-01-493-2777	92878	46273	. FUSES.....	2
5	PAOZZ	4520-01-493-2797	92878	5-13-5477	. WRENCH .....	1
6	PAOZZ	4520-01-493-2783	92878	60480	. GLOW PLUG.....	1
7	PAOZZ	4520-01-493-2781	92878	60470	. FLAME SENSOR.....	1
8	PAOZZ	4520-01-493-2810	92878	5-13-5593	. BATTERY CHARGING ADAPTER.....	1
9	PAOZZ	4520-01-493-2816	92878	5-13-5638	.KIT, FUEL STRAINER	1
10	KFOZZ		92878	5-13-5531	. SCREEN, FUEL STRAINER .....	1
11	KFOZZ		92878	5-13-5530	. GASKET, FUEL STRAINER.....	1
12	PAOZZ	4520-01-493-2815	92878	5-13-5639	.LABEL KIT	1
					END OF FIGURE	

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**SPACE HEATER, CONVECTIVE (SHC)  
NATIONAL STOCK NUMBER (NSN) INDEX**

STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5310-00-014-5850	5	4	4520-01-493-2787	10	1
5310-00-014-5850	13	5	4520-01-493-2788	8	1
5310-00-045-3296	13	7	4520-01-493-2790	3	2
5310-00-067-6357	7	4	4520-01-493-2791	14	1
5310-00-193-7577	4	3	4520-01-493-2792	13	11
5310-00-193-7577	5	3	4520-01-493-2792	15	6
5310-00-209-0786	4	6	4520-01-493-2793	5	1
5310-00-209-0788	15	4	4520-01-493-2794	2	2
5310-00-209-0788	15	8	4520-01-493-2795	7	1
5305-00-432-4171	4	2	4520-01-493-2796	2	1
5305-00-432-4171	4	8	4520-01-493-2797	17	5
5305-00-432-4171	5	2	4520-01-493-2798	16	3
5305-00-432-8027	15	7	4520-01-493-2799	15	1
5310-00-559-0070	4	9	4520-01-493-2800	1	1
5310-00-596-7691	11	3	4520-01-493-2801	9	1
5310-00-596-7691	12	4	4520-01-493-2802	15	5
5310-00-596-7691	13	8	4520-01-493-2803	9	2
5310-00-789-0398	11	4	4520-01-493-2804	6	1
5325-00-809-8867	15	11	4520-01-493-2805	4	7
5340-00-904-3705	12	2	4520-01-493-2806	4	1
5310-00-934-9758	13	6	4520-01-493-2807	1	2
5305-00-969-6914	15	3	4520-01-493-2808	4	10
5305-00-988-1728	4	5	4520-01-493-2810	17	8
5305-00-989-7434	7	3	4520-01-493-2811	13	13
5305-00-989-7435	11	2	4520-01-493-2811	14	3
5305-00-989-7435	12	3	4520-01-493-2811	15	10
4730-01-206-8726	3	1	4520-01-493-2812	13	12
4520-01-465-4430	17	1	4520-01-493-2812	14	2
4520-01-469-5775	17	2	4520-01-493-2812	15	9
4520-01-492-9125	3	10	4520-01-493-2813	3	11
4520-01-493-2777	2	3	4520-01-493-2814	3	2
4520-01-493-2777	17	4	4520-01-493-2815	17	12
4520-01-493-2778	12	1	4520-01-493-2816	17	9
4520-01-493-2779	4	4	4520-01-493-2816	3	6
4520-01-493-2780	4	11	4520-01-493-2817	13	1
4520-01-493-2781	13	4	4520-01-493-2862	11	1
4520-01-493-2781	17	7	4520-01-493-2863	16	1
4520-01-493-2782	3	4	4520-01-493-2864	16	2
4520-01-493-2783	13	2			
4520-01-493-2783	17	6			
4520-01-493-2784	12	5			
4520-01-493-2785	3	5			
4520-01-493-2786	12	11			

