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SUPERSEDING
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MILITARY SPECIFICATION

AIR CONDITIONER, A/M32C-5, TRAILER MOUNTED, VAPOR CYCLE, ELECTRIC MOTOR DRIVEN

This specification is approved for use by the Department of the Air Force and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

*1.1 Scope. This specification covers one type of electric motor driven, vapor cycle, trailer mounted air conditioner, having a nominal cooling capacity of 240,000 BTU/HR (20 tons), Type A/M32C-5.

2. APPLICABLE DOCUMENTS

2.1 Issues of documents. The following documents of the issue in effect on date of invitation for bids or request for proposal form a part of the specification to the extent specified herein:

SPECIFICATIONS

FEDERAL

CC-M-1807	Motor, Alternating Current Fractional and Integal Horsepower (500 HP and Smaller)
QQ-B-654	Brazing Alloy, Silver
QQ-S-698	Steel, Sheets and Strip, Low Carbon
VV-L-825	Lubricating Oil Refrigerant Compressor
WW-T-799	Tube, Copper, Seamless, Water and Refrigeration (For Use With Solder-Flared-or Compression Type Fittings)

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: HQ AFLC CASO/LODS, Federal Center, Battle Creek MI 49016 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

Military

MIL-V-173	Varnish, Moisture and Fungus Resistant (For the Treatment of Communication, Electronic, and Associated Electrical Equipment)
MIL-F-3541	Fittings Lubrication
MIL-R-3593	Refrigeration and Cooling Equipment (Excluding Household Refrigerators) Packing of
MIL-C-5015	Connectors, Electrical, Circular Threaded, "AN" Type, General Specification For
MIL-W-5088	Wiring, Aerospace Vehicle
MIL-C-5756	Cable and Wire, Power, Electrical Portable
MIL-R-5757	Relay, Electrical (For Electronic and Communication Type Equipment) General Specification for
MIL-T-7928	Terminals; Lug and Splice; Crimp Style, Cooper
MIL-W-8005	Wheels and Hubs, for Industrial Pneumatic Tires
MIL-M-8090	Mobility, Towed Aerospace Ground Equipment, General Specification for
MIL-G-8402	Gages, Pressure, Dial, Indicating General Specification for
MIL-A-8421	Air Transportability Requirements, General Specification for
MIL-W-22759	Wire, Electric, Fluoropolymer Insulated, Copper or Copper Alloy
MIL-D-38386	Duct Assemblies, Ground Conditioned Air, Insulated Flexible

STANDARDS

Federal

FED-STD-595	Colors

Military

DOD-STD-100	Engineering Drawing Practices
MIL-STD-129	Marking for Shipment and Storage
MIL-STD-130	Identification Marking of US Military Property
MIL-STD-143	Standards and Specifications, Order of Precedence for the Selection of

MIL-STD-195	Marking of Connections for Electrical Assemblies
MIL-STD-461	Electromagnetic Emission and Susceptibility Requirements For the Control of Electromagnetic Interference
MIL-STD-462	Electromagnetic Interference Characteristics, Measurement of
MIL-STD-808	Finishes, Protective and Codes, For Finishing Schemes For Ground and Ground Support Equipment
MIL-STD-810	Environmental Test Methods
MIL-STD-831	Test Reports, Preparation of
MIL-STD-889	Metals, Dissimilar
MIL-STD-1474	Noise Limits for Army Materiel
MS27265	Connector, Plug, Electrical Ramp Power 416/240, Male
MS27766	Shroud for Aerospace Ground Equipment
MS51335	Pintle Assembly, Towing 18,000 Lbs Capacity, Manual Release
MS51336	Lunette, Coupler, Drawbar, Ring

DRAWINGS

Air Force

48B7796	Ring Assembly Tie Down 10,000 Lb
49B6564	Ring-Eyebolt, 25,000 lb Cargo Tie Down
64C1004	Connector-Air Duct Hose, Ground Cooling Male
64C1005	Connector-Air Duct Hose, Ground Cooling Female
64C1006	Packing, Performed Air Duct Hose, Ground Cooling
7545352	Requirements for Finishes Protective and Codes for San Antonio ALC, Ground and Ground Support Equipment
8044080	Cap, Air Duct, Female, Grounding Cooling

AMERICAN AIR FILTER

DL10756-101	Drawing List for A/M32C-5 Air Conditioner, Trailer Mounted Vapor Cycled Electric Motor Driven

(Copies of specifications, standards, drawings and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or requests for proposal shall apply.

American Society of Heating, Refrigerating & Air Condition Engineers

ASHRAE Incorporated Standard 37-69 - Unitary Air Conditioning Equipment, Method of Testing for Rating (Latest Edition)

ASHRAE Guide and Data Book (Latest Edition)

(Application for copies should be addressed to the American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc., 345 E 47th Street, New York NY 10017.)

American Society of Mechanical Engineers

ASME Boiler and Pressure Vessel Code Section VIII Unfired Pressure Vessels (Latest Edition)

(Application for copies should be addressed to the American Society of Mechanical Engineers, 29 W 29th Street, New York, NY 10018.)

American Standards Association

Standard S1.4 - 1961	General Purpose Sound Level Meters
Standard S1.6 - 1960	Preferred Frequencies for Acoustical Measurements

(Application for copies should be addressed to American Standards Association, 10 E 40th Street, New York, NY 10017.)

National Fire Protection Association

NFPA 70 - National Electrical Code (Electric Wiring & Apparatus)

(Application for copies should be addressed to National Fire Protection Association, 60 Batterymarch Street, Boston, MA 02119.)

3. REQUIREMENTS

3.1 Preproduction. This specification makes provisions for preproduction testing.

3.1.1 General requirements. The air conditioning unit produced and delivered must meet all the requirements of this specification and must conform to American Air Filter (AAF) drawings list 10756-101 except as provided herein. This specification defines revised design, performance and quality assurance requirements for the A/M32C-5 air conditioner and the AAF drawings ostensibly define a model which met all the requirements of a prior edition of the specification. It shall be the contractor's responsibility to determine and correct any deficiencies or inaccuracies depicted in the AAF drawing so as to enable manufacture and delivery of an end item unit in compliance with all requirements of this specification. Deviations from the drawings will be allowed where required for compliance with the specification and additions thereto included in the solicitation, where necessary to correct errors among the drawings and when nonavailability of previously identified components requires change. These type changes shall be documented and shall be submitted with justification through the procuring activity to San Antonio ALC (MMIRGC) for record purposes. In addition, product improvement changes

may be considered but will not be the basis for bid and must be submitted for approval prior to incorporation into any unit. The inability of the government to provide additional data, or the existence of any deficiencies or inaccuracies in the referenced drawings, shall not later be construed as justification for an increase in contract price nor as an excusable delay under the terms of the contract. Baseline configuration is established upon approval of first article and all subsequent changes must carry procuring office approval prior to incorporation into any unit.

3.2 Components. The air conditioner shall consist of the following major components and necessary accessory equipment:

Item No.	Description	See Requirement
1	Refrigeration System	3.7
2	Condenser Assembly	3.8
3	Receiver	3.9
4	Evaporator Assembly	3.10
5	Air/Refrigeration Control's System and Accessories	3.11
6	Refrigeration Piping	3.12
7	Air Flow System	3.13
8	Cabinet Trailer Design Features	3.15
9	Electrical System	3.16
10	Instruments	3.17

3.3 Selection of specification and standards. Specifications and standards for necessary commodities and services not specified herein shall be selected in accordance with MIL-STD-143 except as specified in 3.3.1 and 3.3.2.

3.3.1 Commercial parts. Commercial parts having suitable properties may be used where, on the date of invitation for bids, there are not suitable standard parts. In any case, commercial utility parts, such as screws and self-tapping screws, shall not be used. Bolts, nuts and cotter pins having suitable properties shall be used provided:

a. They can be replaced by the standard parts (MS or AN) without alteration.

b. The corresponding standard part numbers are referenced in the parts list and, if practical, on the contractor's drawings.

3.3.2 Standard parts. With the exceptions specified in 3.3.1, MS and AN standard parts shall be used where they are suitable for the purpose intended. They shall be identified on the drawings by their part numbers.

3.4 Materials.

3.4.1 Fungus-proof material. Materials that are nutrients for fungi shall not be used where it is practical to avoid them. Where used and not hermetically sealed, they shall be treated with a fungicidal agent. However, if they will be used in a hermetically sealed enclosure fungicidal treatment will not be necessary.

3.4.2 Metals. Metals shall be of the corrosion resistant type or treated in accordance with paragraph 3.23 to resist corrosion due to fuels, salt spray or atmosphere conditions likely to be met in storage or normal service.

3.4.3 Dissimilar metals. Unless suitably protected against electrolytic corrosion, dissimilar metals shall not be used in intimate contact with each other. Dissimilar metals are defined in MIL-STD-889.

3.4.4 Gasketing and insulating materials. Where rubber or similar gasketing and insulating materials are used, they shall be compounded to insure their oil resistance and, where applicable, their ability to withstand low temperature.

3.5 Design and construction. The air conditioner shall be designed to be completely automatic once it is placed in operation and shall provide a rugged and trouble-free unit of lightest weight and smallest practicable size comparable with the requirements specified herein. The air conditioner shall be so designed that all major air conditioner components, including stored ducts and operating controls, shall be enclosed in a metallic cabinet and mounted on a four-wheel trailer. The air conditioner shall be so designed that the major air conditioner components specified herein can be removed through cabinet doors and/or removable panels. A drawbar shall be provided in the front of the unit to provide a means of attaching a towing vehicle, also a pintle hook on the rear for towing additional vehicles. Tie down rings shall be provided to secure the unit in shipment and for lifting. The cabinet shall be so designed to present a neat, smooth external appearance free from sharp edges and sharp corners.

3.5.1 Adjustments and repairs. The air conditioner shall be so constructed that adjustments and repairs can be easily made by personnel of operating units and overhaul bases with the use of standard hand tools.

3.5.2 Life. The air conditioner shall be designed for an operating life of 3,000 hours between major overhauls and shall be capable of operating for 550 hours at design capacity without failure of any major part. (4.6.11)

*3.5.3 Forklifting provisions. The air conditioner shall be provided with lifting pads or channels along the width dimension to permit the air conditioner to be forklifted without damage. These pads or channels shall be positioned no more than 20 inches (inside dimension) on each side of the center of gravity of the unit. The pads or channels shall be capable of accommodating lifting forks that are 8 inches wide and 2 3/4 inches thick.

*3.5.4 Hoisting. The air conditioner shall be constructed with hoisting provisions to permit hoisting of the enclosure for accessibility and hoisting of the complete, dry unit (6.4) from the chassis. An internal spread bar shall be incorporated at the top of the enclosure and shall be designed not to collapse during hoisting. Tie down provisions in accordance with MIL-A-8421 shall be provided and shall serve as both tie down and hoisting provisions, where practicable. These provisions shall be capable of withstanding a vertical acceleration of 3g. The hoisting ring assemblies shall confrom to drawing 48B7796 or 49B6564 as applicable. The air conditioner shall have a minimum of four collapsible hoisting rings on each corner to permit hoisting of the enclosure for accessibility and a minimum of four to permit hoisting of the complete dry unit from the chassis. The hoisting ring assemblies shall be located around the periphery of the unit in a horizontal plane. The hoisting rings can be used as the tie down ring assemblies. The location of the hoisting ring assemblies shall be further governed by hoisting considerations. For hoisting, the rings shall be located with respect to the center of gravity in order to comply with the following requirements:

a. The air conditioner shall not tilt at an angle greater than 15° when hoisted from a single point with four equal length cables attached to the ring assemblies.

b. The angle of the air conditioner with the horizontal shall not increase when the air conditioner is hoisted from a single point with cable lengths that cause the unit to tilt at an angle of 30° with the horizontal.

