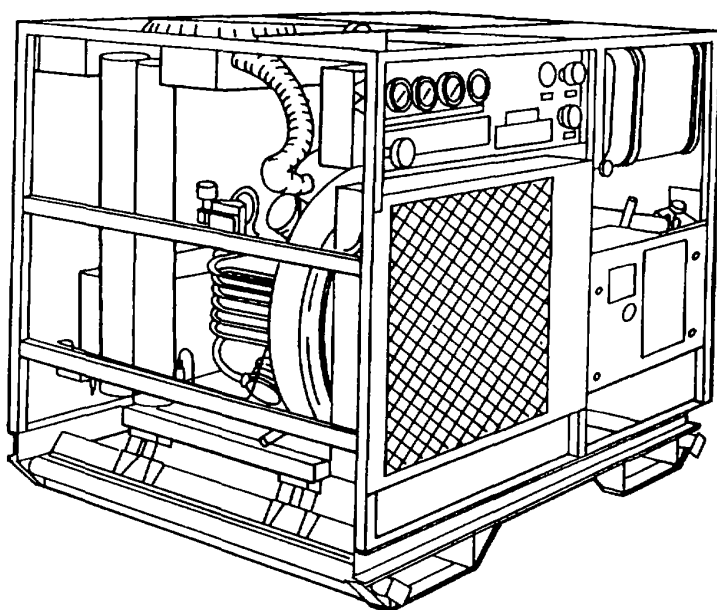


TECHNICAL MANUAL**OPERATOR'S, UNIT, DIRECT
SUPPORT AND GENERAL SUPPORT
MAINTENANCE MANUAL**

**COMPRESSOR UNIT,
DIESEL ENGINE DRIVEN
20 CFM, 3200 PSI
MODEL K-20-D
(NSN 4310-01-227-1408)**



EQUIPMENT DESCRIPTION AND DATA	1-1
---	------------

OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)	4-12
---	-------------

UNIT PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)	4-12
---	-------------

UNIT TROUBLESHOOTING PROCEDURES	4-17
--	-------------

UNIT MAINTENANCE PROCEDURES	4-31
--	-------------

DIRECT SUPPORT MAINTENANCE	5-9
---------------------------------------	------------

GENERAL SUPPORT MAINTENANCE	6-5
--	------------

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

**HEADQUARTERS, DEPARTMENT OF THE ARMY
15 JANUARY 1993**

TECHNICAL MANUAL

NO. 5-4310-386-14

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 15 JANUARY 1993

Operator, Unit, Direct Support, and General Support Maintenance Manual
for
COMPRESSOR UNIT, DIESEL ENGINE DRIVEN 20 CFM 3200 PSI
(MODEL K-20-D)
NSN 4310-01-227-1408

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

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

TABLE OF CONTENTS

	Page
CHAPTER 1 INTRODUCTION	1-1
OVERVIEW	1-1
Section I General Information	1-1
Section II <u>Equipment Description and Data</u>	1-2
Section III Principles of Operation	1-5
CHAPTER 2 OPERATING INSTRUCTIONS	2-1
OVERVIEW	2-1
Section I Description and Use of Operator Controls and Indicators.....	2-1
Section II <u>Operator Preventive Maintenance Checks and Services (PMCS)</u>	2-5
Section III Operation Under Usual Conditions	2-9
Section IV Operation Under Unusual Conditions	2-15
CHAPTER 3 OPERATOR'S MAINTENANCE	
Not Applicable.....	3-1

TABLE OF CONTENTS (Cont)

