



OPERATION & SERVICE MANUAL



**Models: 17-7503J7000
17-7503J7000-A1
Mobile Air Conditioner
460 VAC, 3 Phase, 60 Hz**

03/2021 – Rev. 07

REVISION	DATE	TEXT AFFECTED
01	04/2002	Major Revision
02	06/2006	Added Appendix III
03	04/2007	Modified 3.1, 6.2, and Parts Lists
04	12/2007	Removed Electrical Schematic
05	10/2009	Modified 1.0 Description, 2.1 Usage, 3.2 Ratings, 3.3 Electrical Data, 5.3 Check For Refrigerant Leaks, 7.5 Refrigerant Charge and Appendix I Removed 7.6 Package Service Training
06	10/2018	Major revision
07	03/2021	Modified 9.0 Maintenance and Service and 17-7503J0000-A1 Parts Lists

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This product can not be modified without the written approval of Tronair, Inc. Any modifications done without written approval voids all warranties and releases Tronair, Inc., its suppliers, distributors, employees, or financial institutions from any liability from consequences that may occur. Only Tronair OEM replacement parts shall be used.

1.0 PRODUCT INFORMATION

1.1 DESCRIPTION

The Tronair Model 17-7503J7000 and 17-7503J7000-A1 Mobile Air Conditioner is a complete portable aircraft ground cooling unit designed for corporate aviation departments, FBO's, and regional/commuter airlines.

The Mobile Air Conditioner provides pre-cooling prior to passenger arrival, as well as during ramp maintenance work.

The 4 ton air conditioner provides cool air using R-410A, environmentally "safe", refrigerant when plugged into 3 phase, 60 Hz, 460 VAC power source.

1.2 MODEL & SERIAL NUMBER

Reference nameplate on unit

1.3 MANUFACTURER

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Telephone: (419) 866-6301 or 800-426-6301
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E-mail: sales@tronair.com
Website: www.tronair.com

1.4 USAGE

The Tronair Model 17-7503J7000 and 17-7503J7000-Mobile Air Conditioner provides 45,000 Btu/hr of cool air at 1,200-2,000 cfm for aircraft cabin comfort.

2.0 SAFETY INFORMATION

2.1 USAGE AND SAFETY INFORMATION

To insure safe operations please read the following statements and understand their meaning. Also refer to your equipment manufacturer's manual for other important safety information. This manual contains safety precautions which are explained below. Please read carefully.



WARNING!

Warning is used to indicate the presence of a hazard that can cause **severe personal injury, death, and/or substantial property damage** if the Warning Notice is ignored.



CAUTION!

Caution is used to indicate the presence of a hazard, which will or can cause **minor personal injury or property damage** if the Caution Notice is ignored.

2.2 EXPLANATION OF WARNING & DANGER SIGNS



Accidental Starts! Before servicing the equipment, always disconnect the power cord to prevent the air conditioner from starting accidentally. Ground leads to prevent sparks that could cause fires.



Rotating Parts! Keep hands, feet, hair, and clothing away from all moving parts to prevent injury. Never operate the air conditioner with covers, shrouds, or guards removed.



Hot Parts! Components can get extremely hot from operation. To prevent severe burns, do not touch these areas while the air conditioner is running or immediately after it is turned off. Never operate the air conditioner with heat shields or guards removed.



Electrical Shock! Never touch electrical wires or components while the air conditioner is running. They can be sources of electrical shock.

2.3 SAFETY CONSIDERATIONS

Installation and servicing of air-conditioning equipment can be hazardous due to system pressure and electrical components. Only trained and qualified service personnel should install, repair, or service air-conditioning equipment.

Untrained personnel can perform the basic maintenance functions of cleaning coils and filters and replacing filters. All other operations should be performed by trained service personnel. When working on air-conditioning equipment, observe precautions in the literature, tags and labels attached to the unit, and other safety precautions that may apply.

Follow all safety codes. Wear safety glasses and work gloves. Use quenching cloth for unbrazing operations. Have fire extinguisher available for all brazing operations.



WARNING!

Air conditioner unit must be on a level surface or it may not operate correctly.

Before performing service or maintenance operations on unit, turn off main power switch to unit.

Electrical shock could cause personal injury.

3.0 TRAINING

3.1 TRAINING REQUIREMENTS

The employer of the operator is responsible for providing a training program sufficient for the safe operation of the unit.

3.2 TRAINING PROGRAM

The employer provided operator training program should cover safety procedures concerning use of the unit in and around the intended aircraft at the intended aircraft servicing location.

3.3 OPERATOR TRAINING

The operator training should provide the required training for safe operation of the unit.

NOTE: Maintenance and Trouble Shooting are to be performed by a skilled and trained technician.

4.0 FEATURES, BENEFITS AND RATINGS

Every compact one-piece unit arrives fully assembled, charged, tested and ready to run.

4.1 FEATURES/BENEFITS

- Pre-coated aluminum fin coil
- High pressure switch
- Loss of charge/low pressure switch
- Freeze protection switch
- Non-corrosive, sloped condensate drain pan, meets ASHRAE 62-89 (IAQ)
- Two inch (2") return-air filters
- Includes exclusive Acutrol™ metering device to precisely control refrigerant flow (preventing slugging and flood-back) while maintaining optimum unit performance.
- The wheels lock with the towbar in the upright and locking position.
- 12 inch diameter 25 ft long blower hose (with storage compartment), connects quickly and easily to the air conditioning unit. The hose will not fully inflate during the cooling or heating process.
- Unit is designed to cool and/or heat an aircraft through a window or door opening.
- Durable, Dependable Construction
- Designed for durability in any climate, the weather-resistant cabinets are constructed of galvanized steel, bonderized, and all exterior panels are coated with a pre painted baked enamel finish. The paint finish is non-chalking, and is capable of withstanding ASTM B117 500-hour Salt Spray Test. All internal cabinet panels are primed, permitting longer life and a more attractive appearance for the entire unit. Totally enclosed condenser-fan motor and permanently lubricated bearings provide additional unit dependability.
- Proven Compressor Reliability
- Design techniques feature computer-programmed balance between compressor, condenser and evaporator. Carrier-specified hermetic compressors are equipped with compressor over current and over temperature protection to ensure durability.
- Extra Receptacles
- An external, covered 115 volt Ground Fault Interrupt (GFI) receptacle is provided as a convenient power source for drills, lights, refrigerant recovery units, or other electrical service tools. Simply connect the outlet to a field-supplied and properly fused branch circuit power supply.

4.2 RATINGS

Air Conditioning and Refrigeration Institute (ARI) Capacity Ratings

Nominal Tons	Standard cfm	Net Cooling Capacity (Btuh)	Total kW	SEER	Sound Rating (Bels)
4	1200-2000	45,000	4.0	13.0	8.5

LEGEND

Bels – Sound Levels (1 bel = 10 decibels)
Btuh – British Thermo unit/hour

kW – Kilowatt
SEER – Seasonal Energy Efficiency Ratio

NOTES:

1. Rated in accordance with ARI Standards 210/240-06 or 360/360-04.
2. Ratings are net values, reflecting the effects of circulating fan heat.

4.3 ELECTRICAL DATA

Electrical Data

Nominal V-Ph-Hz	Voltage Range		Compr (each)		OFM			IFM	Power Supply		Disconnect Size	
	Min	Max	RLA	LRA	Quantity	Hp	FLA	FLA	MCA	MOCP††	FLA	LRA
460-3-60	414	506	6.2	41.0	1	1/4	0.8	2.1	11.2	15	11	58

LEGEND

IFM – Indoor (Evaporator) Fan Motor
RLA – Rated Load Amps
FLA – Full Load Amps
MOCP – Maximum Overcurrent Protection

OFM – Outdoor (Condenser) Fan Motor
LRA – Locked Rotor Amps
MCA – Minimum Circuit Amps
†† – Fuse or HACR Circuit Breaker

4.4 FIELD POWER SUPPLY

1. Remove evaporator fan access panel (See Figures 1A through 1C – Typical Component Location) on following page.
2. Check fan and belt rotation by turning on disconnect for one to two seconds. See Figure 2 on following page. If fan is rotating in the wrong direction, switch the power cable lines. An arrow is on the unit.
3. Replace evaporator fan access panel. See Figure 2.

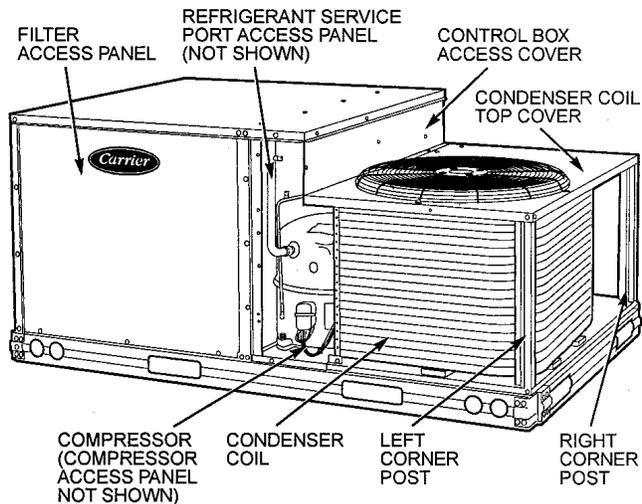


FIGURE 1 A

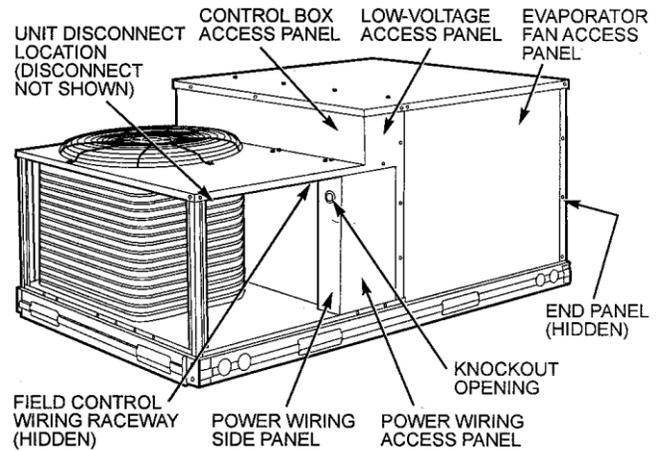


FIGURE 1 B

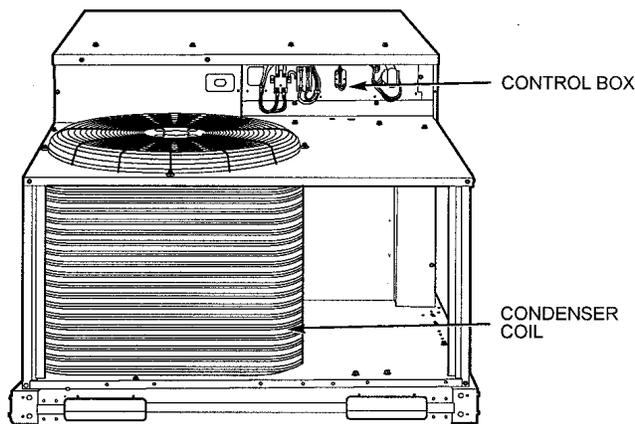


FIGURE 1 C

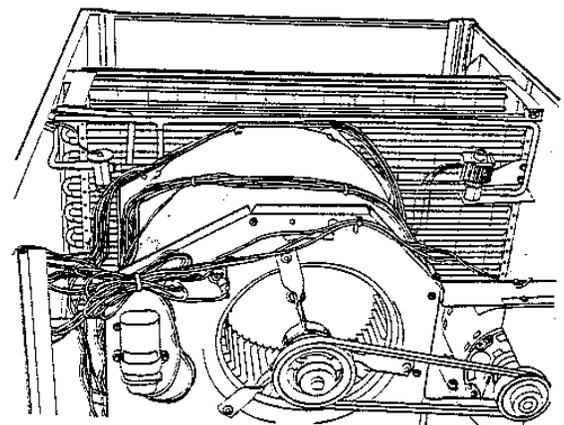


FIGURE 2



CAUTION!