*3.5.5 Air transportability. The air conditioner shall be transportable in accordance with MIL-A-8421 for C130 and C141 aircraft.

3.5.6 Detachable fittings. AM or MS type disconnect plugs and receptacles in the electrical system and readily detachable and attachable type fittings in mechanical components shall be utilized wherever practicable to permit rapid component removal and replacement.

*3.5.7 Radio interference. The air conditioner shall meet the radio interference requirements of MIL-STD-461, Class IIIC Test Method RE03. Conducted radio interference in power cable shall not exceed limits of MIL-STD-461, Class IC Test Method CE03.

*3.5.8 Noise level. The noise level generated by air conditioner shall not exceed the values as specified in MIL-STD-1474 Table 2, Category D, when measured as speciified in 4.6.14.

*3.5.8.1 Sound attenuation. In addition to the blower silencers required by 3.13.2.3 other acoustical treatment will be required to meet the noise limits cited in 3.5.8. As required, double wall type construction will be used for the air intake plenum, air discharge plenum, the entire air conditioner enclosure and subenclosure. When double wall construction is utilized the acoustical material between the inner and outer wall shall be lead filled vinyl nonhygroscopic insulation material manufactured by Duraconte Corp Raverria OH (Product Dura Sonic Product No 5517) or equal. The perforated inner panel for the air intake and discharge plenum shall be AISI 304L or

316L stainless steel. The perforated inner panel for the air conditioner enclosure shall be carbon steel and the finish shall be SF100 in accordance with Air Force drawing 7545352. The perforated inner panel shall have 3/32 inch OD holes on 3/16 inch staggered center. The perforated inner panels shall be mounted in such a way to not permit acoustic energy to be transmitted through fasteners to the outer panels. No external means shall be used to suppress the noise level.

3.5.9 Accessibility. The air conditioner shall be so designed and constructed that the following actions may be accomplished by removing a limited number of components and/or subassemblies (other than panels):

a. Remove the electric motor(s) by merely uncoupling the flexible coupling, removing the mounting bolts, disconnecting the electric wiring, and lifting it out of the top, side or end of the air conditioner by use of an overhead crane or forklift truck.

b. Remove the compressor by merely uncoupling the flexible coupling, refrigerant plumbing, removing the mounting bolts and lifting it out the top, side or end of the air conditioner by use of an overhead crane or forklift truck.

c. Remove the blower by merely uncoupling the flexible coupling, removing the flexible duct connections and mounting bolts and lifting it out the top, side or end of the air conditioner by use of an overhead crane or forklift truck.

d. Remove the condenser motor by merely removing the mounting bolts, v-bolts, disconnecting the electrical wiring and lifting it out the top, side or end of the air conditioner by the use of an overhead crane or forklift truck.

3.6 Performance.

3.6.1 Ambient operating range.. The air conditioner shall be capable of operating within the range of ambient conditions described on a psychrometric chart by the following limits:

a. The 0° Fahrenheit (F) dry bulb line to intersect with its saturation line.

b. The saturation line from 0° to 90° F.

c. A line from 90° F dew point on the saturation line to 140° F at 0 percent relative humidity.

3.6.1.1 Operating and storage capability. The air conditioner shall be capable of operating as a ventilating blower, without refrigeration, at ambient temperature between 0° F and + 125° F. Also, it shall be capable of being stored at - 65° F to +165°F without detrimental effect or maintenance prior to being put into service.

3.6.1.2 Delivery pressure. At standard atmospheric pressure, without manual adjustment, the air conditioner shall deliver air at the specified discharge

temperature as specified in 3.6.1.3. through 3.6.1.7 against an external static pressure ranging from 0 to 4 psig when measured at the end of a 15-foot section of duct.

*3.6.1.3 Rated condition. When operating at a sea level ambient condition of 100° F ± 3° F dry bulb (DB) and 85° F ± 3° F wet bulb (WB), the air conditioner shall be capable of delivering 75 pounds per minute of air at temperature of 50° F ± 3° F and a minimum of 90 percent relative humidity as specified delivery pressures.

3.6.1.4 Design summer day condition. When operating in an ambient condition of 100° F ± 3° F DB and 76° F ± 3° F WB, the air conditioner shall be capable of delivering a minimum of 100 pounds per minute of 50° F ± 3° F air against an external static pressure specified. Under these conditions, the air conditioner shall also be capable of delivering 50° F ± 3° F air within 10 minutes after prime mover start.

*3.6.1.5 Design hot day condition. When operating in an ambient condition of 125° F ± 3° F DB and 75° F ± 3° F WB, the air conditioner shall be capable of delivering a minimum of 80 pounds per minute of 50° F ± 3° F against an external static pressure specified.

3.6.1.6 Design humid day condition. When operating in an ambient condition of 97° F ± 3° F DB and 87° F ± 3° F WB, the air conditioner shall be capable of delivering a minimum of 70 pounds per minute of 50° F ± 3° F air against the static pressures specified.

3.6.1.7 Low ambient condition. When operating in an ambient condition of 0° F, the air conditioner shall be capable of delivering a minimum of 75 pounds per minute of 50° F ± 3° F against an external static pressure of 4 psig.

3.6.2 Tilted position. The air conditioner shall be capable of operating satisfactorily when its normal operating plane is an angle of 8 1/2° in any direction from true horizontal.

3.6.3 Environmental Exposure. The air conditioner shall be capable of conforming to all requirements specified herein after exposure to the following environmental conditions:

a. Ambient temperatures of - 65° F to + 165° F.

b. Radiant energy as found under natural conditions.

c. Salt spray as may be encountered in salt-sea atmosphere.

d. Fungus growth as may be encountered in tropical climates.

e. Rainfall as encountered in any locale.

f. Sand and dust as may be encountered in desert areas.

3.7 Refrigeration system. The air/refrigeration control system shall include a refrigerant compressor, condenser, receiver, evaporator (aftercooler and precooler) controls and accessories.

3.7.1 Refrigerant. The refrigerant shall be dichorodifluromethane (R-12).

*3.7.1.1 The refrigerant system prior to charging with refrigerant shall be statically tested for leakage at a pressure of at least 300 psig dry nitrogen in conjunction with specified refrigerant for a minimum of 1 hour.

*3.7.1.2 Prior to charging with refrigerant, the system, excluding the compressor, shall be evacuated to a minimum of 0.5 mm Hg absolute, recharged with dry nitrogen and re-evacuated to a minimum to 0.5 mm Hg absolute. The system shall be held at this secondary evacuation pressure for 6 hours and the evacuation pump shall be operating during this 6 hour period. If no noticeable pressure rise occurs, the unit may be charged with refrigerant. The evacuation shall be performed while the unit is prevailing indoor ambient temperature 72°F.

*3.7.2 Compressor assembly. The compressor shall be of the multi-cylinder reciprocating type conforming to good refrigeration practice and shall have sufficient capacity to meet the air conditioner requirements specified herein when operating at 1750 revolution per minute (rpm). The compressor shall be directly driven by an electric motor sized for the application. The compressor procured from the compressor manufacture shall be equipped with suction and discharge valves, three electric solenoid operated capacity control actuator assemblies, internal cylinder unloading mechanism assemblies so the compressor can start without load and its capacity can automatically vary in steps according to the load on the evaporator. The electrical power requirements for the solenoid coils on the capacity control actuators shall be 24 volts/50/60 cycle/single phase. The compressor shall be provided with a readily observed oil level sight glass and shall contain a charge of refrigerant oil in accordance with VV-L-825. The compressor shall be the Trane Company reciprocating Series E or F.

3.7.2.1 The compressor and compressor motor shall both be mounted on a common structural component of the unit of adequate rigidity to ensure alignment. The compressor and motor shall be directly coupled in such fashion that either can be readily replaced without disturbing the other and without removal of the refrigerant plumbing.

3.8 Condenser coil assembly. The condenser shall be of the air cooled type conforming to good refrigeration practice and shall have adequate surface and air supply to enable the unit to meet the maximum capacity requirement specified in 3.6.1.4 with a refrigerant condensing temperature not exceeding 130°F (head pressure of approximately 180 pounds per square inch gage), and a refrigerant condensing temperature of 150°F and a head pressure of approximately 235 pounds per square inch gage for capacity requirements as specified in 3.6.1.5.

*3.8.1 Condenser coil assembly. The condenser coil shall be of the tube-finned type constructed of aluminum fins and copper tubes. The condenser coil shall have a minimum of 12 fins per inch and shall be integral with or securely bonded to the tubes by a continuous metallic bond. The coils shall be properly circuited without trays and headed to provide the capacity required at minimum pressure drop. The aluminum fins shall have minimum 0.006 inch thickness with the surface corrugated and the edges straight. The coil shall be

adequate size to limit the air velocity throught the coil to 750 feet per minute.

3.8.1.1 Mechanical bonding of the fins to the tubes will be adequate provided that fins with integral collars are used and the tubes are expanded into the fin collars. Fin collars shall completely sheath the tube and shall be free from splits, cracks, or other defects. An interface fit of 0.005 to 0.008 inch shall be provided after final assembly of the fins and tube.

*3.8.1.2 The condenser components shall be suitably cleaned prior to assembly and be free of oil or other foreign matter during assembly. The aluminum fins shall have an iridite finish to prevent corrosion.

3.8.1.3 The condenser coil, if exposed to the exterior of the unit shall be protected with a suitable grating or screen with an opening no larger than 3/4 inch. The protective device shall be spaced 2 inches from the condenser fins.

3.8.2 Condenser cooling fan(s). The air conditioner shall be equipped with a commercial type statically balanced condenser fan(s) so located as to draw ambient air through the condenser and discharge the air through the top of the air conditioner in a vertical direction without recirculation. The fan(s) shall be directly driven or V-belt driven by electric motor(s). If the condenser fan is V-belt(s) driven, it shall be so designed to facilitate V-belt(s) removal/replacement and shall have adequate means for V-belt(s)adjustment. The condenser fan(s) shall have the capacity to draw a minimum of 18000 CFM through the condenser coils at a pressure differential of 1.75 H_2O.

*3.8.3 Condenser discharge sliding door. The air conditioner shall be equipped with a condenser sliding door. The sliding door shall have handles on each side at a right angle to the direction of the slide and shall cover the condenser discharge fan opening when the air conditioner is not in operation. The sliding door shall be weathertight to prevent rain and other foreign debris from entering the unit. The sliding door assembly shall permit personnel on the ground to operate the door smoothly when opening and closing. The condenser sliding door shall be equipped with a minimum of eight nylon rollers, four on each side of the condenser sliding door adequately sized for the application. The rollers shall be enclosed in channels to insure smooth operation of the condenser door. The door shall have a latch to hold it securely in the closed position.

*3.9 Receiver. The air conditioner shall be provided with a refrigerant receiver of a size to hold the complete charge of refrigerant after pump down. The receiver shall be equipped with an automatic relief valve and shall be constructed in accordance with ASME Unfired Pressure Vessel Code requirements. The maximum working pressure and temperature of the receiver shall be 300 psi and 180° F respectively. A drain plug shall be provided at the bottom on the receiver.

*3.9.1 The receiver shall be equipped with adequate wrench type service valves on the inlet and outlet connections for entrapping the total refrigerant charge in the receiver. The automatic relief valve shall not be capable of being capped. The refrigerant charge shall not be greater than 80 percent of the receiver volume. Flanges shall be provided as close as possible to the receiver. One flanged connection shall be installed upstream and adjacent to

the inlet wrench type service valve and one flanged connection shall be installed downstream and adjacent to the outlet wrench type service valve.

