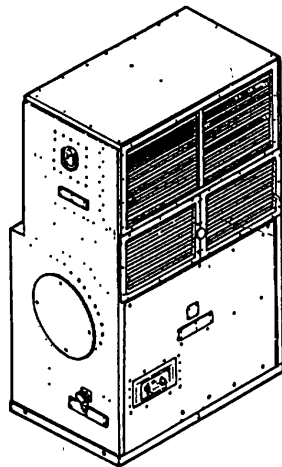


TECHNICAL MANUAL

OPERATOR, UNIT INTERMEDIATE DIRECT SUPPORT, AND INTERMEDIATE GENERAL SUPPORT MAINTENANCE

This copy is a reprint which includes
current pages from Changes 1 through 3



AIR CONDITIONER, COMPACT,
VERTICAL,
208-VOLT, 3 PHASE, 50/60 HERTZ,
60, 000 BTU/HR

MODEL F60T-2S
NSN 4120-01-238-4277

Approved for public release.
Distribution is unlimited.

HEADQUARTERS
DEPARTMENT OF THE ARMY

INTRODUCTION

PAGE 1-1

OPERATING INSTRUCTIONS

PAGE 2-1

OPERATOR MAINTENANCE

PAGE 3-1

UNIT MAINTENANCE

PAGE 4-1

INTERMEDIATE DIRECT SUPPORT MAINTENANCE PAGE 5-1

INTERMEDIATE GENERAL SUPPORT MAINTENANCE PAGE 6-1

REFERENCES

PAGE A-1

MAINTENANCE ALLOCATION CHART (MAC) PAGE B-1

COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LIST PAGE C-1

ADDITIONAL AUTHORIZATION LIST (AAL) ITEMS PAGE D-1

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST PAGE E-1

ILLUSTRATED LIST OF MANUFACTURED ITEMS PAGE F-1

ALPHABETICAL INDEX

INDEX-1

TECHNICAL MANUAL
NO. 5-4120-393-14

HEADQUARTERS DEPARTMENTS OF
THE ARMY AND THE AIR FORCE
WASHINGTON, D C, 2 November 1987

Operator, Unit, Intermediate Direct Support
and Intermediate General Support Maintenance
For

**AIR CONDITIONER, COMPACT, VERTICAL
208-VOLT, 3 PHASE, 50/60 HERTZ
60,000 BTU/HR
MODEL F60T-2S NSN 4120-01-238-4277
MODEL F60T-2HS NSN 4120-01-384-6922**

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. You may also submit your recommended changes by E-mail directly to <mpmt%avma28@st-louis-emh7.army.mil>. A reply will be furnished directly to you. Instructions for sending an electronic 2028 may be found at the back of this manual immediately preceding the hard copy 2028.

For Air Force, submit AFTO Form 22 (Technical Order System Publication Improvement Report and Reply) in accordance with paragraph 6-5, Section VI, T.O. 00-5-1. Forward to Commander, San Antonio Air Logistics Center, ATTN: SA-ALC/TIRTR, Kelly Air Force Base, TX 78241-5000.

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

TABLE OF CONTENTS

	PAGE
CHAPTER 1. INTRODUCTION	1-1
Section I General Information	1-1
Section II Equipment Description and Data.....	1-3
Section III Principles of Operation	1-8
CHAPTER 2. OPERATION INSTRUCTIONS	2-1
Section I Description and Use of Operator's Controls and Indicators	2-1
Section II Operator Preventive Maintenance Checks and Services (PMCS).....	2-3
Section III Operation Under Usual Conditions	2-7
Section IV Operation Under Unusual Conditions	2-17