	Page
CHAPTER 4	UNIT MAINTENANCE INSTRUCTIONS 4-1
	OVERVIEW 4-1
Section I	Repair Parts; Special Tools; TMDE, and Support Equipment 4-1
Section II	Service Upon Receipt 4-2
Section III	Lubrication Instructions 4-4
Section IV	<u>Unit Preventive Maintenance Checks and Services (PMCS).</u> 4-12
Section V	<u>Unit Troubleshooting Procedures</u> 4-17
Section VI	Unit Maintenance Procedures 4-31
Section VII	Unit Level Cleaning Procedures 4-170
Section VIII	Preparation for Shipment or Storage 4-179
CHAPTER 5	DIRECT SUPPORT MAINTENANCE INSTRUCTIONS..... 5-1
	OVERVIEW 5-1
Section I	Repair Parts, Special Tools, TMDE, and Support Equipment 5-1
Section II	Direct Support Troubleshooting 5-1
Section III	<u>Direct Support Maintenance Procedures</u> 5-9
CHAPTER 6	GENERAL SUPPORT MAINTENANCE INSTRUCTIONS 6-1
	OVERVIEW 6-1
Section I	Repair Parts, Special Tools, TMDE, and Support Equipment 6-1
Section II	General Support Troubleshooting 6-2
Section III	<u>General Support Maintenance Procedures</u> 6-5
APPENDIX A	REFERENCES A-1
APPENDIX B	MAINTENANCE ALLOCATION CHART B-1
APPENDIX C	COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LISTS..... C-1
APPENDIX D	ADDITIONAL AUTHORIZATION LIST D-1
APPENDIX E	EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST E-1
APPENDIX F	TORQUE LIMITS F-1
INDEX	 Index 1

LIST OF ILLUSTRATIONS

Figure Number	Title	Page
1-1	Compressor Unit, Model K-20-D.....	1-0
1-2	Location of Major Components.....	1-3
1-3	Flow Diagram.....	1-6
2-1	Control Panel Controls and Indicators	2-2
2-2	Diesel Engine Controls and Indicators	2-4
2-3	Pre-Operational Checks	2-10
2-4	Start-Up Procedures.....	2-12
2-5	Shut-Down Procedures.....	2-14
2-6	Fuel Mixture by Temperature	2-15
4-1	Servicing Engine	4-6
4-2	Servicing Engine Oil Filter.....	4-7
4-3	Servicing Engine Oil Bath Air Filter	4-8
4-4	Servicing Compressor Oil	4-10
4-5	Servicing Engine Clutch	4-11
4-6	Belt Guard, Replace.....	4-33
4-7	Clutch Panel, Replace.....	4-35
4-8	Side Panel, Replace.....	4-37
4-9	Top Tray, Replace.....	4-39
4-10	Engine Oil Pressure Gage, Replace	4-41
4-11	Temperature Gage, Replace	4-42
4-12	Ammeter, Replace	4-43
4-13	Houmeter, Replace	4-44
4-14	Start Switch, Replace	4-45
4-15	Engine RUN/STOP Switch, Replace	4-46
4-16	Relay Latch, Replace	4-47
4-17	Switches (ON/OFF), Replace	4-48
4-18	Indicator Light, Replace.....	4-49
4-19	Throttle Control, Replace	4-51
4-20	Solenoid, Replace	4-53
4-21	Compressor Drive Belt and Pulleys, Adjust	4-55
4-22	Compressor Drive Belt and Pulley, Replace	4-57
4-23	Air Compressor Assembly, Service (Oil Change)	4-59
4-24	Air Compressor Assembly, Service (Intercooler)	4-61
4-25	Compressor Air Intake Filter Assembly, Replace	4-63
4-26	Compressor Fanwheel Guard, Replace	4-65
4-27	Compressor Flywheel/Fanwheel Assembly, Replace.....	4-67
4-28	Compressor Flywheel/Fanwheel Assembly, Repair	4-69
4-29	Compressor Drive Belt, Adjust	4-71
4-30	Compressor Drive Belt and Guard, Replace.....	4-73
4-31	Fuel Tank, Replace	4-75
4-32	Top Strap Assembly, Replace	4-79
4-33	Bottom Strap Assembly, Replace	4-81
4-34	Engine Assembly, Service.....	4-83
4-35	Engine Assembly, Removal	4-85

LIST OF ILLUSTRATIONS (Cont)