*3.10 Evaporator coil assembly. The evaporator(s) (aftercooler and precooler) shall be of the finned type constructed of aluminum fins and copper tubes. The aftercooler coil shall have a minimum of 12 fins per inch and the precooler coil shall have a minimum of 8 fins per inch and shall be integral with or securely bonded to the tubes by a continuous metallic bond. The coils shall be properly circuited without trays and heated to provide the capacity required at minimum pressure drop. The aluminum fins shall have a minimum 0.006 inch thickness with the surface corrugated and the edges straight. The coil shall be of adequate size to limit the air velocity through the coil to 500 feet per minute at maximum capacity requirements specified in 3.6.1.4.

3.10.1 Mechanical bonding of fins of the tubes will be acceptable provided that fins with integral collars are used and the tubes are extended into the fin collars. Fin collars shall completely sheath the tube and shall be free from splits, cracks or other defects. An interference fit of 0.005 to 0.008 inch shall be provided after final assembly of the fins and tubes.

*3.10.2 The evaporator component shall be suitably cleaned prior to assembly and free of oil or other foreign matter during assembly. The aluminum fins shall have an iridite finish to prevent corrosion.

*3.10.3 A condensation pan and drain shall be provided for each evaporator coil section (precooler coil and aftercooler coil) to collect and dispose of moisture condensed by the evaporator coils. A suitable water eliminator shall be provided downstream of the aftercooler coil to collect entrained water droplets in the air stream. The drain shall be provided with an anti-siphoning device to insure condensate drainage while the air conditioner is operating. The water eliminators and condensate pan shall be constructed of AISI 304L or 316L stainless stee. The condensate drains of each evaporation section (precooler and aftercooler) shall be manifold together with a proper slope to assure drainage. The manifold shall be fabricated from copper and shall terminate at a convenient location outside the air conditioner with a male hose connection. The male hose connection shall be adequately supported to the air conditioner. The male hose connection shall have a cap to seal off the opening when not in use. The cap shall be attached to the air conditioner by a retaining chain of adequate length.

*3.10.3.1 Condensate drain hoses and all necessary fittings shall be provided to carry away condensed moisture from the air conditioner. The hose and fitting shall not be damaged by exposure to the temperature as specified in 3.6.3. The hose shall be 25 feet long and of an adequate size to carry away the condensed moisture encountered during the operation for each condition as specified in 3.6.1.3 through 3.6.1.7. The 25-foot hose shall be stored in a compartment within the enclosure of the air conditioner.

*3.10.3.2 A Condensate drain connection marking shall be printed in an easily observed location near the drain connection.

3.11 Air/refrigerant control system and accessories. The air/refrigerant control system shall be equipped with liquid line solenoid valve(s), liquid charging valve, dryer strainer, sight glass, liquid sub-cooler, hot gas

bypass system, suction line throttling valve, head pressure control system, refrigerant pressure safety controls and thermostats.

*3.11.1 Air/refrigerant control system. Air/refrigeration control system shall be incorporated into the air conditioner and shall be such that thermostat (T1) shall sense the precooled entering air temperature. The thermostat (T1) shall control the precooler liquid line solenoid valve and the compressor fourth stage cylinder unloading valve. When entering air temperature is below the thermostat set point, the thermostat shall open, closing the liquid line solenoid valve and closing the fourth stage unloading valve, thereby controlling the precooling coil. Thermostat (T2) shall sense the aftercooler entering air temperature. The thermostat (T2) shall control the liquid line solenoid valve to the first one-third of the aftercooler coil and closing the compressor third stage cylinder unloading valve. When aftercooler entering air temperature is below thermostat set point, the thermostat shall open, closing the liquid line valve and closing the compressor third stage unloading valve, thereby controlling the first one-third of the cooling coil. Thermostat (T3) shall sense the aftercooler entering air temperature. The thermostat (T3) shall control the aftercooler liquid line solenoid valve to the second one-third of the cooling coil. When the aftercooler entering air temperature is below thermostat set point, the thermostat shall open, closing the liquid line solenoid valve and closing the compressor second stage unloading valve, thereby controlling the second one-third aftercooling coil. The final one-third of the aftercooler shall act as a trimmer for the leaving air temperature. This portion of the coil shall be under the control for the suction line throttling valve which senses the leaving air temperature. A small electric heating element shall be attached to the leaving air temperature sensing bulb, which is controlled by a rheostat on the control panel. The thermostats and suction line throttling valve shall vary the leaving air temperature from 50° F to 80° F ($\pm$ 3° F).

*3.11.2 Solenoid valve. Solenoid valve(s) shall be provided ahead of each expansion valve(s) to allow pump down of the refrigeration system prior to the stopping of the compressor. A switch on the control panel shall de-energize the solenoid(s) valve(s). This will allow the compressor to operate until suction pressure actuates the low pressure cutoff switch stopping the compressor and condenser fan. All necessary pressure controls and relays to insure automatic pump down shall be provided. The automatic pump down shall not affect the operation of the unit in a ventilation mode. The electrical characteristics of the solenoid coil(s) shall be 24 volt/50/60 single phase.

*3.11.3 Charging valve. A service valve shall be provided upstream of the dryer-strainer for charging refrigerant into the system.

3.11.4 Dryer/strainer. A replaceable element type refrigerant dryer-strainer of sufficient capacity shall be provided upstream of the sight glass. The dryer shall be of sufficient size such that the moisture content of the refrigerant after charge into the unit is no greater than 15 parts per million by weight.

*3.11.5 Sight glass. A line or bypass sight glass shall be provided in the liquid line located where the condition of the refrigerant may be observed while the air conditioner is operating and while charging the system with

refrigerant. Protective caps shall be provided to cover the sight glass during transit and other periods of nonoperation.

3.11.6 Thermal expansion valve. The evaporator(s) (aftercooler and precooler) shall be equipped with an equalizer type thermostatic expansion valve(s) of sufficient capacity to meet the requirements specified herein.

*3.11.7 Subcooler. A subcooler shall be provided in the liquid line of the refrigeration system. The subcooler shall be provided upstream from the expansion valve(s). This will prevent liquid refrigerant from flashing prior to entering the expansion valve(s).

3.11.8 Hot gas bypass system. A hot gas bypass system shall be incorporated in the air conditioner to provide an artificial load on the last two cylinders of the compressor upon sensing a decrease in evaporator load (aftercooler). The hot gas bypass sytem shall maintain continuous compressor operation down to and including 0° F. A liquid line with a liquid injection valve and a hot gas bypass line with solenoid valve and a hot gas bypass valve shall be provided. The two lines shall feed into compressor suction line to maintain an acceptable suction pressure through the range of capacity loads. The pressure drop shall not cause excessive superheat or the introduction of refrigerant into the suction line thus preventing damage to the compressor. A liquid injection valve, hot gas bypass valve and solenoid valve shall be provided and properly sized for the application. The solenoid valve shall be ahead of the hot gas bypass valve.

*3.11.9 Head pressure control system. A head pressure control system shall be incorporated in the air conditioner to allow continuous compressor operation down to and and including 0° F ambient temperature. The head pressure control system shall incorporate a 3-way head pressure control valve and a pressure control fan cycling switch to maintain adequate compressor discharge pressure for satisfactory operation down to and including 0° F ambient temperature. The pressure control fan cycling switch shall be located in the main control panel.

*3.11.10 Pressure safety controls. The compressor shall be equipped with an oil safety switch, low pressure switch and high pressure switch. These safety controls shall be located in the main control panel.

3.11.10.1 Oil safety switch. This switch shall stop the compressor if there is a lubrication failure due to oil leaks from the system, a clogged strainer stopping the oil intake to the pump, excessive refrigerant in the crankcase or insufficient oil pressure. The oil pressure switch shall have a manual reset and a time delay switch to prevent inadvertent or nuisance stoppage due to momentary fluctuation of oil pressure.

3.11.10.2 Low pressure switch. This switch shall stop the compressor when the suction pressure is reduced to a point which could produce freezing of the coils or which would permit operation beyond the prescribed operating limits of the compressor. The low pressure switch shall be of the automatic reset type.

3.11.10.3 High pressure switch. This switch shall stop the compressor when the discharge pressure rises above the prescribed limits because of

inadequate condensing, an overcharge or refrigerant, or air in the system. The high pressure switch shall be of the manual reset type.

3.11.10.4 Pressure gage. Pressure gages shall be of the flush mounted dial type having a minimum dial diameter of 2 1/2 inches. The gages shall conform to MIL-G-8402 as applicable and shall have an accuracy of at least ± 2 percent of full scale range.

*3.11.10.5 Temperature controller. A temperature controller shall be provided to control the leaving air temperature. The leaving air temperature shall be manually selected and automatically maintained during the air condition operation. A small electric heating element shall be attached to the leaving air temperature sensing bulb located on the control panel. The thermostats and suction line throttling valve shall vary the leaving air temperature from 50° F ± 3° F to 80° F ± 3° F when the ambient temperature is down to and including 0° F.

*3.11.10.6 Suction line throttling valve. A suction line throttling valve shall be provided to control the leaving air temprature by throttling the suction pressure to balance the compressor capacity to the evaporator (aftercooler) load. The suction line throttling valve sensing bulb shall be located in the leaving air plenum.

3.11.10.7 Pump down control. Automatic pump down of the refrigerant system shall be controlled by the use of a solenoid valve in the hot gas bypass line and the liquid line. The pump down solenoid valve shall be located down stream of the dryer and strainer. The solenoid valves shall be actuated through the compressor controls. Opening of the solenoid valve shall coincide with compressor start up. Valve shutoff shall permit continued operation of the compressor until the suction pressure is reduced to a value that will actuate the low pressure safety control switch stopping the compressor motor.

3.11.10.8 Check valve and aftercool coils. Check valve(s) shall be provided in the suction line leaving the precooling and the compressor discharge line to prevent migration into the compressor crankcase.

3.12 Refrigerant piping. All refrigerant piping shall be Type L copper in accordance with WW-T-799 except as specified in paragraph 3.12.1. The piping shall be fabricated with the use of high temperature solder conforming to QQ-B-654. Flared end connections shall be used where disassembly for component replacement is required; however, such applications shall be in accordance with ASHRAE Guide and Data Book.

3.12.1 The refrigerant compressor lines shall be equipped with vibration eliminating connections to control transmitted vibration and allow removal of the compressor without the breaking of the soldered joints.

3.12.1.1 Satisfactory means shall be incorporated to prevent the transmission of vibration to pressure control devices and gages. All refrigeration controls and piping shall be rigidly fastened to supporting structure.

*3.12.1.2 To facilitate removal of components from the power pac, all refrigeration lines, capillary lines and electrical wires, etc., shall not be clamped to the cable storage rack or the air conditioner enclosure.

3.13 Air flow system. The air flow system of the air conditioner shall include an inlet filter, evaporator blower, blower silencers, evaporator(s) housing (aftercooler and precooler) pressure safety switch, rigid duct work, discharge and intake openings, flexible air duct.

*3.13.1 Filters. The air conditioning unit shall be equipped with suitable air filter or filter(s) and shall have a National Bureau of Standards average efficiency of 72 percent installed on the conditioned air intake to the unit. The filters shall be of the permanent, cleanable, reusable type not subject to corrosion by moisture and salt laden atmosphere and shall be readily removable for cleaning. Filters used in the conditioned air intake opening shall be 2 inch nominal thickness and the maximum face velocity shall be 500 feet per minute. Filters used in air intake openings supplying only cooling air to components, condensers, etc., shall be of the 1 inch nominal thickness with a maximum face velocity of 500 feet per minute. Where more than one filter is required, all filters of each type shall be of the same size. The aluminum frame and media shall be of adequate rigidity to prevent any deformation of the filter such as twisting, bulging etc. during use and handling.

