This copy is a reprint which includes current pages from Changes 1 through 10.

TM 5-4120-243-14

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

TECHNICAL MANUAL

OPERATOR, ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL

AIR CONDITIONER, HORIZONTAL COMPACT 18,000 BTU

TRANE MODELS

208V, 3 PHASE, 50/60 HERTZ,

MODEL MAC6H18-208-1201-02

(FSN 4120-411-3730)

208V, 3 PHASE, 400 HERTZ,

MODEL MAC4H18-208-1201-03

(FSN 4120-411-3731)

230V, 1 PHASE, 50/60 HERTZ,

MODEL MAC6H18-230-1201-01

(FSN 4120-411-3729)

This copy is a reprint which includes current pages from Changes 1 through 8.

HEADQUARTERS, DEPARTMENT OF THE ARMY

28 OCTOBER 1971

WARNING

HIGH VOLTAGE

is used in the operation of this equipment,

DEATH ON CONTACT

or severe injury may result if personnel fail to observe safety precautions.
Always disconnect the air conditioner from power source before performing maintenance on this equipment.
Do not operate the air conditioner without louvers, top covers, and guards in place and tightly secured.

WARNING

REFRIGERANT UNDER PRESSURE

is used in the operation of this equipment,

DEATH

or severe injury may result if personnel fail to observe safety precautions.
Never use a heating torch on any part that contains refrigerant-22.
Avoid bodily contact with liquid refrigerant and avoid inhaling refrigerant gas.

CHANGE

No. 11

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 21 NOVEMBER 1995

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

AIR CONDITIONER, HORIZONTAL, COMPACT, 18,000 BTU, 208 V, 3 PHASE, 50-60 HERTZ
HARVEY W. HOTTEL MODEL CH20-6-08 NSN 4120-00-411-3730
AMERICAN AIR FILTER MODEL AACH-618-2 NSN 4120-01-177-5889
208 V, 3 PHASE, 400 HERTZ
TRANE MODEL MAC4H18-208-1201-03 NSN 4120-00-411-3731
HARVEY W. HOTTEL MODEL CH20-4-08, NSN 4120-00-383-3571
KECO MODEL KIF-18H-4 NSN 4120-01-177-5990

TM 5-4120-243-14, 28 October 1971, is changed as follows:

Title is changed to read as shown above.

Page 1-1, paragraph 1-3 is superseded as follows:

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 <daf2028@st-louis-emh7.army.mil>. A reply will be furnished directly to you.

Correct mailing address for Equipment Improvement Recommendation (EIR) is:

Commander
U.S. Army Aviation and Troop Command
ATTN: AMSAT-I-MDO
4300 Goodfellow Blvd.
St. Louis, MO 63120-1798

Page 2-1, paragraph 2-4. Add the following CAUTION:

CAUTION

Prior to connecting and disconnecting power cable, ensure ON/OFF circuit breaker is in the off position

Page 4-6, Prior to Paragraph 4-17. SERVICING RETURN AIR FILTER, Add the following personnel WARNING:

WARNING

Gloves should be worn when servicing or replacing the return air filter due to sharp edges. All sharp edges should be filed down to prevent future potential injuries.

By Order of the Secretary of the Army:

DENNIS J. REIMER
General, United States Army
Chief of Staff

Official:

JOEL B. HUDSON
Acting Administrative Assistant to the Secretary of the Army
00836

DISTRIBUTION:

To be distributed in accordance with DA Form 12-25-E, block no. 0070, requirements for TM 5-4120-243-14.

PIN: 005769-011

• U.S. GOVERNMENT PRINTING OFFICE: 1995-655-121/20320

CHANGE

NO. 10

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 1 JULY 1992

Operator's, Organizational, Direct Support, and General Support and Depot Maintenance Manual

AIR CONDITIONER, HORIZONTAL, COMPACT, 18,000 BTU,
208 V, 3 PHASE, 50-60 HERTZ
HARVEY W. HOTTEL MODEL CH20-6-08 NSN 4120-00-411-3730
AMERICAN AIR FILTER MODEL AACH-618-2 NSN4120-01-177-5989
208 V, 3 PHASE, 400 HERTZ
TRANE MODEL MAC4H18-208-1201-03, NSN 4120-00-411-3731
HARVEY W. HOTTEL MODEL CH20-4-08, NSN 4120-00-383-3571
KECO MODEL KIF–18H-4 NSN 4120-01-177-5990

Approved for public release; distribution is unlimited

TM 5-4120-243-14, 28 October 1971, is changed as follows:

Page 1-1, paragraph 1-3 is superseded as follows:

You can help improve this manual. If you find any mistake or if you know of a way to improve the procedure, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to: Commander, U.S. Army Troop Support Command, ATTN: AMSTR-MMTS, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798. A reply will be furnished to you.

Page 6-2 is changed as follows:

- Paragraph *6-3b, Discharging and Purging System,* add the following note:

NOTE

In accordance with Environmental Protection Agency regulations, refrigerants cannot be discharged into the atmosphere. A recovery/recycling unit must be used whenever discharging the unit.

Operation of the recovery/recycling unit must be by AUTHORIZED PERSONNEL ONLY.

Page 6-3 is changed as follows:

- Figure 6-1, *Discharging and evacuating refrigerant system,* the discharging portion of this illustration is superseded as follows:

TO DISCHARGE SYSTEM:
CONNECT AND OPERATE RECOVERY/RECYCLE UNIT IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.

Page 6-4 is changed as follows:

- Figure 6-2, *Charging refrigerant system, (sheet 1 of 2),* add following note:

NOTE

Whenever available, use recycled refrigerant for charging the refrigeration system.

Page B-4 is changed as follows:

- SECTION III. TOOLS AND TEST EQUIPMENT REQUIREMENTS is superseded as shown:

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
	F-H	Recovery and Recycling Unit, Refrigerant	4130-01-338-2707	17500B (07295)

By Order of the Secretary of the Army:

GORDON R. SULLIVAN
General, United States Army
Chief of Staff

Official:

MILTON H. HAMILTON
Administrative Assistant to the Secretary of the Army
01640

DISTRIBUTION:
To be distributed in accordance with DA Form 12-25E, qty rqr block no. 0070.

CHANGE

NO. 9

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., 20 November 1990

Operator's, Organizational, Direct Support, General Support and Depot Maintenance Manual

AIR CONDITIONER, HORIZONTAL, COMPACT, 18,000 BTU, 208 V, 3 PHASE, 50-60 HERTZ
HARVEY W. HOTTEL MODEL CH20-6-08 NSN 4120-00-411-3730
AMERICAN AIR FILTER MODEL AACH-618-2NSN4120-01-177-5989
208 V, 3 PHASE 400 HERTZ
TRANE MODEL MAC4H18–208–1201-03 NSN 4120-00-411-3731
HARVEY W. HOTTEL MODEL CH20-4-08 NSN 4120-00–383-3571
KECO MODEL KIF-18H-4 NSN 4120-01-177-5990

Approved for public release; distribution is unlimited

TM 5-4120-243-14, 28 October 1971 is changed as follows:

Page 2–12, paragraph 2– 13 is superseded as follows:

2-13. Operation in Extreme Heat.

NOTE

Unit Preventive Maintenance Checks and Services (PMCS) should be performed at daily intervals.

a. General. The air conditioner is designed to operate in temperatures up to 120 ° F (49 °C). Extra care should be taken to minimize the cooling load when operating in extreme high temperatures.

b. Protection.

(1) Check all openings in the enclosure, especially doors and windows, to be sure they are tightly closed. Limit in and out traffic if possible.

(2) When appropriate, use shades or awnings to shut out direct rays of the sun.

(3) When possible, limit the use of electric lights and other heat producing equipment.

(4) Limit the amount of hot, outside air introduced through the fresh air damper to that essential for ventilation.

NOTE

Weatherstripping, the installation of storm doors, and windows, if appropriate, and insulation of surfaces exposed to the outside is recommended when operating in extremely high temperatures for extended periods.

c. Cleaning.

(1) Clean outside grilles, coils, filters, and mist eliminator more frequently.

Page 2–12, paragraph 2–14 is superseded as follows:

2-14. Operation in Dusty or Sandy Conditions.

NOTE

Unit Preventive Maintenance Checks and Services (PMCS) should be performed at daily intervals.

a. General. Dusty and sandy conditions can seriously reduce the efficiency of the air conditioner by clogging the air filter, mist eliminator, and coils. This will cause a restriction in the volume of airflow. Accumulation of dust or sand in the condenser coil and/or in the compressor compartment may cause overheating of the refrigeration system. Dust or sand may also clog the condensate trap and water drain lines.

CAUTION

Never operate the air conditioner without having the air filters in place.

b. Protection.

(1) Shield the air conditioner from dust as much as possible.

(2) Take advantage of any natural barriers which offer protection.

(3) Limit the amount of dusty or sandy outside air introduced through the fresh air damper.

(4) Roll down and secure the fabric cover on the back of the cabinet during periods of shutdown.

c. Cleaning.

(1) Keep the air conditioner as clean as possible.

(2) Pay particular attention to the outside grilles, condenser, filters, mist eliminator, louvers, and electrical components.

(3) In extreme conditions, daily cleaning of condenser, filters, and outside grilles may be necessary.

By Order of the Secretary of the Army:

CARL E. VUONO
General, United States Army
Chief of Staff

Official:

THOMAS F. SIKORA
Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:
To be distributed in accordance with DA Form 12-25E, (qty rqr block no. 0070)

CHANGE
No. 8

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 21 March 1988

Operator's, Organizational, Direct Support,
General Support and Depot Maintenance Manual

AIR CONDITIONER, HORIZONTAL, COMPACT, 18,000 BTU,
208 V, 3 PHASE, 50-60 HERTZ
HARVEY W. HOTTEL MODEL CH20-6-08 NSN 4120-00-411-3730
AMERICAN AIR FILTER MODEL AACH-618-2 NSN 4120-01-177-5989
208V, 3 PHASE, 400 HERTZ
TRANE MODEL MAC4H18-208-1201-03 NSN 4120-00-411-3731
HARVEY W. HOTTEL MODEL CH20-4-08 NSN 4120-00-383-3571
KECO MODEL KIF-18H-4 NSN 4120-01-177-5990

TM 5-4120-243-14, 28 October 1971, is changed as follows:

Page i. Title is changed as above.

Page 1-1. Change "AMSTR-MPS" to read, "AMSTR-MCTS".

Throughout manual:

Delete all references to Trane Model Nos. MAC6H18-208-1201-01 and MAC6H18-208-1201-02, and to KECO Model No. F18H.

Change "American Air Filter Model CH618-2, NSN 4120-00-411-3730" to read "American Air Filter Model AACH-618-2, NSN 4120-01-177-5989".

Change "KECO Model FISH-4, NSN 4120-00-411-3731" to read, "KECO Model KIF-18H-4, NSN 4120-01-177-5990".

Change "Harvey W. Hottel Model CH20-4-08, NSN 4120-00-411-3731" to read "Harvey W. Hottel Model CH20-4-08, NSN 4120-00-383-3571".

By Order of the Secretary of the Army:

CARL E. VUONO
General, United States Amy
Chief of Staff

Official:

R.L.DILWORTH
Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:
To be distributed in accordance with DA Form 12-25A Operator, Unit, Direct Support and General Support Maintenance requirements for Air Conditioner, Horizontal Compact, 18,000 BTU, 208V, 50/60HZ-400HZ, 3PH).

Changes in force: C1, C2, C3, C4, C5, C6 and C7

TM 5-4120-243-14
C 7

CHANGE
No. 7

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 4 February 1985

Operator's Organizational, Direct Support,
General Support and Depot Maintenance Manual

AIR CONDITIONER, HORIZONTAL, COMPACT, 18,000 BTU,
208 V, 3 PHASE, 50-60 HERTZ
(TRANE MODEL MAC6H18-208-1201-02)
(HARVEY W. HOTTEL MODEL CH20-6-08)
(AMERICAN AIR FILTER MODEL CH618-2)
NSN 4120-00-411-3730
208V, 3 PHASE, 400 HERTZ
(TRANE MODEL MAC4H18-208-1201-03)
(HARVEY W. HOTTEL MODEL CH20-4-08)
(KECO MODEL FISH-4)
NSN 4120-00-411-3731
230 V, 1 PHASE, 50-60 HERTZ
(TRANE MODEL MAC6H18-230-1201-01)
(KECO MODEL F18H)
NSN 4120-00-411-3729

TM 5-4120-243-14, 28 October 1971, is changed as follows:

Page 1-1, paragraph 1-2.b. Change TM 38-750 to read "DA Pam 738-750."

Page 1-1, paragraph 1-3 is superseded as follows:

1-3. Reporting of Errors

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

b. Report all equipment improvement recommendations as prescribed by "DA Pam 738-750."

Page 3-2. Table 3-1, Preventive Maintenance Checks and Services is replaced with "Table 3-1. Operator/Crew Preventive Maintenance Checks and Services."

Table 3-1. Operator/Crew Preventive Maintenance Checks and Services

NOTE

Within designated interval, these checks are to be performed in the order listed.

D-During

Itern No.	Interval D	Item To be Inspected	Procedures Check for and have repaired or adjusted as necessary	Equipment is Not Ready/ Available if:
1	●	Air Conditioner Unit	During starting and operation, check for unusual noise, rough running, excessive vibration, lack of power, or any indication of a failing or defective component. If suspected, notify organizational maintenance.	

Page 4-2. Table 4-1, Preventive Maintenance Checks and Services is replaced with "Table 4-1. Organizational Preventive Maintenance Checks and Services."

Page A-1. Reference A-5 TM 38-750 should be changed to read "DA Pam 738-750."

By Order of theSecretary of the Army:

JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

Official:

DONALD J. DELANDRO
Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:
To be distributed in accordance with DA Form 12-25C, Operator, Organizational and Direct and General Support maintenance requirements for Environmental Equipment: Air Conditioners, 18,000 BTU, Compact.

Table 4-1. Organizational Preventive Maintenance Checks and Services

Q-Quarterly

Item No.	Interval Q	Item to be Inspected	Procedures
1	●	Air Filter	Clean and service as required.
2	●	Evaporator Coil	Clean and service as required.
3	●	Condenser Coil	Clean and service as required.
4	●	Evaporator Fan Motor	Clean and service as required. Turn shaft to be sure bearings are not defective.
5	●	Condenser Fan Motor	Clean and service as required. Turn shaft to be sure bearings are not defective.
6	●	Air Conditioner Unit	Lubricate all movable connections and linkage with SAE 30 oil. Check for loose, missing, or damaged components.
7	●	Mist Eliminator (Harvey W. Hottel, American Air Filter and Keco models only)	Clean and service as required.
8	●	Heaters	Check for breaks in wiring and insulation. Tighten loose connections.
9	●	Liquid Sight Indicator	Check for damage.
10	●	Refrigeration System	Check compressor, valves, and piping for damage. Report damage to direct support maintenance.

TM 5-4120-243-14
C 6

CHANGE
No. 6

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., 3 May 1982

**Operator's Organizational, Direct Support,
General Support and Depot Maintenance Manual
AIR CONDITIONER, HORIZONTAL, COMPACT, 18,000 BTU,
208 V, 3 PHASE, 50-60 HERTZ
(TRANE MODEL MAC6H18-208-1201-02)
(HARVEY W. HOTTEL MODEL CH20-6-08)
(AMERICAN AIR FILTER MODEL CH618-2)
NSN 4120-00-411-3730
208V, 3 PHASE, 400 HERTZ
(TRANE MODEL MAC4H18-208-1201-03)
(HARVEY W. HOTTEL MODEL CH20-4-08)
(KECO MODEL F18H-4)
NSN 4120-00-411-3731
230 V, 1 PHASE, 50-60 HERTZ
(TRANE MODEL MAC6H18-230-1201-01)
(KECO MODEL F18H)
NSN 4120-00-411-3729**

TM 5-4120-243-14,28 October 1971, is changed as follows:

Page 2-6. Immediately following paragraph 2- 10.b, add the following caution:

CAUTION

Do not operate Harvey W. Hottel, American Air Filter and Keco Model Air Conditioners in the cool mode for at least four hours after power has been provided to the air conditioners. These models contain compressors with crankcase heaters which provide proper operating temperature for the compressor lubricating oil, and boils off liquid refrigerant to prevent slugging of the compressor. The crankcase heater is energized when electrical power is applied to these air conditioners.

By Order of the Secretary of the Army:

E. C. MEYER
General, United States Army
Chief of Staff

Official:

ROBERT M. JOYCE
Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:

To be distributed in accordance with DA Form 12-25C, Operator's maintenance requirements for Environmental Equipment: Air Conditioners, 18,000 BTU, Compact.

*TM 5-4120-243-14
C5

CHANGE
NO.5

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., *21 June 1978*

Operator, Organizational, Direct Support and General Support Maintenance Manual

AIR CONDITIONER, HORIZONTAL, COMPACT, 18,000 BTU, 208 V, 3 PHASE, 50-60 HERTZ (TRANE MODEL MAC6H18-208-1201-02) (HARVEY W. HOTTEL MODEL CH20-6-08) (AMERICAN AIR FILTER MODEL CH618-2) NSN 4120-00-411-3730 208 v, 3 PHASE, 400 HERTZ (TRANE MODEL MAC4H18-208-1-201-03)' (HARVEY W. HOTTEL MODEL CH20-4-08) (KECO MODEL F18H-4) NSN 4120-00-411-3731 230 V, 1 PHASE, 50-60 HERTZ (TRANE MODEL MAC6H18-230-1201-01) (KECO MODEL F18H) NSN 4120-00-411-3729

TM 5-4120-243-14, 28 October 1971, is changed as follows:

The title is changed as shown above.

Page 1-1, Paragraph 1-1 *a* is superseded as follows :

1-1. Scope

a. These instructions are published for the use of the personnel to whom Trane Company models MAC6H18-230-1201-01, MAC6H18-208-1201-02, and MAC6H18-208-1201-03, Harvey W. Hottel models CH20-6-08 and CH20-4-08, American Air Filter Model CH618-2, or Keco models F18H-4 and F18H air conditioners are issued. Chapters 1 through 4 provide information on the operation, preventive maintenance services, and organizational maintenance of the equipment, accessories, components, and attachments. Chapters 5 and 6 provide information for direct and general support maintenance. Aslo included are descriptions of main units and their functions in relationship to other components.

Page 1-5, Paragraph 1-5 is superseded as follows:

a. This manual covers Trane models *MAC* 6H18-230-1201-01, MAC6H18-208-1201-02, and MAC4H18-208-1201 -03, Harvey W. Hottel models CH20-6-08 and CH20-4-08, American Air Filter Model CH618-2, and Keco models F18H-4 and F18H air conditioners. Each model is designed to operate on a different set of incoming power current characteristics. The electrical characteristics for each model are as follow:

(1) Single phase, 50/60 hertz, 230 volts. Trane model MAC6H18-230-1201-01 or Keco model F18H.

(2) Three phase, 5-/60 hertz, 208 volts, Trane model MAC6H18-208-1201-02, Harvey W. Hottel Model CH20-6-08, or American Air Filter Model CH618-2.

(3) Three phase, 400 hertz, 208 volts. Trane model MACH18-208-1201 -03, Keco model F18H-4, or Harvey W. Hottel Model CH20-4-08.

b. Where instructions and descriptions apply only to specific models, the model numbers to which the description or instructions apply will be specified. If no model number is specified, the instructions or descriptions apply to all eight models. Instructions applicable to Trane model MAC6H18-208-1201 -02 are applicable to Hottel model Ch20-6-08, and American Air Filter Model CH618-2. Instructions applicable to Trane model MAC4H18-208-1201-03 are applicable also to Hottel model CH204-08 or Keco model F18H-4. Instructions applicable to Trane model MAC6H 18-230-1201-01 are also applicable to Keco model F18H.

Page 1-5, Paragraph 1-6, replace sub para. a. and b. (1) as follows:

1-6. Identification and Tabulated Data

a. Identification. Each air conditioner has one major identification plate mounted on the side of the unit. The plate specifies nomenclature, manufacturer, military part number, BTU/HR, phase, hertz, volts, serial number, contract number, and shipping weight.

b. Tabulated Data.

(1) *Air conditioner (Models MAC6H18 230-1201-01, and F118H).*

Nomenclature. . .	Air conditioner, horizontal, compact
Manufacturer. . .	Trane or Keco Capacity:
Cooling	18,000 BTU/HR.
Heating.	14,300 BTU/HR
Phase	1
Hertz	50/60
Volts	230

Page 1-5, Add paragraph l-6b (2.2) as follows:

(2. 2) Air conditioner' (Model CH618-2).

Nomenclature.. .	Air conditioner, horizontal, compact
Manufacturer. . .	American Air Filter Co., Inc. Capacity
Cooling	18,000 BTU/HR
Heating.	14,300 BTU/HR
Phase	3
Hertz	50/60
volts	208

Paragraph 1-6, replace b. (3) as follows:

(3) *Air conditioner (Models MAC4H18-208-1201-03 and F18H-4).*

Nomenclature. . .	Air conditioner, horizontal, compact
Manufacturer. . .	Trane or Keco Capacity:
Cooling	18,000 BTU/HR
Heating.	14,300 BTU/HR
Phase	3
Hertz	400
Volts	208

Paragraph 1-6, replace b. (4) as follows:

(4) *Condenser fan motor (B2) and/or evaporator* fan *Motor (B3)* (Models MAC6H18-*230-1201-01 and F18H).*

Manufacturer. . .	IMC Magnetics Corp.
Model	FBC4620 (modified by marking "97403 13216E6140-2")
volts	230
Hertz	50/60
Phase	Single
RPM	3450/1725
Horsepower. . . .	
High	0.73
Low	0.12
Amperes	
High	3.5
Low	1.2
Duty	Continuous
Motor drive. . . .	Direct
Thermal protector	Automatic reset type opens at 145°C ± 5°C
Rotation(facing shaft end).	Counterclockwise

Page 1-6, Add paragraph l-6b (5.1) as follows:

(5. 1) Condenser fan motor (B2) and/or evaporator fan motor (B3) (Model CH618-2).

Manufacturer. . .	IMC Magnetics Corp.
Model	FEC4625-3 (modified by marking "97403 13216 E6140-3")
volts	208
Hertz	50/60
Phase	3
RPM	3450/1725
Horsepower. . . .	
High	0.73
Low	0.16
Amperes	
High	2.3
Low	0.9
Duty	Continuous
Motor Drive	Direct
Thermal protector	Automatic reset type

High	Opens at 120°C ± 5°C
Low	Opens at 150°C ± 7°C
Rotation (Facing shaft end)	Counterclockwise

Page 1-6, Paragraph 1-6, replace b. (6) as follows:

(6) *Condenser fan motor and/or evaprator fan motor (Models MAC4H18-208-1201-03 and* F18H-4).

Manufacturer.	IMC Magnetics Corp.
Model	BT4520-2 (modified by marking "97403 13216 E6140-4")
volts	208
Hertz	400
Phase	3
RPM	3750/1800
Horsepower.	
High	1.1
Low	3.0
Motor drive.	Direct
Thermal protector	Automatic reset type
High	Opens at 150°C ± 5°C
Low	Opens at 150°C ± 5°C
Rotation (facing shaft end).	Counterclockwise

Paragraph 1-6, replace b. (9), (10), (11), (12) and (13) as follows:

(9) *Condenser fan motor capacitor (C2) (MAC6H18-230-1201-01 and F18H).*

Manufacturer.	General Electric
Part Number.	28 F1557G2 (modified by marking "97403 13216E6236-4") (with protective boot 614 A625P21).
Type	Fixed
Dielectric.	Paper
Capacitance.	12.5 mf
Volts AC	440

(10) Evaporator fan motor capacitor (C3) (MA C6H18-230-1201-01 anf F18H).

Manufacturer.	General Electric
Part Number.	28F1557G2 (modified by marking "97403 13216E6236-4") (with protective boot 614A625P21).
Type	Fixed
Dielectric.	Paper
Capacitance.	12.5 mf
Volts AC	440

(11) *Compressor motor starting capacitor (C4) (MAC6H18-230-1201-01 and F18H).*

Manufacturer.	General Electric
Part Number.	35 F1109BA3 (modified by marking "97403 13216E6239")
Type	Fixed, aluminum electrolytic
Capacitance.	80 mf ± 10%
Bleed resistor.	15,000 ohms ± 2070, 1 watt

(12) *Compressor motor runcapacitor (C5) (MA C6H18-230-1201-01 and F18H).*

Manufacturer.	General Electric
Part Number.	72 F5013FB (modified by marking "97403 13216E6236-5") (with protective boot 614 A625P21).
Type	Fixed
Dielectric.	Paper
Capacitance.	35 mf
Volts AC	440

(13) *Compressor circuit breaker (CB1) (MA C6H18-230-1201-01 and F18H).*

Manufacturer.	Heinemann Electric
Part Number.	JA2Z21-3 (modified by marking "97403 13216 E202-3")
Type	DPST, series trip with mechanically actuated auxiliary switch

Page 1-6, Paragraph l-6b (14), title is changed as follows:

(14) *Compressor circuit breaker (CB1) (MAC6H18-208-1201-02 and CH618-2).*

Page 1-7, Paragraph 1-6, replace b. (15), as follows:

(15) *Compressor circuit breaker (CB1) (MAC4H18-208-1201-03 and F18H-4).*

Manufacturer.	Heinemann Electric
Part Number.	JA3Z18-4 (modified by marking "97403 13216 E6205-4")
Type	3 PST, series trip with mechanically actuated auxiliary switch

Paragraph 1-6, replace b. (16) and (17), as follows:

(16) *Control circuit breaker (CB2) (MAC-6H18-230-1201-01), (MAC6H18-208-1201-02 and F18H), and (CH618-2).*

Manufacturer . . . Taxas Instruments, Inc.
Part Number. . . 2MC1-102-1 (modified by marking "97403 13216E178-1")
Type . . . . . SPST, series trip

(17) *Control circuit breaker (CB2) (MAC-4H18-208- 1201-03 and F18H-4).*

Manufacturer . . . Texas Instruments, Inc.
Part Number. . . 2MC1-202-1 (modified by marking "97403 13216E6178-2")
Type . . . . . SPST, series trip

Paragraph 1-6, after b. (18) replace b. (18.1), (19) and (20), as follows:

(18.1) *Rectifier (CR1) (Hottel models CH20 6-08 and CH20-4-08, and Keco models F18H and F18H-4).*

Manufacturer. . . Motorola Semiconductor Products, Inc.
Part Number. . . MDA802 (modified by marking "97403 13216 E6223")

(19) *Heater element (HR1 through HR6) (MA C6H18-230-1201-01 and F18H).*

Manufacturer. . . Hotwatt Inc.
Part Number. . . 13 E6077-3 (modified by marking "97403 13216 E6124-3")
Sheath . . . . . Nickel-iron-chromium alloy tubular type
Element ..... Nickel-chromium
Volts 230
Watts 630

(20) *Heater element (HR1 through HR6) (MA C6H18-208-1201-02, MA C4H18-208-1201-03 F18H-4, and CH816-2).*

Manufacturer. . . Hotwatt Inc.
Part Number. . . 13E6077-4 (modified by marking "97403 13216 E6124-4")
Sheath . . . . . Nickel-iron-chromium alloy tubular tupe
Element . . . . . Nickel-chromium
volts 120
Watts 630

Paragraph 1-6, replace b. (21) as follows:

(21) *Time delay relay (K1) (Trane and Keco models only).*

Manufacturer. . . Magnecraft Electric Company
Part Number. . . P/N-67H550X (modified by marking "97403 13216E6182-3")
Type . . . . . Solid state-hermetically sealed
Time delay. . . . . 30 ± 6 seconds

Paragraph 1-6, add after (25) a new b. (25.1) as follows:

(25. *1) Compressor start relay (K5) (Keco model F18H only).*

Manufacturer. . . Essex International, Inc., Control Division.
Part Number. . . 1Z8116-1343S (modified by marking 97403 13216 E6240)
Type . . . . . SPST, Normally closed
Rated Volts. . . . . (Coil) 336 VAC (Pickup) 180-193 VAC (Dropout) 55-115VAC

Paragraph 1-6, after b. (28), replace (28.1) as follows:

(28.1) *Solenoid valves (L1 and L2) (Hottel models and Keco models).*

Manufacturer. . . Jackes-Evans Manufacturing Company
Part Number. . . 0B234 (modified by marking 97403 13216E6158)

Page 1-8, Paragraph 1-6, after b. (32), replace (32. 1) as follows:

(32.1) *High pressure switch (S4) (Hottel and Keco models only).*

Manufacturer. . . Penn Controls, Inc,
Part Number. . . P20DA-18 (modified by marking 97403 13216 E6215-3

Paragraph 1-6, after b. (33), replace (33.1) as follows:

(33. *1) Low pressure switch (S5) (Hottel and Keco models only).*

Manufacturer. . . Penn Controls, Inc.
Part Number. . . P20BA-16 (modified by marking 97403 13216 E6215-1)

Paragraph 1-6, after b. (35), replace (36) as follows:

(36) *Transformer (T1) (Trane and Keco models only).*

Manufacturer. . . Signal Transformer Co., Inc.
Part Number. . . 5249 (modified by marking 97403-13216E6214 and changing mounting slots to holes)

Rating:

Input . . . . . 115 VAC, 120 watts, 50 to 500 hertz
Output . . . . . 30 VAC, 4 amps

Paragraph 1-6, after b. (37), add a new (37.1) as follows:

(37.1) *Compressor (Keco F18H only).*

Manufacturer. . . arrier
Part Number. . . 6A26M-129 (Modified by marking 974031321 1E3793-9)
Type. . . . . Reciprocating
Oil Change. . . . . 22.4 ounces
Volts 230
Hertz 50/60
Phase 1
Weight. . . . . 80 pounds
(with oil)

Page 1-8. Paragraph 16b (38. 2) is added as follows:

(38.2) *Compressor (CH618-2).*

Manufacturer. . . Carrier
Model . . . . . 6A26M-179 (modified by marking "97403 13211E793-2")
Oil charge. . . . . 2-1/2 pints
Volts 208
Hertz 50/60
Phase 3
Weight with oil. 79 pounds

Paragraph 1-6, after b. (39.1), add a new (39.2) as follows:

(39.2} *Compressor (Keco Model F18H-4 only).*

Manufacturer. . . Carrier
Part Number. . . 6A26M-189 (Modified by marking 9740313211E3793-5)
Type. . . . . Reciprocating
Oil Charge. . . . . 22.4 ounces
Volts 208
Hertz 400
Phase 3
Weight. . . . . 75 pounds
(with oil)

Paragraph 1-6, after b. (42.1), add a new (42.2) as follows:

(42.2) *Refrigerant Service Valve (Keco Models F18H and F18H-4. and American Air Filter Model CH618-2).*

Manufacturer. . . Robinair Mfg. Corp.
Part Number. . . V2A-4 (Modified by marking 97403, 13218 E6975)

Page 1-9, Paragraph l-6b, replace (45) as follows:

(45) *Dehydrator (Trane and Keco models).*

Manufacturer. . , Alto Valve Co.
Part Number.. EK052 (Modified by marking "97403 13214 E3557")
Type. . . . . Sealed - non-refillable

Page 1-9, Add paragraph 1-6b (46.2. 1) as follows:

(46.2.1) Sruge resistor (Rl) (American Air Filter Model only).

Manufacturer. . . Workman Electronics Products, Inc.
Part number. . . . WRID
Type . . . . . WireWound
Resistance. . . . . 10 ohms
Wattage 15

Page 1-9. Add paragraph 1-6b (46. 3.1) as follows:

(46.3. *1) Mist eliminator assembly (American Air Filter Model only).*

Manufacturer. . . Research Products
Part number. . . . 907015 (modified by marking "97403 13220E1147")

Paragraph 1-6, after b. (46.3) add a (46.4) as follows:

(46.4) *Valve, Pressure, Relief (Hottel models only).*

Manufacturer. . . Fluid Regulator Corp.
Part Number . . . FRC-PN-C1503-01 (Modified by marking 97403 13211 E8369)
Relief pressure. . 540psig

Page 1-9. Add paragraph l-6b (46. 5.1) as follows:

(46.5. *1) Value, pressure relief (American Air Filter Model only),*

Manufacturer, . . Rexnord Aerospace
Part number. . . . C1503-01 (modified by marking "97403 1321 1E8369")
Relief pressure. . 540 ± 10% psig

Paragraph 1-7, is superseded as follows:

1-7. Diagrams

Control System Schematic Diagrams. Refer to figures 1-4 and 1-4.1, 1.5, 1 and 1-5.2 for schematic wiring diagrams.

Figure 1-4. Change caption to read as follows:

Figure 1-4. *Control system schematic diagram, 1 phase,* 50/60 *hertz,* 230 *volts (Trane model only).*

Add figure 1-4.1 as follows:

Figure 1-4.1 *Control system schematic diagram, 1 phase,* 50/60 *hertz,* 230 *volts (Keco model only).*

(Located in back of manual)

Figures 1-5 and 1-5.1. Change captions to read as follows:

Figure 1-5. Control system schematic diagram, 3 phase, 50/60 hertz and 400 hertz, 208 volts (Trane models only).

Figure 1-5.1 Control system schematic diagram, 3 phase, 50/60 hertz and 400 hertz, 208 volts (Hottel models only).

Add figure *1-5.2* and 1-5.3 as follows:

Figure 1-5.2 Control schematic diagram, 3 phase 400 hertz, 208 volts (Keco model F18H only)

(Located in back of manual)

Figure 1-5.3. Control system schematic diagram, 3 phase, 50/60 hertz, 208 volts (American Air Filter Model only)

(Located in back of manual)

b. *Wiring Diagrams.* Refer to figures 1-6 through 1-8.2 for wiring diagrams.

Figure 1-6. Change caption to read as follows:

Figure 1-6. Wiring diagram, 1 phase, 50/60 hertz, 230 volts (Trane model only).

Add figure 1-6.1 as follows:

Figure 1-6.1 *Wiring diagram, 1 phase, 50/60 hertz, 230 volts (Keco model only).*

(Located in back of manual)

Figure 1-7. Change caption to read as follows:

Figure 1-7. *Wiring diagram, 3 phase, 50/60 hertz, 208 volts (Trane model only).*

Figure 1-7.1. Change caption to read as follows:

Figure 1-7.1 *Wiring diagram, 3 phase, 50/60 hertz, 208 volts (Hottel model only).*

(Located in back of manual)

Add figure. 1-7.2 as follows:

Figure 1-7.2. Wiring *diagram, 3 phase, 50/60 hertz, 208 volts, (American Air* filter only) .

(Located in back of manual)

Figure 1-8. Change caption to read as follows:

Figure 1-8. Wiring diagram, 3 phase, 400 hertz, 208 volts (Trane model only).

Figure 1-8.1. Change caption to read as follows:

Figure 1-8.1. Wiring diagram, 3 phase, 400 hertz, 208 volts (Hottel model only).

Add figure 1-8.2 as follows:

Figure 1-8.2. Wiring diagram, 3 phase, 400 hertz, 208 volts (keco model only),

(Located in back of manual)

Page 4-2, Table 4-1. Change sequence *2. 1 as follows:

Sequence number	Item to be inspected	Procedures	Paragraph reference
*2.1	Mist eliminator (Harvey W. Hottel, American Air Filter and Keco Models only)	Inspect and service or replace, if necessary	4-17.1

Page 4-3, Table 4-2. Item 2, Second Column. Change 1 to read:

1. Mist eliminator dirty. (Harvey W. Hottel, Keco and American Air Filter Models only).

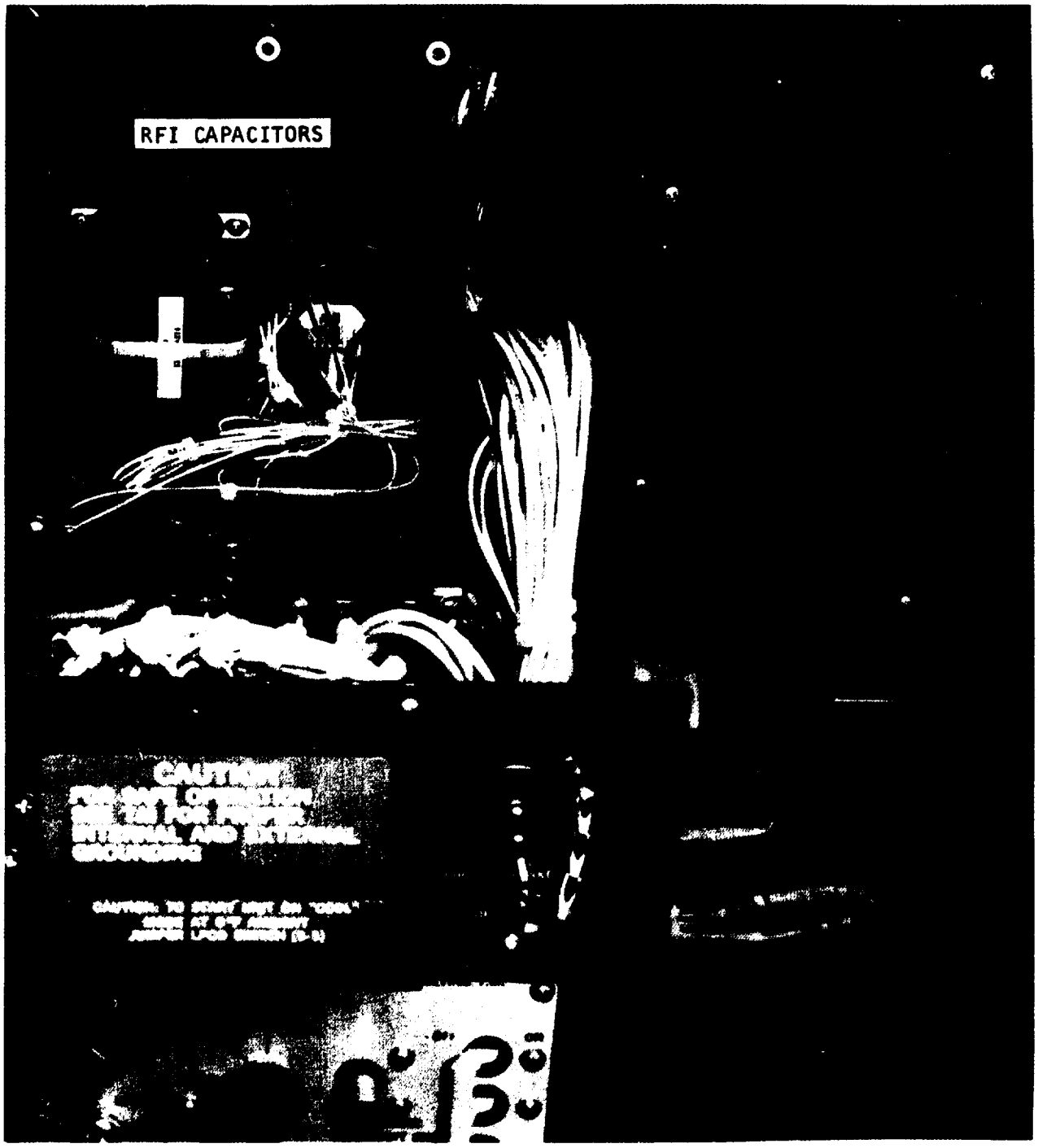
Page 4-5, Table 4-2. Item 6, Second Column. Change f to read:

f. Dirty or damaged mist eliminator (Harvey W. Hottel, Keco and American Air Filter Models only).

Page 4-5, Table 4-5. Item 8, Second Column. Change i to read:

Dirty mist eliminator (Harvey W. Hottel, Keco and American Air Filter Models only).

Page 4-6, Add figure 4-1.1 as follows:



TS 4120-24+14/4-1.1

Figure 4-1.1. RFI capacitors (American Air Filter MOdel CH618-2).

Page 4-7. Add figure 4-2. 1 as follows:

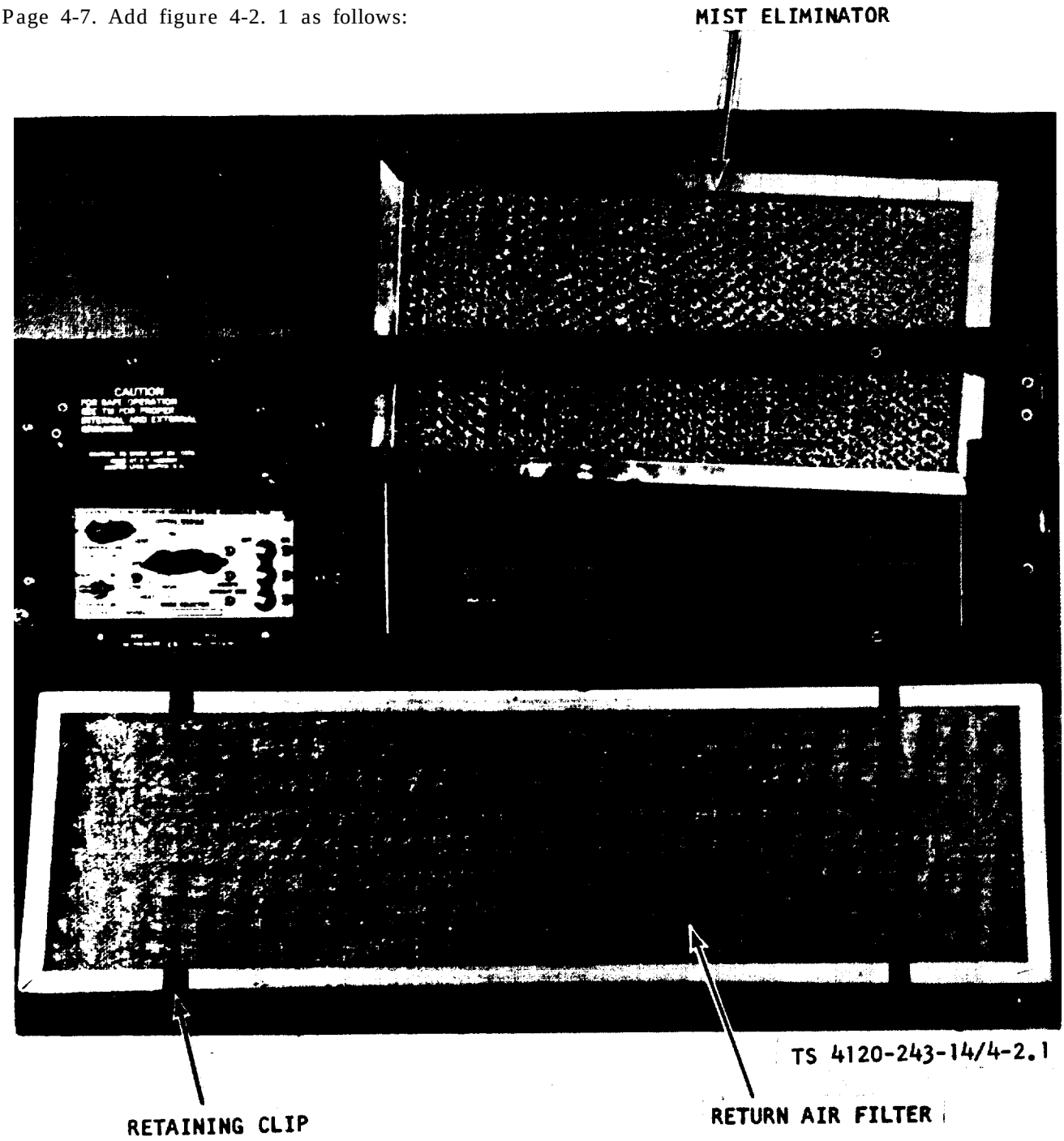


Figure 4-2.1. Evaporator air louvers and air filter, and mist eliminator (American Air Filter Model CH618-2).

Page 4-8, paragraph 4-17.1, Replace headings follows:

4-17. 1. Servicing mist eliminator (Hottel models CH20-6-08 an CH20-4-08, Keco models F18H and F18H-4, and American Air Filter model CH618-2 only).

Page 4-29, paragraph 4-49. Replace the following:

4-49. General

The junction box (fig. 4-20) contains the time delay relay, control circuit breaker, condenser fan relay, heater relay, and compressor motor relay. The junction boxes in Trane and Hottel three phase models also contain a phase sequence relay which is not required in the Keco model.

Page 4-33, paragraph 4-52, step c., replace with the following:

c. *Time Delay Relay.* Install time delay relay (16) on junction box. Secure relay in single phase models to the junction box with four screws (11), nuts (12), and washers (13). For three phase (Trane and Hottel models only) junction boxes, omit the two inner sets of hardware.

Page 4-33, Paragraph 4-52e (2) is superseded as follows:

(2) To remove time delay relay (16) from single phase units, Harvey W. Hottel units and American Air Filter Co. units, remove four screws (11), nuts (12) and flat washers (13).

Page 4-33, Paragraph 4-53c is superseded as follows:

c. Time Delay Relay. Install time delay (16) on junction box. Secure relay to Harvey W. Hottel, American Air Filter, or single-phase Trane junction box with four screws (11). nuts (12) and washers (13). For Trane three-phase junction boxes, omit the two inner sets of hardware.

Page 4-33. Paragraph 4-55. The first sentence is superseded as follows:

The power transformer, surge resistor (Harvey W. Hottel and American Air Filter CO. Models only) and rectifier, reduce the power voltage and convert the alternating current to direct current to operate the coils and switches in the control circuit.

Page 4-35, Add figure 4-22.1 as follows:

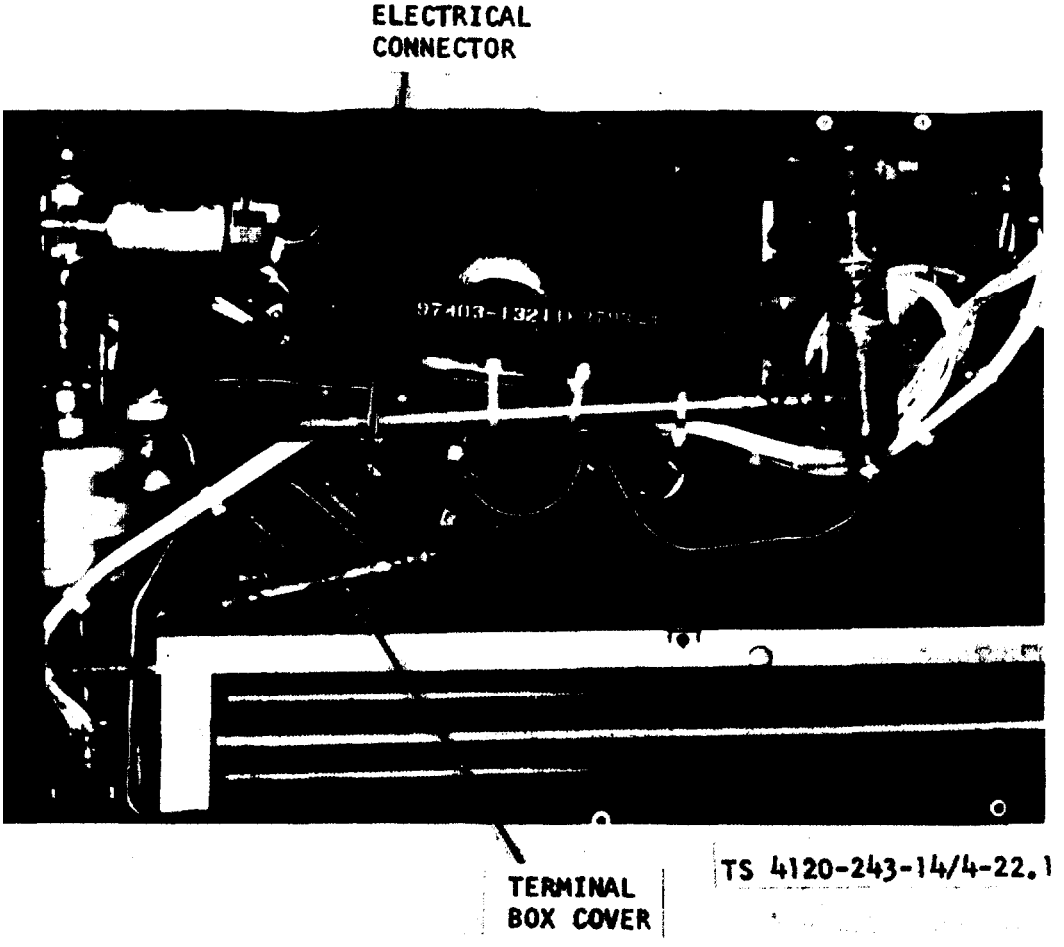


Figure 4-22.1. Compressor electrical connector and terminal box cover (American Air Filter Model CH618-2).

(Applicable to Trane and Keco single-phase models only.)

Page 4-36, figure 4-23, add immediately below figure title a second sentence as follows:

(Applicable to Trane and Keco single-phase models only.)

Page 4-37, figure 4-24, add immediately below figure title a second sentence as follows:

Page 4-37, Paragraph *4-63b.* Change paraheading as follows:

b. Vibration Eliminators (Trane and harvey W. Hottel Models only).

Page 5-5. Add figures 5-2.2 (sheet 1 of 2) and 5-2.2 (sheet 2 of 2) following figure 5-2.1, as follows:

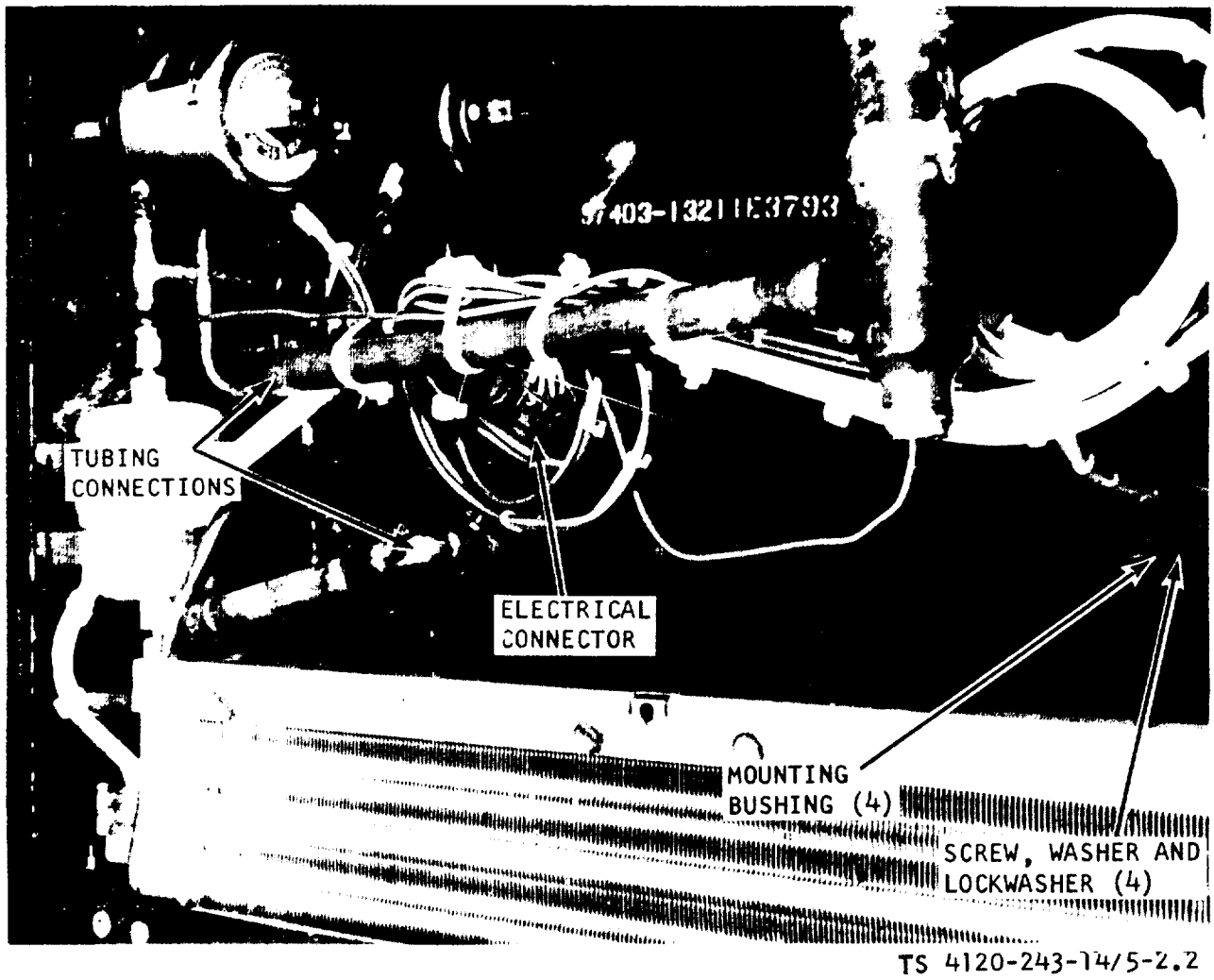


Figure 5-2.2. Compressor, installed view, carrier (sheet 1 of 2) (American Air FilterModel CH618-2).

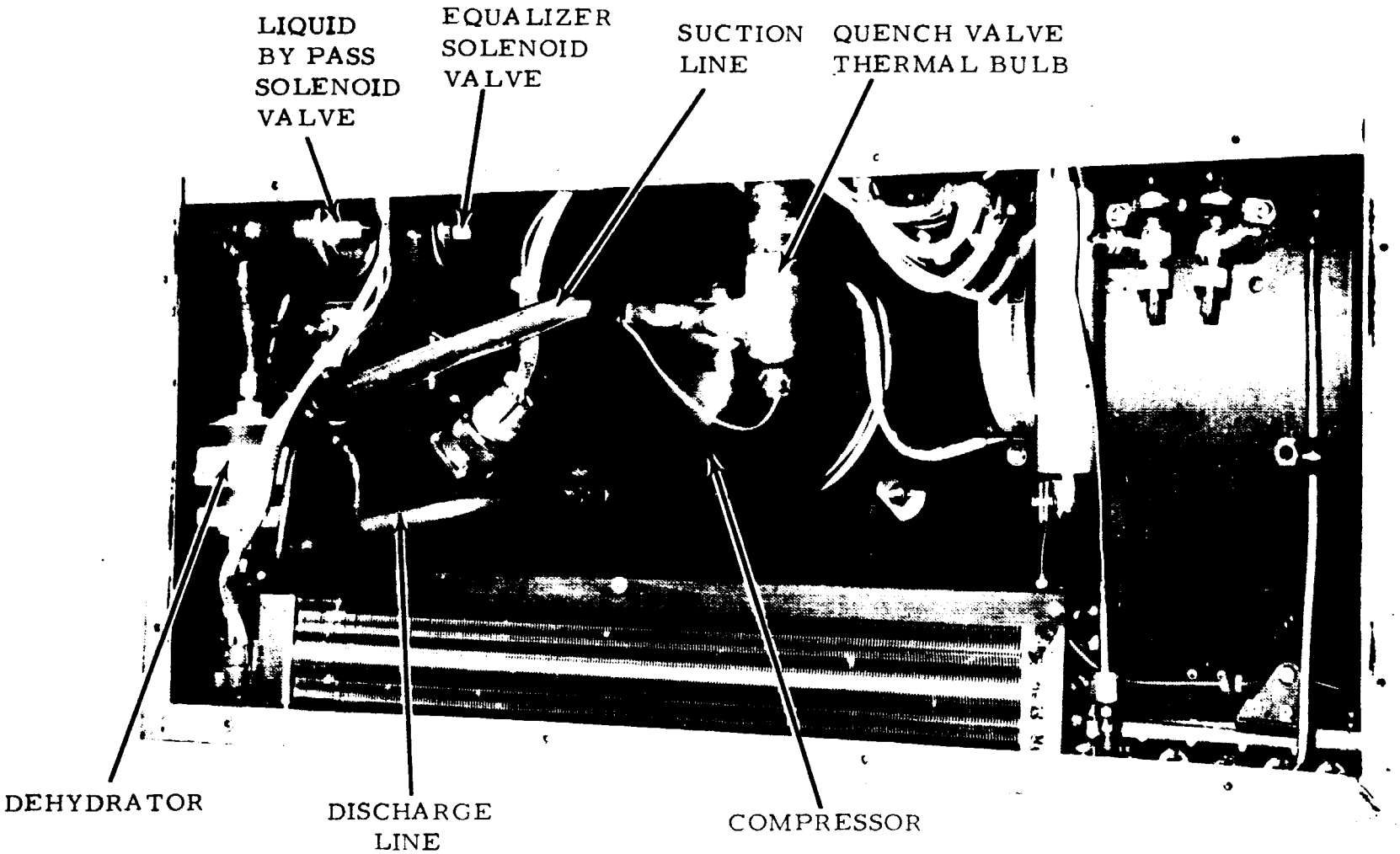


Figure 5-2.2. Carrier compressor, installed view (sheet 2 of 2) Keco models onlu).

Page 5-6, figure 5-3, change second line to read as follows:

(Applicable to Trane and Keco models only.)

Page *5-9,* figure 5-6, change second line to read as follows:

(Applicable to Trane and Keco models only.)

Page 5-9, Add figure 5-6.1, as follows:

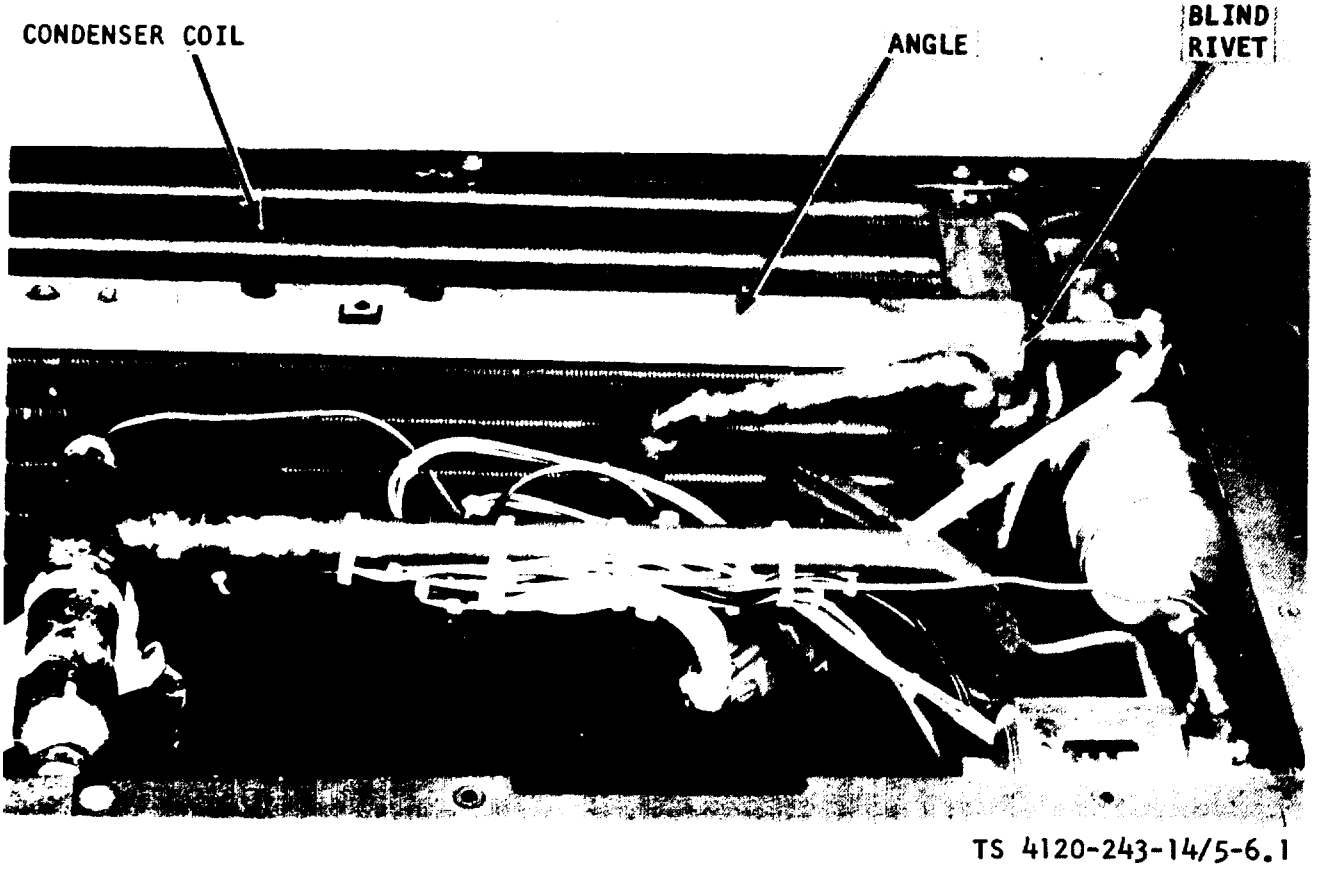


Figure 5-6.1. Condenser coil, removal and installation (American Air Filter Model CH618-2).

Page *5-11,* figure 5-7, change second line to read as follows:

(Applicable to Trane and Keco models only.)

Page 5-12, figure 5-8, change second line to read as follows:

(Applicable to Trane and Keco models only.)

Page 5-12, Add figure 5-8.1 as follows:

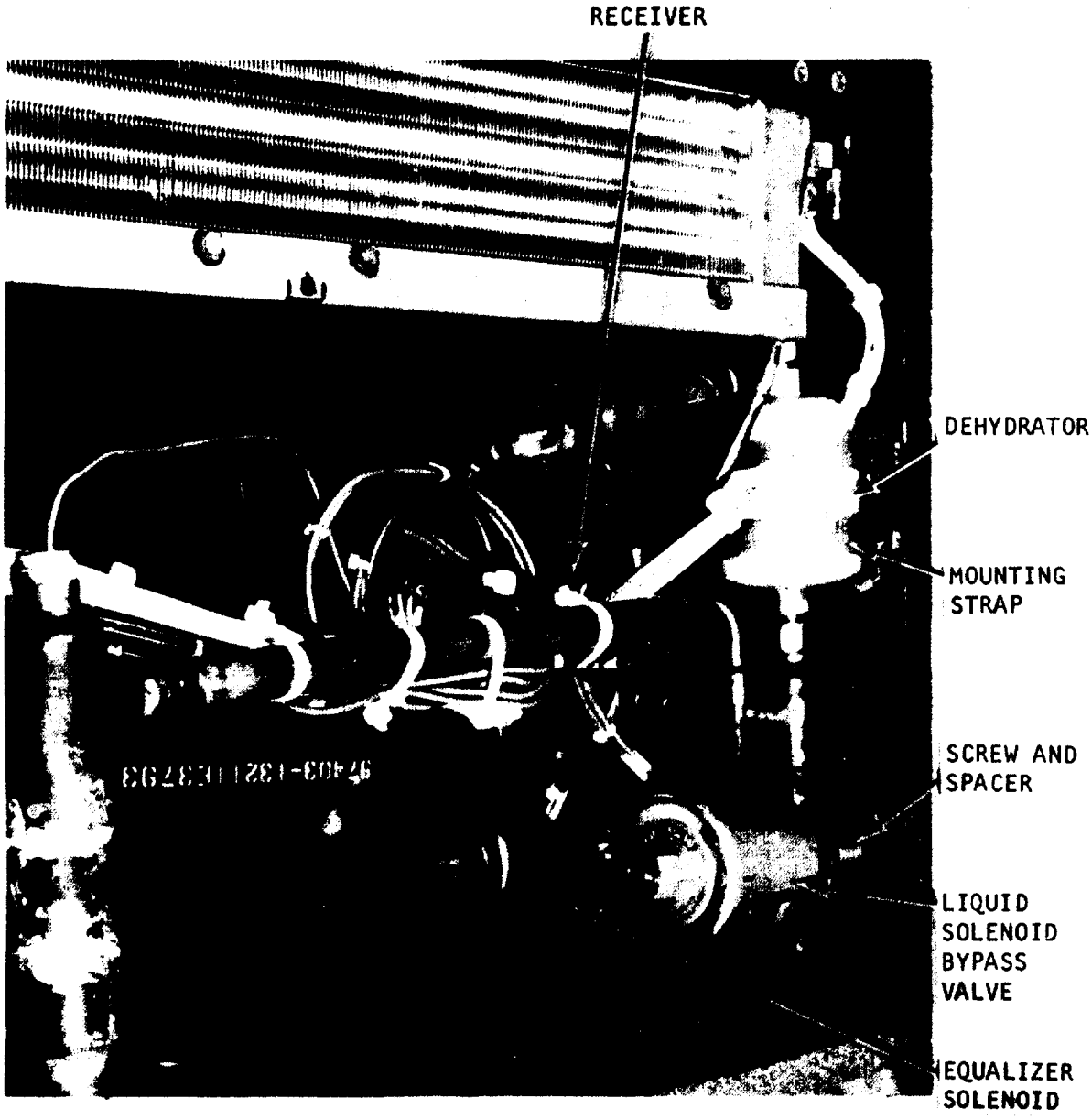


Figure 5-8.1. Dehydrator, receiver and solenoid valves (American Air Filter Model CH618-2).

Page 6-4, figure 6-2, change second line to read as follows:

(Applicable to Trane and Keco models only.)

In back of manual, add a new control system schematic figure 1-4. 1, titled as follows:

Figure 1-4.1. Control System Schematic Diagram, 1 Phase, 50,/60 Hertz, 230 volts (Keco model F18H only).

In back of manual, add a new control system schematic diagram figures 1-5.2 and 1-5.3 titled as follows:

Figure 1-5.2. Control System Schematic Diagram, 3 Phase, 400 Hertz, 208 volts (Keco model F18H-4 only).

Figure 1-5.3. Control System Schematic Diagram (American Air Filter Model CH618-2)

In back of manual, add a new Wiring Diagram, figure 1-6.1, titled as follows:

Figure 1-6.1. Wiring Diagram, 1 Phase, 50/60 Hertz, 230 volts (keco model F18H only).

In back of manual, add a new Wiring Diagram, figure 1-8.1. Wiring Diagram, 3 Phase, 400 Hertz, 208 volts (Keco model F18H-4 only).

By Order of the Secretary of the Army:

BERNARD W. ROGERS
General, United States Army
Chief of Staff

Official:

J. C. PENNINGTON
Major General, United States Army
The Adjutant General

Distribution:
To be distributed in accordance with DA Form 12-25C, Operator maintenance requirements for Environmental Equipment: Air Conditioners, 18,000 18,000 BTU, Compact.

TM 5-4120-243-14
C 4

CHANGE

No. 4

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC 10 *Febmury* 1976

Operator, organizational, Direct Support

and General Support Maintenance Manual

AIR CONDITIONER, HORIZONTAL, COMPACT, 18,000 BTU,

TRANE MODELS

208 V, 3 PHASE, 50/60 HERTZ, MODEL MAC6H 18-208-1201-02

(NSN 4120-00-411-3730)

208 V, 3 PHASE, 400 HERTZ, MODEL MAC4H 18-108-1201-03

(NSN 4120-00-411-3731)

208 V, 1 PHASE, 50/60 HERTZ, MODEL MAC6H 18-230-1201-01

(NSN 4120-00-411-3729)

HARVEY W. HOTTEL MODELS

208 V, 3 PHASE, 50/60 HERTZ, MODEL CH20-6-08

(NSN 4120-00-537-8824)

208 V, 3 PHASE, 400 HERTZ, MODEL CH20-4-08

(NSN 4120-00-383-3571)

TM 5-4120-243-14, 28 October 1971, is changed as follows:

The title is changed as showm above.

Page 2 of cover. Add the following warning to list of safety precautions:

WARNING

Dry cleaning solvent P–D680, used to clean parts, is potentionally dangerous. Avoid repeated and prolonged skin con–tact. Do not use near open flame or excessive heat. Flash point of solvent is 100°—138° F. (38°—59° C.).