Voltage to compressor terminals during operation must be within voltage range indicated on unit nameplate. On 3-phase units, voltages between phases must be balanced within 2% and the current within 10%. Use the formula shown below to determine the percent of voltage imbalance. Operation on improper line voltage or excessive phase imbalance constitutes abuse and may cause damage to electrical components. Such operation would invalidate any applicable Carrier warranty.

- NOTES:**
1. In compliance with NEC requirements for multi motor and combination load equipment (refer to NEC Articles 430 and 440), the over current protective device for the unit shall be fuse or HACR breaker.
 2. *Unbalanced 3-Phase Supply Voltage* - Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent of voltage imbalance:

$$\% \text{ Voltage Imbalance} = 100 \times \frac{\text{max voltage deviation from avg voltage}}{\text{average voltage}}$$

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

4.5 TRAILER

- Welded steel frame construction
- Tapered roller bearings; can be re-lubricated, sealed
- Wheel: 4 hole, 4 inch bolt circle
- Tires: Size – 4.80 x 8 inch diameter Pressure – 50 psi
- Size – 4 x 12.6 inch diameter Pressure – 85 psi

5.0 ELECTRICAL CONNECTIONS



CAUTION!

Voltage to compressor terminals during operation must be within voltage range indicated on unit nameplate.

NOTE: In compliance with NEC requirements for multi-motor and combination load equipment (refer to NEC Articles 430 and 440), the over current protective device for the unit shall be fuse or HACR breaker. See section 3.3 Electrical Data for size.



WARNING!

Unit cabinet must have an uninterrupted, unbroken electrical ground to minimize the possibility of personal injury if an electrical fault should occur.

This ground consists of an electrical wire connected to unit ground lug in control compartment when installed in accordance with NEC (National Electrical Code), ANSI (American National Standards Institute)/NFPA (National Fire Protection Association), latest edition (in Canada, Canadian Electrical Code CSA [Canadian Standards Association] C22. 1) and local electrical codes.

Failure to follow this warning could result in the installer being liable for personal injury of others.

5.1 ON/OFF (DISCONNECT) SWITCH LOCATION

The On/Off switch (Disconnect) is mounted on the unit under the top panel and behind the condenser coil. **Reference Figures 1A through 1C – Typical Component Location and Figure 3.**

This factory-installed, internally-mounted, NEC (National Electrical Code) and UL (Underwriters' Laboratories) approved non-fused On/Off switch (Disconnect) provides unit power shutoff.

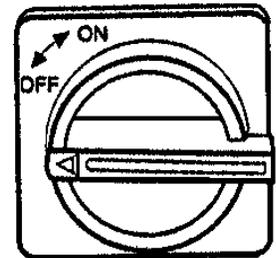


FIGURE 3
 Unit Mounted Disconnect

6.0 PRE START-UP**6.1 PRIOR TO OPERATION**

Prior to operating the Mobile Air Conditioner, the user should become familiar with the owner's operating manual.

**CAUTION!**

Do not jumper any safety devices when operating the unit.

Do not operate the compressor when the outdoor temperature is below 40° F (4° C) unless accessory low-temperature kit is installed.

Do not rapid-cycle the compressor. Allow five (5) minutes between "On" cycles to prevent compressor damage.

**WARNING!**

Failure to observe the following warnings could result in serious personal injury:

1. Follow recognized safety practices and wear protective goggles when checking or servicing refrigerant system.
2. Do not operate compressor or provide any electric power to unit unless compressor terminal cover is in place and secured.
3. Do not remove compressor terminal cover until all electrical sources are disconnected.
4. Relieve all pressure from both high and low-pressure sides of the system before touching or disturbing anything inside terminal box if refrigerate leak is suspected around compressor terminals. Use accepted methods to recover refrigerant.
5. Never attempt to repair soldered connection while refrigerant system is under pressure.
6. Do not use torch to remove any component. System contains oil and refrigerant under pressure. To remove a component, wear protective goggles and proceed as follows:
 - a. Shut off electrical power to unit.
 - b. Relieve all pressure from system using both high and low-pressure ports. Use accepted methods to recover refrigerant.
 - c. Cut component connecting tubing with tubing cutter and remove component from unit.
 - d. Carefully unsweat remaining tubing stubs when necessary. Oil can ignite when exposed to torch flame.

6.2 GENERAL INSPECTION

1. Remove all access panels.
2. Read and follow instructions on all **WARNING, CAUTION, and INFORMATION** labels attached to and/or shipped with unit. Make the following inspections:
 - a. Inspect for shipping and handling damages such as broken lines, loose parts, disconnected wires, etc.
 - b. Inspect for oil at all refrigerant tubing connections and on unit base. Detecting oil generally indicates a refrigerant leak. Leak-test all refrigerant tubing connections using electronic leak detector or liquid-soap solution. If a refrigerant leak is detected, see 5.3 Check for Refrigerant Leaks section.
 - c. Inspect all field and factory wiring connections. Be sure that connections are completed and tight.
 - d. Inspect coil fins. If damaged during shipping and handling, carefully straighten fins with a fin comb.
3. Verify the following conditions:
 - a. Make sure that condenser-fan blade is correctly positioned in fan orifice. Leading edge of blade should be two inches (2 inch/51 mm) from condenser inlet grille and one-half inch (½ inch/13mm) from fan deck.
 - b. Make sure that air filter(s) is in place.
 - c. Make sure that condensate drain pan and trap are filled with water to ensure proper drainage.
 - d. Make sure that all tools and miscellaneous loose parts have been removed.

6.3 CHECK FOR REFRIGERANT LEAKS

Locate and repair refrigerant leaks and charge the unit as follows:

1. Using both high-pressure and low-pressure ports, locate leaks and recover remaining refrigerant to relieve system pressure.
2. Repair leak following accepted practices.
3. Check system for leaks using an approved method.
4. Evacuate refrigerant system and recover refrigerant if no additional leaks are found.
5. Charge unit with R-410A refrigerant, using a volumetric-charging cylinder or accurate scale. Refer to unit rating plate for required charge. Be sure to add extra refrigerant to compensate for internal volume of filter drier.

6.4 CHECK COOLING EFFECTS

Plug in unit. Turn On/Off switch to "On" position. Fan should be on and blowing correctly. After approximately 30 seconds, condenser should "kick on". Observe that compressor, condenser fan, and evaporator blower motors start. Observe that cooling cycle shuts down when control setting is satisfied.

IMPORTANT! Three-phase scroll compressors are direction-oriented. Units must be checked to ensure proper compressor 3-phase power lead orientation. If not corrected within five (5) minutes, the internal protector will shut off the compressor. The 3-phase power leads to the unit must be reversed to correct rotation. When turning backwards, scroll compressors emit elevated noise levels, and the difference between compressor suction and discharge pressures may be dramatically lower than normal. See section 3.5 Field Power Supply.

7.0 OPERATION

7.1 OPERATING INSTRUCTIONS

Operate the Mobile Air Conditioner in accordance with the operating instructions provided on the instrument panel. **Reference Figure 5** below.

A description of each step of the STARTING and SHUTOFF sequence is given, along with a brief discussion of what is to be expected.

<h2 style="margin: 0;">OPERATING INSTRUCTIONS</h2> <p style="margin: 0; font-size: small;">REFER TO THE OPERATING AND SERVICE MANUAL FOR MAINTENANCE OF UNIT.</p>	
<p>S 1 MAKE SURE DISCONNECT IS TURNED OFF.</p> <p>T 2 PLACE AIR DUCTS IN AIRCRAFT AND ENSURE THAT THEIR OPENINGS ARE UNOBSTRUCTED.</p> <p>A 3 ENSURE COILS AND FILTERS ARE CLEAN.</p> <p>R 4 ENSURE DRAIN BUCKET IS IN PLACE.</p> <p>T 5 PLUG IN UNIT.</p> <p>I 6 IF AIR CONDITIONER HAS A HEATER OPTION, SELECT EITHER HEAT OR COOL BY FLIPPING HEAT/COOL SWITCH.</p> <p>N 7 TURN DISCONNECT TO ON POSITION.</p> <p>G 8 ENSURE AIR IS BEING DISCHARGED OUT OF OUTPUT HOSE.</p> <p>9 EMPTY DRAIN BUCKET AS NEEDED.</p>	<p>S 1 TURN DISCONNECT TO OFF POSITION.</p> <p>H 2 UNPLUG UNIT AND RETURN CABLE TO CART.</p> <p>U 3 PLACE RETURN AND SUPPLY HOSE IN CART.</p> <p>T 4 EMPTY DRAIN BUCKET.</p> <p>O</p> <p>F</p>

FIGURE 5 – Label, Operating Instructions

7.2 STARTING MOBILE AIR CONDITIONER

1. Ensure On/Off switch (Disconnect) is turned to "Off" position. The On/Off (Disconnect) switch is "Off" when turned counter-clockwise. **Reference Figure 3.**



WARNING!

Until ready for use, always leave this switch in the "Off" position.

2. Place air duct in aircraft and ensure that the opening is unobstructed. Remove yellow output air duct from the storage compartment located under the unit. Remove yellow dust caps from the input and output duct openings located on the back of the air conditioner and place in the storage compartments. Attach yellow output air duct to the air conditioner via the duct openings located on the back of the air conditioner. **See Figure 6.** Place other end of yellow duct into the aircraft.
3. Ensure coils and filters are clean. Refer to section 8.1 Cleaning in this manual.