*3.13.2 Blower. A positive displacement or a multi stage centrifugal type blower of adequate capacity to meet the requirements of 3.6.1.2 through 3.6.1.7 shall be provided when operating at 1760 rpm.

*3.13.2.1 The blower and blower motor shall be mounted on a common structural component of the unit of adequate rigidity to insure alignment. The blower and motor shall be direct coupled in such a fashion that either can be readily replaced without removal of rigid ducting. The blower shall draw entering air through the air filter, air intake silencer, evaporator coil (precooler) and deliver through the blower air discharge silencer, the evaporator coil (aftercooler) and to the flexible duct.

*3.13.2.2 The blower plenum outlet shall be connected to the air system by means of a flexible joint to prevent mechanical transmission of the blower vibration to the system.

*3.13.2.3 Blower silencer(s). A blower air intake silencer and a blower air discharge silencer with a minimum pressure drop should be incorporated in the air conditioner to suppress the noise to a value within the noise level as specified in paragraph 3.5.8. The blower air discharge silencer shall be down stream of the blower so the air is blown by the blower into the blower silencer and through the aftercooler coil. The air intake silencer shall be up stream of the blower so the air is drawn by the blower through the air intake silencer and precooler coil.

*3.13.2.4 Blower oil fill/drainage. The blower shall incorporate all plumbing and valves to facilitate oil fill and drainage of the blower bell housing.

3.13.3 Evaporator housing(s). The evaporator housing(s) for the aftercooler and precooler shall be installed in the duct system. The precooler housing shall be upstream of the blower to cause the air to be drawn through the precooler coil. The aftercooler shall be downstream of the blower to cause the air to be blown through the aftercooler coil. Provisions shall be made to allow for the removal of the evaporator housing(s) from the duct work.

*3.13.4 Air damper assembly. An air damper assembly shall be incorporated in the air conditioner on the downstream of the evaporator coil (aftercooler). The air damper shall consist of a set of movable vanes controlled through mechanical linkages actuated by a damper motor. Positioning of the air volume control setting mounted on the control panel shall operate the damper motor and the air bypass control valve in order to bypass that amount of air necessary to vary the air volume delivered.

*3.13.4.1 Air damper motor. An air damper assembly motor shall be incorporated in the air conditioner of sufficient size to meet the requirements specified herein. The air damper motor shall be of the modulating type actuated by the air volume control which in turn shall open and close the damper vanes. The electrical characteristics shall be 24 volts AC, 50/60 cycles, 1 phase.

*3.13.5 Pressure safety switch. The air conditioning unit shall be provided with a pressure actuated safety switch which shall electrically over ride the air volume control and open the air bypass valve when the air discharge pressure exceeds 5 1/2 psig. The pressure switch shall sense the pressure in the evaporator (aftercooler) plenum.

*3.13.6 Rigid ductwork. All internal ducts, duct transitions, plenums, etc. shall be provided in the cabinet for guiding air through the various assemblies. The ducts shall be constructed of material to withstand 5 1/2 psig, and bends and turns shall be internally smooth. Where applicable, duct intersections shall insure proper uniform mixing of various air streams. All duct joints shall be accomplished with mating companion flanges properly gasketed. A double wall construction shall be used for the inlet and discharge plenum. The inner wall shall be a perforated sheet metal with 3/32 inch diameter holes on 3/16 inch staggered centers. The acoustical material contained between the inner and outer wall shall be a specified in paragraph 3.5.8.1.

3.13.7 Discharge and intake openings. The air conditioner shall have a single opening for the air entering and two discharge openings leave the conditioned air circuit. The discharge opening shall be provided on the external wall of the cabinet and shall incorporate two male couplings in accordance with Air Force drawing 64C1004 with provisions for attachment of the ducts specified herein. Also a cap in accordance with Air Force drawing 8044080 shall be provided to seal one of the openings when not in use. The cap shall be retained to the air conditioner by a cable or chain of adequate length. All air intake openings in the air conditioner such as condensers, and air supply shall be protected by means of heavy wire or expanded metal screen of 1/2 to 3/4 inch mesh to prevent entrance of large foreign objects. A distance of 2 inches shall be maintained between the screen and filter(s).

3.13.8 Flexible air ducts. The air conditioner shall be equipped with four 8 inch nominal diameter flexible air ducts, each 15 feet in length conforming

to MIL-D-38386. The air conditioner shall contain adequate space for storing the duct with connectors when not in use. The duct shall incorporate a male connector conforming to Air Force drawing 64C1004 on one end. On the other end, the ducts shall incorporate a female connector conforming to Air Force drawing 64C1005 so that the ducts can be connected in series. The female end of the duct shall connect to the air conditioner discharge opening.

3.13.8.1 Coupling and seal. The seal shall be in accordance with Air Force drawing 64C1006 and shall be mounded on the extended half of the male connector conforming to Air Force drawing 64C1004.

3.14 Prime mover assembly.

*3.14.1 The prime mover assembly on the air conditioner components shall be driven by a motor(s) designed for 230/460V, 3 phase, 50/60 cycle, 4 wire operation. See paragraph 3.16.1. The air conditioner shall be wired for 460V, 3 phase, 50/60 cycle power.

3.15 Cabinet, trailer design features.

3.15.1 General. The air conditioning unit shall be mounted on a four-wheel trailer and be provided with parking brakes, suspension system, towbar and fenders. Requirements of MIL-M-8090 Type 1, Group C, Class 2 shall apply except as modified herein.

3.15.1.1 Chassis. The trailer chassis shall be of welded steel construction and shall meet the structural requirements of paragraphs 3.5.3 and 3.5.4. The trailer shall not employ system components for structural carry through, but shall supply all structure integral in the chassis proper.

3.15.1.2 All components of the power pac, such as the compressor and compressor motor assembly, blower and blower motor assembly, shall be mounted on a welded rectangular frame fabricated from steel of sufficient size to prevent deflection which could impose detrimental stresses on the components. The power pac assembly including the rectangular frame shall be mounted on the steel base of the air conditioner with adequate resilient mounts to minimize vibration.

*3.15.1.3 Clearance. The fully loaded trailer shall have a road clearance of at least 7 1/2 inches at all points with tire pressure of 100 pounds per square inch. The trailer shall have sufficient tire clearance for use of tire size 7.50-10.

*3.15.2 Tie down ring assemblies. The air conditioning unit shall be equipped with tie down fittings to satisfy the requirements of paragraphs 3.5.4, 3.5.5, and MIL-A-8421. The tie down ring assemblies mountings and carry through structures shall also be designed to comply with these requirements. The air conditioning unit tie down arrangement shall be marked in accordance with MIL-S-8421. A total of eight tie down fittings conforming to Air Force drawing 49B6564 or 48B7796 shall be provided. The tie down fittings shall be located near the corners of the unit, two on each side, and shall be secured to the main structural support frame. The fittings shall be so mounted that when the rings are raised to a vertical position for hoisting purposes, a

minimum clearance of 1 1/4 inches between the side of the unit enclosure or cover and the inside of the hoisting ring is provided.

3.15.3 Running gear. The unit shall be provided with four wheel running gear in accordance with MIL-M-8090, Type I, Group C mobility, except that maximum towing speed shall be 20 miles per hour.

3.15.3.1 The four wheels, hubs and tires shall be in accordance with MIL-W-8005. The rear wheel shall be equipped with parking brakes to hold the air conditioner in a fixed position during all operations and positions specified herein. The brakes shall be readily applied or released by means of a single manual control located at the front of the unit in the vicinity of the drawbar. When set, the parking brakes shall be of sufficient capacity to hold the unit in a fixed position during a pull of up through 600 pound line pull, forward or backward, on dry level concrete. The vibration and shock encountered with usage under type mobility specified shall not cause the brakes to lock. If the dry weight exceeds as specified herein, the rear driving hubs shall be cast steel in lieu of cast iron.

3.15.3.2 Tire pressure marking. The tire pressure marking shall be as shown in Figure 1 and shall comply with paragraph 4.6.9.1.

*3.15.3.3 Steering. The front axle shall be equipped with a knuckle type steering incorporating the rods and kingpins to provide a high degree of maneuverability. Adequate means for lubrication shall be provided. Lubrication fittings shall conform to MIL-F-3541. The cramping angle shall be no less than 30° and shall comply with paragraph 3.15.8. The steering mechanism shall be of the compensated type. The front axle and steering mechanism shall be able to withstand the loadings encountered during usage under the type mobility specified in 3.15.3.

3.15.4 Suspension system. The suspension system for the air conditioning unit shall be designed to meet all mobility, structural and proof-load test requirements specified herein.

*3.15.4.1 The suspension system shall provide adequate springing to minimize acceleration inputs and provide a stable ride for the air conditioning unit. Means shall be provided to prevent occurance of suspension frequencies falling into sympathy with the surface frequency. The suspension system shall not allow shock loads greater than 2 "g's" to be transmitted to the air conditioning unit under the mobility test conditions specified herein. The unit shall be so designed that it will not demonstrate an undesirable tendency to sway, skid, yaw, tilt or attain a resonant frequency.

3.15.5 Towbar assembly. The trailer shall be furnished with a hinged towbar and with a lunette eye conforming to MS51336 with a 3 inch inside diameter and a 1 5/8 inch diameter cross section. It shall be suitable for towing the air conditioner at the speeds specified herein or abruptly starting and stopping the unit without damage. The towbar, when stored in its folded position, shall not exceed above the maximum height of the unit. Suitable means shall be provided to retain the towbar assembly in the stored position.

*3.15.6 Pintle. The rear end of the trailer shall be equipped with a pintle conforming to MS51335-2. The pintle shall be located 9 to 16 inches above

ground level. The pintle hook stencil wording shall be in accordance with Figure 1.

3.15.7 The entire air conditioning unit shall be encased in a weathertight enclosure that shall completely enclose all the components of the air conditioner. The cabinet shall be equipped with adequate access doors and panels for servicing and maintenance purposes. The air conditioner shall be designed to operate satisfactory with all access doors and panels closed except for those access doors required to remain open during operation of the air conditioner such as condenser air intake doors, condenser discharge door, ambient air intake door/condition air discharge door and control panel door.

3.15.7.1 The frame shall be fabricated of structural steel members and shall be firmly attached to the trailer chassis to form an integral structure. Framing members may have removable sections as required for the removal of components.

*3.15.7.2 The entire enclosure shall be constructed of Grade C carbon steel in accordance with QQ-S-698 with a minimum of 14 gage steel. All housing panels shall be secured to the framing members in such a way that their complete removal may be accomplished with a minimum of effort to facilitate servicing and maintenance. Panels and access doors frequently used shall be hinged and secured with rugged quick opening door latches of the tongue type utilizing a recess door handle flush with the cabinet. Catches for the access door latches having sharp edges which are hazard to personnel working on the unit shall be rounded off. Plastic knobs or handles shall not be used. When the access panel doors are open, they shall be secured so that high winds will not inadvertently close them from the open position or cause structural damage. As a minimum, hinged access doors shall be provided for access to the main junction box and the refrigeration service accessories. All gasketing used to provide the weathertight seals for access doors, panels, etc shall be avoided. Provide drain holes a minimum of 0.25 inch in diameter or drain channels with run off tubes which allow the escape of standing or entrapped water from the interior areas of the air conditioner. Such areas include the shelves under the condenser racks where the flexible ducts are stored, base of the air conditioner where enclosures were formed to support components, etc. All metal joints formed in the fabrication of the air conditioner shall be so designed to prevent moisture and water entrapment.