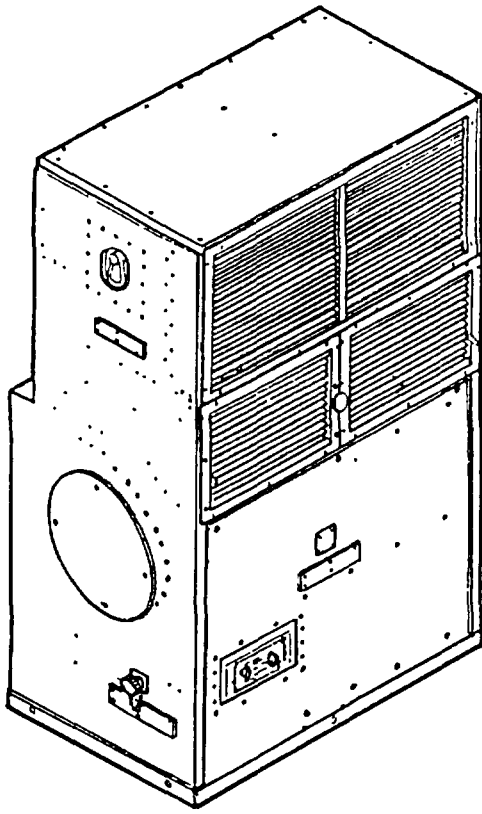
TABLE OF CONTENTS - CONTINUED

CHAPTER 3.	OPERATOR MAINTENANCE	3-1
Section I	Lubrication Instructions	3-1
Section II	Troubleshooting Procedures	3-2
CHAPTER 4.	UNIT MAINTENANCE	4-1
Section I	Repair Parts, Special Tools, TMDE, and Support Equipment	4-1
Section II	Service Upon Receipt	4-2
Section III	Lubrication	4-23
Section IV	Preventive Maintenance Checks and Services (PMCS)	4-24
Section V	Troubleshooting	4-35
Section VI	Maintenance Procedures	4-44
Section VII	Preparation for Storage or Shipment	4-150
CHAPTER 5.	INTERMEDIATE DIRECT SUPPORT MAINTENANCE	5-1
Section I	Repair Parts, Special Tools, TMDE, and Support Equipment	5-1
Section II	Maintenance Procedures	5-2
CHAPTER 6.	INTERMEDIATE GENERAL SUPPORT MAINTENANCE	6-1
Section I	Repair Parts, Special Tools, TMDE and Support Equipment	6-1
Section II	Maintenance Procedures	6-2
APPENDIX A.	REFERENCES	A-1
APPENDIX B.	MAINTENANCE ALLOCATION CHART (MAC)	B-1
Section I	Introduction	B-1
Section II	Maintenance Allocation Chart	B-4
Section III	Tool and Test Equipment Requirements	B-10
Section IV	Remarks	B-11
APPENDIX C.	COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LIST	C-1
Section I	Introduction	C-1
Section II	Components of End Item	C-2
Section III	Basic Issue Items	C-4
APPENDIX D.	ADDITIONAL AUTHORIZATION LIST	D-1
Section I	Introduction	D-1
Section II	Additional Authorization List	D-1
APPENDIX E.	EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST	E-1
Section I	Introduction	E-1
Section II	Expendable/Durable Supplies and Materials List	E-2
APPENDIX F.	ILLUSTRATED LIST OF MANUFACTURED ITEMS	F-1
Section I	Introduction	F-1
Section II	Illustrated List of Manufactured Items	F-1

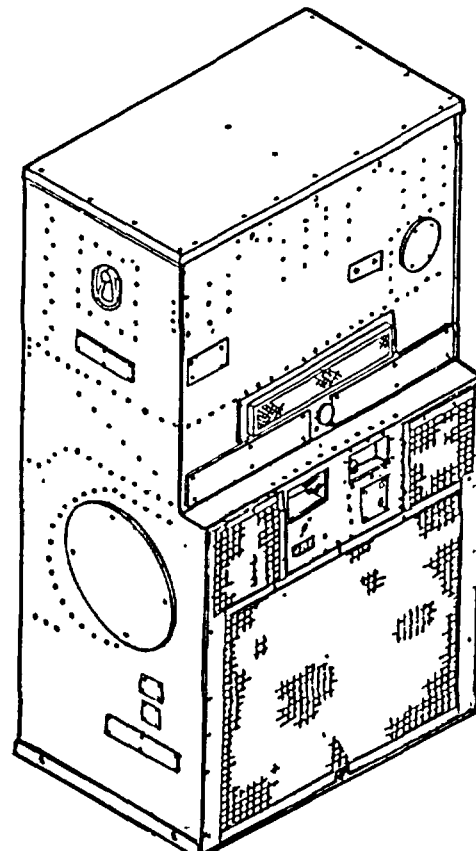
ALPHABETICAL INDEX.....	Index-1
-------------------------	---------