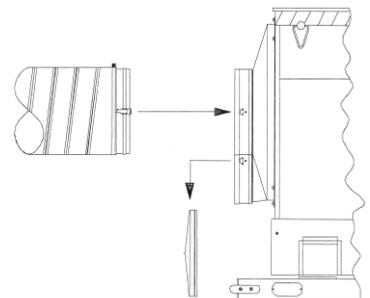


FIGURE 6

7.2 STARTING MOBILE AIR CONDITIONER *(continued)*

4. Ensure drain bucket is in place. The Mobile Air Conditioner unit does not have a factory supplied drain bucket. Depending on your usage, a drain bucket or any condensate collector device may not be needed. Below are two suggestions you may utilize if you do not want the condensation to collect on the floor/ramp:
 - a. Purchase a bucket with a lid on it and the lid has at least a 13/16 inch diameter hole. The hole in the bucket will receive the 3/4 inch diameter yellow condensate hose coming out of the Mobile Air Conditioner unit.
 - b. Buy a 1/2 inch diameter male garden hose coupler and attach it to the end of the 3/4 inch diameter yellow condensate hose coming out of the Mobile Air Conditioner unit. Also, purchase any length garden hose to attach to the 1/2 inch diameter garden hose coupler. By doing the above, you will be able to direct the condensate to any location.

**WARNING!**

The end of the garden hose can not be higher than the condensate trap located under the air conditioning unit. Damage to equipment and/or electrical shock may occur.

5. Plug in unit. The Mobile Air Conditioner unit does not come factory supplied with a plug. Purchase a plug according to your receptacle. See section 5.0 Electrical Connections for important instructions concerning electrical connections.
6. This unit is not equipped with a heater option. Go to step 7.
7. Turn On/Off switch (Disconnect) to "On" position. Turn On/Off switch (Disconnect) to "On" position by turning clockwise. **See Figure 3.**
8. Check supply air duct to ensure cool air is being discharged when condenser is on. When unit is turned "On", the evaporator blower fan located inside the fan access panel (**Reference Figure 1**) begins rotating. After approximately 30 seconds, the compressor and condenser fan "kicks on".

NOTE: If the unit has been sitting for a extended amount of time without use and/or after considerable moving of unit (especially during shipping), the first 30 second delay may be as long as five (5) minutes due to removal of excessive pressure build-up against the head of the compressor.

These two items will continue to function until a temperature of 55° F is reached inside the air conditioner unit.

NOTE: If a temperature of less than 50° F is obtained, the freeze protection switch will open and the air conditioner unit will not function until the freeze protection switch is reset.

When a temperature of approximately 60° F is reached, the compressor and condenser fan will cycle back on. At no time will the evaporator blower fan cease to operate as long as the On/Off (Disconnect) switch is in the "On" position.

9. Empty drain bucket as needed to keep condensate from collecting on the floor/ramp.

7.3 SHUT OFF MOBILE AIR CONDITIONER

1. Turn Disconnect to "Off" position. The On/Off (Disconnect) switch is "Off" when turned counter-clockwise. **Reference Figure 3.**
2. Place return and supply hose in cart.
3. Unplug unit and return cable to cart. The cable hanger is located on the side of the unit. Ensure the cable does not touch the ground.
4. Empty drain bucket.

8.0 TROUBLE SHOOTING

Refer to Trouble Shooting Tables and **Figure 8** for additional information.

TABLE – COOLING SERVICE ANALYSIS

PROBLEM	CAUSE	REMEDY
Compressor and condenser fan will not start	Power failure	Call power company
	Fuse blown or circuit breaker tripped	Replace fuse or reset circuit breaker
	Defective thermostat, contactor, transformer, or control relay	Replace component
	Insufficient line voltage	Determine cause and correct.
	Incorrect or faulty wiring	Check wiring diagram and rewire correctly
	Thermostat setting too high	Lower thermostat setting below room temperature
Compressor will not start but condenser fan runs	Faulty wiring or loose connections in compressor circuit	Check wiring and repair or replace
	Compressor motor burned out, seized, or internal overload open	Determine cause. Replace compressor
	Defective run/start capacitor, overload, start relay	Determine cause and replace
	One leg of three-phase power dead	Replace fuse or reset circuit breaker
Compressor cycles (other than normally satisfying thermostat)	Refrigerant overcharge or undercharge	Recover refrigerant, evacuate system, and recharge to nameplate
	Defective compressor	Replace and determine cause
	Insufficient line voltage.	Determine cause and correct
	Blocked condenser	Determine cause and correct
	Defective run/start capacitor, overload, or start relay	Determine cause and replace
	Defective thermostat	Replace thermostat
	Faulty condenser-fan motor or capacitor	Replace
	Restriction in refrigerant system	Locate restriction and remove
Compressor operates continuously	Dirty air filter	Replace filter
	Unit undersized for load	Decrease load or increase unit size
	Thermostat set too low	Reset thermostat
	Low refrigerant charge	Locate leak; repair and recharge
	Leaking valves in compressor	Replace compressor
	Air in system	Recover refrigerant, evacuate system, and recharge
	Condenser coil dirty or restricted	Clean coil or remove restriction
Excessive head pressure	Dirty air filter.	Replace filter
	Dirty condenser coil	Clean coil
	Refrigerant overcharged	Recover excess refrigerant
	Air in system	Recover refrigerant, evacuate system, and recharge
	Condenser air restricted or air short-cycling	Determine cause and correct
Head pressure too low	Low refrigerant charge	Check for leaks; repair and recharge
	Compressor valves leaking	Replace compressor
	Restriction in liquid tube	Remove restriction

8.0 TROUBLE SHOOTING (continued)

Refer to Trouble Shooting Tables and **Figure 8** for additional information.

TABLE – COOLING SERVICE ANALYSIS

PROBLEM	CAUSE	REMEDY
Excessive suction pressure	High head load	Check for source and eliminate
	Compressor valves leaking	Replace compressor
	Refrigerant overcharged	Recover excess refrigerant
Suction pressure too low	Dirty air filter	Replace filter
	Low refrigerant charge	Check for leaks; repair and recharge.
	Metering device or low-side restricted	Remove source of restriction
	Insufficient evaporator airflow	Increase air quantity. Check filter and replace if necessary
	Temperature too low in conditioned area	Reset thermostat
	Outdoor ambient below 25° F	Install low-ambient kit

9.0 MAINTENANCE AND SERVICE



CAUTION!

When servicing unit, shut off all electrical power to unit to avoid shock hazard or injury from rotating parts.

9.1 17-7503J7000 CLEANING

Inspect unit interior at the beginning of each heating and cooling season or as operating conditions require.

Evaporator Coil - Inspect and clean coil prior to each heating and cooling season, and as required by location.

1. Turn unit power off.
2. Slide filters (located in the hinged access panel) out of unit. Replace if dirty. See **Figure 7**.

NOTE: This panel permits quick and simple filter access and prevents panels from being dropped.

3. Clean coil using a commercial coil cleaner or dishwasher detergent in a pressurized spray canister. Wash both sides of coil and flush with clean water. For best results, back flush toward return-air section to remove foreign material.
4. Flush condensate pan.
5. Reinstall filters.
6. Reconnect wiring.
7. Close filter-hinged access panel.

Condenser Coil – Inspect coil monthly. Clean condenser coil annually, and as required by location and outdoor air conditions.

One-Row Coils – To access one-row coils, remove screws securing condenser-fan grille to condenser coil top cover. Place grille on top of condenser coil top cover as shown in **Figure 8**. It is not necessary to remove the top cover.

Use a water hose or other suitable equipment to remove dirt and debris. Clean the outer surfaces with a stiff brush in the normal manner.

Reverse the procedure outlined above to reinstall the condenser-fan grille and condenser fan top cover.

Condensate Drain – Check and clean each year at start of cooling season. In winter, keep drain dry or protect against freeze-up. Condensate drain and tray are located on the bottom of the air conditioner.

Filters – Clean or replace at start of each heating and cooling season, or more often if operating conditions require it. Replacement filters must be same dimensions as original filters.

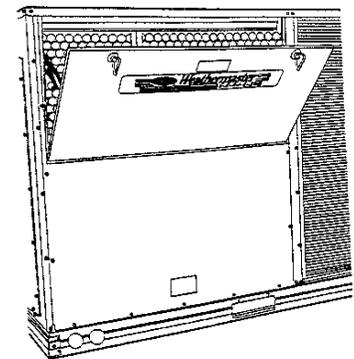


FIGURE 7
Filter Hinged Access Panel

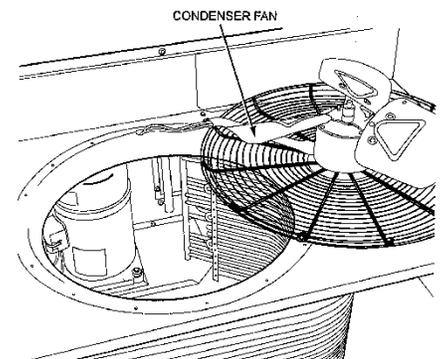


FIGURE 8
Condenser Coil Cleaning

9.2 17-7503J7000-A1 CLEANING

Inspect unit interior at the beginning of each heating and cooling season or as operating conditions require.

Evaporator Coil - Inspect and clean coil prior to each heating and cooling season, and as required by location.

1. Turn unit power off.
2. Remove filter access panel. Loosen thumb screws at bottom of filters. Replace if dirty. See **Figure 9**.
3. Clean coil using a commercial coil cleaner or dishwasher detergent in a pressurized spray canister. Wash both sides of coil and flush with clean water. For best results, back flush toward return-air section to remove foreign material.
4. Flush condensate pan.
5. Reinstall filters.
6. Reconnect wiring.
7. Close filter-hinged access panel.

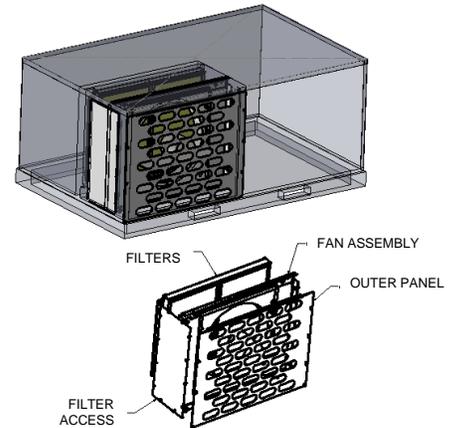


FIGURE 9
Filter Access Panel

Condenser Coil – Inspect coil monthly. Clean condenser coil annually, and as required by location and outdoor air conditions.

One-Row Coils – To access one-row coils, remove screws securing condenser-fan grille to condenser coil top cover. Place grille on top of condenser coil top cover as shown in **Figure 10**. It is not necessary to remove the top cover.

Use a water hose or other suitable equipment to remove dirt and debris. Clean the outer surfaces with a stiff brush in the normal manner.

Reverse the procedure outlined above to reinstall the condenser-fan grille and condenser fan top cover.

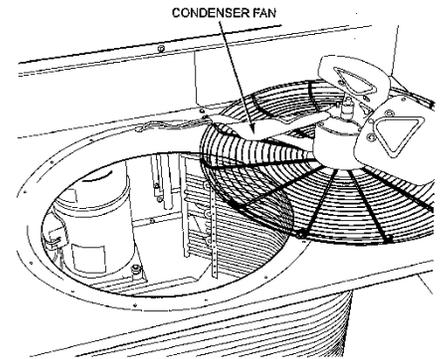


FIGURE 10
Condenser Coil Cleaning

Condensate Drain – Check and clean each year at start of cooling season. In winter, keep drain dry or protect against freeze-up. Condensate drain and tray are located on the bottom of the air conditioner.