*3.15.7.3 Center of gravity. The center of balance shall be identified by stenciling a "center of balance" marking on each side of the unit (see Figure 1). The center of balance of the air conditioner shall be with all components installed and the unit fully charged with R-12 refrigerant shall be determined by having the air conditioner tilted by 10° fore and aft during weighting operations and intersection of the respective vertical line obtained.

*3.15.8 Maneuverability. The trailer shall be capable of executing a full turn to the right and to the left while being towed at a speed of 10 miles per hour by a commercial type vehicle and shall not capsize or skid during turns on dry concrete or macadam at this speed. The trailer shall be capable of turning within a radius of 17 1/2 feet. The turning radius is measured from the center of the circle to the outer edge of the inside wheel.

3.15.9 Mobility. The trailer shall withstand towing over a concrete or macadamized road at speed of not less than 20 miles per hour and over a loose sand or gravel road or upgrated sodden field at a speed of not less than 10

miles per hour. Also, the trailer shall be capable of ascending, negotiating and descending a ramp having a slope of 20°.

3.16 Electrical system.

*3.16.1 General. The air conditioning unit shall be designed for 230/460V, 3 phase, 50/60 cycle, 4 wire operation unless otherwise required due to special power requirements (see 6.2). The instantaneous starting current for each motor shall not exceed 316 amps for 460V operation and 410 amps for 230V operation; the peek current for the unit during starting shall not exceed 400 amps for 460V operation or 570 amps for 230V operation. These amperages shall be exclusive of the first 0.05 seconds following actuation of each contractor. Starting and operating control circuitry shall be single phase 24 vac. The electrical system shall be fed by a power cable terminating at a main service breaker switch located on the unit. Operation shall be push button start and stop switches. A switch shall be provided for selection on "ventilation" mode or "cooling" mode. Circuitry shall be such that motorized and other devices required for the cooling mode are not energized until the blower circuit is activated. Refrigeration system safety devices shall de-energize all power to the motors and refrigeration system components under abnormal operation conditions. A momentary contact service switch shall be provided to bypass the safety devices at the startup of the refrigeration system. Means shall be provided to permit pump down of the refrigeration system if desired. Indicator lights shall be provided to indicate external power "on", blower "on", and cooling system "on". Change of components specified hereunder will be allowed if necessary due to special power requirements (see 6.2.d).

3.16.2 Electrical system. The electrical system and equipment shall be in accordance with the Joint Industry Conference - National Machine Tool Builders combined electrical standards. Explosion proofing requirements shall conform to the standards specified for aircraft hangers in Article 510 of the National Electrical Code.

3.16.3 Service cable and main breakers. The unit shall be equipped with a 600 volt, 50 foot, six conductor rubber covered service cable conforming to MIL-C-5756 and terminated in a suitable main breaker switch on the side of the unit. The cable shall be securely and permanently attached to the air conditioner in a manner that will relieve stress at the terminals. On the other end of the cable shall be provided with a molded rubber, polarized, watertight type plug conforming to MS27265-6. The three power conductors shall be selected for 230V operation. The conductor used for grounding purposes shall be not smaller than size AWG No 4 and the 48V AC dead cable leads shall be not smaller than size AWG No 12. A clearly visible red indicator light shall be located adjacent to the breaker switch to warn personnel of the voltage involved and at a minimum shall contain "WARNING 230/460V". Cable storage and main breaker shall be external but within the profile of the unit and shall provide adequate protection to allow closing the cable access door when the power cable is fully extended.

*3.16.4 Starting control circuit. The starting control circuit shall be in accordance with Figure 2. The starting relay(s) shall be operated by push buttons located on the control panel. The starting relay(s) and protective devices shall be operated on 24V supplied from a transformer that can be

connected to operate on either 230V or 460V. The switch leg leads C_1 and C_2 of Figure 2 shall provide switching control to energize the relays at the power receptacle thus providing dead cable control. This circuit shall be used for no other purpose.

*3.16.5 Starter and overload protection. A reduced voltage starter or other means of limiting the starting current shall be provided. The starters shall include adequate under voltage and over voltage protection.

3.16.6 Voltage conversion. Voltage conversion from 230 to 460 and vice versa shall be accomplished by changing control transformer taps, starter heater elements, and motor winding connections. When delivered, the air conditioner shall be connected for 460 operation. A reversible warning plate shall be permanently attached to the cable storage compartment door indicating the appropriate voltage (230 or 460V) at which the unit is to be operated as well as the applicable wiring connection.

*3.16.8 Motors. The compressor motor, blower motor and condenser fan motors shall be incorporated in the air conditioner and shall be of the squirrel cage inductor type. The electrical characteristics for the compressor and blower motors shall be 40 and 40 HP, respectively, 230/460V, 3 phase, 50/60 cycle totally enclosed type, equipped with the ball bearings and shall conform to CC-M-1807, Type II, Class 3, Style E, Enclosure 2, Design K. The condenser fan motor shall be 7½HP, 230/460 volts, 3 phase, 50/60 cycle, totally enclosed type equippment with ball bearings and shall conform to CC-M-1807, Type II, Class 3, Style E, Enclosure 2, Design K. All motors shall be selected so that when operating under the maximum performance requirements specified herein, the motor shall not exceed rated capacity.

*3.16.9 Motor starting switches. Each of the electric motors in the unit shall be equipped with a magnetic starting switch of the proper size and type. The magnetic switch shall provide under voltage and overcurrent protection and shall be of the "manual reset" type suitable for the use intended. All magnetic starters shall be equipped with 24 vac actuating coils to confrom to the requirements of paragraph 3.16.10.

*3.16.10 Control voltage transformer. The voltage employed for the magnetic controls of the motors specified in 3.16.8 and the control specified in 3.16.1 and 3.16.9 shall be 24V, 50/60 cycle, single phase. A stepdown transformer of capacity as required shall provide the control voltage.

*3.16.11 Junction box. The unit shall be equipped with a main junction box which shall include the motor magnetic switches. The junction box shall be completely weatherproof and provided with a captive cover. Means shall be provided to allow resetting of the magnetic switches without opening of the cover. All connecting cables to the junction box shall be provided with electrical connectors conforming to MIL-C-5015. Connectors shall be potted in accordance with MIL-W-22759.

*3.16.12 Wiring. All wiring shall be accomplished in accordance with MIL-W-22759 and wires shall be equipped with end terminals conforming to Class 1, MIL-T-7928. Wiring within the unit shall be number coded in accordance with MIL-W-22759 and shall be in strict accordance with all applicable wiring diagrams and operating, service or maintenance instruction

manuals. All electrical connectors shall be marked in accordance with MIL-STD-195. All wires shall be in accordance with MIL-W-22759 and shall be selected for continuous duty current capacity in accordance with MIL-W-22759.

3.16.13 Circuit breaker. The compressor and blower motor shall be protected from overcurrent by means of a circuit breaker. The circuit breaker shall be of the type which is nonsensitive to temperature and shall be capable of tripping out the compressor and blower motor during overloading conditions and shall be equipped with manual reset. The blower and compressor motor circuit breakers shall be identified by stenciling 1 1/2 inch letters. The unit shall be provided with 230V heaters and fuses shall be stored and secured adjacent to the circuit breaker.

3.16.14 Electrical relay. Electrical relay(s), if required, shall be of the sealed type in accordance with MIL-R-5757.

3.16.15 Control panel. The air conditioner shall be provided with a recessed composite instrument and control panel on which all instruments, gages, switches, warning lights, etc., are mounted. The instruments and control panel and its accessories shall be readily accessible to operating personnel and all items on the panel shall be permanently and legibly marked. The panel shall be covered by a suitable weathertight cover. The control panel and instruments shall be shock mounted. Suitable light assembly(s) shall be provided for adequate illumination of the panel. Light(s) shall be controlled by an on/off control.

3.17 Instruments. The following major controls shall be mounted on the control panel to facilitate ease of operation by personnel. Other switches and operating mechanisms shall be installed where applicable to perform the various functions required in the unit operation.

a. Suction pressure gage - Indicates the pressure of the refrigerant as it enters the compressor.

b. Discharge pressure gage - Indicates the pressure of the refrigerant gas as it leaves the compressor discharge valve.

c. Compressor oil pressure gage - Indicates oil pressure in the compressor.

d. Cool switch - Energizes and de-energizes the liquid solenoid valve. When the valve opens, suction pressure will cause the low pressure cutout switch to open and energize the compressor motor starting the compressor operation.

e. Air flow gage - Indicates volume of air leaving the unit.

f. Air volume control - Controls the amount of air leaving the unit.

g. Air temperature control - Allows the operator to set and maintain the temperature of the air as it leaves the unit.

h. Discharge air pressure gage - Indicates pressure of discharge air as it leaves the unit and enters the flexible duct.

i. Discharge air temperature gage - Indicates the temperature (0° F) of the discharge air as it leaves the unit.

3.18 Identification.

*3.18.1 Instruction plates. An instruction plate(s) made of noncorrodible metal, minimum thickness of 0.025 inch, shall be attached by rivets suitably located on the internal surface of panel cover specified in 3.17. The wiring diagram, refrigeration cycle diagram and instruction for start up, operation and shutdown procedures shall be photo etched on the instruction plate. All components shall be identified with their reference designation for ease in trouble shooting.

3.18.2 Identification of product. All equipment, assemblies and parts shall be marked for identification in accordance with MIL-STD-130.

3.18.3 Control and gage nameplates. All control switches, gages and pilot lights shall be properly identified with permanently attached nameplates of noncorrodible material, minimum thickness 0.025 inch with nomenclature photo etched on the nameplate.

*3.18.4 Markings. The markings for the air conditioner shall be in accordance with Figure 1. All markings shall be black in color except where otherwise noted. The color shall be in accordance with FED-STD-595, color 27038 semigloss or 37038 luster gloss.

3-19 Accessory equipment.

*3.19.1 Handbook compartment. A handbook compartment shall be provided and shall be a minimum of 1 x 9 x 11 1/2 inches. The compartment shall be located near the control panel and shall be provided with drain holes.

3.20 Interchangeability. All parts having the same manufacturer's part number shall be functionally and dimensionally interchangeable. The drawing number requirements of DOD-STD-100 shall govern in the manufacturer's part number.

3.21 Flexible coupling. Flexible coupling(s) mounted on the motor(s), blower and compressor shall be secured to the shaft using taper lock key bushing. Keys shall be secured by set screw(s) to prevent migration.

*3.22 Dimensions and weight. The overall size of the air conditioner shall not exceed a width of 77 inches, a length of 137 inches (exclusive of the pintle hook, as well as towbar), and a height of 78 inches. The maximum dry weight shall not exceed 7500 pounds.

3.22.1 Dimensions and tolerances not specified shall be as close as is consistent with best shop practices. Where dimensions and tolerances may affect the interchangeability, operation or performance of the air conditioner, they shall be held or limited accordingly.

3.23 Finishes and protective coatings.

*3.23.1 Cleaning, painting, plating, chemical films and chemical treatment. All cleaning, painting, plating, chemical films and chemical treatment shall be in accordance with the general requirements and procedures as defined in

MIL-STD-808 and will be accomplished in conjunction with Table I of Air Force drawing 7545352.