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**SPACE HEATER, CONVECTIVE (SHC)  
PART NUMBER INDEX**

Part Number	Fig	Item	Part Number	Fig	Item
106369	17	1	5-13-5593	17	8
1366	3	9	5-13-5594	13	12
1591	12	7	5-13-5594	14	2
1601	12	10	5-13-5594	15	9
171230	17	2	5-13-5599	13	13
23824	15	11	5-13-5599	14	3
26370	12	6	5-13-5599	15	10
46273	2	3	5-13-5616	3	5
46273	17	4	5-13-5628	13	14
47632	17	3	5-13-5634	8	1
4782401	3	3	5-13-5635	14	1
48389	12	8	5-13-5636	15	1
48390	12	9	5-13-5637	3	2
49602	6	2	5-13-5638	3	6
5-13-5162	7	2	5-13-5638	17	9
5-13-5422	7	6	5-13-5639	17	12
5-13-5425	11	1	52417-9	3	11
5-13-5429	16	1	5914	3	10
5-13-5430	16	2	60384	4	11
5-13-5431	15	2	60458	13	10
5-13-5435	10	1	60468	4	4
5-13-5439	3	2	60469	13	3
5-13-5457	13	11	60470	13	4
5-13-5457	15	6	60470	17	7
5-13-5461	5	1	60472	13	9
5-13-5468	2	2	60477	12	11
5-13-5469	2	1	60478	3	4
5-13-5477	17	5	60480	13	2
5-13-5489	7	5	60480	17	6
5-13-5490	7	1	60481	12	1
5-13-5497	16	3	60490	13	1
5-13-5506	1	1	60499	12	5
5-13-5511	6	3	7951286	11	4
5-13-5519	9	1	HP2-4374	3	1
5-13-5520	15	5	MS21333-82	12	2
5-13-5530	3	7	MS24617-10	15	3
5-13-5530	17	11	MS24617-9	15	7
5-13-5531	3	8	MS27183-42	5	4
5-13-5531	17	10	MS27183-42	13	5
5-13-5539	9	2	MS35206-287	4	5
5-13-5564	6	1	MS35207-263	7	3
5-13-5565	4	1	MS35207-264	11	2
5-13-5568	4	7	MS35207-264	12	3
5-13-5577	1	2	MS35333-36	4	3
5-13-5579	4	10	MS35333-36	5	3

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**SPACE HEATER, CONVECTIVE (SHC)**  
**PART NUMBER INDEX**

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<b>Part Number</b>	<b>Fig</b>	<b>Item</b>
MS35333-38	4	9
MS35335-19	4	6
MS35335-30	15	4
MS35335-30	15	8
MS35335-32	11	3
MS35335-32	12	4
MS35335-32	13	8
MS35338-43	13	7
MS35649-202	13	6
MS45904-69	7	4
MS51861-36	4	2
MS51861-36	4	8
MS51861-36	5	2



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**SPACE HEATER CONVECTIVE (SHC)  
COMPONENTS OF END ITEM (COEI) AND BASIC ISSUE ITEMS (BII) LISTS**

---

**INTRODUCTION****SCOPE**

This work package lists the components of the packaged end item and basic issue items for the Space Heater, Convective (NSN 4520-01-431-8927) and will help you inventory the items for safe and efficient operation of the equipment.

**GENERAL**

The Components of End Item (COEI) and Basic Issue Items (BII) Lists are divided into the following sections:

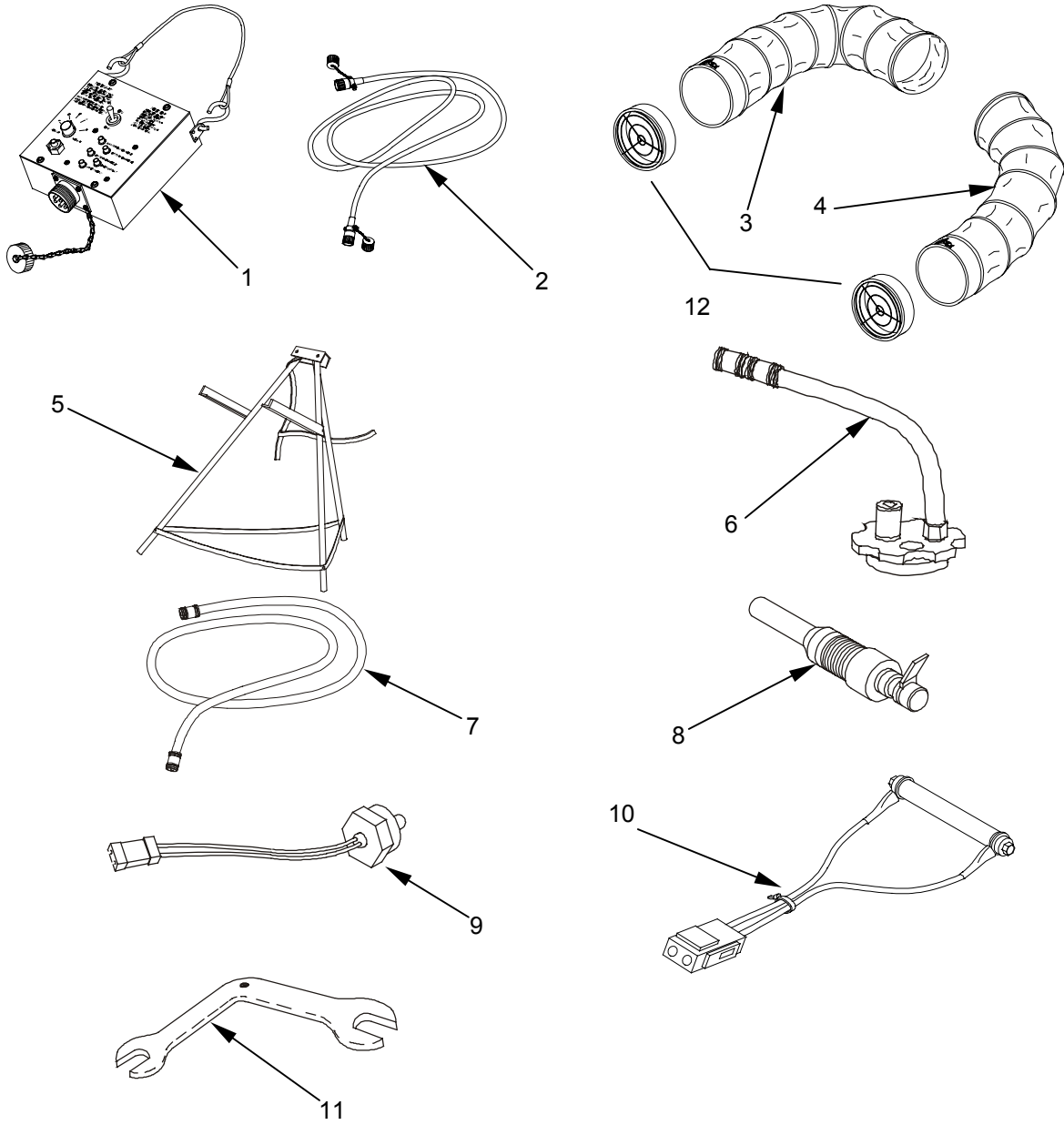
a. Section II. Components of End Item. This listing is for information purposes only, and is not authority to requisition replacements. These items are part of the heater. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Items of COEI are removed and separately packaged for transportation or shipment only when necessary. Illustrations are furnished to help you find and identify the items.

b. Section III. Basic issue items. These essential items are required to place the Convective Space Heater in operation, operate it, and do emergency repairs. BII must be with the heater during operation and when it is transferred between property accounts. This list is your authority to request/requisition them for replacement based on authorization of the end item by the TOE/MTOE. Illustrations are furnished to help you find and identify the items.

**EXPLANATION OF COLUMNS.**

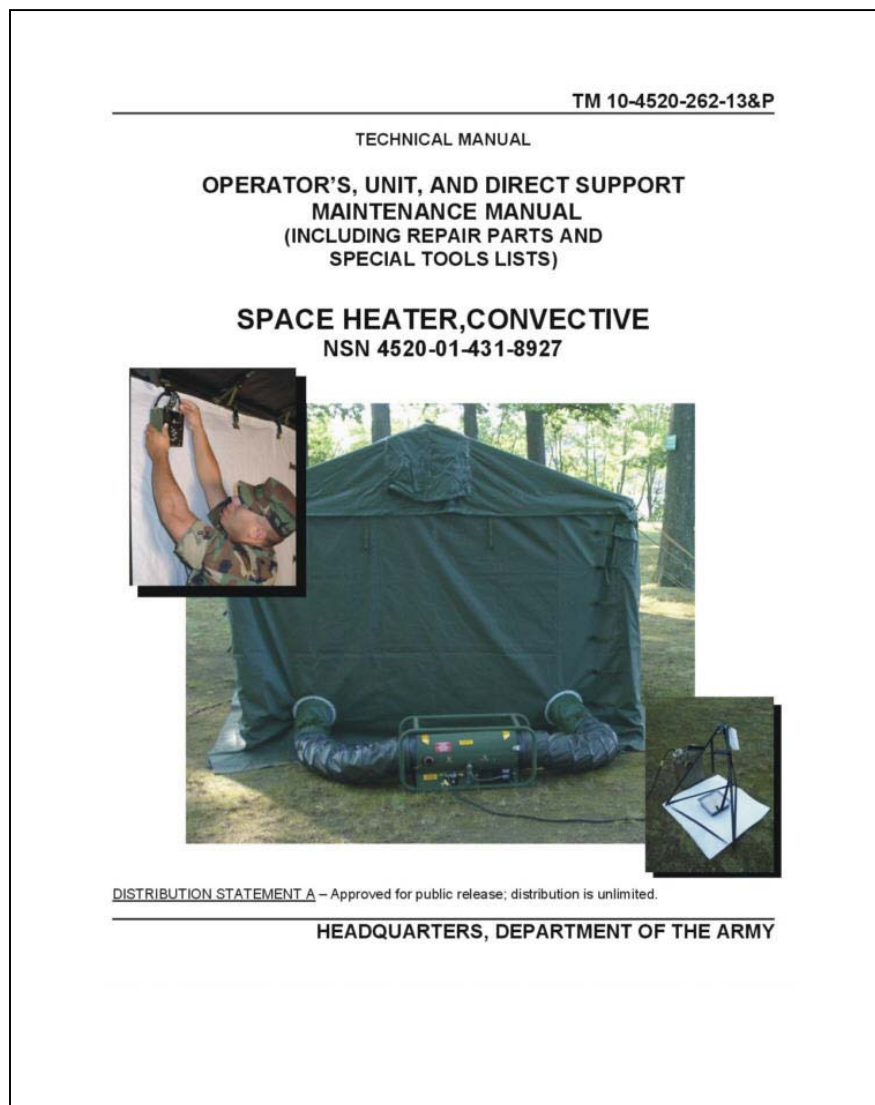
The following provides an explanation of columns found in the tabular listings:

- a. Column (1), Illus Number, gives you the number of the item illustrated.
- b. Column (2), National Stock Number, identifies the stock number of the item to be used for requisitioning purposes.
- c. Column (3), Description and Usable on Code, identifies the Federal item name (in all capital letters) followed by a minimum description when needed. The last line below the description is the Commercial and Government Entity Code (CAGEC) (in parentheses) and the part number.
- d. Column (4), U/I (unit of issue), indicates how the item is issued for the National Stock Number shown in column two.
- c. Column (5), Qty Req'd, indicates the quantity required.



**Section II. COMPONENTS OF END ITEM**

(1) Illus Number	(2) National Stock Number	(3) Description (CAGEC) and Part Number	(4) U/I	(5) Qty Reqd
1	4520-01-493-2800	Controller Assembly, In-tent (92878) 5-13-5506	EA	1
2	4520-01-493-2807	Controller Cable Assembly, In-tent (92878) 5-13-5577	EA	1
3	4520-01-493-2864	Duct, Air Supply (92878) 5-13-5430	EA	1
4	4520-01-493-2863	Duct, Air Return (92878) 5-13-5429	EA	1
5	4520-01-493-2830	Stand Assembly, Fuel Can (92878) 171250	EA	1
6	7240-00-360-0094	Adapter Kit, Gravity Feed (92878) 5-13-6465 (MIL-A-10957)	EA	1
7		Hose Assembly, Heater Fuel Supply (92878) 5-13-5630	EA	1
8	4520-01-493-2783	Glow Plug, 12 VDC (92878) 60489	EA	1
9	4520-01-493-2781	Sensor, Flame (92878) 60470	EA	1
10	4520-01-493-2810	Adapter, Battery Charger (92878) 5-13-5593	EA	1
11	4520-01-493-2797	Wrench, 9/16 inch by 12 mm (92878) 5-13-5477	EA	1
12	4520-01-493-2798	Debris Grill (Finger Guard Assembly) (92878) 5-13-5497	EA	2



**Section III. BASIC ISSUE ITEMS**

(1) Illus Number	(2) National Stock Number	(3) Description (CAGEC) and Part Number	(4) U/I	(5) Qty Reqd
1		Operator's, Unit, and Direct Support Maintenance Manual (including Repair Parts and Special Tools List) (92878) 5-13-5602	EA	1

**SPACE HEATER, CONVECTIVE (SHC)  
ADDITIONAL AUTHORIZATION LIST (AAL)**

**INTRODUCTION**

**Scope**

This section lists additional items you are authorized for the support of the SHC.

**General**

This list identifies items that do not have to accompany the SHC and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA, or JTA.

Explanation of Columns in the AAL:

Column (1) National Stock Number, identifies the stock number of the item to be used for requisitioning purposes.

Column (2) Description, CAGEC, and Part Number, identifies the Federal Item Name (in all capital letters) followed by a minimum description when needed. The last line below the description is the CAGE (Commercial and Government Entity Code) (in parenthesis) and the part number.

Column (3), Usable On Code, when applicable, gives you a code if the item you need is not the same for different models of equipment.

Column (4), UM (unit of measure) indicates how the item is issued for the National Stock Number shown in column (1).