Filters – Clean or replace at start of each heating and cooling season, or more often if operating conditions require it. Replacement filters must be same dimensions as original filters.

9.3 LUBRICATION

Compressors - Each compressor is charged with the correct amount of oil at the factory.

Fan-Motor Bearings - Fan-motor bearings are of the permanently lubricated type. No further lubrication is required. No lubrication of condenser or evaporator-fan motors is required.

9.4 CONDENSER-FAN ADJUSTMENT

1. Shut off unit power supply.
2. Remove condenser-fan assembly (grille, motor, and fan).
3. Loosen fan hub setscrews.
4. Adjust fan height as shown in **Figure 11**.
5. Tighten setscrews.
6. Replace condenser-fan assembly.

9.5 CONDENSER COIL GRILLE

Condenser coil grille is shipped factory installed. No adjustments are required.

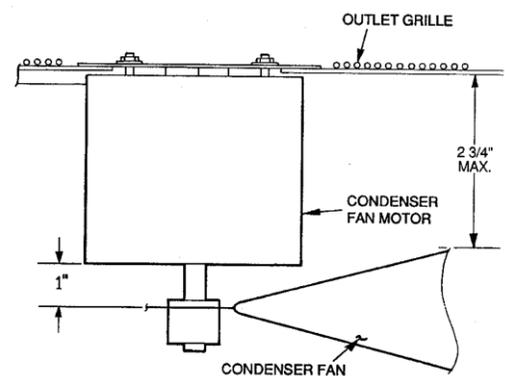


FIGURE 11
Condenser Fan Adjustment

9.6 REFRIGERANT CHARGE

Amount of refrigerant charge is listed on unit nameplate. Refer to Carrier Charging, Recovery, Recycling, and Reclamation training manual and the following procedures.

Unit panels must be in place when unit is operating during charging procedure.

No Charge – Use standard evacuating techniques. After evacuating system, weigh in the specified amount of refrigerant.

Low Charge Cooling – Vary refrigerant until the conditions of the cooling chart on following page are met. Note the charging chart is different from type normally used. Chart is based on charging the units to the correct superheat for the various operating conditions. Accurate pressure gage and temperature sensing device are required. Connect the pressure gage to the service port on the suction line. Mount the temperature sensing device on the suction line and insulate it so that outdoor ambient temperature does not affect the reading. Indoor-air cfm must be within the normal operating range of the unit.

10.0 PROVISION OF SPARES

10.1 SOURCE OF SPARE PARTS

Spare parts may be obtained from the manufacturer:

TRONAIR, Inc.

1 Air Cargo Pkwy East

Swanton, Ohio 43558 USA

Telephone: (419) 866-6301 or 800-426-6301

Fax: (419) 867-0634

E-mail: sales@tronair.com

Website: www.tronair.com

10.2 RECOMMENDED SPARE PARTS LISTS

Reference the following page(s) for Replacement Parts and Kits available.

11.0 IN SERVICE SUPPORT

Contact Tronair, Inc. for technical services and information. See Section 1.3 – Manufacturer.

12.0 GUARANTEES/LIMITATION OF LIABILITY

Tronair products are warranted to be free of manufacturing or material defects for a period of one year after shipment to the original customer. This is solely limited to the repair or replacement of defective components. This warranty does not cover the following items:

- a) Parts required for normal maintenance
- b) Parts covered by a component manufacturers warranty
- c) Replacement parts have a 90-day warranty from date of shipment

If you have a problem that may require service, contact Tronair immediately. Do not attempt to repair or disassemble a product without first contacting Tronair, any action may affect warranty coverage. When you contact Tronair be prepared to provide the following information:

- a) Product Model Number
- b) Product Serial Number
- c) Description of the problem

If warranty coverage is approved, either replacement parts will be sent or the product will have to be returned to Tronair for repairs. If the product is to be returned, a Return Material Authorization (RMA) number will be issued for reference purposes on any shipping documents. Failure to obtain a RMA in advance of returning an item will result in a service fee. A decision on the extent of warranty coverage on returned products is reserved pending inspection at Tronair. Any shipments to Tronair must be shipped freight prepaid. Freight costs on shipments to customers will be paid by Tronair on any warranty claims only. Any unauthorized modification of the Tronair products or use of the Tronair products in violation of cautions and warnings in any manual (including updates) or safety bulletins published or delivered by Tronair will immediately void any warranty, express or implied.

The obligations of Tronair expressly stated herein are in lieu of all other warranties or conditions expressed or implied. **Any unauthorized modification of the Tronair products or use of the Tronair products in violations of cautions and warnings in any manual (including updates) or safety bulletins published or delivered by Tronair will immediately void any warranty, express or implied and Tronair disclaims any and all liability for injury (WITHOUT LIMITATION and including DEATH), loss or damage arising from or relating to such misuse.**

13.0 APPENDICES

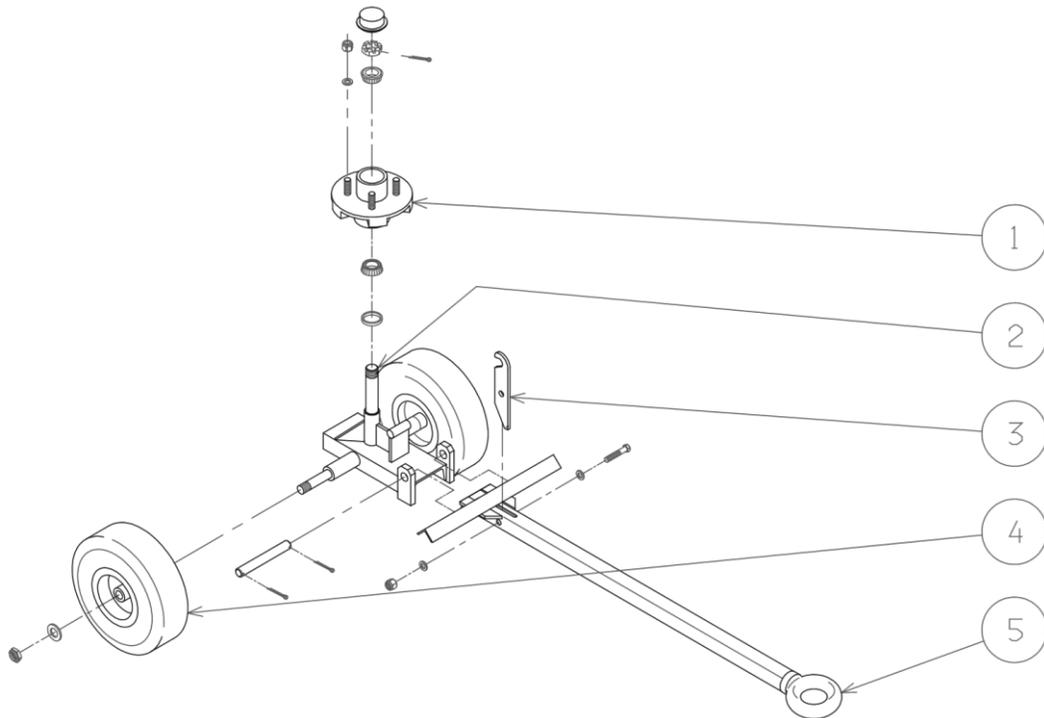
APPENDIX I Safety Data Sheet – R-410A Refrigerant

Additional Documents:

Carrier Manuals

Parts List

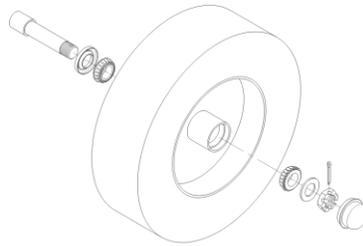
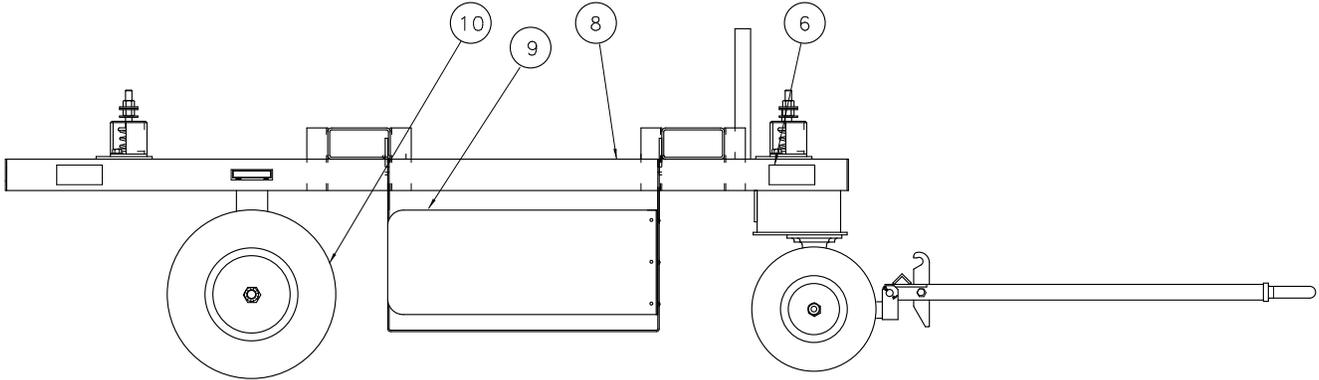
When ordering replacement parts/kits, please specify model, serial number and color of your unit.