Page 1–1, paragraph 1–1a. The first sentence is superseded as follows:

a. These instructions are published for the use of the personnel to whom Trane Company models MAC6H18–230–1201–01, MACH18-208-1201–02, and MAC6H18-208–1201–03 or Harvey W. Hottel models CH20–6-08 air conditioners are issued.

Paragraph 1-3 is superseded as follows:

1-3. Recommendation for Maintenance Publications Improvements

You can improve this manual by recommending improvements using DA Form 2028 (Recom–mended Changes to Publications and Blank Forms) or DA Form 2028–2 (Test) included in this change and mail the form direct to Com–mander, US Army Troop Support Command. ATTN: AMSTS–MPP, St. Louis, MO) 63120. A reply will be furnished direct to you.

Paragraph 1–4a is superseded as follows:

a. General. Air conditioners covered by this manual are lightweight, compact, horizontal units designed for cooling and heating air to a desired predetermined range and circulating the con-

ditioned air to provide heating or cooling of equipment or personnel within the air conditioned area. *Page 1–5,* paragraph 1–50, third line. Add "and Harvey W. Hottel models CH20-6-08 and CH20-4–08" after "MA4C4H18-208-1201-3."

Add subparagraph (4) below subparagraph (3) as follows:

(4) CH20-6-08, Three phase, 50/60 hertz, 208 volts. Add subparagraph (5) below subparagraph (4) above as follows:

(5) CH20-4-08. Three phase, 400 hertz, 208 volts.

Paragraph 1–5b fifth line. Change "three" to read "five."

Add new sentence after last sentence as follows: Instructions applicable to Trane model MAC6H18-208-1201-02 are applicable to Harvey W. Hottel model CH20-4–08. Instructions applicable to Trane model MAC4H18–20–1201–03 are applicable to Harvey W. Hottel model CH20-4–08 unless otherwise noted.

Paragraph 1–6a, line 9. Add "(Trane models only)" after "numbers."

Add paragraph 1-6b(2.1) after 1-6b(2) as follows:

(2.1) *Air conditioner (Model* CH20-6-08)

Nomenclature--------Air conditioner, horizontal, compact
Manufacturer-------Harvey W. Hottel, Inc.
Capacity:
Cooling----------18,000 BTU/HR
Heating----------14,300 BTU/HR
Phase----------3
Hertz----------50/60
Volts----------208

Add paragraph 1–6b (3.1) after paragraph 1–6b (3) as follows:

(3.1) *Air conditioner (Model CH20-4-08).*

Nomenclature____ Air conditioner, horizontal, compact
Manufacturer____ Harvey W. Hottel, Inc.
Capacity:

Cooling----------18,000 BTU/HR
Heating----------14,300 BTU/HR
Phase----------3
Hertz----------400
Vlts----------208

Add paragraph 1-6b(7.1) after paragraph 1-6b (7) as follows:

(7.1) *R.F.I. Capacitor (C1) (Harvey W. Hottel model only).*

Type designation----CKO5BX
Specification----------MIL-C-11015/20A
Type----------Fixed
Dielectric----------Ceramic
Capacitance----------10,000 Pf ± 10 Pf

Add paragraph 1–6b (8.1) after paragraph 1–6b(8) as follows:

(8.1) *R.F.I. Capacitor* (C2) *(Harvey W. Hottel model only).*

Manufacturer--------Cornell
Part number----------PM-4S56
Type number-----Fixed
Dielectric----------Mylar
Capacitance----------0.056 mfd ± 10%
Working Voltage-------400VDC

Paragraph 1–6.b(14). Change title to read as follows:

(14) *Compressor circuit breaker (CB1) (MAC6H18-208-1201-02 only).*

Add paragraph 1-6b(14.1) after paragraph 1–6b(14) as follows:

(14.1) *Compressor circuit breaker (CB1) (CH20-6-08 only)*

Manufacturer----------Air Pax Electronics
Part number---------- APGH111–1REC2–2630-3
Type----------3PST, series trip with mechanically actuated auxiliary switch

Paragraph 1-6.b (15). Change title to read as follows:

(15) *Compressor circuit breaker (CB1) (MAC4H18-208-1201-03 only).*

Add paragraph 1–6b(15.1) after paragraph 1-6b (15) as follows:

(15.1) *Compressor circuit breaker (CB1) (CH20-4-08 only).*

Manufacturer ---- Air Pax Electronics
Part number _____ APGH111-1REC2-2630-4
Type _____ 3PST, series trip with mechanically actuated auxiliary switch

Paragraph 1-6b(16). Change part number "2M01-102-1" to read "2MC1-102-1."

Paragraph 1-6b (17). Change part number "2M01-202-2" to read "2MC1-202-1."

Paragraph 1–6b (18). Change title to read "*Rectifier (Trane models only):*"

Add paragraph 1-6b(18.1) after paragraph 1-b (18) as follows:

(18.1) *Rectifier (CRI) (Harvey W. Hottel model only).*

Manufacturer--------Motorola Semiconductor Products, Inc.
Part number---------MDA802 (modified by marking 97403-13216E6223)

Paragraph 1-6b (20). Change title to read as follows:

(20) Heater element (HR1) through (HR6) (MAC6H18-208-1201-02 and MAC4H18-208-1201–03 only).

Add paragraph 1–6b (20.1) after paragraph 1-6b(20) as follows:

(20.1) *Heater element (HR1 throu.qh (HR6) (CH20-6-08 and CH20-4-08* only).

Manufacturer----------Truheat Corporation
Part number----------A2171 (97403–13216E6124-4)
Sheath----------Nickel–iron-chromium alloy tubular type
Element----------Nickel-chromium
Volts----------120
Watts----------630

Paragraph 1–6b(21) is superseded as follows:

(21) *Time delay relay (K1) (Trane models only).*

Manufacturer----------Magnecraft Electric Company
Part number----------P/N-67 H550X (modified by marking 97403-13216E6182–3)
Type----------Solid state-hermetically sealed
Time delay----------30 ± 6 seconds

Paragraph 16b(26). Change title to read as follows :

(26) *Phase sequence relay (K5) (MAC6H18--208–1201-02 only).*

Paragraph 1-6b(27). Change title to read as follows:

(27) *Phase sequence relay (K5) (MAC4H18-208–1201-03 only).*

Add paragraph 1-6b(28.1) after paragraph 1-6b (28) as follows:

(28.1) *Solenoid valves (L1 and L2) (Harvey W. Hottel model only).*

Manufacturer--------Jackes—Evans Manufacturing Company
Part number---------0B234 (modified by marking 97403-13216E6158)

Add paragraph 1–6b(32.1) after paragraph 1-6b (32) as follows:

(32.1) *Hiqh pressure switch* (S4) {Harvey *W. Hottel* model only).

Manufacturer---------Penn Controls, Inc.
Part number----------P201DA-18 (modified by marking 97403–13216E6215-3)

Add paragraph 1–6b(33.1) after paragraph 1–6b (33) as follows:

(33.1) *Low pressure switch (S5) (Harvey W. Hottel model only).*

Manufacturer--------Penn Controls. Inc.
Part number---------P20BA-16 (modified by marking 97403-13216E6215-1)

Paragraph 1–6b(36). Change title to read as (33) as follows:

(36) *Transformer (T1) (Trane Models only)*

Add paragraph 1-6b(36.1) after paragraph 1–6b (36) as follows:

(36.1) *Transformer (T1) (Harvey W. Hottel models only).*

Manufacturer----------SNC Manufacturing Co., Inc.
Part number--------SNC P10188
Rating:
Input _____ 115 VAC, 120 watts, 50 to 600 hertz
Output----------30 VAC, 4 amps

Add paragraph 1-6b (38.1) after paragraph 1-6b (38) as follows:

(38.1) *Compressor (Model CH20-6-08) (Harvey W. Hottel model only).*

Manufacturer----------Trane Company
Model----------J20J–2-C
Volts----------208
Hertz----------50/60
Phase----------3 (4wire)

Add paragraph 1-6b(39.1) after paragraph 1–6b (39) as follows:

(39.1) Compressor *(Model CH2-4-08) (Harvey W. Hottel model only).*

Manufacturer----------Trane Company
Model----------J20J-2-C
Volts----------208
Hertz----------400
Phase----------3 (4 wire)

Paragraph 1-6b(42). Change title to read as follows:

(42) *Refrigerant service valves (Trane models only).*

Add paragraph 1-6b(42.1) after paragraph 1-6b (42) as follows :

(42.1) *Refrigerant service valves (Harvey W. Hottel models only).*

Manufacturer----------Robinair Mfg. Corp.
Part number----------VUS 3-46AC

Paragraph 1–6b (45). Change title to read as follows:

(45) *Dehydrator (Trane models only).*

Add paragraph 1–6b (45.1) after paragraph 1–6b (45) as follows:

(45.1) *Dehydrator (Harvey W. Hottel models only).*

Manufacturer--------Sporlan Valve Co.
Part number----------C–052
Type----------Sealed – non–refillable

Add paragraph 1-6b (46.1) after paragraph 1–6b (46) as follows:

(46.1) *Actuator cylinder assembly (Harvey W. Hottel model only).*

Manufacturer----------Robert Shaw Controls, Inc.
Part number----------P011–22–01 (modified by marking 97403-13216E6128)

Add paragraph 1–6b (46.2) after paragraph 1-6b (46.1) as follows:

(46.2) Surge resistor (R1) (Harvey W. Hottel model only).

Manufacturer----------Ohmite
Part number----------Ohmite 1804
Type----------Wire wound
Resistance----------10 ohms
Wattage----------20

Add paragraph 1-6b(46.3) after paragraph 1-6b (46.2) as follows:

(46.3) Mist eliminator assembly (Harvey W. Hottel model only).

Manufacturer---------Research Products
Part number----------A-21–7109 (modified by marking 97403-13220E1147)

Add paragraph 1–6b (46.4) after paragraph 1–6b(46.3) as follows:

(46..5) *Valve, Pressure, Relief (Harvey) W. Hottel models only).*

Manufacturer----------Fluid Regulators Corp.
Part number----------FRC-PN–C1503-01 (modified by marking 97403 –13211E8369)
Relief pressure---------510 psig

Page 1–9, Paragraph 1-7a is superseded as follows:

a. Control System Schematic Diagrams. Refer to figures 1-1, 1–5 and 1–5.1 for schematic wiring diagrams.

Figure 1–5. Change legend line to read as follows:

Figure 1-5. Control system schematic diagram, 3 phase, 50/60 hertz and 400 hertz, 208 volts (Trane models only).

Add figure 1-5.1 as follows:

Figure 1-5.1. Control system schematic diagram, 3 phase, 50/60 hertz and 400 hertz, 208 volts (Harvey W. Hottel *models only).*
(Located in back of manual)

Paragraph 1–7b, second line. Change figure "1-8" to read "1-8.1."

Figure 1-7. Change legend line to read as follows:

Figure *1–7. Wiring diagram, 3 phase, 50/60 hertz, 208 volts (model MA6H18-208-1201-02 only).*

Add figure 1–7.1 as follows:

Figure *1-7.1.* Wirng *diaqram, .3 phase, 50/60 hertz, 208 volts (model CH20-6-08* only).
(Located in back of manual)

Figure 1-8. Change legend line to read as follows:

Figure 1–8. Wirinq diagram, 3 *phase, 400 hertz, 208 volts (model MAC4H18-208-1201-03 only).*

Add figure 1-8.1 as follows:

Figure 1–8.1. Wiring diagram, 3 *phase, 400 hertz, 208 volts {model CH20-4-08 only).*
(Located in back of manual)

Page 2–1. Paragraph 2-4e is superseded as follows:

c. *Ground/neutral isolation.* The air conditioner as delivered to the user has the unit frame ground–ing electrically connected to the neutral wire of the four wire power service. There may be cases in which this interconnection may cause electrical interference with electronic equipment being served by the samc power distribution system. Provision is made inside the air conditioner for isolation of the grounrd from the neutral. This is applicable to Harvey W. Hottel models only. Refer to terminal board TB4 on wiring diagrams, figure numbers 1–7.1 and 1–8.1. The ,jumper between terminals 1 and 2 of terminal board TB4 should be removed to isolate the frame ground from the neutral wire. The terminal board is located at the

top of the bulkhead to which the wlwctrical heating elements are secured. Access to the terminal board is obtained by removal of the front top conver of the air conditioner.

Page 5-2, table 4-1, Add new sequence number *2.1 item below item *2 as follows:

Sequence number	Item to be inspected	Procedures	Paragraph reference
*2.1	Mist eliminator (Harvey W. Hottel models only).	Inspect and service, or replace if necessary.	paragraph 4–17.1

Page 4-3, table 4-2, item 1, second column, line f. Add "(Trane models only)" immediately after "relay."

Item 2, second column. Add "1. Mist eliminator dirty (Harvey W. Hottel models only)." immediately below line k

Third column. Add "1. Clean mist eliminator (para 4-14.1)." immediately below line k.

Item 4, second column. Line k is superseded as follows:

Defective phase sequence relay (three phase Trane units only).

Item 6, second column. Add "f. Dirty or damaged mist eliminator (Harvey W. Hottel models only)." immediately below line e.

Third column. Add "f. Clean or replace mist eliminator (para 4-17.1)." immediately below line e.

Item 8, second column. Add "i. Dirty mist eliminator (Harvey W. Hottel models only)." immediately below line h.

Third column. Add "i. Clean mist eliminator (para 4–17.1)." immediately below line h.

Page 4-6. paragraph 4–17c. Add warning immediately below second line as follows:

WARNING

Dry cleaning solvent, P–D–680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°—138° F. (38°—59ºC.).

Add new paragraph 4–17. 1 after paragraph 4–17d as follows:

4-17.1. Servicing Mist Eliminator (Harvey W. Hottel, Inc. Models CH20-6-08 and CH20-4-08 Only)

a. *General.* The mist eliminator is mounted in a bracket attached to the front of the evaporator coil. The purpose of the mist eliminator is to prevent moisture from leaving the air conditioner in the supply air stream when operating under conditions in which there is high humidity in the air–conditioned space.

b. Removal. Refer to figure 4-2 and remove the evaporator air outlet louver by removing eight screws and lock washers. Refer to figure 4–5 and remove the front cover by removing 12 screws. Slide the mist eliminator up out of the U-shaped bracket which secures it to the face of the evaporator coil.

WARNING

Dry cleaning solvent, P–D–680, used to clean parts, is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°-138°F. (38°—59°C.).

c. *Clcaning and Inspection.* Inspect the gaskets on the mist eliminator and flame. If loose, reglue with contact adhesive. If damaged, replace. Clean the mist eliminator with warm water and detergent or cleaning solvent (Fed. Spec. P-D-680). Dry thoroughly. Inspect for damage or a clogged condition after cleaning. If damaged or clogged, replace the mist eliminator.

d. lnstallation. Slide the mist eliminator into the holder. The mist eliminator must be held in a perfectly vertical position to prevent binding in the frame. If It binds upon insertion, remove and check to insure that the two ends are perfectly parallel. Do not force into the frame as subsequent removal will be difficult. Reinstall the evaporator air outlet louver and front cover.

Page 4–8, paragraph 4–18c. Add warning im–mediately below second line as follows:

WARNING

Dry cleaning solvent, P–D–680, used to clean parts, is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use

near open flame or excessive heat. Flash point of solvent is 100°---138° F. (38°—59° C.).

Page 4-11, paragraph 4- 21 c. Add ~warning immediately below second line as follows:

WARNING

Dry cleaning solvent, P-D-680, used to clean parts, is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flalme or cxcessive heat. Flash point of solvcnt is 100°—138° F. (38°—59°C.).

Page 4-17, paragraph 4–31, eighth line. Add "(Trane models MAC6H18-208-1201-02 and MAC4H8-208-1201-03 only)" after "conditioners."

Page 4-29, paragraph 4-49, fourth line. Add "(Trane models MAC6H18-–208-1201--02"and) MAC4H18-208-1201-03 only)" after "phase."

Page 4–17, paragraph 4-41, line 8. Add "(Trane modlels MAC6H18-208-l201-02 and MAC4H18–208-1201-03 only)" after '"conditioners."

Page 4–29, paragraph 4–.19, fourth line. Add "(Trane models MAC6H18-208–1201-02 and MAC4H8–208-1201-03 only)" after "phase."

Page 4–30, paragraph 4–52d. first line. Change "*Phase Sequence relay. "* to read "Phase Sequence Relay (Trane, three-phase models only) ."

Paragraph 4–52e(1). Add second sentence as follows:

Applicable to Trane three-phase units only.

Paragraph 4–52e (2) is superseded as follows:

(2) To remove time delay relay (16) from single-phase units and Harvey W'. Hottel units, remove four screws (11), nuts (12), and flat washers (13).

Page 4-39, key to fig. 4-20. Items *11* through 15 are superseded as follows:

11 Screw, f1–hd, 6–32x1/2 (Trane, 3–phase models only)

12 nut, hex, self–locking, 6-32 (Trane 3_ phase models only)

13 Washer, flat. No. 6 (.156 ID) (Trane, 3–phase models only)

14 Washer, flat, No, 6 (.149 ID) (Trane, 3– phase models only)

15 Phase sequecnce relay (Trane, 3-phase models only)

Paragraph 4-53c, second line. Add "or Harvey W. Hottel" after "phase."

Fourth *line.* Add "(Trane models only)" after "phase."

paragraph 4–53d, first line. Change "*Phase Sequence relay."* to read "Phase Sequenes Relay *(Trane models only). "*

Paragraph 4-55. The first sentence is superseded as follows:

The power transformer, surge resistor (Harvey W. Hottcl models only), and rectifier reduces the power voltage and converts alternating current–rent to direct current to operate the coils and switches in the control circuit.

Add new paragraph 4-56.1 after paragraph 4–56c as follows:

***4-56.1.* Surge Resistor**

a. *Tcsting.* Refer to transformer testing and measure the resistor for continuity using an ohmeter. lf winding is open or does not read 10 ohms, replace the resistor.

b. installation. *Replace,* if open, with new surge resistor (to the transformer prior to reinstallation of transformer.

Page 4-35, figure 4-22. Add "(Applicable to Trane, single- phase models only.)" after legend line.

Page 4–36, figure 4- 23. Add "Applicable to "Trane, single-phase models only.)" after legend line.

Page 4–37, figure 4-24. Add "(Applicable to Trane, single-phase models only.)" after legend line.

Paragraph 4-63b, first line. Change "*Vibration Eliminators." To read "Vibration Eliminators (Trane models only)*

Page 5–2, figure 5–1, refrigerant system parts list, find No. 2, fourth column. Add "(Trane models only)" after "metal. "

Find No. 13, fourth column. Add " (Trane models only)" after "metal."

Page 5–3, table 5–1, item 1, second column. Line d is superseded as follows:

d. Defective phas, sequence relay (Trane, 3-phase models only). Add new line as follows:

g. Defective time delay relay.

Third column. Add new line as follows:

g. Replace time dela,v relay.

Page 5-5, figure .5–2. Add "(Applicable to Trane models only.)" after legend line.

Page 5–6, figure 5–3. Add " (Applicable to Trane modcls only.)" after legend line.

Page , 5–,9, figure 5–6. Add " (Applicable to Trane models only.)" after legend line.

Page 5–11, figure 5-7, Legend line is superseded as follows:

Figure 5–7. High pressure and low pressure charging valves. (Applicable to Trane models only.)

Page 5-12, figure 5–8. Add "(Applicable to Trane models *only,)* after legend line.

Page, 5–15, figure 5-10. Add "(Applicable to Trane models only. " after legend line.

Paragraph 5–30. Change "Vibration Eliminators" to read "Vibration Eliminators (Trane models only)

Page 6–3, figure 6–1. Add "(Applicable to Trane models only.)" after legend line.

Page 6–4, figure 6–2. Add " (Applicable to Trane models only.)

Page 6-8. paragraph 6–8c. Add warning im–mediately below second sentence as follows:

WARNING

Dry cleaning solvent, P–D–680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°—138° F. (38°—59° *C.).*

Page 6–10, paragraph 6–9c. Add warning im-mediately below heading as follows:

WARNING

Dry cleaning solvent, P–D-680, used to clean parts, is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°-138°F. (38° — 59°C.).

Page B-2. section 11, group No. 42, subgroup 4201, column (2). Add "Resistor, surge" below "Rectifier."

Column (3), divisions A, B, G, and H. Add "O" under each division.

Page B-3, group No. 52, subgroup 5217, column (2), fourth line. Add " (Trane models only)" after "eliminators.'

By Order of the Secretary of the Army:

FRED C. WEYAND,
General, United States *Army*
Chief of Stuff

Official:

PAUL T. SMITH
Major General, United States Army,
The Adjutant General.

Distribution:

To be distributed in accordance with DA Form 12-25C (qty rqr block no. 542), organizational maintenance requirements for Environmental Equipment: Air Conditioners, 18,000 BTU, Compact.

CHANGE
No. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 12 *March* 1975

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

AiR Conditioner, HORIZONTAL COMPACT, 18$)00 BTU, TRANE MODELS, 208 VOLT, 3 PHASE 50/80 HERTZ MODEL MAC6H18-208-1201-02, NSN 412040-411-3730,208 VOLTS, 3 PHASE, 400 HERTZ MODEL MAC4H18-208-1201-03, NSN 4120-00-411-3731,230 VOLT, 1 PHASE 50/60 HERTZ MODEL MAC6H18-230-1201-01 NSN 412040-411-3729

TM 5-4120-243-14, 28 October 1971, is changed as follows:
The title is changed as shown above.
Page 2 of cover. Add the following warning to the list of safety precautions.

WARNING

The burning of polyurethane foams is dangerous. Due to the chemical composition of a polyurethane foam, toxic fumes are released when it is burned or heated. If it is burned or heated indoors, such as during a welding operation in its proximity, precautions should be taken to adequately ventilate the area. An exhaust system equivalent to that of a paint spray booth should be used. Air supplied respirators, approved by the National Institute for Occupational Safety and Health or the U.S. Bureau of Mines, should be used for all welding in confined spaces and when ventilation is inadequate. Individuals who have chronic or recurrent respiratory conditions, including allergies and asthma should not be employed *in* this type of environment.

By Order of the Secretary of the Army:

FRED C. WEYAND
General, *United States Army*
Chief of staff

Official:

VERNE L BOWERS
Major General, *United States A rmy*
The Adjutant General

Distribution:
To be distributed in accordance with DA Form 12-25C, (qty rqr block No. 542) Organizational maintenance requirements for Environmental Equipment, Air Conditioners 18,000 BTU.

TM 5-4120-243-14
C 2

CHANGE
No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, **D.C. 28 *December* 1973**

Operator, Organizational, Direct Support and General Support Maintenance Manual
AIR CONDITIONER, HORIZONTAL COMPACT, 18,000 BTU, TRANE MODELS
208V, 3 PHASE, 50/60 HERTZ, MODEL MAC6H18--208-1201-02
(FSN 4120-41 1-3730)
208V, 3 PHASE, 400 HERTZ, MODEL MAC4H18-208-1201-03
(FSN 4120-411 -3731)
230V, 1 PHASE, 50/60 HERTZ, MODEL MAC6H18-230-1201 -01
(FSN4120-411-3729)

TM 5-4120-243-14, 28 October 1971, is changed as follows:

Page 1-2. Paragraph 1-1, subparagraph *b is* superseded as follows:

b. Appendix A contains a list of publications applicable to this manual. Appendix B contains the maintenance allocation charts. Appendix C contains a list of basic issue items authorized to operator of this equipment. The organizational maintenance repair parts are listed and illustrated in TM 5-4120-243-20P. The direct support and general support maintenance repair parts and special tools are listed and illustrated in TM 5-4120-243-34P.

Page 1-1, paragraph 1-3 is superseded as follows:

1-3. Reporting of Equipment Publication Improvements.

The reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications) and forwarded direct to Commander, US Army Troop Support Command, ATTN: AMSTS-MPP, 4300 Good fellow Boulevard, St. Louis, MO 63120.

Page 1-7. In paragraph 1-6(21), change part No. "1600-3590" to read "1600 -S590."

Page 1-7. In paragraph 1-6(28) change part No. "OB2S3" to read "OB234."

Page 1-9. In paragraph 1-6(46), change part No. "PO11-12" to read "PO11-2201."

Page 2-3. After paragraph 2-4d, add:

e. *Drain Plug.* Remove the evaporator drain plug located under the fresh air screen.

Page 2-5. Figure 2-3 is superseded as follows:

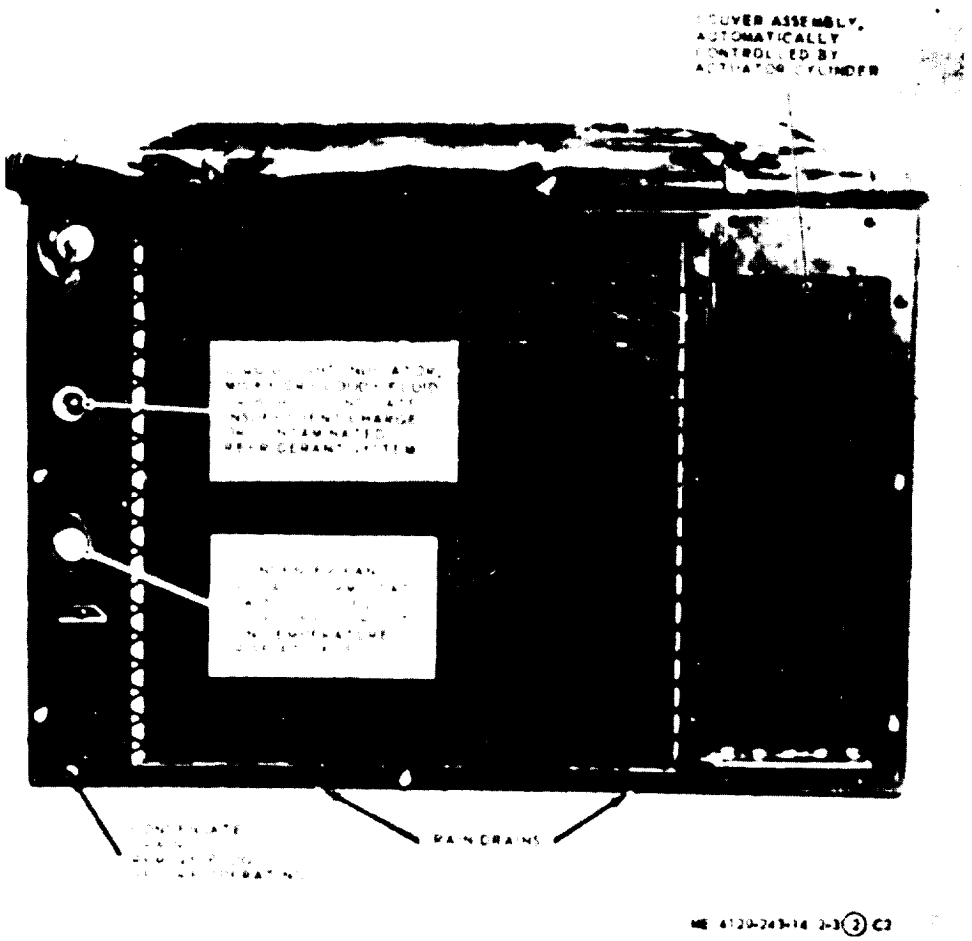


Figure 2-3 Controls and instruments (sheet 2 of 2).

Page 4-8. Paragraph 4-17c(3) is superseded *as* follows:

(3) Spray the filter with filter-kote or oil, Military Specification 0-2104, grade 20,30 or better. Drain off excess oil before installing.

Page 4-8. Paragraph 4-18, subparagraph *b is* superseded as follows:

b. Removal. Refer to paragraph 4-17 and remove the evaporator air inlet louver. Refer to figure 4-2 and remove the evaporator air outlet louver by removing eight screws and lockwashers.

Page 4-9. Paragraph 4-19, subparagraph *b is* superseded as follows:

b. Removal. Refer to figure 4-3. Remove two screws and lockwashers and fresh air screen.

Page ***4-11.*** Paragraph 4-21(b) (3) is superseded as follows:

(3) To remove the cover (fig. 4-5) remove four screws, flatwashers, and lockwashers and remove the condenser cover. Remove eight screws and the rear cover.

Page 4-11. Paragraph 4-21b(4) is changed as follows:

Change 'The front and rear covers" to read "The front cover". . . and change "Remove six screws." to read "Remove seven screws."

page 4-19, paragraph 4-35, subparagraph b(3), add the following:

To remove the lower three elements, the heater mounting bracket, must be removed first.

Page 4-21, paragraph 4-38, subparagraphs a(4), a(5), and *a(6)* are superseded as follows:

(4) Remove the two capacitor brackets and one blower discharge bracket, move the temperature selector bulb clear of the fan.

(5) Remove the four resilient mounts. Each mount is secured with two screws from the bottom of the cabinet.

(6) To remove the motor from the assembly, remove the four allen screws and lockwashers from the upper side of the base.

Page 4-22, add the following note, after paragraph 4-38b(4).

NOTE

If shims are used on the condenser fan mounting bolts or plate, reinstall **them** on the same location when anew motor is mounted to insure proper alinement of the fan in the fan housing.

Paragraph 4-38, subparagraph *b(5)* superseded as follows:

(5) To provide a clearance for removing the motor, the motor mounting plate must be unbolted and the quench expansion valve bulb well and cables P6 and P4 removed from their sockets.

Page 4-26. Paragraph *4-44b,* change paragraph to read figure.

Page 4-29. Paragraph 4-46d, add the following: Remove the standoffs and connector knob.

Page *4-29,* paragraph 4-46e, add the following: Remove the standoffs and connector knob.

Page 4-30, paragraph 4-52, add the following note after subparagraph 4-52b.

NOTE

The electrical connector receptacle must be removed before the compressor motor relay can be removed.

Page 4-33, paragraph 4-54b is superseded as follows:

b. Carefully install the junction box into the housing, making sure that the metal tab located above the rectifier engages the receptacle on the back of the junction box. Install seven screws and Iockwashers.

Page 4-33, paragraph 4-55, after the word box in the seventh line, add the following: A 10-ohm 15-watt resistor is provided to prevent tripping of CB2. This resistor is added to the circuit by connecting one end to terminal 1 of the transformer and the end to lead X34 A20V.

Page 6-1. Table 6-1 is superseded as follows:

Table ii-1. Normal Operating Pressures

	OUTDOOR AMBIENT.-DEGREE.S F.			
	50 F	*75 F*	*100 F*	*120 F*
	90 F DB Return Air to Unit			
Suction	58-65	58-70	60-75	75-90
Discharge	160-165	175-210	255-295	370-410
	80 F DB Return Air to Unit			
Suction	58-65	58-70	60-75	65-75
Discharge	160-165	170-205	250-290	370-410

Page 6-7, paragraph 6-7c(1) is changed as follows: After "(2, fig. 6-3)," add "refer to paragraph 6-3 and discharge refrigerant,... "

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
General, United States Army
Chief of Staff

Official:

VERNE L. BOWERS
Major General, United *States Army*
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-25C (qty rqr block No. 542), Organizational Maintenance Requirements for Environmental Equipment Air Conditioners, 18,000 BTU Compact.

CHANGE

No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D. C., 4 October 1972

Operator, Organizational, Direct and General Support Maintenance Manual

AIR CONDITIONER; HORIZONTAL, COMPACT; 18,000 BTU (TRANE MODELS)

208V, 3 PHASE, 50/60 HERTZ; MODEL MAC6H-18-208-1201-02 (FSN 4120-41 1-3730)

208V, 3 PHASE, 400 HERTZ; MODEL MAC4H-18-208-1201-03 (FSN 4120-41 1-3731)

208V, 1 PHASE, 50/60 HERTZ; MODEL MAC6H18-230-1201-01 (FSN 4120-41 1-3729)

TM 5-4120-243-14,28 October 1971, is changed as follows:

Page *1-7*, paragraph 1-6b subparagraph (25), change part number from 128116-1343S to 128116-1375AB.

Change drawing number from 13216E6240 to 13216 E6240–2.

Page 1-8, paragraph 1-6b, subparagraphs (37), (38), and (39) are superseded as follows:

(37) Compressor (MAC6H18-234-1201-01)

Manufacturer	*Wkirlpool Corp.*	*The Tram Co.*
Part Number	WHP622H18-230-1 (Modified by marking 97403, 13211E3793-3)	A4525-1435-3
Type	Rotary	Reciprocating
Oil Charge	20.5 ounces	22.4 ounces
volts	230	230
Hertz	50/60	50/60
Phase	1	1
Weight (with oil)	55 pounds	87 pounds

(38) Compressor (MAC6H18-208-1201-02)

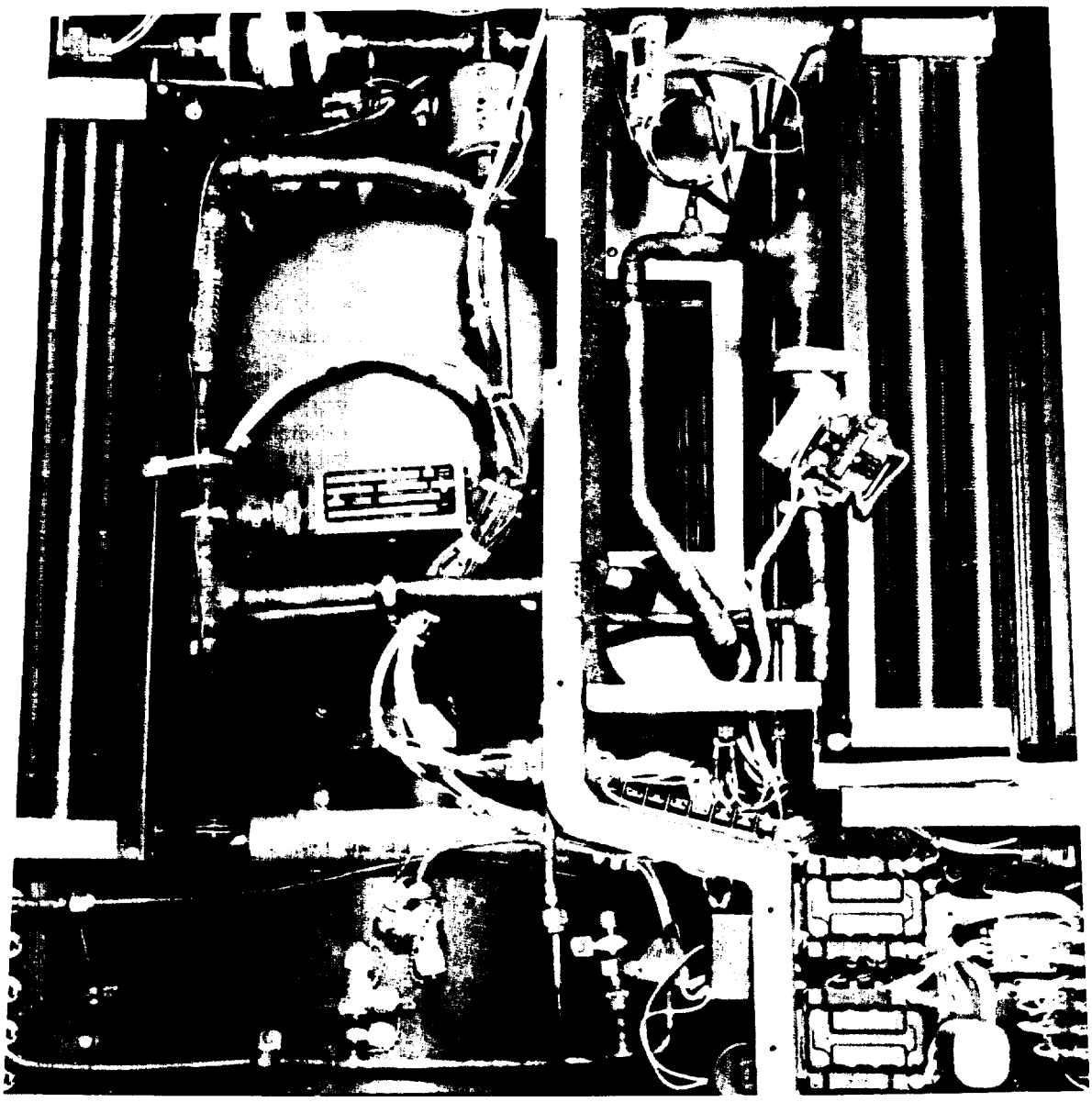
Manufacturer	Whirlpool Corp.	*The Trane Co.*
Part Number	WHP622H18-208-3 (Modified by marking 97403, 13211E3793-2)	A4525-1435-2
Manufacturer	*Whirlpool Corp.*	*The Tran Co.*
Type	Rotary	Reciprocating
Oil Charge	20.5 ounces	22.4 ounces
volts	208	208
Hertz	50/60	50/60
Phase	3	3
Weight (With oil)	55 pounds	87 pounds

(39) Compressor (MAC4H18-208-1201-03)

Manufacturer	Whirlpool Corp.	The Trane Co.
Part Number	WHP422H18-208-3 (Modified by marking 97403, 13211E3793-1)	A4525-1435-1
Type	Rotary	Reciprocating
Oil Charge	20.5 ounces	22.4 ounces
volts	208	208
Hertz	400	400
Phase	3	3
Weight (With oil)	49 pounds	76 pounds

Page 5-5. Figure 5-2. Caption is changed to read as follows: Figure 5-2. Compressor removal and installation (Whirlpool).

Figure 5-2.1 is added.



ME 4120-243 -14/5.2.1 C1

Figure* 5-2.1 *Compressor, installed view **(Trane)**

Page C–1. Appendix C is superseded as follows:

APPENDIX C

BASIC ISSUE ITEMS LIST AND ITEMS TROOP INSTALLED OR AUTHORIZED

Section 1. INTRODUCTION

C-1. Scope

This appendix lists items required by the operator for operation of the air conditioner.

C-2. General

This list is divided into the following sections:

a. *Basic Issue Items List-Section II.* Not applicable.

b. Items Troop Installed or Authorized List—Section III. A list of items in alphabetical sequence, which at the discretion of the unit commander may accompany the air conditioner. These items are NOT SUBJECT TO TURN-IN with the air conditioner when evacuated.

C-3. Explanation of Columns

The following provides an explanation of columns in the tabular list of Basic Issue Items List, Section II and Items Troop Installed or Authorized, Section III.

a. Source, Maintenance, and Recoverability y Code(s) (SMR):

(1) Source Code, indicates the source for the listed item. Source codes are:

Code	*Explanation*
P	Repair parts, special tools, and test equipment supplied from GSA/DSA or Army supply system and authorized for use at indicated maintenance levels.
P2	Repair parts, special tools, and test equipment which are procured and stocked for insurance purposes because the combat or military essentiality of the end item dictates that a minimum quantity be available in the supply system.

(2) *Maintenance code,* indicates the lowest level of maintenance authorized to install the listed item. The maintenance level code is:

Code	*Explanation*
C	Crew/Operator

(3) *Recoverability code,* indicates whether unserviceable items should be returned for recovery or salvage. Items not coded are nonrecoverable. Recoverability codes are:

Code	*Explanation*
R	Applied to repair parts (assemblies and components), special tools, and test equipment which are considered economically reparable at direct and general support maintenance levels.
S	repair parts, special tools, test equipment and assemblies which are economically reparable at DSU and GSU activities and which are normally furnished by supply on an exchange basis.

b. Federal Stock Number. This column indicates the Federal stock number assigned to the item and will be used for requisitioning purposes.

c. *Description.* This column indicates the Federal item name and any additional description of the item required.

d. Unit of Measure (U/M). A 2 character alphabetic abbreviation indicating the amount or quantity of the item upon which the allowances are based, e.g., ft, ea, pr, etc.

e. Quantity *Furnished with Equipment (BIIL).* Not applicable.

f. Quantity *Authorized (items Troop Installed or Authorized).* This column indicates the quantity of the item authorized to be used with the equipment.

Section III. ITEMS TROOP INSTALLED OR AUTHORIZED LIST

(1) SMR Code	(2) Federal Stock Number	Ref No. & Mfr Code	(3) Description	Usable on Code	(4) Unit of Meas	(5) Qty Auth
PC	7520–559–9618		CASE, Maintenance and Operation Manuals		EA	1

By Order of the Secretary of the Army:

BRUCE PALMER, JR.
General, U. S. Army
Acting Chief of Staff

Official:

VERNE L. BOWERS,
Major General, United States Army,
The Adjutant General.

To be distributed in accordance with DA Form 12–25C (qty rqr block No. 642) organizational maintenance requirements for Air Conditioners, 18,000 BTU Compact.

TECHNICAL MANUAL
No. 5-4120-243-14

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C. *28 0ctober 1971*

OPERATOR, ORGANIZATIONAL, DIRECT AND GENERAL SUPPORT MAINTENANCE MANUAL

AIR CONDITIONER, HORIZONTAL COMPACT, 18,000 BTU

(TRANE MODELS)

208V, 3 PHASE, 50/60 HERTZ, MODEL MAC6H18-208-1201-02 (FSN 4120-411-3730)

208V, 3 PHASE, 400 HERTZ, MODEL MAC4H18-208-1201-03 (FSN 4120-411-3731)

230V, 1 PHASE, 50/60 HERTZ, MODEL MAC6H18-230-1201-01 (FSN 4120-411-3729)

LIST OF ILLUSTRATIONS

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope

a. These instructions are published for the use of the personnel to whom the Trane Company Models, MAC6H18-230-1201-01, MAC6H18-208-1201-02 and MAC4H18-208-1201-03 Air Conditioners are issued. Chapters 1 through 4 provide information on the operation, preventive maintenance services, and organizational maintenance of the equipment, accessories, components, and attachments. Chapters 5 and 6 provide information for direct and general support maintenance. Also included are descriptions of main units and their functions in relationship to other components.

b. Appendix A contains a list of publications applicable to this manual. Appendix B contains the Maintenance Allocation Charts. Appendix C contains a list of Basic Issue Items authorized to operator of this equipment. The Organizational, Direct, and General Support Maintenance Repair Parts are listed and illustrated in TM 5-4120-243-34P (when printed).

c. Numbers in parentheses on illustrations indicate quantity.

1-2. Record and Report Forms

a. DA Form 2258, Depreservation guide of Engineer Equipment.

b. Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

Note. Applicable forms, excluding Standard Form 46 (United States Government Motor Vehicle Operator's Identification Card) which is carried by the operator, will be kept in a canvas bag mounted on the equipment.

1-3. Reporting of Errors

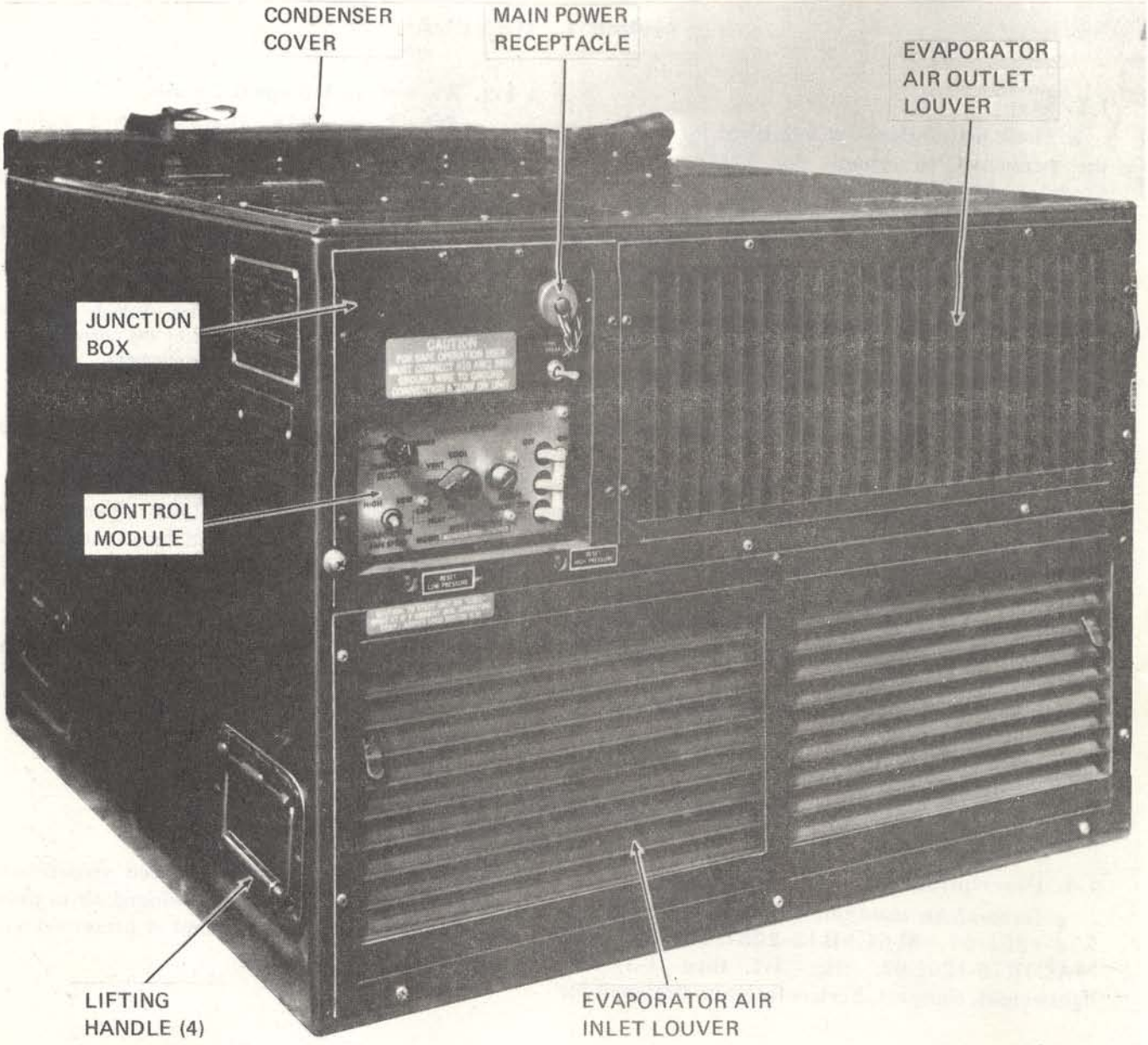
a. Report of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications) and forwarded direct to Commanding General, U. S. Army Mobility Equipment Command, ATTN: AMSME-MPP, 4300 Goodfellow Boulevard, St. Louis, Mo. 63120.

b. Report all equipment improvement recommendations as prescribed by TM 38-750.

Section II. DESCRIPTION AND DATA

1-4. Description

a. General. Air conditioners, Model MAC6HA18-230-1201-01, MAC6H18-208-1201-02, and MAC4H18-1201-03, (fig. 1-1 thru 1-3) are lightweight, compact, horizontal units designed for cooling and heating air to a desired predetermined range and circulating the conditioned air to provide heating or cooling of equipment or personnel within the air conditioned area.



SHIPPING DIMENSIONS	
LENGTH	27.8 INCHES
HEIGHT	20 INCHES
WIDTH	30 INCHES
VOLUME	9.7 CUBIC FEET
WEIGHT	250 POUNDS

ME 4120-243-14/1-1

Figure 1-1. Air conditioner, left front ¾ view with shipping dimensions.

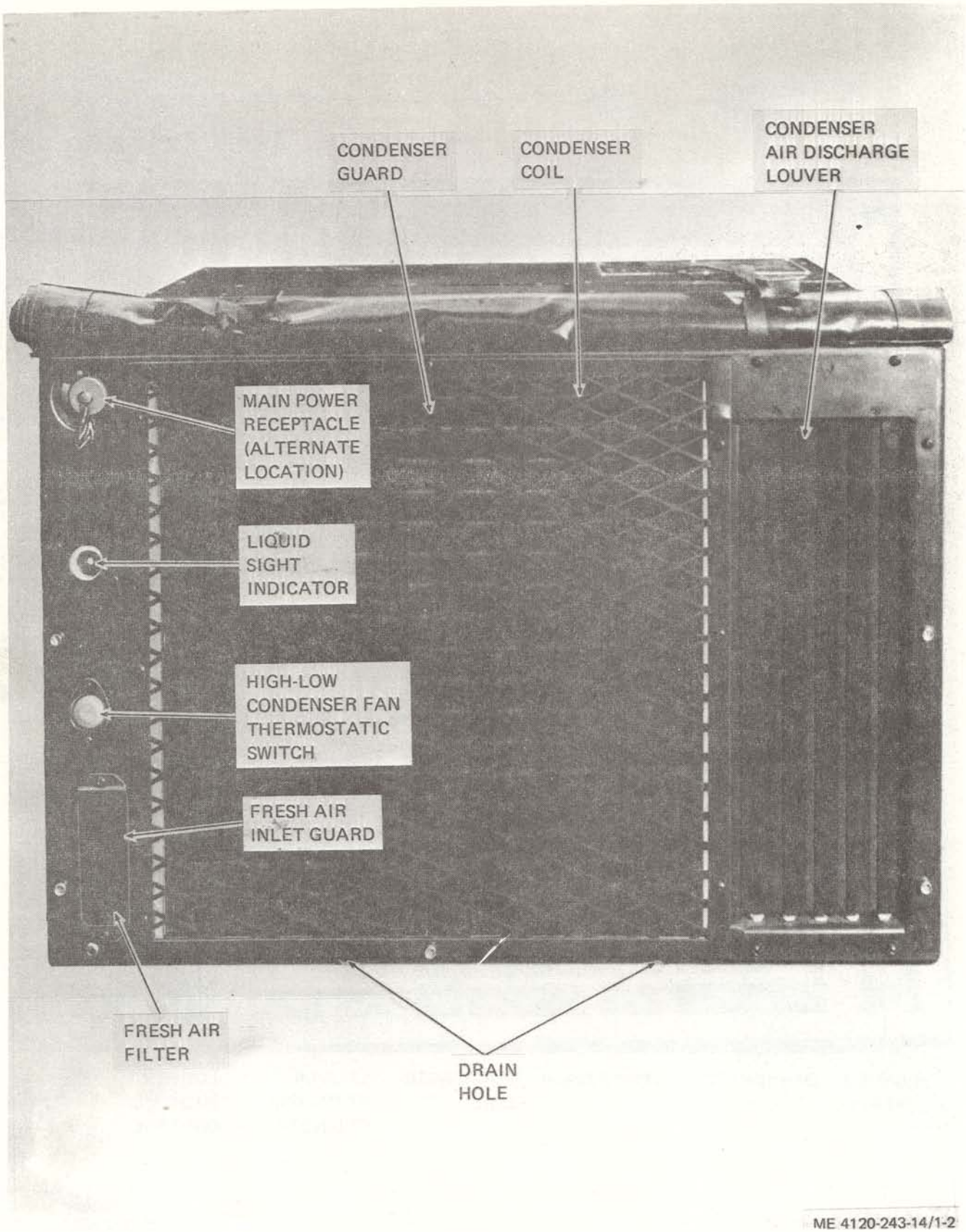


Figure 1-2. Air conditioner, right rear ¾ view.

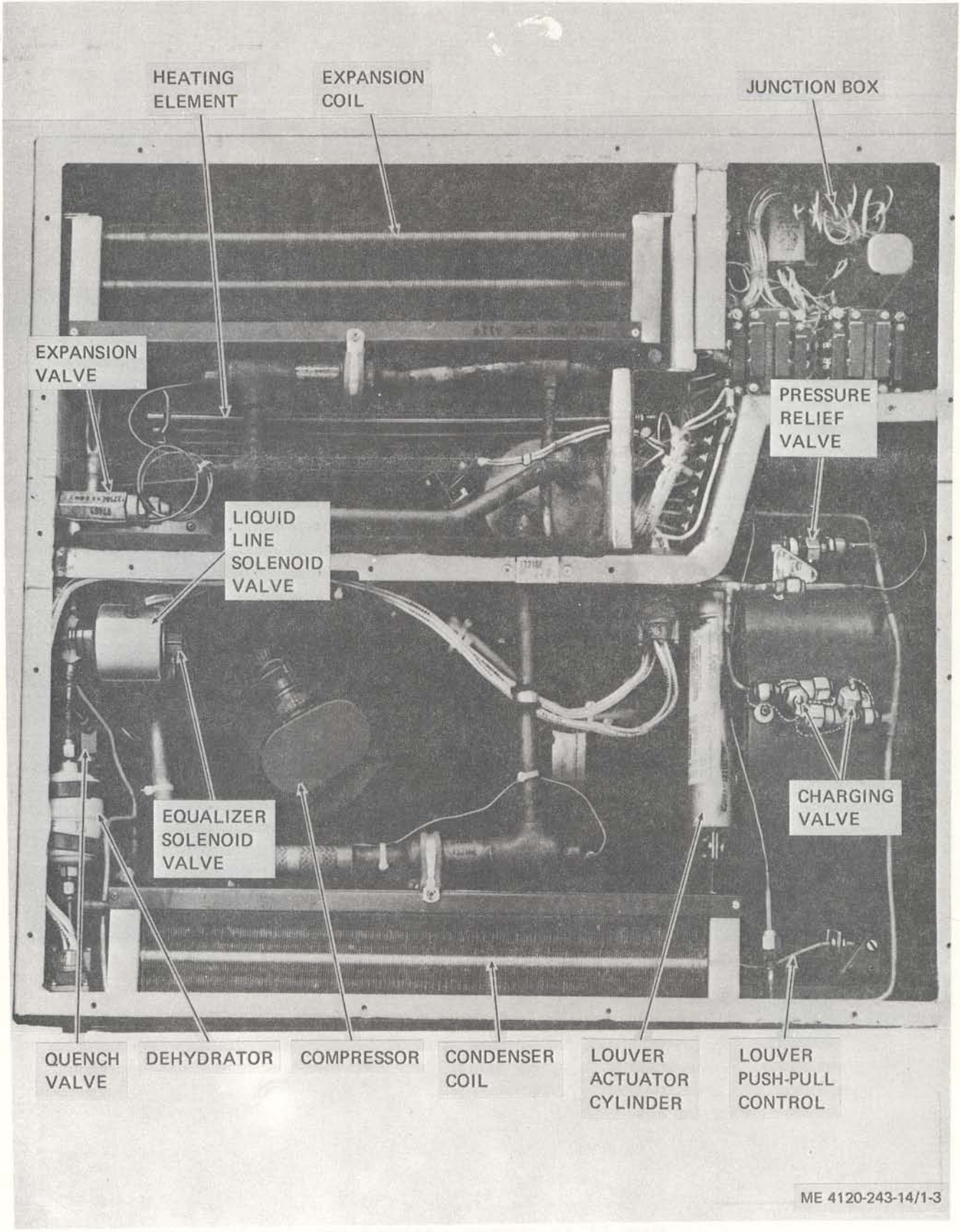


Figure 1-3. Air conditioner, top view, top covers removed.

b. Evaporator Section. The evaporator section contains the evaporator coil, fan motor and fan, control module and junction box, air filter, heating elements and thermal expansion valve. When cooling, air in the evaporator section is forced over the evaporator coil by the evaporator fan which lowers the temperature of the air before it is distributed into the space to be conditioned. When heating, air is circulated over the heating elements and distributed by the evaporator fan. Evaporator fan speed is controlled by a selector switch located on control module.

c. *Condenser Section.* The condenser section contains the hermetically sealed motor compressor, condenser coil, condenser fan and motor, service valves, filter dryer, equalize solenoid valve, liquid line solenoid valve, liquid quench valve, pressure regulator valves, electrical power connectors, and the necessary refrigerant. The compressor mechanically compresses refrigerant vapor to a condensing condition and discharges it into the condenser coil through the hot gas line. Outside air, drawn over the condenser coil surface by the condenser fan, condenses the refrigerant vapor to a liquid. The liquid then leaves the condensing coil and returns to the thermal valve through the liquid line. Condenser fan speed is controlled with a thermostatic switch located on rear of unit. At ambient temperature of 100° F(±5°F) or above the condenser fan speed will turn at high speed but at ambient temperature below 100° F (±5° F) the condenser fan will turn at low speed. Due to residual mass heat there will be a delayed reaction time for this to happen when ambient temperature drops below the 100° F changeover point.

1-5. Differences Between Models

a. This manual covers Trane Model MAC6H18-230-1201-01, MA C6H18-208-1201-02, and MAC4H18-208-1201-03 air conditioners. Each model is designed to operate on a different set of incoming power current characteristics. The electrical characteristics for each model are as follows :

(1) MAC6H18-230-1201-01. Single phase, 50/60 hertz, 230 volts.

(2) MAC6H18-208-1201-02. Three phase, 50 /60 hertz, 208 volts.

(3) MAC4H18-208-1201-03. Three phase, 400 hertz, 208 volts.

b. Where instructions and descriptions apply only to specific models, the model numbers to which the description or instructions apply will be specified. If no model number is specified, the instructions or descriptions apply to all three models.

1-6. Identification and Tabulated Data

a. Identification. Each air conditioner has one major identification plate mounted on the side of the unit. The plate specifies nomenclature, manufacturer, military part number, BTU / HR, phase, hertz, volts, serial number, contract number, and shipping weight. A manufacturers identification plate mounted just below that military plate contains the manufacturer's name and ad dress and the moodel and serial numbers.

b. Tabulated Data..

(1) Air conditioner (Model MAC6H18-230-1201-01).

Nomenclature Air conditioner, horizontal, compact
Manufacturer. ..... The Trane Company
Capacity :
Cooling. ..... 18,000 BTU/HR
Heating. ..... 14,300~ BTU/HR
Phase. 1
Hertz. 50/60
Volts 230

(2) *Air conditioner (Model MAC6H18-208-1201-02).*

Nomenclature ..... Air conditioner, horizontal, compact
Manufacturer. ..... The Trane Company
Capacity:
Cooling. ..... 18,000 BTU / HR
Heating. ..... 14,300 BTU/HR
Phase 3
Hertz.. ..... 50/60
Volts. 208

(3) Air conditioner (Model MAC4H18-208-1201-03).

Nomenclature Air conditioner. horizontal. compact
Manufacturer. ..... The Trane Company
Capacity:
Cooling. ..... 18,000 BTU / HR
Heating 14.300" BTU / HR
Phase.. 3
Hertz. 400
Volts. 208

(4) Condenser fan motor (B2) and/or evaporator fan motor (B3) (Model MAC6H18-230-1201-01).

Manufacturer. ..... IMC Magnetics Corp.
Model ..... FBC4620 (modified by marking "97403 13216E6140-2")
Volts 230
Hertz 50/60
Phase.. ..... Single
RPM.. ..... 3450 / 1725
Horsepower. .....
High.. ..... 0.73
Low 0.12
Amperes.. .....
High. ..... 3..5
Low 1.2

Duty . . . . . Continuous
Motor drive. . . . . Direct
Thermal protector . . . . . Automatic reset type opens at 145°C ± 5°C
Rotation (facing shaft end). . . . . *Counterclockwise*

(5) Condenser fan motor (B2) and/or evaporator fan motor (B3) (Model MA C6H18-208-1201-02).

Manufacturer . . . . . IMC Magnetics Corp.
Model. . . . . FBT 4625-3 (modified by marking "97403 13216E6140-3)
Volts 208
Hertz 50/60
Phase 3
RPM 3450/1725
Horsepower . . . . . .
High 0.73
Low 0.16
Amperes . . . . . .
High 2.3
Low 0.9
Duty . . . . . Continuous
Motor drive . . . . . Direct
Thermal protector . . Automatic reset type
High . . . . . 0pens at120°C ±5°C
Low . . . . . 0pens at 150°C ±7°C
Rotation (facing shaft end). . . . . Counterclockwise

(6) *Condenser fan motor and/or evaporator fan motor (Model MA C4H18-208-1201-03).*

Manufacturer. . . . . IMC Magentics Corp.
Model . . . BT4520-2 (modified by marking "94703 13216E6140-4")
Volts 208
Hertz 400
Phase 3
RPM 3750/1800
Horsepower . . . . . .
Hgh 1.1
Low 0.27
Amperes . . . . . .
High 6.0
Low 3.0
Motor drive . . . . . Direct
Thermal protector Automatic reset type
High . . . . . Opens at 150°C ±5°C
Law . . . . . Opens at 150°C±5°C
Rotation (facing shaft end). . . . . Counterclockwise

(7) R.F.I. capacitor (C1).

Type designation . . CK14AX103K
Specification . . . MIL-C-11015/20A
Type . . . . . Fixed
Dielectric . . Ceramic
Capacitance . 10.000 pf ± 10 pf

(8) R.F.I. capacitor (C2 or C6).

Manufacturer. . . . . Paktron
Part number. . . . . Paktron wa .056
Type . . . . . Fixed
Dielectric . . . . . Mylar
Capacitance. . . . . 0.056 mfd ± 10%
Working voltage. . . . . 400 VDC

(9) Condenser fan motor capacitor (C2) (MAC6H18-230-1201-01).

Manufacturer . . . . General Electric
Part number 28 F1557G2 (modified by marking "97403 13216E6236-4") (with protective boot 614A625P21)
Type. . . . . Fixed
Dielectric Paper
Capacitance 12.5 mf
Volts AC 440

(10) Evaporator fan motor capacitor (C3) (MAC6H18-230-1201-01).

Manufacturer General Electric
Part number 28F1557G2 (modified by marking "97403 13216E6236-4") (with protective boot 614A625P21)
Type, ... Fixed
Dielectric. . . . . Paper
Capacitance . . . 12.5 mf
Volts AC 440

(11) Compressor motor starting capacitor (C4) *(MAC6H18-230-1201-01).*

Manufacturer . . . General Electric
Part number. . . . . 35F1109BA3 (modified by marking "97403 13216E6239")
Type. . . . . Fixed, aluminum electrolytic
Capacitance . . . . . 80mf ±10%
Bleed resistor. . . . . 15,000 ohms ± 20%, 1 watt

(12) Compressor motor run capacitor (C5) (MAC6H18-230-1201-01).

Manufacturer General Electric
Part number. . . . . 72F5013FB (modified by marking "97403 13216E6236-5") (with protective boot 614A625P21)
Type . . . . . Fixed
Dielectric . . . . . Paper
Capacitance. . . . . 35 mf
Volts AC 44O

(13) Compressor circuit breaker (CB1) (MAC6H18-230-1201-01).

Manufacturer. . . . . Heinemann Electric
Part number. . . . . JA2Z21-3 (modified by marking "97403 13216E6206-3")
Type . . . . . DPST series trip with mechanically actuated auxiliary switch

(14) Compressor circuit breaker (CB1) (MAC6H18-208-1201-02).

Manufacturer. . . . . Heinemann Electric
Part number. . . . . JA3Z18-3 (modified by marking "97403 13216E6205.3")
Type. . . . . 3PST. series trip with mechanically actuated auxiliary switch

(15) Compressor circuit breaker (CB1) (MAC4H18-208-1201-03).

Manufacturer. ..... Heinemann Electric
Part number. ..... JA3Z18-4 (modified by marking "97403 13216E6205-4")
Type. ..... .3PST, series trip with mechanically actuated auxiliary switch

(16) *Control circuit breaker (CB2) (MAC6H18-230-1201-01 and (MAC6H18-208-1201-02).*

Manufacturer Texas Instruments, Inc.
Part number. ..... 2M01-102-1 (modified by marking "97403 13216E6178-1")
Type ..... SPST, series trip

(17) *Control circuit breaker (CB2) (MAC4H18-208-1201-03).*

Manufacturer. ..... Texas instruments, Inc.
Part number. ..... 2M01-202-1 (modified by marking "97403 13216E6178-2")
Type ..... SPST, series trip

(18) *Rectifier (CR1).*

Manufacturer Motorola Semiconductor Products, Inc.
Part number MDA952-3 (modified by marking "97403 13216E6223")

(19) *Heater element (HR1 through HR6) (MAC6H18-230-1201-01).*

Manufacturer. ..... Hotwatt Inc.
Part number. ..... 13E6077-3 (modified by marking "97403 13216E6124-3"")
Sheath ..... Nickel-iron-chromium alloy tubular type
Element ..... Nickel-chromium
Volts 230
Watts. 630

(20) Heater element (HR1) through HR6) (MAC6H18-208-1201-02 and MAC4H18-208-1201-03).

Manufacturer. ..... Hotwatt Inc.
Part number 13E6077-4 (modified by marking "97403 13216E6124-4")
Sheath ..... Nickel-iron-chromium alloy. tubular type
Element. ..... Nickel-chromium
Volts. 120
Watts 630

(21) Time delay relay (K 1).

Manufacturer. ..... *E. V.* Naybor Laboratories, Inc.
Part number. ..... TQ1D25 (modified by marking "97403 13216E6182")
Alternate. ..... HI-G Inc. Part No. 1600-3590 (modified by marking)
Type.. ..... SPDT
Time delay. ..... 25 ±6 seconds

(22) Heater relay (K2).

Part number. MS24192D1
Type. ..... 3PST, Normally open
Volts. ..... 28 VDC:

(23) Compressor motor relay (K3).

Part number MS24192D1
Type ..... .3PST, Normally open
Volts ..... 28 VDC

(24) Condenser fan relay (K4).

Manufacturer. ..... Potter and Brumfield
Part number. ..... KA4619 (modified. by marking "97403 13216E6184")
Type ..... 3PDT, armature type
Coil voltage 24VDC

(25) Compressor start relay (K5) (MAC6H18-230-1201-01).

Manufacturer. ..... Essex Wire Corp.
Part number. ..... 128116-1343S (modified by marking "97403-13216E6240")
Type ... SPST, armature type, normally closed

(26) Phase sequence relay (K5) (MAC6H18-208-1201-02).

Manufacturer. ..... HI-G Inc.
Part number. ..... 1400-S421 (modified by marking "97403 13216E6183-1")
Type ..... SPDT
Hertz 50/60
Phase 3
Voltage ..... 208 VAC

(27) Phase sequence relay (K5) (MAC4H18-208-1201-03).

Manufacturer. ..... HI-G Inc.
Part number. ..... 1400-S428 (modified by marking "97403 13216E6183-2"")
Type ..... SPDT
Hertz 400
Phase 3
Voltage ..... 208 VAC

(28) *Solenoid valves (L1 and L2).*

Manufacturer. ..... Jackes-Evans Mfg. Co.
Part number. ..... OB2S3 (modified by marking "97403 13216E6158")
Type. ..... Pilot operated diaphragm type, normally open (when not energized)
Volts 24DC

(29) Rotary selector switch (S1).

Manufacturer. ..... Cutler Hammer
Part number. ..... 8912K261 (modified by marking "97403 13216E6201")
Type. ..... 8PDT, 4 switch wafers
Number of switch positions. 5

(30) Toggle switch (S2).

Manufacturer. ..... Cutler Hammer
Part number. ..... 8906K1462 (modified by marking "97403 13216E6200")
Type. ..... 3PDT, slow make, slow break contacts

(31) *Temperature selector switch (S3).*

Manufacturer. . . . . Penn Controls, Inc.
Part number.. . . . . A19AGF23 (modified by marking "97403 13216E6203-1')
Type .... SPDT
Temperature range. . . . . 60°F to 90°F

(32) *High pressure switch (S4).*

Manufacturer. . . . . Penn Controls, Inc.
Part number.. . . . . 210AP40AN2301 (modified by marking "97403 13216E6215-3")
Type. . . . . SPST, normally closed with trip free manual reset
Pressure setting 445 ±10 psig

(33) Low pressure switch *(S5).*

Manufacturer. . . . . Penn Controls, Inc.
Part number .. . . . . 210AP10AN2308 (modified by marking "97403 13216E6215-1")
Type . . . . . SPST, normally closed with trip free manual reset
Pressure setting . . . . . 15 ± 5 psig

(34) Heater thermostatic switch (S6).

