

**CHAPTER**

**21**

**AIR CONDITIONING**



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**ILLUSTRATED TOOL AND EQUIPMENT MANUAL**

**CHAPTER 21**  
**AIR CONDITIONING**

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**PART NUMBER: A21004-1**

**NAME:** TEST BOX - CURRENT SENSOR FAN, ENVIRONMENTAL CONTROL SYSTEM

**AIRPLANE MAINTENANCE:** NO

**COMPONENT MAINTENANCE:** YES

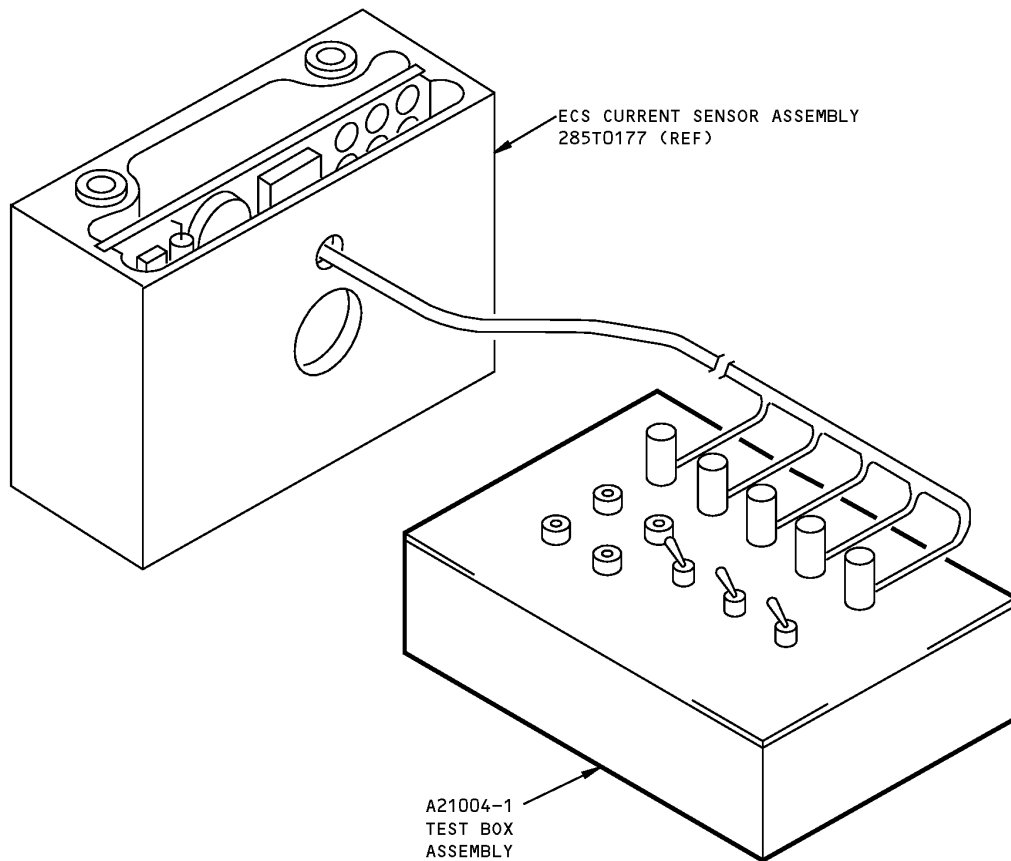
**USAGE & DESCRIPTION:** The A21004 drawing has been transferred to BAE Systems and will no longer be revised by Boeing. The A21004 inclusion in the 767 ITEM is for information and historical purposes only.

This tool is used to test the current sensor assembly, 285T0177-1 and -3, on all 767 Environmental Control System (ECS) fan. Refer to CMM 21-25-51 for further usage instructions. This tool consists of a panel, wires (as required), a chassis assembly, toggle switches, resistors, banana jacks, binding posts and rubber bumpers.