Item	Part Number	Description	Qty
1	H-1335	HUB	1
2	Z-2449-01	WELDMENT, STEERING AXLE	1
3	K-1320	KIT, LEVER; CONSISTS OF:	
	G-1100-109522	BOLT, HEX HEAD, GRADE 5, 1/2-20 X 2-1/4" LONG	1
	G-1202-1090N	STOPNUT 1/2-20 ELASTIC	1
	G-1250-1090N	FLATWASHER, 1/2 NARROW	2
	J-1626	LEVER	1
4	K-2084	KIT, WHEEL (SINGLE); CONSISTS OF:	
	G-1203-1115	STOPNUT, 3/4-16 ELASTIC	1
	U-1041	WHEEL, PNEUMATIC TIRE	1
5	K-3361	KIT, TONGUE; CONSISTS OF:	
	G-1301-03	PIN, COTTER (1/8" DIAMETER X 1-1/2" LONG)	2
	R-1122	PIN	1
	Z-4838-01	WELDMENT, TONGUE	1

Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

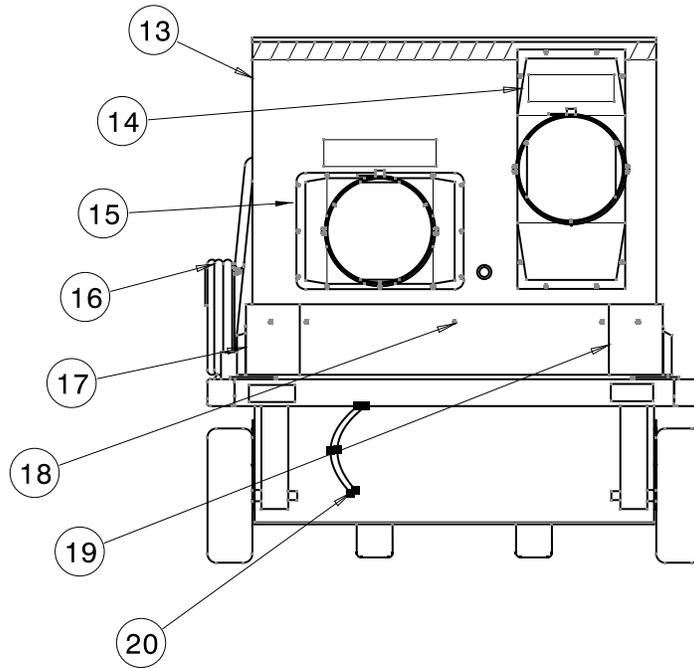


ITEM 10 DETAIL

Item	Part Number	Description	Qty
8	Z-4734-01	WELDMENT, FRAME	1
10	Z-1217	ASSEMBLY, WHEEL, TIRE & BEARING	1
6	K-3344	KIT, ISOLATOR; CONSISTS OF:	
	G-1100-109514	BOLT, HEX HEAD, GRADE 5, 1/2-20 X 1-1/2" LONG	2
	G-1202-1090N	STOPNUT 1/2-20 ELASTIC	4
	G-1250-1090N	FLATWASHER, 1/2 NARROW	2
	H-2396	ISOLATOR	1
9	K-4120	KIT, VENT HOSE HOLDER	1

Parts List – 17-7503J7000

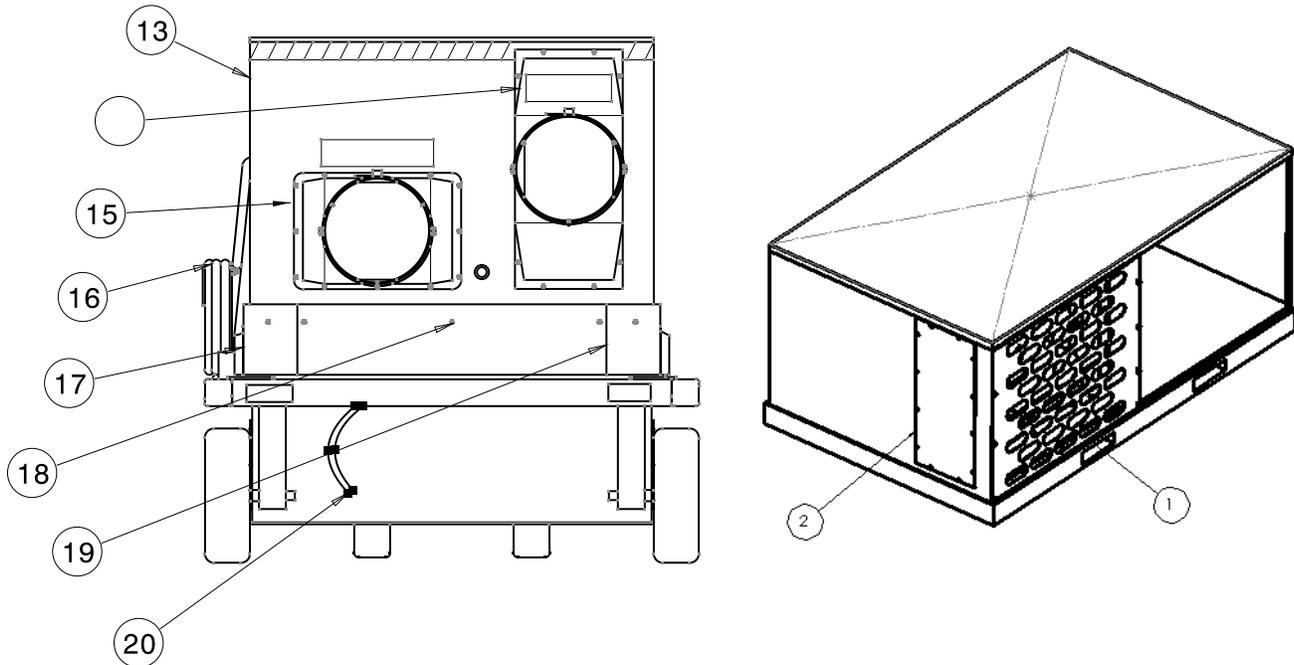
When ordering replacement parts/kits, please specify model, serial number and color of your unit.



Item	Part Number	Description	Qty
13	H-2361	AIR CONDITIONER	1
14	Z-6592	ASSEMBLY, CLAMP	1
15	Z-6591	ASSEMBLY, CLAMP	1
20	Z-4733	ASSEMBLY, DRAIN	1
N/S	H-3003	HOSE, INSULATED VENT	1
N/S	H-2459	FILTER, AIR CONDITIONER (16" X 25" X 2")	1
6	K-3348	KIT, ELECTRICAL CABLE; CONSISTS OF:	
	EC-1176-04	LOCKNUT, CONDUIT	1
	EC-1433-21	CONNECTOR, STRAIN RELIEF	1
	EC-1507-02*0600	CABLE, TYPE 50 ELECTRICAL 600 V, 50 FT LONG	1
	G-1159-105010	SCREW, ROUND HEAD CROSS RECESS MACHINE 1/4-20 X 1" LONG	1
	G-1202-1050	STOPNUT, 1/4-20 ELASTIC	1
	G-1250-1050N	FLATWASHER, 1/4 NARROW	2
	H-1721-10	CLAMP, ELECTRICAL	1
17	K-3349	KIT, RIGHT HAND SHROUD; CONSISTS OF:	
	G-1189	SCREW, HEX WASHER HEAD, #10 X 3/4" LONG	7
	S-1666-01	SHROUD	1
	S-1667-01	SHROUD	1
18	K-3351	KIT, FRONT OR BACK SHROUD; CONSISTS OF:	
	G-1189	SCREW, HEX WASHER HEAD, #10 X 3/4" LONG	3
	S-1663-01	SHROUD	1
19	K-3350	KIT, LEFT HAND SHROUD; CONSISTS OF:	
	G-1189	SCREW, HEX WASHER HEAD, #10 X 3/4" LONG	7
	S-1664-01	SHROUD	1
	S-1665-01	SHROUD	1

Parts List – 17-7503J7000-A1

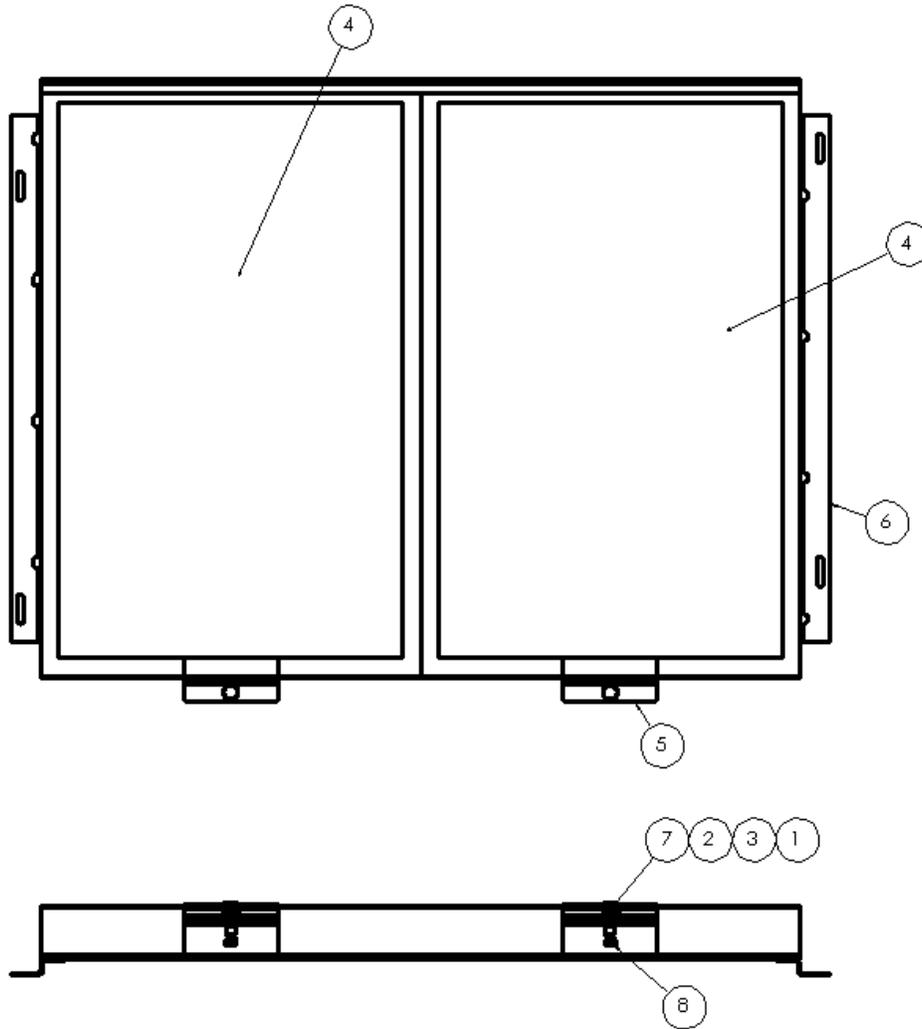
When ordering replacement parts/kits, please specify model, serial number and color of your unit.