Manufacturer. . . . . Therm-O-Disc, Inc.
Part number. . . . . HLAS4947 (modified by marking "97403 13216E6224")
Type . . . . . DPST. normally closed, bimentallic
Reset . . . . . Automatic
Contacts open (temp. rise) . . . . . 150° ±5°F
Contacts close (temp. drop) . . . . . 110° ±10°F

(35) Condenser fan relay *thermostatic switch (S7).*

Manufacturer. . . . . Therm-O-Disc, Inc.
Part number . . . . . 14T22 (modified by marking "97403 13216E6217" and changing mounting holes to slots)
Type . . . . . SPST, normally open, non-adjustable bimetallic disc
Contacts close (temp. rise) . . . . . 100° ±5°F

(36) *Transformer (T1).*

Manufacturer .. . . . . Signal Transformer Co., Inc.
Part number . . . . . 5249 (modified by marking "97403 13216E6214" and changing mounting slots to holes)
Rating:
Input. . . . . 115VAC, 120 watts, 50 to 500 hertz
Output . . . . . 30 VAC, 4 amps

(37) Compressor (MAC6H18-230-1201-01).

Manufacturer ..... Whirlpool Corporation
Part number. . . . . WHP622-H18-230-1 (modified by marking "97403 13211E3793-3")
Oil charge . . . . . 20.5 ounces
Volts 230
Cycles 50/60
Phase. 1
Weight (with oil) 55 pounds

(38) Compressor (MAC6H18-208-1201-02).

Manufacturer. . . . . Whirlpool Corporation
Model. . . . . WHP-622H18-208-3 (modified by marking "97403 13211E3793-2")
Oil charge 20.5 ounces
Volts 208
Cycles 50/60
Phase, ... 3
Weight (with oil1) . . . 55 pounds

(39) Compressor (MAC4H18-208-1201-03).

Manufacturer. . . . . Whirlpool Corporation
Model . . . . . WHP-422H18-208-3 (modified by marking "97403 13211E3793-1")
Oil charge 20.5 ounces
Volts 208
Hertz 400
Phase 3
Weight (with oil . . . . 49 pounds

(40) *Thermal expansion value.*

Manufacturer. . . . . Alco Controls Corp.
Part number. . . . . HNE2HW 100-6A (modified by marking "97403 13216E6160-2")
Inlet . . . . . 3/8 ODF
Outlet . . . . . 1/2 ODF
Cap tube length . . . . . 30"
Norminal capacity 2 Ton
Superheat (factory set) . . . . . 6°F ±1/2° at a 32 F° bath temperature

(41) *Liquid quench valve.*

Manufacturer. . . . . Alco Controls Corp.
Part number . . . . . HN3/4CW16A (modified by marking "97403 13216E6174-2")
Inlet 1/4ODF
Outlet 3/8ODF
Cap tube length . . . . . 30"
Nominal capacity . . . . . 3/4 Ton
Superheat (factory set) . . . . . 16°F ±1/2° at a 32°F bath temperature

(42) *Refrigerant service valves.*

Manufacturer . . . . . Henry Valve Co.
Part number F503A
Valve stem . . . . . Hex socket for opening and closing

(43) Pressure regulator valve.

Manufacturer . . . . . Controls Co. of America
Model number 104A
Part number . . . 70034-187 (modified by marking "97403 13216E6171")
Adjustment range . . . 0 to 80 psig
Setting . . . . . 68 psig

(44) *Liquid sight indicator.*

Manufacturer . . . . . Sporlan Valve Co.
Part number . . . . . SA12S (modified by marking "97403 13216E6155")

(45) *Dehydrator.*

Manufacturer	Alco Valve Co.
Part number	ADK052 (modified by marking "07403 1321433557")
Type	Sealed-non-refillable

(46) Actuator cylinder assembly.

Manufacturer	Robert Shaw Controls Co.
Part number	Poll-12 (modified by marking "07403 13216E6128" and changing cable attachment plate)
Stroke	.952 in.
Full stroke pressure (no load)	240 ± 20 psig
Pressure to start stroke	165 ± 15 psig

(47) Dimensions and weights.

Length	27.8	in.
Height	20	in.
Width	30	in.
Weight	250	lbs.

1-7. Diagrams

a. Control System Schematic Diagrams.Refer **to figure 1-4 and 1-5 for schematic wiring diagrams.**

Figure 1-4. Control system schematic diagram, 1 phase, 50/60 hertz, 230 volts.

(Located in back of manual)

Figure l-5. Control system schematic diagram, 3 phase, 50/ 60 hertz and 400 hertz, 208 volts.

(Located in back of manual)

b. Wiring Diagrams.Refer **to figures 1-6 through 1-8 for wiring diagrams.**

Figure 1-6. Wiring diagram, 1 phase, 50 / 60 hertz, 230 volts.

(Located in back of manual)

Figure l-7. Wiring diagram, 3 phase. 50/ 60 hertz, 208 volts.

(Located in back of manual)

Figure 1-8. Wiring diagram, 3 phase, 400 hertz, 208 volts,

(Located in back of manual)

CHAPTER 2

INSTALLATION AND OPERATION INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

2-1. Unloading Equipment

The total weight of the air conditioner is 250 pounds. Use a hand truck or forklift of at least 300 pounds capacity to unload the unit. Keep unit upright during the unloading operation.

2-2. Unpacking Equipment

Move the unit as near to the site of installation as possible. Remove crating hardware and metal straps, being careful not to damage the unit with the tools used for uncrating.

2-3. Inspecting and Servicing Equipment

a. *Inspection.* Inspect the entire air conditioner for signs of damage, missing or loose hardware, and any defects that may have been incurred during shipment. Make a thorough check to see that all wiring, lines, and tubing are secure; and pay particular attention to the evaporator and condenser coils and main power receptacle connectors. Be sure that visible wiring and insulation is not frayed or broken. Check the evaporator and condenser fan motors. Report all damage and defects to organizational maintenance.

b. Servicing. Perform the daily preventive maintenance services listed in paragraph 3-6. Be sure all hardware is securely in place.

2-4. Installation

a. *General.* The air conditioner is shipped, assembled and ready for operation. It contains a full charge of refrigerant and compressor oil. Install the unit on a firm, level surface to allow proper condensate drainage. Place it so that the control panel and condenser and evaporator louvers are accessible to the operator and to maintenance personnel. Be sure there are no obstructions in front on any air intake or discharge louvers or other openings that may cause insufficient flow of air into or out of the air conditioner. If the unit is van mounted, report any such obstructions to organizational maintenance.

b. Mounting. Base mounting hole dimensions are shown on figure 2-1. The resilient mount parts shown in figure 2-2 are shipped with the air conditioner.

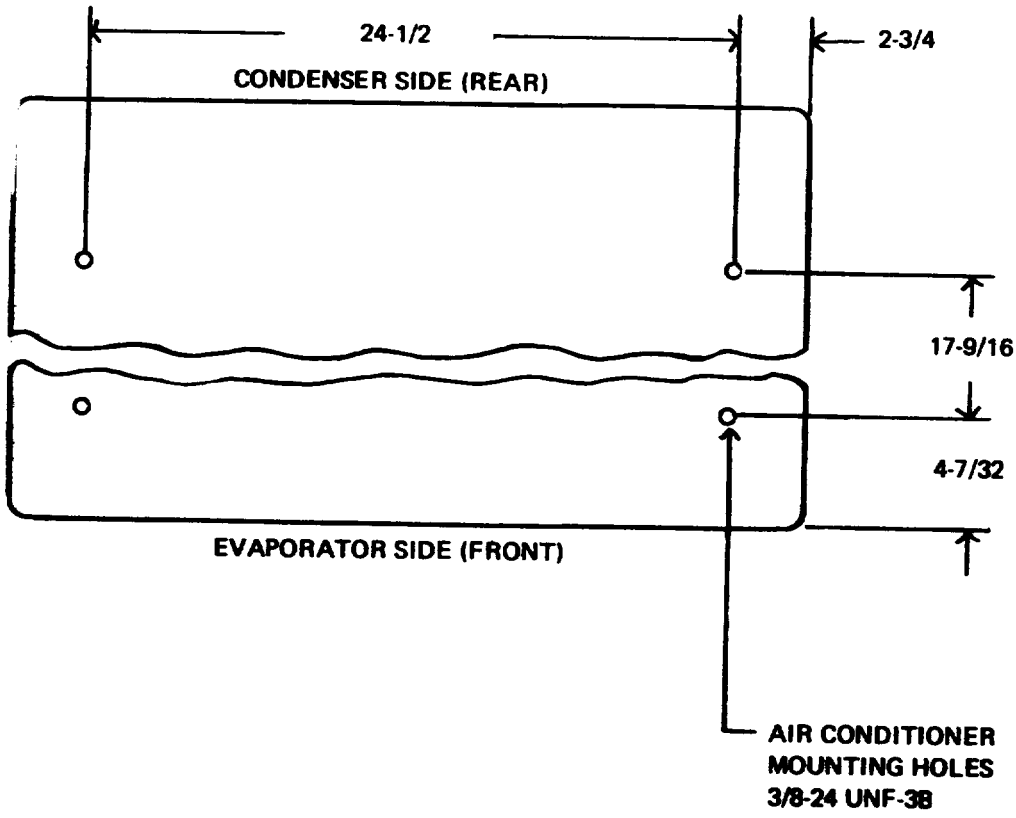


Figure 2-1. Base mounting holes.

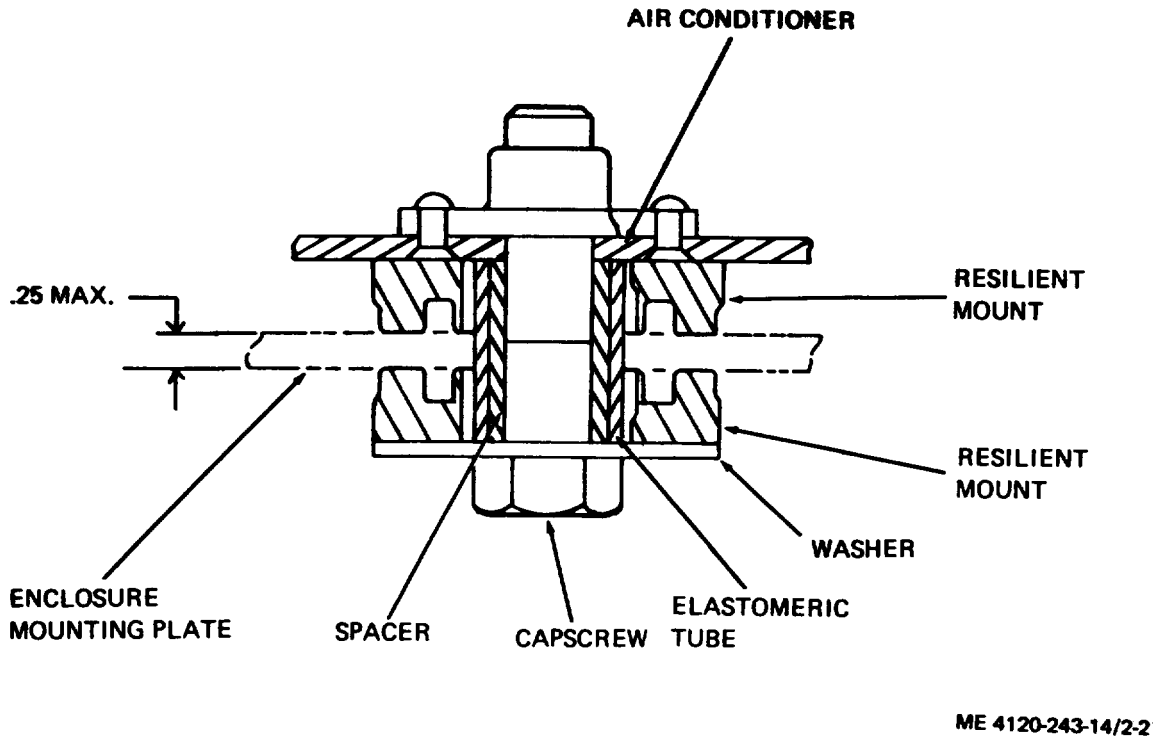


Figure 2-2. Typical installation on air conditioner to enclosure.

Caution: **For safe operation, connect a No. 10 AWG (min.) ground wire to ground connection.**

c. *Connections.* Connect the main power cable.

d. Air Ducts. Connect air ducts contingent to site of installation. Mount air filter in duct work if an evaporator return air duct is required.

Note. Operation without filtration will clog coils.

Section II. MOVEMENT TO A NEW WORKSITE

2-5. Dismantling for Movement

a. Disconnect main power cable.

b. Disconnect drain lines from the outlets.

c. Disconnect any air ducts and install the evaporator air discharge grille and air return grille.

d. Remove the unit from the mounting surface.

e. If the air conditioner is to be moved over a long distance, recrate it by reversing the unpacking procedures. See paragraph 2-2.

2-6. Reinstallation After Movement

After movement, follow the procedures in paragraph 2-4 to reinstall the air conditioner.

Section III. CONTROLS AND INSTRUMENTS

2-7. General

This section describes, locates, and illustrates the various controls and provides the operator crew sufficient information to insure proper operation of the air conditioner.

2-8. Controls and Instruments

The location and the function of the controls and instruments are illustrated in figure 2-3.

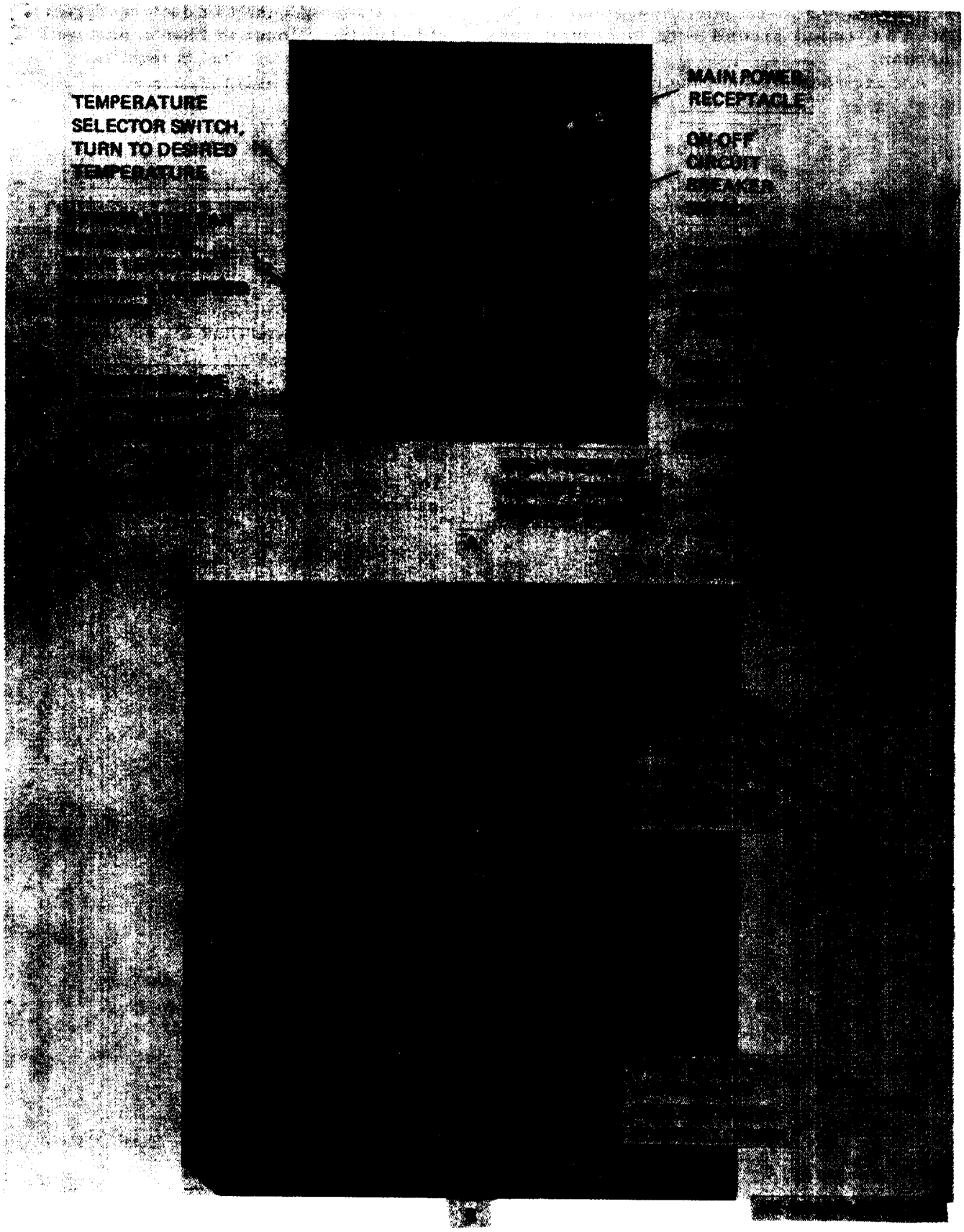


Figure 2-3 Controls and Instruments (sheet 1 of 2)

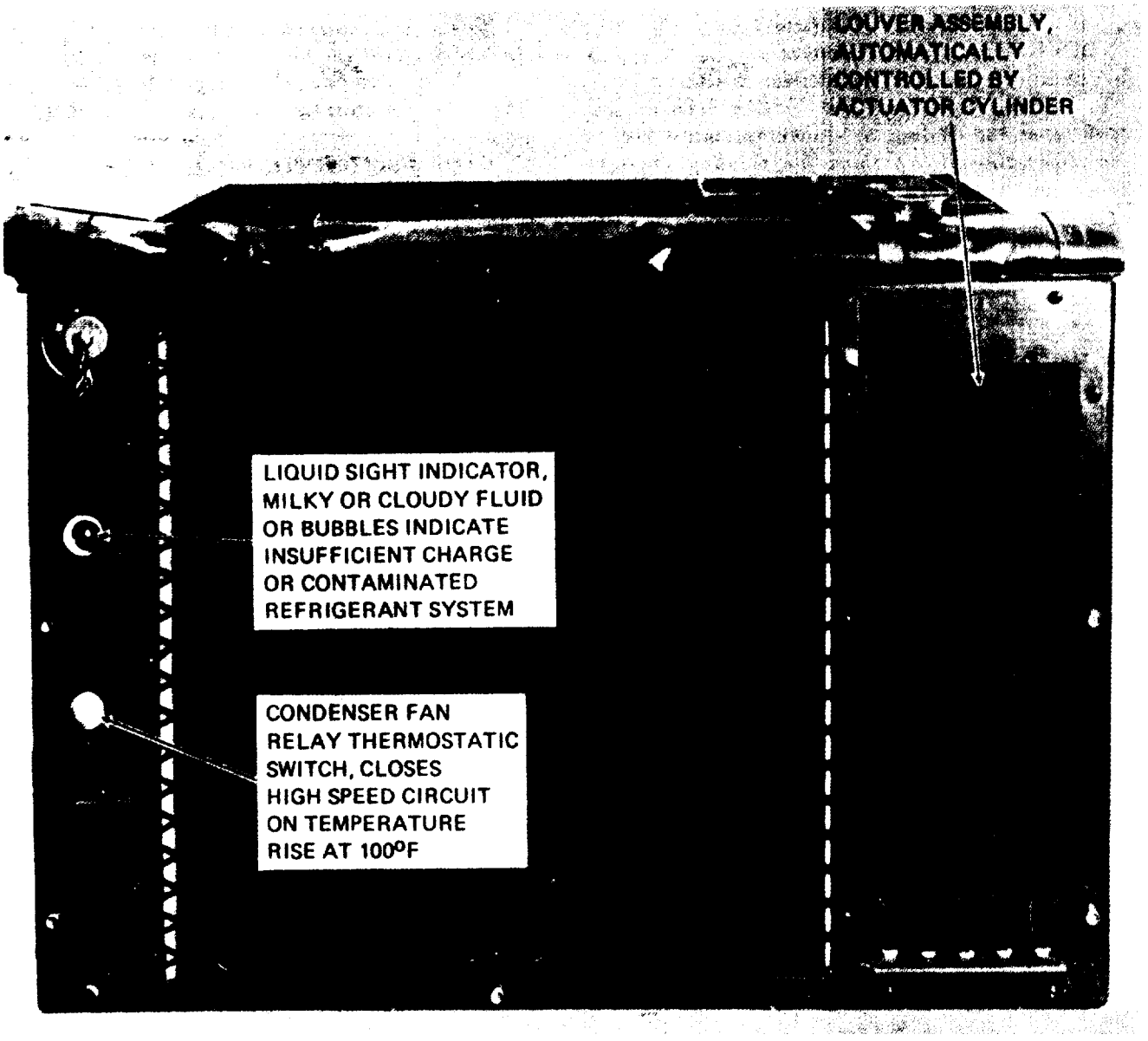


Figure 2-3. Controls and Instruments (sheet 2 of 2)

Section IV. OPERATION UNDER USUAL CONDITIONS

2-9. General

a. The instructions in this section are published for the information and guidance of the personnel responsible for the operation of the air conditioner.

b. The operator must know how to perform every operation of which the air conditioner is capable. This section gives instructions on starting and stopping the air conditioner, and detailed operating instructions. Since nearly every condition presents a different problem, the operator may have to vary the given procedure to fit the condition.

2-10. Starting and Operating Instructions

***a. Preparation for* Starting.**

(1) Perform the daily preventive maintenance service (para 3-6).

(2) Connect the main power cable.

(3) Check drain holes to insure that they are open.

(4) Be sure the unit is firmly secured.

(5) Roll up condenser cover and tie at top of air conditioner to clear condenser opening.

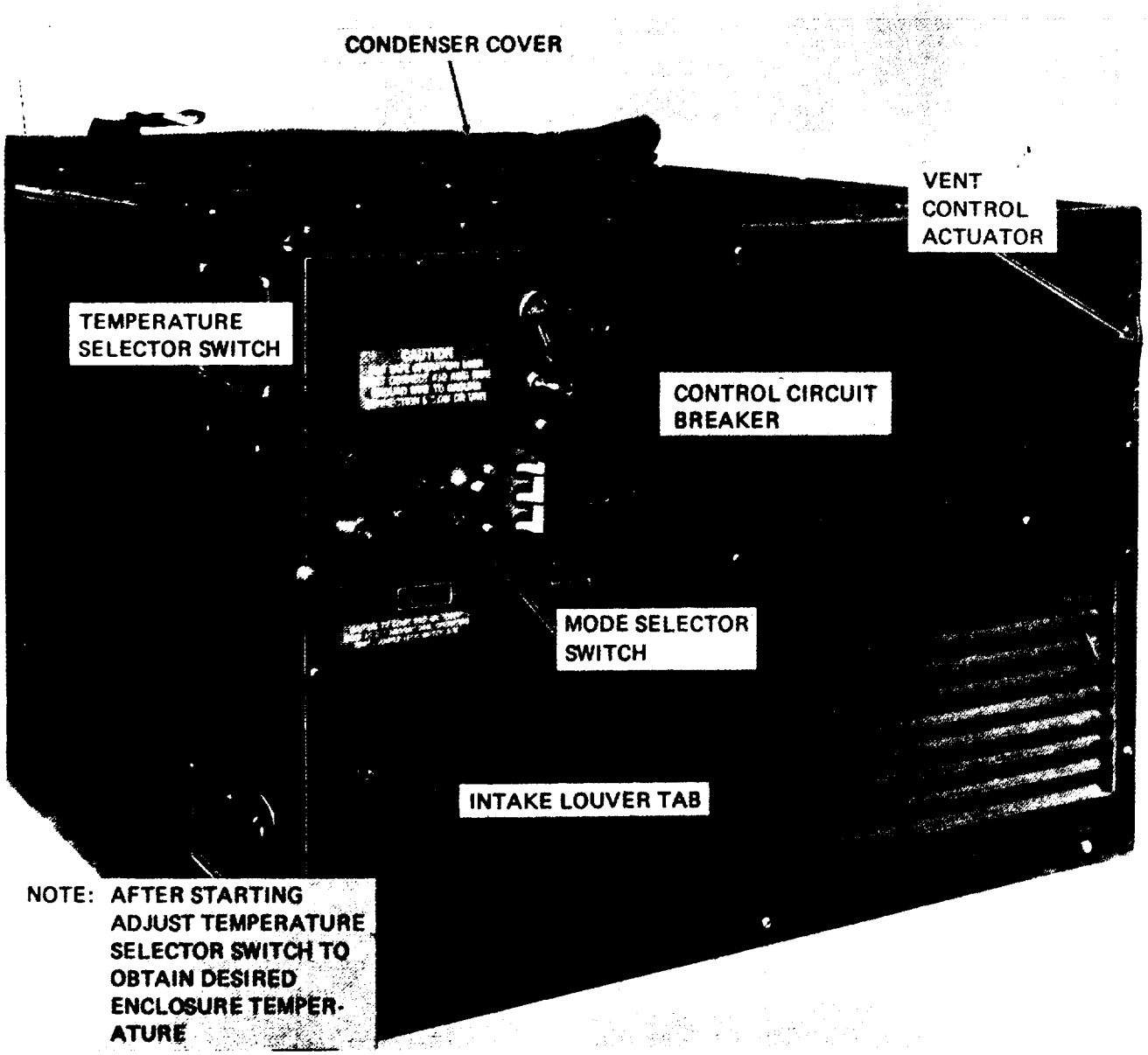
b. Starting Instruction for Cooling. Start the air conditioner for cooling as shown in figure 2-4.

c. *Operating Instructions for Cooling.* Operate the air conditioner for cooling as shown in figure 2-5.

d. Starting Instructions for Heating. Starting the air conditioner for heating is shown in figure 2-6.

e. *Operating Instructions for Heating.* Operate the air conditioner for heating as shown in figure 2-7.

f. Operating Instructions for Ventilation. Operate the air conditioner for ventilation as shown in figure 2-8.



STEP 1. BE SURE CONDENSER COVER IS ROLLED UP.

STEP 2 LIFT TABS .AND OPEN INTAKE LOUVERS.

STEP3. TURN FRESH AIR VENT CONTROL ACTUATOR TO CLOSE DAMPER DOOR.

STEP4. TURN TEMPERATURE SELECTOR SWITCH TO FURTHEST CLOCKWISE POSITION (WARMER).

STEP 5. TURN ON CONTROL CIRCUIT BREAKER.

STEP 6. TURN MODE SELECTOR SWITCH TO VENTILATE AND ALLOW FAN TO REACH FULL SPEED, THEN TURN TO COOL.

ME4120-243-14/2-4

Figure 2-4. Starting instruction for cooling.

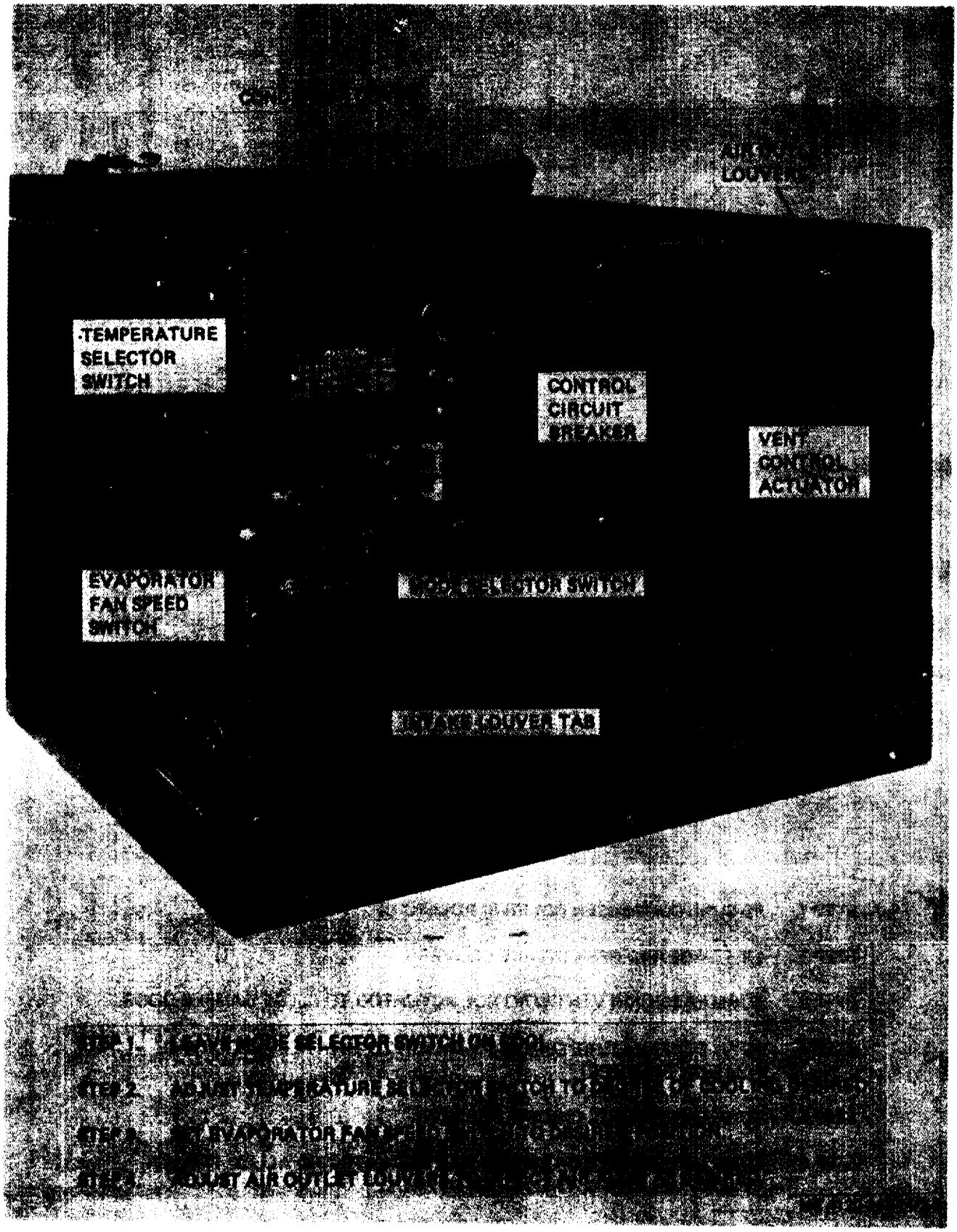
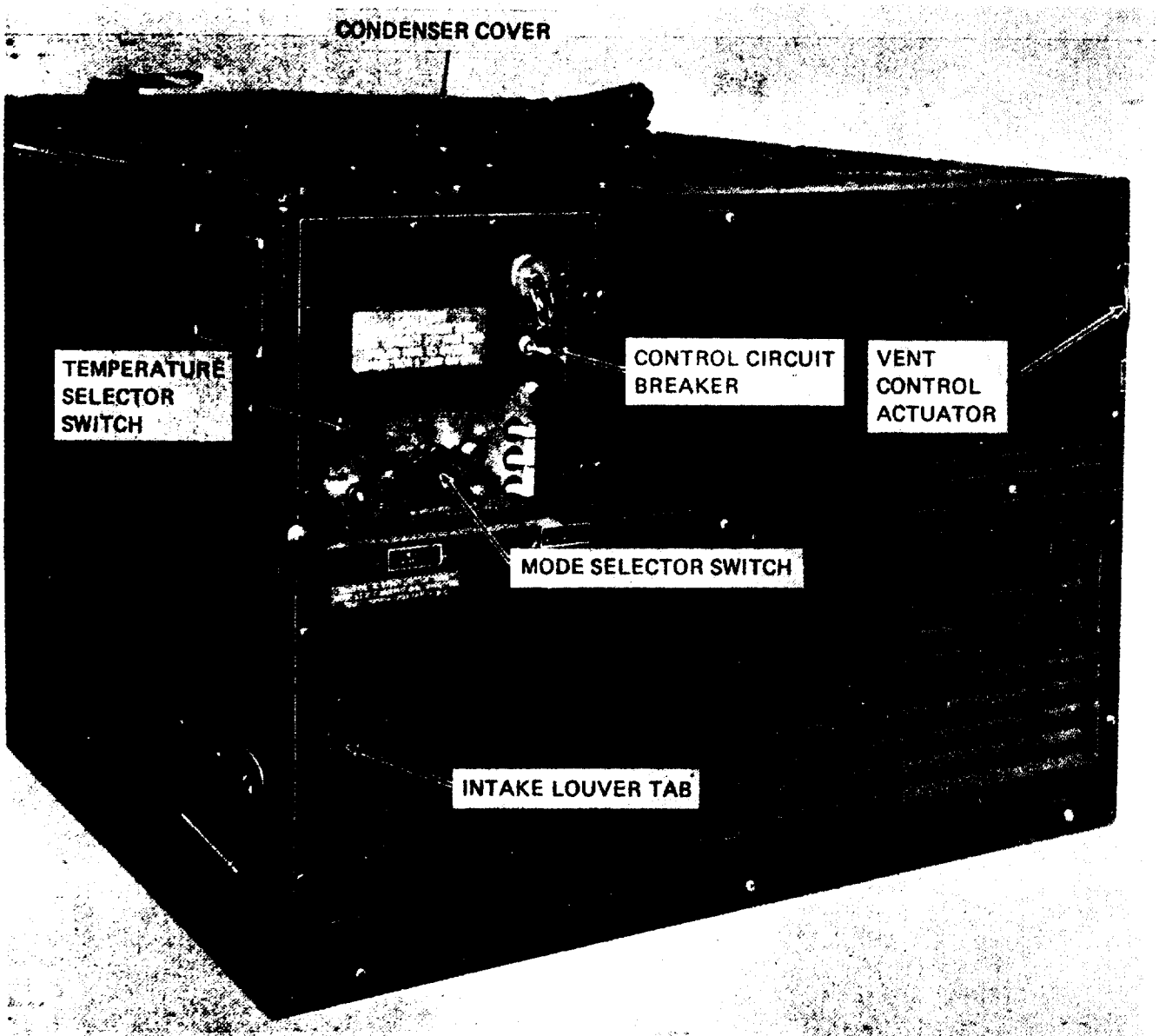


Figure 2-5. Operating instructions for cooling.



STEP 1. BE SURE CONDENSER COVER IS ROLLED UP.

STEP 2. LIFT TABS AND OPEN INTAKE LOUVERS.

STEP 3. TURN VENT CONTROL ACTUATOR TO CLOSE DAMPER DOOR.

STEP 4. TURN TEMPERATURE SELECTOR SWITCH TO FARTHEST COUNTER-CLOCKWISE POSITION (COOLER).

STEP 5. TURN ON CONTROL CIRCUIT BREAKER.

STEP 6. TURN MODE SELECTOR SWITCH TO LOW HEAT. TURN TO HIGH IF MORE HEAT IS DESIRED.

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Figure 2-6. Starting in instructions for heating.

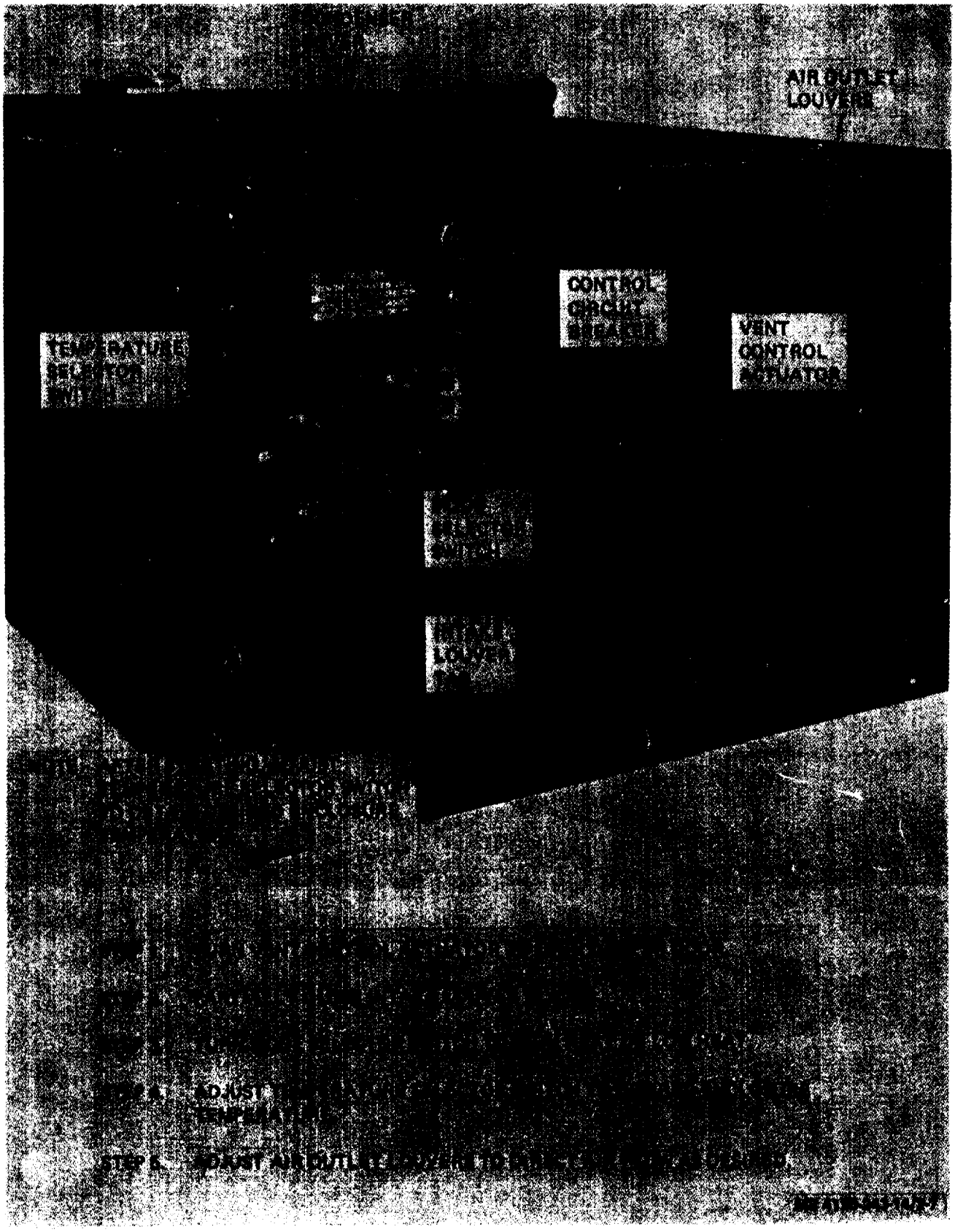
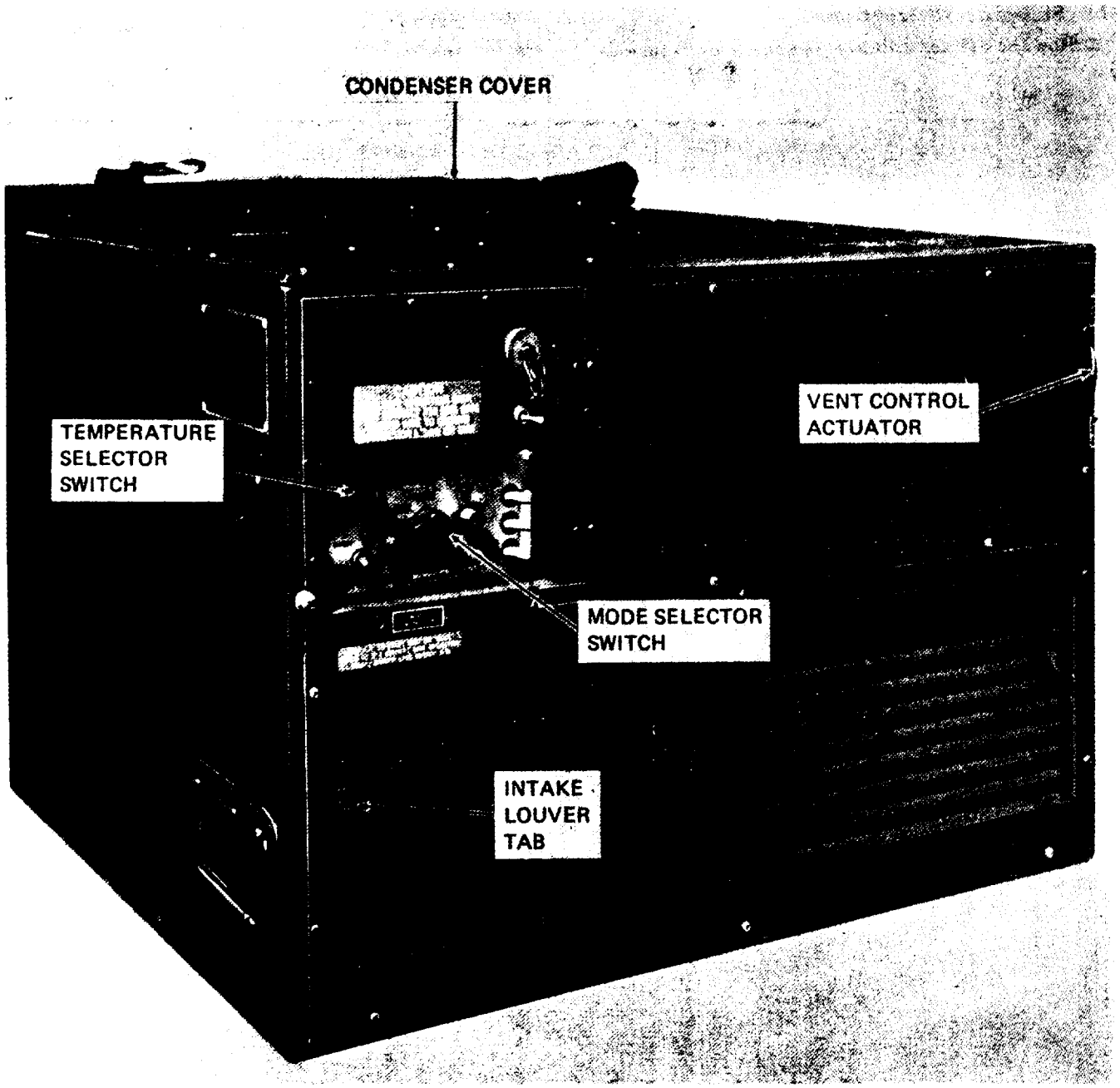


Figure 2-7. Operating instructions for heating.



STEP 1 BE SURE CONDENSER COVER IS ROLLED UP.

STEP 2. TURN VENT CONTROL ACTUATOR TO OPEN DAMPER DOOR.

STEP 3. PARTIALLY CLOSE INTAKE LOUVERS.

STEP 4. TURN MODE SELECTOR SWITCH TO VENTILATE.

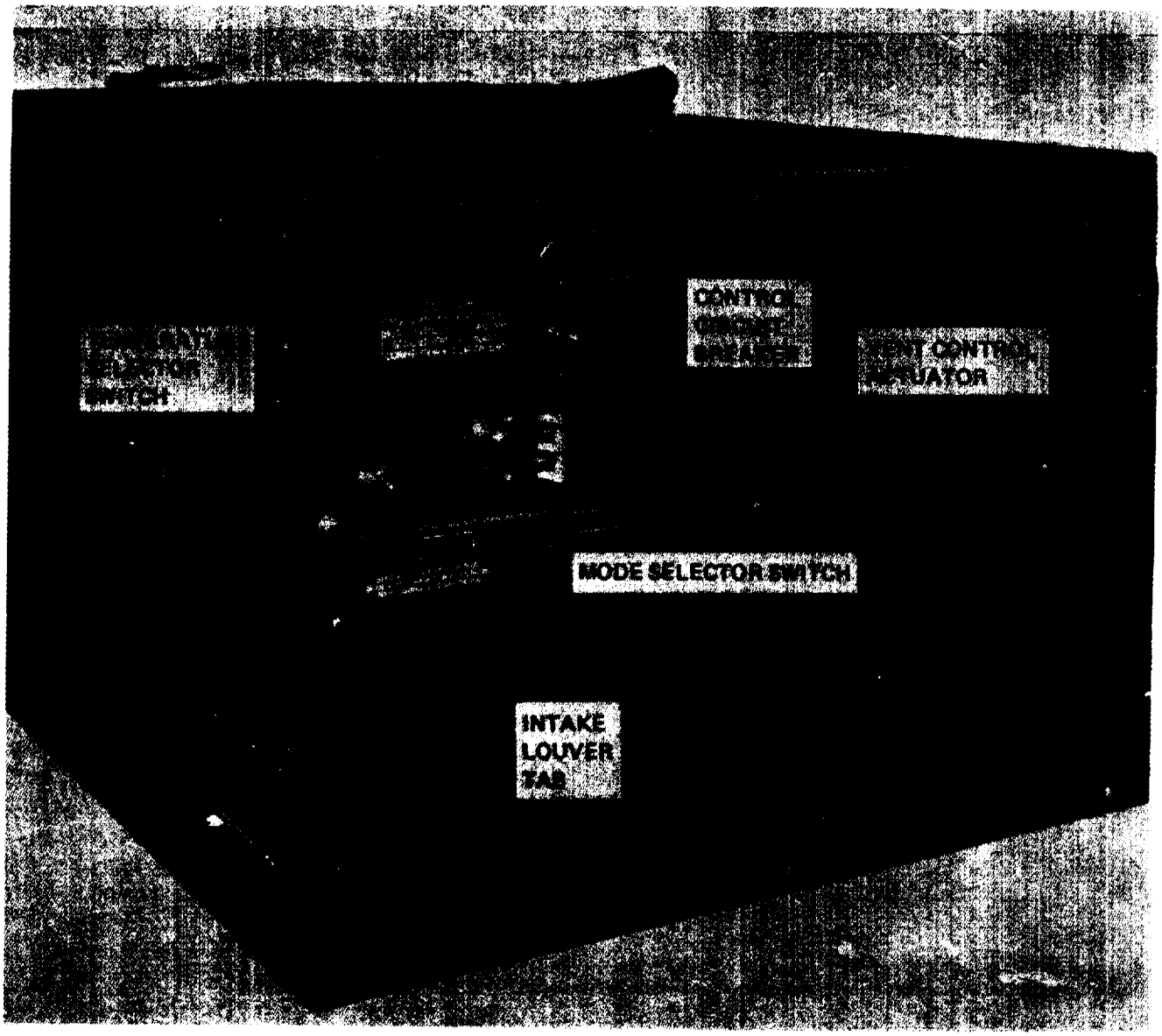
ME 4120-243-14/2-8

Figure 2-8. Operating instructions for ventilation.

2-11. Stopping Instructions

a. Stop the air conditioner as shown by figure 2-9.

b. Perform the daily preventive maintenance service (para 3-6).



NOTE: IF SHUTDOWN IS FOR AN EXTENDED PERIOD, COVER EVAPORATOR AND CONDENSER LOUVERS AND DISCONNECT POWER CABLE.

STEP 1. TURN MODE SELECTOR SWITCH TO OFF.

STEP 2. CLOSE INTAKE LOWERS.

STEP 3. TURN ACTUATOR TO CLOSE FRESH AIR VENT DAMPER.

ME 4120-243-14/2-9

Figure 2-9. Stopping instructions.

Section V. OPERATION UNDER UNUSUAL CONDITIONS

2-12. Operation in Extreme Cold

Caution: **To start unit on "Cool" mode at 0°F ambient (min. operating temp.), jumper LPCO switch (S-5).**

a. *General.* The air conditioner is designed to operate on the heating cycle in ambient temperatures as low as minus 50°F (Fahrenheit) and on cooling cycle with 0°F air entering the condenser and 70°F air entering the evaporator.

b. *Before Operation.* Before starting on cooling cycle, be sure cover is removed from condenser air intake and discharge Clear all ice and snow from openings. Be sure all dampers are in operating conditions.

c. *After Operation.* Install cover over condenser air intake and discharge openings.

Caution: **Do not disturb wiring during cold weather unless absolutely necessary. Cold temperatures make wiring and insulation brittle and easily broken.**

2-13. Operation in Extreme Heat

a. *General.* The air conditioner is designed to operate satisfactorily at temperatures up to plus 120°F. If unit is operated at condenser inlet temperatures higher than 120°F, the cooling capacity will be lowered and long periods of operation at extended temperatures may cause condenser or condenser fan motor to overheat and trip their internal overload switches or the high pressure cut out switch will shut the unit off.

b. *Filters.* To maintain the highest capacity of the unit, the return air filter and fresh air screen should be cleaned weekly or more often if necessary. Dirty filters reduce the flow of air across the evaporator coil, thereby reducing the capacity of the air conditioner.

c. *Guards and Louvers.* Keep all guards and louvers clean and free of any obstructions to maintain full air flow through the air conditioner.

d. Coils. Clean evaporator and condenser coils as frequently as necessary to prevent dirt or other matter from obstructing the air flow.

2-14. Operation in Dusty or Sandy Areas

a. Protection. Shield the air conditioner from dust as much as possible. Take advantage of any natural barriers which offer protection.

b. Cleaning. Keep the air conditioner as clean as possible. Pay particular attention to the louvers, filters, coils electrical components and grilles. Use compressed air, if available, to aid in cleaning.

c. *Air Filters and Coils.*

(1) Under extremely dusty or sandy conditions, the louvers. filters, coils. electrical components and grilles must be serviced more often.

Note. Never operate the unit without having the air filters in place.

(2) The condenser coil is subjected to ambient air. Therefore, it requires cleaning more often than the evaporator coil.

2-15. Operation Under Rainy or Humid Conditions

Take special precautions to keep equipment dry. If installed outdoors, cover the equipment with a waterproof cover when it is not in use. Remove cover during the dry periods. Take all necessary precautions to keep electrical components free from moisture.

Caution: **Make sure power is disconnected from air conditioner before touching any wiring or other electrical parts.**

2-16. Operation in Salt Water Areas

a. General. Wash the exterior and condenser section of the unit, particularly condenser air discharge louver control mechanism. With clean fresh water at frequent intervals. Be careful not to damage electrical system with water. Special attention must be given to prevent rust and corrosion.

Warning: **Disconnect power source prior to washing the air conditioner.**

b. Painting. Paint all exposed areas where paint has cracked, peeled, or blistered or report condition to organizational maintenance. Coat all exposed areas of polished metal with a light coat of grease.

CHAPTER 3

OPERATOR/CREW MAINTENANCE INSTRUCTIONS

Section I. BASIC ISSUE ITEMS

3-1. Basic Issue Tools and Equipment

Tools, equipment, and repair parts issued with or authorized for the air conditioner are listed in the basic issue items list, appendix C.

3-2. Special Tools and Equipment

No special tools or equipment are required by the operator/crew for maintenance of the air conditioner.

Section II. LUBRICATION

3-3. Fan Motors

The evaporator fan and condenser fan motors are permanently lubricated by the manufacturer and require no additional lubrication.

3-4. Compressor

The compressor and compressor motor are fully lubricated by the manufacturer and require no additional lubrication.

Section III. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

3-5. General

To insure that the air conditioner is ready for operation at all times, it must be inspected systematically so that defects may be discovered and corrected before they result in serious damage or failure. The necessary preventive maintenance services to be performed are listed and described in paragraph 3-6. The item numbers indicate the sequence of minimum inspection requirements. Defects discovered during operation of the unit will be noted for future correction to be made as soon as operation of the unit has ceased. Stop operation immediately if a deficiency is noted during operation which would damage the equipment if operation were continued. All deficiencies and shortcomings will be recorded, together with the corrective action taken, on DA Form 2404 (Equipment Inspection and Maintenance Worksheet) at the earliest possible opportunity.

3-6. Daily Preventive Maintenance Services

This paragraph contains a tabulated listing of preventive maintenance services which must be performed by the operator. The item numbers are listed consecutively and indicate the sequence of minimum requirements. Refer to table 3-1 for the daily preventive maintenance services.

Table 3-1. Preventive Maintenance Checks and Services

Operator's Maintenance Category — **Daily Schedule (or weekly)**

Interval and sequence number			Item to be inspected	Procedure	Paragraph reference
Before operation	During operation	After operation			
1		12	Evaporator outlet louver.	Remove obstructions. Clean louvers. Tighten mounting screws.	paragraph 3-10
2		13	Evaporator inlet louver.	Remove obstructions. Clean louvers. Check for ease of operation. Tighten mounting screws.	paragraph 3-10
3			Condenser cover.	With cover rolled up for operation check securing ties for damage.	
4		14	Fresh air inlet	Inspect for obstructions and insecure mounting. Remove obstructions clean and tighten loose mounting screws.	paragraph 3-10
5		15	Drains	Inspect drains for obstructions. Remove obstructions.	paragraph 3-11
6		16	Condenser louver.	Check for insecure mounting and damaged louvers.	paragraph 3-10
7		17	Condenser guard.	Remove obstructions and clean guard.	paragraph 3-10
8			Controls	Check for visual damage. Check operation of damper control.	paragraph 2-8
9			Main power receptacle connector	Check for secure power connection. Tighten if necessary.	
	10		Liquid sight indicator	Check for moisture and low refrigerant charge. Yellow indicates moisture bubbles or milky appearance indicates low charge.	paragraph 3-12
	11		Air conditioner operation.	Check for abnormal operation, vibration, unusual noise, failure to respond to controls.	
		18	Condenser cover.	Check for damaged fasteners.	

Section IV. TROUBLESHOOTING

3-7. General

This section contains information that is useful in diagnosing and correcting troubles which cause unsatisfactory operation or failure of the air conditioner.

3-8. Operator's Troubleshooting Chart

Troubleshooting procedures for operator/crew are listed in table 3-2. The first column shows the apparent trouble or symptom, the second column contains the probable cause, and the correcting action is listed in the third column. Remedies that are beyond the scope of the operator must be reported to organizational maintenance.

Table 3-2. Troubleshooting Chart

Malfunction	Probable Cause	Corrective Action
1. Air conditioner fails to operate.	a. Main power cable disconnected.	a. Connect power cable to receptacle (fig. 2-3, sheet 1).
	b. Control or compressor circuit breaker in "OFF" position.	b. Reset circuit breaker (fig. 2-3. sheet 1).
	c. Mode selector switch in "OFF"' position.	c. Turn selector switch knob to desired operation (fig. 2-3, sheet 1).
2. Insufficient cooling.	a. Mode selector switch improperly positioned.	a. Set switch to "COOL" (fig. 2-.5).
	b. Temperature selector switch set incorrectly.	b. Adjust setting to "COOLER'" (fig. 2-5).
	c. Insufficient air passing over evaporator coil.	c. Open evaporator inlet louvers (fig. 2-4). Remove any obstructions from evaporator inlet and outlet louver (para 3-10).
	d. Too much outside air entering unit.	d. Close or adjust damper door (fig. 2-3, sheet 1).
	e. Insufficient refrigerant in system.	e. Check liquid sight indicator (para 3-12).
	f. Evaporator fan speed switch set at low speed.	f. Reset switch to high speed (fig. 3-2, sheet 1).
	g. Insufficient air passing through condenser coil.	g. Remove any obsturctions for condenser fan inlet and outlet (para 3-10). Make sure louvers are open (fig. 2-3, sheet 3).
3. No heat or low capacity heat.	a. Mode selector switch improperly set.	a. Set switch to LOW HEAT OR HIGH HEAT (fig. 2-3, sheet 1).
	b. Temperature selector switch set incorrectly.	b. Reset switch (fig. 2-3, sheet 1).
	c. Insufficient air movement over heaters.	c. Remove any Obstructions from evaporator air intake and discharge louvers (para 3-10). Make sure intake louvers are open (fig. 2-3. sheet 3).

Section V. OPERATOR'S MAINTENANCE OF AIR CONDITIONER

3-9. General

This section contains maintenance procedures for the operator of the air conditioner.

3-10. Louvers, Condenser Guard and Fresh Air Screen

Remove any obstructions. Brush off loose dirt and wipe clean.

3-11. Drains

Clean out drain openings and remove any- obstructions.

3-12. Liquid Sight Indicator

Wipe refrigerant liquid sight indicator glass with a soft clean cloth. Set controls at cool-cooler and operate unit for 15 minutes before observation. Yellow appearance indicates moisture in system and bubbles or milky flow indicate low refrigerant charge. Report presence of these conditions to direct support maintenance.

CHAPTER 4

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF MATERIAL

4-1. General

Instructions for unloading, unpacking and installing the air conditioner are covered in paragraphs 2-1, 2-2 and 2-4.

4-2. Inspecting and Servicing Equipment

a. Inspection. General inspection of the equipment is covered in paragraph 2-3. If possible dam age has occured, requiring removal of covers or other components not authorized for removal by the operator, further inspection of internal components is to be performed by organizational maintenance personnel. If other than new equipment has been received, a thorough inspection is to be performed.

b. Servicing. Remove and inspect return air filter and fresh air screen and service filter and screen if necessary.

4-3. Installation

Check air conditioner for proper installation. If auxiliary power connection is to be used, change leads as shown on wiring diagram.

Section II. MOVEMENT TO A NEW WORKSITE

4-4. Dismantling for Movement

Refer to paragraph 2-5.

4-5. Reinstallation After Movement

Refer to paragraphs 2-6 and 4-3.

Section III. REPAIR PARTS, SPECIAL TOOLS, AND EQUIPMENT

4-6. Tools and Equipment

Refer to appendix C for tools, equipment and repair parts issued with the air conditioner.

4-7. Special Tools and Equipment

No special tools or equipment are required for maintenance of the air conditioner.

4-8. Maintenance Repair Parts

Repair parts and equipment are listed and illustrated in the repair parts and special tool list covering organizational maintenance for this equipment. (TM 5-4120-243-20P) (when printed).

Section IV. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

4-9. General

Periodic maintenance checks are required by organizational maintenance personnel to check the performance of daily preventive maintenance services. Additional periodic maintenance services are required that are beyond the scope of the operator's maintenance.

4-10. Quarterly Preventive Maintenance Service

a. This paragraph contains a tabulated listing of preventive maintenance services which must be performed by organizational maintenance personnel at quarterIy intervals. A quarterly interval is equal to three calendar months, or 250 hours of operation, whichever occurs first.

b. The item numbers are listed consecutively and indicate the sequence of inspection and minimum requirements. Refer to table 4-1 for quarterly preventive maintenance services.

c. Some services are required at a shorter interval and are so noted. Service intervals should be shorted under extreme or unusual conditions.

Table **4-1.** ***Preventive Maintenance Checks and Services***
Organizational Maintenance Category **Monthly Schedule (or quarterly)**

Sequence number	Item to be inspected	Procedures	Paragraph reference
1	Evaporator inlet and discharge louvers	Clean, inspect for damage. Replace if necessary.	paragraph 4-18
*2	Air filter	Inspect and service or replace if necessary.	paragraph 4-17
3	Condenser guard	Inspect and clean. Replace if damaged.	paragraph 4-20
*4	Fresh air screen	Inspect and clean or replace as necessary.	paragraph 4-19
5	Evaporator Coil	Clean and inspect.	paragraph 4-24
6	Condenser coil	Clean and inspect.	paragraph 4-23
7	Condenser cover	Inspect, clean and repair or replace if damaged.	paragraph 4-21
8	Housing covers	Repair or replace damaged covers.	paragraph 4-21
9	Fans	Check fans for damage. Check motors for evidence of over heating. Replace damaged fans and motors.	paragraphs 4-38, 4-39, and 4-40
10	Heaters	Check for breaks in wiring and insulation. Tighten loose connections.	paragraph 4-35
11	Controls and instruments	Check for damage to any controls in control module. Replace defective parts or control module.	paragraphs 4-44, thru 4-48
12	Junction box components	Check for defective relays and circuit breaker.	paragraphs 4-49 thru 4-54
13	Wiring and electrical components	Check for damaged or frayed wiring. Check for defective electrical components. Repair or replace defective wiring. Replace defective electrical components.	paragraph 4-33
14	Liquid sight indicator	Check for damage.	
15	refrigeration system	Check compressor, valves, and piping for damage. Report damage to direct support maintenance.	paragraph 4-63

* Perform check and service weekly.

Section V. TROUBLESHOOTING

4-11. General

This section contains troubleshooting instructions for the isolation of causes of common troubles that may occur during operation and also contains the possible remedies to correct the trouble.

4-12. Organizational Troubleshooting Chart

a. General. Troubleshooting procedures for organizational maintenance personnel are listed in table 4-2. The first column shows the apparent trouble or symptom. The second column contains the probable cause. The third column lists the corrective action to be taken. Remedies that are beyond the scope of organizational maintenance must be reported to direct support maintenance personnel. Additional procedures are listed in paragraph b and c below.

b. Control Circuit. The cause for a system's failure to operate can be greatly narrowed if the control which caused the failure can be isolated. It is the function of safety devices to open the circuit under certain conditions; therefore, additional checking may be required to determine whether the safety device is open because it is defective or is performing its designed function. The following steps contain instructions for checking the control circuit.

(1) Disconnect power from air conditioner.

(2) Test the continuity across each control in the affected circuit with a test lamp or ohmmeter if available using schematic diagrams as a guide. Check wiring diagrams for connections.

(3) Replace defective parts.

c. Safety Devices. When testing the control circuit and other equipment, take into consideration the fact that open safety devices may not be defective. It may be normal for the device to be open under the existing conditions or it may indicate trouble elsewhere in the' air conditioner.

Table 4-2. Troubleshooting Chart

Malfunction	Probable Cause	Corrective Action
1. Air conditioner fails to operate.	a. Main power cable disconnected.	a. Connect cable.
	b. Main power receptacle connector defective.	b. Replace connector (para 4-33).
	c. Loose electrical connections.	c. Tighten connections.
	d. Rotary selector switch improperly adjusted or defective.	d. Turn selector switch to "COOL" or "VENTILATE". Replace a defective switch (para 4-44 through 4-48).
	e. Control or compresser circuit breaker in OFF position or defective.	e. Reset circuit breaker(s) or replace (para 4-44 thru 4-48 or para 4-50 thru 4-54).
	f. Defective phase, sensing relay.	f. Replace defective phase sensing relay (para 4-50 thru 4-.54).
	g. Defective control circuit transformer.	g. Replace defective transformer (para 4-56).
	h. Defective control circuit rectifier.	h. Replace defective rectifier (para 4-57).
2. Insufficient cooling.	a. Mode selector switch improperly positioned.	a. Set switch to "COOL".
	b. Insufficient refrigerant charge.	b. Report condition to direct support maintenance.
	c. Condenser coil dirty.	c. Clean coil (para 4-23).
	d. Evaporator return air filter dirty.	d. Clean filter (para 4-17).
	e. Temperature selector switch set incorrectly or defective.	e. Adjust setting or replace switch (para 4-44 thru 4-48).
	f. Fresh air damper control set incorrectly or incorrectly adjusted.	f. Check setting of Control. Adjust fresh air damper control (para 4-27).
	g. Defective compressor.	g. Report condition to general support maintenance.
	h. Evaporator outlet louver bent or stuck in closed position.	h. Repair or replace louver (para 4-18).
	i. Evaporator fan motot worn or defective.	i. Report deficiency to direct support maintenance or replace motor (para 4-38 and 4-40).
	j. Evaporator fan loose or defective.	j. Tighten or replace fan.
	k. Evaporator fan motor thermal protector defective.	k. Replace thermal protector (para 4-39).

Table 4-2. Troubleshooting Chart—Continued

Malfunction	Probable Cause	Corrective Action
3. Evaporator or condenser fan fails to operate.	a. Main power cable disconnected.	a. Connect cable.
	b. Defective fan motor.	*b*. Replace motor (para 4-32 and 4-40).
	c. Evaporator or condenser fan defective or binding.	c. Relieve binding or replace fan (para 4-38 and 4-40).
	d. Defective condenser motor thermal protector.	d. Replace thermal protector (para 4-39).
	e. Defective evaporator fan motor thermal protector.	e. Replace thermal protector (para 4-39).
	f. Defective receptacle or plug connectors.	f. Replace connectors or receptacles (para 4-33).
	g. Defective high-low condenser fan thermostatic switch.	g. Replace thermostatic switch (para 4-41).
	h. Defective condenser fan relay.	h. Replace defective relay (para 4-50 thru 4-54).
	i. Defective evaporator fan speed control switch.	i. Replace defective switch (para 4-44 thru 4-48).
	j. Mode selector switch improperly adjusted or defective.	j. Replace a defective switch (para 4-44 thru 4-48).
4. Compressor will not start.	a. Compressor or control circuit breakers or selector switch improperly set.	a. Reset controls properly.
	b. Contacts of high or low pressure cutout switch open.	b. Reset pressure switches. Report deficiency to direct support maintenance if condition continues.
	c. Loose electrical connections or faulty wiring.	c. Tighten loose connections. Repair wiring if necessary.
	d. Open control circuit.	d. Make continuity check of circuit (para 4-12).
	e. Defective circuit breaker.	e. Replace defective control or compresser circuit breaker (para 4-44 thru 4-48 or para 4-50 thru 4-54).
	f. Defective control transformer.	f. Replace defective transformer (para 4-56).
	g. Defective rectifier.	g. Replace defective rectifier (para 4-57).
	h. Defective time delay relay.	h. Replace defective relay (para 4-50 thru 4-54).
	i. Defective compressor relay.	i. Replace defective relay (para 4-50 thru 4-54).
	j. Defective starting relay or capacitor (single phase compressor).	j. Replace defective capacitor or relay (para 4-61).
	k. Defective phase sequence relay (three phase compressor).	k. Replace defective relay (para 4-50 thru 4-54).
	l. Defective or tripped compressor internal temperature overload switch.	l. Allow unit to cool. Report deficiency to direct support maintenance if condition continues.
	m. Defective compressor motor.	m. Check and report deficiency to general support maintenance if motor is defective.
5. Compressor starts but goes out on **overload.**	a. Condenser fan motor failure.	a. Replace defective motor (para 4-38 and 4-40).
	b. High head pressure.	b. Clean condenser coil and louvers. Check fan for proper operation.
	c. Defective or "tripped" compressor internal temperature overload switch.	c. Allow unit to cool. Report deficiency to direct support maintenance if condition continues.
	d. Improperly adjusted or defective refrigerant control valves.	d. Report condition to direct support maintenance.

Table 1-2. Troubleshooting Chart—Continued

Malfunction	Probable Cause	Corrective Action
	c. Evaporate: fan speed switch set at low speed.	d. Reset switch to high speed.
6. Evaporator air output volume low.	a. Dirty or damaged filter or louvers.	a. Clean or replace filter (para 4-17). Clean or replace louvers as required (para 4-18).
	b. Iced or dirty evaporator coil.	b. De-ice and clean coil (para 4-24).
	c. Defective evaporator fan.	c. Replace fan.
	d. Defective fan motor.	d. Replace motor (para 4-38 and 4-40).
	e. Evaporator fan speed switch set at low speed.	e. Reset switch to HIGH speed.
7. Condenser air output volume low.	a. Dirty condenser coil or guard.	a. Clean coil and guard (para 4-23).
	b. Defective HIGH-LOW condenser fan thermostatic switch.	b. Replace switch (para 4-41).
	c. Defective condenser fan.	c. Replace fan.
	d. Defective fan motor.	d. Replace motor (para 4-38 and 4-40).
	e. Air outlet louvers stuck in closed position.	e. Free louvers and control cables. Adjust control or refer to direct support maintenance if actuating cylinder is not functioning properly.
8. Air conditioner fails to heat.	a. Selector switch improperly adjusted.	a. Reset selector switch to LO-Heat or HI-heat (para 2-10).
	b. Temperature control switch *set* incorrectly.	b. Reset switch (para 2-10).
	c. Dirty evaporator return air filter.	c. Clean filter (para 4-17).
	d. Defective evaporator fan motor.	d. Replace motor (para 4-38 and 4-40).
	e. Defective temperature selector switch or mode selector switch.	e. Replace defective switch (para 4-44 thru 4-48).
	f. Defective heaters or wiring.	f. Tighten connections and repair damaged wiring. Replace defective heaters (para 4-35).
	g. Defective heater relay.	g. Replace defective relay (para 4-50 thru 4-54).
	h. Defective heater high temperature cutout thermostatic switch.	h. Replace defective thermostatic switch (para 4-34).
9. Excessive noise.	a. Evaporator or condenser fan vibrating.	a. Tighten fans on shafts. Tighten all mounting screws.
	b. Evaporator or condenser fan motor worn or defective.	b. Replace worn or defective motor (para 4-38 and 4-40).
	c. Compressor knocks or clatters.	c. Stop air conditioner and report condition to direct support maintenance.