Figure Number	Title	Page
4-36	Engine Assembly, Installation.....	4-91
4-37	Fuel System, Service.....	4-97
4-38	Fuel Lines and Fittings, Replace	4-99
4-39	Fuel Feed Pump, Replace.....	4-103
4-40	Fuel Feed Pump, Repair	4-105
4-41	Fuel Filter, Replace.....	4-107
4-42	Injector Lines, Replace.....	4-109
4-43	Over Flow Return Line, Replace	4-111
4-44	Prefilter, Replace	4-113
4-45	Oil Bath Air Filter Assembly, Service.....	4-115
4-46	Oil Bath Air Filter Assembly, Replace.....	4-117
4-47	Oil Bath Air Filter Assembly, Repair	4-119
4-48	Air Intake Manifold, Replace	4-121
4-49	Exhaust System, Replace	4-123
4-50	Engine V-Beltguard, Replace	4-125
4-51	V-Belts, Replace	4-127
4-52	Cooling Air Ducting, Replace.....	4-129
4-53	Wiring Harness Test.....	4-132
4-54	Wiring Harness, Replace.....	4-135
4-55	Alternator, Test	4-137
4-56	Alternator, Adjust	4-139
4-57	Alternator, Replace	4-141
4-58	Battery, Test	4-143
4-59	Battery and Cables, Replace	4-145
4-60	Shutdown Device, Replace	4-147
4-61	Starter, Replace	4-149
4-62	Starting Aid, Replace	4-151
4-63	Hoses, Replace	4-152
4-64	Reservoir, Replace.....	4-153
4-65	Hand Pump, Replace	4-155
4-66	Oil Filter Assembly, Service	4-157
4-67	Oil Filter Assembly, Replace	4-159
4-68	Dipstick and Filler Cap, Replace	4-161
4-69	Engine Lube Oil Cooler, Service	4-163
4-70	Engine Lube Oil Cooler, Replace	4-165
4-71	Rocker Cover, Replace	4-167
4-72	Engine Mounts, Replace	4-169
5-1	Control Panel, Replace	5-11
5-2	Control Panel, Repair	5-13
5-3	Service Line Control Valve, Replace	5-15
5-4	Service Line Pressure Gage, Replace	5-17
5-5	Pressure Gage, Replace	5-19
5-6	Oil Pressure Gage, Replace.....	5-21
5-7	Service Outlet, Replace	5-23

LIST OF ILLUSTRATIONS (Cont)

Figure Number	Title	Page
5-8	Compressor Assembly, Replace.....	5-25
5-9	Lines and Fittings, Removal.....	5-31
5-10	Lines and Fittings, Installation.....	5-41
5-11	Compressor Oil Pump and Supply Line, Replace.....	5-51
5-12	Oil Pressure Regulator Valve and Oil Return Line, Adjust.....	5-53
5-13	Oil Pressure Regulator Valve and Oil Return Line, Replace.....	5-55
5-14	Oil Pressure Regulator Valve and Oil Return Line, Repair.....	5-57
5-15	Compressor 1st Stage Intercooler, Replace.....	5-59
5-16	Compressor 2nd Stage Intercooler, Replace.....	5-61
5-17	Compressor 3rd Stage Intercooler, Replace.....	5-63
5-18	Compressor Aftercooler, Replace.....	5-65
5-19	Manifold and Safety Valve (1st Stage), Replace.....	5-67
5-20	Interfilter Heater Block Assembly, Replace.....	5-69
5-21	Interfilter Safety Valves, Replace.....	5-73
5-22	Interfilter Drain Valves, Replace.....	5-75
5-23	Interfilter Drain Valves, Repair.....	5-77
5-24	Interfilter 2nd and 3rd Stage Housing, Replace.....	5-81
5-25	Interfilter 2nd and 3rd Stage Housing, Repair.....	5-83
5-26	Oil Water Separator, Replace.....	5-85
5-27	Oil Water Separator Housing, Repair.....	5-87
5-28	Interfilter Heater Block, Replace.....	5-89
5-29	1st Stage Valve Head Assembly, Replace.....	5-91
5-30	1st Stage Valve Head Assembly, Repair.....	5-93
5-31	2nd and 3rd Stage Valve Head Assembly, Replace.....	5-97
5-32	2nd and 3rd Stage Valve Head Assembly, Repair.....	5-99
5-33	4th Stage Valve Head Assembly, Replace.....	5-103
5-34	4th Stage Valve Head Assembly, Repair.....	5-105
5-35	Safety Valve, Replace.....	5-109
5-36	Tension Pulley Assembly, Driving Gear and Eccentric Shaft Drive Gear, Replace.....	5-111
5-37	Tension Pulley Assembly, Driving Gear and Eccentric Shaft Drive Gear, Repair.....	5-113
5-38	Air Purification Group, Service.....	5-115
5-39	Purification Cylinders, Replace.....	5-117
5-40	Purification Cylinders, Repair.....	5-119
5-41	Pressure Maintaining Valve, Replace.....	5-121
5-42	Pressure Maintaining Valve, Repair.....	5-123
5-43	Fuel Tank, Repair.....	5-125
5-44	Fuel Injection Pump, Adjust.....	5-127
5-45	Fuel Injection Pump, Replace.....	5-131
5-46	Injection Pump, Repair.....	5-133
5-47	Engine Injectors, Replace.....	5-141
5-48	Cooler Air Blower, Replace.....	5-143
5-49	Cooler Air Blower, Repair.....	5-145
5-50	Oil Pump, Replace.....	5-147
5-51	Lube Oil Line Assembly, Replace.....	5-149