LIST OF TABLES

Table		Page
2-1	Operator Preventive Maintenance Checks and Services.....	2-4
2-2	Operator Control Settings.....	2-9
3-1	Operator Troubleshooting.....	3-2
4-1	Unit Preventive Maintenance Checks and Services (PMCS) Quarterly Schedule.....	4-25
4-2	Unit Maintenance Troubleshooting.....	4-36
4-3	Wire List.....	4-74
4-4	Rectifier Test.....	4-122
5-1	Pressure-Temperature Relationship of Saturated Refrigerant-22.....	5-35
5-2	Normal Operating Pressures (in full cooling DECREASE mode).....	5-35



AIR CONDITIONER-FRONT
AND LEFT SIDE VIEW



AIR CONDITIONER-REAR
AND RIGHT SIDE VIEW (WITH
FABRIC COVER REMOVED)

AIR CONDITIONER VIEWS

CHAPTER 1

INTRODUCTION

Section I GENERAL INFORMATION

1-1. Scope. This manual is for use by personnel responsible for the operation and maintenance of the F60T-2S and F60T-2HS air conditioners.

a. **Type of Manual.** Operator, Unit, Intermediate Direct Support, and Intermediate General Support Maintenance Manual.

b. **Model Number and Equipment Name.** Keco Industries, Inc., Model F60T-2S and F60T-2HS Compact, Vertical 60,000 BTU/HR Cooling, 47,000 BTU/HR Heating, 208 Volt 3 Phase, 50/60 Hertz Air Conditioners.

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

1-3. Reporting Equipment Improvement Recommendations (EIR's). If your Air Conditioner needs improvement, let us know. Send us an EIR. You the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Quality Deficiency Report). Mail it to: Commander, U.S. Army Aviation and Troop Command, ATTN: AMSAT-I-MDO, 4300 Goodfellow Boulevard, St. Louis, Missouri 63120-1798. We'll send you a reply.

1-4. Warranty information. Air Conditioners, Model F60T-2S and F60T-2HS, are warranted by Keco Industries, Inc. for a period of one year from date of shipment when properly installed. Warranty starts on the date found on DA Form 2410 or DA Form 2408-16 in the logbook. Report all defects in material or workmanship to your supervisor who will take appropriate action.

1-5. List of Abbreviations.

ACU	Air Conditioning Unit
EIR	Equipment Improvement Recommendation
MAC	Maintenance Allocation Chart
MEK	Methylethylketone (Solvent)
MTOE	Modified Table of Organization and Equipment
PMCS	Preventive Maintenance Checks and Services
TMDE	Test, Measurement and Diagnostic Equipment

1-6. Destruction of Army Material to Prevent Enemy Use. Command decisions, according to tactical situation, will determine when destruction of the air conditioning unit will be accomplished. A destruction plan will be prepared by the user organization unless one has been prepared by higher authority. For general destruction procedures for this equipment refer to TM 750-244-3, Procedures for Destruction of Equipment to Prevent Enemy Use.

1-7. Preparation for Storage or Shipment. Contact unit maintenance for air conditioning unit preparation for storage or shipment. See para 4-66 for instructions.

1-8. Quality Assurance/Quality Control (QA/QC). See appropriate QA/QC technical manual for further information.