**WEIGHT:** 1 lb (0.45 kg)

**DIMENSIONS:** 2 x 5 x 7 inches (51 x 127 x 178 mm)

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**Environmental Control System (ECS) Current Sensor Fan Test Box**  
**Figure 1**

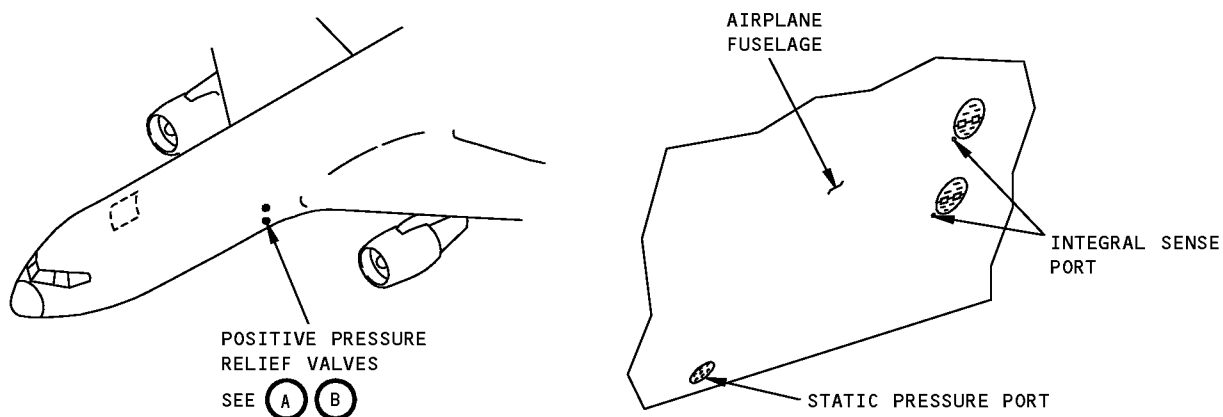


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## ILLUSTRATED TOOL AND EQUIPMENT MANUAL

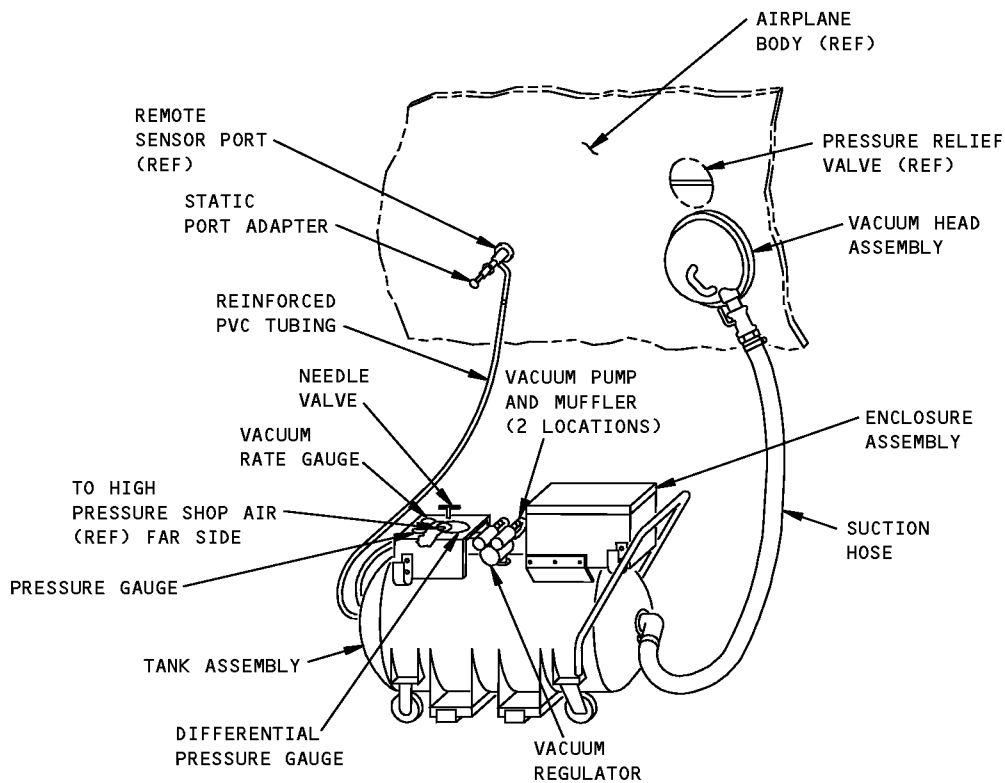
<b>I</b>	<b>PART NUMBER:</b> <u>A21010-57, -69, -70, -72,</u>
<b>NAME:</b>	VACUUM TANK - PRESSURE RELIEF VALVE TEST
<b>AIRPLANE MAINTENANCE:</b>	YES
<b>COMPONENT MAINTENANCE:</b>	NO
<b>I USAGE &amp; DESCRIPTION:</b>	The A21010-57, -69, -70 or -72 (preferred) pressure relief valve test equipment is used on all 767 airplanes. The vacuum tank assembly is used to test pressure relief valves. A21010-70 may be worked into the A21010-72 by replacing A21010-66 with A21010-74 and adding 33410LH-125-4. Refer to AMM 21-32-01 and current A21010 drawing for complete usage instructions. A21010 consists of an enclosure assembly, a vacuum head assembly, a tank assembly, a static port adapter, two vacuum pumps, a suction hose, a pressure gage, a differential pressure gage, a vacuum rate gage, two mufflers, a vacuum regulator, and associated hardware.
<b>I WEIGHT:</b>	430 lbs (195 kg)
<b>DIMENSIONS:</b>	22 x 39 x 66 inches (559 x 991 x 1676 mm)
<b>I <u>NOTE:</u></b>	A21010-72 replaces A21010-70 for future procurement. A21010-70 replaces A21010-69 for future procurement. A21010-70 replaces A21010-57 for future procurement. A21010-69 supersedes A21010-63.