Item	Part Number	Description	Qty
1	S-3829-00	PANEL	1
2	S-3814-00	PANEL	1
13	H-2361	AIR CONDITIONER	1
15	Z-6591	ASSEMBLY, CLAMP	1
20	Z-4733	ASSEMBLY, DRAIN	1
N/S	H-3003	HOSE, INSULATED VENT	1
N/S	EC-3200	PLUG, ELECTRICAL	1
N/S	EC-3201	PLUG, ELECTRICAL	1
6	K-3348	KIT, ELECTRICAL CABLE; CONSISTS OF:	
	EC-1176-04	LOCKNUT, CONDUIT	1
	EC-1433-21	CONNECTOR, STRAIN RELIEF	1
	EC-1507-02*0600	CABLE, TYPE 50 ELECTRICAL 600 V, 50 FT LONG	1
	G-1159-105010	SCREW, ROUND HEAD CROSS RECESS MACHINE 1/4-20 X 1" LONG	1
	G-1202-1050	STOPNUT, 1/4-20 ELASTIC	1
	G-1250-1050N	FLATWASHER, 1/4 NARROW	2
	H-1721-10	CLAMP, ELECTRICAL	1
17	K-3349	KIT, RIGHT HAND SHROUD; CONSISTS OF:	
	G-1189	SCREW, HEX WASHER HEAD, #10 X 3/4" LONG	7
	S-1666-01	SHROUD	1
	S-1667-01	SHROUD	1
18	K-3351	KIT, FRONT OR BACK SHROUD; CONSISTS OF:	
	G-1189	SCREW, HEX WASHER HEAD, #10 X 3/4" LONG	3
	S-1663-01	SHROUD	1
19	K-3350	KIT, LEFT HAND SHROUD; CONSISTS OF:	
	G-1189	SCREW, HEX WASHER HEAD, #10 X 3/4" LONG	7
	S-1664-01	SHROUD	1
	S-1665-01	SHROUD	1

Parts List – 17-7503J7000-A1 Air Filter

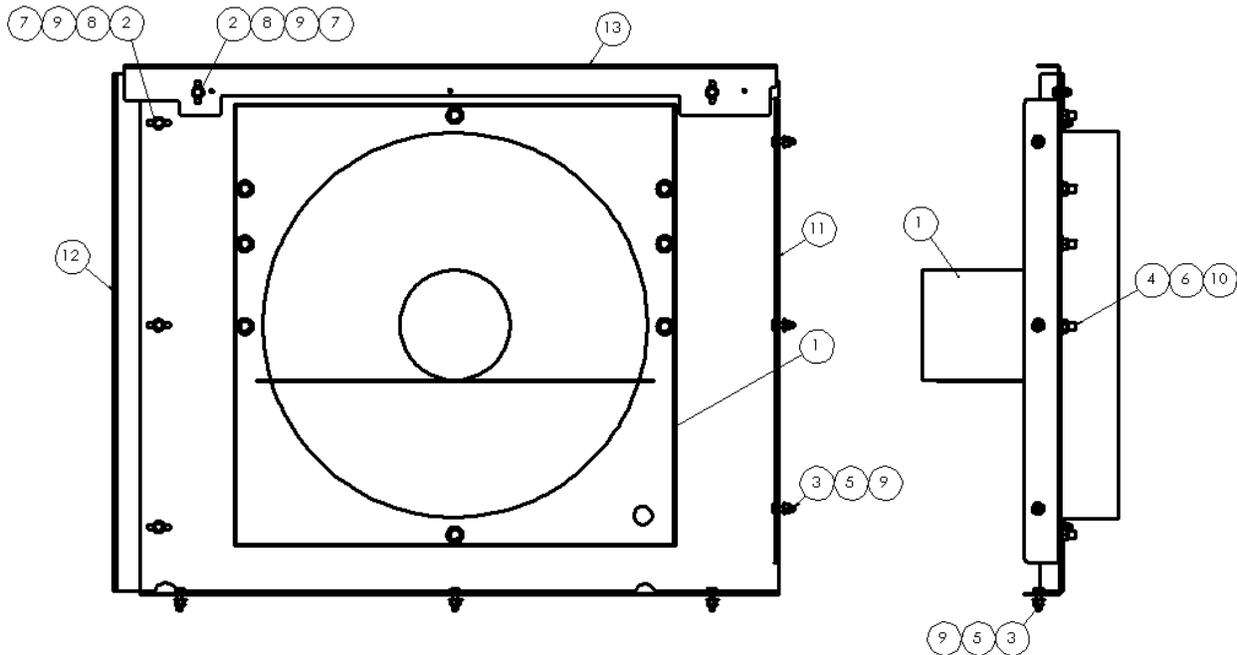
When ordering replacement parts/kits, please specify model, serial number and color of your unit.



Item	Part Number	Description	Qty
1	Z-10813-00	WELDMENT, FILTER PANEL (P)	1
2	H-4686	FILTER, HEPA	2
3	G-1440-1050-S	NUTSERT, 1/4-20 OPEN END	2
4	S-3818-00	CLAMP, FILTER (P)	2
5	G-1503-1050N	FLATWASHER, 1/4 SST NARROW	2
6	G-1502-1050R	LOCKWASHER, 1/4 SST REGULAR	2
7	G-1828-104125	SCREW, THUMB KNURLED HEAD	2
8	G-1203-1050	JAMNUT, 1/4-20 ELASTIC	2

Parts List – 17-7503J7000-A1 Fan

When ordering replacement parts/kits, please specify model, serial number and color of your unit.



Item	Part Number	Description	Qty
1	EC-3271	FAN, DIRECT DRIVE EXHAUST	1
2	S-3826-00	PANEL, FAN (P)	1
3	S-3827-00	GUARD, SIDE (P)	1
4	S-3828-00	PANEL, TOP (P)	1
5	G-1439-1050-S	NUTSERT, THIN WALL 1/4-20	5
6	G-1503-1050N	FLATWASHER. 1/4 SST NARROW	18
7	G-1503-1070N	FLATWASHER. 3/8 SST NARROW	16
8	G-1502-1050R	LOCKWASHER, 1/4 SST REGULAR	5
9	G-1112-105006	BOLT, 1/4-20 X 3/4" LG SST HEX HD	5
10	G-1112-105010	BOLT, 1/4-20 X 1.0" LG SST HEX HD	6
11	G-1202-1050	STOPNUT, 1/4-20 ELASTIC	6
12	G-1112-107010	BOLT, 3/8-16 X 1.0" SST HEX HD	8
13	G-1202-1070	STOPNUT, 3/8-16 ELASTIC	8



APPENDIX I

Safety Data Sheet Gentron 410A (R-410A) Refrigerant

Genetron® 410A**00000009881**

Version 2.7

Revision Date 04/18/2014

Print Date 04/14/2015

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Genetron® 410A

MSDS Number : 00000009881

Product Use Description : Refrigerant

Manufacturer or supplier's details : Honeywell International Inc.
101 Columbia Road
Morristown, NJ 07962-1057

For more information call : 800-522-8001
+1-973-455-6300
(Monday-Friday, 9:00am-5:00pm)

In case of emergency call : **Medical: 1-800-498-5701 or +1-303-389-1414**
: **Transportation (CHEMTREC): 1-800-424-9300 or +1-703-527-3887**
:
: (24 hours/day, 7 days/week)

SECTION 2. HAZARDS IDENTIFICATION**Emergency Overview**

Form : Liquefied gas

Color : colourless

Odor : weak

Classification of the substance or mixture

Classification of the substance or mixture : Gases under pressure, Liquefied gas
Simple Asphyxiant

GHS Label elements, including precautionary statements

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Symbol(s)

:



Signal word

: Warning

Hazard statements

: Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.

Precautionary statements

: **Prevention:**
Use personal protective equipment as required.**Storage:**

Protect from sunlight. Store in a well-ventilated place.

Hazards not otherwise
classified: May cause eye and skin irritation.
May cause frostbite.
May cause cardiac arrhythmia.**Carcinogenicity**

No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP, IARC, or OSHA.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical nature : Mixture

Chemical Name	CAS-No.	Concentration
Pentafluoroethane	354-33-6	50.00 %
Difluoromethane	75-10-5	50.00 %

SECTION 4. FIRST AID MEASURES

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- Inhalation : Move to fresh air. If breathing is irregular or stopped, administer artificial respiration. Use oxygen as required, provided a qualified operator is present. Call a physician. Do not give drugs from adrenaline-ephedrine group.
- Skin contact : After contact with skin, wash immediately with plenty of water. If there is evidence of frostbite, bathe (do not rub) with lukewarm (not hot) water. If water is not available, cover with a clean, soft cloth or similar covering. If symptoms persist, call a physician.
- Eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In case of frostbite water should be lukewarm, not hot. If symptoms persist, call a physician.
- Ingestion : Unlikely route of exposure. As this product is a gas, refer to the inhalation section. Do not induce vomiting without medical advice. Call a physician immediately.

Notes to physician

- Treatment : Because of the possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, should be used with special caution and only in situations of emergency life support. Treatment of overexposure should be directed at the control of symptoms and the clinical conditions. Treat frost-bitten areas as needed.

SECTION 5. FIREFIGHTING MEASURES

- Suitable extinguishing media : The product is not flammable. Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
- Specific hazards during firefighting : Contents under pressure. This product is not flammable at ambient temperatures and atmospheric pressure. However, this material can ignite when mixed with air under pressure and exposed to strong ignition sources. Container may rupture on heating. Cool closed containers exposed to fire with water spray.

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Do not allow run-off from fire fighting to enter drains or water courses.

Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.

In case of fire hazardous decomposition products may be produced such as:

Hydrogen halides

Hydrogen fluoride

Carbon monoxide

Carbon dioxide (CO₂)

Carbonyl halides

Special protective equipment for firefighters : In the event of fire and/or explosion do not breathe fumes. Wear self-contained breathing apparatus and protective suit. No unprotected exposed skin areas.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions : Immediately evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Wear personal protective equipment. Unprotected persons must be kept away. Remove all sources of ignition. Avoid skin contact with leaking liquid (danger of frostbite). Ventilate the area. After release, disperses into the air. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Avoid accumulation of vapours in low areas. Unprotected personnel should not return until air has been tested and determined safe. Ensure that the oxygen content is $\geq 19.5\%$.

Environmental precautions : Prevent further leakage or spillage if safe to do so. The product evaporates readily.

Methods for cleaning up : Ventilate the area.

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SECTION 7. HANDLING AND STORAGE**Handling**

Handling : Handle with care.
Avoid inhalation of vapour or mist.
Do not get in eyes, on skin, or on clothing.
Wear personal protective equipment.
Use only in well-ventilated areas.
Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50 °C.
Follow all standard safety precautions for handling and use of compressed gas cylinders.
Use authorized cylinders only.
Protect cylinders from physical damage.
Do not puncture or drop cylinders, expose them to open flame or excessive heat.
Do not pierce or burn, even after use. Do not spray on a naked flame or any incandescent material.
Do not remove screw cap until immediately ready for use.
Always replace cap after use.

Advice on protection against fire and explosion : The product is not flammable.
Can form a combustible mixture with air at pressures above atmospheric pressure.

Storage

Requirements for storage areas and containers : Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50 °C. Do not pierce or burn, even after use.
Keep containers tightly closed in a dry, cool and well-ventilated place.
Storage rooms must be properly ventilated.
Ensure adequate ventilation, especially in confined areas.
Protect cylinders from physical damage.
Store away from incompatible substances.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Protective measures : Do not breathe vapour.

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- Avoid contact with skin, eyes and clothing.
Ensure that eyewash stations and safety showers are close to the workstation location.
- Engineering measures : General room ventilation is adequate for storage and handling. Perform filling operations only at stations with exhaust ventilation facilities.
- Eye protection : Wear as appropriate:
Safety glasses with side-shields
If splashes are likely to occur, wear:
Goggles or face shield, giving complete protection to eyes
- Hand protection : Leather gloves
In case of contact through splashing:
Protective gloves
Neoprene gloves
Polyvinyl alcohol or nitrile- butyl-rubber gloves
- Skin and body protection : Avoid skin contact with leaking liquid (danger of frostbite).
Wear cold insulating gloves/ face shield/ eye protection.
- Respiratory protection : In case of insufficient ventilation, wear suitable respiratory equipment.
Wear a positive-pressure supplied-air respirator.
Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
For rescue and maintenance work in storage tanks use self-contained breathing apparatus.
- Hygiene measures : Handle in accordance with good industrial hygiene and safety practice.
Ensure adequate ventilation, especially in confined areas.
Avoid contact with skin, eyes and clothing.
Remove and wash contaminated clothing before re-use.
Keep working clothes separately.
- Hygiene measures : Handle in accordance with good industrial hygiene and safety practice.
Ensure adequate ventilation, especially in confined areas.
When using do not eat, drink or smoke.
Remove and wash contaminated clothing before re-use.
Keep working clothes separately.
Do not breathe vapour.
Avoid contact with skin, eyes and clothing.