LIST OF ILLUSTRATIONS (Cont)

Figure Number	Title	Page
5-52	Flywheel and Clutch Carrier, Replace	5-151
5-53	Flywheel and Clutch Carrier, Repair	5-153
5-54	Flywheel Housing Assembly, Replace	5-155
5-55	Rear Cover, Replace.....	5-157
5-56	Rocker Arms and Push Rods, Replace.....	5-159
5-57	Push Rod Tubes, Replace.....	5-163
5-58	Cylinder Head, Adjust.....	5-165
5-59	Cylinder Head, Replace	5-167
5-60	Cylinder Head, Repair.....	5-169
5-61	Valves, Adjust	5-173
5-62	Valves, Replace	5-175
5-63	Engine Cylinder, Replace	5-177
5-64	Engine Piston and Rings, Replace	5-179
5-65	Engine Piston and Rings, Repair	5-181
5-66	Engine Connecting Rod, Replace	5-185
5-67	Engine Connecting Rod, Repair	5-187
5-68	Engine Front Cover, Replace	5-191
5-69	Engine Front Cover, Repair.....	5-193
5-70	Access Cover, Replace	5-195
5-71	PTO Clutch, Adjust	5-197
5-72	PTO, Replace	5-199
5-73	Clutch Assembly, Replace.....	5-201
5-74	Inner Frame, Replace	5-203
5-75	Inner Frame, Repair	5-205
5-76	Outer Frame, Replace.....	5-207
5-77	Outer Frame, Repair	5-209
6-1	1st Stage Cylinder and Piston, Replace.....	6-7
6-2	1st Stage Cylinder and Piston, Repair	6-9
6-3	2nd Stage Cylinder and Piston, Replace	6-11
6-4	2nd Stage Cylinder and Piston, Repair	6-13
6-5	3rd Stage Cylinder and Piston, Replace	6-17
6-6	3rd Stage Cylinder and Piston, Repair.....	6-19
6-7	4th Stage Cylinder and Piston, Replace	6-23
6-8	4th Stage Cylinder and Piston, Repair.....	6-25
6-9	Upper Crankcase, Replace.....	6-27
6-10	Crankcase Front Cover Assembly, Replace	6-29
6-11	Crankcase Front Cover Assembly, Repair.....	6-31
6-12	Compressor Crankshaft Assembly, Replace.....	6-33
6-13	Compressor Crankshaft Assembly, Repair	6-35
6-14	Compressor Lower Crankcase, Replace.....	6-37
6-15	Compressor Lower Crankcase, Repair	6-39
6-16	Compressor Eccentric Shaft, Replace	6-41
6-17	Compressor Eccentric Shaft, Repair.....	6-43
6-18	Alternator, Disassemble	6-45

LIST OF ILLUSTRATIONS (Cont)