**ILLUSTRATED TOOL AND EQUIPMENT MANUAL**



**POSITIVE PRESSURE RELIEF VALVES**

**(A)**



**(B)**

**Pressure Relief Valve Test Vacuum Tank  
Figure 1**



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## **ILLUSTRATED TOOL AND EQUIPMENT MANUAL**

**PART NUMBER: A21008-1**

**NAME:** HOLD OPEN SET - CABIN AIR OUTFLOW, 767

**AIRPLANE MAINTENANCE:** YES

**COMPONENT MAINTENANCE:** NO

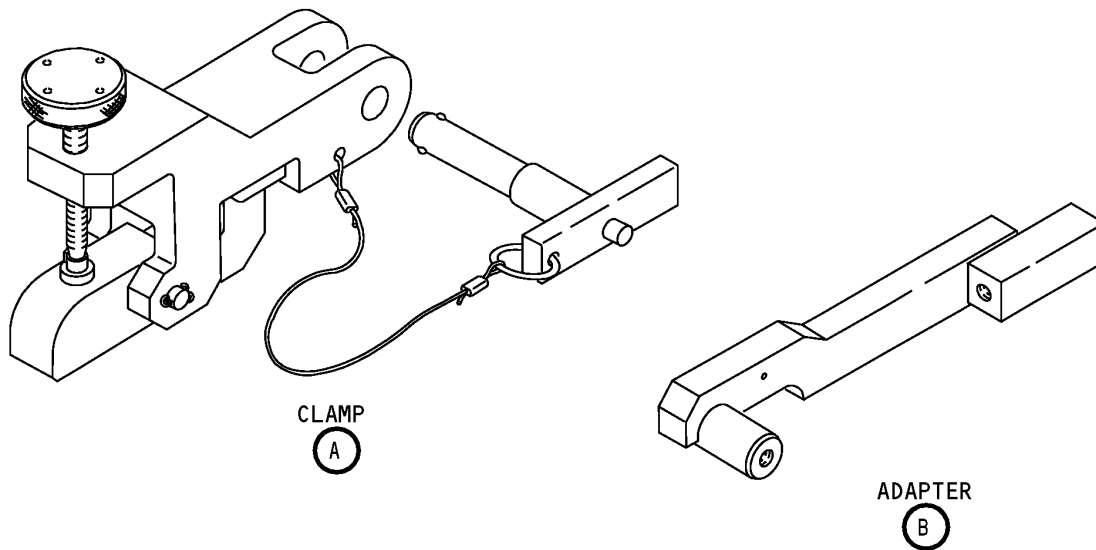
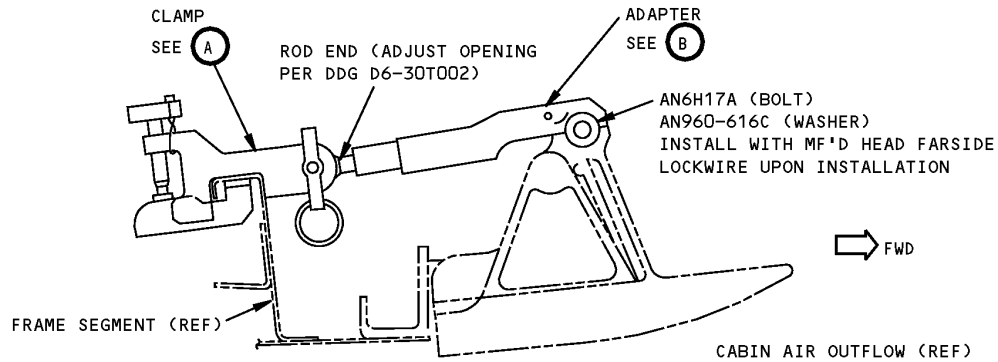
**USAGE & DESCRIPTION:** This tool is used to allow a 767 airplane to be dispatched with the cabin air outflow valve inoperative. Usage of the tool is explained in "Dispatch Deviation Guide D6-30T002".