*3.23.2 Finishes. Finishes for application to equipment or parts thereof shall be in accordance with the general requirements and procedures as defined in MIL-STD-808 for Type I exposure. This shall be accomplished in conjunction with Table I of Air Force drawing 7545352.

a.	Ferrous metals	SF100
b.	Cadmium or zinc plated surfaces	SF221
c.	Aluminum & aluminum alloys	SF300
d.	Magnesium alloys	SF400

*3.23.3 Finishing colors. The painting shall be in accordance with the general requirements and procedures as defined in MIL-STD-808 and shall be accomplished in conjunction with Table I of Air Force drawing 7545352. The exterior and interior film coats shall be dark green (FED-STD-595, No. 24052). All inside and exterior surfaces of the air conditioner shall be painted except the evaporator coils (aftercooler and precooler), condenser coils, refrigeration piping, controls, accessories, lubricating fittings and tie down rings.

3.24 Government furnished property. When the contract or purchase order so provides (6.2), the Government will furnish the following to the contractor, upon his request, in fabricating the air conditioner.

Item Number	Stock Number	Item Description
1	4130-01-039-8991	Trane 3F5C80N Refrigeration Compressor

3.25 Workmanship.

3.25.1 General. The air conditioner, including all parts and accessories shall be fabricated and finished in a workmanlike manner. Particular attention shall be given to freedom from blemishes, defects, burrs and sharp edges; accuracy of dimensions, radii of fillets and marking of parts and assemblies; thoroughness of soldering, welding, brazing, painting, wiring and riveting; alignment of parts; and tightness of assembly screws and bolts.

3.25.2 Fabrication. Machining, drilling and forming shall be accomplished with the use of accurate templates, jigs or gages. Boxes, cases, shields and compartment walls shall be fabricated by casting, drawing or bending and welding except that riveting or bolting may be used where ease of servicing of the air conditioner requires that a removable panel construction be used or where the applicable stresses dictate the use of strong aluminum alloy that does not provide a good weld.

3.25.3 Riveting. Riveting operations shall be carefully performed to insure tight and satisfactory heading of rivets.

3.25.4 Gears. Gear assemblies shall be properly aligned and meshed and shall be operable without interference, tight spots, loose spots or other irregularities. Where required for accurate adjustments, gear assemblies shall be free from pronounced backlash.

3.25.5 Cleaning. The air conditioner shall be thoroughly cleaned. Loose, spattered or excess solder or brazing flux, metal chips and other foreign material shall be removed during and after final assembly. Necessary actions will be taken to neutralize flux to prevent corrosion on solder or brazed joints.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection (see 6.2). Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the contractor may utilize his/her own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to insure suppliers and services conform to prescribed requirements.

4.2 Classification of tests. The inspection and testing of the air conditioner shall be classified as follows:

a. Preproduction testing	See 4.4
b. Acceptance tests	See 4.5

4.3 Test conditions.

4.3.1 Method of testing and rating. The method of testing and rating the air conditioner shall be in accordance with the ASHRAE Standard 37-69.

4.3.2 Apparatus.

4.3.2.1 Positive counter. Whenever practicable, rotational speeds shall be determined by means of a directly coupled positive counter that will count the revolutions for not less than one minute. A combination unit that counts the revolutions while measuring the time required in connection with other data is preferred. Strobotachometers may be used provided data can be furnished to attest to their accuracy. Hand tachometers shall not be used.

*4.3.2.2 Nozzles or orifices. Air flow shall be measured by means of smooth approach nozzles or flatplate orifices conforming to the latest edition of ASHRAE Standard 37-69. Other apparatus such as pilot tubes, rotameter, etc, may be used only when specifically approved by the procuring activity. The rate of air flow shall be expressed in terms of pounds per hour.

*4.3.2.3 Psychrometric chart. Humidity shall be determined by means of an ASHRAE psychrometric chart (ASHARE Guide and Data Book) from readings of wet and dry bulb temperatures. Air velocity over the wet bulb thermometer shall be in accordance with ASHRAE Standard 37-69. The thermometers shall be so arranged that the air passing over the wet bulb will not subsequently pass

over the dry bulb. The wick of the web bulb shall be kept with distilled water only and shall be replaced whenever a perceptible quantity of oil, dirt, incrustation of other foreign substances has accumulated thereon.

4.3.2.4 Mercurial barometer. Barometric pressure shall be measured by means of a mercurial barometer at the same elevation as the test. The pressure shall be corrected for the temperature of the scale and mercury and for variation in gravity resulting from the location of the barometer and regard to elevation and latitude. Readings obtained from aneroid barometers will not be acceptable.

4.3.2.5 Thermocouples and potentiometers. Temperatures shall be measured by means of appropriately located thermocouples and properly calibrated potentiometers. Insofar as practicable, thermocouples shall be insulated from contact with other metals. Temperatures shall be expressed in degrees Fahrenheit. Laboratory type mercury thermometers will be permissible if used correctly in the application.

4.3.2.6 Liquid manometers. Insofar as practicable, pressure and pressure differentials shall be measured by means of liquid manometers. Pressures exceeding the range of conventional liquid manometers shall be measured by means of properly calibrated Bourdon tube gages. Gages shall be of laboratory type having a dial diameter of not less than 4 inches.

4.3.3 Readings. Readings of all refrigerant pressures, condenser, evaporator and discharge air temperatures shall be recorded at intervals not exceeding 30 minutes during all tests specified herein.

4.3.4 Air conditioning unit capacity. The discharge temperatures, air flow rates, relative humidities and static pressure specified herein shall be measured at the end of one 15 foot length of duct specified herein. (Capacity rating points are specified for standard sea level atmospheric pressure.)

4.3.5 Preliminary run in. Any preliminary run in specified by the manufacturer shall be performed prior to submission of the air conditioner for testing. A certified log of all preliminary running time shall be included in the air conditioner log.

4.4 Preproduction testing.

4.4.1 Test samples. Two complete air conditioners, meeting all requirements of this specification, shall be subjected to the preproduction tests specified in 4.4.3 as a means to expedite testing.

4.4.2 Test report. Upon completion of the preproduction tests, a test report in accordance with MIL-STD-831 shall be prepared and two complete copies and one reproducible copy of the report furnished to the procuring activity.

4.4.2.1 Reliability and maintainability information. The following information shall be included as an appendix to the test report:

a. All failures, servicing, adjustments, maintenance and irregular functioning shall be identified by accumulated operating time, cycles, miles

or position in the test procedure, as appropriate. Test conditions at the time of the events identified shall be recorded.

b. A summary of the engineering analysis and of any tests conducted to determine assignable causes for any failure or irregular functioning.

c. A summary of the engineering analysis leading to any corrections made to design, construction, quality control or other procedures of leading to any corrections to be made or proposed to be made to production items. The summary shall also include an analysis of the predicted effectiveness of such corrections.

d. Clock time and man hour required for each maintenance and servicing action taken during the tests. A brief description of the experience and qualifications of the personnel taking such actions.

e. Test activity or contractor comments on item features or requirements that, if modified, should improve the item.

f. Test activity or contractor comments on use or maintenance conditions to be avoided or cultivated to increase the reliability or useful life of the item.

g. Any of the above information that is already included in the test report body need not be repeated in the information by this paragraph, but clear reference to the location of the data shall be included.

4.4.3 Preproduction Tests. Two complete air conditioners, meeting all requirements of this specification, shall be allocated to the preproduction tests as follows and tested as described under 4.6.

Sample Number 1	Sample Number 2
Examination of product	Examination of product
Operational test	Operational test
Environmental tests	Acceleration loadings
Duct test	Mobility test
Radio interference test	Titled position test
Noise level test	Peformance low ambient & endurance test

4.5 Acceptance tests. The acceptance tests shall consist of the following:

a. Individual tests	See 4.5.1
b. Sampling plan and tests	See 4.5.2

4.5.1 Individual tests. Each air conditioner shall be subjected to the following tests as described under 4.6:

a. Examination of product — See 4.6.1

b. Operational test — See 4.6.2

4.5.2 Sampling plan and tests.

4.5.2.1 Periodic sampling. One air conditioner shall be selected at random from the first ten and one from each subsequent ten or fraction thereof produced and subjected to the following tests.

a. Acceptance performance tests — See 4.6.3

b. Final inspection — See 4.6.4

4.5.2.1.1 Rejection and retest. When an item selected from a production run fails to meet the specification, items still on hand or later produced shall not be accepted until the extent and cause of failure have been determined and appropriately corrected. The contractor shall explain to the Government representative the cause of failure and the action taken to preclude recurrence. After correction, all of the tests shall be repeated.

4.5.2.1.2 Individual tests may continue. For production reasons, individual tests or other sampling plans may be continued pending the investigation of a sampling test failure. But final acceptance of the items on hand or produced later shall not be made until it is determined all items meet all the requirements of the specification.

4.5.3 Defects in items already accepted. The investigation of a test failure indicates that defects may exist in items already accepted. If so, the contractor shall fully advise the procuring activity of all defects likely to be found and the method of correcting them.

4.6 Test method.

4.6.1 Examination of product. Two air conditioners shall be inspected to determine compliance with the requirements specified herein with respect to materials, workmanship, dimensions, markings and finishes prior to start of any proproduction testing.

4.6.2 Operational tests. The air conditioner shall be subjected to and shall satisfactorily complete the following tests. Individual records of all operational tests shall be maintained.

4.6.2.1 The air conditioning unit shall be started and the cooling cycle operated at the prevailing normal room or ambient temperature for not less than 2 hours. The measured or indicated cooling system air flow shall be greater than 60 PPM and the discharge air temperature shall not exceed 50° F $\pm$ 3° F.

4.6.2.2 The temperature, air flow and safety controls shall be checked to insure proper operation and stability.

4.6.2.3 A functional test on all operating components including air conditioner brakes, steering, switches, lights, doors, ducts and connectors shall be conducted to insure proper operation.

*4.6.3 Acceptance performance test. Under ambient condition specified in 3.6.1.4, it shall be demonstrated that within 10 minutes after prime mover start, the air conditioner is capable of delivering 100 pounds per minute of 50° F ± 3° F air at 4 psig. The air conditioner shall also be operated for 2 hours under these ambient conditions and shall meet all the requirements for effectiveness. The air conditioner shall exhibit no malfunctions, leaks, rough operation, vibration or other irregularities as a result of this test.

4.6.4 Final inspection. After completion of the acceptance tests, the air conditioner shall be visually inspected to the maximum practicable extent. Indication of physical breakdown or defects shall be cause for rejection.

4.6.5 Environmental tests.

4.6.5.1 The following environmental tests shall be conducted in accordance with the specified procedures of MIL-STD-810 except as noted.

*4.6.5.1.1 High temperature. The high termperature test shall be in accordance with Procedure I except that the air conditioner shall not be operated during the test. Upon completion of the test, the air conditioner shall be started and operated as specified in 4.6.6. The air conditioner shall be inspected for detrimental affects on finishes, seals, etc.

*4.6.5.1.2 Salt spray. The salt spray test shall be in accordance with the specified procedure for a period of 50 hours except that the visual examination shall be conducted prior to electrical starting. The air conditioner shall be started and operated as specified in 4.6.6. A comprehensive record of the effects shall be maintained for future reference in determining whether the effects of the exposure to the salt spray were contributory to possible failures encountered during other tests.

4.6.5.1.3 Fungus treatment. Certifications from manufacturer(s) that nutrient containing components are fungus treated per MIL-V-173 instead of testing as outlined is acceptable.

*4.6.5.1.4 Rain. The rain test shall be conducted in accordance with the procedure specified except that the air conditioner shall be operated for a period of 30 minutes while still under the conditions specified. The air conditioner shall continue to deliver cooling air during and after exposure to the test.

*4.6.5.1.1 Sand and dust. The sand and dust test shall be conducted in accordance with the procedure specified. Upon completion of the test, the air conditioner shall be examined and operated as specified in 4.6.6.