Figure Number	Title	Page
6-19	Alternator, Assemble	6-47
6-20	Starter, Disassembly	6-49
6-21	Starter, Assembly	6-51
6-22	Crankshaft, Removal	6-53
6-23	Crankshaft, Inspections	6-55
6-24	Crankshaft, Installation	6-57
6-25	Engine Camshaft and Valve Lifter Tappets, Replace	6-59
6-26	Engine Crankcase, Replace	6-63
6-27	Power Take-Off Assembly, Repair	6-65
6-28	Clutch Assembly, Repair	6-69

vii/(viii blank)

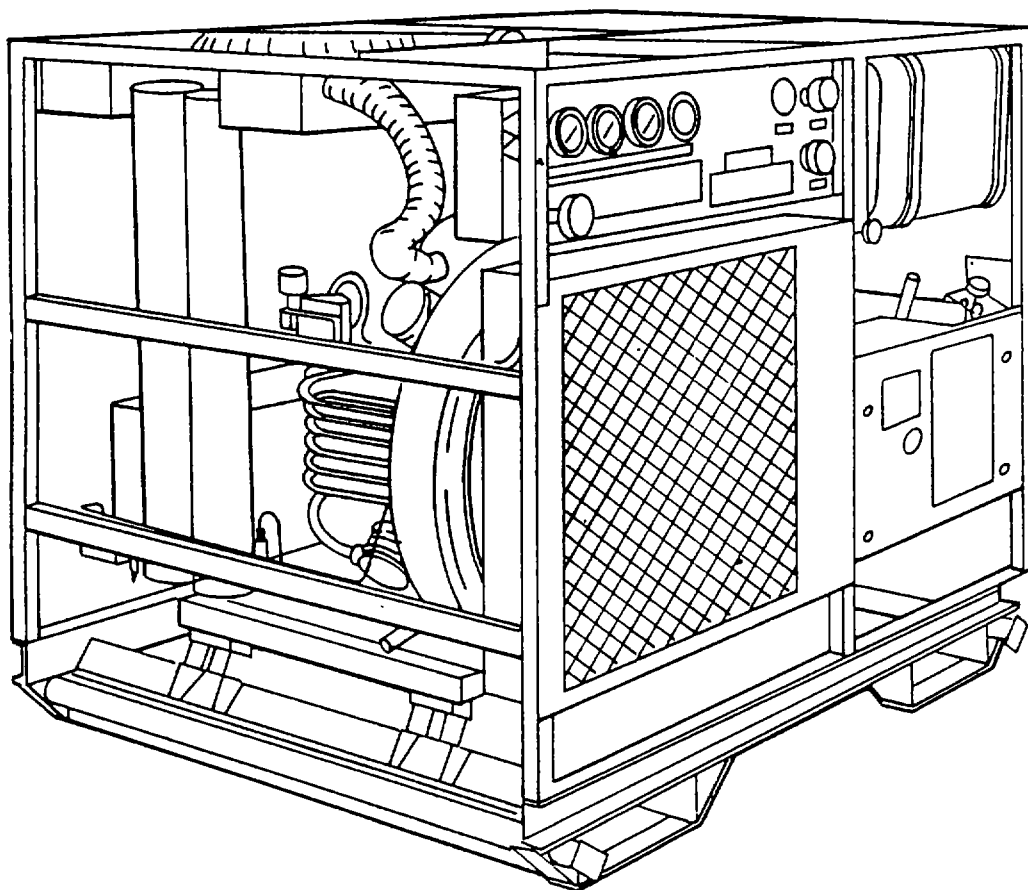


Figure 1-1. Compressor Unit, Model K-20-D.

CHAPTER 1 INTRODUCTION

	Page
OVERVIEW	1-1
Section I. General Information	1-1
Section II. Equipment Description and Data	1-2
Section III. Technical Principles of Operation	1-5

OVERVIEW

This chapter contains general information pertaining to Compressor Unit, Diesel Engine Driven, 20 Cubic Feet per Minute (CFM), Model K-20-D, and its components.