Column (5), Qty Recm, indicates the quantity recommended.

**ADDITIONAL AUTHORIZED LIST ITEMS**

Table 1. Additional Authorization List.

(1) NATIONAL STOCK NUMBER	(2) DESCRIPTION, (CAGEC) AND PART NUMBER	(3) USABLE ON CODE	(4) U/M	(5) QTY RECM
4520-01-493-3215	KIT, TENT WALL MODIFICATION (92878, 5-13-5627)		EA	1
	KIT, COMBUSTION EXHAUST (92878) 5-13-5554	CVB	EA	1
	KIT, COMBUSTION INLET (92878) 5-13-5510	CVB	EA	1
7240-01-337-5268	CAN (DT), FUEL, MILITARY (81349) MIL-C-53109	CVB	EA	1
7240-01-337-5269	CAN (CG), FUEL, MILITARY (81349) MIL-C-53109	CVB	EA	1

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**SPACE HEATER CONVECTIVE (SHC)  
EXPENDABLE AND DURABLE ITEMS LIST**

---

**SCOPE**

This work package lists expendable and durable items that you will need to operate and maintain the Space Heater, Convective. This listing is for information only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-790, Expendable/Durable Items (except medical, Class V repair parts, and heraldic items), or CTA 8-100, Army Medical Department Expendable/Durable Items.

**EXPLANATION OF COLUMNS**

- a. Column (1), Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the item.
- b. Column (2), Level. This column identifies the lowest level of maintenance that requires the item.
- c. Column (3), National Stock Number. This is the national stock number assigned to the item which you can use to requisition it.
- d. Column (4), Item Name, Description, Commercial and Government Entity Code (CAGEC), and Part Number. This provides the other information you need to identify the item.
- e. Column (5), Unit of Measure (U/M). This code shows the physical measurement or Count of an item, such as gallon, dozen, gross, etc.

(1) Item Number	(2) Level	(3) National Stock Number	(4) Item Name, Part Number, (CAGEC)	(5) U/M
1	O	8040-00-973-4870	Adhesive, MIL-A-21366, (96906)	OZ
2	O	6810-00-286-5435	Alcohol, Isopropyl, TT-I-735 (81348)	GL
3	O		Sealant, thread, 5-13-5357, (81337)	OZ
4	O	6850-01-265-3115	Lubricant, silicone 03030 (10136)	BX
5	C	7920-00-205-1711	Rags, wiping, clean, A-A-53 (58536)	BE
6	O	9905-00-537-8955	Tags, marking, MIL-T-12755 (81349)	BD
7	O	5970-00-681-8236	Tape, electrical HH-I-553 (81348)	FT
8	O	7920-00-269-1259	Brush, wire 20010 (76861)	EA
9	O	7510-01-481-9824	Tape, Duct P32W2A2-75-72 (06383)	RL
10	C,O	7930-01-363-8631	Mat, Petroleum Absorbent, GOV106 (1JA49)	RL
11	O	5975-01-156-6648	Wrap, Tie	EA
12	C,O	7930-01-316-6008	Tray, Petroleum Absorbent, GOV103, (1JA49)	EA



**SPACE HEATER, CONVECTIVE (SHC)  
LUBRICATION INSTRUCTIONS**

**GENERAL**

Lubricate the heater with silicone lubricant in accordance with Table 1.



Table 1. Lubrication Instructions

COMPONENT	LUBRICANT/ AMOUNT	TEMPERATURE	INTERVAL	MAN HOUR
All fasteners (1)	Light coating of silicone lubricant (WP 0067, Table 1, Item 4)	All temperatures	As required	0.1

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**SPACE HEATER CONVECTIVE (SHC)  
TORQUE LIMITS**

**GENERAL**

This work package provides general torque limits for fasteners. Special torque values are indicated in the maintenance procedures for applicable components. The general torque values given in this work package shall be used when specific torque values are not indicated in the maintenance procedures.

**TORQUE LIMITS**

Torque limits are listed in Tables 1 and 2 for fasteners. Dry fasteners are defined as fasteners on which no lubricants are applied to the threads. Wet fasteners are defined as fasteners on which graphite, molydisulphide greases, or other extreme pressure lubricants are applied to the threads. Table 3 lists the minimum breakaway torque values for locknuts.