**WEIGHT:** 3 lbs (1.4 kg)

**DIMENSIONS:** 12 x 3 x 1 inches (305 x 76 x 25 mm)



# ILLUSTRATED TOOL AND EQUIPMENT MANUAL



767 Cabin Air Outflow Hold Open Set  
Figure 1



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## ILLUSTRATED TOOL AND EQUIPMENT MANUAL

**PART NUMBER: A21014-1**

**NAME:** LOCK - HOLD OPEN, OUTFLOW VALVE

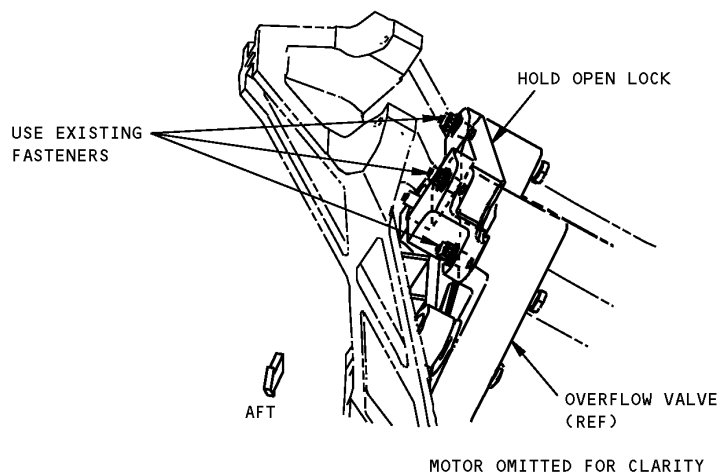
**AIRPLANE MAINTENANCE:** YES

**COMPONENT MAINTENANCE:** NO

**USAGE & DESCRIPTION:** This tool is used to lock the outflow valve in the full open position which allows the airplane to be dispatched for unpressurized flight with the outflow valve inoperative. Refer to AMM 21-00-00 for further usage instructions. This tool is used on 767-400 airplanes. This tool consists of a hold open lock and a storage box assembly.

**WEIGHT:** 1 lb (0.45 kg)

**DIMENSIONS:** 2 x 2 x 10 inches (51 x 51 x 254 mm)



**Outflow Valve Hold Open Lock  
Figure 1**



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## **ILLUSTRATED TOOL AND EQUIPMENT MANUAL**

**PART NUMBER: A21001-44, -45**

**NAME:** HOIST ADAPTERS - AIR CONDITIONING PACK

**AIRPLANE MAINTENANCE:** YES

**COMPONENT MAINTENANCE:** NO

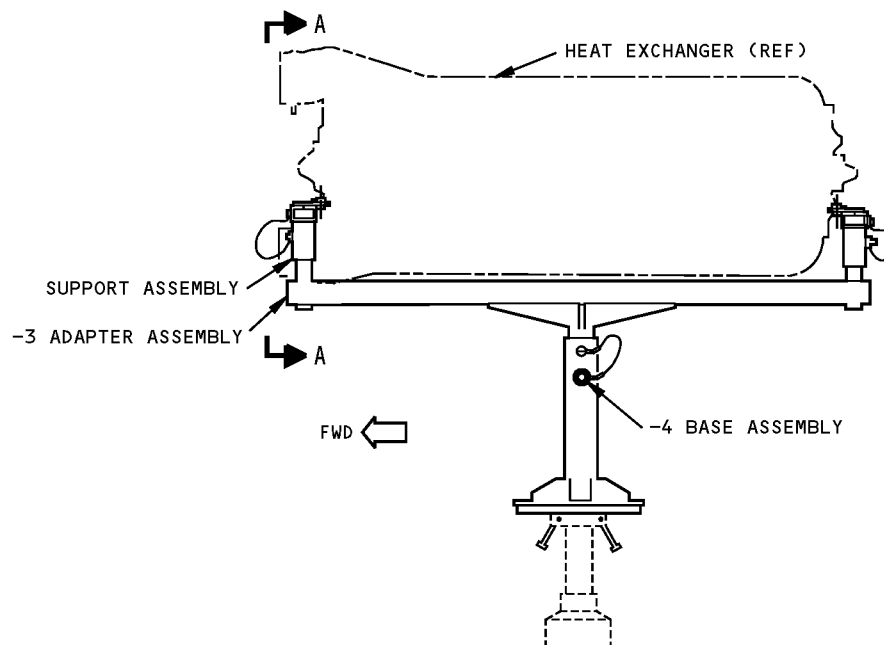
**USAGE & DESCRIPTION:** These hoist adapters are added to a customer furnished jack or A71015 Engine Accessory Lift Fixture and used to remove and install the air cycle pack heat exchanger. The -44 is used with applicable Hein-Werner or Blackhawk jack. The -45 is used with A71015 Engine Accessory Hoist Fixture. This tool is used on 767-200 and -300 airplanes. The -44 consists of a -48 adapter assembly, a -3 adapter assembly, a -4 base assembly and related hardware. The -45 consists of a -46 adapter assembly, a -36 adapter assembly and related hardware.