Section VI. RADIO INTERFERENCE SUPPRESSION

4-13. General Methods Used to Attain Proper Suppression

Essentially, suppression is attained by providing a low resistance path to ground for the stray currents. Methods used include shielding ignition and high frequency wires, grounding the frame with banding straps and using capacitors and resistors.

4-14. Interference Suppression Components

The control module, junction box and electrical system components are grounded to the housing. The housing is connected to a ground wire in. power supply. Capacitors (fig. 4-1) are located across the rectifier terminals. Grommets are inserted in the heat support bracket to isolate heating elements from bracket to prevent metal to metal contact and scraping during expansion and contraction of heating elements. Power inlet cover chains are encased in shrink type tubing to prevent rattling of chain links.

4-15. Replacement of Capacitor

a. Removal.

(1) Remove front top cover of air conditioner.

(2) Disconnect capacitor (fig. 4-1) from terminals 1 and 3 or 2 and 4 of rectifier.

b. Installation. Connect new capacitor across terminals 1 and 3 or 2 and 4 of rectifier as required and install from top cover.

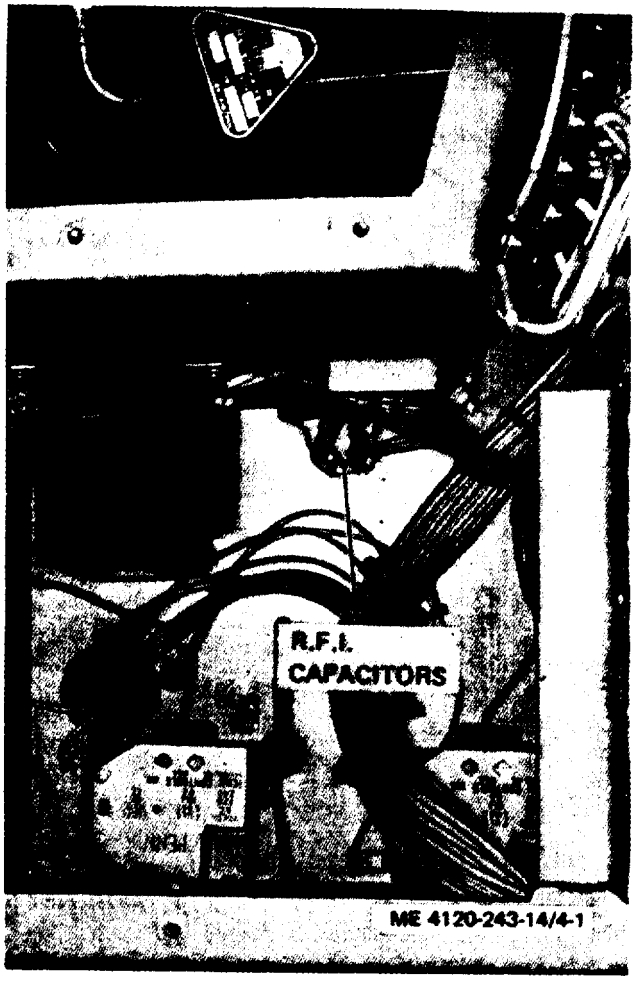


Figure 4-1. R.F.I. capacitors.

Section VII. COVERS, LOUVERS, AND FILTERS

4-16. General

This section covers the evaporator louvers, return air filter, condenser guard, condenser louvers, fresh air screen, and the top covers of the housing. These parts must be serviced regularly or removed frequently to gain access to other parts of the air conditioner. For ease of reference these parts are covered in separate paragraphs in this section. This unit was designed for use with CBR.

4-17. Servicing Return Air Filter

a. General. The return air filter (fig. 4-2) mounted in clips on the inner side of the inlet louver, filters the air returning to the air conditioner from the conditioned air.

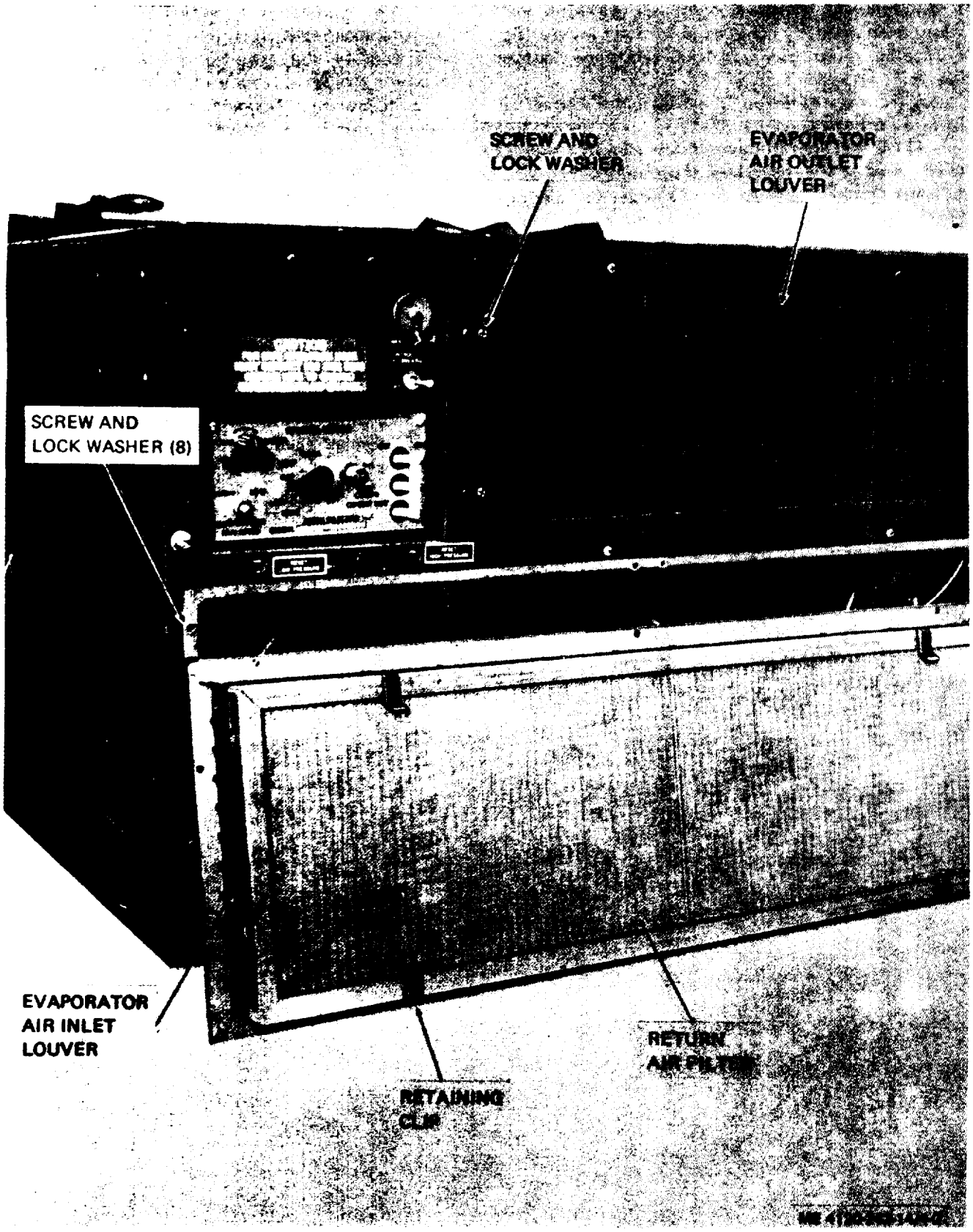


Figure 4-2. Evaporator air louvers and air filter.

b. Removal. Remove eight screws and lock washers and remove evaporator air inlet louver (fig. 4-2). Slide return air filter from retaining clips on louver.

c. *Cleaning and Inspection.* Clean and inspect air filter as follows:

(1) W ash filter in detergent or cleaning solvent (Fed. Spec. P-D-680). Dry thoroughly.

(2) Inspect filter for damage or clogged condition. Replace filter if damaged or clogged.

(3) Reoil filter with SAE 30 oil. Drain eight hours and wipe off excess oil.

d. Installation. Slide filter into air inlet louver and secure louver to housing with eight screws and lock washers.

4-18. Evaporator Air Inlet and Outlet Louvers

a. *General* The evaporator air inlet louver is adjustable to control the amount of return air that will pass through the air conditioner when the fresh air ventilation damper is open. The evaporator air outlet louver, mounted in front of the evaporator coil, has individually adjustable blades to direct the evaporator air outlet flow.

b. Removal. Refer to paragraph 4-17 and remove the evaporation air inlet louver. Refer to figure 4-2 and remove the evaporator air outlet filter by removing eight screws and lock washers.

c. *Cleaning, Inspection and Repair.* Clean, inspect and repair louvers as follows:

(1) Clean louvers with cleaning solvent (Fed. Spec. P-D-680).

(2) Inspect for bent or broken louver blades. Straighten bent blades. Replace louver if damaged.

d. lnstallation. Refer to paragraph 4-17 and install the air inlet louver. Install outlet louver over discharge opening and install eight screws and lock washers.

4-19. Fresh Air Vent Guard and Filter

a. General. The fresh air screen (fig. 4-3), mounted on the rear wall of the housing, covers the fresh air inlet opening to prevent bugs and other air borne matter from entering the air conditioner. This unit was designed for use with CBR.

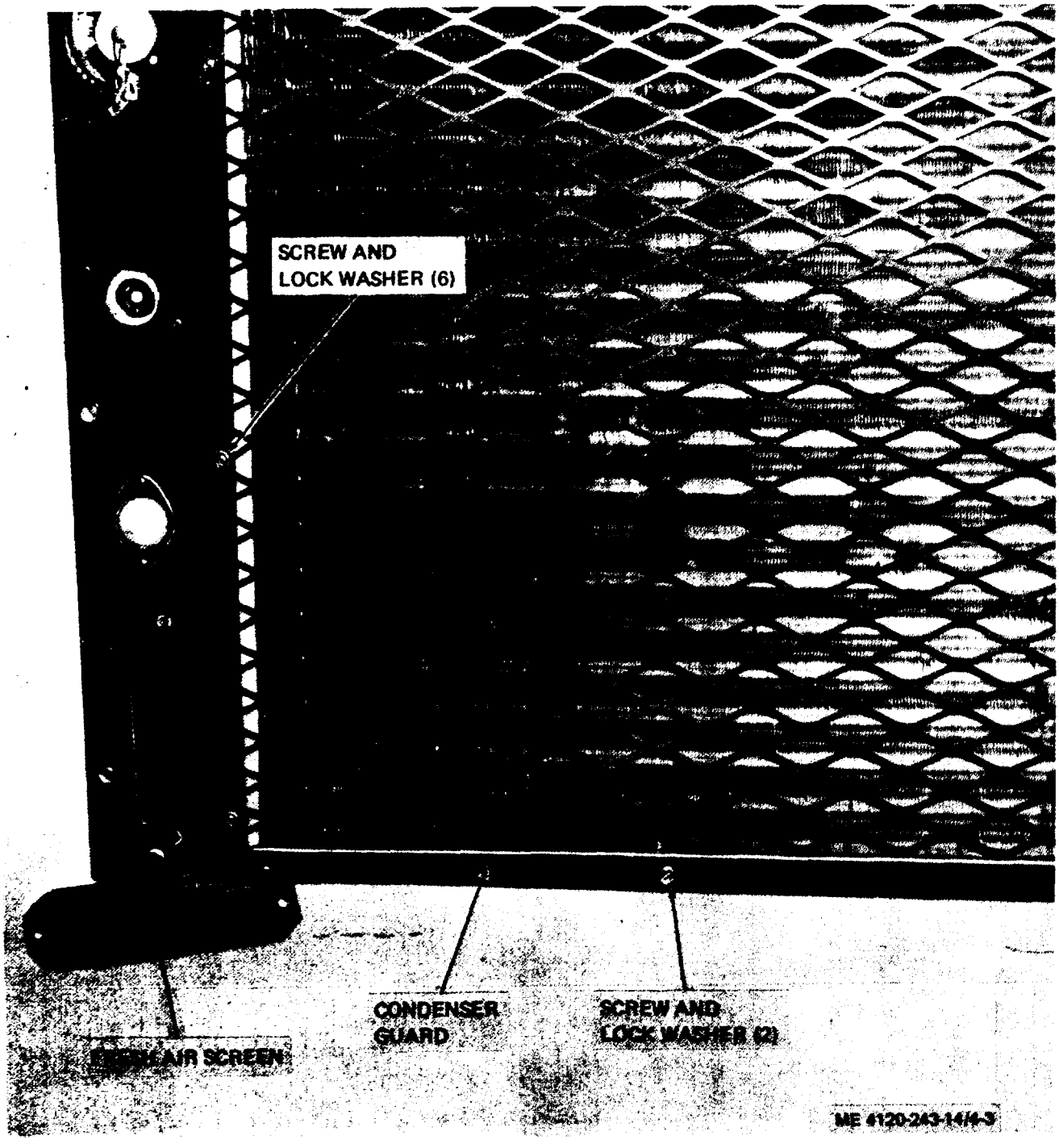


Figure 4--3. Fresh air screen.

b. Removal. Refer to figure 4-3. Remove two screws and lock washers and fresh screen.

c. *Cleaning and Inspection.* Clean the guard in cleaning solvent (Fed. Spec. P-D-680). Replace the screen if damaged or broken.

d. Installation. Refer to figure 4-3 and install the fresh air screen. Secure screen to housing with two screws and lock washers.

4-20. Condenser Guard and Louvers

a. General. The condenser guard (fig. 1-2), located at the rear of the air conditioner, is an expanded metal guard that protects the condenser coil from dam age. The condenser air discharge louver is opened and closed automatically by an actuator cylinder in the refrigeration system. A

push-pull control assembly connects the louver and cylinder.

b. Cleaning and Inspection. The guard can be cleaned with a bristle brush without removing the guard from the air conditioner or the guard can be removed and washed thoroughly. Clean the louver with a dry cloth. Inspect louver blades for bent condition or damaged rubber strips. Inspect guard for bent or broken condition.

c. *Condenser Guard Removal and Installation.* Refer to figure 4-3 and remove and install condenser guard as follows:

(1) Remove two screws and lock washers from top and bottom of guard.

(2) Remove six screws and lock washers that secure guard to condenser coil. Remove guard.

(3) Install guard and eight screws and lock washers previously removed.

d. Replacement of Louver Blades. Individual condenser louver blades (fig. 1-2) are flexible enough for removal. Remove damaged blades as follows :

(1) Remove rear cover as described in paragraph 4-21.

(2) Remove push-on type nut (fig. 4-4) from louver blade to be removed. Bend blade to remove ends from bearings and remove blade.

(3) Bend new blade in same manner as in rem oval and install ends in bearings.

(4) Install push-on nut.

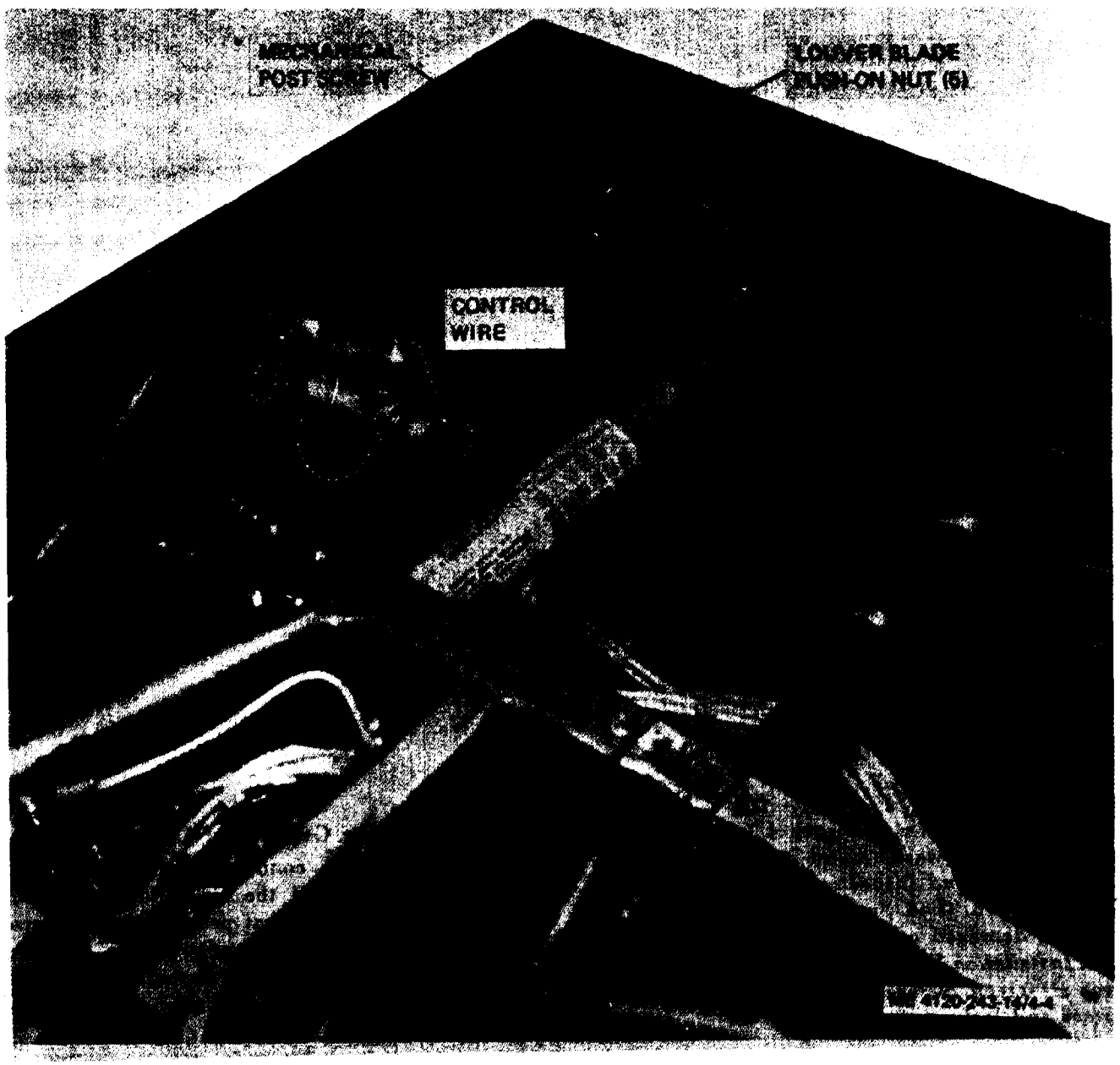


Figure 4-4. Louver blade push-on nuts and louver control attachment.

e. Condenser Louver Control Adjustment. To adjust the louver control with refrigerant in the system proceed as follows:

(1) Turn off air conditioner and wait four hours or until air conditioner is uniformly at ambient temperature.

(2) Remove rear cover as described in paragraph 4-21.

(3) Loosen mechanical post screw (fig. 4-4). Close condenser louvers, pull wire tight and tighten mechanical post screw. Louvers must be tightly closed when air conditioner is off.

4-21. Housing Covers

a. General. The top of the housing is enclosed by front, center and rear covers. The rear cover has an access opening over the charging valves. This opening is covered by an access cover during normal operation. A canvas cover, mounted on the rear cover, is used to cover the condenser and fresh air openings when the air conditioner is not in use.

b. Removal.

(1) To remove front cover, remove 12 screws (fig. 4-5) and remove front cover.

(2) To remove access cover (fig. 4-5), remove four screws and cover.

(3) To remove rear cover (fig. 4-5) remove four screws and lock washers and remove condenser cover. Remove eight screws and rear cover.

(4) The front and rear covers must be removed before removing the center cover (fig. 4-5). Remove six screws. Remove two screws securing thermostatic switch bracket to cover.

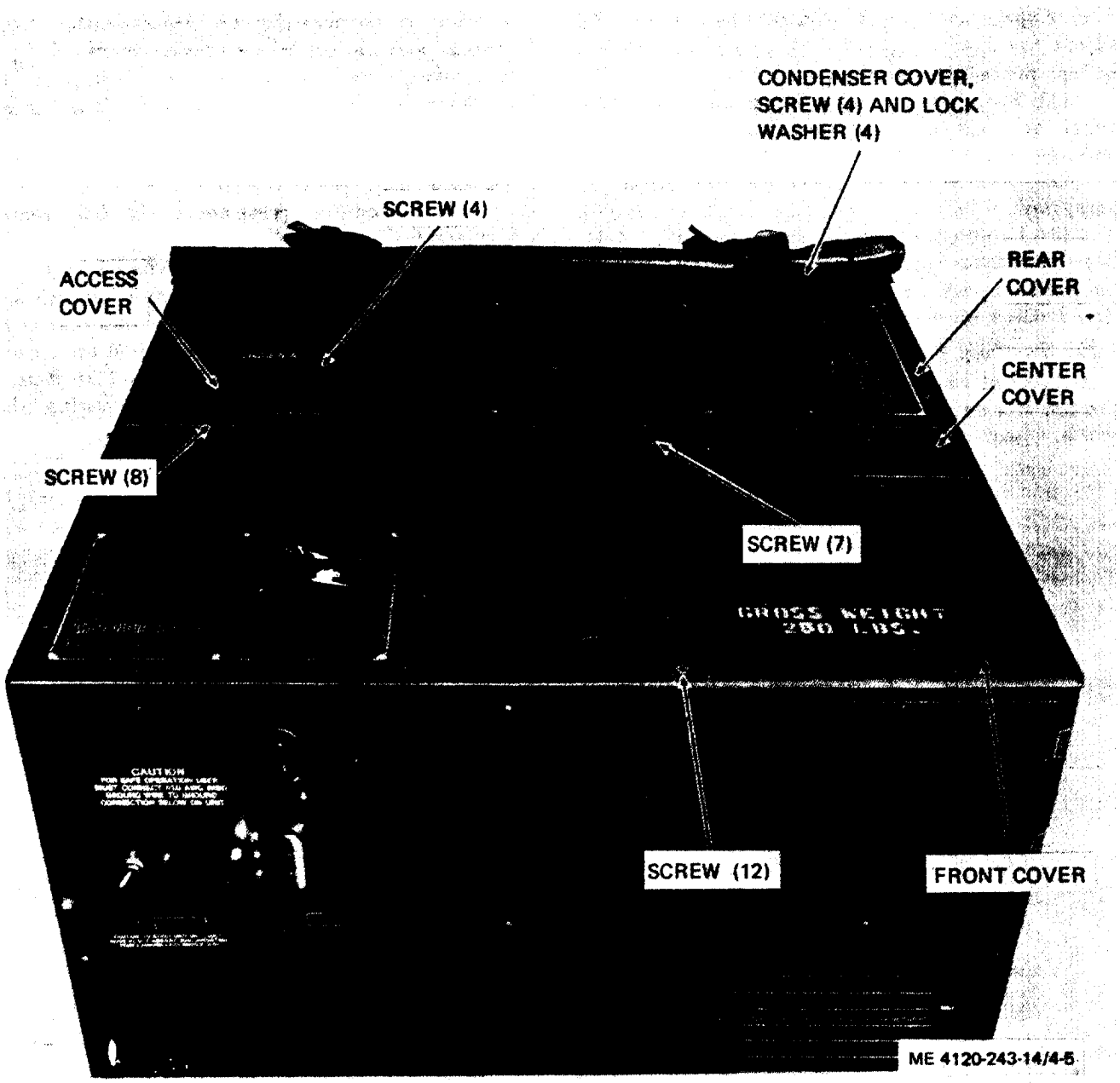


Figure 4-5. Housing Covers.

c. Cleaning, Inspection and Repair. Clean, inspect and repair covers as follows:

(1) Brush off any loose dirt or foreign matter from gaskets and insulation. Wipe off tops of metal parts with a cloth dipped in cleaning solvent (Fed. Spec. P-D-680). Wash dirt from condenser cover.

(2) Inspect metal covers for distortion and damaged or loose gaskets and insulation. Inspect canvas cover for torn condition and for damaged fasteners.

(3) Straighten a bent metal cover, cement or replace loose or damaged gaskets and insulation. Replace cover if it will not form a satisfactory seal after repair.

(4) Repair torn areas of condenser cover. Replace cover if damage is extensive.

d. Installation. Refer to figure 4-5 and install covers as follows:

(1) Install thermostatic switch bracket on center cover and secure with two screws. Install center cover and seven screws.

(2) Install rear cover and eight screws. Install condenser cover and four screws 'and lock washers.

(3) Install access cover and four screws.

(4) Install front cover and 12 screws.

Section VIII. CONDENSER COIL, EVAPORATOR COIL, AND DRAINS

4-22. General

The condenser coil (fig. 1-3) and evaporator coil require periodic cleaning to insure full air flow through the coils and maximum heat transfer during operation. The evaporator drain tubes (fig. 4-6), located under the evaporator coil in the evaporator fan compartment, are connected to a drain tube in the housing. The housing drain tube terminates in the drain openings at the rear of the housing. Drain tubes must be open to prevent buildup of condensate under the evaporator coil.

4-23. Servicing Condenser Coil

a. Refer to paragraph 4-21 and remove rear cover and condenser cover.

b. Clean the surface of the condenser coil with a soft bristle brush. Blow dirt out from between the fins with compressed air. Hold nozzle of air hose at least 6 to 8 inches away from coil to avoid dam aging the fins.

Warning: **Do not use steam to clean coils.**

c. During cleaning inspect coil for leaks or damaged fins. If leaks or damage are evident, report condition to direct support maintenance.

d. Refer to paragraph 4-21 and install rear cover and condenser cover.

4-24. Servicing Evaporator Coil

a. Refer to paragraph 4-18 and remove evaporator outlet louvers. Refer to paragraph 4-21 and remove front cover.

b. Clean the surface of the evaporator coil with a soft bristle brush. Blow dirt out from between the fins with compressed air. Hold nozzle of air hose at least 6 to 8 inches away from coil to avoid damaging the fins.

Warning: Do not use steam to clean coils.

c. During cleaning inspect coil for leaks or dam aged fins. lf leaks or damage are evident, report condition to direct support maintenance.

d. Refer to paragraph 4-18 and install outlet louvers. Refer to paragraph 4-21 and install front cover.

4-25. Evaporator Drain Tubing

a. Removal. Refer to figure 4-6 and remove six hose clamps, tee, and three pieces of flexible tubing.

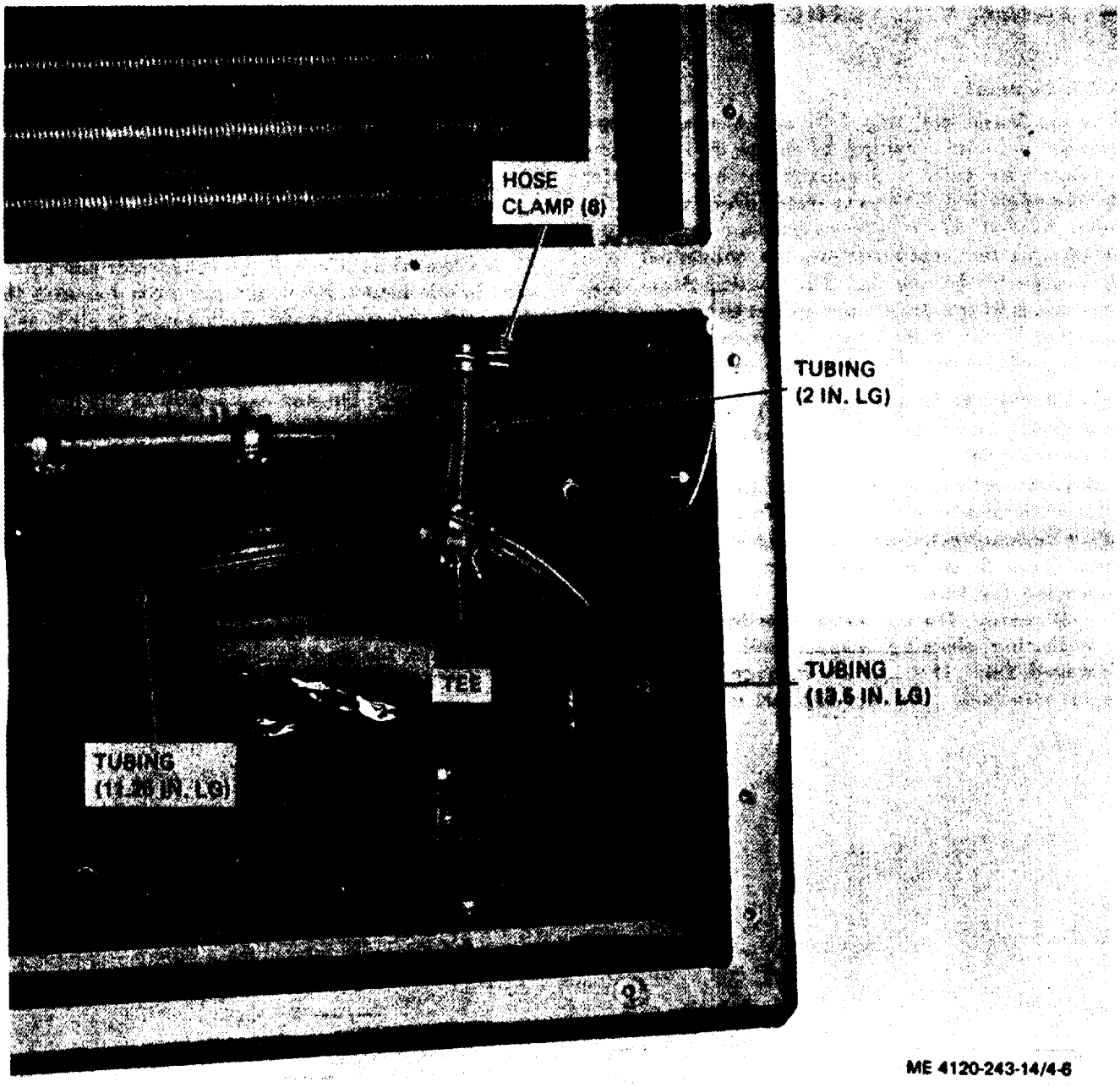


Figure 4-6. Evaporator drain tubing.

b. Cleaning and Inspection. Clean and inspect drain tubing as follows:

(1) Flush out tubing and clean out any accumulation of dirt or other foreign matter from tee. Use a small diameter brush or a piece of soft wire to clean drain tube in housing.

(2) Inspect tubing for split or deteriorated condition. Inspect tee for cracks. Replace defective parts.

c. Installation. Refer to figure 4-6 and install drain tubing as follows:

(1) Connect each piece of tubing to tee with hose clamps.

(2) Connect tubing to drain connections with hose clamps.

Section IX. FRESH AIR VENT DAMPER AND CONTROL

4-26. General

The vent damper opens and closes the fresh air inlet passage. It is opened and closed by a push-pull type control attached to the damper and to air actuator (fig. 2-3). This unit was designed for use with CBR.

4-27. Adjustment

a. The wire core of the push-pull control is attached to the actuator (fig. 4-7) and to the rod on top of the vent damper (fig. 4-8) by a mechanical post. To change the adjustment at either end, loosen the screw on the mechanical post, set the actuator or damper rod and tighten the screw.

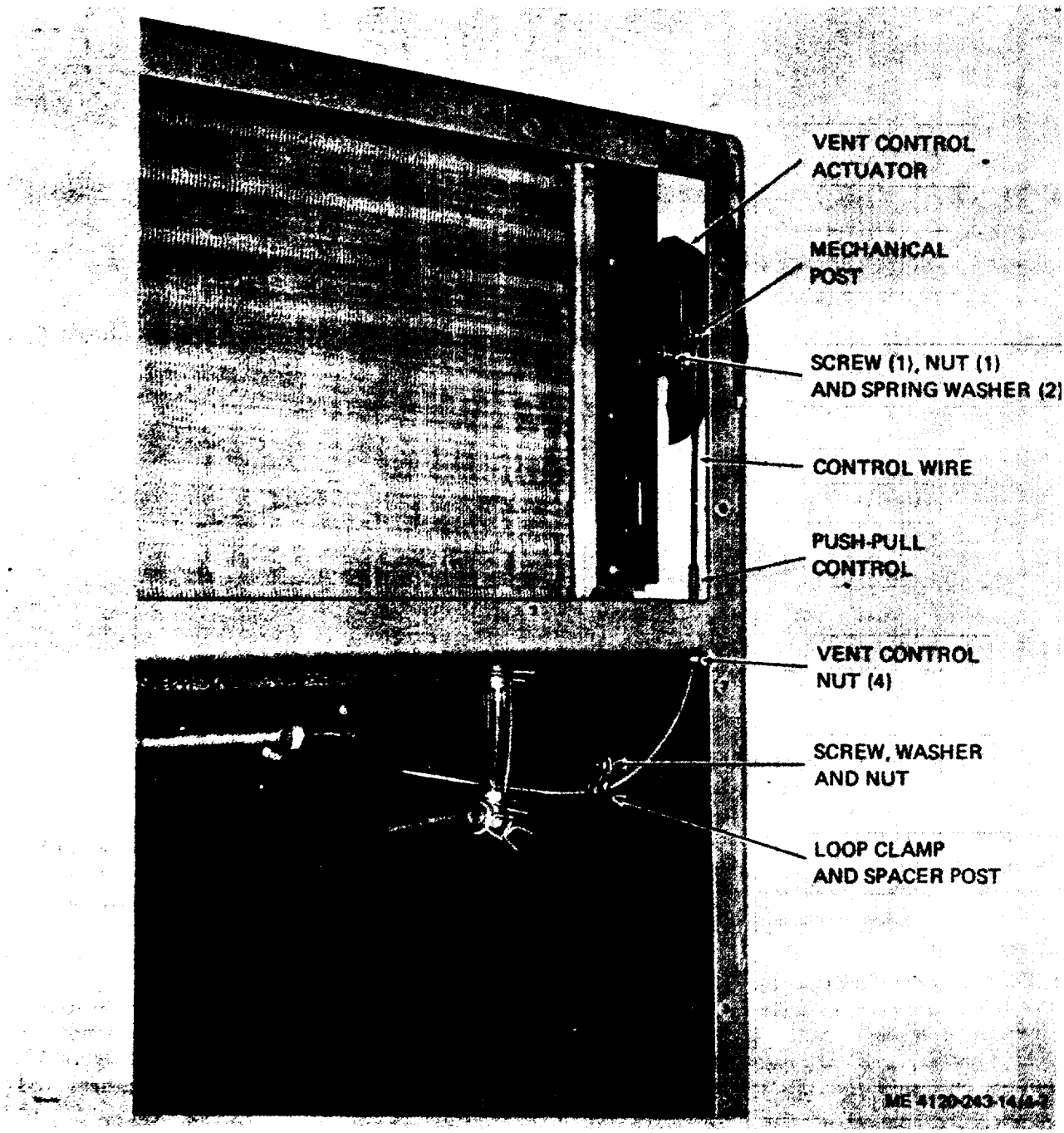


Figure 4-7. Vent damper control.

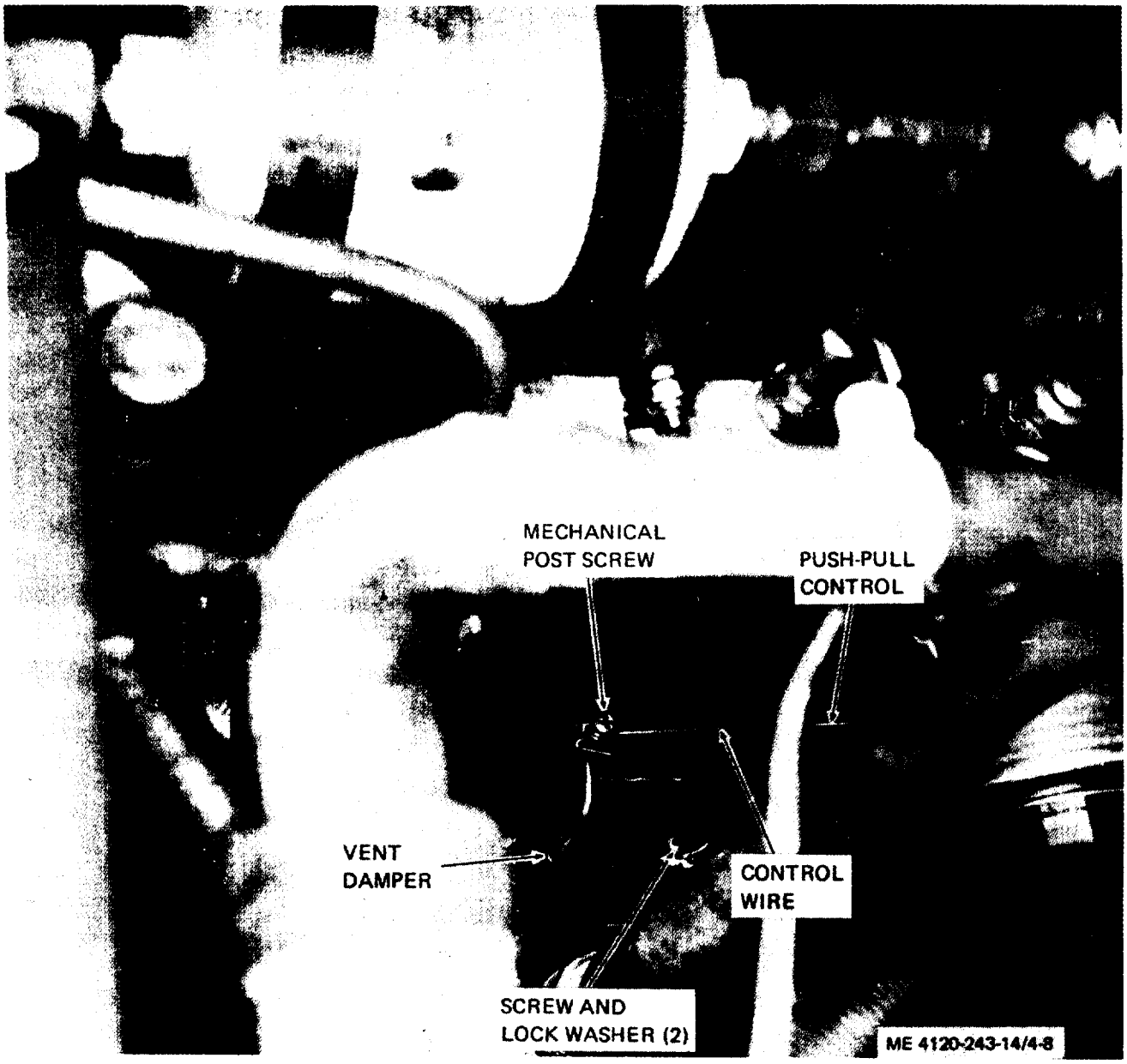


Figure 4-8. Vent damper.

b. The control should be adjusted for the center position between open and closed. The actuator should then be in the centered position and the rod on top of the dam per should be parallel with front of the housing.

c. Check operation. The control should move smoothly between the open and closed position.

4-28. Removal.

a. *Vent Damper.* Refer to paragraph 4-21 and remove the housing covers. Refer to figure 4-8 and remove vent damper as follows:

(1) Loosen screw on mechanical post and disconnect push-pull control.

(2) Remove two screws and lock washers and lift vent damper from air conditioner.

b. Push-Pull Control. Refer to paragraph 4-18 and remove evaporator louvers. Refer to figures 4-7 and 4-8 and remove push-pull control as follows:

(1) Remove screw, washer, nut, spacer and loop clam p.

(2) Loosen screw on mechanical post to free end of control wire core.

(3) Remove outer nuts from both ends of control outer casing and remove push-pull control.

c. *Vent Control Actuator.* Refer to figure 4-7 and remove screw, nut, two spring washers and actuator.

4-29. Cleaning, Inspection and Repair

Clean, inspect and repair vent damper and control as follows:

a. Wipe off all loose dirt with a dry cloth.

b. Inspect push-pull control for smooth operation of core in casing. Inspect vent damper for bent or broken condition. Replace defective parts. Inspect for loose or damage rubber seal or damper. Cement loose rubber or replace rubber if damaged. Inspect actuator for bent condition. Straighten actuator or replace as required.

4-30. Installation

a. Vent Control Actuator. Refer to figure 4-7 and install actuator, screw, two spring washers and nut.

b. Vent Damper. Refer to figure 4-8 and install vent damper in opening in housing. Secure vent dam per cover to housing with two screws and lock washers.

c. Push-Pull Control. Refer to figures 4-7 and 4-8 and install control as follows:

(1) With one nut on each end of outer casing of push-pull control, install ends of control through opening in housing. Install outer nuts and insert ends of wire core into mechanical posts of damper and actuator. Tighten outer nuts on casing.

(2) Install clamp, spacer, screw, nut and washer.

(3) Refer to paragraph 4-27 and adjust the control.

(4) Refer to paragraph 4-21 and install housing covers.

(5) Refer to paragraph 4-18 and install evaporator inlet and outlet louvers.

Section X. ELECTRICAL SYSTEM

4-31. General

The electrical system consists of the evaporator and condenser fan motors, electric heaters and heater thermostatic switch, junction box, control module, transformer, rectifier, condenser fan motor, high-low speed thermostatic switch and connecting harnesses and wiring. Single phase air conditioners are equipped with motor capacitors and a compressor-start relay. Three phase air conditioners are equipped with phase sequence relays. Electrical assemblies and groups of associated components are covered in separate sections.

Warning: **Disconnect air conditioner power supply before performing maintenance work on electrical system.**

4-32. Testing and Inspecting the Electrical System

Troubleshooting procedures for testing the electrical system to isolate cause of trouble are covered in paragraph 4-12. Additional detailed test inform at ion is contained in specific paragraphs covering the electrical components. Use a continuity tester or multimeter set on low ohms range to test for continuity. Use an insulation tester or multimeter set on high ohm range to test for shorts between the circuit in a component and the outside case of the component. When testing air electrical component, check also for visual damage and inspect all wiring in the area for damage or loose connections.

4-33. Wiring Harnesses and Leads

a. General. The electrical circuits in the air conditioner are completed by individual wire leads or by wire leads laced or enclosed in a loom to form a wiring harness. All of the wiring carries code numbers. When testing, repairing, or replacing the wiring harness or individual wires, refer to the wiring diagrams.

b. Inspection. Inspect all wiring installations for cracked or frayed insulation material. Pay particular attention to wires passing through holes in the frame or around sharp edges. Repair or replace defective wiring. Inspect electrical connectors and fittings for damage or broken condition. Replace defective connectors and fittings.

c. Testing. Test for continuity in leads or wiring harnesses by disconnecting each end. Where wires terminate in an electrical connector, disconnect connector from corresponding receptacle connector or plug connector. Touch the test probes of a continuity tester or multimeter set on low ohms range to ends of wire or to corresponding pin of connector. If continuity is not indicated, repair or replace wire.

d. Repair. Remove insulation to expose 1/2 inch of bare wire on each side of break. Twist the wire ends together and solder the splice. Cover the splice with rubber or PVC electrical tape and friction tape making certain to cover all the repaired area. Replace broken terminal lugs with exact duplicates. To replace electrical connectors. unsolder wires from solder wells of inserts. Install new connector and insert ends of wires in solder wells. Solder wires in place. Check connections carefully. Refer to wiring diagram.

4-34. Heater Thermostatic Switch

a. General. The heater thermostatic switch, mounted in a bracket under the housing center cover, protects the air conditioner from overheating if the heating element circuit is actuated and the air flow is restricted or stopped.

b. Removal. Remove the switch as follows:

(1) Refer to paragraph 4-21 and remove housing front cover.

(2) Refer to figure 4-9 and remove switch screws and disconnect leads from thermostatic switch.

(3) Remove two screws to remove bracket and switch from center cover.

(4) Remove two screws and lock washers and remove bracket.

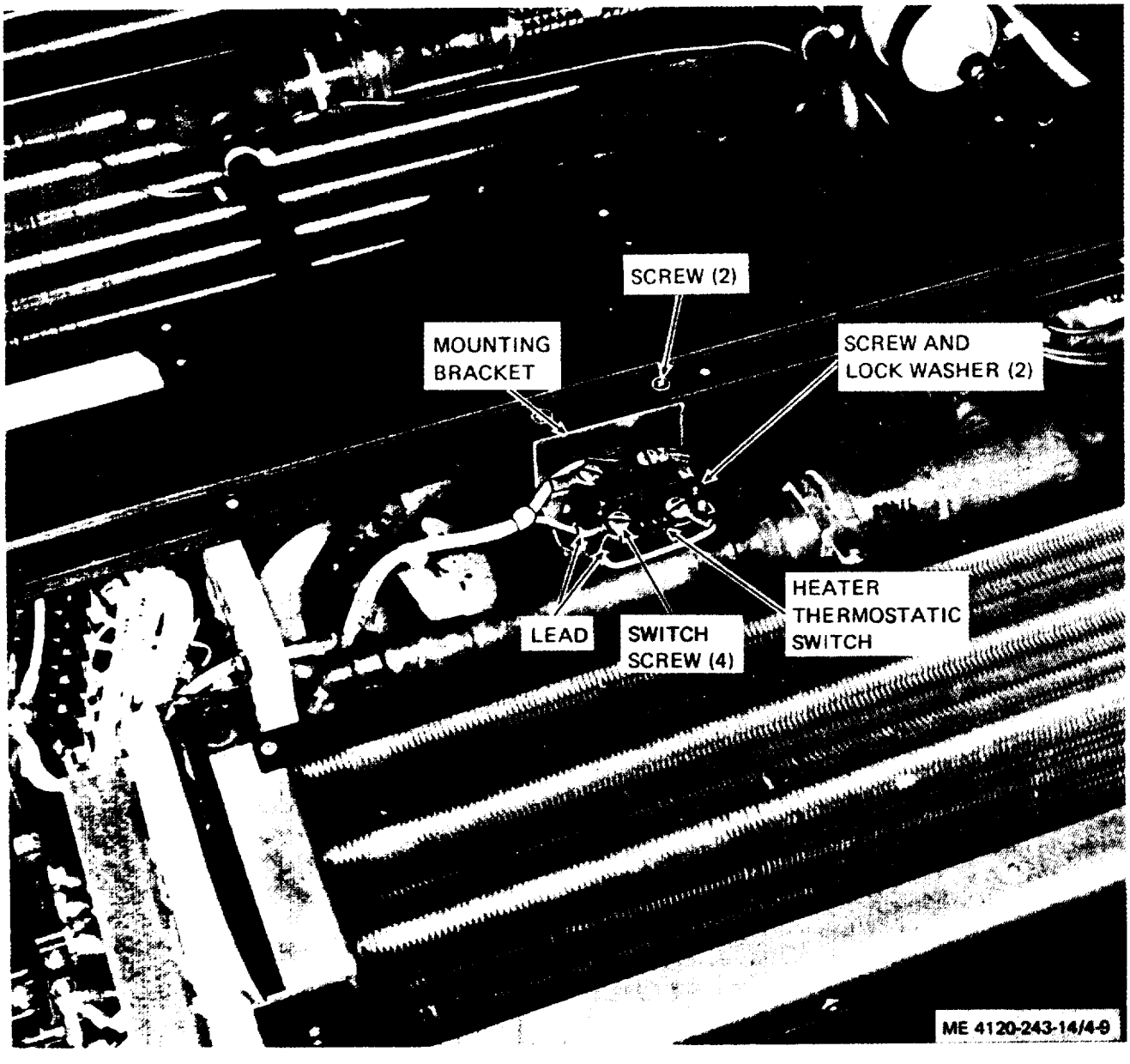


Figure 4-9. Heater thermostatic switch.

c. Cleaning and Inspection. Wipe off any accumulation of dust and test as described below.

(1) Test for continuity between contacts 1 and 2 and also between contacts 3 and 4. Contacts should open on temperature rise at 150°F ± 5°F and close on temperature drop at 110°F ± 10°F.

(2) Replace switch if it fails to meet test requirements.

d. Installation. Refer to figure 4-9 and install heater thermostatic switch.

(1) Attach switch to bracket with two screws and lock washers.

(2) Secure bracket to center cover with two screws.

(3) Refer to wiring diagram and connect leads to switch with switch screws.

(4) Refer to paragraph 4-21 and install housing front cover.

4-35. Heater Element

a. General. The single phase air conditioners are equipped with six 230 volt heater elements and the three phase air conditioners are equipped with six 120 volt heater elements.

b. Removal. Refer to figure 4-10 and remove heater elements as follows:

(1) Refer to paragraph 4-21 and remove housing covers.

(2) Disconnect leads from heaters.

(3) Remove two screws, washers and lock washers that secure heater support to housing. Slide support from ends of heater elements.

(4) Remove heater element nut, lock washer and flat washer from each heater in turn and slide heater from bracket.

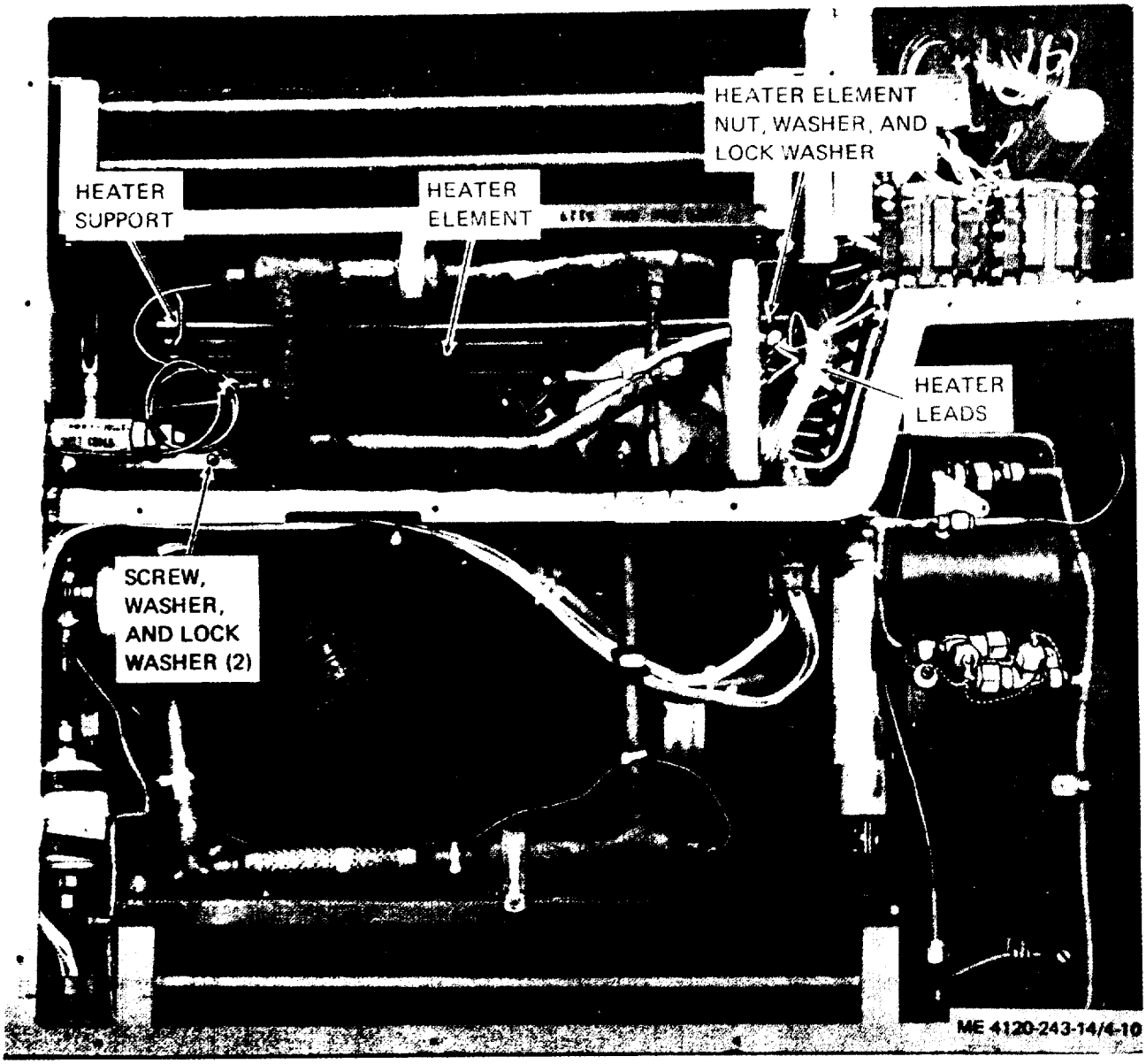


Figure 4-10. Heater elements and support.

c. Cleaning and Inspection. Wipe off all accumulated dirt from heater elements and inspect for visible damage to element or leads. Check each heater element for continuity. Replace defective heaters. Repair damaged leads.

d. Installation. Refer to figure 4-10 and install heater elements as follows:

(1) Insert heaters in bracket and support with an insulating washer between bracket and flange of each heater element.

(2) Install washer, lock washer and nut on each heater element. Secure support with two screws, washers and lock washers.

(3) Refer to wiring diagram and make connections to heaters.

(4) Refer to paragraph 4-21 and install housing covers.

Section XII. FAN MOTORS

4-36. General

The evaporator fan and condenser fan motors are identical. The evaporator fan and motor are mounted on a common base in the lower front compartment of the air conditioner. The condenser fan motor is mounted on a separate base in the rear compartment of the air conditioner.

4-37. On-Equipment Testing

a. Disconnect motor lead electrical connector.

b. Use a multimeter and test for continuity across each combination of two motor terminals. If continuity is not indicated, the windings are open or shorted and the motor should be replaced.

c. Place one multimeter probe against the motor housing and the other against one of the motor terminals. If continuity is indicated the motor is grounded.

d. Replace motor if open or grounded.

Note. Where there are separate circuits through the thermal protectors on high and low speed circuits, check for continuity across terminals in the same circuit. Refer to wiring diagram.

4-38. Removal

a. Evaporator Fan Motor. Refer to figure 4-11 an d remove evaporator fan motor as follows:

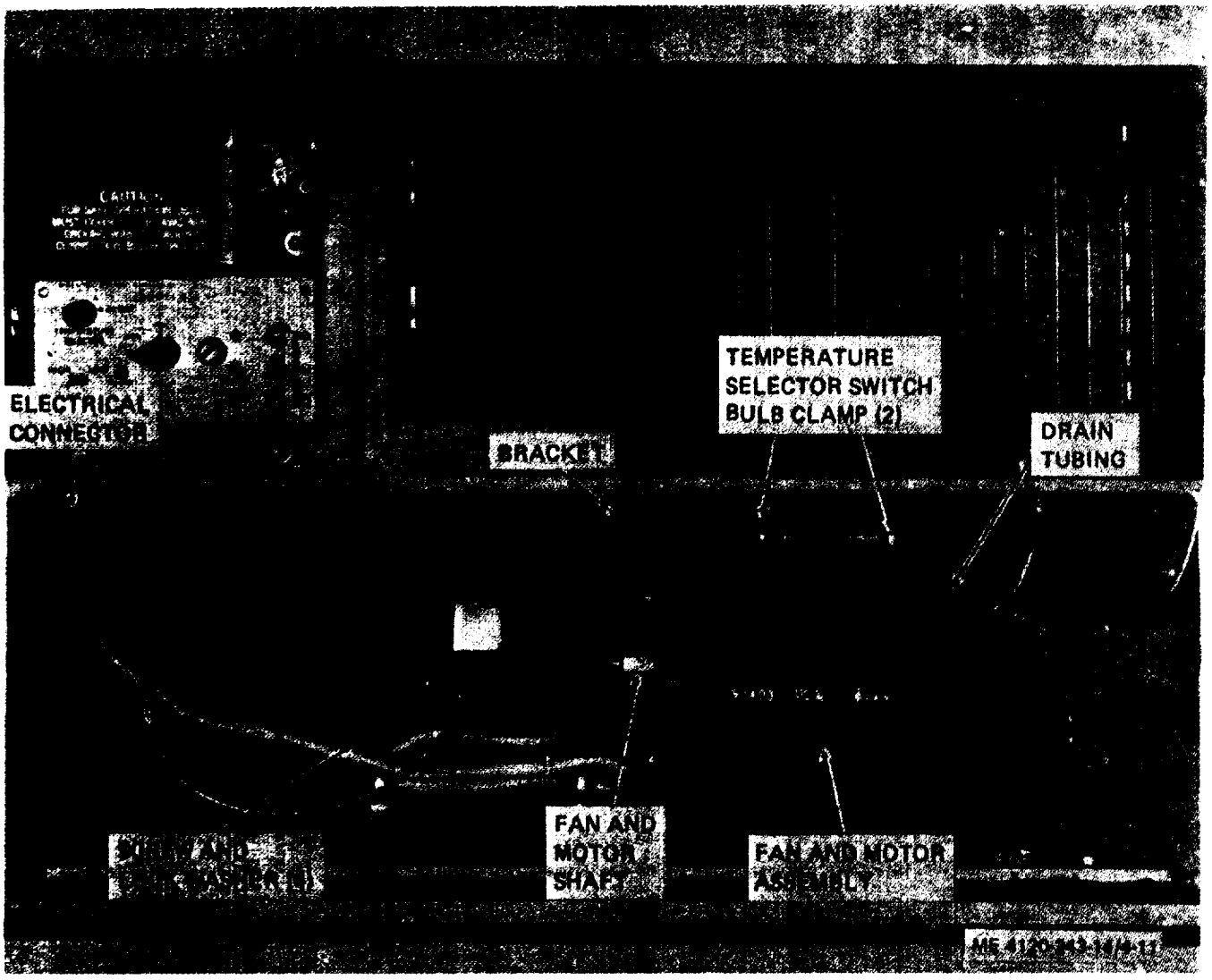


Figure 4-11. Evaporator fan and motor assembly.

(1) Refer to paragraph 4-18 and remove evaporator air inlet louver.

(2) Disconnect motor electrical connector.

(3) Refer to paragraph 4-25 and disconnect evaporator drain tubing.

(4) Remove three brackets above fan to facilitate removal of fan and motor assembly. Remove two screws, lock washers and clamps. Move temperature selector bulb clear of fan.

(5) Remove four screws and lock washers securing fan and motor base to resilient mounts and remove fan and motor assembly.

(6) To remove motor from the assembly, remove four cap screws and lock washers from underside of base. Loosen setscrew in fan and motor shaft and remove motor.

b. Condenser Fan Motor. Remove condenser fan motor as follows:

(1) Refer to paragraph 4-21 and remove housing covers.

(2) Refer to figure 4-12 and remove four screws and flat washers that secure motor mounting plate to housing.

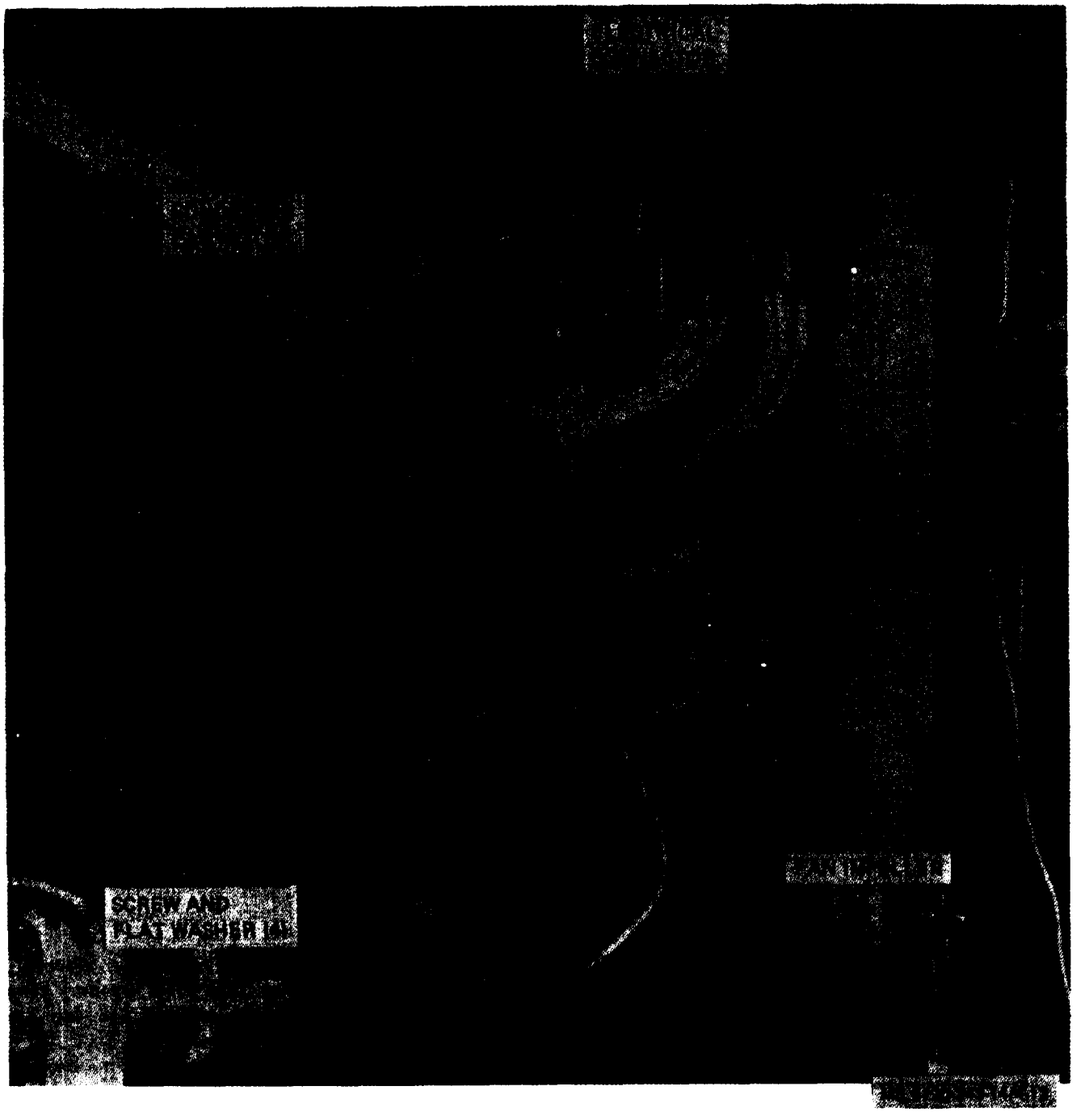


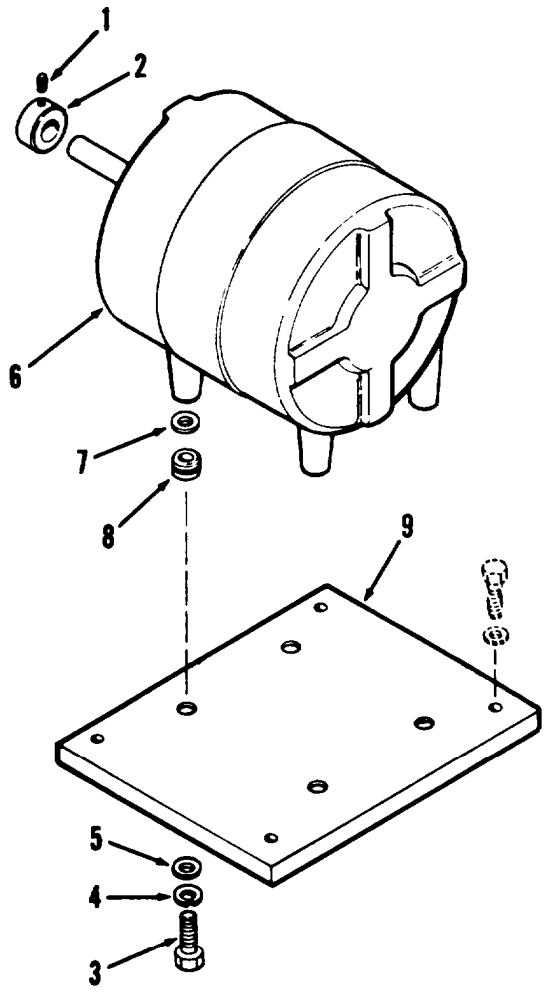
Figure 4-12. Condenser fan and motor.

(3) Disconnect motor lead electrical connector. Remove wire ties as required.

(4) Loosen setscrew in hub of fan impeller and remove impeller from shaft of motor.

(5) Remove motor and mounting plate from air conditioner.

(6) Refer to figure 4-13 and remove setscrew (1) and collar (2) from motor shaft. Remove four cap screws (3), lockwasher (4) and flat washer (5). Remove motor (6) and four flat washers (7) from mounting plate (9). Remove bushing (8) from plate only if they require replacement.



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1. Setscrew, 1/4-28 x 1/4
2. Collar
3. Screw, cap, hex-hd, 1/4—28 x 1
4. Washer, lock, spr, 1/4 in.
5. Washer, flat, 5/8 OD
6. Motor
7. Washer, flat, 5/8 OD
8. Bushing
9. Mounting plate

Figure 4-13. Condenser fan motor and mounting plate, exploded view.

4-39. Fan Motor Thermal Protector Replacement

a. General. Organizational repair of motors is limited to testing and replacement of defective thermal protectors. Thermal protectors for single phase motors are imbedded in motor windings and cannot be removed for repair. Instructions contained in this paragraph cover replacement of three phase motor thermal protectors.

b. Removal. Refer to figure 4-14 and partially remove thermal protector housing from motor by removing two screws and washers. Tag and disconnect electrical leads. Remove thermal protector. Remove other protector in the same manner.

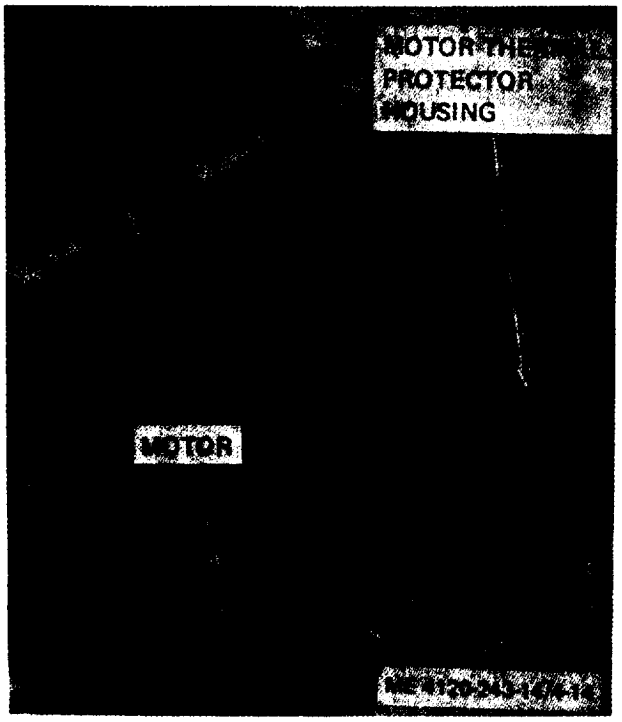


Figure 4-14. Motor thermal protector housing.

c. Testing. Check for continuity between terminals. Replace protector if open.

d. Installation. Install thermal protector in housing and connect leads. Install thermal protector housing on motor and secure with screws and washers previously removed.

4-40. Installation

a. Evaporator Fan Motor. Install evaporator fan motor as follows:

(1) Set motor on fan and motor base with motor shaft in fan and motor shaft (fig. 4-11). Install four cap screws and lock washers through underside of base to secure motor. Tighten setscrew in fan and motor shaft.

(2) Install fan and motor assembly on resilient mounts and install four screws and lock washers (fig. 4-11).

(3) Install brackets above fan. Install temperature selector switch bulb in clamps. Secure clamps to fan with screws and lock washers.

(4) Refer to paragraph 4-25 and install evaporator drain piping.

(5) Connect motor electrical connector.