Table 1. General Torque Requirements for Dry Fasteners (#2 through #10)\*

Bolt/Screw Size	Torque Requirements in in.-lb (N-m)						
	18-8 Stainless Steel	Brass	Silicon Bronze	Aluminum 2024-T4	316 Stainless Steel	Monel	Nylon**
2-56	2.5 (0.28)	2.0(0.23)	2.3 (0.26)	1.4 (0.16)	2.6 (0.29)	2.5 (0.28)	0.44 (0.5)
2-64	3.0 (0.34)	2.5 (0.28)	2.8 (0.32)	1.7 (0.19)	3.2 (0.36)	3.1 (0.35)	
3-48	3.9 (0.44)	3.2 (0.36)	3.6 (0.41)	2.1 (0.24)	4.0 (0.45)	4.0 (0.45)	
3-56	4.4 (0.50)	3.6 (0.48)	4.1 (0.46)	2.4 (0.27)	4.6 (0.52)	4.5 (0.51)	
4-40	5.2 (0.59)	4.3 (0.49)	4.8 (0.54)	2.9 (0.33)	5.5 (0.62)	5.3 (0.60)	1.19 (0.13)
4-48	6.6 (0.75)	5.4 (0.61)	6.1 (0.69)	3.6 (0.41)	6.9 (0.78)	6.7 (0.76)	
5-40	7.7 (0.87)	6.3 (0.71)	7.1 (0.80)	4.2 (0.48)	8.1 (0.92)	7.8 (0.88)	
5-44	9.4 (1.06)	7.7 (0.87)	8.7 (0.98)	5.1 (0.58)	9.8 (1.11)	9.6 (1.09)	
6-32	9.6 (1.09)	7.9 (0.89)	8.9 (1.01)	5.3 (0.60)	10.1 (1.14)	9.8 (1.11)	2.14 (0.24)
6-40	12.1 (1.37)	9.9 (1.12)	11.2 (1.27)	6.6 (0.75)	12.7 (1.44)	12.3 (1.39)	
8-32	19.8 (2.24)	16.2 (1.83)	18.4 (2.08)	10.8 (1.22)	20.7 (2.34)	20.2 (2.28)	4.3 (0.49)
8-36	22.0 (2.49)	18.0 (2.03)	20.4 (2.31)	12.0 (1.36)	23.0 (2.60)	22.4 (2.53)	
10-24	22.8 (2.58)	18.6(2.10)	21.2 (2.40)	13.8 (1.56)	23.8 (2.69)	25.9 (2.93)	6.61 (0.75)
10-32	31.7 (3.58)	25.9 (2.93)	29.3 (3.31)	19.2 (2.17)	33.1 (3.74)	34.9 (3.94)	8.2 (0.93)

\* Torque given is for clean, dry threads. Reduce by 10% when lubricated.

\*\* Nylon values only are breaking torque, rather than safe working torque.

Table 2. General Torque Requirements for Dry Fasteners (1/4-20 UNC through 1-1/2-12 UNF)\*

Bolt/Screw Size	Torque Requirement in lb ft (N.m)			
	SAE Grade 1 or 2	SAE Grade 5	SAE Grade 6 or 7	SAE Grade 8
1/4-20 UNC	5 (7)	8 (11)	10 (14)	12 (16)
1/4-2SUNF	7 (8)	10 (14)	12 (16)	14 (19)
5/16-18 UNC	11 (15)	17 (23)	19 (26)	24 (33)
5/16-24 UNF	13 (18)	19 (26)	23 (31)	27 (37)
3/8-16 UNC	18 (24)	31 (42)	34 (46)	44 (60)
3/8-24 UNF	20 (27)	35 (47)	42 (57)	49 (66)
7/16-14 UNC	28 (38)	49 (66)	55 (75)	70 (95)
7/16-20 UNF	30 (41)	55 (75)	67 (91)	78 (106)
1/2-13UNC	39 (53)	75 (102)	85 (115)	105 (142)
1/2-2OUNF	41 (56)	85 (115)	102 (138)	120 (163)
9/16-12UNC	51 (69)	110 (149)	120 (163)	155 (210)
9/16-18UNF	55 (75)	120 (163)	145 (197)	170 (231)
5/8-11UNC	63 (85)	150 (203)	167 (226)	210 (285)
5/8-18 UNF	95 (129)	170 (231)	205 (278)	240 (325)
3/4-10 UNC	105 (142)	270 (366)	280 (380)	375 (509)
3/4-16 UNF	115 (156)	295 (400)	357 (484)	420 (570)
7/8-9 UNC	160 (217)	395 (536)	440 (597)	605 (820)
7/8-14 UNF	175 (237)	435 (590)	555 (753)	675 (915)
1-8 UNC	235 (319)	590 (800)	660 (895)	910 (1234)
1-14UNF	250 (339)	660 (865)	825 (1119)	999 (1342)
1-1/8-7 UNC	350 (475)	800 (1085)	1000 (1356)	1280 (1736)
1-1/8-12 UNF	400 (542)	880 (1193)	1050 (1424)	1440 (1953)
1-1/4-7 UNC	500 (678)	1080 (1464)	1325 (1797)	1820 (2468)
1-1/4-12UNF	550 (746)	1125 (1526)	1325 (1797)	1820 (2712)
1-3/8-6 UNC	660 (895)	1460 (1980)	1800 (2441)	2380 (3227)
1-3/8-12 UNF	740 (1003)	1680 (2278)	1960 (2658)	2720 (3688)
1-1/2-6UNC	870 (1180)	1940 (2631)	2913 (3950)	3160 (4285)
1-1/2-12 UNF	980 (1329)	2200 (2983)	3000 (4068)	3560 (4827)