Section I. GENERAL INFORMATION

Paragraph	Page
1-1 Scope	1-1
1-2 Maintenance Forms, Records and Reports.....	1-1
1-3 Destruction of Army Materiel to Prevent Enemy Use	1-1
1-4 Preparation for Storage or Shipment	1-1
1-5 Reporting Equipment Improvement Recommendations (EIR's)	1-1
1-6 List of Abbreviations.....	1-2

1-1. Scope. This manual contains operator, unit, direct support and general support maintenance for Compressor Unit, Model K-20-D (figure 1-1).

1-2. Maintenance Forms, Records and Reports. Department of the Army forms and procedures used for equipment maintenance will be those prescribed in DA PAM 738-750, The Army Maintenance Management System (TAMMS).

1-3. Destruction of Army Materiel to Prevent Enemy Use. Refer to TM 750-244-3 for procedures to destroy Compressor Unit to prevent enemy use.

1-4. Preparation for Storage or Shipment. Refer to Chapter 4, Section VIII, and TM 38-230 for procedures to place the equipment into storage and prepare equipment for shipment.

1-5. Reporting Equipment Improvement Recommendations (EIR). If your Compressor Unit 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 us at: Commander, U.S. Army Troop Support Command, ATTN: AMSTR-MOF, 4300 Goodfellow Boulevard, St. Louis, Missouri 63120-1798. We will send you a reply.

1-6. List of Abbreviations.

AC	alternating current
AH	ampere/hour
AMP	ampere
ASME	American Society of Mechanical Engineers
BTU	British Thermal Unit
CFM	cubic feet per minute
DC	direct current
GPH	gallons per hour
FSW	feet of sea water
kPa	Kilo Pascals
NEDU	Navy Experimental Diving Unit
NM	newtons per square meter
PSI	pounds per square inch
RPM	revolutions per minute
TSP	trisodium phosphate
V	volt

Section II. EQUIPMENT DESCRIPTION AND DATA

Paragraph		Page
1-7	Equipment Characteristics, Capabilities and Features	1-2
1-8	Location and Description of Major Components.....	1-2
1-9	Equipment Data	1-4
1-10	Safety, Care and Handling	1-5

1-7. Equipment Characteristics, Capabilities, and Features. The compressor unit is driven by a two cylinder, air cooled, diesel engine connected to a four stage, reciprocating, air cooled, compressor. It is designed for continuous operation at a rated capacity of 20 cfm at pressures up to 3200 psi (22,064 kPa). It is also designed to operate under extreme climatic conditions. The K-20-D Compressor Unit is a portable, self contained skid mounted unit. The frame is constructed of welded steel channel. The subframe is attached to the main frame by 10 anti-vibration mounts. Slings/Tie-downs for hoisting or securing the compressor unit are welded to the skids and located at the four corners of the skids.

1-8. Location and Description of Major Components. (figure 1-2)

DIESEL ENGINE (1). Two cylinder four cycle diesel engine capable of producing 23 Hp at 2200 RPM.

AIR COMPRESSOR (2). Four-stage reciprocating air compressor cable of producing 20 cfm of diving air at 3200 psi.

PURIFIERS (3). Consist of two purifying cylinders with two purifying filters.

CONTROL PANEL (4). Contains controls and indicators needed to start, monitor, and terminate engine and compressor operations.

BATTERIES (5). A 12-volt (V) battery for starting the diesel engine.