(6) Refer to paragraph 4-18 and install evaporator air inlet louver.

b. Condenser Fan Motor. Assemble motor on mounting plate and install motor and mounting plate as follows:

(1) Refer to figure 4-13 and install bushings (8) in mounting plate (9) if they were removed.

(2) Place a washer (7) over each bushing and set motor (6) on washers. Install four screws (3), washers (5), and lock washers (4). Install collar (2) on motor shaft and install setscrew (1).

(3) Install plate and motor in air conditioner and slide fan impeller (fig. 4-12) on motor shaft. Install four screws and flat washers.

(4) Connect motor electrical connector.

(5) Refer to paragraph 4-21 and install housing covers.

Section XIII. FAN MOTOR SWITCHES AND CAPACITORS

4-41. Fan Motor Speed Control Switches

a. General. The evaporator fan motor speed control switch is a toggle switch which is part of the control module. Replacement instructions for this switch are included with the control module. The condenser fan motor speed control thermostatic switch, located on the rear wall of the housing, automatically controls the fan motor speed. The switch is normally open and closes on temperature rise between 95° F and 105° F. When the switch contacts close, the condenser fan relay coil is energized and the relay shifts the fan motor circuit from low-speed to high-speed.

b. Testing. Test the switch and connector assembly in the air conditioner as follows:

(1) Refer to paragraph 4-21 and remove rear top cover.

(2) Disconnect electrical connector located just below condenser motor electrical connector (fig. 4-12).

(3) Check for continuity between terminals of connector. There should be no continuity between terminals when temperature is below 95° F. If a source of heated air is available, check for closing of contacts and continuity between terminals at 95° F to 105° F.

(4) If switch and connector assembly do not meet requirements, check wiring and repair damaged wiring or replace switch.

c. *Removal.* With top cover removed and electrical connector disconnected, proceed as follows :

(1) Refer to figure 4-15 and remove two screws and lock washers. Remove switch and connector assembly.

(2) Disconnect switch leads from connector.

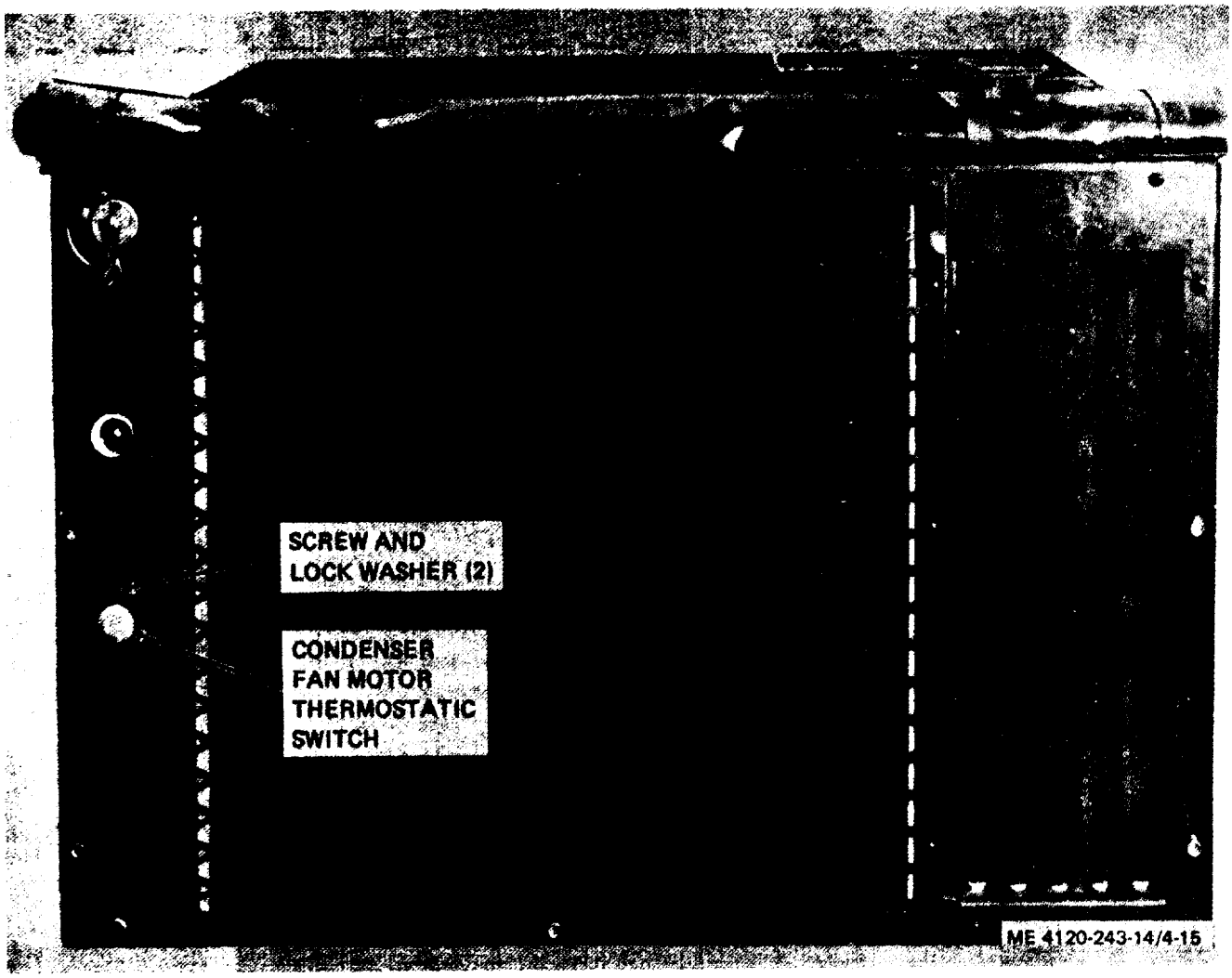


Figure 4-15. *Condenser fan motor thermostatic switch.*

d. Installation. Install the condenser fan thermostatic switch as follows:

(1) Connect switch leads to connector.

(2) Refer to figure 4-15 and install switch in opening. Secure switch with two screws and lock washers.

(3) Connect electrical connector.

(4) Refer to paragraph 4-21 and install rear top cover.

4-42. Fan Motor Capacitors

a. General. Single phase air conditioners are quipped with fan motor run capacitors which are located in the evaporator air inlet compartment.

b. Removal. Remove fan motor capacitors as follows:

(1) Refer to paragraph 4-18 and remove the evaporator air inlet louver.

(2) Refer to figure 4-16 and disconnect capacitor leads.

(3) Remove two screws, lock washers and straps from each capacitor. Remove capacitors from air conditioner.

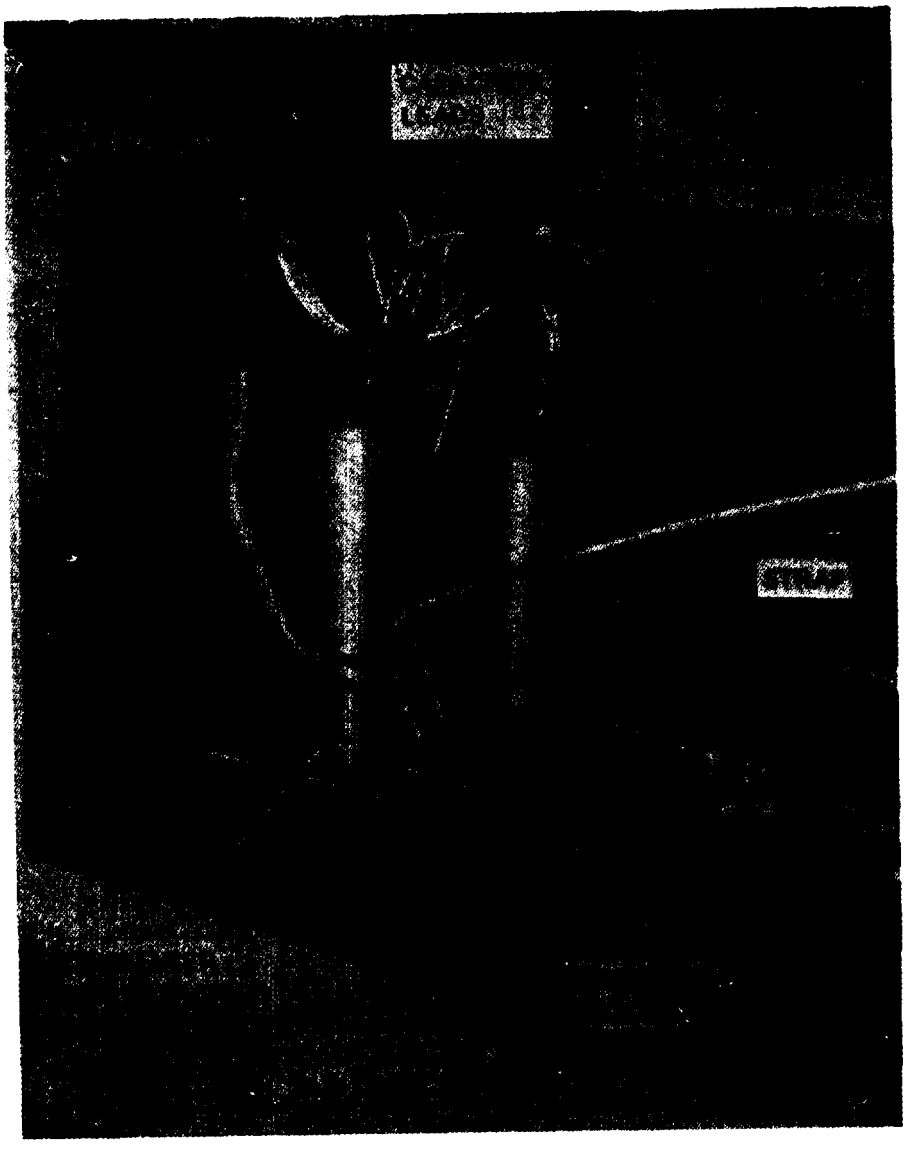


Figure 4-16. Fan motor capacitors.

c. Installation. Install capacitors as follows:

(1) Refer to figure 4-16 and install capacitors, straps, screws and lock washers.

(2) Connect capacitor leads.

(3) Refer to paragraph 4-18 and install evaporator air inlet louvers.

Section XIV. CONTROL MODULE

4-43. General

The control module is located in a compartment in the junction box. All electrical connections to the control module are through plug-in type connectors permitting easy removal of the module as a unit. The control module contains the compressor circuit breaker, temperature selector switch, mode selector rotary switch, and the evaporator fan speed toggle switch.

Warning: **Disconnect air conditioner power supply before removing control module.**

4-44. Removal

a. Refer to paragraph 4-18 and remove evaporator air inlet louver.

b. Refer to paragraph 4-17 and disengage temperature selector switch bulb from clamps by loosening clamp screws.

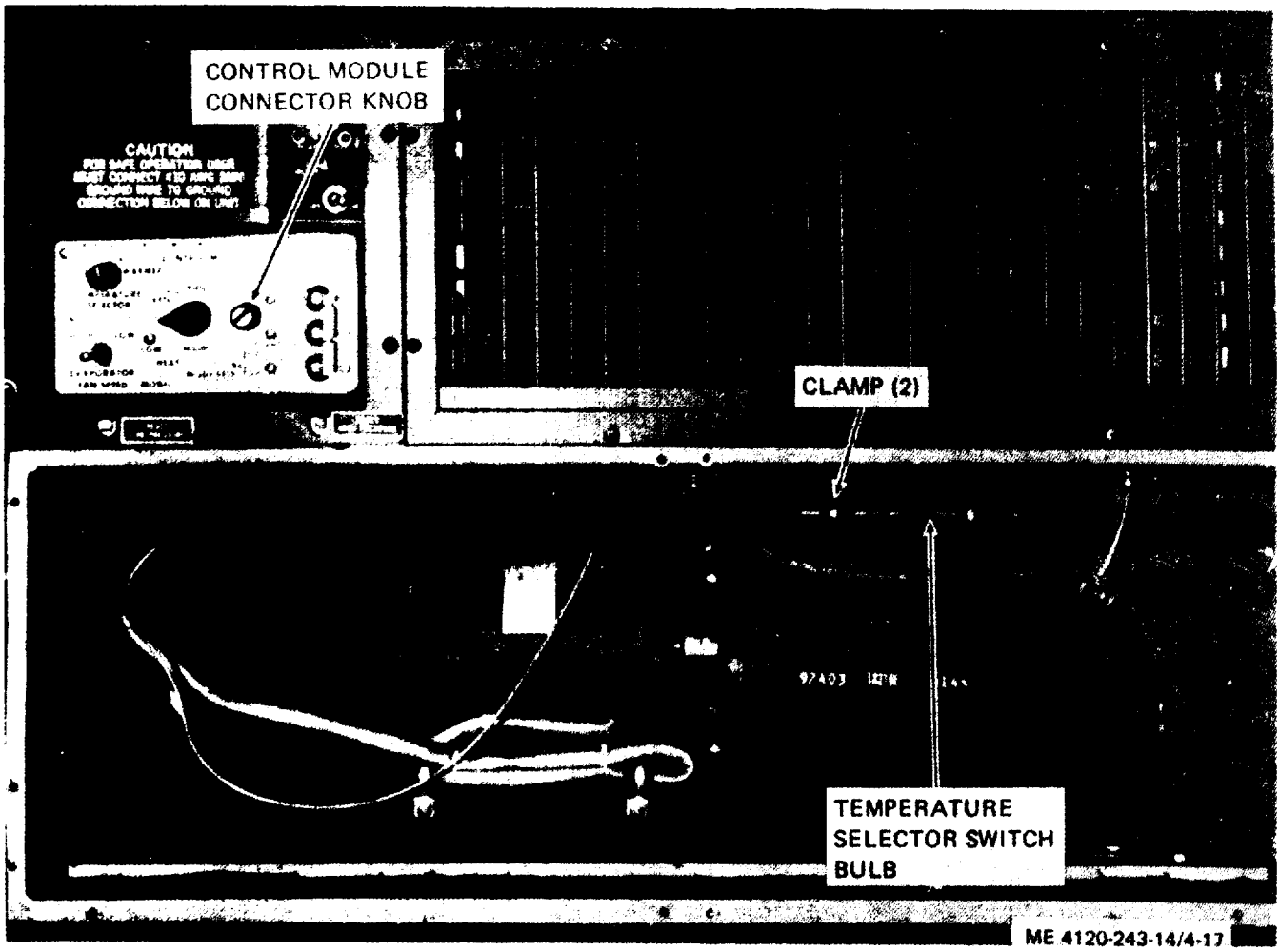


Figure 4-17. Control module connector knob and bulb mounting.

c. Turn connector knob (fig. 4-17) counterclockwise until screw is disengaged and pull control module from junction box. Carefully pull temperature selector switch bulb through slot in bottom of junction box.

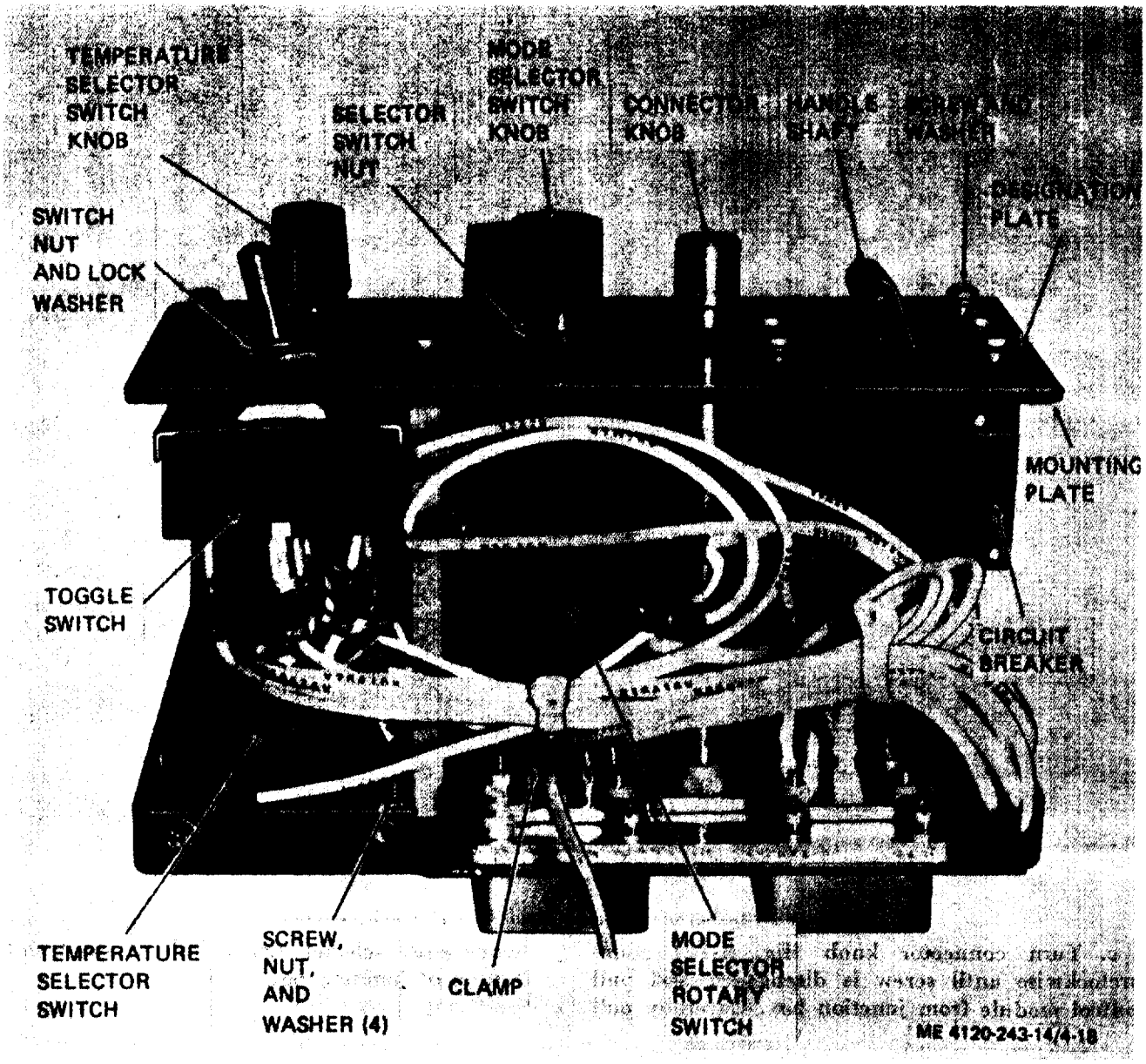


Figure 4-18. Control module less cover.

4-45. Testing

a. General. Remove four screws securing cover to frame. Remove capillary tube grommet and slide cover from module. Pull capillary tube bulb through hole in cover. To test individual components, mark and disconnect leads, and check for continuity. Refer to schematic diagram as a guide and refer to the following additional instructions.

b. Circuit Breaker. Check for continuity between corresponding terminals in closed position. Check for proper functioning in open position. Replace defective circuit breaker.

c. Evaporator Fan Toggle Switch. Check for continuity in both positions. Replace defective switch.

d. Temperature Selector Switch. Check for continuity between common terminal 1 and blue terminal 2 (blue). Switch should close on temperature drop below setting. Turn switch knob to full "COOLER" position. Switch should be open. Turn switch knob toward warmer. Switch should close as setting becomes higher than bulb temperature. Replace defective switch.

e. Mode Selector Rotary Switch. Refer to wiring diagram chart showing connections made by switch in various switch positions. Check for continuity. Replace defective switch.

4-46. Disassembly

a. General. Disassembly is limited to replacement of individual controls. Remove control module cover and mark and disconnect leads of control to be replaced.

b. Circuit Breaker. Refer to figure 4-18 and remove handle shaft and spacers. Remove screws and washers that secure circuit breaker to mounting plate and designation plate and remove circuit breaker. Single phase breakers are attached with four screws and washers and three phase breakers are attached with six screws and washers.

c. Evaporator Fan Toggle Switch. Refer to figure 4-18 and remove the switch nut and lock washer. Remove toggle switch.

d. Temperature Selector Switch. Refer to figure 4-18 and remove nut and capillary tube clamp. Remove four screws, nuts, and washers. Remove switch knob and temperature selector switch.

e. Mode Selector Rotary Switch. Refer to figure 4-18, loosen setscrew in knob, and remove knob. Remove switch nut and switch.

4-47. Assembly

a. General. Refer to figure 4-18 and install any components that were removed. Complete the assembly as described in f below.

b. Circuit Breaker. Install circuit breaker, screws and washers. Assemble handle spacers and shaft.

c. Evaporator Four Toggle Switch. Install toggle switch and secure to mounting plate with switch nut and lock washer.

d. Temperature Selector Switch. Install switch and secure with four screws, washers and nuts. Install switch knob. Install clamp on capillary tube and secure clamp with nut.

e. Mode Selector Rotary Switch. Install switch and secure with switch nut. Install knob and tighten setscrew.

f. Control Module. After components have been installed, make all necessary electrical connections. Insert a capillary tube bulb through opening in cover. Install cover and mounting screws. Install capillary tube grommet.

4-48. Installation

a. Install temperature selector switch bulb and tube through slot in junction box. Install bulb in clamps (fig. 4-17) and tighten screws.

b. Install control module into junction box and turn connector knob clockwise until screw is tight.

c. Refer to paragraph 4-18 and install evaporator air inlet louver.

Section XV. JUNCTION BOX

4-49. General

The junction box (fig. 1-1) contains the time relay delay, control circuit breaker, condenser fan relay, heater relay, and compressor motor relay. Three phase junction boxes also contain the phase sequence relay.

4-50. Removal

a. Refer to paragraph 4-21 and remove front top cover. Refer to paragraph 4-44 and remove control module.

b. Remove seven screws and lock washers securing junction box to housing. Partially remove the junction box by pulling the box forward and out of the air conditioner. See figure 4-19. Support the junction box to relieve strain on wiring.

c. To completely remove the junction box it is necessary to disconnect all the electrical leads and connectors.

Figure 4-19. Junction box, partially removed.

4-51. Testing

Refer to schematic wiring diagram and test components for continuity after disconnecting leads. Check coils of armature relays for continuity then actuate the coil with a 24 volt dc source and check across contacts that should be closed according to the schematic wiring diagram. Check circuit breaker in open and closed position.

4-52. Disassembly

a. *General.* Disassembly is limited to replacement of individual components. Tag and disconnect leads from component to be removed.

b. Heater and Compressor Motor Relays. To remove the heater and compressor motor relays refer to figure 4-20 and remove relays as follows:

(1) Remove four screws (1), nuts (2), and washers (3). Remove compressor motor relay (4).

(2) Follow same procedure to remove heater relay (5).

c. *Condenser Fan* Relay. Refer to figure 4-20 and remove relay as follows:

(1) Remove two screws (6) from side of junction box. Remove relay and bracket from junction box.

(2) Remove three nuts (7) and flat washers (8) to separate bracket (9) from condenser fan relay (10).

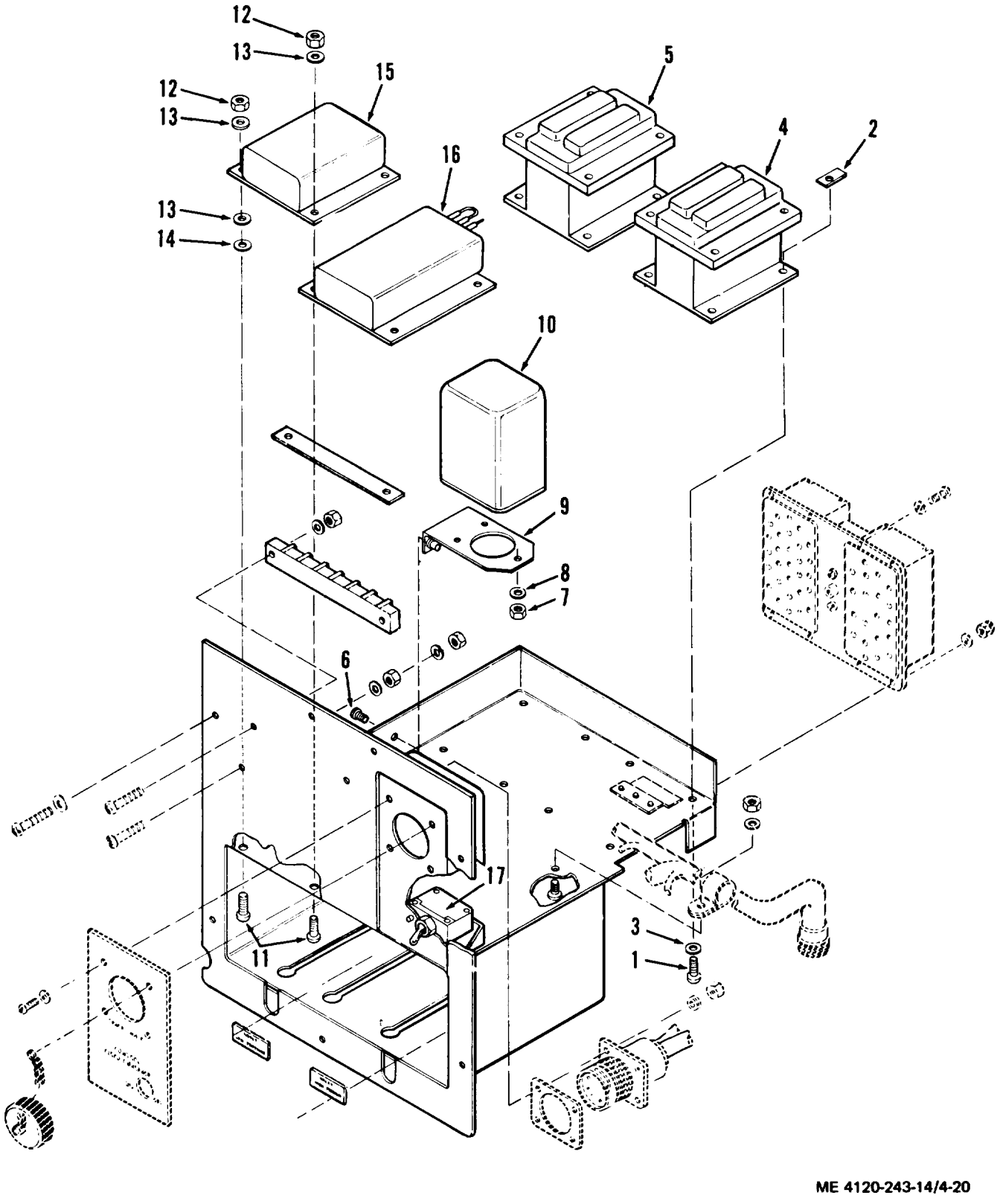


Figure 4-20. Junction box components, exploded view.

KEY to fig. 4-20:
1. Screw, pan-hd, 10-32 x 5/8
2. Nut, hex, slflkg, 10-32
3. Washer, flat, no. 10
4. Compressor motor relay
5. Heater relay
6. Screw, fl-hd, 8-32 x 1/2
7. Nut, hex, slflkg, 6-32
8. Washer, flat, no. 6 (.156 ID)
9. Bracket
10. Condenser, fan relay
11. Screw, fl-hd, 6-32 x 1/2
12. Nut, hex, slflkg, 6-32
13. Washer, flat, no. 6 (.156 ID)
14. Washer, flat, no. 6 (.149 ID)
15. Phase sequence relay
16. Time delay relay.
17. Circuit breaker

d. Phase Sequence Relay. To remove the phase sequence relay from three phase units, refer to figure 4-20 and remove relay as follows:

(1) Remove four screws (11), nuts (12) and washers (13).

(2) Remove relay (15) and two each of washers (13 and 14).

e. Time Delay Relay. To remove the time delay relay, refer to figure 4-20 and remove relay as follows :

(1) To remove time delay relay (16) from three phase units, remove the phase sequence relay then remove two remaining screws (11), nut (12), and flat washers (13).

(2) To remove time delay relay (18) from single phase units, remove four screws (11), nuts (12), and flat washers (13).

f. Control Circuit Breaker. To remove the control circuit breaker (17, fig. 4-20), remove circuit breaker nut from front of junction box and pull breaker to the rear of the junction box.

4-53. Assembly

a. General. Refer to figure 4-20 and install any components that were removed. After installation of components, make all the necessary electrical connections.

b. Control Circuit Breaker. Install control circuit breaker (17) through opening in junction box with locating projection in opening provided. Install breaker nut.

c. Time Delay Relay. Install time delay relay (16) on junction box. Secure relay to single phase junction box with four screws (11), nuts (12), and washers (13). For three phase junction boxes, omit the two inner sets of hardware.

d. Phase Sequence Relay. To install the phase sequence relay on three phase junction box proceed as follows:

(1) Place a flat washer (14) and flat washer (13) over outer mounting holes of phase sequence relay.

(2) Install phase sequence relay (15) on washers and mounting flange of time delay relay. Install four screws (11) flat washers (13) and nuts (12).

e. Condenser Fan Relay. Install condenser fan relay (10) on bracket (9) and secure relay with three nuts (7) and flat washers (8). Install bracket on junction box and install screws (6), nuts (7) and washers (8).

f. Heater and Compressor Motor Relays. Install heater relay (5) or compressor motor relay (4) and secure relay with four screws (1), nuts (2) and flat washers (3).

4-54. Installation

a. Making any electrical connections that were disconnected during removal.

b. Carefully install junction box into housing and install seven screws and lock washers.

c. Refer to paragraph 4-48 and install control module.

d. Refer to paragraph 4-21 and install top front cover.

Section XVI. TRANSFORMER, RECTIFIER, AND PRESSURE SWITCHES

4-55. General

The power transformer rectifier, reduces the power voltage and converts the alternating current to direct current to operate the coils and switches in the control circuit. The transformer is rated at a secondary voltage of 30 vac with a primary voltage of 115 vac. The transformer and rectifier are located below the junction box. The high and low pressure cutout switches are also located below the junction box with the reset buttons extending through the front of the housing. The pressure cutout switches are connected in the refrigeration system and are electrically connected in the control system to the compressor motor relay coil. Extreme high or low pressure opens the circuit causing the compressor to stop.

4-56. Transformer

a. Testing. Test transformer as follows:

(1) Refer to paragraph 4-21 and remove top cover. Refer to paragraph 4-50 and partially remove junction box.

(2) Disconnect leads and check for continuity across the primary winding and then across the secondary winding. If either winding is open. replace the transformer.

(3) Check for shorts between one terminal and transformer case and also between one primary terminal and one secondary terminal using an insulation tester, megger or multimeter on high ohms setting. Replace transformer if a short is indicated.

b. Removal. With junction box removed, refer to figure 4-21 and remove four screws and lock washers. Disconnect and remove transformer.

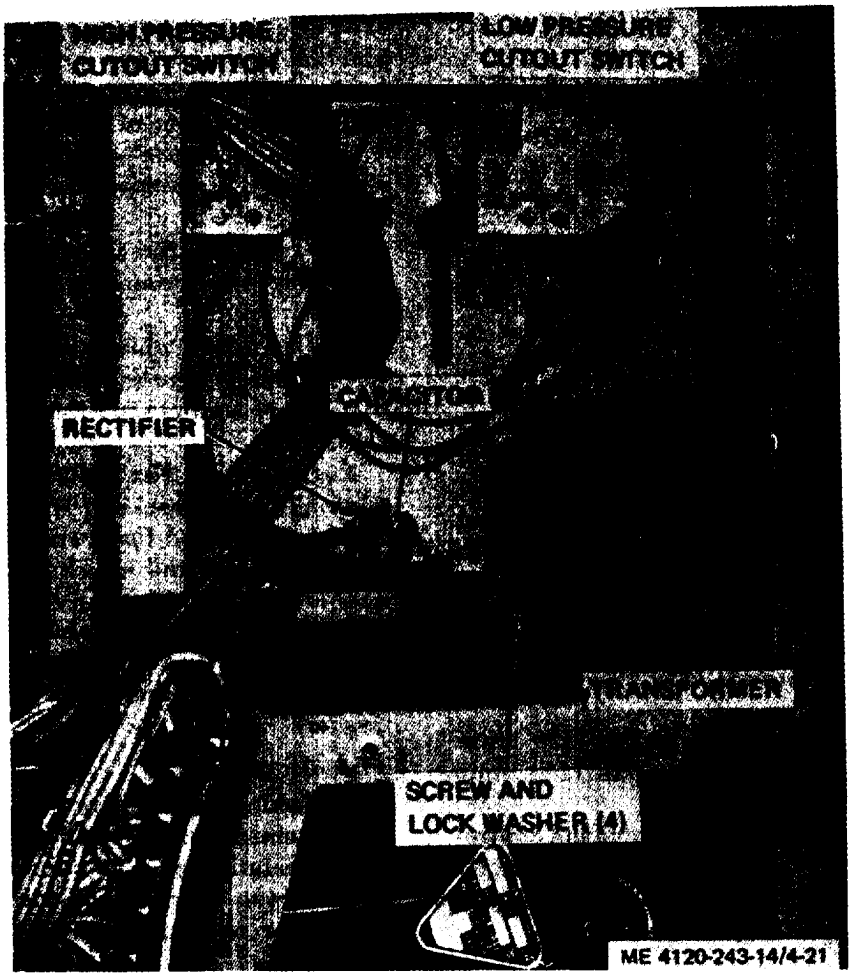


Figure 4-21. Transformer, rectifier and pressure switches.

c. *Installation.* Refer to figure 4-21 and install transformer, four screws, and four lock washers. Connect leads. Refer to paragraph 4-54 and install junction box.

4-57.Rectifier

a. *Removal.* Remove rectifier as follows:

(1) Refer to paragraph 4-50 and remove junction box.

(2) Refer to figure 4-21 and remove filter capacitor. Disconnect leads.

(3) Remove two cap screws and remove rectifier.

b. Testing. Apply a 30 volt ac source of power across the No.1 and 3 terminals. Check for 24 to 28 volt dc output across terminals 2 and 4. Replace rectifier if defective.

c. Installation. Refer to figure 4-21 and install rectifier as follows:

(1) Install rectifier and two cap screws.

(2) Connect leads and install capacitor.

(3) Refer to paragraph 4-54 and install junction box.

4-58. High and Low and Pressure Cutout Switches

a. General. The high and low pressure cutout switches cannot be removed without opening the refrigeration system. Electrical tests should be made with the switches installed.

b. Testing. Test switches as follows:

(1) Refer to paragraph 4-50 and remove junction box.

(2) Disconnect leads and test for continuity

across terminals of switch. If no continuity is indicated, press reset button and recheck.

(3) If switch is defective, report condition to direct support maintenance.

(4) If switch is not defective, connect leads and install junction box.

Section XVII. COMPRESSOR

4-59. General

Organizational maintenance of the compressor is limited to the inspection, testing and repair of the electrical equipment.

4-60. Inspection, Testing and Repair.

a. Refer to paragraph 4-21 and remove housing rear top cover.

b. Refer to figure 4-22 and disconnect electrical connector.

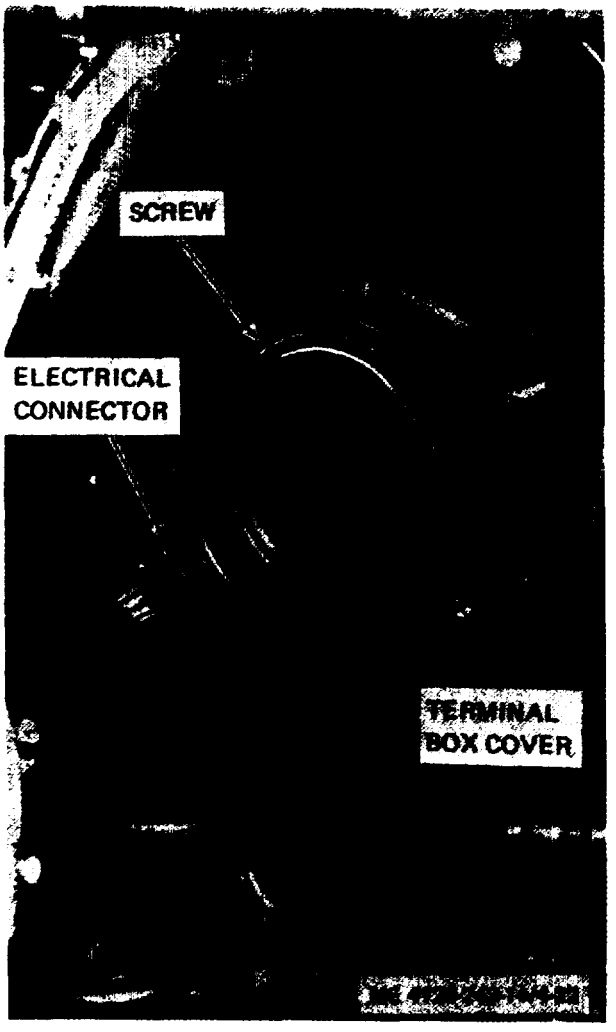


Figure 4-22. Compressor electrical connector and terminal box cover.

c. Follow procedure outlined in paragraph 4-37 and test motor.

d. If any deficiency is indicated, remove screws and terminal box cover and check for damaged wiring or loose connections. Repair damaged wiring and tighten loose connections. If this does not correct the trouble, report the condition to direct support maintenance.

e. Install terminal box cover and screws. Connect electrical connector. Refer to paragraph 4-21 and install housing rear top cover.

4-61. Compressor Capacitors and Relay

a. General. Single phase air conditioners are equipped with a compressor start capacitor and relay and a compressor run capacitor. The compressor run capacitor is located in the evaporator air inlet compartment over the evaporator fan motor. The compressor start capacitor and relay are located under the counter top cover on the inner wall of the junction box compartment of the housing.

b. Removal. Remove the compressor capacitors and relay as follows:

(1) Remove housing covers (para 4-21) to gain access to start capacitor and relay. Remove evaporator air inlet louver (para 4-18) to gain access to compressor run capacitor.

(2) To remove start capacitor, refer to figure 4-23, disconnect leads and remove capacitor from retainer.

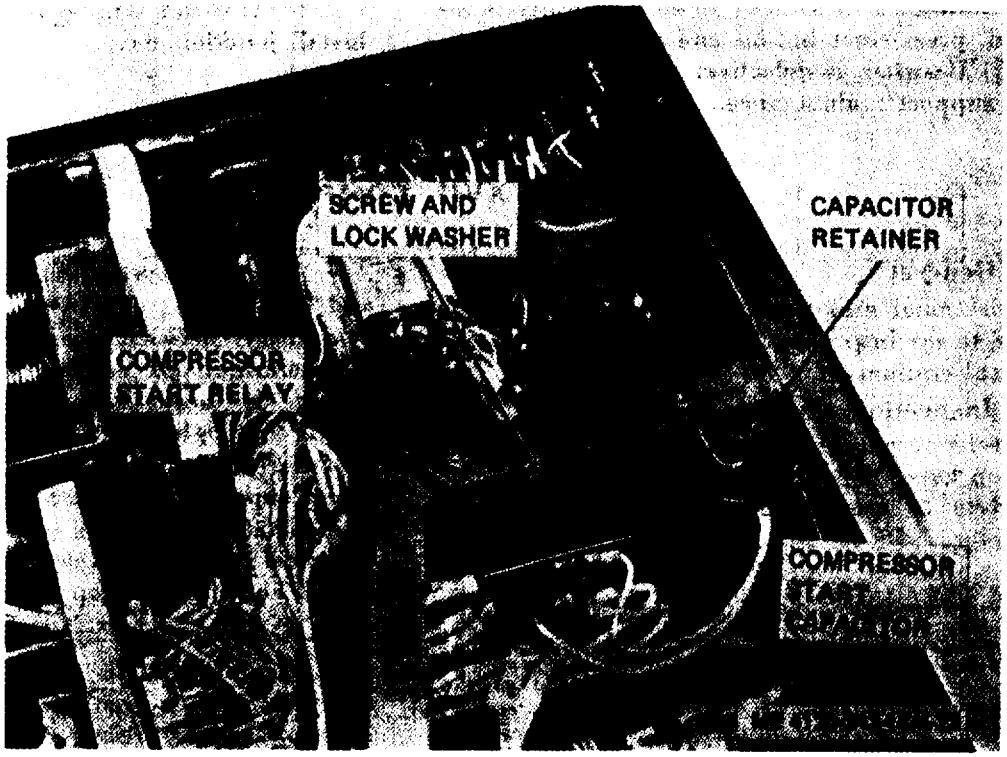


Figure 4-23. Compressor start capacitor and relay.

(3) To remove, start relay, refer to figure 4-23 and disconnect relay leads. Remove screw and lock washer. Remove relay.

(4) To remove run capacitor, refer to figure 4-24 and disconnect capacitor leads. Remove two screws and lock washers securing each strap to housing. Remove straps and capacitors.

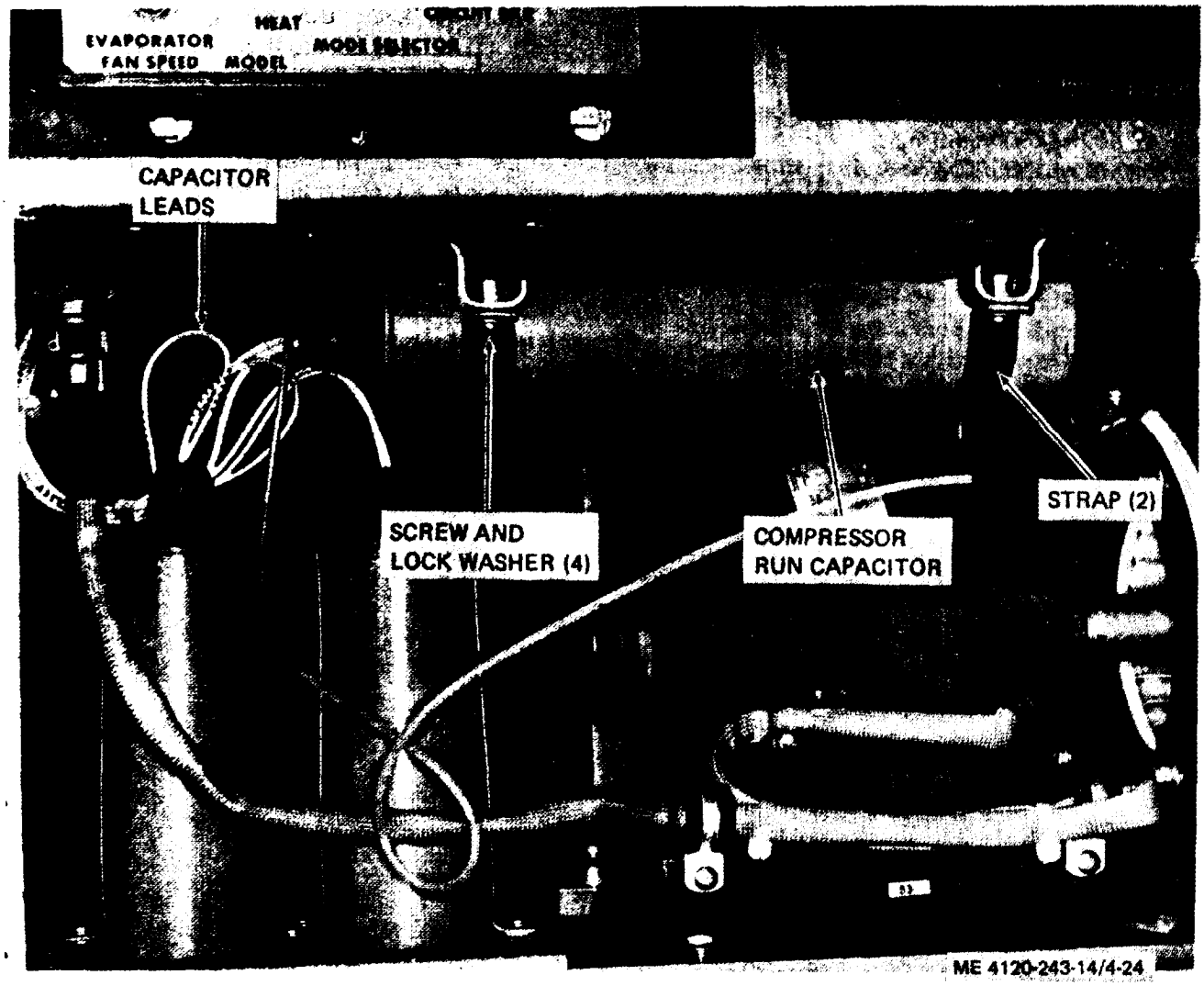


Figure 4-24. Compressor run capacitor.

c. Installation. Install the compressor capacitors and relays as follows:

(1) Refer to figure 4-23 and install relay screw and lock washer. Correct leads.

(2) Refer to figure 4-23 and install capacitor in retainer. Connect leads.

(3) Refer to figure 4-24 and install capacitor and straps. Secure each strap with two screws and lock washers. Connect leads.

(4) Install housing covers (para 4-21) and evaporator air inlet louver (para 4-18) as required.

Section XVIII. REFRIGERATION SYSTEM

4-62. General

Organizational maintenance of the refrigeration system is limited to inspection and testing of the system. Remove top covers, louvers and partially remove junction box as required to gain access to all parts of the system. Report any deficiencies to direct support maintenance.

4-63. Inspection

a. Valves. Inspect charging valves, solenoid valves, expansion valves, pressure relief valves and pressure regulating valves for cracks or damaged condition. Inspect capillary tubes for kinks or breaks. Disconnect solenoid valve electrical connectors and check for coil continuity between terminals.

b. Vibration Eliminators. Check vibration eliminators for damaged covering and connections.

c. Coils. Inspect condenser and evaporator coils

for bent or broken fins and for damaged connections.

d. Louver Control Actuator. Inspect cylinder for cracks and damaged connections. Inspect control for bent or broken condition.

e. Dehydrator and Receiver. Inspect dehydrator and receiver for damage.

f. Tubing and Fittings. Inspect tubing for kinks, cracks or other damage. Inspect fittings for cracks.

4-64. Testing System for Leaks

Check all piping, components and connections of the refrigerant system with a General Electric Type H-2 Halogen Leak Detector Unit (or approved equal). The detector shall be calibrated with a General Electric LS-20 leak standard (or approved equal) for a pure refrigerant leak rate of 0.1 ounce per year. Any detected leaks exceeding this rate shall be reported immediately to direct support maintenance for correction and recharging.

Warning: **Avoid bodily contact with liquid refrigerant and avoid inhaling refrigerant gas. Be especially careful that refrigerant does not come in contact with the eyes. In case of refrigerant leaks, ventilate area immediately.**

CHAPTER 5

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE INSTRUCTIONS

Section I. REPAIR PARTS, SPECIAL TOOLS, AND EQUIPMENT

5-1. Tools and Equipment

Refer to Appendix C for tools, equipment and repair parts issued with the air conditioner.

5-2. Special Tools and Equipment

No special tools or equipment are required for maintenance of the air conditioner.

5-3. Maintenance Repair Parts

Repair parts and equipment are listed and illustrated in the repair parts and special tool list covering direct and general support maintenance for this equipment. (TM 5-4120-243-34P) (when printed) .

Section II. TROUBLESHOOTING

5-4. General

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the air conditioner or any of its components. Electrical schematic and wiring diagrams shown in figures 1-4 through 1-8 will be helpful for checking electrical circuits. A refrigerant flow diagram is shown in figure 5-1. System pressure test procedures are in paragraph 6-2.

FIND NO.	PART NO.	QTY	NOMENCLATURE
1A	13211E3793-3	1	COMPRESSOR (1 PHASE, 50/60 HZ, 230V)
OR 1A	13211E3793-2	1	COMPRESSOR (3 PHASE, 50/60 HZ, 208V)
OR 1A	13211E3793-1	1	COMPRESSOR (3 PHASE, 400 HZ, 208V)
1B	PT OF FIND NO. 1A	1	SUCTION LINE FILTER
2	13216E6167-1	1	HOSE ASSY, METAL
3A	13216E6126	1	COIL,CONDENSER WITH ANGLE
3B	PT OF FIND NO. 3A	1	SUBCOOLER
4	13216E6163-2	1	RECEIVER, LIQUID REFRIGERANT
5	13216E6155	1	INDICATOR, SIGHT, LIQUID
6	13214E3557	1	DEHYDRATOR, DESICCANT, REFRIGERANT
7	13216E6172-1	1	SOLENOID VALVE, WITH LEADS
8	13216E6160-2	1	VALVE, EXPANSION (PRIMARY)
9	13216E6161	1	RESTRICTOR, FLUID FLOW
10	13216E6119	1	COIL, EVAPORATOR WITH ANGLE
11	13216E6166	2	BULB WELL
12	13216E6164	1	ACCUMULATOR
13	13216E6167-2	1	HOSE ASSY, METAL
14	13216E6168	2	VALVE, CHARGING, WITH CAP
15	13211E8369	1	VALVE, PRESSURE RELIEF
16	13216E6128	1	CYLINDER ASSY, ACTUATING, LINEAR
17	13216E6215-3	1	SWITCH, PRESSURE (HIGH)
18	13216E6174-2	1	VALVE, EXPANSION (QUENCH)
19	13216E6172-2	1	SOLENOID VALVE WITH LEADS
20	13216E6171	2	REGULATOR, FLUID PRESSURE
21	13216E6215-1	1	SWITCH, PRESSURE (LOW)

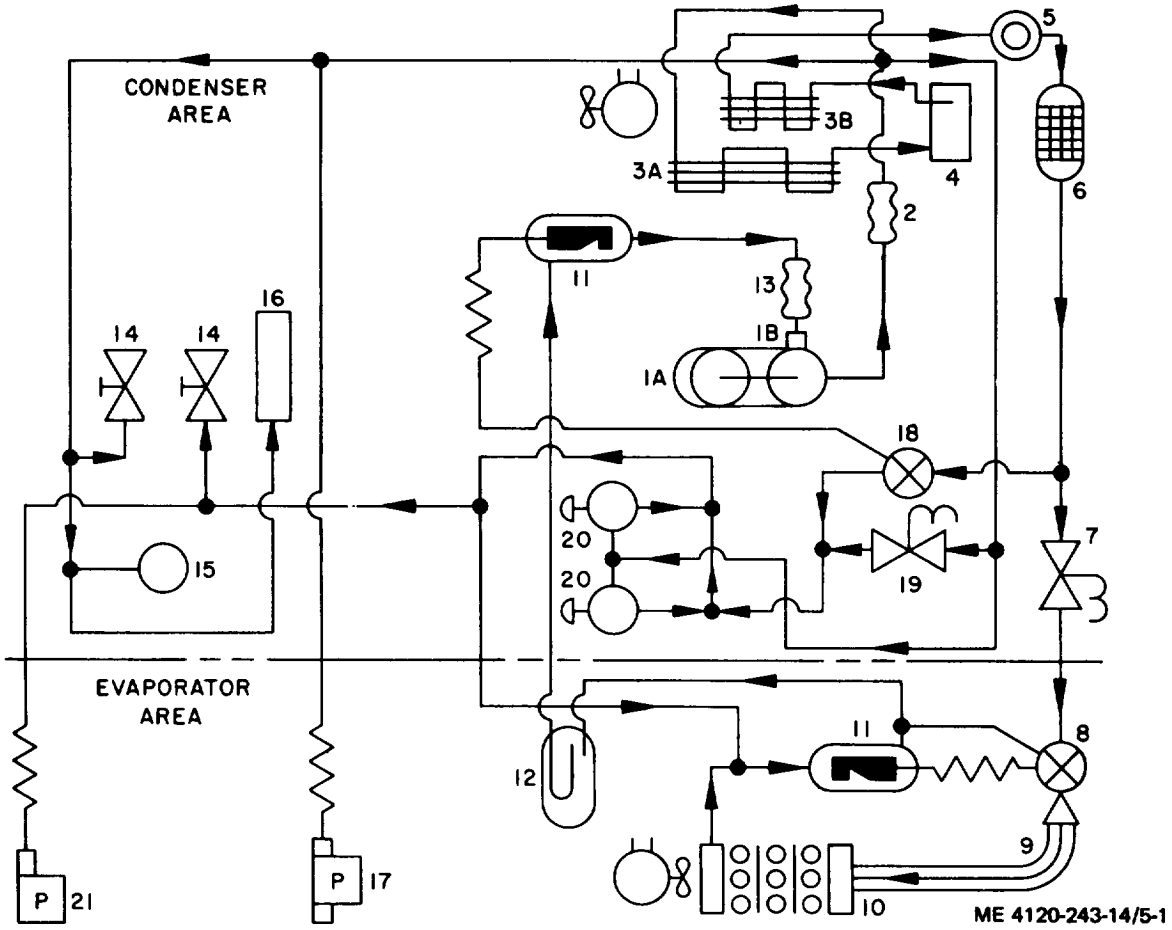


Figure 5-1. Refrigerant flow diagram.

5-5. Troubleshooting Chart

Troubleshooting procedures for direct and general support maintenance are listed in Table 5-1. Each trouble symptom or malfunction stated is followed by a list of probable causes of the trouble. The corrective action recommended is described opposite the probable cause.

Table 5-1. Troubleshooting Chart

Malfunction	Probable Cause	Corrective Action
1. Compressor will not start.	a. Open control circuit.	a. Make continuity check of control circuit (para 4-12).
	b. Defective circuit breaker.	b. Replace circuit breaker (para 4-50 through 4-54).
	c. Defective starting relay or capacitor (single phase compressor.	c. Replace defective capacitor or relay (para 4-61).
	d. Defective phase sequence relay (three phase compressor).	d. Replace defective relay (para 4-50 thru 4-54).
	e. Defective high or low pressure cutout switch.	e. Replace defective switch (para 5-21).
	f. Defective compressor motor or thermal protector.	f. Replace compressor (para 5-17).
2. Compressor starts but goes out on overload.	a. Defective compressor run capacitor (single phase compressor).	a. Replace capacitor (para 4-61).
	b. Defective compressor.	b. Replace compressor (para 5-17).
3. Little or no heating capacity.	a. Loose electrical connection or faulty wiring.	a. Check wiring and repair if necessary (para 4-33).
	b. Defective temperature selector switch or mode selector switch.	b. Replace defective switch (para 4-44 thru 4-48).
	c. Defective heaters.	c. Replace defective heaters (para 4-35).
	d. Defective heater high temperature cutout switch.	d. Replace defective thermostatic switch (para 4-34).
	e. Defective heater relay.	e. Replace defective heater relay (para 4-50 thru 4-54).
	f. Defective evaporator fan motor.	f. Repair motor (para 6-8).
4. Insufficient cooling.	a. Low refrigerant charge.	a. Charge refrigerant system (para 6-3).
	b. Dehydrator clogged.	b. Replace clogged dehydrator (para 5-24).
	c. Pressure regulator valve defective.	c. Replace defective valve (para 5-31).
	d. Air in refrigerant system.	d. Purge and charge system (para 6-3).
	e. Thermal expansion valve defective.	e. Replace defective valve (para 5-28).
	f. Defective solenoid valve.	f. Replace defective solenoid valve (para 5-27).
	g. Defective quench thermal expansion valve.	g. Replace defective valve (para 5-29).
5. Low suction pressure.	a. l)efective thermal expansion valve.	a. Replace defective valve (para 5-28).
	b. Dehydrator clogged or defective.	b. Remove restriction or replace dehydrator (para 5-24).
	c. Pressure regulating valve defective.	c. Replace defective valve (para 5-31).
6. Low discharge pressure.	a. Compressor **not** pumping due to defective compressor	a. Replace defective compressor (para 5-17).
	b. Defective high-low condenser fan thermostatic switch.	b. Replace defective switch (para 4-41).
7. Low suction and discharge pressure.	a. Lack of refrigerant.	a. Check sight glass for bubbles or milky appearance and check system for leaks (para 4-64). Repair leaks and add refrigerant as necessary.
	b. Defective thermal expansion valve.	*b.* Replace valve (para 5-28).

Table 5-1. Troubleshooting Chart -Continued

Malfunction	Probable Cause	Corrective Action
	c. Defective quench thermal expansion valve.	c. Replace valve (para 5-29).
8. High suction pressure.	a. Defective thermal expansion valve.	a. Replace valve (para 5-28).
	b. Defective pressure regulator valve.	b. Replace valve (para 5-31).
9. High head pressure.	a. Overcharge of refrigerant.	a. Discharge refrigerant as necessary (para 6-3).
	b. Condenser coil dirty.	b. Clean coil.
	c. Defective condenser fan motor.	c. Repair motor (para 6-8).
	d. Inoperative or improper adjustment of condenser louvers or actuating mechanism.	d. Adjust and clean as necessary. Replace inoperative components (para 5-20).
	e. Compressor defective.	e. Replace defective compressor (para 5-17).
	f. Quench thermal expansion valve defective.	f. Replace defective valve (para 5-29).

Section III. GENERAL MAINTENANCE INSTRUCTIONS

5-6. General

This section contains general repair instructions which would otherwise have to be repeated several times.

5-7. Refrigeration System

a. Opening System. When the refrigeration system must undergo maintenance that requires the system to be opened for removal of parts, the system must first be discharged and purged (para 6-3). After the repair has been made and all soldering completed, the system must be charged (para 6-31) and tested for leaks.

b. Removal of Parts. It may be necessary to remove some tubing and fittings with a part that is to be replaced. The tubing and fittings can then be removed from the defective part and installed in the new part. Care should be exercised in opening joints or resoldering to prevent damage to other parts of the air conditioner.

c. Brazing. Braze copper to copper joints with silver solder type 3, 4 or 6A specifications QQ-S-561 and copper to brass or copper to steel with type 4 or 6A specifications QQ-S-561 per MIL-B-7883. Solder melting point is 1160°F. All brazed or solder joints shall be made with an atmosphere of inert gas to prevent internal oxidation.

5-8. Insulation and Gaskets

Replace damaged insulation and gaskets. Cement loose insulation.

5-9. Hardware

Replace any damaged screws, washers, lock washers or nuts. Use screws of correct length to hold parts securely. In some applications screws that are too long may bottom before the head is tight against part it is to hold or may cause damage to the threads or other parts.

5-10. Shims

Be sure to remove all shims where used. Keep shims together and identify them as to location.

5-11. Repairing Damaged Threads

Damaged threads should be repaired by use of a thread restorer or by chasing in a lathe. Internal threads should be repaired with a used tap of the correct size. If threads cannot be satisfactorily repaired, replace the part.

5-12. Repair or Damaged Machined and Polished Surfaces

Smooth rough spots, scores, burs, galling, and gouges from damaged machined and polished surfaces so that part will efficiently perform its normal function. The finish of the repaired part is to approximate that of the original finish. In performing any of these operations, critical dimensions must not be altered.

5-13. Removal of Rust or Corrosion

Remove corrosion from all parts of material. To remove rust or corrosion, use wire brush, abrasive cloth, sand blast, vapor blast equipment, or rust remover except on highly polished surfaces. On these surfaces, buffing or the use of crocus cloth is recommended.

5-14. Tubes and Fittings

Check tubes and fittings for cracked or split condition. Check tubing for kinks. Replace defective fittings. Replace damaged tubing with tubing of same size. Take care in making ends in tubing to prevent kinking of tubing. All tubing and fittings must be completely clean on inside prior to installation.

5-15. Valves

Valves and other parts should be handled carefully to prevent damage. Capillary tubes must be handled very carefully to prevent kinking of the tubes.

Section IV. REMOVAL AND INSTALLATION OF MAJOR COMPONENTS

5-16. General

This section covers removal of all major assemblies of the air conditioner which are the responsibility of the direct support and general support maintenance. The refrigerant piping and valves cannot be removed as a unit and only those parts that require replacement should be removed. Removal and installation instructions for individual valves and other components of the refrigeration system are contained in this section. Refer to paragraph 5-7 before performing maintenance on the refrigeration system.

5-17. Compressor

a. General. The compressor is a self-contained hermetically sealed unit and cannot be repaired.

b. Removal. Remove compressor as follows:

(1) Refer to paragraph 6-3 and discharge the refrigerant system.

(2) Refer to paragraph 4-21 and remove top covers.

(3) Refer to figure 5-2 and disconnect electrical connector.

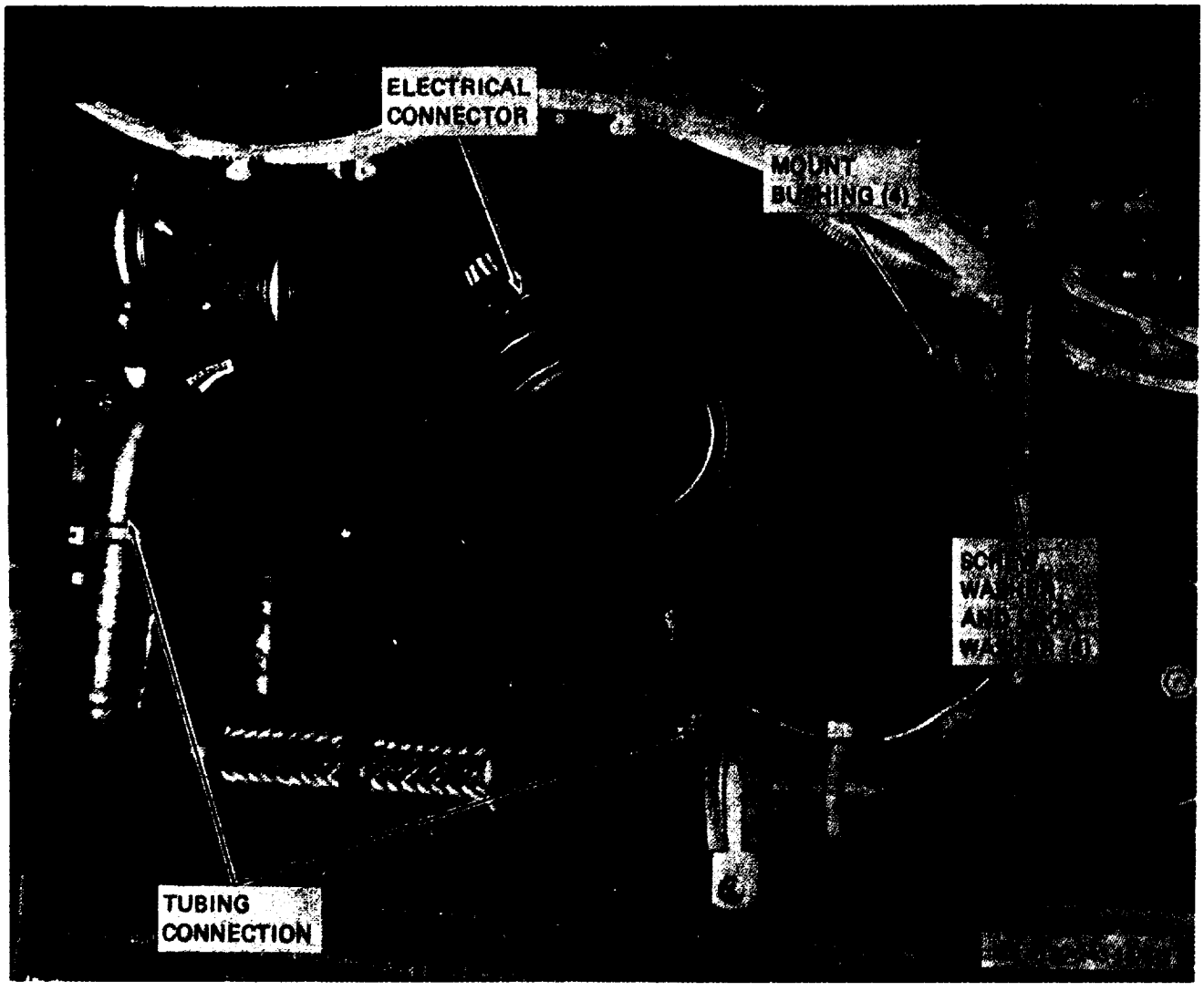


Figure 5-2. Compressor, removal and installation.

(4) Disconnect tubing as required to permit removal of compressor.

(5) Remove four screws, washers, lock washers, and compressor mount bushings.

(6) Lift compressor from air conditioner.

Caution: **If compressor is being replaced because of a motor burnout, decontaminate system as instructed in paragraph 6-5. Failure of the replacement compressor will result if all the contaminates are not removed.**

c. Installation. Refer to figure 5-2 and install compressor as follows:

(1) Place compressor on mounts and install four compressor mount bushings. Secure compressor with four screws, washers and lock washers.

(2) Connect tubing.

(3) Connect electrical connector.

(4) Refer to paragraph 4-21 and install housing top covers.

(5) Refer to paragraph 6-3 and charge the refrigerant system.

5-18. Evaporator Coil

a. Removal. Remove the evaporator coil as follows :

(1) Refer to paragraph 6-3 and discharge the refrigerant system.

(2) Refer to paragraph 4-21 and remove housing top covers.

(3) Refer to paragraph 4-18 and remove evaporator air outlet louver.

(4) Refer to figure 5-3 and remove screw that secures bulb well loop clamp to evaporator coil angle.

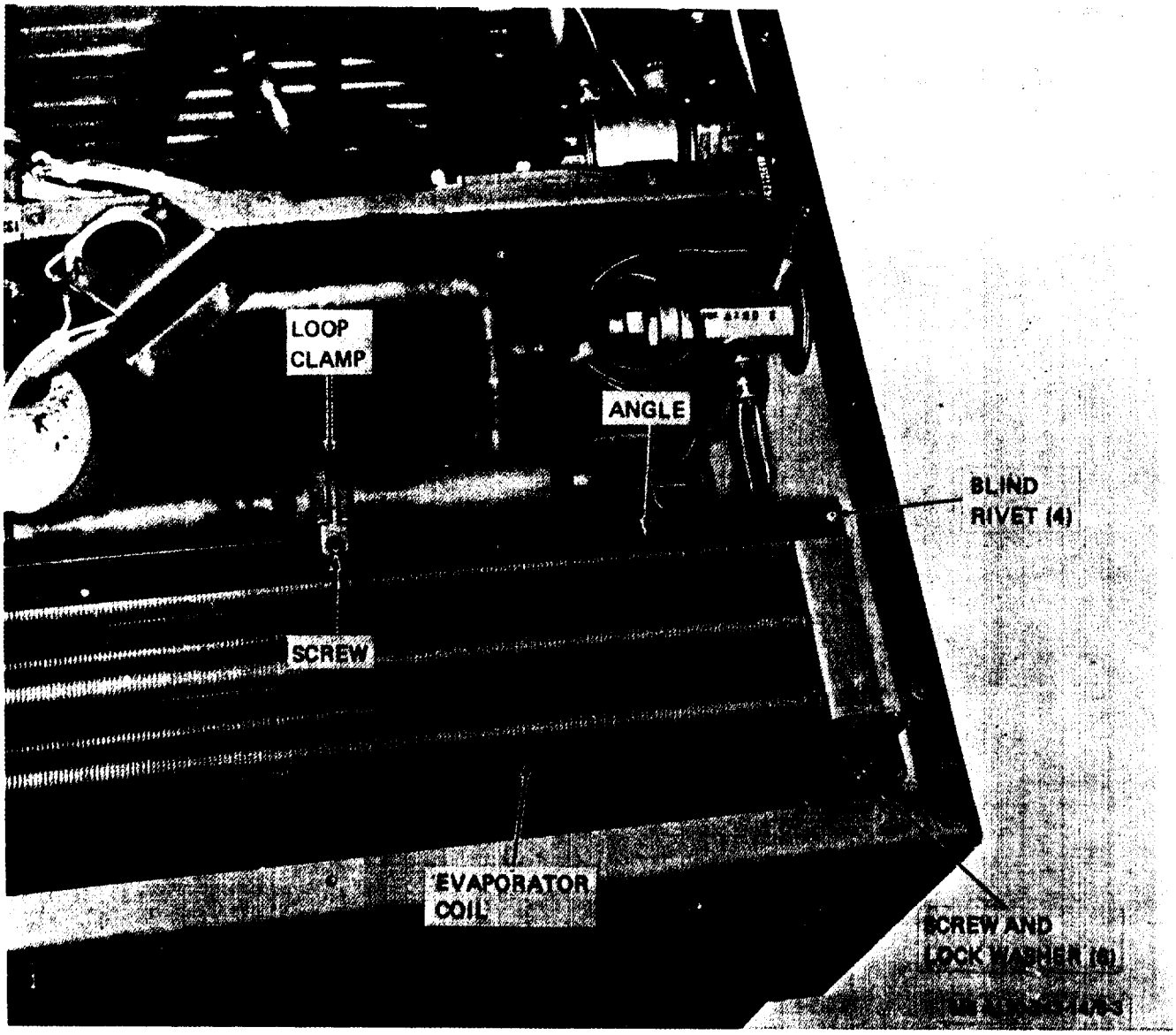


Figure 5-3. Evaporator coil, removal and installation.