**WEIGHT:** A21001-44 - 50 lbs (23 kg)  
A21001-45 - 33 lbs (15 kg)

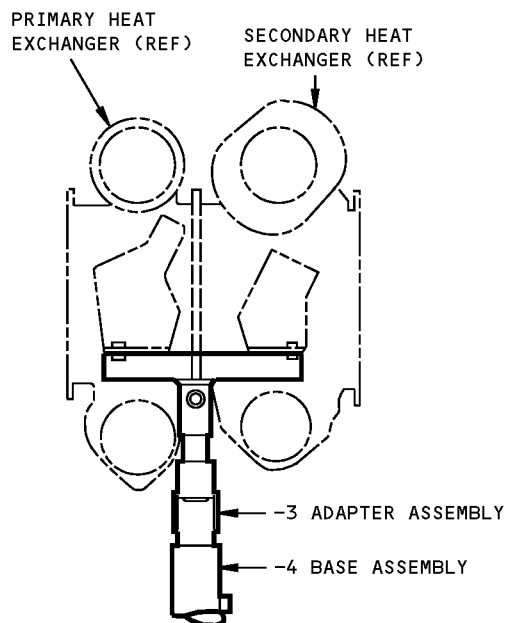
**DIMENSIONS:** A21001-44  
A21001-48 - 10 x 16 x 24 inches (254 x 406 x 610 mm)  
A21001-3 - 11 x 26 x 45 inches (279 x 660 x 1143 mm)  
A21001-4 - 10 x 10 x 14 inches (254 x 254 x 356 mm)  
  
A21001-45  
A21001-46 - 11 x 11 x 16 inches (279 x 279 x 406 mm)  
A21001-36 - 6 x 9 x 45 inches (152 x 229 x 1143 mm)

**NOTE:** A21001-44 supersedes A21001-1.  
A21001-45 supersedes A21001-34.

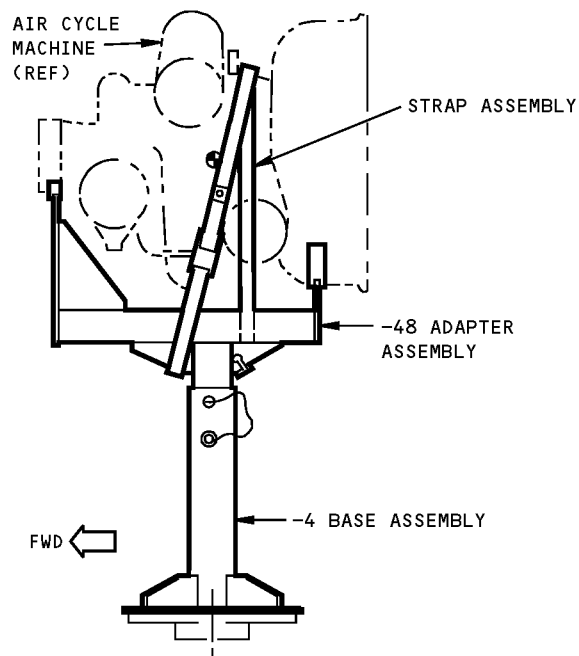
**ILLUSTRATED TOOL AND EQUIPMENT MANUAL**