Section II EQUIPMENT DESCRIPTION AND DATA

1-9. Equipment Characteristics, Capabilities, and Features. The F60T-2S and F60T-2HS are designed to ventilate, cool or heat and to filter and circulate air in enclosures.

- a. Provides a maximum of 60,000 BTU/HR of cooling and 47,000 BTU/HR of heating.
- b. Has two stages of heat.
- c. Provides a source of filtered outside (fresh) ventilation air.
- d. Is self contained in a single cabinet that is suited for van, shelter or other enclosed areas.
- e. Operates in environmental conditions from arctic to tropic.
- f. Is fully portable.
- g. Has connection point for CBR (chemical, biological, radiological) filter.
- h. Is designed for low-noise level operation.
- i. Has alternate power input connection locations to provide for a variety of installations.
- j. The control panel may be removed from the unit and remote mounted.

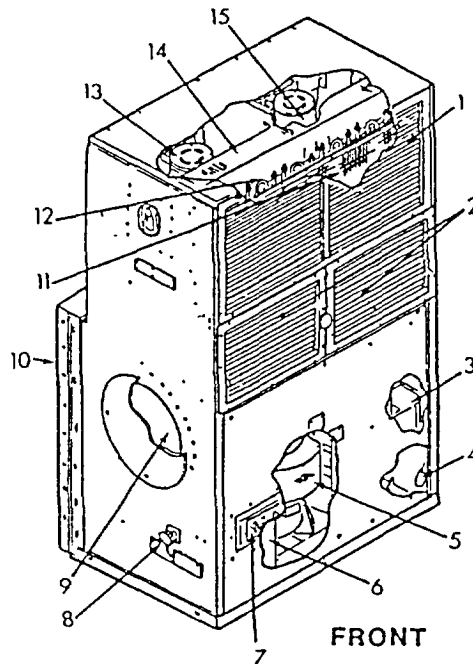
NOTE

When control panel is remote mounted, a block off panel must be used on the air conditioner. The block off panel must be ordered separately. Interconnecting cables must also be fabricated. See installation instructions (para 4-7) for additional information.

- k. The F60T-2HS model is equipped with a high speed fan and motor that allows use with fixed or flexible ducts to distribute the conditioned air.
- l. An accessory 16 inch flexible duct adapter is available for use with the model F60T-2HS.

NOTE

The 16 inch flexible duct adapter, when used, is mounted in the same location as the conditioned air inlet and outlet grilles.

1-10. Location and Description of Major Components.

CONDITIONED AIR DISCHARGE GRILLE (1). Adjustable louvers allow directional control of conditioned air

INTAKE (RETURN) AIR GRILLES (2). Adjustable louvers allow control of outside (fresh) and return (from enclosure) air.

JUNCTION BOX NUMBER ONE (3). Contains circuit breaker (CB) relays (K1, K2, K7, K8 and K9) and terminal boards (TB1 and TB2).

CONDENSATE WATER DRIP PAN AND DRAIN TRAP (4). The drip pan is located directly below the evaporator coil and mist eliminator and is built into the casing. Its purpose is to collect condensate that drips off the evaporator coil and mist eliminator during cooling operations. Condensate water then flows through tubing to the drain trap located inside the lower front of the cabinet. The drain trap has a check valve that prevents air flow between the condenser and evaporator sections through drain tubing.

COMPRESSOR (5). Pumps refrigerant through the system during cooling operations.

JUNCTION BOX NUMBER TWO (6). Contains fuses (F1, F2 and F3), transformer (T), relays (K6 and K10), rectifier (CR), and filters (FL1, FL2, FL3 and FL4).

NOTE

The control panel is shown in its location when the air conditioner is installed as a self-contained unit. The control panel is designed so that it may be removed from the cabinet and installed in a remote location. See installation instructions (para 4-8).

CONTROL PANEL (7) Contains a live position mode selector switch(s) and a temperature control thermostat (S1).

NOTE

The air conditioner is designed so that the input power receptacle may be used in the side panel location shown, or it may be moved to one of three other alternative locations. See installation instructions (para 4-9).