\* Torque given is for clean, dry threads. Reduce by 10% when lubricated.

**NOTE**

To determine breakaway torque, thread locknut onto screw or bolt until at least two threads stick out. Locknut shall not make contact with a mating part. Stop the locknut. Torque necessary to begin turning locknut again is the breakaway torque. Do not reuse locknuts that do not meet minimum breakaway torque.

Table 3. Locknut Breakaway Torque Values

Thread Size	Minimum Breakaway Torque	
	lb-in.	(N-m)
10-32	2.0	(0.23)
1/4-28	3.5	(0.40)
5/16-24	6.5	(0.73)
3/8-24	9.5	(1.07)
7/16-20	14.0	(1.58)
1/2-20	18.0	(2.03)
9/16-18	24.0	(2.71)
5/8-18	32.0	(3.62)
3/4-16	50.0	(5.65)
7/8-14	70.0	(7.91)
1-12	90.0	(10.17)
1-1/8-12	117.0	(13.22)

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**SPACE HEATER CONVECTIVE (SHC)  
MANDATORY REPLACEMENT PARTS LIST**

---

Table 1. Mandatory Replacement Parts

<b>Item Number</b>	<b>Nomenclature</b>	<b>Part Number</b>
1	Seal, graphite ribbon tape	5-13-5594-16

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**SPACE HEATER CONVECTIVE (SHC)  
GLOSSARY**

---

**A**

AUDIBLE TONE - A sound made within the control box assembly to alert the operator of the heater or tent occupants to the occurrence of a heater SYSTEM FAULT condition. This tone will repeat a number of times to indicate the applicable DIAGNOSTIC CODE. See the back of the control box assembly for a description of the applicable code.

**B**

BATTERY CHARGED - The thermoelectric generator (TEG) has completed charging the battery.

BATTERY CHARGING - The TEG is charging the battery.

BREATHABLE AIR - Air heated by the heater and introduced into the tent. Also known as heated air. This air is completely separated from the combustion air system of the heater and is free of any products of combustion resulting from heater operation.

**D**

DEBRIS GRILL - A device on the end of a duct used to prevent foreign objects from entering the duct or heater during heater operation. This item is not a louver and is not used to direct heated air.

DUCT - Term used to designate an item attached to either the heated air outlet or the breathable air inlet of the heater and through which heated (breathable) air passes.

**G**

GEL CELL - A type of rechargeable battery. Also known as starved electrolyte cell.

**H**

HEATER ON/ON-HOLD - Advisory light on control panel assembly.

HEATED AIR - Air heated by the heater and introduced into the tent. Also known as breathable air. This air is completely separated from the combustion air system of the heater and is free of any products of combustion resulting from heater operation.

**L**

LOWER-HIGHER KNOB - A knob on the control panel assembly used to control the temperature within the tent.

**P**

PIPE - Term used to designate an item attached to the combustion air inlet or outlet of the heater and through which combustion air passes.

POST-PURGE - A stage of heater operation that follows normal operation and precedes heater shutdown. During this stage of operation, the heater's fuel supply is shutoff and the fans run to clear combustion gases from the heater systems and cooldown heater components.

PREPURGE - A stage of heater operation that precedes normal operation. During this stage of operation, heater fans run to purge heater systems.

**S**

SETPOINT - A term used to indicate that the ambient temperature within the tent has reached or exceeded the setting number at which the LOWER/HIGHER knob is positioned. This condition is indicated by the illumination of the AT SETPOINT advisory light on the control panel assembly.

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By Order of the Secretary of the Army:

Official:



JOEL B. HUDSON

*Administrative Assistant to the  
Secretary of the Army*

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*General, United States Army  
Chief of Staff*

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## ***These are the instructions for sending an electronic 2028***

The following format must be used if submitting an electronic 2028. The subject line must be exactly the same and all fields must be included; however only the following fields are mandatory: 1, 3, 4, 5, 6, 7, 8, 9, 10, 13, 15, 16, 17, and 27.