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Exposure Guidelines

Components	CAS-No.	Value	Control parameters	Update	Basis
Difluoromethane	75-10-5	TWA : time weighted average	2,200 mg/m3 (1,000 ppm)	2007	WEEL:US. AIHA Workplace Environmental Exposure Level (WEEL) Guides
Difluoromethane	75-10-5	TWA : time weighted average	(1,000 ppm)	1994	Honeywell:Limit established by Honeywell International Inc.
Pentafluoroethane	354-33-6	TWA : time weighted average	4,900 mg/m3 (1,000 ppm)	2007	WEEL:US. AIHA Workplace Environmental Exposure Level (WEEL) Guides
Pentafluoroethane	354-33-6	TWA : time weighted average	(1,000 ppm)		Honeywell:Limit established by Honeywell International Inc.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state	: Liquefied gas
Color	: colourless
Odor	: weak
pH	: Note: neutral
Melting point/freezing point	: Note: not determined

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Boiling point/boiling range	: -48.5 °C
Flash point	: Note: not applicable
Evaporation rate	: > 1 Method: Compared to CCl4.
lower flammability limit	: Note: None
upper flammability limit	: Note: None
Vapor pressure	: 14,844 hPa at 21.1 °C(70.0 °F) 33,798 hPa at 54.4 °C(129.9 °F)
Vapor density	: 3 Note: (Air = 1.0)
Density	: 1.08 g/cm3 at 21.1 °C
Water solubility	: Note: no data available
Partition coefficient: n-octanol/water	: log Pow: 1.48 Test substance: Ethane, pentafluoro- (HFC-125) log Pow: 0.21 Test substance: Difluoromethane (HFC-32)
Ignition temperature	: > 750 °C
Decomposition temperature	: > 250 °C

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Global warming potential (GWP) : 1,975
Ozone depletion potential (ODP) : 0

SECTION 10. STABILITY AND REACTIVITY

Chemical stability : Stable under normal conditions.

Possibility of hazardous reactions : Hazardous polymerisation does not occur.

Conditions to avoid : Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50 °C.
Decomposes under high temperature.
Some risk may be expected of corrosive and toxic decomposition products.
Can form a combustible mixture with air at pressures above atmospheric pressure.
Do not mix with oxygen or air above atmospheric pressure.

Incompatible materials to avoid : Finely divided aluminium
Potassium
Calcium
Powdered metals
Aluminium
Magnesium
Zinc

Hazardous decomposition products : In case of fire hazardous decomposition products may be produced such as:
Hydrogen fluoride
Carbonyl halides
Carbon monoxide
Carbon dioxide (CO₂)

SECTION 11. TOXICOLOGICAL INFORMATION

Acute inhalation toxicity
Pentafluoroethane : > 769000 ppm
Exposure time: 4 h

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	Species: rat
Difluoromethane	: LC50: > 520000 ppm Exposure time: 4 h Species: rat
Sensitisation Pentafluoroethane	: Cardiac sensitization Species: dogs Note: No-observed-effect level 75 000 ppm Lowest observable effect level 100 000 ppm
Difluoromethane	: Cardiac sensitization Species: dogs Note: No-observed-effect level >350 000 ppm
Repeated dose toxicity Pentafluoroethane	: Species: rat Application Route: Inhalation Exposure time: (4 Weeks) NOEL: 50000 ppm Subchronic toxicity
Difluoromethane	: Species: rat Application Route: Inhalation Exposure time: (90 d) NOEL: 50000 ppm Subchronic toxicity
Genotoxicity in vitro Pentafluoroethane	: Test Method: Ames test Result: negative
Difluoromethane	: Test Method: Ames test Result: negative : Cell type: Human lymphocytes Result: negative

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- : Cell type: Chinese Hamster Ovary Cells
Result: negative
- : Cell type: Human lymphocytes
Result: negative
Method: Mutagenicity (in vitro mammalian cytogenetic test)
- : Test Method: Chromosome aberration test in vitro
Result: negative

**Genotoxicity in vivo
Difluoromethane**

- : Species: mouse
Cell type: Bone marrow
Method: Mutagenicity (micronucleus test)
Result: negative

**Teratogenicity
Pentafluoroethane**

- : Species: rabbit
Application Route: Inhalation exposure
NOAEL, Teratog: 50,000 ppm
NOAEL, Maternal: 50,000 ppm
Note: Did not show teratogenic effects in animal experiments.
- : Species: rat
Application Route: Inhalation exposure
NOAEL, Teratog: 50,000 ppm
NOAEL, Maternal: 50,000 ppm
Note: Did not show teratogenic effects in animal experiments.

Difluoromethane

- : Species: rat
Dose: NOEL - 50,000 ppm
Note: Did not show teratogenic effects in animal experiments.
- : Species: rabbit
Dose: NOEL - 50,000 ppm
Note: Did not show teratogenic effects in animal experiments.

Further information

- : Acute toxicity Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Rapid evaporation of the liquid may cause frostbite. May cause

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cardiac arrhythmia.

SECTION 12. ECOLOGICAL INFORMATION

Biodegradability
Pentafluoroethane : Result: Not readily biodegradable.
Value: 5 %
Method: OECD 301 D

Difluoromethane : Note: Minimal

Further information on ecology

Additional ecological information : This product is subject to U.S. Environmental Protection Agency Clean Air Act Regulations at 40 CFR Part 82. This product contains greenhouse gases which may contribute to global warming. Do NOT vent to the atmosphere. To comply with provisions of the U.S. Clean Air Act, any residual must be recovered.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods : Observe all Federal, State, and Local Environmental regulations.

Note : This product is subject to U.S. Environmental Protection Agency Clean Air Act Regulations Section 608 in 40 CFR Part 82 regarding refrigerant recycling.

SECTION 14. TRANSPORT INFORMATION

DOT UN/ID No. : UN 3163
Proper shipping name : LIQUEFIED GAS, N.O.S.
(Pentafluoroethane, Difluoromethane)

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Class	2.2
Packing group	
Hazard Labels	2.2

IATA	UN/ID No.	: UN 3163
	Description of the goods	: LIQUEFIED GAS, N.O.S. (Pentafluoroethane, Difluoromethane)
	Class	: 2.2
	Hazard Labels	: 2.2
	Packing instruction (cargo aircraft)	: 200
	Packing instruction (passenger aircraft)	: 200

IMDG	UN/ID No.	: UN 3163
	Description of the goods	: LIQUEFIED GAS, N.O.S. (PENTAFLUOROETHANE, DIFLUOROMETHANE)
	Class	: 2.2
	Hazard Labels	: 2.2
	EmS Number	: F-C, S-V
	Marine pollutant	: no

SECTION 15. REGULATORY INFORMATION**Inventories**

US. Toxic Substances Control Act	: On TSCA Inventory
Australia. Industrial Chemical (Notification and Assessment) Act	: On the inventory, or in compliance with the inventory
Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL)	: All components of this product are on the Canadian DSL.
Japan. Kashin-Hou Law List	: On the inventory, or in compliance with the inventory

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Korea. Toxic Chemical Control Law (TCCL) List : On the inventory, or in compliance with the inventory

Philippines. The Toxic Substances and Hazardous and Nuclear Waste Control Act : On the inventory, or in compliance with the inventory

China. Inventory of Existing Chemical Substances : On the inventory, or in compliance with the inventory

NZIOC - New Zealand : On the inventory, or in compliance with the inventory

National regulatory information

SARA 302 Components : SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components : SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards : Acute Health Hazard
Sudden Release of Pressure Hazard

California Prop. 65 : WARNING! This product contains a chemical known to the State of California to cause cancer.
Dichloromethane 75-09-2

Massachusetts RTK : Dichloromethane 75-09-2

New Jersey RTK : Difluoromethane 75-10-5

Pennsylvania RTK : Difluoromethane 75-10-5

WHMIS Classification : A: Compressed Gas

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This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.

Global warming potential : 1,975

Ozone depletion potential (ODP) : 0

SECTION 16. OTHER INFORMATION

	HMIS III	NFPA
Health hazard	: 1	2
Flammability	: 1	1
Physical Hazard	: 0	
Instability	:	0

Hazard rating and rating systems (e.g. HMIS® III, NFPA): This information is intended solely for the use of individuals trained in the particular system.

Further information

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text. Final determination of suitability of any material is the sole responsibility of the user. This information should not constitute a guarantee for any specific product properties.

Changes since the last version are highlighted in the margin. This version replaces all previous versions.

Previous Issue Date: 09/11/2013

Prepared by Honeywell Performance Materials and Technologies Product Stewardship Group

Article Information Sheet (AIS)

This Article Information Sheet (AIS) provides relevant battery information to retailers, consumers, OEMs and others users requesting a GHS-compliant SDS. Articles, such as batteries, are exempt from GHS SDS classification criteria. The GHS criteria is not designed or intended to be used to classify the physical, health and environmental hazards of an article. Branded consumer batteries are defined as electro-technical devices. The design, safety, manufacture, and qualification of branded consumer batteries follow ANSI and IEC battery standards. This document is based on principles set forth in the following hazard communication approaches: ANSI Z-400.1, GHS, JAMP AIS, and IEC 62474.