(5) Disconnect tubing from evaporator coil as required.

(6) Remove six screws and lock washers and lift evaporator coil and angle from air conditioner. Angle is connected to coil with four blind rivets.

b. Installation. Install evaporator coil as follows:

(1) If angle figure 5-3 was removed from coil, secure angle to coil with four rivets.

(2) Install coil in air conditioner and secure coil to brackets with six screws and lock washers.

(3) Connect tubing to coil

(4) Install loop clamp and screw.

(5) Refer to paragraph 4-18 and install evaporator air outlet louver.

(6) Refer to paragraph 4-21 and install housing top covers.

(7) Refer to paragraph 6-3 and charge the refrigerant system.

5-19. Condenser Louver Actuator and Control

a. Removal. Remove actuator and push-pull control as follows:

(1) Refer to paragraph 6-3 and discharge the refrigerant system.

(2) Refer to paragraph 4-21 and remove housing covers.

(3) Refer to figure 5-4 and loosen mechanical post screws to loosen control wire.

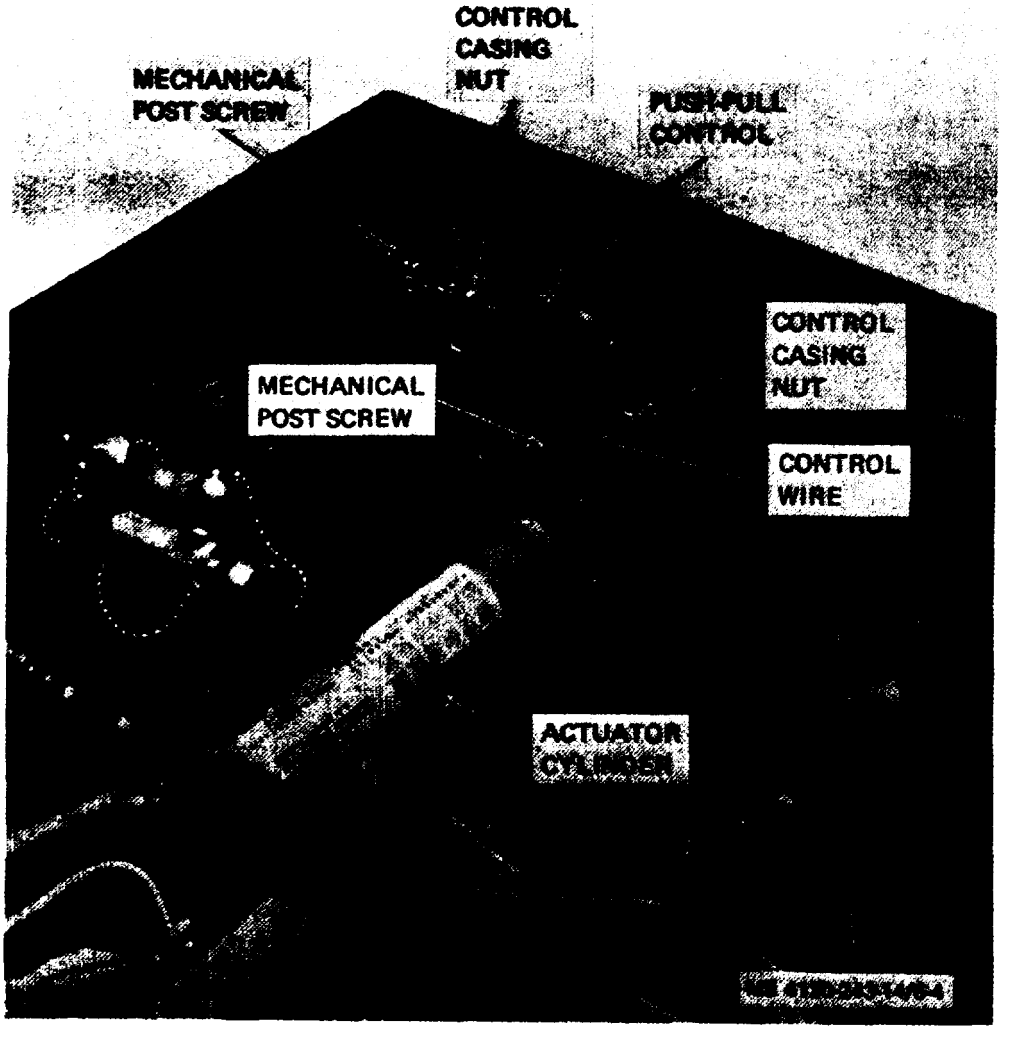


Figure 5-4. Condenser louver control and actuator cylinder.

(4) Remove control casing outer nuts at each end and remove push-pull control.

(5) Disconnect elbow swivel nut from end of actuator cylinder.

(6) Refer to paragraph 4-20 and remove condenser guard. Refer to figure 5-5 and remove five screws and lock washers that secure condenser air discharge louver assembly to housing. Remove two screw base studs and louver assembly.

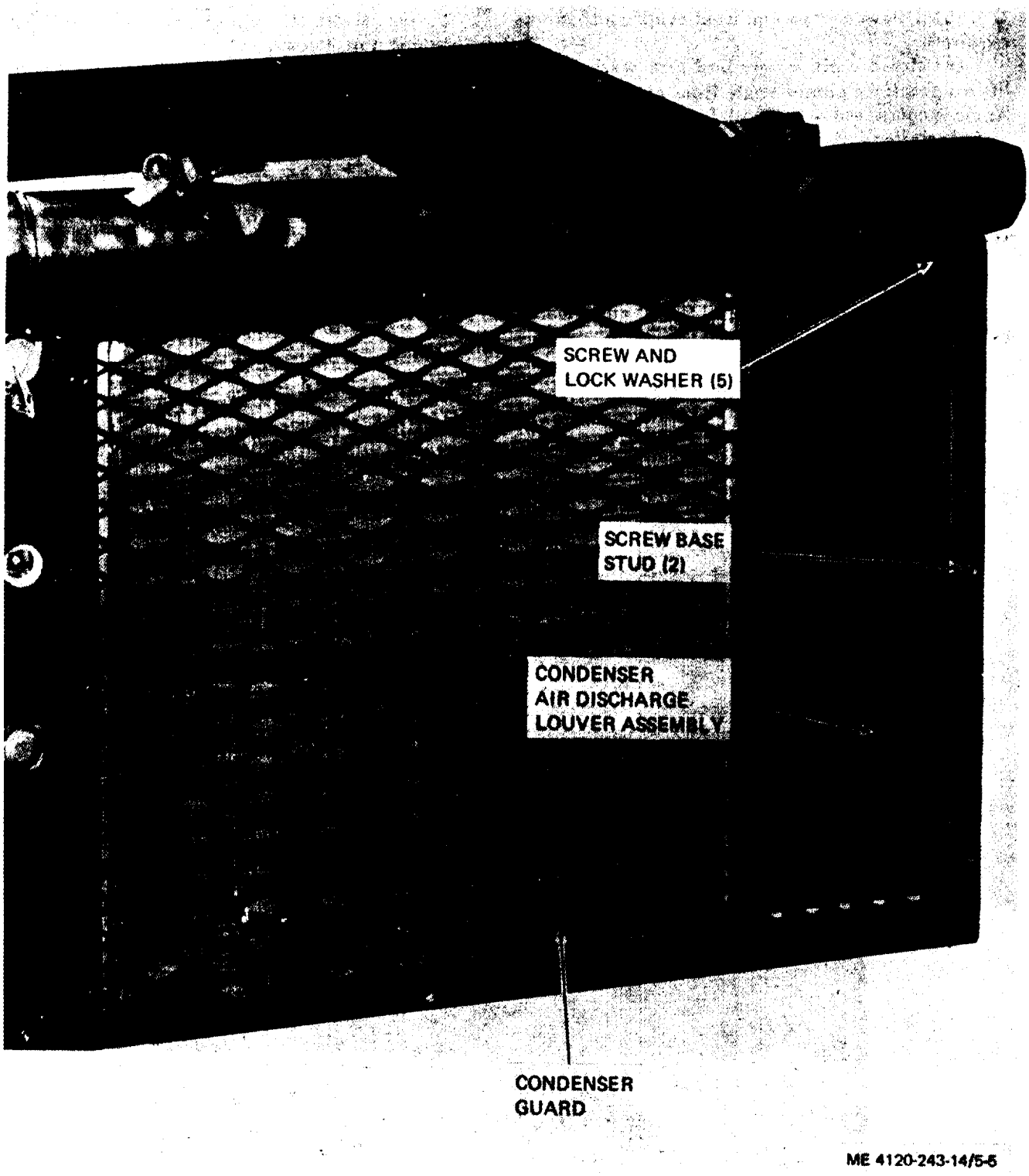


Figure 5-5. Condenser air discharge louver assembly.

(7) Remove two nuts and lock washers from inside fan housing and remove actuator cylinder (fig. 5-4).

b. Installation. Install actuator cylinder and control as follows:

(1) Install actuator cylinder (fig. 5-4) with studs through openings in fan housing. Install lock washers and nuts on studs.

(2) Connect elbow swivel nut.

(3) Refer to figure 5-5 and install condenser

air discharge louver assembly. Install five screws and lock washers and two screw base studs. Refer to paragraph 4-20 and install condenser guard.

(4) Install push-pull control (fig. 5-4). Place outer control casing nuts over wire and insert wire ends into openings in mechanical posts on louver lever and actuator cylinder.

(5) Install control casing nuts on casing to hold casing in position. Adjust control as described in c below.

c. Adjustment. Before system is charged, adjust louver push-pull control as follows:

(1) Close louver blades and tighten screw in mechanical post to lock wire on that end.

(2) Extend actuator rod until there is a 1/4 inch space between inner edge of mechanical post bracket and the face of the cylinder. Tighten the mechanical post screw.

(3) Refer to paragraph 4-21 and install housing top covers.

(4) Refer to paragraph 6-3 and charge the refrigerant system.

5-20. Condenser Coil

a. Removal. Remove condenser coil as follows:

(1) Refer to paragraph 6-3 and discharge the refrigerant system.

(2) Refer to paragraph 4-21 and remove housing top covers.

(3) Refer to figure 5-6 and remove screw that secures bulb well loop clamp to condenser coil angle.

(4) Disconnect tubing from condenser coil and remove other tubing and fittings as required.

(5) Refer to paragraph 5-19 and remove louver actuator control.

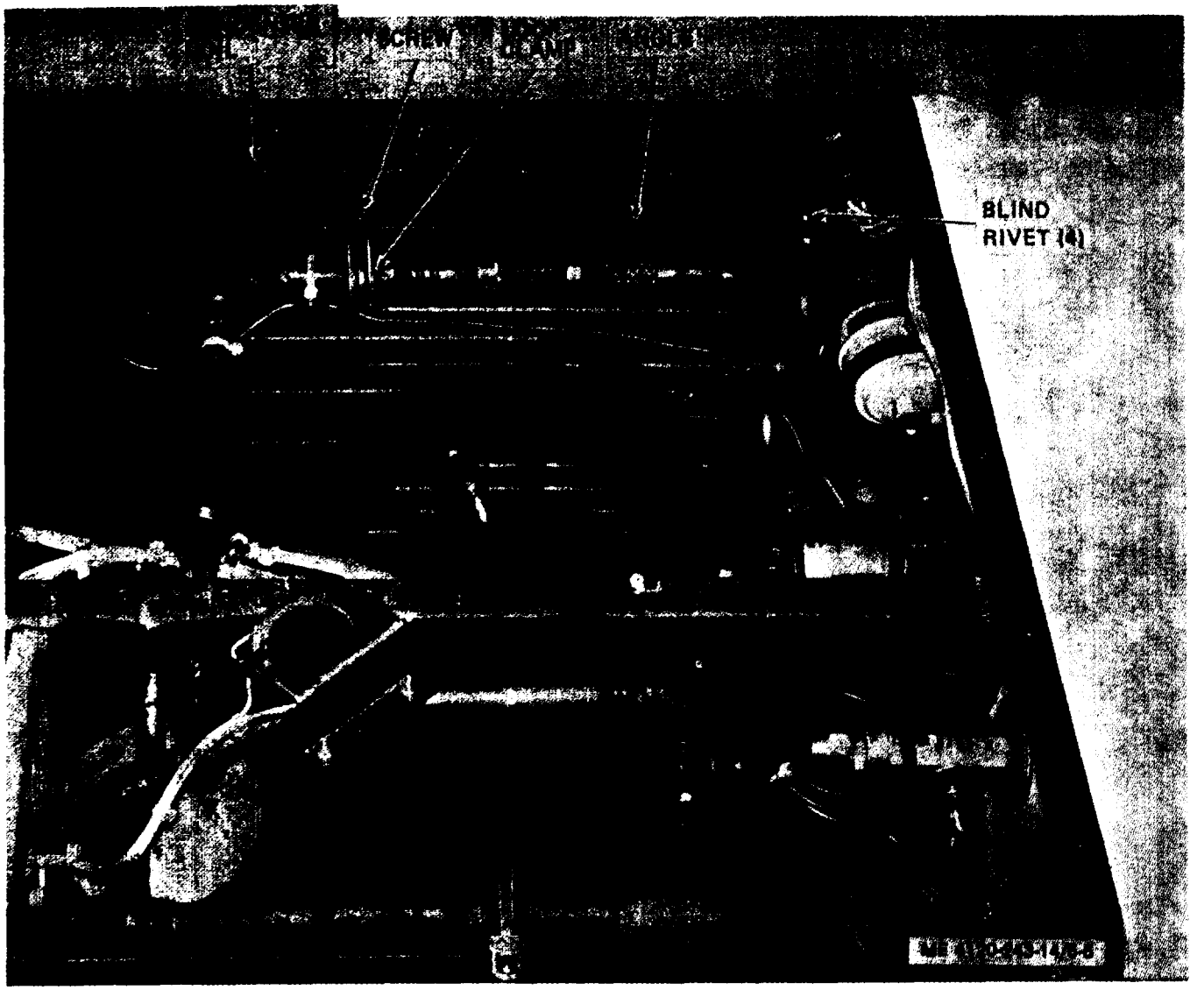


Figure 5-6. Condenser coil, removal and installation.

(6) Refer to paragraph 4-20 and remove condenser guard.

(7) Remove four countersunk-head screws that secure coil to base of housing.

(8) Remove coil from air conditioner. Use care when removing coil to prevent damage to coils and fins.

(9) To remove angle from coil, grind off four rivets.

b. Installation. Install condenser coil as follows:

(1) If angle was removed from condenser coil, rivet angle to coil with four blind rivets.

(2) Be sure sheet spring nuts are in place on bottom of coil. Position coil in air conditioner and install four countersunk-head screws from underside of housing.

(3) Refer to paragraph 4-20 and install condenser guard.

(4) Refer to paragraph 5-19 and install and adjust condenser louver control.

(5) Connect tubing to condenser and install any other tubes and fittings that were removed.

(6) Attach bulb well clamp to angle with screw (fig. 5-6).

(7) Refer to paragraph 4-21 and install housing top covers.

(8) Refer to paragraph 6-3 and charge the refrigerant system.

5-21. Pressure Switches

a. Removal. Remove high and low pressure cutout switches (fig. 4-21) as follows:

(1) Refer to paragraph 6-3 and discharge the refrigerant system.

(2) Refer to paragraph 4-50 and remove junction box. Disconnect electrical leads. Refer to paragraph 4-21 and remove housing rear and center top covers.

(3) Remove two mounting screws and lock washers from each switch.

(4) Refer to figure 5-7 and disconnect capillary tube nuts. Remove grommet and pull capillary tubes through partition.

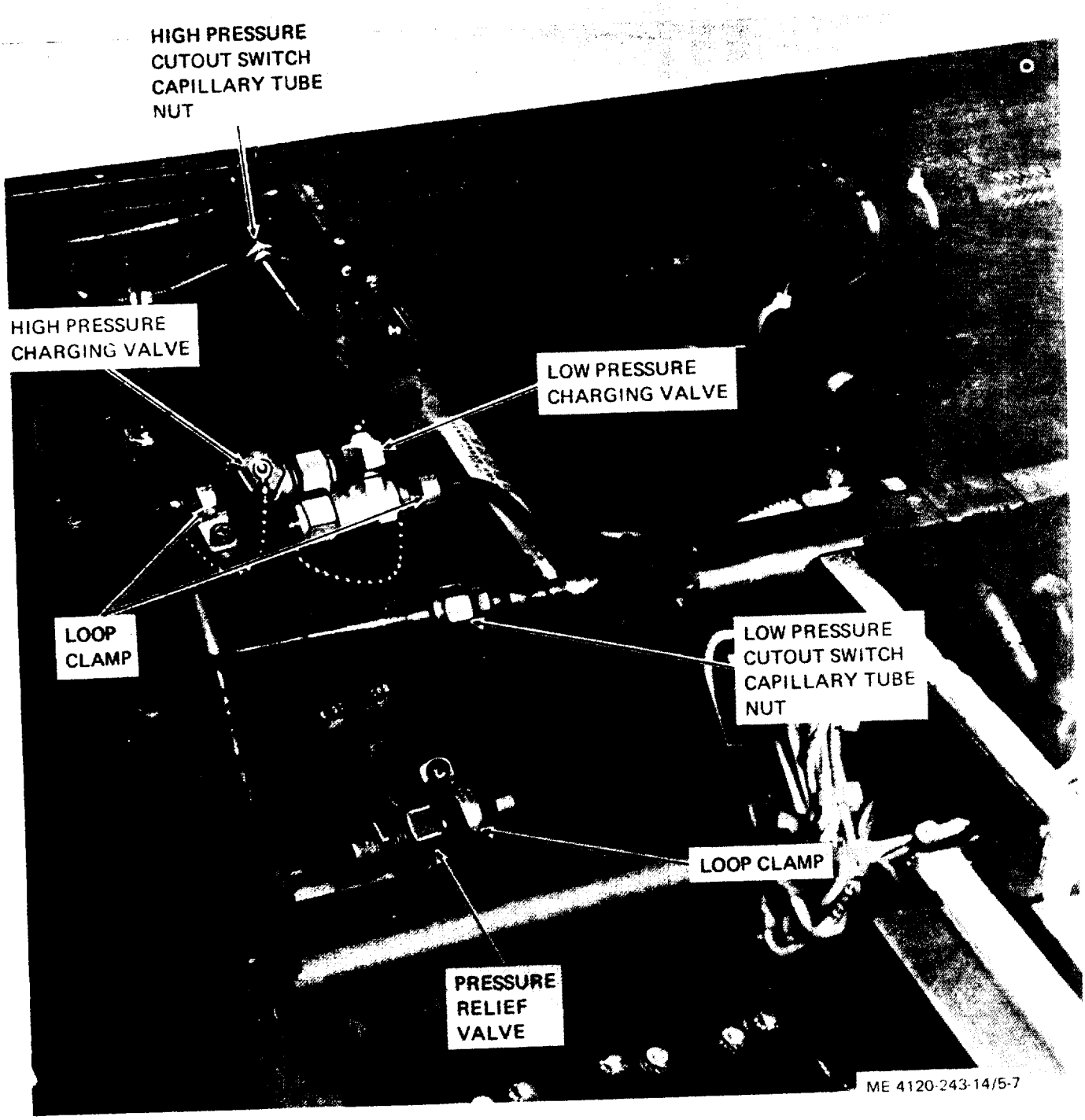


Figure 5-7. Charging valves and pressure switch connections.

b. Installation. Install high and low pressure cutout switches as follows:

(1) Insert capillary tube ends through partition and install grommet. Connect capillary tube nuts (fig. 5-7) to fittings.

(2) Install switches (fig. 4-21) and secure each with two screws and lock washers.

(3) Make electrical connections to switches.

(4) Refer to paragraph 4-54 and install junction box. Refer to paragraph 4-21 and install housing top covers.

(5) Refer to paragraph 6-3 and charge the refrigerant system.

5-22. Charging Valves

a. Removal. Refer to paragraph 6-3 and

discharge the refrigerant system. Remove housing rear top covers (para 4-21). Remove loop clamps from charging valves from line.

b. Installation. Install charging valves on line and solder. Install loop clamps. Refer to paragraph 4-21 and install housing rear top cover. Refer to paragraph 6-3 and charge the refrigerant system.

5-23. Pressure Relief Valve

a. Removal. Refer to paragraph 6-3 and discharge the refrigerant system. Refer to paragraph 4-21 and remove housing top covers. Remove screw, lock washer, and loop clamp (fig. 5-7). Remove pressure relief valve from adapter.

b. Installation. Install pressure relief valve (fig. 5-7) in adapter. Install loop clamp on valve and secure clamp with screw and lock washer. Install housing top covers (para 4-21). Refer to paragraph 6-3 and charge the refrigerant system.

5-24. Dehydrator

a. General. The dehydrator is to be replaced whenever the refrigeration system is opened for maintenance.

b. Removal. Refer to paragraph 6-3 and discharge the refrigerant system. Refer to paragraph 4-21 and remove housing rear top cover. Refer to figure 5-8 and remove four screws and two straps. Disconnect and remove dehydrator.

c. Installation. Connect dehydrator to tubing. Install two straps and four screws, using sealing compound on screw threads. Install rear top cover (para 4-21). Refer to paragraph 6-3 and charge the refrigerant system.

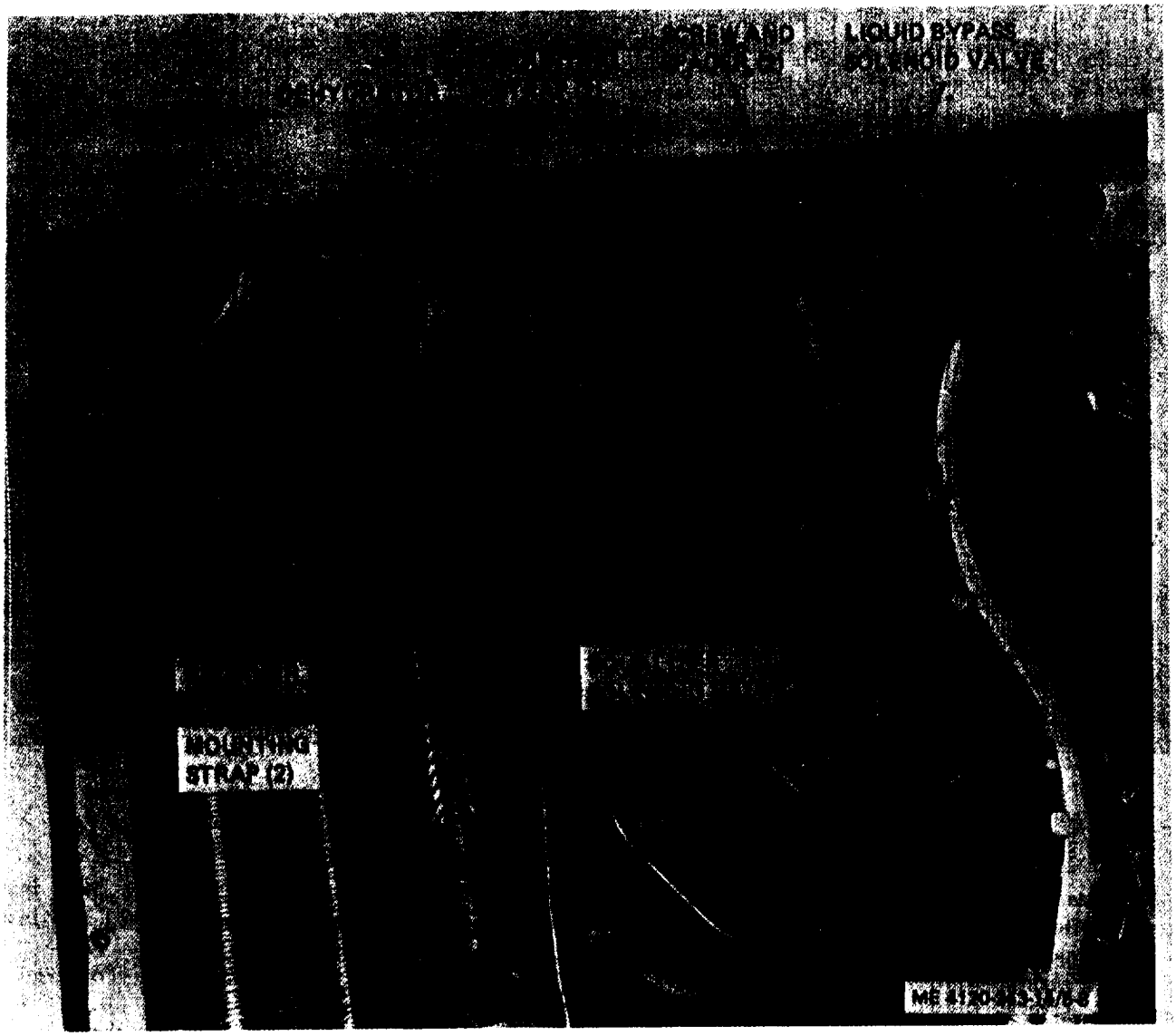


Figure 5-8. Dehydrator, receiver and solenoid valves.

5-25. Receiver

a. Removal. Refer to paragraph 6-3 and discharge the refrigerant system. Refer to paragraph 4-21 and remove rear top cover. Remove four screws and two mounting straps (fig. 5-8). Disconnect receiver tubing.

b. Installation. Install receiver and solder connections. Install two mounting straps and four screws using sealing compound on screw threads. Refer to paragraph 6-3 and charge the refrigerant system.

5-26. Liquid Sight Indicator

a. Removal. Refer to paragraph 6-3 and discharge the refrigerant system. Remove housing rear top cover (para 4-21). Remove two screws and lock washers from sides of liquid sight indicator (fig. 1-2) and remove mounting bracket from inside housing. Unsolder liquid sight indicator from tubing.

b. Installation. Solder liquid sight indicator on tubing. Place bracket over indicator on inside of housing and secure with two screws and lock washers. Install housing top rear cover (para 4-21). Refer to paragraph 6-3 and charge the refrigerant system.

5-27. Solenoid Valves

a. Removal. Removal procedures for the bypass solenoid valve and the equalizer solenoid valve are the same.

(1) Refer to paragraph 6-3 and discharge the refrigerant system.

(2) Refer to paragraph 4-21 and remove housing rear top cover.

(3) Disconnect solenoid valve electrical connector.

(4) Remove two socket-head cap screws from underside of valve body and carefully remove bonnet assembly. Do not drop plunger. Remove diaphragm.

Caution: **Remove bonnet assembly and diaphragm before applying heat to valve body.**

(5) To remove liquid bypass solenoid valve (fig. 5-8), remove two screws and spacers and unsolder valve body from tubing. Remove bushings.

(6) Follow same procedure and remove equalizer solenoid valve body.

b. Installation. Install each solenoid valve as follows :

(1) Install bushings in valve body and solder body on tubing.

(2) Install spacers between body and housing and install two screws from outside of housing.

(3) Place diaphragm in the body with the pilot port extension away from body. Hold plunger with synthetic seat against pilot port. Make sure preformed packings are in place and lower bonnet assembly over plunger. Install body screws.

(4) Connect electrical connector.

(5) Refer to paragraph 4-21 and install housing rear top cover.

(6) Refer to paragraph 6-3 and charge the refrigerant system.

5-28. Thermal Expansion Valve

a. General. The main thermal expansion valve is hermetically sealed and cannot be repaired.

b. Removal. Remove the thermal expansion valve as follows:

(1) Refer to paragraph 6-3 and discharge the refrigerant system.

(2) Remove housing top covers (para 4-21).

(3) Soften mastic in bulb well (fig. 5-9) and remove bulb from well. Take care to prevent damage to capillary tube.

(4) Unsolder thermal expansion valve from tubing.

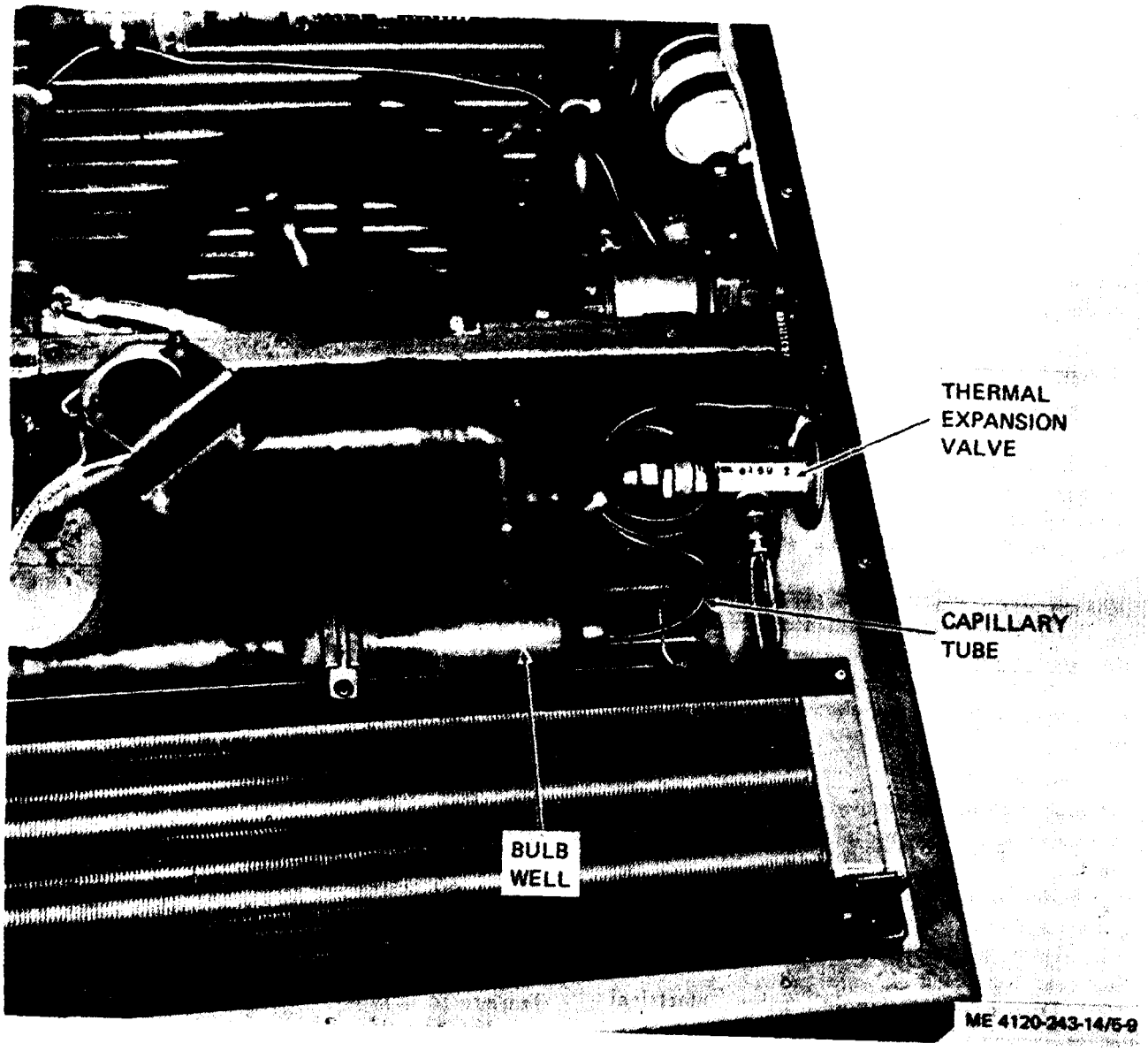


Figure 5-9. Thermal expansion valve.

c. Installation. Install thermal expansion valve (fig. 5-9) as follows:

(1) Solder valve to tubing.

(2) Insert approximately one ounce of thermal mastic in bulb well. Insert sensing bulb of expansion valve and move bulb back and forth to distribute mastic and set bulb approximately one inch beyond open end.

(3) Install housing top covers (para 4-21).

(4) Refer to paragraph 6-3 and charge the refrigerant system.

5-29. Quench Thermal Expansion Valve

a. General. The quench thermal expansion valve is hermetically sealed and cannot be repaired.

b. Removal. Remove the quench valve as follows :

(1) Refer to paragraph 6-3 and discharge the refrigerant system.

(2) Remove housing rear top cover (para 4-21).

(2) Soften mastic in bulb well (fig. 5-10) and remove bulb from well. Take care to prevent damage to capillary tube.

(4) Remove two screws, spacers, self-locking nuts, and valve mounting brackets.

(5) Unsolder valve from tubing.

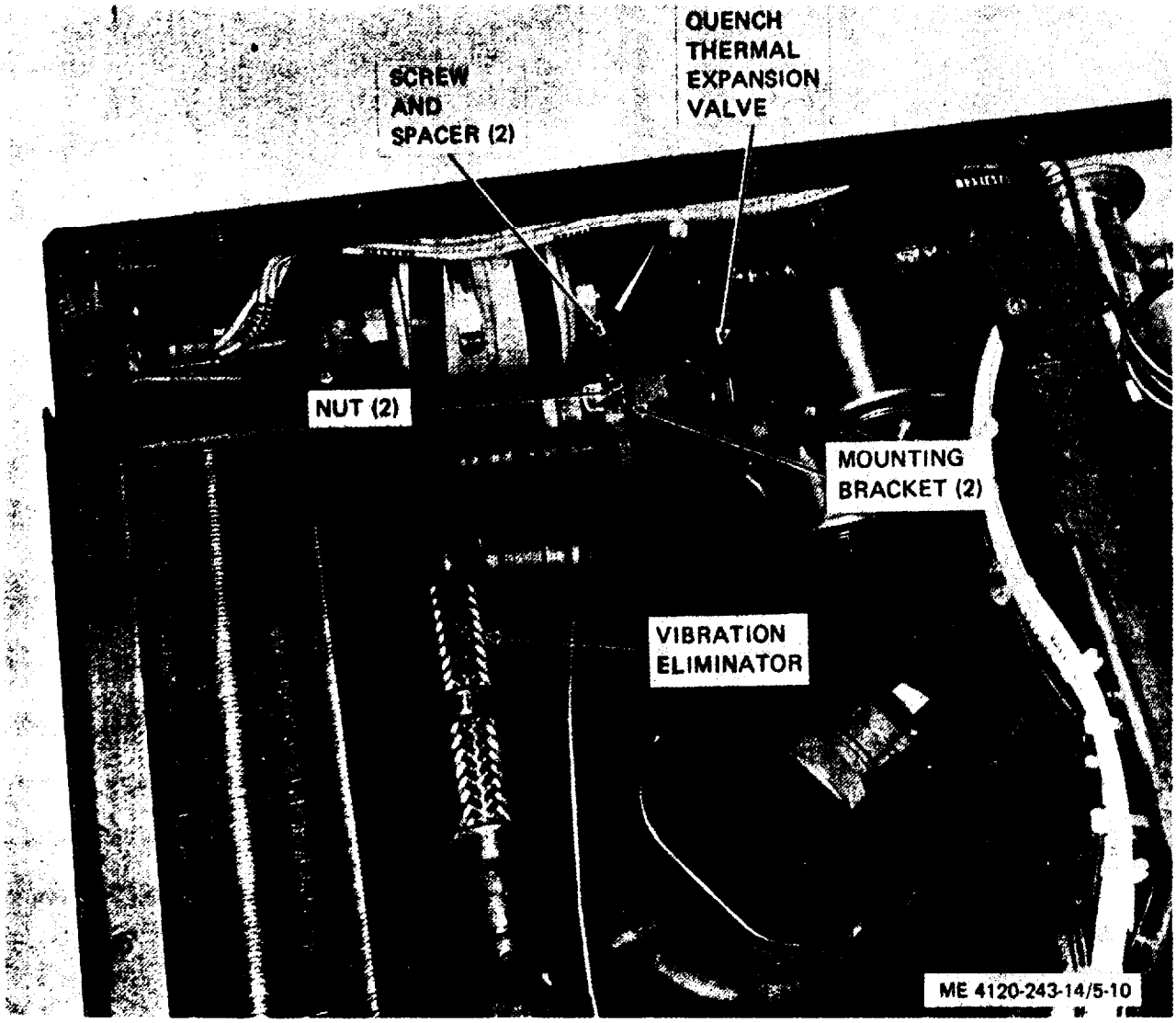


Figure 5-10. Quench valve and vibration eliminator.

c. Installation. Install the quench thermal expansion valve (fig. 5-10) as follows:

(1) Solder valve to tubing.

(2) Install mounting bracket and two screws, spacers and self-locking nuts.

(3) Insert approximately one ounce of thermal mastic in bulb well. Insert sensing bulb of expansion valve and move bulb back and forth to distribute mastic and set bulb approximately one inch beyond open end.

(4) Install housing rear top cover (para 4-21).

(5) Refer to paragraph 6-3 and charge the refrigerant system.

5-30. Vibration Eliminators

a. Removal. Refer to paragraph 6-3 and discharge the refrigerant system. Remove housing top covers. Refer to figure 5-10 and unsolder hose type vibration eliminators.

b. Installation. Refer to figure 5-10 and solder vibration eliminators into refrigeration lines. Install housing top covers. Refer to paragraph 6-3 and charge the refrigerant system.

5-31. Pressure Regulator Valves

a. *Removal.* Refer to paragraph 6-3 and discharge the refrigerant system. Remove housing top covers (para 4-21). Refer to figure 5-11 and remove screws, lock washers, loop clamps, and spacers. Unsolder pressure regulator valves from tubing.

b. Installation. Solder pressure regulator valve (fig. 5-10) on tubing and install loop clamp, spacer, screw and lock washer. Install housing top covers (para 4-21). Refer to paragraph 6-3 and charge the refrigerant system.

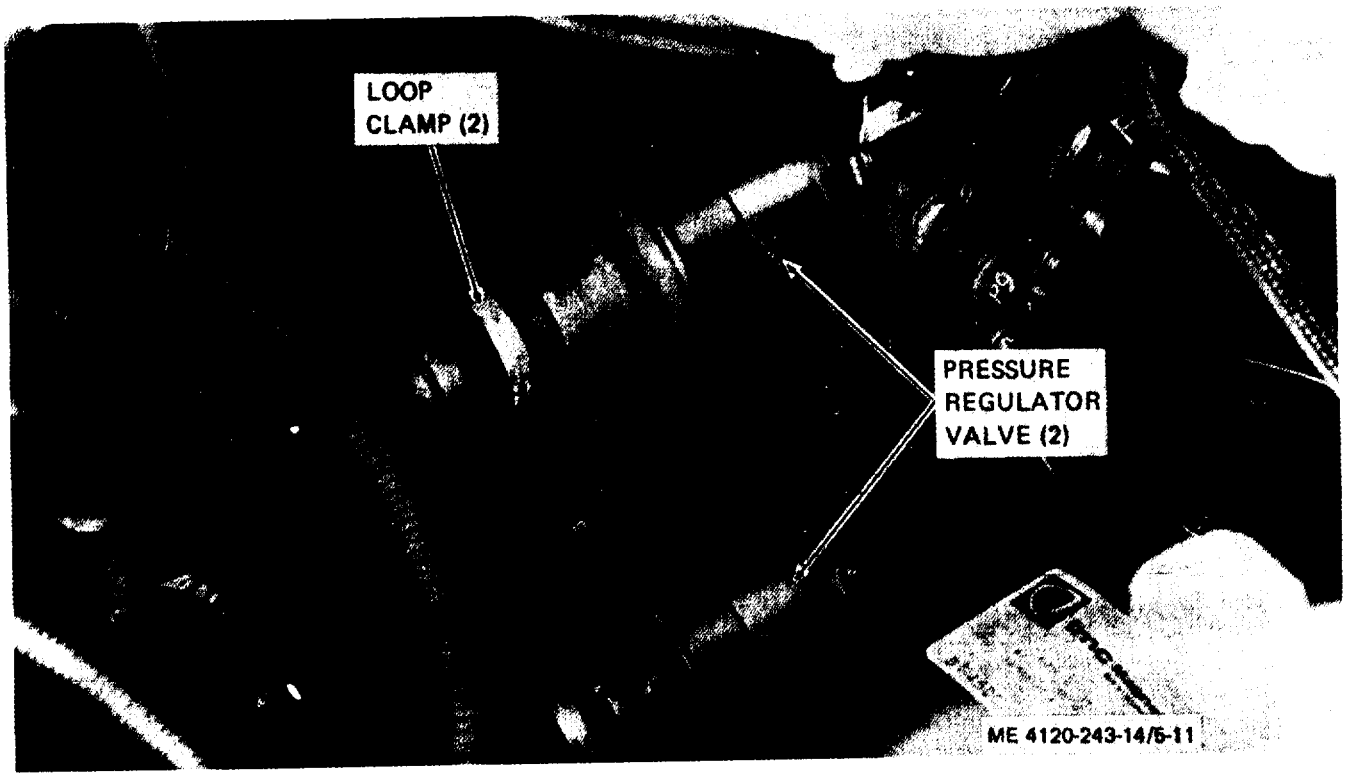


Figure 5-11. Pressure regulator valves.

5-32. Accumulator

a. Removal. Remove the accumulator (fig. 5-12) as follows:

(1) Refer to paragraph 6-3 and discharge the refrigerant system.

(2) Refer to paragraph 4-21 and remove housing top covers. Refer to paragraph 4-18 and remove air inlet louver.

(3) Remove nut and lock washer from stud on bottom of accumulator.

(4) Disconnect piping as required and remove elbow from top of accumulator.

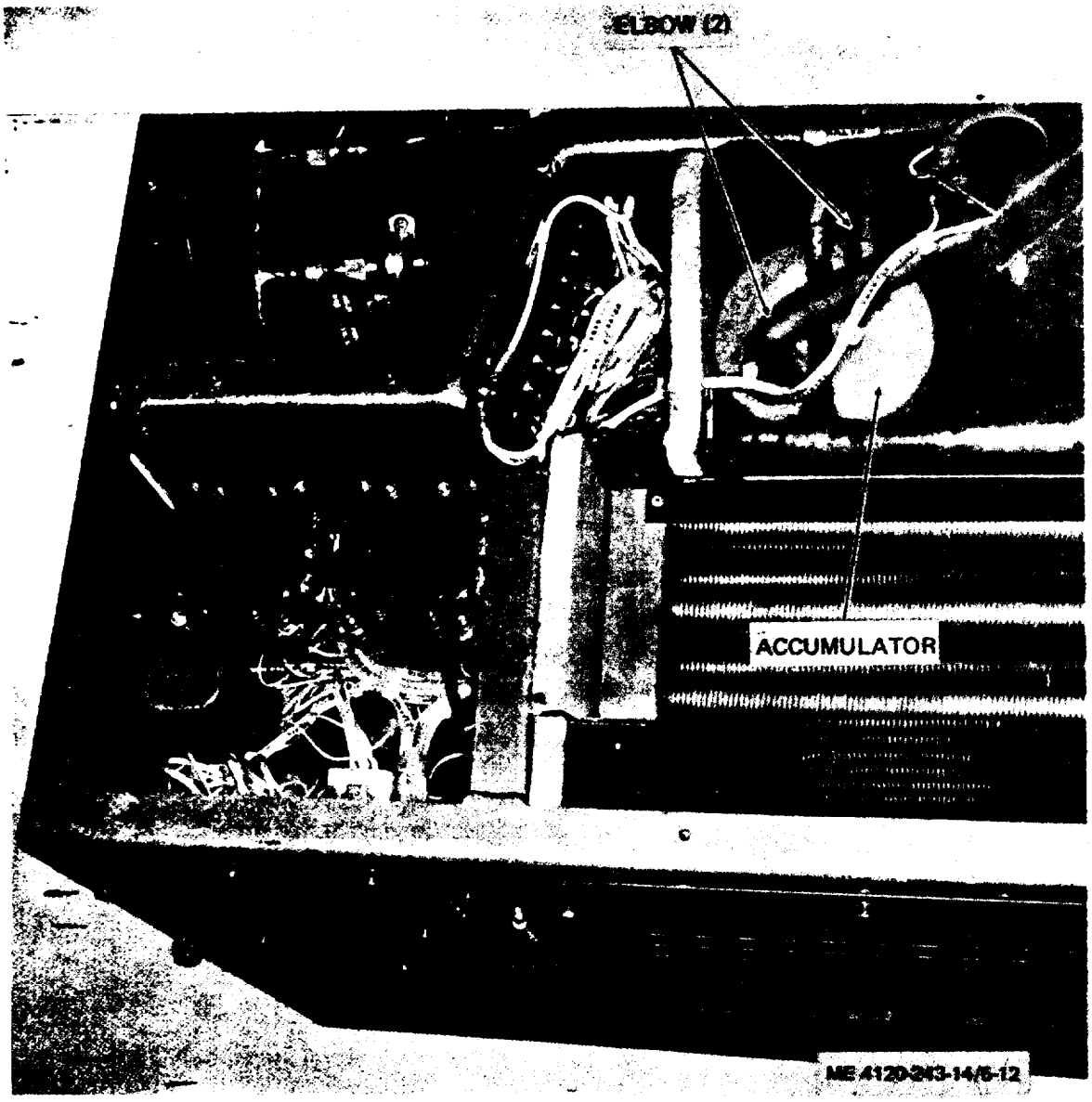


Figure 5-12. Accumulator.

b. Installation. Install the accumulator as follows :

(1) Install accumulator (fig. 5-12) with stud through hole in bottom of evaporator compartment of the housing. Install lock washer and nut on stud.

(2) Install elbows and connect elbows and piping.

(3) Install evaporator air inlet louver (para. 4-18) and housing top covers (para 4-21).

(4) Refer to paragraph 6-3 and charge the refrigerant system.

5-33. Motors

Refer to paragraph 4-38 for removal of motors and to paragraph 4-40 for installation.

5-34. Control Module

Refer to paragraph 4-44 for removal of control module and to paragraph 4-48 for installation

CHAPTER 6

REPAIR INSTRUCTIONS

Section I. REFRIGERATION SYSTEM

6-1. General

The refrigerant system, illustrated by the refrigerant flow diagram (fig. 5-1), is a mechanical, vapor cycle-type circuit consisting of the evaporator, thermal expansion valve, motor compressor, condenser and the necessary valves and cutout devices for automatic control during operation. The thermal expansion valve releases high-pressure liquid refrigerant into the evaporator at reduced pressure. The liquid refrigerant begins to vaporize by absorbing heat from the air passing over the external surface of the evaporator core. The heated vapor is sucked out of the evaporator suction by the motor compressor and forced into the condenser section under high pressure where it is cooled and condensed back into a liquid. The heat released during condensation is carried off by the condensing air stream. The liquid refrigerant flows from the condenser to a receiver, to a sub-cooler, and then to the thermal expansion valve. If the temperature control switch (evaporator return air thermostat) becomes satisfied, or the evaporator return air temperature is lower than the control switch set point, the refrigerant system will switch to a by-pass condition. The temperature control switch will activate the normally open bypass solenoid valve, closing the valve, and therefore shutting off the evaporator section of the unit. The motor compressor will continue to pump as usual and the suction pressure will begin to drop. When it reaches approximately 65 psig, the pressure regulating valves will start to open in an effort to maintain the suction pressure above 55 psig (approx.). As the suction temperature increases, due to the pressure regulating valves opening, the quench expansion valve will start to meter liquid refrigerant into the suction line in an effort to maintain the suction temperature below 75°F (approx.) or 30° F superheat (approx.). This action (the pressure regulating and quench valve actions) is totally automatic and also may occur at extreme conditions in an attempt to maintain the suction pressures (even during the cooling mode) at a condition above 55 psig and the suction temperatures (measured at the quench bulb well) below 75° F. When the compressor stops, the equalizer solenoid valve de-energizes and assure es its normal open position, thus allowing pressure to equalize from the discharge line to the suction side of the compressor. To determine if the valve is good, check for continuity or ground, by using an ohmmeter. It should read a resistance of 40 ohms. The condenser louvers are operated by a refrigerant powered piston located in high pressure part of the system. This piston should be fully extended (louvers open 80° approx.) at 250 psig head pressure and fully closed at 165 psig. Failure to perform this function could result in icing of the evaporator coil and / or cutout on the low pressure cutout.

6-2. Pressure Testing the Refrigerant System

a. General. A pressure test will indicate whether the air conditioner is operating at normal or abnormal pressures. When the air conditioner is not operating at normal pressures, the cause should be ascertained and corrected. Refer to table 5-1 for troubleshooting chart.

b. System Pressure Test. Remove caps from high and low pressure charging valves (fig. 5-7). Correct suction and discharge pressure gages to their respective charging valves. Compare the gage reading with the normal range of system pressure shown in Table 6-1.

Table 6-1. Normal Operating Pressures

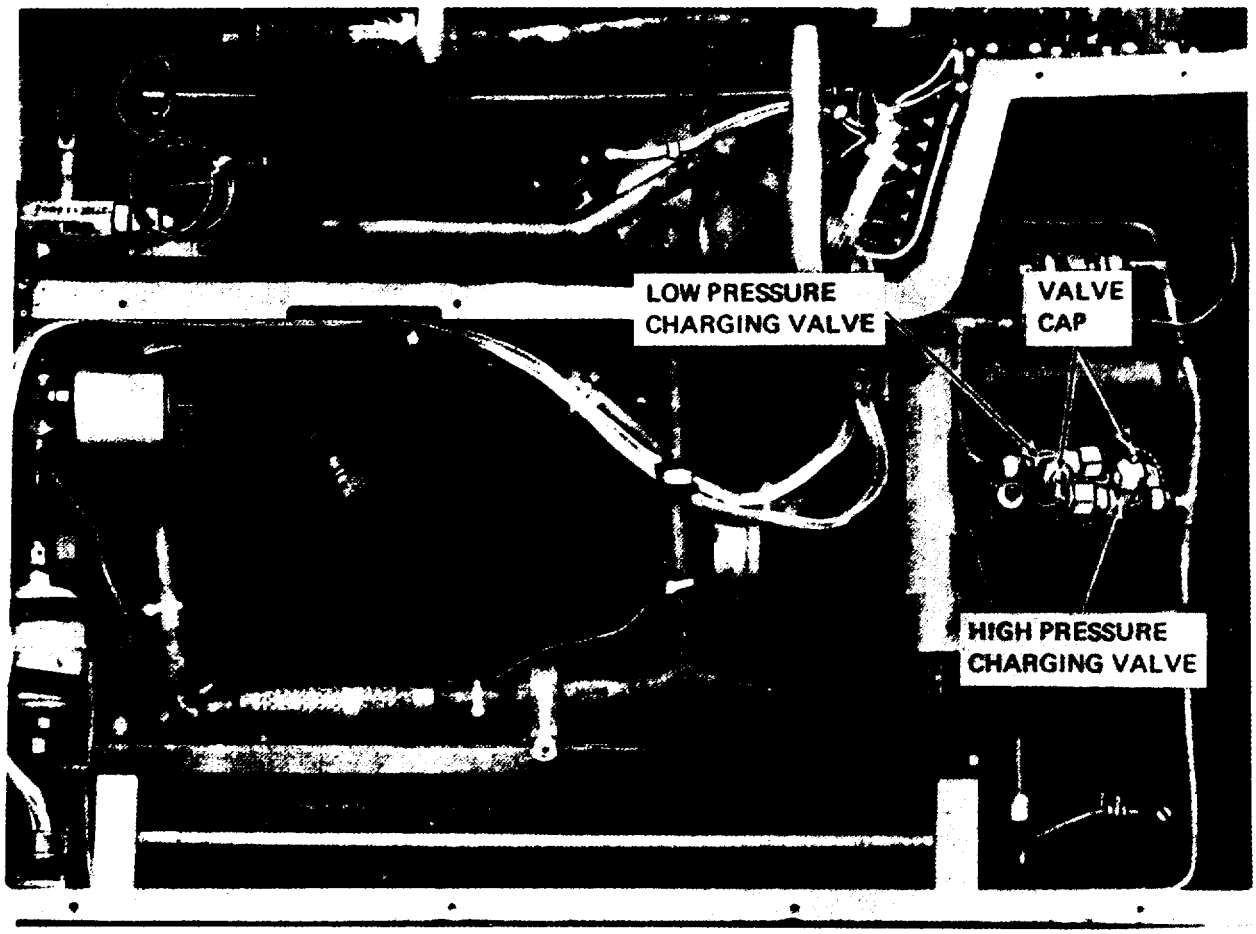
OUTDOOR AMBIENT — DEGREES F

	50° F	75° F	100° F	120° F
	90° F DB RETURN AIR TO UNIT			
Suction	58—65	58—70	60—75	75—90
Discharge	125—160	175—210	255—295	370—410
	80° F DB RETURN AIR TO UNIT			
Suction	58—65	58—70	60—75	65—75
Discharge	120—155	170—205	250—290	370—410

6-3. Servicing Refrigerant System

a. General. When the air conditioner must undergo maintenance that requires opening the system, the system must be discharged prior to maintenance and purged and charged after maintenance. This paragraph covers the basic procedures involved in servicing the refrigerant system.

b. Discharging and Purging System. Refer to figure 6-1 for discharging or purging the refrigerant system.



TO DISCHARGE SYSTEM:

REMOVE LOW PRESSURE CHARGING VALVE CAP. ATTACH A SUITABLE HOSE TO CHARGING VALVE AND DISCHARGE REFRIGERANT INTO A SAFE AREA.

NOTE: TO PREVENT EXCESS LOSS OF OIL, DISCHARGE SYSTEM SLOWLY OVER A PERIOD OF TWO HOURS.

TO PURGE SYSTEM:

REMOVE HIGH PRESSURE CHARGING VALVE CAP. CONNECT VALVE TO A CYLINDER OF DRY NITROGEN. ATTACH A SUITABLE DISCHARGE HOSE TO LOW PRESSURE CHARGING VALVE. OPEN NITROGEN VALVE AND ALLOW NITROGEN TO FLOW THROUGH SYSTEM UNTIL ALL MOISTURE IS FORCED OUT. CLOSE NITROGEN CYLINDER VALVE.

CONNECT A VACUUM PUMP TO HIGH AND LOW PRESSURE CHARGING VALVES. HOLD A 29.0" Hg VACUUM FOR 8 HOURS.

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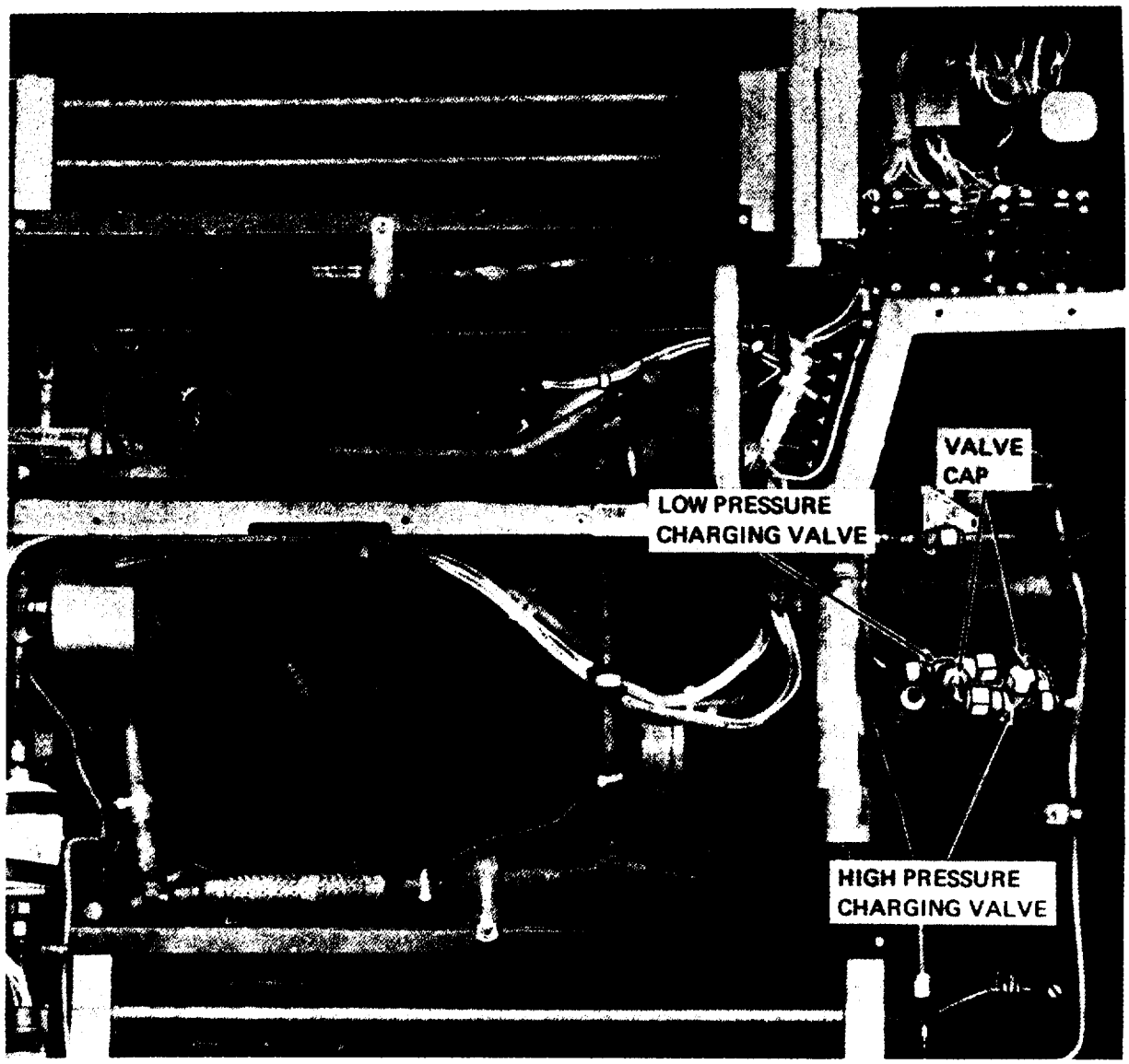
Figure 6-1. Discharging and evacuating refrigerant system.



NOTE: A DRUM OF REFRIGERANT (R22) IS REQUIRED WITH A SUITABLE CHARGING LINE CONNECTED TO THE DRUM. THE CHARGING LINE SHALL CONTAIN A DEHYDRATOR AND A SHUT-OFF VALVE AT THE DRUM.

ME 4120-243-14/6-2(1)

Figure 6-2. Charging refrigerant system (sheet 1 of 2).

NOTE: STEPS 1, 2 AND 3 APPLY ONLY TO A COMPLETELY EVACUATED SYSTEM. TO ADD ADDITIONAL REFRIGERANT TO A CHARGED SYSTEM, REFER TO STEPS 6 THROUGH 9.

STEP 1. REMOVE HIGH PRESSURE CHARGING VALVE CAP AND LOOSELY CONNECT CHARGING LINE OF DRUM TO VALVE.

STEP 2. OPEN REFRIGERANT DRUM VALVE SLIGHTLY TO PURGE AIR FROM CHARGING LINE. CLOSE REFRIGERANT DRUM VALVE AND TIGHTEN CONNECTION AT CHARGING VALVE.

STEP 3. SET THE REFRIGERANT DRUM IN AN INVERTED POSITION ON A SCALE. DO NOT OPERATE THE AIR CONDITIONER. OPEN CHARGING LINE VALVE AND CHARGING VALVE AND CHARGE REFRIGERANT SYSTEM UNTIL SYSTEM AND DRUM PRESSURES HAVE EQUALIZED OR UNTIL 5.5 POUNDS OF REFRIGERANT HAVE ENTERED THE SYSTEM.

STEP 4. CLOSE VALVES AND CAREFULLY LOOSEN THE CHARGING LINE TO RELEASE TRAPPED PRESSURE. DISCONNECT CHARGING LINE AND INSTALL CHARGING VALVE CAP. OPERATE AIR CONDITIONER IN COOLING MODE FOR 15 MINUTES.

STEP 5. CHECK LIQUID SIGHT INDICATOR. IF SYSTEM IS SHORT OF REFRIGERANT, GAS BUBBLES WILL APPEAR REGULARLY IN THE INDICATOR. IF REFRIGERANT SYSTEM IS UNDER-CHARGED, ADD ADDITIONAL REFRIGERANT FOLLOWING STEPS 6 THROUGH 9.

STEP 6. USING SAME DRUM AND CHARGING LINE, PLACE DRUM IN AN UPRIGHT POSITION ON A SCALE. REMOVE CAP FROM LOW PRESSURE (SUCTION STEP E) CHARGING VALVE AND LOOSELY CONNECT CHARGING LINE TO VALVE. PURGE AIR FROM LINE AS IN STEP 2.

CAUTION: WHEN ADDING REFRIGERANT, USE EXTREME CARE TO AVOID ADDING REFRIGERANT TO THE SYSTEM TOO FAST WHICH WOULD CAUSE SLUGGING AT THE COMPRESSOR.

STEP 7. WITH THE AIR CONDITIONER OPERATING, ADMIT GAS TO SYSTEM SLOWLY (APPROXIMATELY 1 OUNCE PER MINUTE). CONSTANTLY OBSERVE DRUM WEIGHT TO INSURE THAT ONLY 5.5 POUNDS TOTAL WEIGHT OF REFRIGERANT IS IN SYSTEM.

STEP 8. REPEAT STEP 4.

STEP 9. CHECK LIQUID SIGHT INDICATOR. IF INDICATOR REGULARLY SHOWS BUBBLES, REPEAT STEPS 6 THROUGH 8 ADDING REFRIGERANT IN 4 OUNCE INCREMENTS UNTIL INDICATOR IS CLEAR.

ME 4120-243-14/6-2 (2)

Figure 6-2. Charging refrigerant system (sheet 2 of 2).

6-4. Repairing Refrigerant Leaks

a. Locate leak (para 4-64).

b. Discharge system (para 6-3), repair leak, and recharge system (para 6-3).

Note. If soldering is necessary on any part of the system, a constant purge of dry nitrogen must be fed through the system being soldered to prevent scale formation within the system.

6-5. Compressor Motor Burnout Clean Up Procedures

a. General. Experience has demonstrated that after a hermetic motor burnout, the system must be cleaned thoroughly to remove all contaminants, otherwise, a repeat burnout will occur.

b. Clean Up Procedures. A motor that fails to start may be due to improper voltage, a malfunction of the compressor start relay, or a compressor mechanical fault. Make certain that a burnout has occured by doing the following:

(1) Check for proper voltage by turning off the main disconnect switch so that all power is off.

(2) Remove the front access cover.

(3) Remove the compressor leads at the compressor side of the start relay.

(4) Close the disconnect switch to energize the control circuit.

(5) Check for voltage on all lines at both the line and load side of the compressor start relay.

Note. Before checking the compressor motor, make sure the compressor is cool to the touch. Otherwise, a false indication may be obtained due to internal motor protectors being open.

(6) Check the compressor motor to see if it is electrically grounded or open. A 500 volt megger or an ohmmeter can be used for making the test. Typical megger reading is 5 megohms.

(7) Purge a small amount of refrigerant gas from the compressor and smell it cautiously. A motor burnout is ususally indicated by the customary burned odor.

c. Safety Measures. In addition to the electrical hazards, the serviceman should be aware of acid burns. Take the following precautions:

(1) When testing for odor, release a small amount of gas and smell it cautiously to avoid inhalation of toxic decomposed products.

(2) When discharging gas or liquid refrigerant from a burnout, avoid eye or skin contact with the product. If the entire charge is to be removed, it should be discharged outside any enclosure. Do not discharge into an open flame.

(3) When necessary to come in contact with oil or sludge from a burned out compressor, rubber gloves should be worn to avoid acid burns.

d. Determine Severity of Burnout. It is helpful to classify burnouts as "mild" or "severe" and to use the severity as a guide for the clean up procedure to be followed. The severity can be determined by the following means: if possible, obtain a small sample of oil from the burned out compressor and analyze it, using an acid test kit. Discoloration of the oil may indicate a severe burnout.

e. Clean Up after a Mild Burnout. When the burnout is mild, the contaminant can be removed by changing the liquid line dehydrator, or installing one, if the system did not have one originally. The procedure to follow is:

(1) Discharge the refrigerant system (para 6-3).

(2) Remove the burned out compressor (para 5-17).

(3) Install a new compressor motor (para 5-17).

(4) Remove the dehydrator and install an oversize replacement dehydrator.

(5) Pump the system down to less than 500 merons. Break the vacuum at least three times with a small refrigerant charge, bringing the suction pressure up to approximately 3 psig.

(6) Recharge the system and put in operation (fig. 6-2).

f. Clean Up after a Severe Burnout. Complete cleaning of the system is required as follows:

(1) Discharge the refrigerant system (para 6-3).

(2) Install a dehydrator in the suction line. Change strainer, as well as changing or installing an oversize liquid line dehydrator. In this way, the suction dehydrator protects the new compressor from any contaminants that may remain in the system. Leaving a permanent type dehydrator in the suction line allows the serviceman to complete the clean up at one time. A pressure tap should be installed upstream of the suction dehydrator so that the pressure drop, from the tap to the service valve, can be checked after several hours of operation. A pressure drop in excess of 3 psig is generally considered excessive.

(3) Check the expansion device and clean or replace it. Replace sight glass.

(4) Remove the burned out compressor and install the replacement.

(5) Evacuate the system.

(6) Recharge the system and put in operation.

(7) Check pressure drop across the suction dehydrator after one hour of operation. Change, if necessary, and evacuate system.

(8) After 8 to 24 hours of operation, change suction dehydrator. Check odor and color of oil. Evacuate system.

(9) After 14 days of operation, check color and acidity of oil. If required, change dehydrators. Before clean up is completed, it is essential that oil is clean and no acid is present.

Note. The new compressor should not be used for pulling a vacuum. Pull a high vacuum (less than 500 microns) for several hours. Allow the system to stand several hours to be sure the vacuum is maintained.

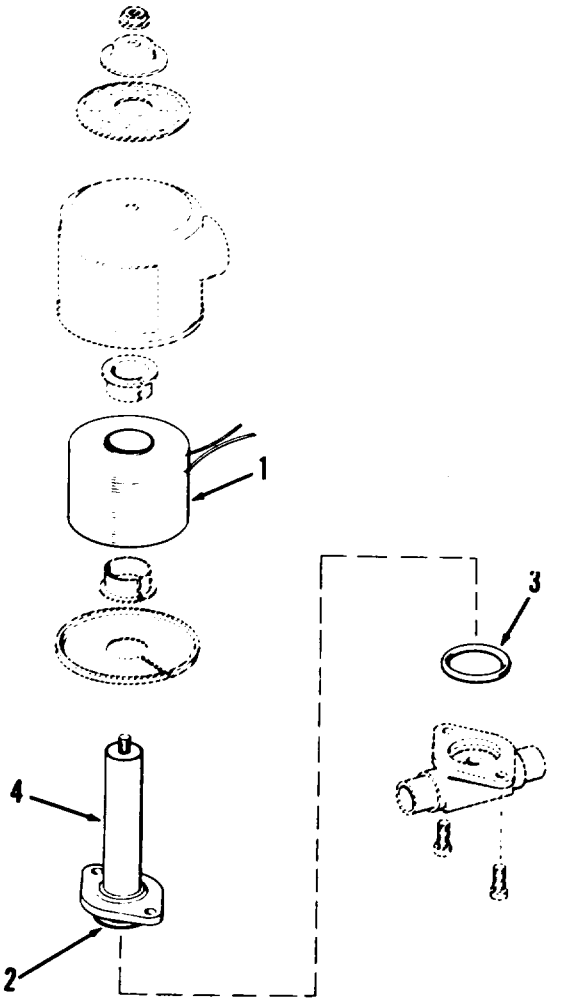
6-6. Evaporator and Condenser Coils

a. Inspection. Inspect coils for damaged tubing and bent fins. Inspect threaded holes for damaged or stripped threads.

b. Repair. Repair any leaks. Straighten bent fins. Repair or replace damaged tubing if possible. Replace coil if repair is not practical.