*4.6.5.2 Low temperature exposure. The dry air conditioner shall be placed in a test chamber and cooled to and maintained at a test of -65° F for a period of 72 hours. At the end of this time, the air conditioner shall be allowed to reach prevailing ambient temperatures and then serviced, examined and tested as specified in 4.6.6.

4.6.5.3 Capacity check. Upon completion of the environmental testing of Sample Number 1, this sample shall be subjected to a capacity check under the conditions specified in 3.6.1.4 and shall satisfactorily meet the requirements specified herein.

4.6.6 Preproduction operational test. The air conditioner shall be started and operated for a period of 30 minutes and checked for correct operation of all components and controls. During this time, the air conditioner shall exhibit no malfunctioning, leaks, rough operation, excessive vibration nor other irregularities.

4.6.7 Acceleration loadings. The ability of the hoisting provisions and the air conditioner to withstand the acceleration loadings specified in 3.5.3 and 3.5.4 hoisting components analyses shall be for the main chassis, the internal roof structure and tie down rings. Acceleration shall be performed sufficiently to show that the structural integrity will be retained and that no permanent deformation will result from the specified loading.

4.6.7.1 The acceleration forces identified in MIL-A-8421 will be employed in the analyses of the following critical points of stress:

a. The mounting of compressor and compressor motor, blower and blower motor to the power pac frame.

b. The mounting of the power pac frame, control panel, main junction box, refrigeration coils, condenser fan motor blower silencer, receiver and running gear to the main chassis or supporting structure. Calculation will be sufficient to show that these major items will not become projectile when subjected to the specified loadings.

4.6.8 Ducts. The duct shall be tested in accordance with MIL-D-38386 or certified by the manufacturer that the ducts meet the test requirements of the specification.

4.6.9 Mobility test. The trailer mounted air conditioner shall be towed over concrete or macadamized road at a speed of not less than 20 miles per hour for a distance of not less than 100 miles and over a loose sand or gravel road or an ungraded sodden field at a speed of not less than 10 miles per hour for a distance of not less than 70 miles. The air conditioner shall satisfactorily enter, negotiate and leave a ramp with a 20° slope without bottoming. Upon conclusion of the test, the air conditioner shall be examined and tested as specified in 4.6.3.

*4.6.9.1 Turns. The mounted air conditioner shall be towed over dry concrete or macadam by a commercial type vehicle through 10 complete turns each to the right and to the left at a speed of 10 miles per hour. The trailer shall turn within 17 1/2 foot radius without capsizing or skidding. The turning radius is measured from the center of the circle to the outer edge of the inside wheel.

4.6.9.2 Brake performance. With the air conditioner parked and coupled to a towing vehicle, the handbrake shall be applied. The air conditioner shall then be towed for a distance of 10 feet. A towing force of 600 pounds will be required to be applied before the wheels roll.

*4.6.9.3 Refrigerant system leak. Test pressure tolerance shall be plus 5 psig and minus 0 psig. Charge the refrigerant system with R-12 to 75 psig, then pressurize the receiver to 300 psig with dry nitrogen containing refrigerant gas detectable with a halogensensitive electronic leak detector (General Electric Type H-2 or equal). Calibrate the leak detector for 25 percent concentration of R-12 mixture and set this indicator to indicate a leakage rate of 0.5 ounce per year. Check the entire refrigerant system for leaks. Either of the following shall constitute failure of the test:

a. Deformation of any component in the refrigerant system.

b. Any detectable refrigerant leaks.

4.6.10 Tilted position. The air conditioner shall be tilted in four different positions, 90° apart, an angle of 8 1/2° to the true horizontal plane. The air conditioner shall be tested as specified in 4.6.11 at the various positions.

4.6.11 Performance and endurance tests. The air conditioner shall satisfactorily pass a performance and an endurance test of 550 hours total duration, with all access doors and panels closed except for those doors required to remain open during operation of the air conditioner such as condenser air intake doors, condenser discharge door, ambient air intake door/condition air discharge door and central panel door. Once started, these tests shall not be interrupted by using the unit for any other purpose. In conducting these tests, operation of the air conditioner shall be continuous except for shutdown of the unit as necessary for servicing, changes in test conditions, minor repairs, and replacement of minor parts and for nonoperating period associated with shift scheduling of test personnel. The total test time shall be divided as follows:

a. A 100 hour performance test on cooling (20 cycles)

b. A 50 hour low ambient test at 0° F (10 cycles)

c. A 400 hour endurance test on the cooling components (80 cycles)

4.6.11.1 Performance of 100 hours. The 100 hours shall be conducted in cycles of 5 hours duration. Each cycle shall be as follows: 4 hours of operation, 15 minutes of safety controls recommended by the contractor, 30 minutes shutdown of the unit and 15 minutes for the unit to stabilize prior to another cycle. At every cycle the air conditioner shall be tilted at a different position, 90° apart, at an angle of 8 1/2° to the true horizontal plane for satisfactory operation of all components during tilt.

4.6.11.2 0° F low ambient test of 50 hours. The 50 hours shall be conducted in 5 hours duration. Each cycle shall be as follows: 4 hours of operation, 15 minutes of safety controls recommended by the contractor, 30 minutes shutdown of the unit, and 15 minutes for the unit to stabilize prior to another cycle. At every cycle the air conditioner shall be tilted at a different position, 90° apart, at an angle of 8 1/2° to the true horizontal plane for satisfactory operation of all components during tilt.

4.6.11.3 Endurance test of 400 hours. The 400 hours shall be conducted in cycles of 5 hours duration. Each cycle shall be as follows: 4 hours of operation, 15 minutes of safety controls recommended by the contractor, 30 minutes shutdown of the unit, and 15 minutes for the unit to stabilize prior to another cycle. At every cycle the air conditioner shall be tilted at a

different position, 90° apart, at an angle of 8 1/2° to the true horizontal plane for satisfactory operation af all components during tilt.

*4.6.12 Performance and low ambient temperature test (150 hours). The 150 hours performance and low ambient temperature test shall be conducted under the conditions specified in Table I with the unit wired for 230V/60 Hz operation and then 460V/60 Hz operation. During the performance test the unit shall operate for 50 hours at 230V/60 Hz and 50 hours at 460V/60 Hz. During the low ambient temperature test the unit shall operate for 25 hours at 230V/60 Hz and 25 hours 460V/60 Hz. It shall be demonstrated that the instantaneous current does not exceed those currents specified in 3.16.1.

TABLE I

Performance and Low Ambient Test

Hours of Operation	Ambient Conditions	Leaving Conditions	Air to be Conditioned
25	Rated Capacity @ 100° F ± 3° F DB/85°F ± 3°F WB	75 P/M @ 50° F ± 3° F against static pressure specified	Fresh Air
25	Design Summer Day 100° F ± 3° F DB/76° F ± 3° F WB	100 P/M @ 50° F ± 3° F against static pressure specified	Fresh Air
25	Design Hot Day 125° F ± 3° F DB/75° F ± 3° F WB	80 P/M @ 50° F ± 3° F against static pressure specified	Fresh Air
25	Design Humid Day 97° F ± 3° F DB/87° F ± 3° F WB	70 P/M @ 50° F ± 3° F against external pressure specified	Fresh Air
50	0° Ambient	75 P/M @ 50° F ± 3° F against external pressure specified	Fresh Air

4.6.12.1 Data. At intervals of 30 minutes (item a specified in 4.6.11), sufficient data shall be recorded to determine compliance of the air conditioner with the performance requirements specified in Section 3. However, during the last half of the time specified in Table I for each design ambient condition, data shall be recorded more frequently to show the characteristics of the temperature control until stability is reached, the length of time required to reach stability, and the ability of the control to maintain stability. These unstable conditions shall be created by varying

either the air flow from maximum to minimum or varying the discharge pressure from 0 to 4 psig, or a combination of both. The order of tests in Table I shall be at the option of the contractor but the total continuous hours shall amount to those specified. One run or condition shall be not less than 1 hour's duration.

4.6.12.2 50 hour operation. The 50 hour portion as specified in Table I shall be so conducted as to provide sufficient data for determining the complete performance characteristics of the air conditioner for the specified ambient operating range.

4.6.12.3 Performance check. A performance check shall be conducted on the air conditioner under design summer day and overload conditions at intervals of 100 hours operation and at the end of the 550 hour performance/low ambient and endurance tests, the air conditioner shall be capable of fulfilling the low design requirements specified in 3.6.1.4 to 3.6.1.7, inclusive. The performance check shall be of sufficient duration to record all necessary data to ascertain satisfactory operation but shall not be in excess of 5 hours. This time may be logged against the endurance test.

*4.6.13 Radio interference. The complete air conditioner shall be tested for radiated radio interference suppression in accordance with MIL-STD-462. The power cable shall be tested for condition radio interference in accordance with MIL-STD-462.

*4.6.14 Acoustic noise level test.

*4.6.14.1 Test environment.

*4.6.14.1.1 Test site. The test site for the air conditioner shall be on a concrete surface of the uniform grade free from gravel and other loose material and shall not be within 30 feet of a reflecting surface, such as an aircraft hanger, building, tree or hillside.

*4.6.14.1.2 Background noise. The noise level including wind noise shall be at least 10 DB below that of the equipment noise being measured; but shall always be at least 10 decibels below the criteria. A windscreen shall be used for all measurements and the measurements shall not be made at velocities of 12 mph or over.

*4.6.14.3 Acoustic noise level testing. The air conditioner shall be tested for acoustic noise level while the unit is operating at a maximum cooling capacity consistent with the prevailing ambient temperature. The criteria specified in 3.5.8 gives the noise levels at 10 feet. The noise levels at 10 feet shall be determined from measurement at head level (5 feet - 4 inches) on a perimeter 10 feet from the exterior surface of the unit. The noise level for each octave band shall be determined at 12 position, 30° apart around the perimeter. At no measurement position (10feet) shall the valves measure exceed the criteria limits specified at 3.5.8. The delivery hose shall be attached to the outlet of the air conditioner and laid out to discharge the air away from the air conditioner. Sound level measurements shall also be taken at the operator's position.

*4.6.14.4 Sound level measuring instrumentation. The audio sound level measurement shall be taken using a sound meter in conjunction with an octave band analyser. The instruments used shall meet the requirement specified in ANSI Standard S1.4 except that the octave band analyser shall employ the preferred frequencies specified in ANSI Standard S1-6. The flat frequency response shall be used at all measurement positions. DBA and DBC readings will also be taken at each position, including at the instrument control panel. The instrumentation shall have a frequency response range of at least 45 to 11,200 Hz, with the response known within +2 DB. An acoustical calibrator shall be used for an end-to-end (from the microphone to the meter) system calibration to provide the information needed for correcting the measured levels. The sound pressure level in DB (0,0002 dynes/CM^2) produced by the calibrator when used in conjunction with the particular sound level pickup employed in the system shall be known to within $\pm$ 0.5 DB.

4.7 Inspection of the preservation, packaging, packing and marking for shipment and storage. Sample items or packs and the inspection of the preservation, packaging, packing and marking for shipment and storage shall be in accordance with the requirements of Section 5 or the documents specified herein.

5. PACKAGING

5.1 Preservation, packaging and packing. Preservation, packaging and packing shall conform to the requirements of MIL-R-3593.

5.1.1 Level A, B and C. The air conditioner shall be preserved and packaged in accordance with MIL-R-3593.

5.2 Packing. Packing shall be Level A, B or C, as specified (see 6.2).

5.2.1 Levels A and B. The air conditioner, preserved and packaged as specified in 5.1, shall be shipped as a mobile unit; a shroud conforming to MS27766 shall be fabricated and secured over the unit.