1. Document Information				
Document Name	Duracell Alkaline Batteries (Major and Specialty Cells)			
Document ID	AIS-ALK			
Issue Date	1-May-15			
Version	1			
Preparer	Global Product Stewardship			
Last Revision	New			
Information Contact	moquet.l@pg.com			
2. Company Information				
Name & Address	P&G Duracell Global Business Unit, 14 Research Drive, Bethel, CT USA 06801			
Telephone	(203) 796- 4430			
Website	www.duracell.com			
Consumer Relations	North America: 1-800-551-2355 (9:00 AM - 5:00 PM EST)			
3. Article Information				
Description	Duracell branded consumer alkaline battery			
Product Category	Electro-technical device			
Use	Portable power source for electronic devices			
Global sub-brands (Retail)	Coppertop, Plus, Quantum, Simply, Turbo, Ultra, Basic, TurboMax			
Global sub-brands (B2B)	Procell, Industrial, OEM/OEA			
Sizes	Major Cells: AA,AAA, C, D & 9V			
Sizes	Specialty Cells: AAAA, MN11, MN21, MN27, MN175, PX76 (LR44), PX28, PX625, (LR09), LR43, LR54, N, J, 4.5V, 625A			
Sizes	Lanterns: MN903, MN908, MN915, MN918; MN1203			
Principles of Operation	A battery powers a device by converting stored chemical energy into electrical energy.			
Representative Product Images				
	Major Cells	Major Cells	Lantern	Specialty
4. Article Construction				
Applicable Battery Industry Standards	ANSI C18.1M Part 1, ANSI C18.1M Part 2, ANSI C18.4, IEC 60086,1, IEC 60086-2, IEC 60086-5			
Electro-technical System	Alkaline Manganese Dioxide			
Electrode - Negative	Zinc (CAS # 7440-66-6)			
Electrode - Positive	Manganese Dioxide (CAS # 1313-13-9)			
Electrolyte	Alkali Metal Hydroxide (aqueous potassium hydroxide - CAS # 1310-58-3)			
Materials of Construction - Can	Nickel Plated Steel			
Declarable Substances (IEC 62474 Criteria 1)	None			
Mercury Free Battery (ANSI C18.4M <500m)	Yes			
Small Cell or Battery (ANSI C18.1M Part 2; IEC 60086-5)	Sizes: AAA and Specialty Cells fit inside a specially designed test cylinder 2.25 inches (57.1mm) long by 1.25 inches (31.70 mm) wide.			
5. Health & Safety				

Article Information Sheet (AIS)

Ingestion/Small Parts Warning	Required for Small Cell or Battery (Sizes: AAA and Specialty Cells): Keep away from children. If swallowed, consult a physician immediately.
Normal Conditions of Use	Exposure to contents inside the sealed battery will not occur unless the battery leaks, is exposed to high temperatures, or is mechanically abused.
Note to Physician	A damaged battery will release concentrated and caustic potassium hydroxide.
First Aid - If swallowed	Do not induce vomiting. Seek medical attention immediately. USA CALLS ONLY - CALL 24-HOUR NATIONAL BATTERY INGESTION HOTLINE: (202) 625-3333 - COLLECT.
First Aid - Eye Contact	Flush with water for at least 15 minutes. Seek medical care if irritation persists.
First Aid - Skin Contact	Remove contaminated clothing. Wash skin with soap and water. Seek medical care if irritation persists.
First Aid - Inhalation	Remove to fresh air.
Battery Safety Standards & Testing	Duracell batteries meet the requirements of ANSI C18. 1M Part 2 and IEC 60086-5. These standards specify tests and requirements for alkaline batteries to ensure safe operation under normal use and reasonably foreseeable misuse. The test regimes assess three conditions of safety. These are: <u>1-Intended use simulation:</u> Partial use, vibration, thermal shock, and mechanical shock <u>2-Reasonably foreseeable misuse:</u> Incorrect installation, external short-circuit, free fall (user-drop), over-discharge, and crush <u>3-Design consideration:</u> Thermal abuse, mold stress
Precautionary Statements	CAUTION: Batteries may explode or leak, and cause burn injury, if recharged, disposed of in fire, mixed with a different battery type, inserted backwards or disassembled. Replace all used batteries at the same time. Do not carry batteries loose in your pocket or purse. Do not remove the battery label. Keep small batteries (i.e., AAA) away from children. If swallowed, consult a physician at once.
6. Fire Hazard & Firefighting	
Fire Hazard	Batteries may rupture or leak if involved in a fire.
Extinguishing Media	Use any extinguishing media appropriate for the surrounding area.
Fires Involving Large Quantities of Batteries	Large quantities of batteries involved in a fire will rupture and release caustic potassium hydroxide. Firefighters should wear self-contained breathing apparatus and protective clothing.
7. Handling & Storage	
Handling Precautions	Avoid mechanical and electrical abuse. Do not short circuit or install incorrectly. Batteries may rupture or vent if disassembled, crushed, recharged or exposed to high temperatures. Install batteries in accordance with equipment instructions.
Storage Precautions	Store batteries in a dry place at normal room temperature. Refrigeration does not make them last longer.
Spills of Large Quantities of Loose Batteries (unpackaged)	Notify spill personnel of large spills. Irritating and flammable vapors may be released from leaking or ruptured batteries. Spread batteries apart to stop shorting. Eliminate all ignition sources. Evacuate area and allow vapors to dissipate. Clean-up personnel should wear appropriate PPE to avoid eye and skin contact and inhalation of vapors or fumes. Increase ventilation. Carefully collect batteries and place in appropriate container for disposal. Remove any spilled liquid with absorbent material and contain for disposal.
8. Disposal Considerations (GHS Section 13)	
Collection & Proper Disposal	Dispose of used (or excess) batteries in compliance with federal, state/provincial and local regulations. Do not accumulate large quantities of used batteries for disposal as accumulations could cause batteries to short-circuit. Do not incinerate. In countries, such as Canada and the EU, where there are regulations for the collection and recycling of batteries, consumers should dispose of their used batteries into the collection network at municipal depots and retailers. They should not dispose of batteries with household trash.

Article Information Sheet (AIS)

USA EPA RCRA (40 CFR 261)	Classified as non-hazardous waste (not ignitable, corrosive, reactive or toxic). Federal Universal Waste Regulations (40 CFR 273) do not apply. State requirements may be more stringent than Federal.
California Universal Waste Rule (Cal. Code Regs. Title 22, Div. 4.5, Ch. 23)	California prohibits disposal of batteries as trash (including household trash).
9. Transport Information (GHS Section 14)	
Regulatory Status	Not regulated. Alkaline batteries (sometimes referred to as "Dry Cell" or "household" batteries) are not listed or regulated as dangerous goods under IATA Dangerous Goods Regulations, ICAO Technical Instructions, IMDG Code, UN Model Regulations, U.S. Hazardous Materials Regulations (49 CFR), and UNECE ADR.
UN Identification Number/ Shipping Name	None - Not Required
Special Provision (SP) Conformance	Special regulatory provisions require batteries to be packaged in a manner that prevents the generation of a dangerous quantity of heat and short circuits. Shippers can prepare batteries by taping the terminals, individually packaging batteries, or otherwise segregating the batteries to prevent risk of creating a short circuit. Batteries shipped in original unopened Duracell packaging is compliant.
US DOT SP	49 CFR 172.102 Special Provision 130
Air Transport (IATA/ICAO) SP	Special Provision A123 (56th Edition - 2015). NOTE: The words "NOT RESTRICTED" and "SPECIAL PROVISION A123" must be included on the description of the substance on the Air Waybill, when air way-bill is issued.
Passenger Air Travel	No restrictions
Emergency Transportation Hotline	CHEMTREC 24-Hour Emergency Response Hotline Within the United States call +703-527-3887 Outside the United States, call +1 703-527-3887 (Collect)
10. Regulatory Information (GHS Section 15)	
10a. Battery Requirements	
USA EPA Mercury Containing & Rechargeable Battery Management Act of 1996	During the manufacturing process, no mercury is added.
EU Battery Directive 2006/66/EC & amendment 2013/56/EU	Compliant with marking and substance restrictions for mercury (<0.0005%); cadmium (<0.0020%) and lead (<0.0040%). Global labels are marked with the special collection symbol and the EU qualifier in accordance with EU Battery Directive 2006/66/EC, Article 11. Paragraph 1 on batteries and accumulators and waste batteries and accumulators
10b. General Requirements	
USA CPSIA 2008 (PL. 11900314)	Exempt
USA CPSC FHSA (16 CFR 1500)	Consumer batteries are not listed as a hazardous product.
USA EPA TSCA Section 13 (40 CFR 707.20)	For customs clearance purpose, batteries are defined as an "Article".
USA EPA RCRA (40 CFR 261)	Classified as non-hazardous waste (not ignitable, corrosive, reactive or toxic). Federal Universal Waste Regulations (40 CFR 273) do not apply. State requirements may be more stringent than Federal.
California Prop 65	No warning required per 3rd party assessment.
CANADA Products Containing Mercury Regulations SOR/20140254	Mercury free
EU REACH SVHC's (161 Substances) Candidate List December 2014)	No listed substances are present (>0.01% w/w)
EU REACH Article 31	SDS is not required consumer alkaline batteries.

Article Information Sheet (AIS)

10c. Regulatory Definitions - Articles

USA OSHA	29 CFR 1910.1200(b)(6)(v)
USA TSCA	40 CFR 704.3; 710.2(3)(c); and [19 CFR 12.1209a]]
EU REACH	Title 1 - Chapter 2 - Article 3(3)
GHS	Section 1.3.2.1

11. Other Information

11a. Certification & 3rd Party Approvals

UL (UTGT2.S50939 Single Multiple Station Smoke Alarms - Component)	AA, 9V Certification Standard: ANSI/UL 217 Single & Multiple Station Smoke Alarms
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11b. AIS Hazard Communication Approaches (consulted in developing this document):

Globally Harmonized System (GHS)	GHS SDS requirements and classification criteria do not apply to articles or products (such as batteries) that have a fixed shape, which are not intended to release a chemical. The article exemption is found in Section 1.3.2.1.1 of the GHS and reads: <i>"The GHS applies to pure substances and their dilute solutions and to mixtures. "Articles" as defined by the Hazard Communication Standard (29 CFR 1900.1200) of the OSHA of the USA, or by similar definition, are outside the scope of the system."</i>
Joint Article Management Promotion Consortium JAMP	JAMP is a Japanese Industry Association who developed the concept of an Article Information Sheet as a supply chain tool to share and communicate chemical information in articles. The AIS authoring process is based on "declarable" substances to meet global regulatory requirements as well as substances to be reported by GADSL, JIG, etc.
IEC 62474 Ed. 1.0 B:2012 Material Declaration for Products of and for the Electro-technical Industry	An international standard that came into effect in March 2012 concerning declaration for electrical and electronic products. IEC 6274 replaces the defunct Joint Industry Guide – Material Declaration for Electro-technical Products (JIG-101-Ed 4.1 (May 21, 2012)
IEC 62474 Database - Publically available online (maintained by TC11: Environmental Standardization for electrical and electronic products and systems.	The general principle for a substance to be included in the database as a declarable substance is: 1) existing national laws or regulations in an IEC member country that are relevant to Electro-technical products and that prohibit or restrict substances, or that have a labeling, communication, reporting or notification requirement, and 2) applying IEC 62474 criteria results in identification of declarable substance.
ANSI Z 400.1/Z19.1 (2010)	2.1 Scope: Applies to preparation of SDSs for hazardous chemicals used under occupational conditions. Does not address how the standard may be applied to articles. It presents basic information on how to develop and write a SDS. Additional information is provided to help comply with state and federal environmental and safety laws and regulations. Elements of the standard may be acceptable for International use.

DISCLAIMER: This AIS is intended to provide a brief summary of our knowledge and guidance regarding the use of this material. The information contained here has been compiled from sources considered by Procter & Gamble to be dependable and is accurate to the best of the Company's knowledge. It is not meant to be an all-inclusive document on worldwide hazard communication regulations. This information is offered in good faith. Each user of this material needs to evaluate the conditions of use and design the appropriate protective mechanisms to prevent employee exposures, property damage or release to the environment. Procter & Gamble assumes no responsibility for injury to the recipient or third persons or for any damage to any property resulting from misuse of the product.