From: "Whomever" <whomever@avma27.army.mil>

To: amssb-rim-e@natick.army.mil

Subject: DA Form 2028

1. **From:** Joe Smith
2. **Unit:** home
3. **Address:** 4300 Park
4. **City:** Hometown
5. **St:** MO
6. **Zip:** 77777
7. **Date Sent:** 19-OCT-93
8. **Pub no:** 55-2840-229-23
9. **Pub Title:** TM
10. **Publication Date:** 04-JUL-85
11. **Change Number:** 7
12. **Submitter Rank:** MSG
13. **Submitter FName:** Joe
14. **Submitter MName:** T
15. **Submitter LName:** Smith
16. **Submitter Phone:** 123-123-1234
17. **Problem:** 1
18. **Page:** 2
19. **Paragraph:** 3
20. **Line:** 4
21. **NSN:** 5
22. **Reference:** 6
23. **Figure:** 7
24. **Table:** 8
25. **Item:** 9
26. **Total:** 123
27. **Text:**

This is the text for the problem below line 27.

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RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS



**SOMETHING WRONG** WITH THIS PUBLICATION?

THEN ...JOT DOWN THE DOPE ABOUT IT ON THIS FORM, CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

PFC John DOE  
 Co A 3rd Engineer Bn  
 Ft. Leonardwood, MO 63108

DATE SENT  
 22 August 1992

PUBLICATION NUMBER  
 TM 1-1520-250-10

PUBLICATION DATE  
 15 June 1992

PUBLICATION TITLE  
 Operator's manual MH60K Helicopter

BE EXACT PIN-POINT WHERE IT IS

IN THIS SPACE, TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO
6	2-1 a		
B1		4-3	

In line 6 of paragraph 2-1a the manual states the engine has 6 cylinders. The engine on my set only has 4 cylinders. Change the manual to show 4 cylinders.

Callout 16 in figure 4-3 is pointed out bolt. In key to figure 4-3, item 16 is called a shim. Please correct one or the other

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

JOHN DOE, PFC (268) 317-7111

SIGN HERE

JOHN DOE *John Doe*

DA FORM 2028-2  
 1 JUL 79

PREVIOUS EDITIONS ARE OBSOLETE.  
 DRSTS-M verprint2, 1 Nov 80

P.S. - IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION, MAKE A CARBON COPY OF THIS AND GIVE TO YOUR HEADQUARTERS.

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## The Metric System and Equivalents

### *Linear Measure*

1 centimeter = 10 millimeters = .39 inch  
 1 decimeter = 10 centimeters = 3.94 inches  
 1 meter = 10 decimeters = 39.37 inches  
 1 dekameter = 10 meters = 32.8 feet  
 1 hectometer = 10 dekameters = 328.08 feet  
 1 kilometer = 10 hectometers = 3,280.8 feet

### *Weights*

1 centigram = 10 milligrams = .15 grain  
 1 decigram = 10 centigrams = 1.54 grains  
 1 gram = 10 decigrams = .035 ounce  
 1 dekagram = 10 grams = .35 ounce  
 1 hectogram = 10 dekagrams = 3.52 ounces  
 1 kilogram = 10 hectograms = 2.2 pounds  
 1 quintal = 100 kilograms = 220.46 pounds  
 1 metric ton = 10 quintals = 1.1 short tons

### *Liquid Measure*

1 centiliter = 10 milliliters = .34 fl. ounce  
 1 deciliter = 10 centiliters = 3.38 fl. ounces  
 1 liter = 10 deciliters = 33.81 fl. ounces  
 1 dekaliter = 10 liters = 2.64 gallons  
 1 hectoliter = 10 dekaliters = 26.42 gallons  
 1 kiloliter = 10 hectoliters = 264.18 gallons

### *Square Measure*

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch  
 1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches  
 1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet  
 1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet  
 1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres  
 1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

### *Cubic Measure*

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch  
 1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches  
 1 cu. meter = 1000 cu. decimeters = 35.31 feet

## Approximate Conversion Factors

<i>To change</i>	<i>To</i>	<i>Multiply by</i>	<i>To change</i>	<i>To</i>	<i>Multiply by</i>
inches	centimeters	2.540	ounce-inches	newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29.573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	newton-meters	1.356	metric tons	short tons	1.102
pound-inches	newton-meters	.11296			

## Temperature (Exact)

_F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	_C
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**PIN: 079343-000**