5.2.2 Level C. Level C requirements shall be the same as Levels A and B except that the shroud shall be omitted.

5.3 Marking. In addition to any special marking required by the contractor or order, interior packages and exterior shipping containers shall be marked in accordance with MIL-STD-129.

Air Conditioner A/M32C-5, Trailer Mounted, Vapor Cycle
Electric Motor Driven, 240,000 BTU/HR

6. NOTES

6.1 Intended use. The A/M32C-5 air conditioner covered by this specification is intended for general purpose air conditioning of aircraft avionics during maintenance for preflight periods, maintenance shelters, portable hangars, and other similar enclosures.

6.2 Ordering data. Procurement documents should specify the following:

a. Title, number and date of specification.

b. When the refrigerant compressor is to be Government furnished (see 3.24).

c. Level of preservation and packaging and level of packing required (see 5.1 and 5.2). Level of preservation and packaging may be specified under the conditions of MIL-R-3593.

d. Special power requirements other than those specified in 3.16.1

6.3 International standardization agreement. Certain provisions of this specification are the subject of International Standardization Agreement ABC Air Std 17/33. When an amendment, revision or cancellation of this specification is proposed, the departmental custodians will inform their respective Departmental Standardization Offices so that appropriate action may be taken respecting the International Agreement concerned.

6.4 Definition - 6.4.1 dry air conditioner. Dry air conditioner will mean that all fuels have been completely drained; however, this does not include all oil or refrigerant drainage.

*6.3 Reclaimed materials. The use of reclaimed materials shall be encouraged to the maximum extent possible.

*6.4 Changes from previous issue. The margins of this specification are marked with an asterisk to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

Custodians:
Air Force - 99

Preparing Activity:
Air Force - 99

Review Activity:
Army - AL
Navy - YD

Project No. 4120-F207

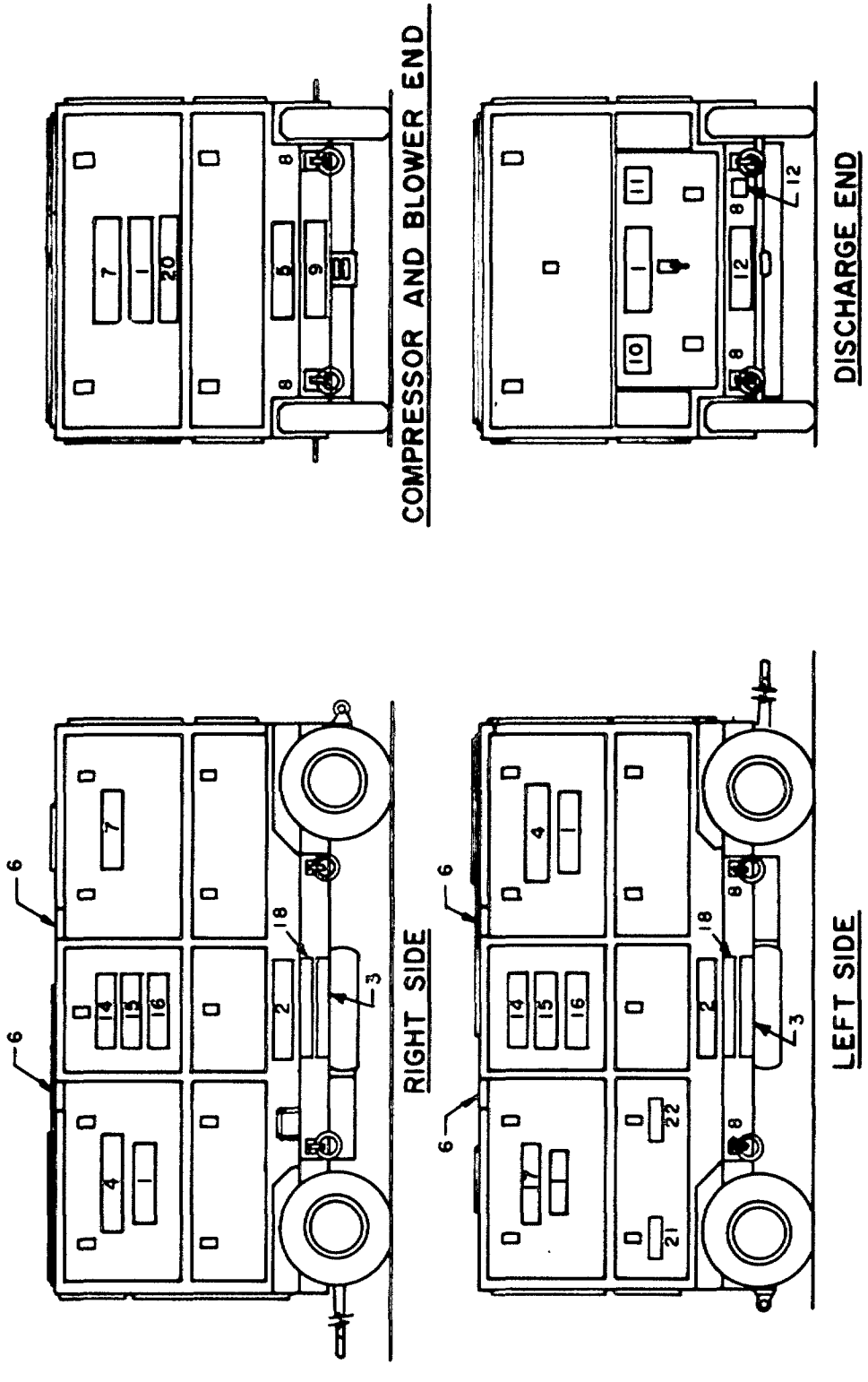


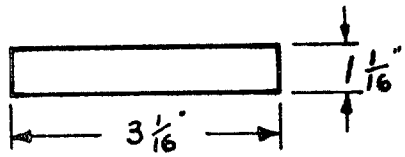
FIGURE 1. A/M32C-5 TRAILER MOUNTED AIR CONDITIONER

A/M32C-5 AIR CONDITIONER

1) OPEN DOOR BEFORE OPERATING AIR CONDITIONER
2) CABLE GUIDE TO BE USED WHEN HOISTING
3) TIRE PRESSURE 100 PSIG
4) OPEN CONDENSER DOOR ON TOP BEFORE OPERATING AIR CONDITIONER
5) DO NOT TOW MORE THAN ONE SIMILAR UNIT FROM THIS PINTLE HOOK
6) CABLE GUIDES
7) COMPRESSOR SERVICE DOOR
8) HOISTING/TIEDOWN RINGS
9) BEFORE TOWING, INSTALL PINTLE PIN AND INSERT SAFETY PIN
10) AIR INLET (INSIDE DOOR)
11) AIR OUTLET (INSIDE DOOR)

STENCILS TO BE PUT ON ENCLOSURE & VISABLE WITH DOOR OPEN

12) HANDBRAKE
13) MAXIMUM TOWING SPEED 20 MPH
14) US AIR FORCE
15) REGISTRATION NUMBER - LEAVE BLANK
16) A/M32C-5
17) CONTROL PANEL
18) CENTER OF BALANCE MARKING
19) BLOWER SERVICE DOOR
20) POWER CABLE STORAGE
21) COMPRESSOR CIRCUIT BREAKER
22) BLOWER CIRCUIT BREAKER



STENCIL TO BE PUT ON CAPTIVE COVER & VISABLE WHEN DOOR IS OPEN

NOTES: 1. ALL LETTERS TO BE 1" HIGH EXCEPT ITEMS 14, 15, 16, ITEMS 9, 18, 21 AND 22 TO BE ½" HIGH.

FIGURE 1. A/M32-C TRAILER MOUNTED AIR CONDITIONER.- CONTINUED.

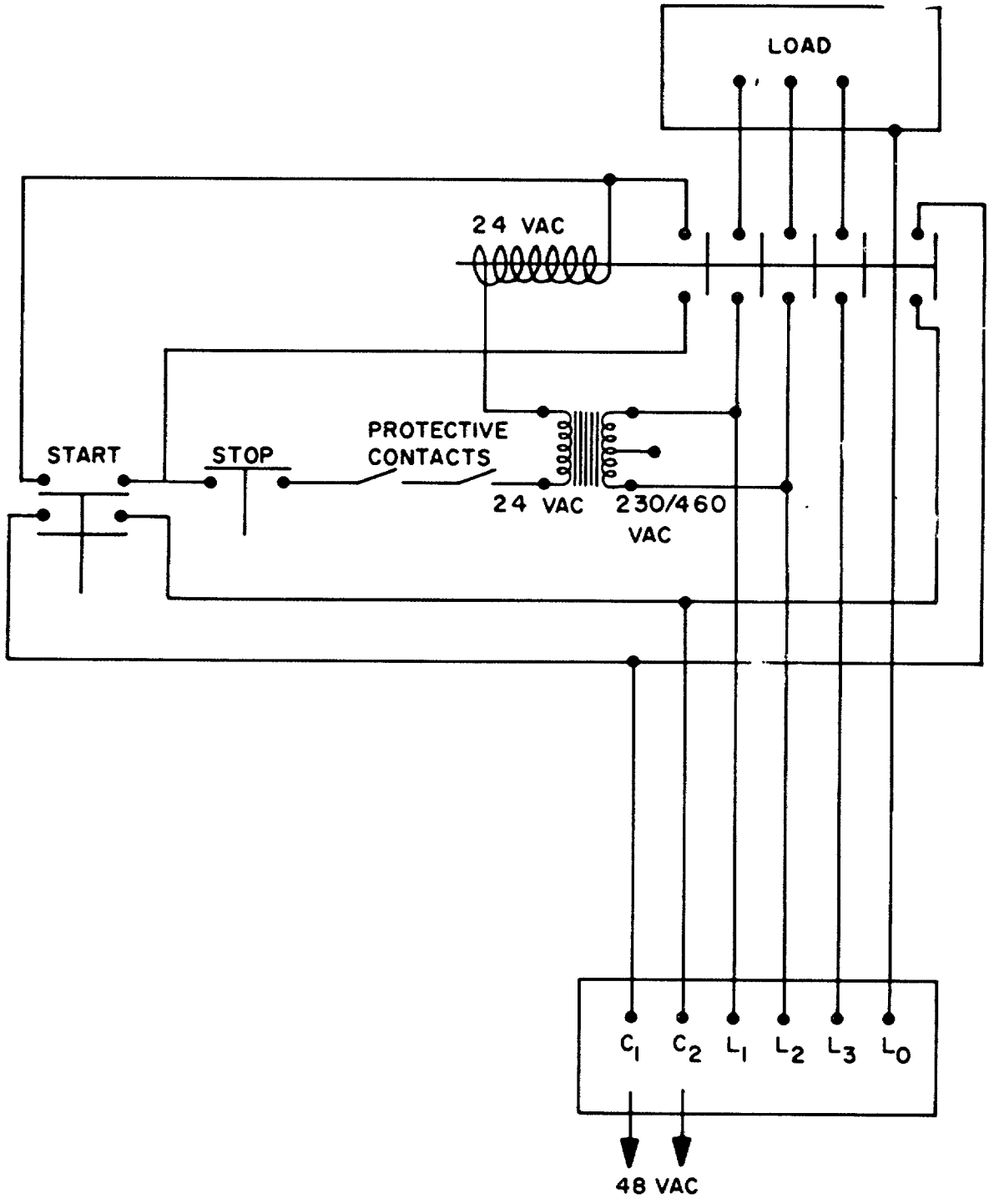


FIGURE 2. STARTING CONTROL CIRCUIT WIRING DIAGRAM

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