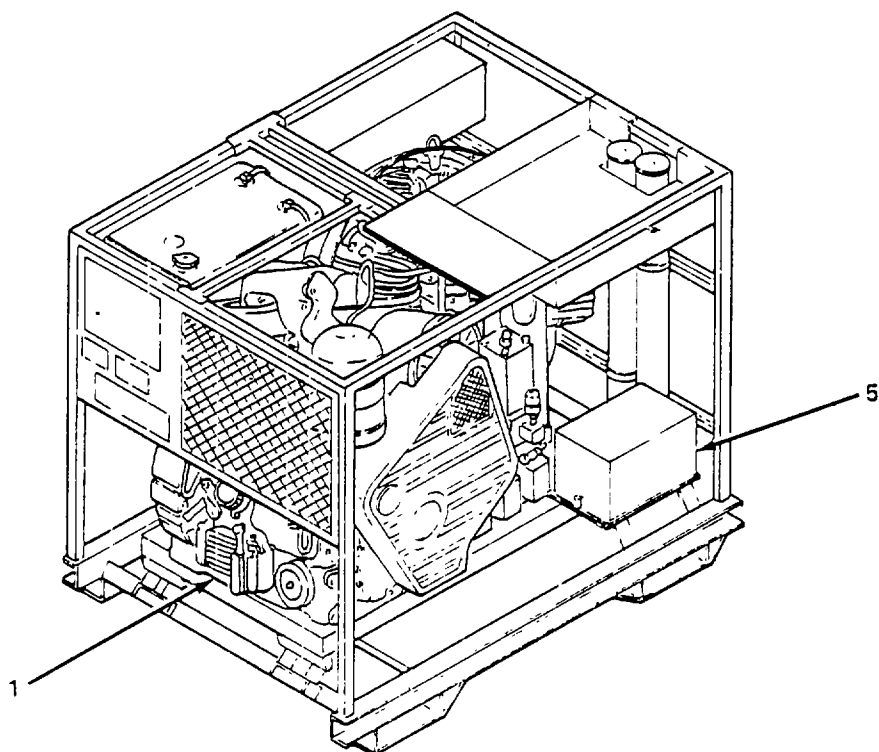
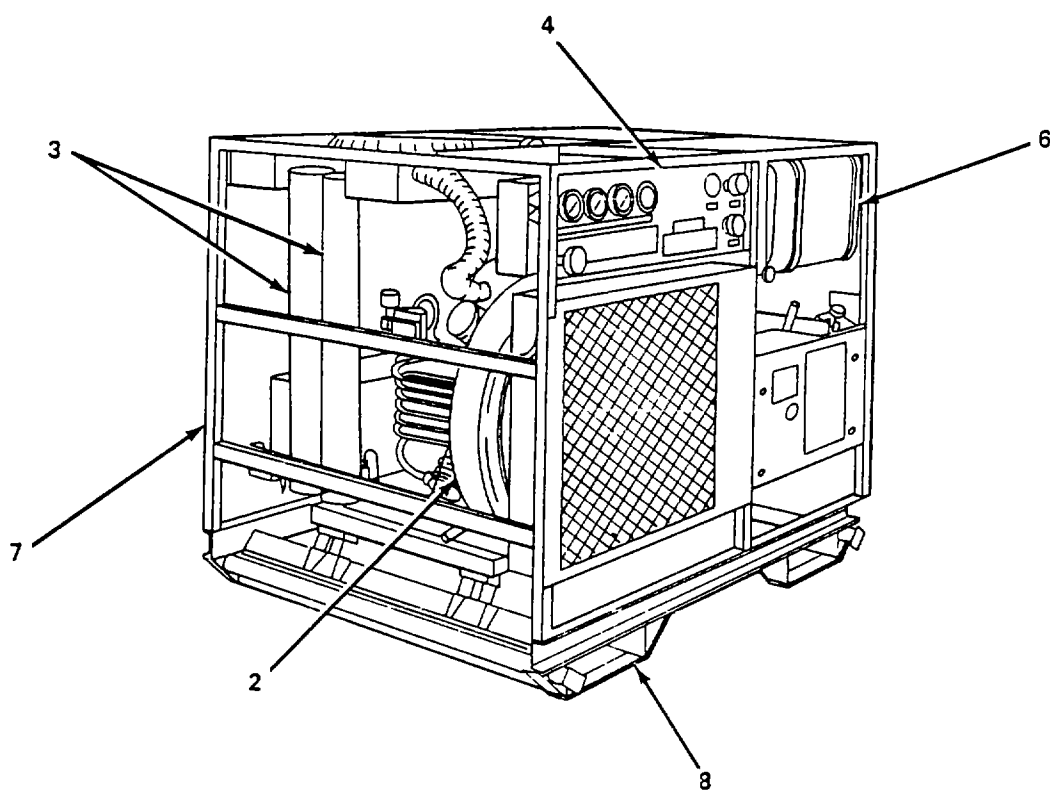


Figure 1-2. Location of Major Components.