6-7. Solenoid Valves

a. General. The solenoid valves without electrical connectors are identical. Replaceable parts are the coil, bonnet assembly, diaphragm and the preformed packing. See figure 6-3.



1. Coil
2. Diaphragm
3. Preformed packing
4. Bonnet assembly

Figure 6-3. Solenoid valve, exploded view.

b. Coil Replacement. Replace coil as follows:

(1) Remove electrical connector from solenoid valve leads.

(2) Remove nut on top of valve housing. Lift housing and coil assembly from bonnet assembly.

(3) Remove coil from housing.

(4) Install coil bottom plate with edge upward.

(5) Install lower coil sleeve with flange at bottom. Install coil with lead exits at bottom.

(6) Install coil spring with flat edges upward and upper coil sleeve with flange at top. Sleeve passes through the coil spring.

(7) Install coil housing, data plate and nut.

c. Bonnet Assembly and Diaphragm Replacement. Replace parts as follows:

(1) To replace diaphragm (2, fig. 6-3), remove two screws from body flanges and lift housing, coil and bonnet assembly (4) from body. Lift out diaphragm.

(2) To replace bonnet assembly, remove coil housing and coil (b above) from bonnet assembly.

(3) Assemble coil and bonnet assembly. Install diaphragm and preformed packing (3) on body. Install coil and bonnet assembly and secure with two screws.

6-8. Fan Motors

a. General. The condenser fan motor and the evaporator fan motor are identical. Motors for air conditioners having different electrical characteristics are similar in construction and the repair instructions contained in this paragraph apply to all motors except as noted.

b. Disassembly. Refer to figure 6-4 and disassemble motor as follows:

(1) Remove four hex nuts (1) four through bolts (2) and eight flat washers (3). Remove rear end bell (4).

(2) Pull out rotor (9) and remove shims (5 and 6), bearing spacers (7) and bearings (8).

(3) Remove screw (10), washer (11), and loop clamp (12). Remove screw (13), washer (14), and ground terminal (15). Disconnect leads and remove cable (16) and strain relief bushing (17).

(4) For single phase motors, remove front end bell (27) from stator (29).

(5) For three phase motors, refer to paragraph 4-39 and remove thermal protector housings (21 and 25) thermal protectors (22 and 26) and attaching hardware. Remove front end bell (28) from stator (29).

KEY to fig. 6-4:

1. Nut, hex
2. Bolt, through
3. Washer, flat
4. End bell, rear
5. Shim
6. Shim
7. Spacer, bearing
8. Bearing, ball annular
9. Rotor
10. Screw
11. Washer
12. Clamp, loop
13. Screw
14. Washer
15. Terminal
16. Cable
17. Bushing, strain relief
18. Connector
19. Screw
20. Washer
21. Housing, thermal protector
22. Thermal protector
23. Screw
24. Washer
25. Housing, thermal protector
26. Thermal protector
27. End bell, front
28. End bell, front
29. Stator

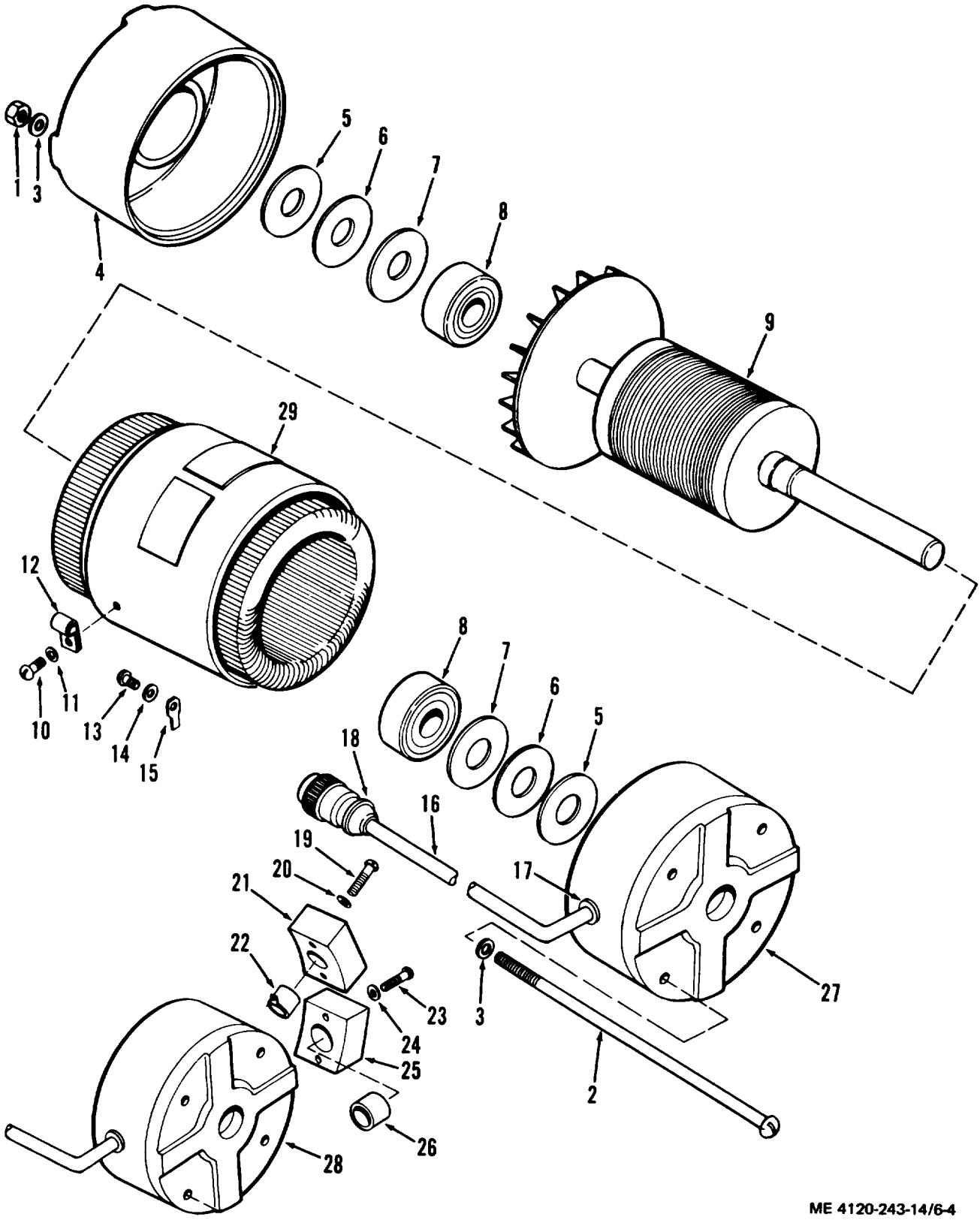


Figure 6-4. Fan motor, exploded view.

c. Cleaning, Inspection and Repair. Clean, inspect and repair parts as follows:

(1) Clean metal parts with cleaning solvent (Fed Spec. P-D-680). Wipe off electrical parts with a clean cloth.

(2) Inspect wiring for damaged insulation and broken wiring. Repair damaged insulation or replace defective wiring.

(3) Inspect connector for damage. Replace damaged connector.

(4) Inspect bearing for wear, galling or flat spots. Replace defective bearings.

(5) Inspect shaft for gouges or worn bearing surface. Repair minor defects or replace rotor.

(6) Inspect stator for damaged, broken or shorted wiring. Replace defective stator.

d. Assembly. Refer to figure 6-4 and assemble motor as follows:

(1) For three phase motors, install thermal protectors (22 and 26) and housings (21 and 25) in front end bell (28) as described in paragraph 4-39.

(2) Install connector (18) and cable (16). Install cable and strain relief bushing (17) in end bell (27 or 28). Partially install end bell on stator and connect terminal (15) with screw (13) and washer (14). Make electrical connections.

(3) Install shims (5 and 6), bearing spacers (7) bearings (8) and rotor (9).

(4) Install rear end bell (4). Place a flat washer (3) on each through bolt (2). Install through bolts in motor and secure each with a nut (1) and washer (3).

(5) Install loop clamp (12) on cable and secure clamp to stator frame with screw (10) and washer (11).

6-9. Control Module

a. General. This paragraph covers repair of the control module. Disassembly and assembly procedures for modules of different electrical characteristics are the same except for minor details. Testing, removal, and installation of switches and circuit breaker are covered in paragraphs 4-45 through 4-47. Parts of the control module are shown in figure 6-5.

b. Disassembly. Refer to figure 6-5 and disassemble the control module as follows:

(1) Remove four screws (1) and split grommet (3). Slide cover (2) from module and pull capillary tube and bulb through opening in bottom of cover.

(2) Remove knob (4). Drive out roll pin (5).

(3) Disconnect leads. Remove three self-locking screws (6) and remove rear mounting frame (23) with connector and temperature control switch attached.

(4) Remove connector mounting screw (7), nut (8) loop clamp (10), washer (21), and spacer post (9) to release temperature control capillary tube.

KEY to fig. 6-5:

1. Screw, flat csk-hd, 4-40 x 7/16
2. Cover
3. Grommet, split
4. Knob
5. Roll pin
6. Screw, self-lkg, flat-hd, 6-32 x 5/16
7. Screw, flat, csk-hd, 6-32 x 7/8
8. Nut, hex, self-lkg, 6-32
9. Post, spacer
10. Loop clamp
11. Screw, flat csk-hd, 6-32 x 7/16
13. Washer, flat, No. 6
14. Switch, temperature control
15. Screw, flat, csk-hd, 8-32 x ½
16. Nut, hex, 8-32
17. Washer, lock, No. 8
18. Washer, flat, No. 8
19. Screw, flat, csk-hd, 6-32 x 7/16
20. Nut, hex, self-lkg, 6-32
21. Washer, flat, No. 6
22. Connector assembly
23. Mounting frame
24. Screw, self-lkg, pan-hd, 6-32 x 5/16
25. Washer, flat, No. 6
26. Post
27. Setscrew, hex-soc, 4-48 x ⅛
28. Knob
29. Jackscrew extension
30. Switch, toggle
31. Knob
32. Rotary switch, mode selector
33. Screw, self-lkg, pan-hd, 6-32 x 5/16
34. Washer, flat, No. 6
35. Circuit breaker (3 phase)
36. Mounting plate
37. Circuit breaker (1 phase)
38. Mounting plate
39. Grommet
40. Designation plate

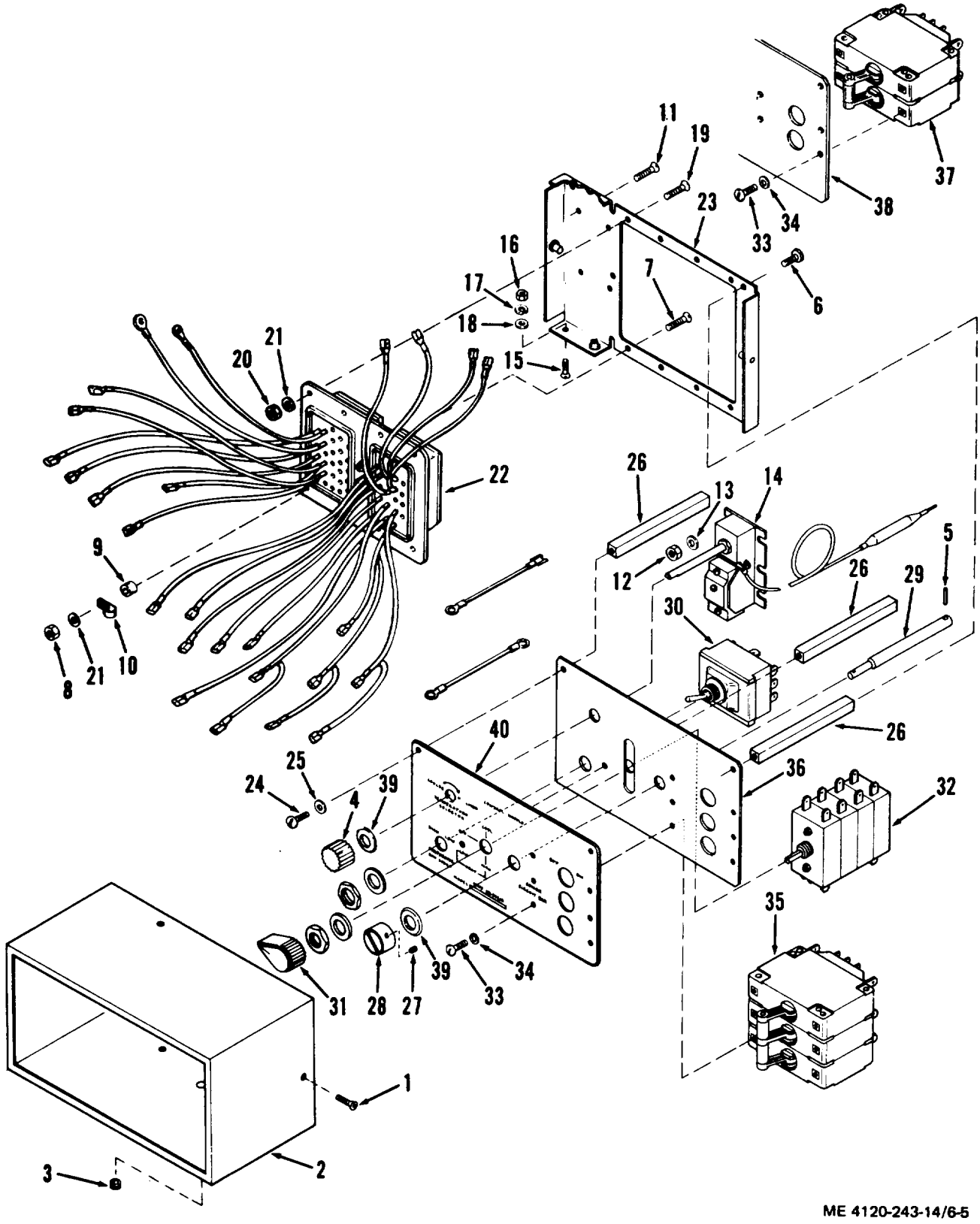


Figure 6-5. Control module, exploded view.

(5) Remove four screws (11), nuts (12) and washers (13) and remove temperature control switch (14).

(6) Remove screw (15), nut (16), lock washer (17) and two flat washers (18) and disconnect ground lead.

(7) Remove seven remaining screws (19), nuts (20) and washers (21) and remove connector assembly (22) from mounting frame (23). Do not remove leads from connector unless they require replacement.

(8) Remove three screws (24), washers (25) and posts (26).

(9) Remove setscrew (27), knob (28), and jackscrew extension (29).

(10) Remove toggle switch (30) by removing locknut and washer.

(11) Remove mode selector knob (31), switch nut and washer and remove mode selector rotary switch (32).

(12) Disassemble handle of three phase circuit breaker (35) or single phase circuit breaker (37). Remove six screws (33) and washers (34) securing three phase circuit breaker (35) to mounting plate (36) or four screws and washers, securing single phase circuit breaker (37) to mounting plate (38). Remove circuit breaker.

(13) Remove grommets (39) and designation plate (40) from mounting plate.

c. Cleaning, Inspection and Repair.

(1) Clean metal parts with cleaning solvent (Fed. Spec. P-D-680). Wipe off electrical parts with a clean cloth.

(2) Refer to paragraph 4-45 and test switches and circuit breaker. Replace defective parts.

(3) Inspect connector for damaged casing and bent or broken contacts. Check wiring for damaged insulation and broken wires. Check terminals for damage. Repair damaged wiring. Replace connector if defective.

(4) Check cover, frame, and plates for bent condition. Straighten bent parts or replace parts as required.

d. Assembly. Refer to figure 6-5 and assemble control module as follows:

(1) Place designation plate (40) on mounting plate (36 or 38) and install circuit breaker (35 or 37) with screws (33) and washers (34). Install grommets (39).

(2) Install rotary switch (32) and secure with switch nut and washer. Install knob (31).

(3) Install toggle switch (30) and secure with switch nut and washer.

(4) Insert jackscrew extension (29) through opening in mounting plate and install knob (28) and setscrew (27).

(5) Install connector assembly (22) on rear mounting frame (23) and secure with seven screws (19), nuts (20), and washers (21). Omit screw in lower corner.

(6) Install screw (15), washers (18), lock washer (17) and nut (16) with ground terminal between the two flat washers (18).

(7) Install temperature control switch (14) on frame and secure switch with four screws (11), nuts (12), and flat washers (13). Install loop clamp (10) on capillary tube and install screw (7), spacer (9), washer (21), clamp and nut (8).

(8) Assemble three posts (26) to front plates with screws (24) and washers (25). Position posts against frame and install screws (6). Install roll pin (5).

(9) Pass capillary tube through opening in bottom of cover (2) and install cover on module. Install grommet (3) and four screws (1).

APPENDIX A

REFERENCES

A-1. Fire Protection

TB 5-4200-200-10	Hand Portable Fire Extinguishers for Army Users

A-2. Lubrication

C9100IL	Fuels, Lubricants, Oils and Waxes

A-3. Painting

TM 9-213	Painting Instructions for Field Use

A-4. Radio Suppression

TM 11-483	Radio Interference Suppression

A-5. Maintenance

TM 38-750	Army Equipment Record Procedures
TM 5-764	Electric Motor and Generator Repair

A-6. Shipment and Storage

TB 740-93-2	Preservation of USAMEC Mechanical Equipment for Shipment and Storage
TM 740-90-1	Administrative Storage of Equipment

APPENDIX B

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1. General

a. Section I provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.

b. Section II designates overall responsibility for the performance of maintenance operations on the identified end item or component. The implementation of the maintenance tasks upon the end item or component will be consistent with the assigned maintenance operations.

c. Section III lists the special tools and test equipment required for each maintenance operation as referenced from Section II.

d. Section IV contains supplemental instructions, explanatory notes and / or illustrations required for a particular maintenance function.

B-2. Explanation of Columns in Section II

a. Functional Group Number. The functional group is numerical group set up on a functional basis. The applicable functional grouping indexes (obtained from TB 750-93-1 Functional Grouping Codes) are listed on the MAC (Maintenance Allocation Chart) in the appropriate numerical sequence. These indexes are normally set up in accordance with their function and proximity to each other.

b. Component Assembly Nomenclature. This column contains a brief description of the components of each functional group.

c. Maintenance Operations and Maintenance Levels. This column lists the various maintenance operations ("A through "K") and indicates the lowest maintenance level authorized to perform these operations. The symbol designations for the various maintenance levels are as follows:

C. . . . . Operator and/or crew
O . . . . Organizational maintenace
F. . . . . Direct support maintenance (DS)
H. . . . General support maintenance (GS)
D. . . . Depot maintenance

The Maintenance Operations are defined as follows:

C—SERVICE: Operations requiring periodically to keep the item in proper operating condition, i.e., to clean, preserve, drain, paint, and replenish fuel, refrigerant lubricants, hydraulic, and deicing fluids, or compressed air supplies.

D—ADJUST: Regulate periodically to prevent malfunction. Adjustments will be made commensurate with adjustment procedures and associated equipment specifications.

E-ALINE: Adjust two or more components of an electrical or mechanical system so that functions are properly synchronized or adjusted.

F—CALIBR ATE: Determine, check, or rectify the graduation of an instrument, weapon, or weapons system or components of a weapons system.

A—INSPECT: Verify serviceability and detect incipient electrical or mechanical failure by close visual examination.

B—TEST: Verify serviceability and detect incipient electrical or mechanical failure by measuring the mechanical or electrical characteristics of the item and comparing those characteristics with authorized standards. Detect leaks in the refrigerant system with the aid of a leak detector. Tests will be made commensurate with test procedures and with calibrated tools and /or test equipment reference in the MAC

H—REPLACE: Substitute serviceable components, assemblies and subassemblies for unserviceable counter parts or remove and install the same item when required for the performance of other maintenance operations.

G—INSTALL: To set up for use in an operational environment such as an emplacement, site, or vehicle.

I—REPAIR : Restore to a serviceable condition by replacing unserviceable parts or by any other action required using available tools, equipment and skills—to include welding, grinding, riveting, straightening, adjusting and facing.

J—OVERHAUL: Restore an item to a completely serviceable condition (as prescribed by serviceability standards developed and published by the commodity commands) by employing techniques of "Inspect and Repair Only as Necessary" (IROAN). Maximum use of diagnostic and test equipment is combined with minimum disassembly during overhaul. "Overhaul" may be assigned to any level of maintenance except organizational, provided the time, tools, equipment, repair parts authorization, and technical skills are available at that level. Normally, overhaul as applied to end items, is limited to depot maintenance level.

K—REBUILD: Restore to a condition comparable to new by disassembling to determine the condition of each component part and reassembling using serviceable, rebuilt, or new assemblies, subassemblies, and parts.

d. Tools and Equipment. This column is provided for referencing the Special Tool and Test Equipment Requirements (sec. III) and Remarks (sec. IV) that may be associated with maintenance operation (sec. II).

e. Remarks. This column is provided for referencing by codes the remarks (sec. IV) pertinent to the maintenance functions.

B-3. Explanation of Columns in Section III

a. Reference Code. This column consists of a number and a letter separated by a dash. The number references the T & TE requirements column on the MAC. The letter represents the specific maintenance operation the item is to be used with. The letter is representative of columns "A" through "J" on the MAC.

b. Maintenance Level. This column shows the lowest level of maintenance authorized to use the special tool or test equipment.

c. Nomenclature. This column lists the name or identification of the tool or test equipment.

d. Tool Number. This column lists the manufacturer's code and part number, or Federal Stock Number, of tools and test equipment.

B-4. Explanation of Columns in Section IV

a. Reference Code. This column consists of two letters separated by a dash, both of which are references to section II. The first letter references column (5), section II and the second letter references a maintenance operation, Column "A" through "K".

b. Remarks. This column lists information pertinent to the Maintenance Operation being performed, as indicated on the MAC section II.

Section II. MAINTENANCE ALLOCATION CHART

(1) Group No.	(2) Functional group NOTE. This maintenance allocation chart is subject to prooftesting by disassembly and reassembly of equipment.	(3) Maintenance functions A Inspect	B Test	C Service	D Adjust	E Align	F Calibrate	G Install	H Replace	I Repair	J Overhaul	K Rebuild	(4) Tools and equipment	(5) Remarks
18	BODY													
1801	Body													
	Cover, louvers and guards	O	..	..	O	..	..	O	O	O				
	Control assembly, push-pull, louver actuator	O	O	..	O	..	..	F	F					
22	BODY CHASSIS OR HULL, AND ACCESSORY ITEMS													
2201	Canvas, Items:													
	Cover, fabric	O	..	..	..	..	.	O	O	O				
40	ELECTRICAL MOTORS													
4000	Motors:													
	Motor assembly, evaporator blower	O	O	..	..	..	..	O	O	F				
	Motor assembly, condenser fan	O	O	..	..	..	..	O	O	F				
	Protectors, overload, thermal	O	O	..	..	..	..	O	O					
4006	Starting and Protective Devices:													
	Capacitors	O	O	..	..	..	..	O	O					
	Relays	O	O	..	..	..	..	O	O					
42	ELECTRICAL EQUIPMENT													
4201	Transformer:													
	Transformer	O	O	..	..	..	..	O	O					
	Rectifier	O	O	..	..	..	..	O	O					
4202	Electrical Controls:													
	Control module	O	O	..	..	..	..	O	O	F				
	Switch temperature control	..	O	..	..	..	..	..	O					
	Switch, toggle, fan speed	..	O	..	..	..	..	..	O					
	Switch, rotary selector	..	O	..	..	..	..	..	O					
	Circuit breakers	..	O	..	..	..	..	..	O	O				
	Relays	O	O	O	..	..	..	O	O					

Section II. MAINTENANCE ALLOCATION CHART

(1) Group No.	(2) Functional group	(3) Maintenance functions											(4) Tools and equipment	(5) Remarks
		A	B	C	D	E	F	G	H	I	J	K		
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
4203	Cutout Devices:													
	Pressure switches	O	O	..	..	..	..	F	F					
4206	Thermostatic Control Devices:													
	Switch, thermostatic, heater	..	O	..	..	..	..	..	O					
4216	Miscellaneous wiring and fittings:													
	Wiring harness assemblies	O	O	..	..	..	..	O	O	O				
47	GAGES (NON-ELECTRICAL)													
4702	Gages, Mounting, Lines and Fittings:													
	Indicator, liquid sight	O	..	..	..	..	..	..	F					
52	REFRIGERATION AND AIR CONDITIONING COMPONENTS													
5200	Gas Compressor Assembly:													
	Compressor assembly	O	O	F	..	..	..	H	H	O				A
5217	Refrigerant Piping:													
	Piping	O	O	F	..	..	..	F	F	F				
	Hose assembly, metal (vibration eliminators)	O	O	F	..	..	..	F	F					
	Valve, solenoid, liquid	O	O	F	..	..	..	F	F	F				B
	Valve, solenoid, equalization	O	O	F	..	..	..	F	F	F				C
	Valve, assemblies, charging	O	..	..	..	..	..	F	F					
	Cylinder assembly, actuator	O	O	..	O	..	..	F	F					
	Dehydrator	O	..	..	..	..	..	F	F					
	Valve, Expansion	..	O	..	F	..	..	..	F					
	Valve, Pressure Relief	O	O	..	..	..	..	F	F					
	Regulator, Fluid Pressure	O	O	..	..	..	..	F	F					
5224	Accumulator, Refrigerant	O	O	..	..	..	..	H	H					
5230	Condenser:													
	Condenser, Coil	O	O	O	..	..	..	F	F	F				
	Receiver, Liquid	O	O	..	..	..	..	H	H					
5241	Evaporator:													
	Tubes, Drain	O	..	O	..	..	..	O	O					
	Evaporator, Coil	O	O	O	..	..	..	F	F	F				
5244	Thermostatic Controls:													
	Switch, Thermostatic, Condenser Fan Speed	..	O	..	..	..	..	..	O					
5245	Air Filter:													
	Filters, Air Conditioning	O	..	O	..	..	..	O	O					
5247	Heating Units:													
	Heating Elements	O	O	..	..	..	..	O	O					

Section III. SPECIAL TOOL AND SPECIAL TEST EQUIPMENT REQUIREMENTS

Reference code	Maintenance level	Nomenclature	Tool number
No Special	Tools or Test Equipment Required		

Section IV. REMARKS

Reference code	Remarks
A—B	Includes testing the refrigeration system for refrigerant leaks or proper operating pressure.
A—C	Includes adding or removing refrigerant (see note).
A—I	Repair by replacing unserviceable external electrical components.
B—C	See remarks reference code A—C.
C—C	See remarks reference code A—C.
	NOTE; Reference Code A—C. This is the lowest maintenance level authorized for servicing the refrigeration system when it is necessary to open the system for replacement of related defective components.

APPENDIX C

BASIC ISSUE ITEMS LIST AND MAINTENANCE AND OPERATING SUPPLIES

Section I. INTRODUCTION

C-1. Scope

This appendix lists items which accompany the air conditioner or are required for installation, operation, or operator's maintenance. Section II lists the accessories, tools, and publications required for the maintenance and operation by the operator, initially issued or authorized with the equipment.

C-2. Explanation of Columns

The following provides an explanation of columns in the tabular list in Section II:

a. Source, Maintenance and Recoverability (SMR) Codes (co1. 1).

(1) Source code, column 1 a, indicates the selection status and source for the listed item. Source codes are:

Code	*Explanation*
P	Applied to repair parts which are stocked in or supplied from the GSA / DSA Army supply system, and authorized for use at indicated maintenance categories.
M	Applied to repair parts which are not procured or stocked but are to be manufactured at indicated maintenance categories.
M2	Applied to repair parts which are not stocked. The indicated maintenance category requiring such repair parts will attempt to obtain them through cannibalization. If not obtainable through cannibalization, such repair parts will be requisitioned with supporting justification through normal supply channels.

(2) Maintenance code, column 1 b, indicates the lowest category of maintenance authorized to install the listed item. The maintenance level code is:

Code	*Explanation*
C.	Operator and /or crew
O. . . .	Organizational maintenance

(3) Recoverability code, column 1 c, indicates whether unserviceable items should be returned for recovery or salvage. Items not coded are expendable. Recoverability codes are:

Code	*Explanation*
R	Applied to repair parts and assemblies which are economically repairable at DSU and GSU activities and are normally furnished by supply on an exchange basis.
T	Applied to high dollar value recoverable repair parts which are subject to special handling and are issued on an exchange basis. Such repair parts are normally repaired or overhauled at depot maintenance activities.
U	Applied to repair parts specifically selected for salvage by reclamation units because of precious metal content, critical materials, high-dollar value reusable casings and castings, etc.

b. Federal Stock Number, (column 2). Indicates the Federal Stock Number for the item.

c. Description, (column 3). Indicates the Federal item name and any additional description required. A five-digit manufacturer's or other service code is shown in parentheses followed by the manufacturer's part number. Repair parts quantities included in kits, sets, and assemblies that differ from the actual quantity used in the specific item, are listed in parentheses following the repair part name.

d. Unit of Measure, (column 4). A two-character alphabetic abbreviation indicating the amount or quantity of the item upon which the allowances are based, e.g., ft, ea, pr, etc.

e. Quantity Incorporated in Unit, (column 5). This column indicates the quantity of the item used in the unit pack. A "V" appearing in this column in lieu of a quantity indicates that a definite quantity cannot be indicated (e.g., shims, spacers, etc).

f. Quantity Furnished With Equipment, (column 6). This column indicates the quantity of an item furnished with the equipment.

g. *Illustration, (column 7).* This column divided as follows:

(1) Figure number, (column 7A). Indicates the figure number of the illustration in which the item is shown.

(2) *Item number, (column 7B).* Indicates the callout number used to reference the item in the illustration.

C-3. Explanation of Columns Contained in Section III

a. Item. This column contains numerical sequence item numbers assigned to each component application to facilitate reference.

b. Component Application. This column identifies the component application of each maintenance or operating supply item.

c. Federal Stock Number. The Federal Stock Number will be shown in this column and will be used for requisitioning purposes.

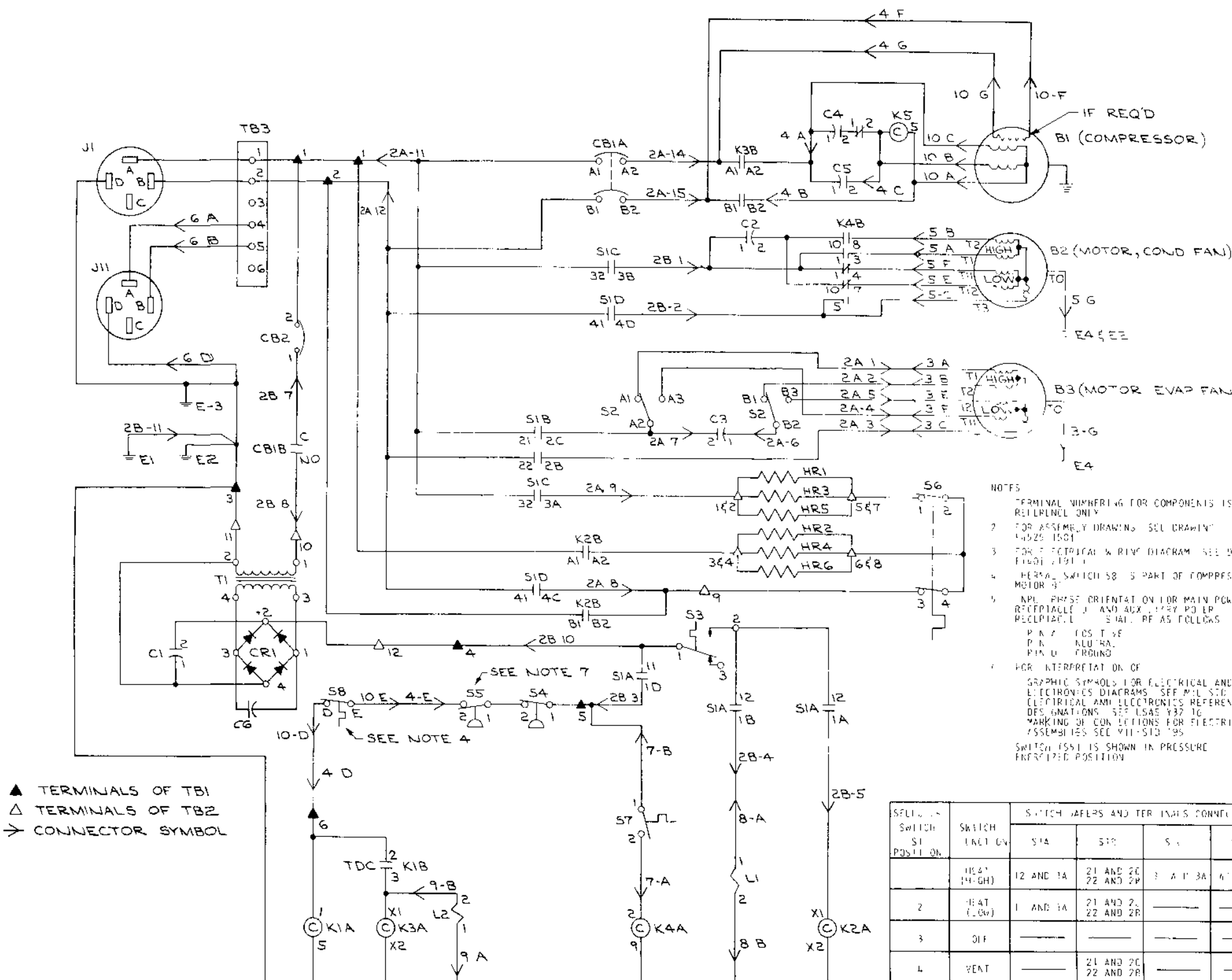
d. Description. The item and a brief description are shown.

e. Quantity Required for Initial Operation. This column lists the quantity of each maintenance or operating supply item required for initial operation of the equipment.

f. Quantity Required for 8-Hours Operation. Quantities listed represent the estimated requirements for an average eight hours of operation.

Section II. BASIC ISSUE ITEMS

(1) SMR code	(2) Federal stock number	(3) Description Ref no. & mfr code Usable on code	(4) Unit of meas	(5) Qty inc in unit	(6) Qty furn with equip	(7) Illustration (A) Fig no.	(7) Illustration (B) Item no.
PC	7510-889-3439	BINDER, Looseleaf	EA		1		
PC	7520-559-9618	CASE, Operator's manual	EA		1		
		ARMY TECHNICAL MANUAL TM 5-4120-243-14	EA		1		



NOTES

1. TERMINAL NUMBERING FOR COMPONENTS IS FOR REFERENCE ONLY
2. FOR ASSEMBLY DRAWING SEE DRAWING [illegible]
3. FOR ELECTRICAL WIRING DIAGRAM SEE DRAWING [illegible]
4. THERMAL SWITCH S8 IS PART OF COMPRESSOR MOTOR B1
5. INPUT PHASE ORIENTATION FOR MAIN POWER RECEPTACLE J1 AND AUXILIARY POWER RECEPTACLE [illegible] SHALL BE AS FOLLOWS
   PIN A POSITIVE
   PIN [illegible] NEUTRAL
   PIN D GROUND
6. FOR INTERPRETATION OF
   GRAPHIC SYMBOLS FOR ELECTRICAL AND ELECTRONICS DIAGRAMS SEE MIL STD [illegible]
   ELECTRICAL AND ELECTRONICS REFERENCE DESIGNATIONS SEE USAS Y32 16
   MARKING OF CONNECTIONS FOR ELECTRICAL ASSEMBLIES SEE MIL-STD 195
7. SWITCH (S5) IS SHOWN IN PRESSURE ENERGIZED POSITION

SELECTOR SWITCH S1 POSITION	SWITCH FUNCTION	SWITCH WAFERS AND TERMINALS CONNECTED			
		S1A	S1B	S1[illegible]	S1C
	HEAT (HIGH)	12 AND 1A	21 AND 2C 22 AND 2B	[illegible] AND 3A	41 AND 4C
2	HEAT (LOW)	1[illegible] AND 1A	21 AND 2C 22 AND 2B	———	———
3	OFF	———	———	———	———
4	VENT	———	21 AND 2C 22 AND 2B	———	———
5	COOL	12 AND 1B 11 AND 1D	21 AND 2C 22 AND 2B	32 AND 3B	41 AND 4D

COMPONENT REFERENCE LIST	
ELEC REF DESIG	DESCRIPTION
B1	COMPRESSOR, ROTARY
B2	MOTOR CONDENSER FAN
B3	MOTOR EVAPORATOR FAN
C6	CAPACITOR, FILTER
C1	CAPACITOR FILTER
C2	CAPACITOR CONDENSER RUN
C3	CAPACITOR EVAPORATOR RUN
C4	CAPACITOR COMPRESSOR START
C5	CAPACITOR COMPRESSOR RUN
CB1	CIRCUIT BREAKER COMPRESSOR
CB2	CIRCUIT BREAKER CONTROL
CR1	RECTIFIER SEMICONDUCTOR DEVICE
E1	TERMINAL STUD (CONTROL MODULE GRD)
E2	TERMINAL STUD (JUNCTION BOX GRD)
E3 AND E4	TERMINAL STUD (SYSTEM GRD)
HR1 THRU 6	HEATER ELEMENT
J1 AND J11	CONNECTOR RECEPTACLE POWER INPUT
J2	CONNECTOR RECEPTACLE JUNCTION
	BOX
J3	CONNECTOR RECEPTACLE
	EVAPORATOR FAN
J4	CONNECTOR RECEPTACLE COMPRESSOR
J5	CONNECTOR RECEPTACLE
	CONDENSER FAN
J6	CONNECTOR RECEPTACLE
	POWER INPUT
J7	CONNECTOR RECEPTACLE
	THERMOSTATIC SWITCH
J8	CONNECTOR RECEPTACLE
	SOLENOID VALVE BY PASS
J9	CONNECTOR RECEPTACLE SOLENOID
	VALVE EQUALIZER
J10	CONNECTOR RECEPTACLE
	COMPRESSOR
K1	RELAY TIME DELAY
K2	RELAY HEATER
K3	RELAY COMPRESSOR MOTOR
K4	RELAY CONDENSER FAN
K5	RELAY COMPRESSOR START
L1	VALVE SOLENOID BY PASS
L2	VALVE SOLENOID PRESSURE EQUALIZER
P1	CONNECTOR PLUG POWER INPUT
P2	CONNECTOR PLUG CONTROL MODULE
P3	CONNECTOR PLUG EVAPORATOR
	FAN
P4	CONNECTOR PLUG COMPRESSOR
P5	CONNECTOR PLUG CONDENSER
	FAN
P6	CONNECTOR PLUG POWER INPUT
P7	CONNECTOR PLUG THERMOSTATIC
	SWITCH
P8	CONNECTOR PLUG SOLENOID
	VALVE BY-PASS
P9	CONNECTOR PLUG SOLENOID
	VALVE EQUALIZER
P10	CONNECTOR PLUG COMPRESSOR
S1	SWITCH ROTARY SELECTOR
S2	SWITCH TOGGLE
S3	SWITCH TEMPERATURE CONTROL
S4	SWITCH HIGH PRESSURE CUTOUT
S5	SWITCH LOW PRESSURE CUTOUT
S6	SWITCH HEATER CUTOUT
S7	SWITCH THERMOSTATIC
T1	TRANSFORMER
TB1	TERMINAL BOARD JUNCTION BOX
TB2	TERMINAL BOARD
TB3	TERMINAL BOARD POWER INPUT

TO ENERGIZE THE UNIT FROM THE AUXILIARY POWER INPUT SOURCE (J11) THE LEADS X1B12V AND X2B12V ON TB3-1 AND 2 MUST BE CHANGED TO TB3-4 AND -5 RESPECTIVELY

ME 4120 243 14/1-4

Figure 1-4. *ol system schematic diagram 1 phase 50 / 60 Hertz 230 volts*

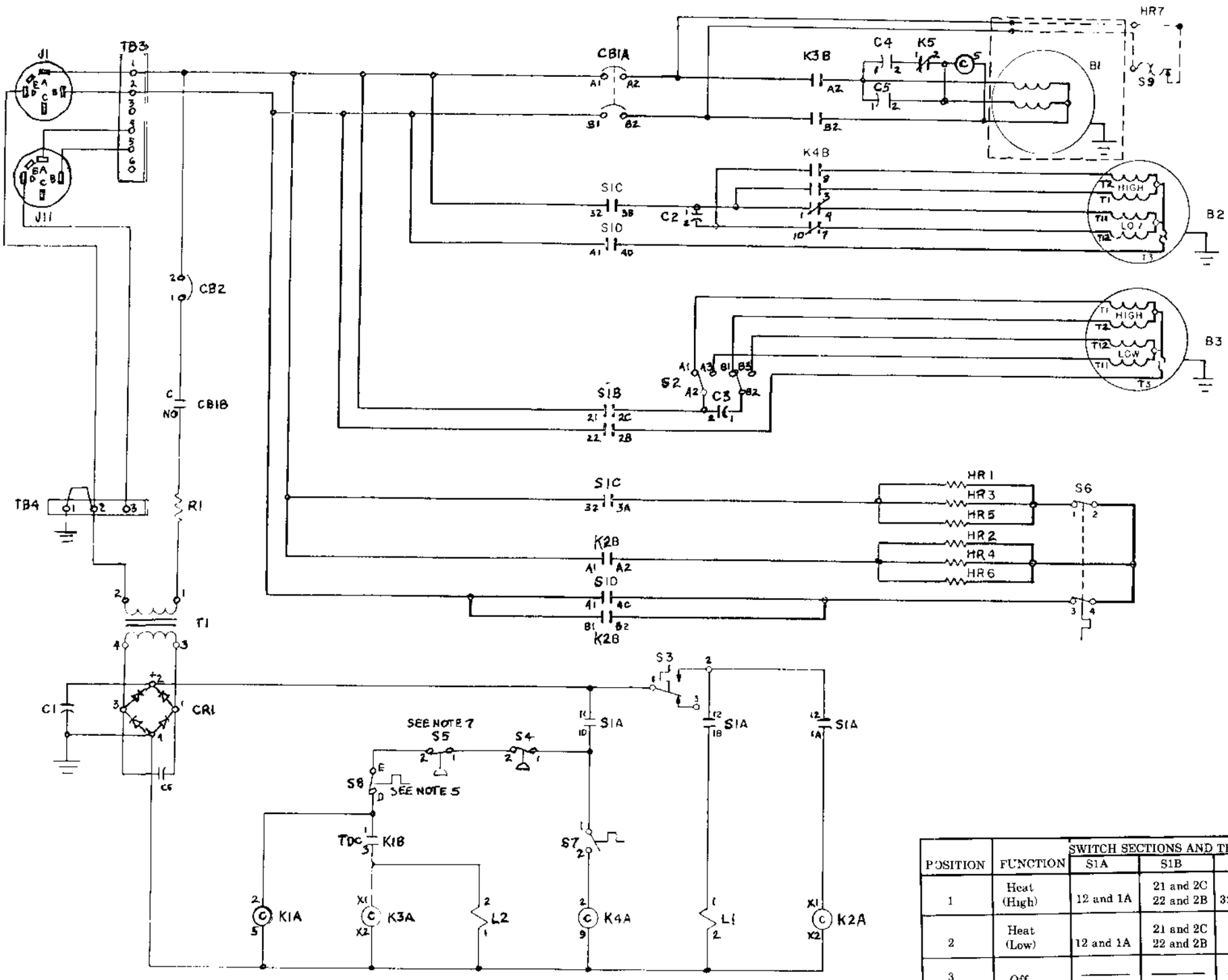


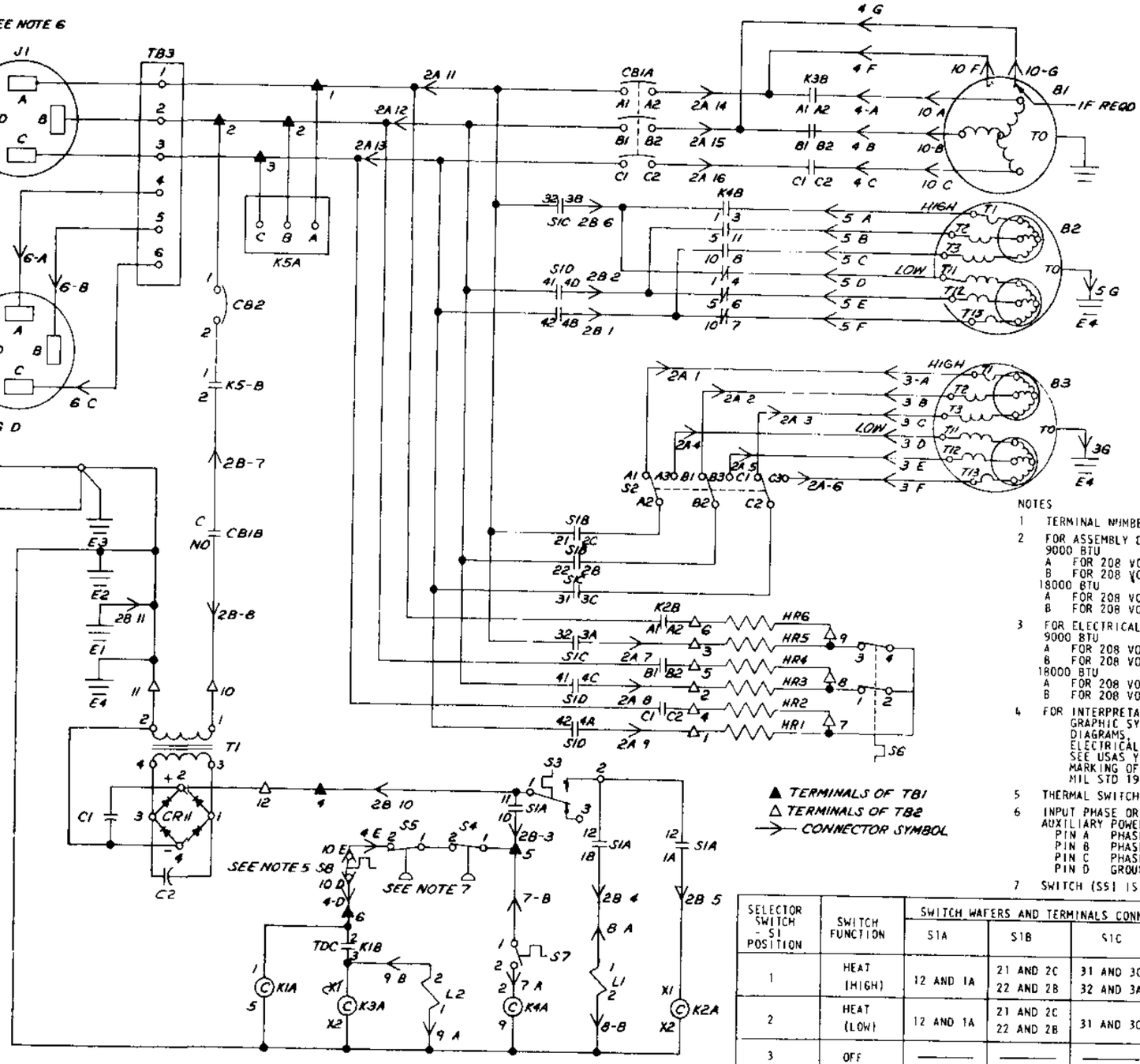
Figure 1-4.1. Control system schematic diagram, 1 phase, 50/60 hertz, 230 volts (Keco model F18H only)

COMPONENT REFERENCE LIST	
Elec Ref Desig	Description
B1	Compressor
B2	Motor, Condenser Fan
B3	Motor, Evaporator Fan
C1	Capacitor Filter
C2	Capacitor Condenser Run
C3	Capacitor Evaporator Run
C4	Capacitor Compressor Start
C5	Capacitor Compressor Run
C6	Capacitor
CB1	Circuit Breaker, Compressor
CR1	Rectifier Semi Conductor
HR1 thru 6	Heater Element
HR7	Heater Crankcase
J1 and J11	Connector Receptacle Power Input
K1	Relay Time Delay
K2	Relay Heater
K3	Relay Compressor Motor
K4	Relay Condenser Fan
K5	Relay Compressor Start
L1	Valve Solenoid By Pass
L2	Valve Solenoid Pressure Equalizer
R1	Resistor
S1	Switch Rotary Selector
S2	Switch Toggle
S3	Switch Temperature Control
S4	Switch High Pressure Cutout
S5	Switch Low Pressure Cutout
S6	Switch Heater Cutout
S7	Switch Thermostatic
S8	Switch Thermal Compressor
T1	Transformer
TB3	Terminal Board Power Input
TB4	Terminal Block

POSITION	FUNCTION	SWITCH SECTIONS AND TERMINALS CONNECTED			
		S1A	S1B	S1C	S1D
1	Heat (High)	12 and 1A	21 and 2C 22 and 2B	32 and 3A	41 and 4C
2	Heat (Low)	12 and 1A	21 and 2C 22 and 2B	——	——
3	Off	——	——	——	——
4	Vent	——	21 and 2C 22 and 2B	——	——
5	Cool	12 and 1B 11 and 1C	21 and 2C 22 and 2B	32 and 3B	41 and 4D

Notes

1. Terminal Number ring for Components is for reference only
2. For assembly drawing see D13216E6110
3. For electrical wiring diagram see D13220E5629
4. For interpretation of
   - Graphic symbols for electrical and electronics diagram See ANS Y32 2
   - Electrical and electronics reference designations See ANS Y32 16
   - Marking of connections for electrical assemblies see MIL STD 195
5. Thermal switch S8 is part of compressor motor B1
6. Input phase orientation for main power receptacle J1 and auxiliary power receptacle J11 shall be as follows
   - Pin A Positive
   - Pin B Neutral
   - Pin D Ground
7. Switch (S5) is shown in the pressure energized position



SELECTOR SWITCH - S1 POSITION	SWITCH FUNCTION	SWITCH WAFERS AND TERMINALS CONNECTED			
		S1A	S1B	S1C	S1D
1	HEAT (HIGH)	12 AND 1A	21 AND 2C 22 AND 2B	31 AND 3C 32 AND 3A	41 AND 4C 42 AND 4A
2	HEAT (LOW)	12 AND 1A	21 AND 2C 22 AND 2B	31 AND 3C	———
3	OFF	———	———	———	———
4	VENT	———	21 AND 2C 22 AND 2B	31 AND 3C	———
5	COOL	12 AND 1B 11 AND 1D	21 AND 2C 22 AND 2B	32 AND 3B 31 AND 3C	42 AND 4B 41 AND 4D

NOTES

1 TERMINAL NUMBERING FOR COMPONENTS IS FOR REFERENCE ONLY

2 FOR ASSEMBLY DRAWING SEE THE FOLLOWING
9000 BTU
A FOR 208 VOLT 60 HZ 3 PHASE SEE E4525 1276-3
B FOR 208 VOLT 400 HZ 3 PHASE SEE E4525 1276-4
18000 BTU
A FOR 208 VOLT 60 HZ 3 PHASE SEE E4525 1501-2
B FOR 208 VOLT 400 HZ 3 PHASE SEE E4525-1501 3

3 FOR ELECTRICAL WIRING DIAGRAM SEE THE FOLLOWING
9000 BTU
A FOR 208 VOLT 60 HZ 3 PHASE SEE E1401 2187 1
B FOR 208 VOLT 400 HZ 3 PHASE SEE E1401-2188 1
18000 BTU
A FOR 208 VOLT 60 HZ 3 PHASE SEE E1401 2192-1
B FOR 208 VOLT 400 HZ 3 PHASE SEE E1401 2193 1

4 FOR INTERPRETATION OF
GRAPHIC SYMBOLS FOR ELECTRICAL AND ELECTRONICS DIAGRAMS, SEE MIL STD 15/1
ELECTRICAL AND ELECTRONICS REFERENCE DESIGNATIONS SEE USAS Y32 16
MARKING OF CONNECTIONS FOR ELECTRICAL ASSEMBLIES SEE MIL STD 195

5 THERMAL SWITCH S8 IS PART OF COMPRESSOR MOTOR B1

6 INPUT PHASE ORIENTATION FOR MAIN POWER RECEPTACLE J1 AND AUXILIARY POWER RECEPTACLE J11 SHALL BE AS FOLLOWS
PIN A PHASE A
PIN B PHASE B
PIN C PHASE C
PIN D GROUND

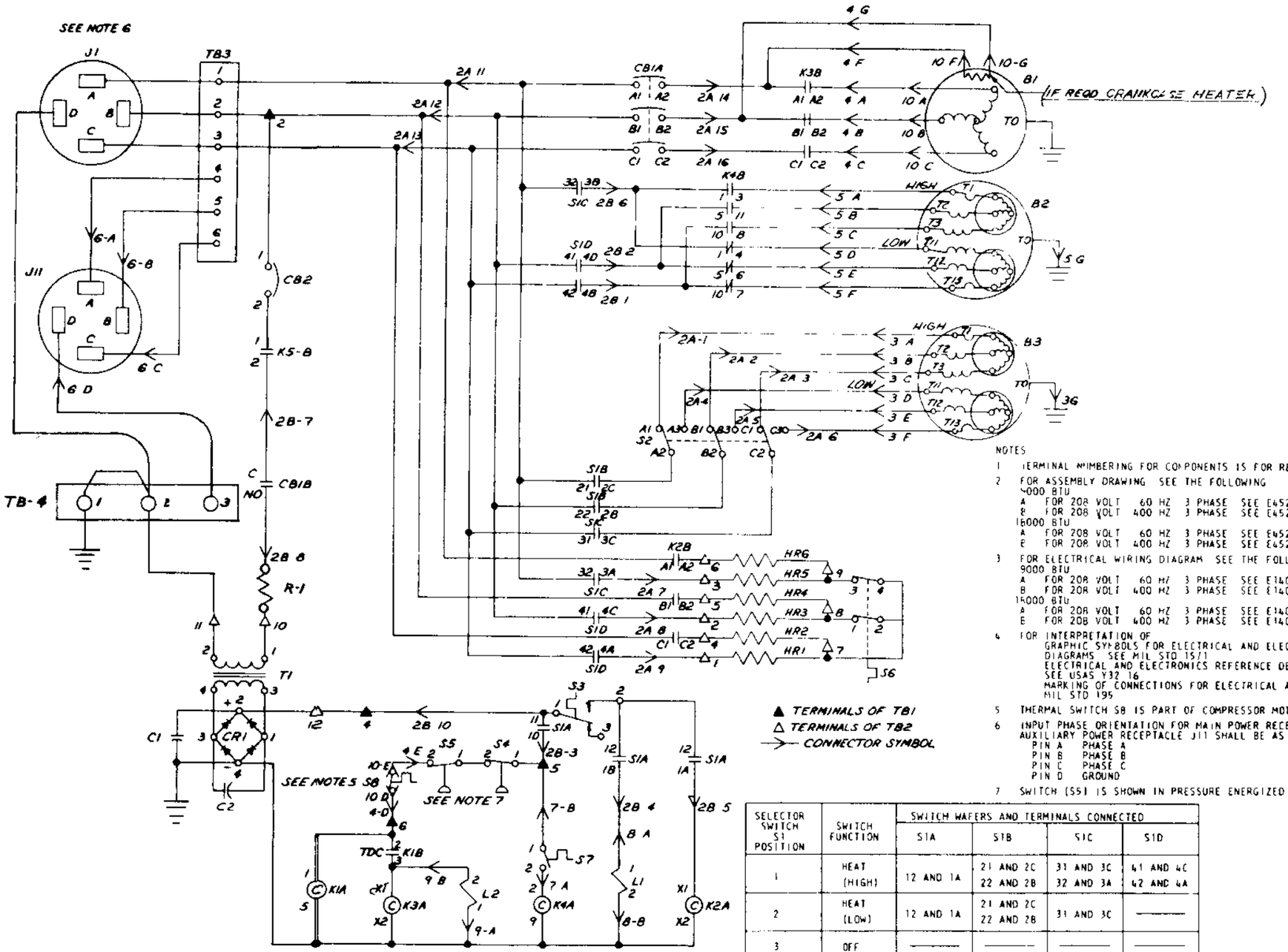
7 SWITCH (S5) IS SHOWN IN PRESSURE ENERGIZED POSITION

COMPONENT REFERENCE LIST	
ELEC REF DESIG	DESCRIPTION
B1	COMPRESSOR, ROTARY
B2	MOTOR, CONDENSER FAN
B3	MOTOR, EVAPORATOR FAN
C1	CAPACITOR, FILTER
C2	CAPACITOR, FILTER
CB1	CIRCUIT BREAKER, COMPRESSOR
CB2	CIRCUIT BREAKER CONTROL
CR1	RECTIFIER SEMICONDUCTOR DEVICE
E1	TERMINAL STUD (CONTROL MODULE
	GRD)
E2	TERMINAL STUD (JUNCTION BOX GRD)
E3 AND E4	TERMINAL STUD (SYSTEM GRD)
HR1 THRU 6	HEATER ELEMENT
J1 AND J11	CONNECTOR RECEPTACLE POWER
	INPUT
J2	CONNECTOR RECEPTACLE JUNCTION
	BOX
J3	CONNECTOR RECEPTACLE
	EVAPORATOR FAN
J4	CONNECTOR RECEPTACLE
	COMPRESSOR
J5	CONNECTOR RECEPTACLE
	CONDENSER FAN
J6	CONNECTOR RECEPTACLE POWER
	INPUT
J7	CONNECTOR RECEPTACLE
	THERMOSTATIC SWITCH
J8	CONNECTOR RECEPTACLE SOLENOID
	VALVE BY-PASS
J9	CONNECTOR RECEPTACLE SOLENOID
	VALVE EQUALIZER
J10	CONNECTOR RECEPTACLE
	COMPRESSOR
K1	RELAY TIME DELAY
K2	RELAY HEATER
K3	RELAY COMPRESSOR MOTOR
K4	RELAY, CONDENSER FAN
K5	RELAY PHASE SEQUENCE
L1	VALVE SOLENOID BY PASS
L2	VALVE SOLENOID PRESSURE
	EQUALIZER
P1	CONNECTOR PLUG POWER INPUT
P2	CONNECTOR PLUG CONTROL MODULE
P3	CONNECTOR PLUG EVAPORATOR
	FAN
P4	CONNECTOR PLUG COMPRESSOR
P5	CONNECTOR PLUG CONDENSER
	FAN
P6	CONNECTOR PLUG POWER INPUT
P7	CONNECTOR PLUG THERMOSTATIC
	SWITCH
P8	CONNECTOR PLUG SOLENOID
	VALVE BY-PASS
P9	CONNECTOR PLUG SOLENOID
	VALVE EQUALIZER
P10	CONNECTOR PLUG COMPRESSOR
S1	SWITCH ROTARY SELECTOR
S2	SWITCH TOGGLE
S3	SWITCH TEMPERATURE CONTROL
S4	SWITCH HIGH PRESSURE CUTOUT
S5	SWITCH LOW PRESSURE CUTOUT
S6	SWITCH HEATER CUTOUT
S7	SWITCH THERMOSTATIC
T1	TRANSFORMER
TB1	TERMINAL BOARD, JUNCTION BOX
TB2	TERMINAL BOARD
TB3	TERMINAL BOARD POWER INPUT

TO ENERGIZE THE UNIT FROM THE AUXILIARY POWER INPUT SOURCE (J11) THE LEADS X1B12A X2B12B AND X3B12C ON TB3 (1 2 AND -3 MUST BE CHANGED TO TB3-4 -5 AND -6 RESPECTIVELY

ME 4120 243-14/1 5

Figure 1-5. *Control system schematic diagram 3 phase 50 / 60 Hertz and 400 Hertz 208 volts*



NOTES

1 TERMINAL NUMBERING FOR COMPONENTS IS FOR REFERENCE ONLY

2 FOR ASSEMBLY DRAWING SEE THE FOLLOWING
9000 BTU
A FOR 208 VOLT 60 HZ 3 PHASE SEE E4525 1276 3
B FOR 208 VOLT 400 HZ 3 PHASE SEE E4525 1276 4
16000 BTU
A FOR 208 VOLT 60 HZ 3 PHASE SEE E4525 1501 2
B FOR 208 VOLT 400 HZ 3 PHASE SEE E4525-1501 3

3 FOR ELECTRICAL WIRING DIAGRAM SEE THE FOLLOWING
9000 BTU
A FOR 208 VOLT 60 HZ 3 PHASE SEE E1401 2187
B FOR 208 VOLT 400 HZ 3 PHASE SEE E1401-2188
16000 BTU
A FOR 208 VOLT 60 HZ 3 PHASE SEE E1401 2192 1
B FOR 208 VOLT 400 HZ 3 PHASE SEE E1401 2193

4 FOR INTERPRETATION OF GRAPHIC SYMBOLS FOR ELECTRICAL AND ELECTRONICS DIAGRAMS SEE MIL STD 15/1 ELECTRICAL AND ELECTRONICS REFERENCE DESIGNATIONS SEE USAS Y32 16 MARKING OF CONNECTIONS FOR ELECTRICAL ASSEMBLIES SEE MIL STD 195

5 THERMAL SWITCH S8 IS PART OF COMPRESSOR MOTOR B1

6 INPUT PHASE ORIENTATION FOR MAIN POWER RECEPTACLE J1 AND AUXILIARY POWER RECEPTACLE J11 SHALL BE AS FOLLOWS
PIN A PHASE A
PIN B PHASE B
PIN C PHASE C
PIN D GROUND

7 SWITCH (S5) IS SHOWN IN PRESSURE ENERGIZED POSITION

SELECTOR SWITCH S1 POSITION	SWITCH FUNCTION	SWITCH WAFERS AND TERMINALS CONNECTED			
		S1A	S1B	S1C	S1D
1	HEAT (HIGH)	12 AND 1A	21 AND 2C 22 AND 2B	31 AND 3C 32 AND 3A	41 AND 4C 42 AND 4A
2	HEAT (LOW)	12 AND 1A	21 AND 2C 22 AND 2B	31 AND 3C	———
3	OFF	———	———	———	———
4	VENT	———	21 AND 2C 22 AND B	31 AND 3C	———
5	COOL	12 AND 1B 11 AND 1D	21 AND 2C 22 AND 2B	32 AND 3B 31 AND 3C	42 AND 4B 41 AND 4D

COMPONENT REFERENCE LIST	
ELEC REF DESIG	DESCRIPTION
B1	COMPRESSOR, RECIP.
B2	MOTOR CONDENSER FAN
B3	MOTOR, EVAPORATOR FAN
C1	CAPACITOR FILTER
C2	CAPACITOR, FILTER
TB 4	TERMINAL BOARD
CB1	CIRCUIT BREAKER, COMPRESSOR
CB2	CIRCUIT BREAKER CONTROL
CR1	RECTIFIER SEMICONDUCTOR DEVICE
E1	TERMINAL STUD (CONTROL MODULE
	GRD)
E2	TERMINAL STUD (JUNCTION BOX GRD)
E3 AND E4	TERMINAL STUD (SYSTEM GRD)
HR1 THRU 6	HEATER ELEMENT
J1 AND J11	CONNECTOR RECEPTACLE POWER
	INPUT
J2	CONNECTOR RECEPTACLE JUNCTION
	BOX
J3	CONNECTOR RECEPTACLE
	EVAPORATOR FAN
J4	CONNECTOR RECEPTACLE
	COMPRESSOR
J5	CONNECTOR RECEPTACLE
	CONDENSER FAN
J6	CONNECTOR RECEPTACLE POWER
	INPUT
J7	CONNECTOR RECEPTACLE
	THERMOSTATIC SWITCH
J8	CONNECTOR RECEPTACLE SOLENOID
	VALVE BY-PASS
J9	CONNECTOR RECEPTACLE SOLENOID
	VALVE EQUALIZER
J10	CONNECTOR RECEPTACLE
	COMPRESSOR
K1	RELAY TIME DELAY
K2	RELAY HEATER
K3	RELAY COMPRESSOR MOTOR
K4	RELAY CONDENSER FAN
R1	RESISTOR 10Ω
L1	VALVE SOLENOID BY PASS
L2	VALVE SOLENOID PRESSURE
	EQUALIZER
P1	CONNECTOR PLUG POWER INPUT
P2	CONNECTOR PLUG CONTROL MODULE
P3	CONNECTOR PLUG EVAPORATOR
	FAN
P4	CONNECTOR PLUG COMPRESSOR
P5	CONNECTOR PLUG CONDENSER
	FAN
P6	CONNECTOR PLUG POWER INPUT
P7	CONNECTOR PLUG THERMOSTATIC
	SWITCH
P8	CONNECTOR PLUG SOLENOID
	VALVE BY PASS
P9	CONNECTOR PLUG SOLENOID
	VALVE EQUALIZER
P10	CONNECTOR PLUG COMPRESSOR
S1	SWITCH ROTARY SELECTOR
S2	SWITCH TOGGLE
S3	SWITCH TEMPERATURE CONTROL
S4	SWITCH HIGH PRESSURE CUTOUT
S5	SWITCH LOW PRESSURE CUTOUT
S6	SWITCH HEATER CUTOUT
S7	SWITCH, THERMOSTATIC
T1	TRANSFORMER
TB1	TERMINAL BOARD JUNCTION BOX
TB2	TERMINAL BOARD
TB3	TERMINAL BOARD POWER INPUT

TO ENERGIZE THE UNIT FROM THE AUXILIARY POWER INPUT SOURCE (J11) THE LEADS X1B12A X2B12B AND X3B12C ON TB3 1 2 AND 3 MUST BE CHANGED TO TB3 4 5 AND 6 RESPECTIVELY

Figure 1-5.1. *Control system schematic diagram, 3-phase, 50/60 Hertz and 400 Hertz 208 volts. (Models CH-20-4-08 and CH-20-6-08)*