INPUT POWER RECEPTACLE (Primary Location) (8). For connection of external power source cable.

CONDENSER AIR FANS AND MOTOR ASSEMBLY (9). Draws air through the condenser coil and discharges the heated air back to the outside during cooling operations.

FABRIC COVER (10). When rolled down it protects the rear surface of the unit.

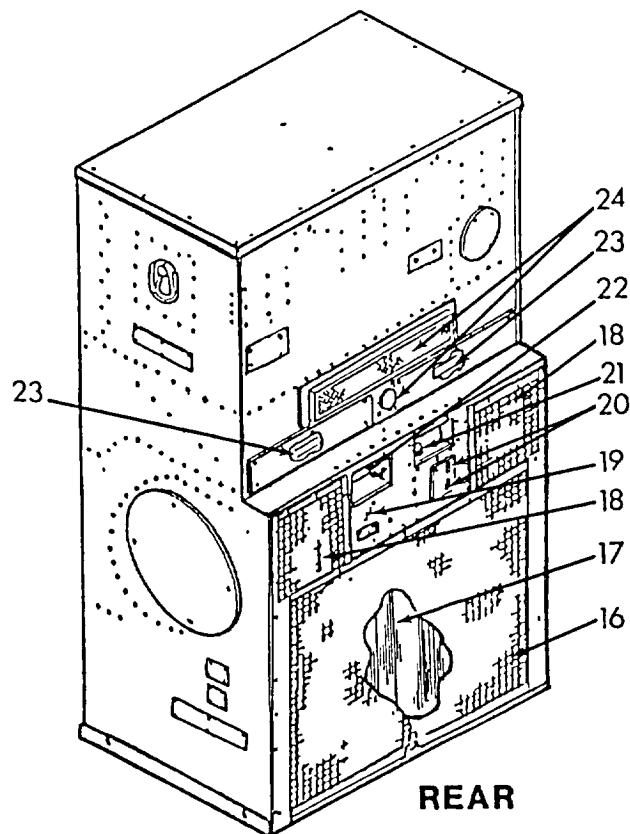
MIST ELIMINATOR (11). Prevents condensate (water) from being blown from the coil into the enclosure.

HEATER ELEMENTS (12). Consists of two banks of three elements each. Only one bank operates in the LO HEAT mode. Both banks operate in the HI HEAT mode, however, the TEMPerature control thermostat controls only one bank.

LEFT EVAPORATOR FAN AND MOTOR (13). Draws air into the evaporator section and exhausts it through the evaporator (cooling) coil and heater elements into the enclosure.

EVAPORATOR COIL (14). Serves as a heat exchanger by transferring heat from the air passing over the tubing and fins to the refrigerant passing through the tubing.

RIGHT EVAPORATOR FAN AND MOTOR (15). Draws air into the evaporator section and exhausts it through the evaporator (cooling) coil and heater elements into the enclosure.



CONDENSER COIL GUARD (16). Protects coil from damage.

CONDENSER COIL (17). Serves as a heat exchanger by transferring heat from the refrigerant passing through the tubing to the air passing over the tubing and the fins.

CONDENSER AIR OUTLET GRILLES (18). Protects personnel from injury and fans from damage.

REFRIGERANT SIGHT GLASS (liquid sight indicator) (19). Allows visual inspection and indicates condition of liquid refrigerant when the unit is operating in the cool mode.

HIGH AND LOW PRESSURE CUTOUT SWITCHES (S5 and S6) (20). Safety switches that protect the refrigerant compressor.

CIRCUIT BREAKER (CB) RESET KNOB (21). Actuates a push-pull type control cable for resetting circuit breaker.

REFRIGERATION SERVICE VALVES (22). Provides connection points for refrigeration system servicing and testing.

CONDITIONED AIR FILTERS (23). Provides filtered return air.

FRESH AIR FILTER AND DAMPER (24). Provides filtered outside air.