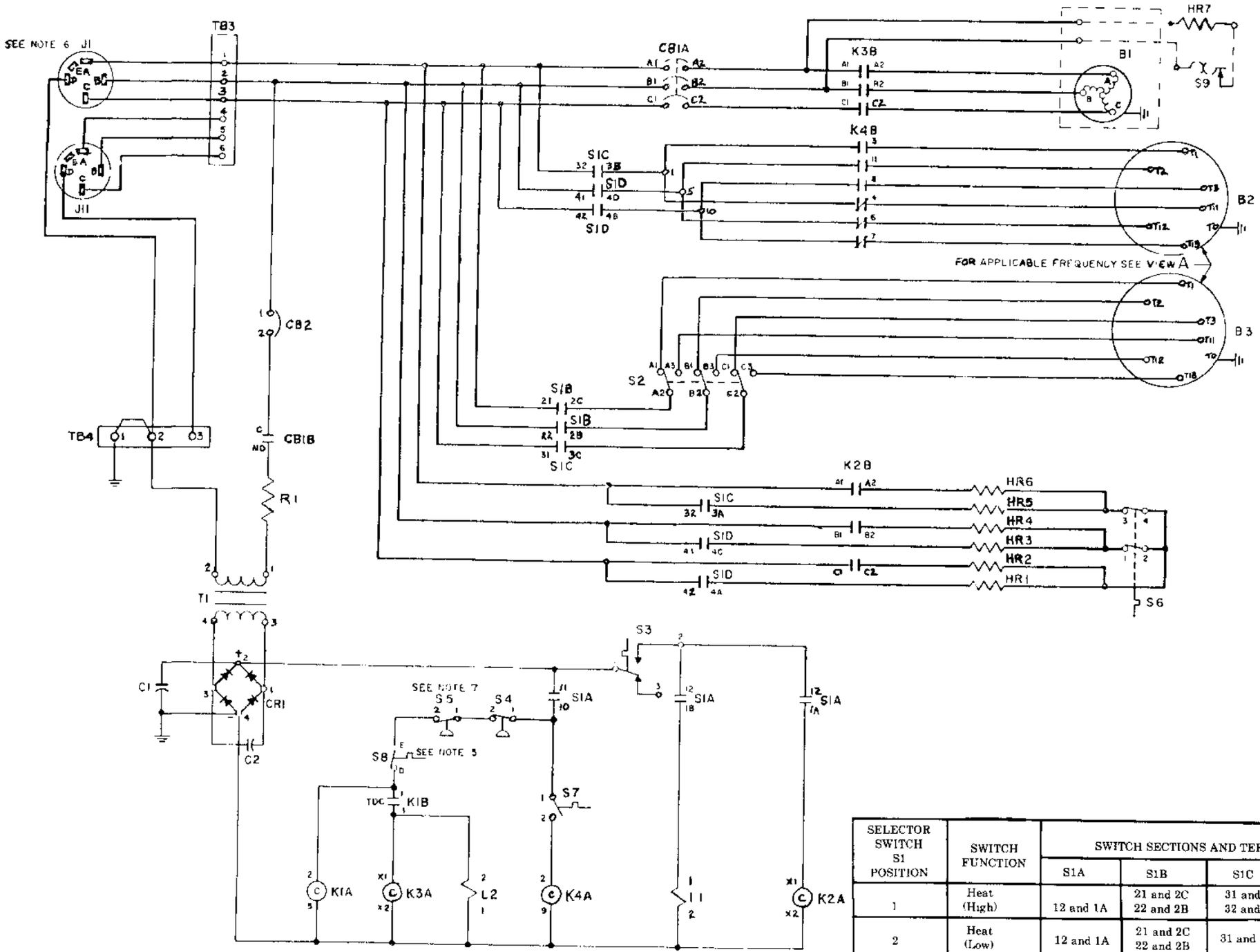


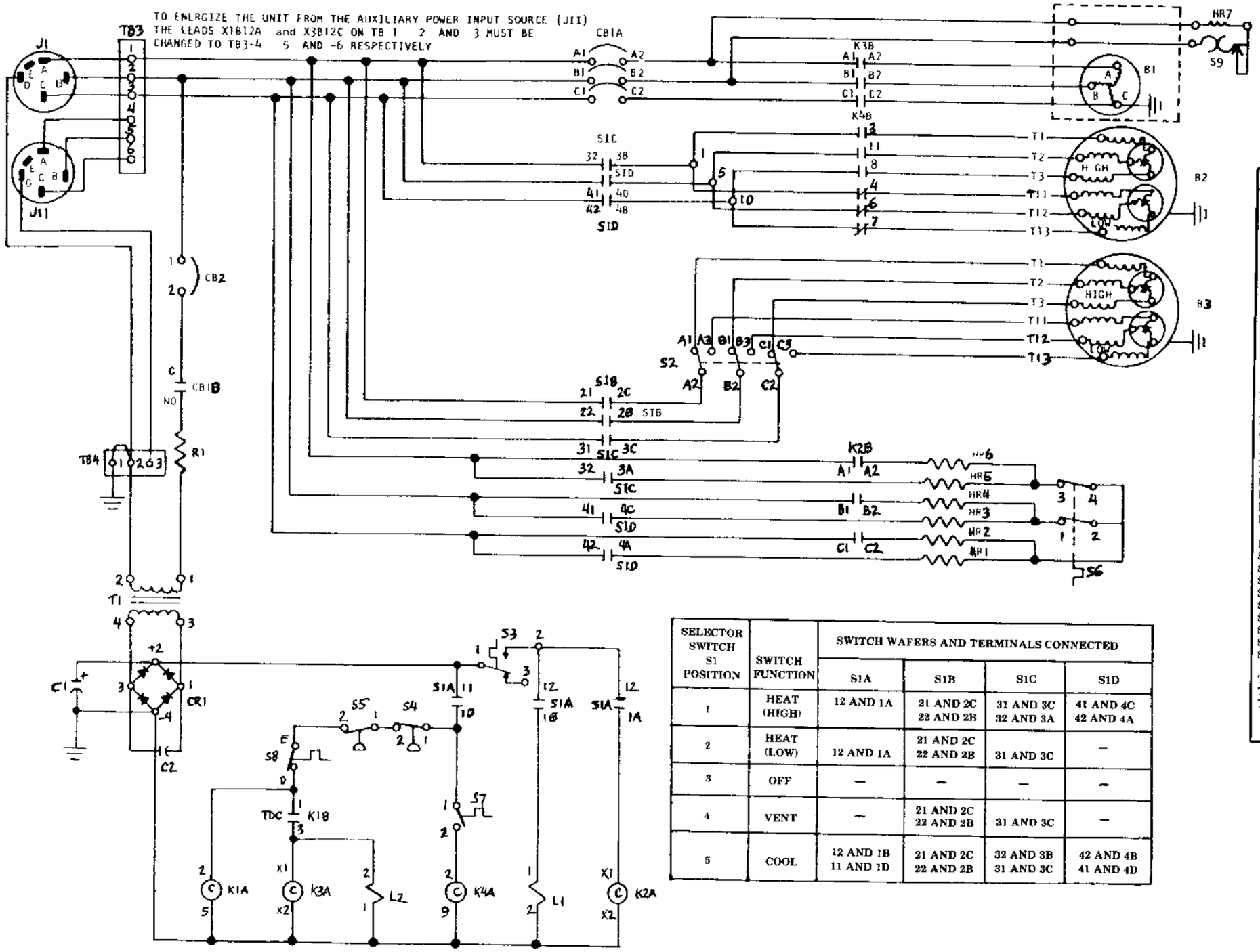
Figure 1-5.2. Control System schematic diagram, 3 phase, 400 hertz, 208 volts (Keco model F18H-4 only)

COMPONENT REFERENCE LIST	
Elec Ref Desig	DESCRIPTION
B1	Compressor
B2	Motor Condenser Fan
B3	Motor Evaporator Fan
C1	Capacitor Filter (EMI)
C2	Capacitor (EMI)
CB1	Circuit Breaker Compressor
CB2	Circuit Breaker Control
CR1	Rectifier Semiconductor Device
HR1 thru 6	Heater Element
HR7	Heater Crankcase
J1 and J11	Connector Receptacle Power Input
K1	Relay Time Delay
K2	Relay Heater
K3	Relay Compressor Motor
K4	Relay Condenser Fan
L1	Valve Solenoid By Pass
L2	Valve Solenoid, Pressure Equalizer
R1	Resistor
S1	Switch Rotary Selector
S2	Switch Toggle
S3	Switch Temperature Control
S4	Switch High Pressure Cutout
S5	Switch Low Pressure Cutout
S6	Switch Heater Cutout
S7	Switch Thermostatic
T1	Transformer
TB3	Terminal Board Power Input
TB4	Terminal Board

Notes

1. Terminal Number ring for Com ponents is for reference only
2. For assembly drawing see D13216E6130
3. For electrical wiring dia gram see D13220E5623
4. For interpretation of
   - Graphic symbols for electrical and electron ics diagram See ANS Y32 2
   - Electrical and electron ics reference desig nations See ANS Y32 16
   - Marking of connections for electrical assemblies see MIL STD 195
5. Thermal switch S8 is part of compressor motor B1
6. Input phase orientation for main power receptacle J1 and auxiliary power receptacle J11 shall be as follows
   - Pin A Phase A
   - Pin B Phase B
   - Pin C Phase C
   - Pin D Ground
7. Switch (S5) is shown in the pressure energized position

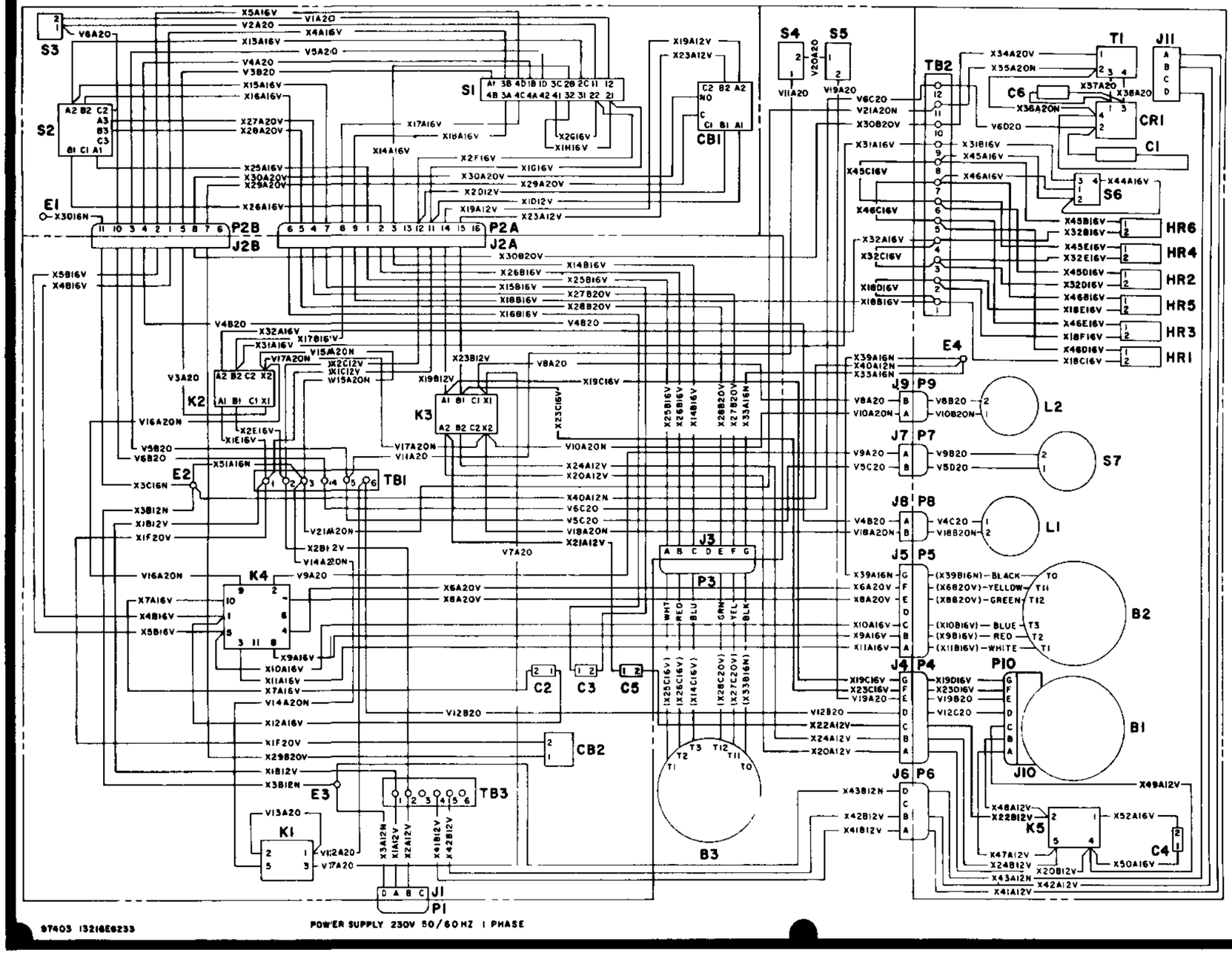
SELECTOR SWITCH S1 POSITION	SWITCH FUNCTION	SWITCH SECTIONS AND TERMINALS			
		S1A	S1B	S1C	S1D
1	Heat (High)	12 and 1A	21 and 2C 22 and 2B	31 and 3C 32 and 3A	41 and 4C 42 and 4A
2	Heat (Low)	12 and 1A	21 and 2C 22 and 2B	31 and 3C	
3	Off				
4	Vent		21 and 2C 22 and 2B	31and 3C	
5	Cool	12 and 1B 11 and 1D	21 and 2C 22 and 2B	32 and 3B 31 and 3C	42 and 4B 41 and 4B



SELECTOR SWITCH S1 POSITION	SWITCH FUNCTION	SWITCH WAFERS AND TERMINALS CONNECTED			
		S1A	S1B	S1C	S1D
1	HEAT (HIGH)	12 AND 1A	21 AND 2C 22 AND 2B	31 AND 3C 32 AND 3A	41 AND 4C 42 AND 4A
2	HEAT (LOW)	12 AND 1A	21 AND 2C 22 AND 2B	31 AND 3C	—
3	OFF	—	—	—	—
4	VENT	—	21 AND 2C 22 AND 2B	31 AND 3C	—
5	COOL	12 AND 1B 11 AND 1D	21 AND 2C 22 AND 2B	32 AND 3B 31 AND 3C	42 AND 4B 41 AND 4D

COMPONENT REFERENCE LIST	
ELEC REF DESIG	DESCRIPTION
B1	COMPRESSOR ROTARY
B2	MOTOR CONDENSER FAN
B3	MOTOR EVAPORATOR FAN
C1	CAPACITOR FILTER
C2	CAPACITOR FILTER
CB1	CIRCUIT BREAKER COMPRESSOR
CB2	CIRCUIT BREAKER CONTROL
CR1	RECTIFIER SEMICONDUCTOR DEVICE
E1	TERMINAL STUD (CONTROL MODULE GRD)
E2	TERMINAL STUD (JUNCTION BOX GRD)
E3 AND E4	TERMINAL STUD (SYSTEM GRD)
HR1 THRU 6	HEATER ELEMENT
HR7	CRANKCASE HEATER
J1 AND J11	CONNECTOR RECEPTACLE POWER INPUT
K1	RELAY TIME DELAY
K2	RELAY HEATER
K3	RELAY COMPRESSOR MOTOR
K4	RELAY CONDENSER FAN
L1	VALVE SOLENOID BY PASS
L2	VALVE SOLENOID PRESSURE EQUALIZER
R1	RESISTOR SURGE
S1	SWITCH ROTARY SELECTOR
S2	SWITCH TOGGLE
S3	SWITCH, TEMPERATURE CONTROL
S4	SWITCH HIGH PRESSURE CUTOUT
S5	SWITCH, LOW PRESSURE CUTOUT
S6	SWITCH HEATER CUTOUT
S7	SWITCH THERMOSTATIC
S8	SWITCH THERMAL COMPRESSOR
S9	SWITCH THERMOSTATIC CRANKCASE HEATER
T1	TRANSFORMER
TB3	TERMINAL BOARD POWER INPUT
TB4	TERMINAL BOARD GROUND

Figure 1-5.3. Control system schematic diagram, 3 phase, 50/60 hertz, 208 volts (American Air Filter model only).



COMPONENT REFERENCE LIST		
ELEC REF DESIG	PART NUMBER	DESCRIPTION
B1	01321IE3793-3	COMPRESSOR, ROTARY
B2	013216E6140-2	MOTOR, CONDENSER FAN
B3	013216E6140-2	MOTOR EVAPORATOR FAN
C6	8132I8E6961	CAPACITOR, FILTER
C1	CK14AX103K	CAPACITOR FILTER
	MIL C 11015/20	
C2	013216E6236-4	CAPACITOR CONDENSER RUN
C3	013216E6236-4	CAPACITOR EVAPORATOR RUN
C4	C13216E6239	CAPACITOR COMPRESSOR START
C5	013216E6236-5	CAPACITOR COMPRESSOR RUN
CB1	013216E6206 3	CIRCUIT BREAKER COMPRESSOR
CB2	C13216E6178-1	CIRCUIT BREAKER CONTROL
CR1	D13216E6223	RECTIFIER SEMICONDUCTOR DEVICE
E1	MS24693 S50	TERMINAL STUD (CONTROL MODULE GRD)
E2	MS24693 S52	TERMINAL STUD (JUNCTION BOX GRD)
E3 AND E4	MS35206 246	TERMINAL STUD (SYSTEM GRD)
HR1 THRU 6	C13216E6124 3	HEATER ELEMENT
J1 AND J11	MS3100R 18 11P	CONNECTOR RECEPTACLE POWER INPUT
J2	D13216E6177	CONNECTOR RECEPTACLE JUNCTION
		BOX
J3	D13216E6193 2	CONNECTOR RECEPTACLE
		EVAPORATOR FAN
J4	D13216E6193 3	CONNECTOR RECEPTACLE COMPRESSOR
J5	D13216E6193 2	CONNECTOR RECEPTACLE
		CONDENSER FAN
J6	D13216E6193-5	CONNECTOR RECEPTACLE
		POWER INPUT
J7	D13216E6193 4	CONNECTOR RECEPTACLE
		THERMOSTATIC SWITCH
J8	D13216E6193 1	CONNECTOR RECEPTACLE
		SOLENOID VALVE BY-PASS
J9	D13216E6193-1	CONNECTOR RECEPTACLE SOLENOID
		VALVE EQUALIZER
J10	PART OF	CONNECTOR RECEPTACLE
	D13211E3793-3	COMPRESSOR
K1	C13216E6182	RELAY TIME DELAY
K2	MS24192D1	RELAY HEATER
K3	MS24192D1	RELAY COMPRESSOR MOTOR
K4	C13216E6184	RELAY CONDENSER FAN
K5	D13216E6240	RELAY COMPRESSOR START
L1	C13216E6158	VALVE SOLENOID BY PASS
L2	C13216E6158	VALVE SOLENOID PRESSURE EQUALIZER
P1	MS3106R 18 11S	CONNECTOR PLUG POWER INPUT
P2	D13216E6209 2	CONNECTOR PLUG, CONTROL MODULE
P3	PART OF	CONNECTOR PLUG EVAPORATOR
	D13216E6140 2	FAN
P4	MS3106R 20 15P	CONNECTOR PLUG COMPRESSOR
P5	PART OF	CONNECTOR PLUG CONDENSER
	D13216E6140-2	FAN
P6	MS3106R 18-11S	CONNECTOR PLUG POWER INPUT
P7	MS3106R-16-10P	CONNECTOR PLUG THERMOSTATIC
		SWITCH
P8	8132I6E6173	CONNECTOR PLUG SOLENOID
		VALVE BY-PASS
P9	8132I6E6173	CONNECTOR PLUG SOLENOID
		VALVE EQUALIZER
P10	MS3106R-20 15S	CONNECTOR PLUG COMPRESSOR
S1	D13216E6201	SWITCH ROTARY SELECTOR
S2	C13216E6200	SWITCH TOGGLE
S3	D13216E6203	SWITCH TEMPERATURE CONTROL
S4	C13216E6215 3	SWITCH HIGH PRESSURE CUTOUT
S5	C13216E6215-1	SWITCH LOW PRESSURE CUTOUT
S6	C13216E6224	SWITCH HEATER CUTOUT
S7	C13216E6217	SWITCH THERMOSTATIC
T1	C13216E6214	TRANSFORMER
TB1	C13216E6231	TERMINAL BOARD JUNCTION BOX
TB2	C13216E6220-1	TERMINAL BOARD
TB3	C13216E6232	TERMINAL BOARD POWER INPUT

TO ENERGIZE THE UNIT FROM THE AUXILIARY POWER INPUT SOURCE (J11) THE LEADS X18I2V AND X2BI2V ON TB3-1 AND-2 MUST BE CHANGED TO TB3-4 AND -5 RESPECTIVELY

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Figure 1-6. *Wiring diagram 1 phase 50 / 60 Hertz 230 volts*

COMPONENT REFERENCE LIST		
ELEC REF DESIG	PART NUMBER	DESCRIPTION
B1	DI3211E3793	COMPRESSOR
B2	DI3216E6140	MOTOR, CONDENSER FAN
B3	DI3216E6140	MOTOR EVAPORATOR FAN
C1	MIL C 39014/5 0461	CAPACITOR FILTER
C2	DI3216E6236	CAPACITOR CONDENSER RUN
C3	DI3216E6236	CAPACITOR EVAPORATOR RUN
C4	CI3216E6239	CAPACITOR COMPRESSOR START
C5	DI3216E6236	CAPACITOR COMPRESSOR RUN
C6	BI3218E6961	CAPACITOR
CB1	DI3216E6206	CIRCUIT BREAKER COMPRESSOR
CB2	CI3216E6178	CIRCUIT BREAKER CONTROL
CR1	DI3216E6223	RECTIFIER SEMICONDUCTOR DEVICE
E1	MS24693 S50	TERMINAL STUD (CONTROL MODULE GRD)
E2	MS24693-S50	TERMINAL STUD (JUNCTION BOX GRD)
E3 AND E4	MS35206-246	TERMINAL STUD (SYSTEM GRD)
HR1 THRU 6	CI3216E6124	HEATER ELEMENT
J1 AND J11	MS3100R 18 11P	CONNECTOR RECEPTACLE POWER INPUT
J2	DI3216E6177	CONNECTOR RECEPTACLE JUNCTION BOX
J3	DI3216E6193	CONNECTOR RECEPTACLE EVAPORATOR FAN
J4	DI3216E6193	CONNECTOR, RECEPTACLE COMPRESSOR
J5	DI3216E6193	CONNECTOR RECEPTACLE CONDENSER FAN
J6	DI3216E6193	CONNECTOR, RECEPTACLE POWER INPUT
J7	DI3216E6193	CONNECTOR RECEPTACLE THERMOSTATIC
		SWITCH
J8	DI3216E6193	CONNECTOR RECEPTACLE SOLENOID
		VALVE BY PASS
J9	DI3216E6193	CONNECTOR RECEPTACLE SOLENOID
		VALVE EQUALIZER
J10	PART OF	CONNECTOR RECEPTACLE COMPRESSOR
	DI3211E3793	
K1	CI3216E6182	RELAY TIME DELAY
K2	MS24192D1	RELAY HEATER
K3	MS24192D1	RELAY, COMPRESSOR MOTOR
K4	CI3216E6184	RELAY CONDENSER FAN
K5	DI3216E6240	RELAY COMPRESSOR START
L1	CI3216E6158	VALVE SOLENOID BY PASS
L2	CI3216E6158	VALVE SOLENOID PRESSURE EQUALIZER
P1	MS3100GR-18-11S	CONNECTOR PLUG POWER INPUT
P2	DI3216E6209	CONNECTOR PLUG, CONTROL MODULE
P3	PART OF	CONNECTOR PLUG EVAPORATOR FAN
	DI3216E6140	
P4	MS3106R-20-15P	CONNECTOR PLUG COMPRESSOR
P5	PART OF	CONNECTOR PLUG CONDENSER FAN
	DI3216E6140*	
P6	MS3106R 18 11S	CONNECTOR PLUG POWER INPUT
P7	MS3106R 16-10P	CONNECTOR PLUG THERMOSTATIC
		SWITCH
P8	BI3216E6173	CONNECTOR PLUG SOLENOID VALVE
		BY-PASS
P9	BI3216E6173	CONNECTOR, PLUG, SOLENOID VALVE
		EQUALIZER
P10	MS3106R 20 15S	CONNECTOR PLUG, COMPRESSOR
R1	BI3220E6838	RESISTOR
S1	DI3216E6201	SWITCH ROTARY SELECTOR
S2	CI3216E6200	SWITCH TOGGLE
S3	DI3216E6203	SWITCH TEMPERATURE CONTROL
S4	CI3216E6215	SWITCH HIGH PRESSURE CUTOUT
S5	CI3216E6215	SWITCH LOW PRESSURE CUTOUT
S6	CI3216E6224	SWITCH HEATER CUTOUT
S7	CI3216E6217	SWITCH THERMOSTATIC
T1	CI3216E6214	TRANSFORMER
TB1	CI3216E6231	TERMINAL BOARD JUNCTION BOX
TB2	CI3216E6220	TERMINAL BOARD
TB3	CI3216E6232	TERMINAL BOARD POWER INPUT
TB4	DI3219E9552	TERMINAL BLOCK

TO ENERGIZE THE UNIT FROM THE AUXILIARY POWER INPUT SOURCE (J11) THE LEADS X1B12V AND X2B12V ON TB3 1 AND 2 MUST BE CHANGED TO TB3-4 AND 5 RESPECTIVELY

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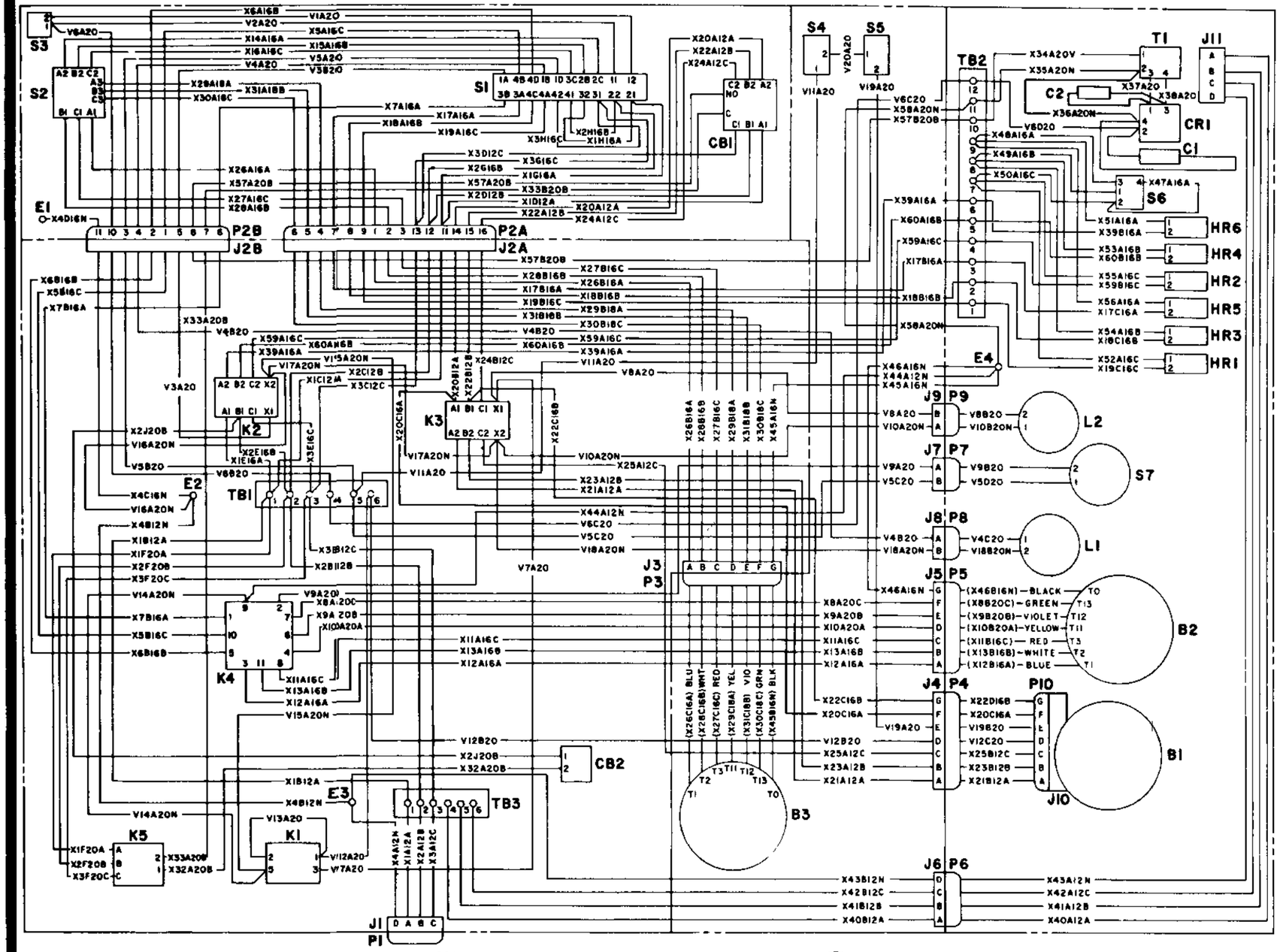
Figure 1-6.1. Wiring diagram, 1 phase, 50/60 hertz, 230 volts (Keco model F18H only)



COMPONENT REFERENCE LIST		
ELEC REF DESIG	PART NUMBER	DESCRIPTION
B1	13211E3793-2	COMPRESSOR, ROTARY
B2	13216E6140-3	MOTOR, CONDENSER FAN
B3	13216E6140-3	MOTOR, EVAPORATOR FAN
C1	CK14AX103K	CAPACITOR FILTER
	MIL C 11015/20	
C2	13218E6961	CAPACITOR, FILTER
CB1	13216E6205-3	CIRCUIT BREAKER, COMPRESSOR
CB2	13216E6178-1	CIRCUIT BREAKER CONTROL
CR1	13216E6223	RECTIFIER SEMICONDUCTOR DEVICE
E1	MS24693-S50	TERMINAL STUD (CONTROL MODULE GRD)
E2	MS24693-S52	TERMINAL STUD (JUNCTION BOX GRD)
E3 AND E4	MS35206-246	TERMINAL STUD (SYSTEM GRD)
HR1 THRU 6	13216E6124-4	HEATER ELEMENT
J1 AND J11	MS3100R-18-11P	CONNECTOR RECEPTACLE POWER INPUT
J2	13216E6177	CONNECTOR RECEPTACLE JUNCTION BOX
J3	13216E6193-2	CONNECTOR RECEPTACLE EVAPORATOR FAN
J4	13216E6193-3	CONNECTOR RECEPTACLE COMPRESSOR
J5	13216E6193-2	CONNECTOR RECEPTACLE CONDENSER FAN
J6	13216E6193-5	CONNECTOR RECEPTACLE POWER INPUT
J7	13216E6193-4	CONNECTOR RECEPTACLE THERMOSTATIC SWITCH
J8	13216E6193-1	CONNECTOR RECEPTACLE SOLENOID VALVE BY-PASS
J9	13216E6193-1	CONNECTOR RECEPTACLE SOLENOID VALVE EQUALIZER
J10	PART OF 13211E3793-2	CONNECTOR RECEPTACLE COMPRESSOR
K1	C13216E6182	RELAY TIME DELAY
K2	MS24192D1	RELAY HEATER
K3	MS24192D1	RELAY COMPRESSOR MOTOR
K4	C13216E6184	RELAY CONDENSER FAN
K5	C13216E6183-1	RELAY PHASE SEQUENCE
L1	C13216E6158	VALVE SOLENOID BY PASS
L2	C13216E6156	VALVE SOLENOID PRESSURE EQUALIZER
P1	MS3106R 18 11S	CONNECTOR PLUG POWER INPUT
P2	13216E6209 2	CONNECTOR PLUG CONTROL MODULE
P3	PART OF 13216E6140 3	CONNECTOR PLUG EVAPORATOR FAN
P4	MS3106R 20 15P	CONNECTOR PLUG COMPRESSOR
P5	PART OF 13216E6140 3	CONNECTOR PLUG CONDENSER FAN
P6	MS3106R 18 11S	CONNECTOR PLUG POWER INPUT
P7	MS3106R 16 10P	CONNECTOR PLUG THERMOSTATIC SWITCH
P8	13216E6173	CONNECTOR PLUG SOLENOID VALVE BY PASS
P9	13216E6173	CONNECTOR PLUG SOLENOID VALVE EQUALIZER
P10	MS3106R 20 15S	CONNECTOR PLUG COMPRESSOR
S1	13216E6201	SWITCH ROTARY SELECTOR
S2	C13216E6200	SWITCH TOGGLE
S3	13216E6203	SWITCH TEMPERATURE CONTROL
S4	C13216E6215 3	SWITCH HIGH PRESSURE CUTOUT
S5	C13216E6215-1	SWITCH LOW PRESSURE CUTOUT
S6	C13216E6224	SWITCH HEATER CUTOUT
S7	C13216E6217	SWITCH THERMOSTATIC
T1	C13216E6214	TRANSFORMER
TB1	C13216E6231	TERMINAL BOARD JUNCTION BOX
TB2	C13216E6220 1	TERMINAL BOARD
TB3	C13216E6232	TERMINAL BOARD POWER INPUT

TO ENERGIZE THE UNIT FROM THE AUXILIARY POWER INPUT SOURCE (J11) THE LEADS X1B12A X2B12B AND X3B12C ON TB3 1 2 AND 3 MUST BE CHANGED TO TB3-4 -5 AND -6 RESPECTIVELY

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Figure 1-7. *Wiring diagram 3 phase 50 / 60 Hertz 208 volts*

COMPONENT REFERENCE LIST		
ELEC REF DESIG	PART NUMBER	DESCRIPTION
B1	D13211E3793 7	COMPRESSOR ROTARY
B2	D13216E6140 3	MOTOR CONDENSER FAN
B3	D13216E6140 3	MOTOR EVAPORATOR FAN
C1	MIL C 39014/5 0461	CAPACITOR FILTER (EMI)
C2	B13218E6961	CAPACITOR (EMI)
CB1	D13216E6205 3	CIRCUIT BREAKER COMPRESSOR
CB2	C13216E6178 1	CIRCUIT BREAKER CONTROL
CR1	D13216E6223	RECTIFIER SEMICONDUCTOR DEVICE
E1	MS24693 S50	TERMINAL STUD(CONTROL MODULE GRD)
E2	MS24693 S50	TERMINAL STUD(JUNCTION BOX GRD)
E3 AND E4	MS35206 246	TERMINAL STUD(SYSTEM GRD)
HR1 THRU 6	C13216E6124 4	HEATER ELEMENT
J1 AND 11	MS3100R 18 11P	CONNECTOR RECEPTACLE POWER
		INPUT
J2	D13216E6177	CONNECTOR RECEPTACLE JUNCTION
		BOX
J3	D13216E6193 2	CONNECTOR RECEPTACLE
		EVAPORATOR FAN
J4	D13216E6193 3	CONNECTOR RECEPTACLE
		COMPRESSOR
J5	D13216E6193 2	CONNECTOR RECEPTACLE
		CONDENSER FAN
J6	D13216E6193 5	CONNECTOR RECEPTACLE POWER
		INPUT
J7	D13216E6193 4	CONNECTOR RECEPTACLE
		THERMOSTATIC SWITCH
J8	D13216E6193 1	CONNECTOR RECEPTACLE SOLENOID
		VALVE BY PASS
J9	D13216E6193 1	CONNECTOR RECEPTACLE SOLENOID
		VALVE EQUALIZER
J10	PART OF	CONNECTOR RECEPTACLE
	D13211E3793 2	COMPRESSOR
K1	C13216E6182	RELAY TIME DELAY
K2	MS24192D1	RELAY HEATER
K3	MS24192D1	RELAY COMPRESSOR MOTOR
K4	C13216E6184	RELAY CONDENSER FAN
L1	C13216E6158	VALVE SOLENOID BY PASS
L2	C13216E6158	VALVE SOLENOID PRESSURE EQUALIZER
P1	MS3106R 18 11S	CONNECTOR PLUG POWER INPUT
P2	D13216E6209 2	CONNECTOR PLUG CONTROL MODULE
P3	PART OF	CONNECTOR PLUG EVAPORATOR
	D13216E6140 3	FAN
P4	MS3106R 20 15P	CONNECTOR PLUG COMPRESSOR
P5	PART OF	CONNECTOR PLUG
	D13216E6140 3	CONDENSER FAN
P6	MS3106R 18 11S	CONNECTOR PLUG POWER INPUT
P7	MS3106R 16 10P	CONNECTOR PLUG THERMOSTATIC
		SWITCH
P8	B13216E6173	CONNECTOR PLUG SOLENOID
		VALVE BY PASS
P9	B13216E6173	CONNECTOR PLUG SOLENOID
		VALVE EQUALIZER
P10	MS3106R 20 15S	CONNECTOR PLUG COMPRESSOR
R1	B13220E6838	RESISTOR
S1	D13216E6201	SWITCH ROTARY SELECTOR
S2	C13216E6200	SWITCH TOGGLE
S3	D13216E6203	SWITCH TEMPERATURE CONTROL
S4	C13216E6215 3	SWITCH HIGH PRESSURE CUTOUT
S5	C13216E6215 1	SWITCH LOW PRESSURE CUTOUT
S6	C13216E6224	SWITCH HEATER CUTOUT
S7	C13216E6217	SWITCH THERMOSTATIC
T1	C13216E6214	TRANSFORMER
TB1	C13216E6231	TERMINAL BOARD JUNCTION BOX
TB2	C13216E6220 1	TERMINAL BOARD
TB3	C13216E6232	TERMINAL BOARD POWER INPUT
TB4	D13219E9552 8	TERMINAL BLOCK

TO ENERGIZE THE UNIT FROM THE AUXILIARY POWER INPUT SOURCE (J 11) THE LEADS X1B12A X2B12B AND X3B12C ON TB3 1 2 AND 3 MUST BE CHANGED TO TB 3 4 5 AND 6 RESPECTIVELY

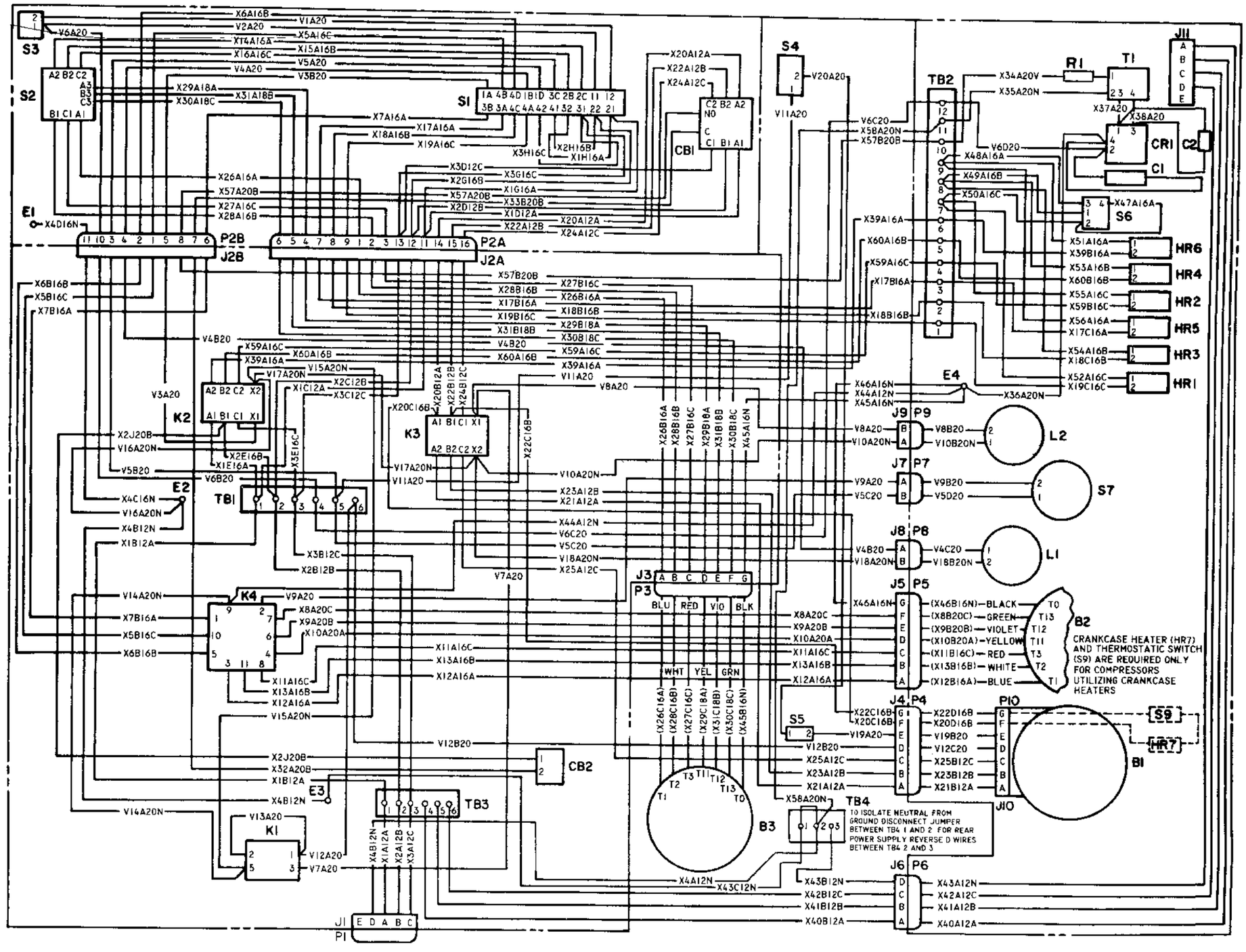


Figure 1-7.1. *Wiring diagram 3-phase 50/60 Hertz 208 volts (Model CH-20-6-08 only)*

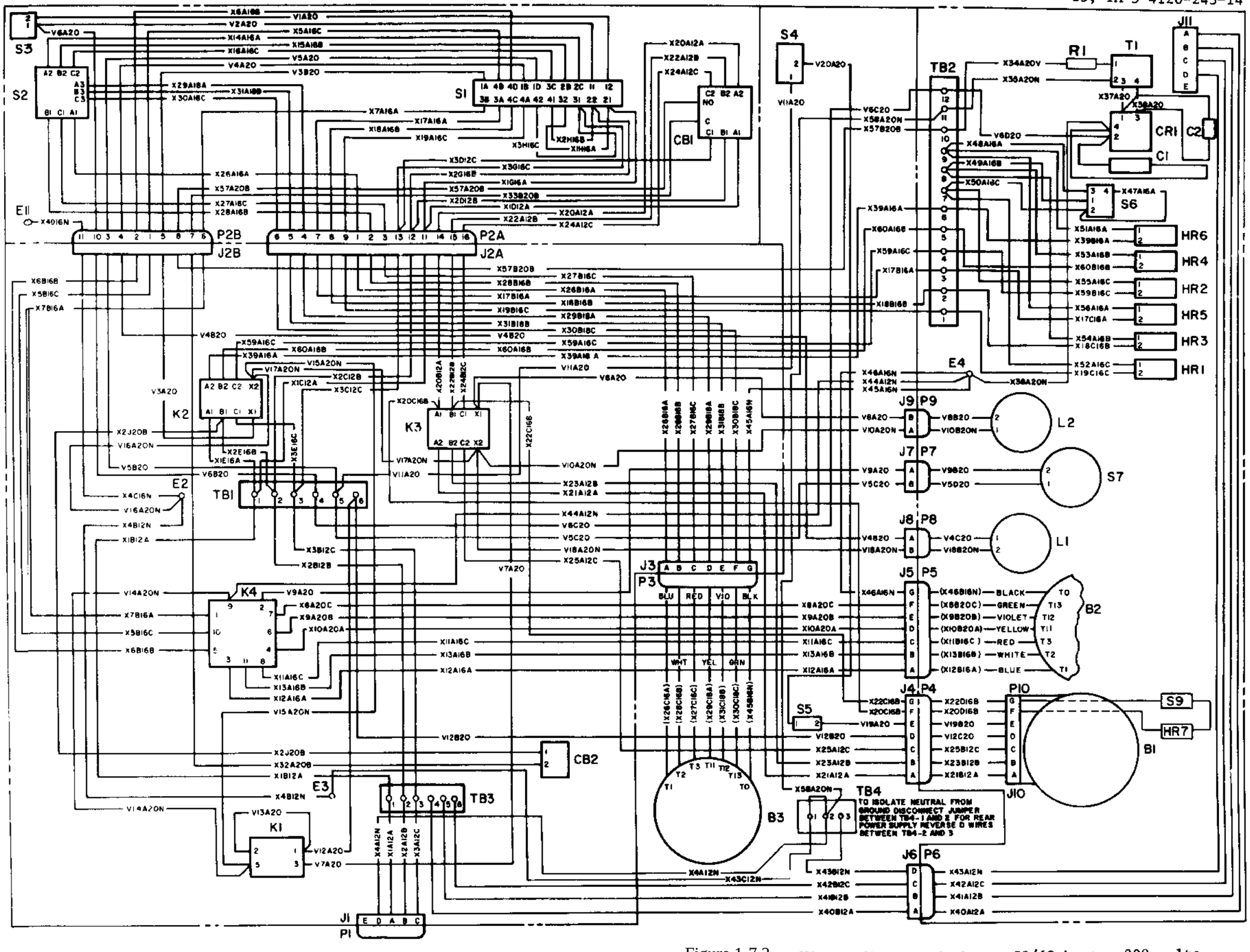
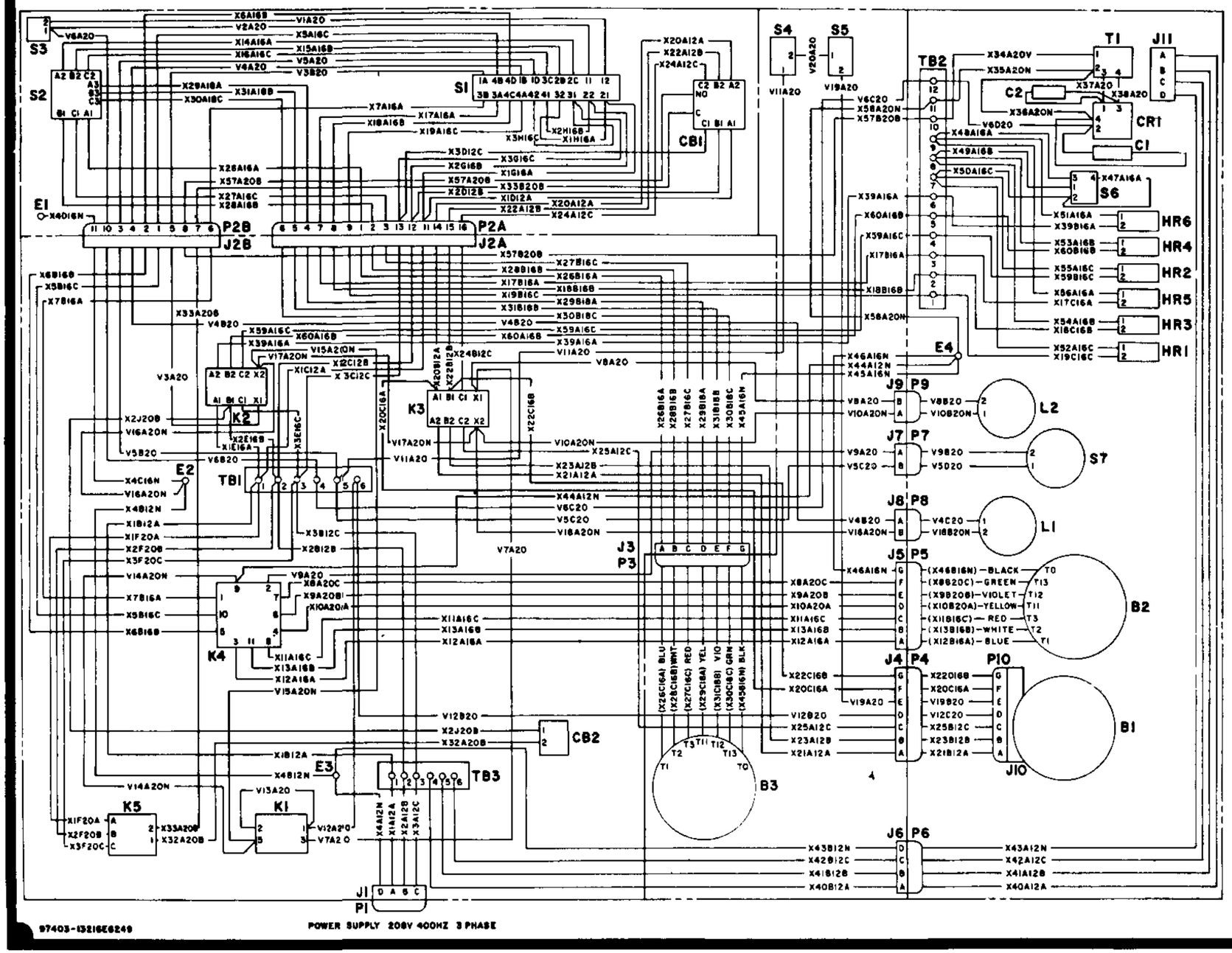


Figure 1-7.2. Wiring diagram, 3 phase, 50/60 hertz, 208 volts (American Air Filter Model only)



COMPONENT REFERENCE LIST		
ELEC REF DESIG	PART NUMBER	DESCRIPTION
B1	D13211E3793-1	COMPRESSOR, ROTARY
B2	D13216E6140 4	MOTOR, CONDENSER FAN
B3	D13216E6140-4	MOTOR, EVAPORATOR FAN
C1	CK14AX103K	CAPACITOR, FILTER
	MIL-C 11015/20	
C2	B13218E6961	CAPACITOR, FILTER
CB1	D13216E6205-4	CIRCUIT BREAKER, COMPRESSOR
CB2	C13216E6178-2	CIRCUIT BREAKER, CONTROL
CR1	D13216E6223	RECTIFIER SEMICONDUCTOR DEVICE
E1	MS24693-S50	TERMINAL STUD (CONTROL MODULE GRD)
E2	MS24693-S52	TERMINAL STUD (JUNCTION BOX GRD)
E3 AND E4	MS35206-246	TERMINAL STUD (SYSTEM GRD)
HR1 THRU 6	C13216E6124-4	HEATER ELEMENT
J1 AND J11	MS3100R-18-11P	CONNECTOR RECEPTACLE POWER INPUT
J2	D13216E6177	CONNECTOR RECEPTACLE JUNCTION BOX
J3	D13216E6193-2	CONNECTOR RECEPTACLE EVAPORATOR FAN
J4	D13216E6193-3	CONNECTOR RECEPTACLE COMPRESSOR
J5	D13216E6193-2	CONNECTOR RECEPTACLE CONDENSER FAN
J6	D13216E6193-5	CONNECTOR RECEPTACLE POWER INPUT
J7	D13216E6193-4	CONNECTOR RECEPTACLE THERMOSTATIC SWITCH
J8	D13216E6193-1	CONNECTOR RECEPTACLE SOLENOID VALVE BY-PASS
J9	D13216E6193-1	CONNECTOR RECEPTACLE SOLENOID VALVE EQUALIZER
J10	PART OF	CONNECTOR RECEPTACLE
	D13211E3793-1	COMPRESSOR
K1	C13216E6182	RELAY TIME DELAY
K2	MS24192D1	RELAY HEATER
K3	MS24192D1	RELAY COMPRESSOR MOTOR
K4	C13216E6184	RELAY, CONDENSER FAN
K5	C13216E6183-2	RELAY PHASE SEQUENCE
L1	C13216E6158	VALVE SOLENOID BY-PASS
L2	C13216E6158	VALVE SOLENOID, PRESSURE EQUALIZER
P1	MS3106R 18 11S	CONNECTOR PLUG, POWER INPUT
P2	D13216E6209-2	CONNECTOR, PLUG CONTROL MODULE
P3	PART OF	CONNECTOR PLUG EVAPORATOR
	D13216E6140 4	FAN
P4	MS3106R 20 15P	CONNECTOR PLUG COMPRESSOR
P5	PART OF	CONNECTOR PLUG CONDENSER
	D13216E6140 4	FAN
P6	MS3106R-18 11S	CONNECTOR PLUG POWER INPUT
P7	MS3106R 16 10P	CONNECTOR, PLUG, THERMOSTATIC SWITCH
P8	B13218E6173	CONNECTOR PLUG SOLENOID VALVE BY-PASS
P9	B13216E6173	CONNECTOR PLUG SOLENOID VALVE EQUALIZER
P10	MS3106R-20 15S	CONNECTOR, PLUG COMPRESSOR
S1	D13216E6201	SWITCH ROTARY SELECTOR
S2	C13216E6200	SWITCH TOGGLE
S3	D13216E6203	SWITCH TEMPERATURE CONTROL
S4	C13216E6215 3	SWITCH HIGH PRESSURE CUTOUT
S5	C13216E6215-1	SWITCH LOW PRESSURE CUTOUT
S6	C13216E6224	SWITCH HEATER CUTOUT
S7	C13216E6217	SWITCH THERMOSTATIC
T1	C13216E6214	TRANSFORMER
TB1	C13216E6231	TERMINAL BOARD, JUNCTION BOX
TB2	C13216E6220 1	TERMINAL BOARD
TB3	C13216E6232	TERMINAL BOARD POWER INPUT

TO ENERGIZE THE UNIT FROM THE AUXILIARY POWER INPUT SOURCE (J11) THE LEADS X1B12A X2B12B AND X3B12C ON TB3 1 2 AND -3 MUST BE CHANGED TO TB3-4 -5 AND 6 RESPECTIVELY

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Figure 1-8. *Wiring diagram 3 phase 400 Hertz 208 volts*

COMPONENT REFERENCE LIST		
ELEC REF DESIG	PART NUMBER	DESCRIPTION
B1	D13211E3793 6	COMPRESSOR ROTARY
B2	D13216E6140 4	MOTOR CONDENSER FAN
B3	D13216E6140 4	MOTOR EVAPORATOR FAN
C1	MIL C 39014/5 0461	CAPACITOR FILTER (EMI)
C2	B13218E6961	CAPACITOR (EMI)
CB1	D13216E6205 4	CIRCUIT BREAKER COMPRESSOR
CB2	C13216E6178 2	CIRCUIT BREAKER CONTROL
CR1	D13216E6223	RECTIFIER SEMICONDUCTOR DEWICE
E1	MS24693 S50	TERMINAL STUD(CONTROL MODULE GRD)
E2	MS24693 S50	TERMINAL STUD(JUNCTION BOX GRD)
E3 AND E4	MS35206 246	TERMINAL STUD(SYSTEM GRD)
HR1 THRU 6	C13216E6124 4	HEATER ELEMENT
J1 AND J11	MS3100R 18 1P	CONNECTOR RECEPTACLE POWER
		INPUT
J2	D13216E6177	CONNECTOR RECEPTACLE JUNCTION
		BOX
J3	D13216E6193 2	CONNECTOR RECEPTACLE EVAPORATOR
		FAN
J4	D13216E6193 3	CONNECTOR RECEPTACLE
		COMPRESSOR
J5	D13216E6193 2	CONNECTOR RECEPTACLE CONDENSER
		FAN
J6	D13216E6193 5	CONNECTOR RECEPTACLE POWER
		INPUT
J7	D13216E6193 4	CONNECTOR RECEPTACLE THERMOSTATIC
		SWITCH
J8	D13216E6193 1	CONNECTOR RECEPTACLE SOLENOID
		VALVE BY PASS
J9	D13216E6193 1	CONNECTOR RECEPTACLE SOLENOID
		VALVE EQUALIZER
J10	PART OF	CONNECTOR RECEPTACLE
	D13211E3793 2	COMPRESSOR
K1	C13216E6182	RELAY TIME DELAY
K2	MS24192D1	RELAY HEATER
K3	MS24192D1	RELAY COMPRESSOR MOTOR
K4	C13216E6184	RELAY CONDENSER FAN
L1	C13216E6158	VALVE SOLENOID BY PASS
L2	C13216E6158	VALVE SOLENOID PRESSURE EQUALIZER
P1	MS3106R 18 11S	CONNECTOR PLUG POWER INPUT
P2	D13216E6209 2	CONNECTOR PLUG CONTROL MODULE
P3	PART OF	CONNECTOR PLUG EVAPORATOR
	D13216E6140 3	FAN
P4	MS3106R 20 15P	CONNECTOR PLUG COMPRESSOR
P5	PART OF	CONNECTOR PLUG
	D13216E6140 3	CONDENSER FAN
P6	MS3106R 18 11S	CONNECTOR PLUG POWER INPUT
P7	MS3106R 16 10P	CONNECTOR PLUG THERMOSTAITIC
		SWITCH
P8	B13216E6173	CONNECTOR PLUG SOLENOID
		VALVE BY PASS
P9	B13216E6173	CONNECTOR PLUG SOLENOID
		VALVE EQUALIZER
P10	MS3106R 20 15S	CONNECTOR PLUG COMPRESSOR
R1	B13220E6858	RESISTOR
S1	D13216E6201	SWITCH ROTARY SELECTOR
S2	C13216E6200	SWITCH TOGGLE
S3	D13216E6203	SWITCH TEMPERATURE CONTROL
S4	C13216E6215 5	SWITCH HIGH PRESSURE CUTOU T
S5	C13216E6215 1	SWITCH LOW PRESSURE CUTOUT
S6	C13216E6224	SWITCH HEATER CUTOUT
S7	C13216E6217	SWITCH THERMOSTATIC
T1	C13216E6214	TRANSFORMER
TB1	C13216E6231	TERMINAL BOARD JUNCTION BOX
TB2	C13216E6220 1	TERMINAL BOARD
TB3	C13216E6232	TERMINAL BOARD POWER INPUT
TB4	D13219E9552 8	TERMINAL BLOCK

TO ENERGIZE THE UNIT FROM THE AUXILIARY POWER INPUT SOURCE (J 11) THE LEADS X1B12A X2B12B AND X3B12C ON TB3 1 2 AND 3 MUST BE CHANGED TO TB 3 4 5 AND 6 RESPECTIVELY

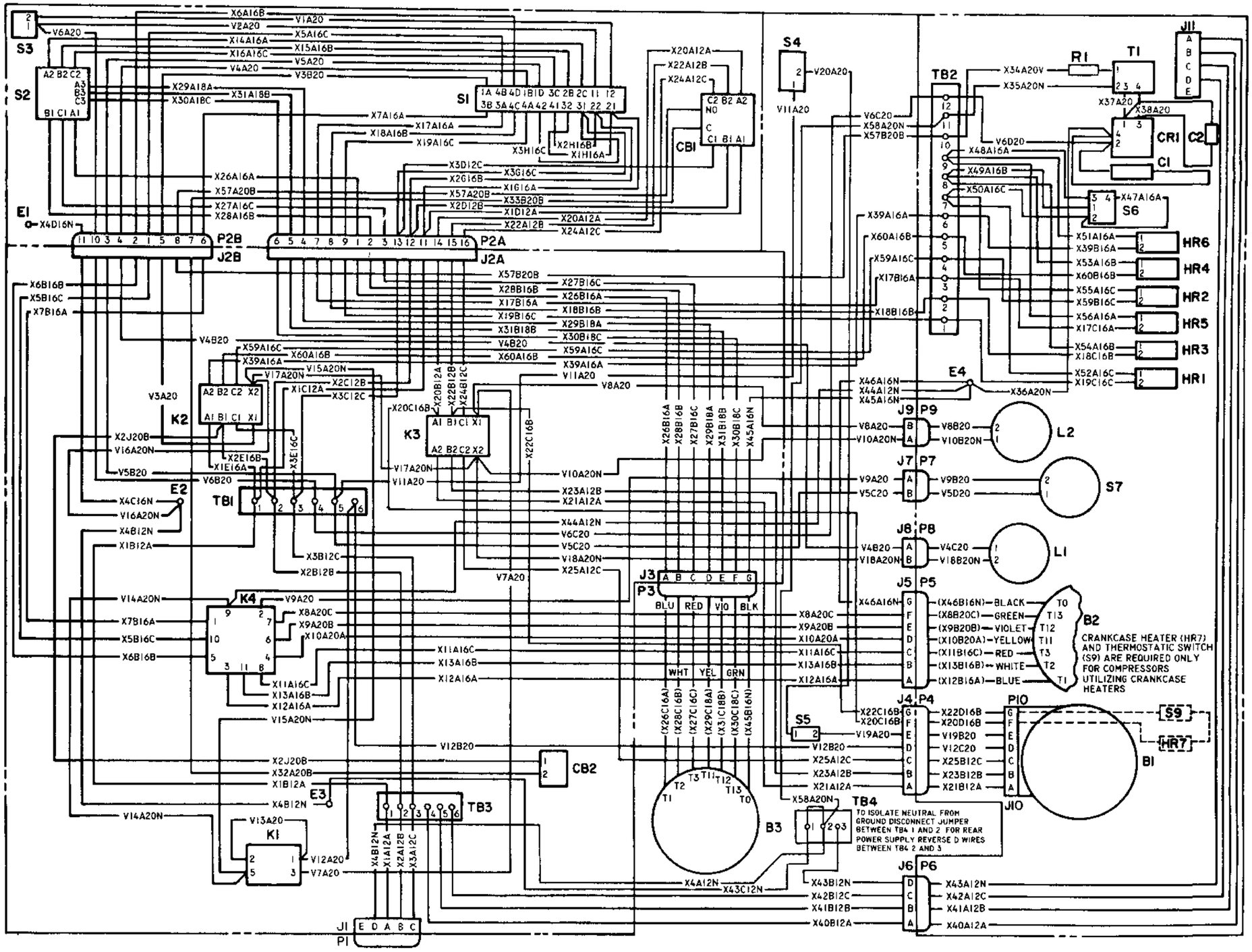

Figure 1-8.1 *Wiring diagram, 3-phase, 400 Hertz, 208 volts (Model CH 20-4-08 only)*

COMPONENT REFERENCE LIST		
ELEC REF DESIG	PART NUMBER	DESCRIPTION
B1	D13211E3793-5	COMPRESSOR
B2	D13216E6140-4	MOTOR CONDENSER FAN
B3	D13216E6140-4	MOTOR EVAPORATOR FAN
C1	MIL C 39014/5-0481	CAPACITOR FILTER (EMI)
C2	B13218E6961	CAPACITOR (EMI)
CB1	D13216E6205-4	CIRCUIT BREAKER COMPRESSOR
CB2	C13216E6178 2	CIRCUIT BREAKER CONTROL
CR1	D13216E8223	RECTIFIER SEMICONDUCTOR DEVICE
E1	MS24693 S50	TERMINAL STUD (CONTROL MODULE GRD)
E2	MS24693-S50	TERMINAL STUD (JUNCTION BOX GRD)
E3 AND E4	MS35206 246	TERMINAL STUD (SYSTEM GRD)
HR1 THRU 6	C13216E6124-4	HEATER ELEMENT
J1 AND J11	MS3100R 18 11P	CONNECTOR RECEPTACLE, POWER INPUT
J2	D13216E6177	CONNECTOR RECEPTACLE JUNCTION BOX
J3	D13216E6193 2	CONNECTOR RECEPTACLE EVAPORATOR FAN
J4	D13216E6193 3	CONNECTOR RECEPTACLE COMPRESSOR
J5	D13216E6193 2	CONNECTOR RECEPTACLE CONDENSER FAN
J6	D13216E6193 5	CONNECTOR RECEPTACLE POWER INPUT
J7	D13216E6193 4	CONNECTOR RECEPTACLE THERMOSTATIC SWITCH
J8	D13216E6193-1	CONNECTOR RECEPTACLE SOLENOID VALVE BY PASS
J9	D13216E6193 1	CONNECTOR RECEPTACLE SOLENOID VALVE EQUALIZER
J10	PART OF D13211E3793 5	CONNECTOR RECEPTACLE COMPRESSOR
K1	C13216E6182	RELAY TIME DELAY
K2	MS24192D1	RELAY, HEATER
K3	MS24192D1	RELAY COMPRESSOR MOTOR
K4	C13216E6184	RELAY CONDENSER FAN
L1	C13216E6158	VALVE SOLENOID BY PASS
L2	C13216E6158	VALVE SOLENOID PRESSURE EQUALIZER
P1	MS3106R-18 11S	CONNECTOR PLUG POWER INPUT
P2	D13216E6209 2	CONNECTOR PLUG CONTROL MODULE
P3	PART OF D13216E6140 4	CONNECTOR PLUG EVAPORATOR FAN
P4	MS3106R 20 15P	CONNECTOR PLUG COMPRESSOR
P5	PART OF D13216E6140 4	CONNECTOR PLUG CONDENSER FAN
P6	MS3106R-18 11S	CONNECTOR, PLUG, POWER INPUT
P7	MS3106 R 16 10P	CONNECTOR PLUG THERMOSTATIC SWITCH
P8	B13216E6173	CONNECTOR, PLUG SOLENOID VALVE BY PASS
P9	B13216E6173	CONNECTOR PLUG SOLENOID VALVE EQUALIZER
P10	MS3106R 20 15S	CONNECTOR PLUG COMPRESSOR
R1	B13220E6838	RESISTOR
S1	D13216E6201	SWITCH ROTARY SELECTOR
S2	C13216E6200	SWITCH TOGGLE
S3	D13216E6203	SWITCH TEMPERATURE CONTROL
S4	C 3216E6215 3	SWITCH HIGH PRESSURE CUTOUT
S5	C13216E6215 1	SWITCH LOW PRESSURE CUTOUT
S6	C13216E6224	SWITCH HEATER CUTOUT
S7	C13216E6217	SWITCH THERMOSTATIC
T1	C13216E6214	TRANSFORMER
TB1	C13216E6231	TERMINAL BOARD JUNCTION BOX
TB2	C13216E6220-1	TERMINAL BOARD
TB3	C13216E6232	TERMINAL BOARD POWER INPUT
TB4	D13219E9552 8	TERMINAL BOARD

TO ENERGIZE THE UNIT FROM THE AUXILIARY POWER INPUT SOURCE (J 11) THE LEADS X1B12A X2B12B, AND X3B12C ON TB3 1 2 AND 3 MUST BE CHANGED TO TB 3-4 5 AND 6 RESPECTIVELY

Figure 1-8.2 Wiring diagram, 3 phase, 400 hertz, 208 volts (Keco model F18H-4 only)

INDEX

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PAGE NO.	PARAGRAPH	FIGURE NO.	TABLE NO.	
6	2-1 a			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
81		4-3		Callout 16 on figure 4-3 is pointing at a bolt. In the key to fig. 4-3, item 16 is called a shim. Please correct one or the other.
125	line 20			I ordered a gasket, item 19 on figure B-16 by NSN 2910-00-762-3001. I got a gasket but it doesn't fit. Supply says I got what I ordered so the NSN is wrong. Please give me a good NSN

SAMPLE

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THE METRIC SYSTEM AND EQUIVALENTS

'NEAR MEASURE

. Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

'VEIGHTS

Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 lb.
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq. Centimeter = 100 Sq. Millimeters = 0.155 Sq. Inches
1 Sq. Meter = 10,000 Sq. Centimeters = 10.76 Sq. Feet
1 Sq. Kilometer = 1,000,000 Sq. Meters = 0.386 Sq. Miles

CUBIC MEASURE

1 Cu. Centimeter = 1000 Cu. Millimeters = 0.06 Cu. Inches
1 Cu. Meter = 1,000,000 Cu. Centimeters = 35.31 Cu. Feet

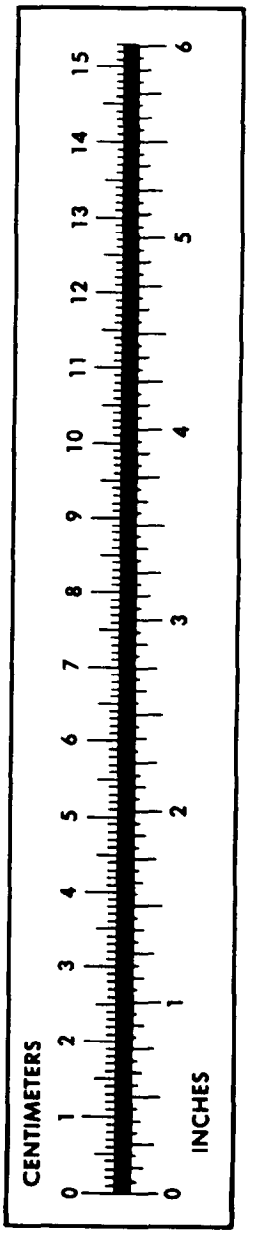
TEMPERATURE

5/9(°F - 32) = °C
212° Fahrenheit is evuivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
9/5C° + 32 =°F

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
ıts	Liters	0.473
arts	Liters	0.946
allons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
ers	Gallons	0.264
ms	Ounces	0.035
ograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pounds-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
lometers per Liter	Miles per Gallon	2.354
meters per Hour	Miles per Hour	0.621



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