**USAGE: JACKING HEAT EXCHANGER  
(LEFT SIDE VIEW)**



**USAGE: JACKING HEAT EXCHANGER  
A-A**

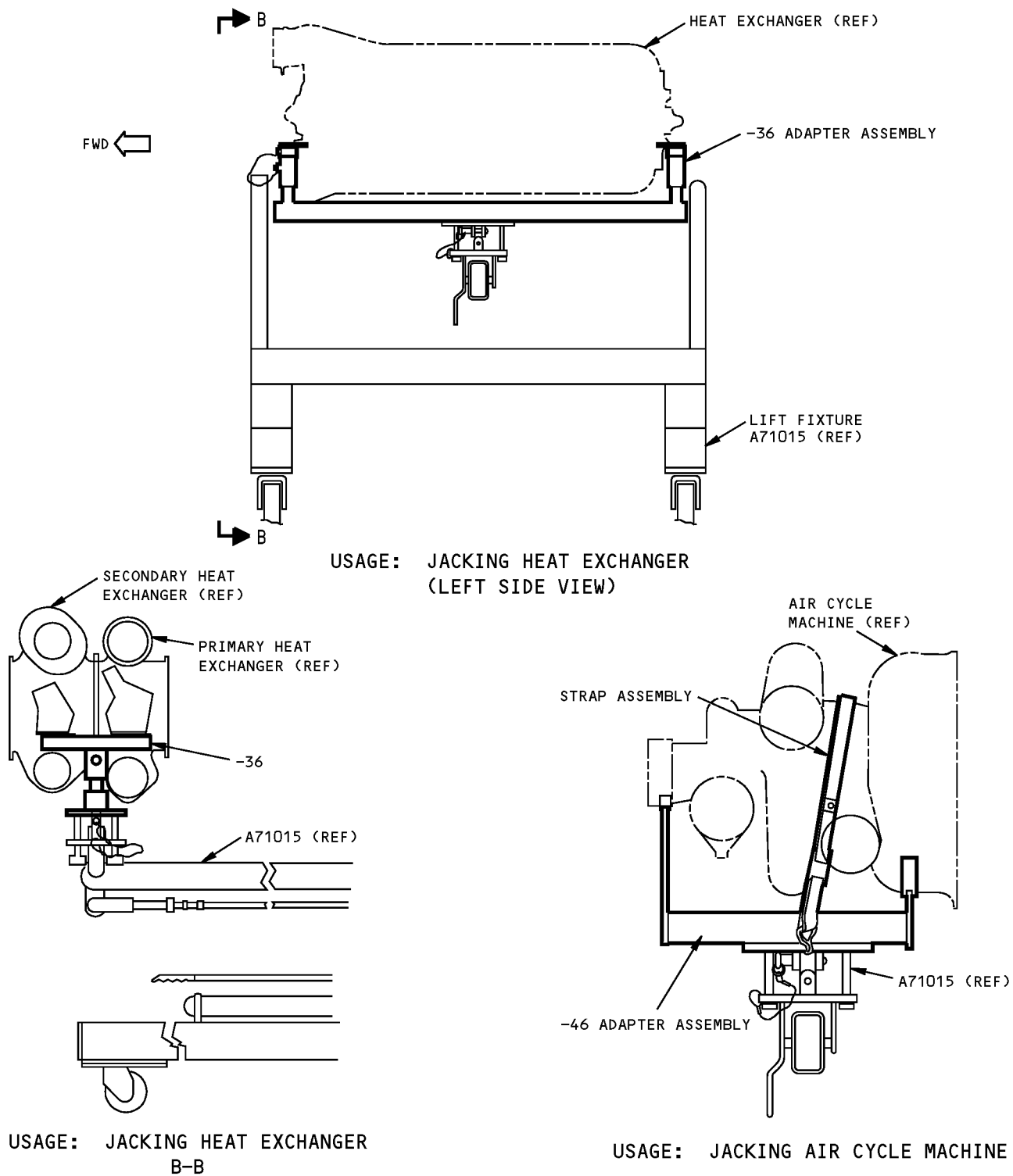


**USAGE: JACKING AIR CYCLE MACHINE**

**A21001-44 HOIST ADAPTER**

**Air Conditioning Pack Hoist Adapter - A21001-44  
Figure 1**

**ILLUSTRATED TOOL AND EQUIPMENT MANUAL**



A21001-45 HOIST ADAPTER

**Air Conditioning Pack Hoist Adapter - A21001-45**

**Figure 2**



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## ILLUSTRATED TOOL AND EQUIPMENT MANUAL

**PART NUMBER: A21002-1**

**NAME:** REMOVAL/INSTALLATION EQUIPMENT - AVIONICS COOLING REFRIGERATION UNIT

**AIRPLANE MAINTENANCE:** YES

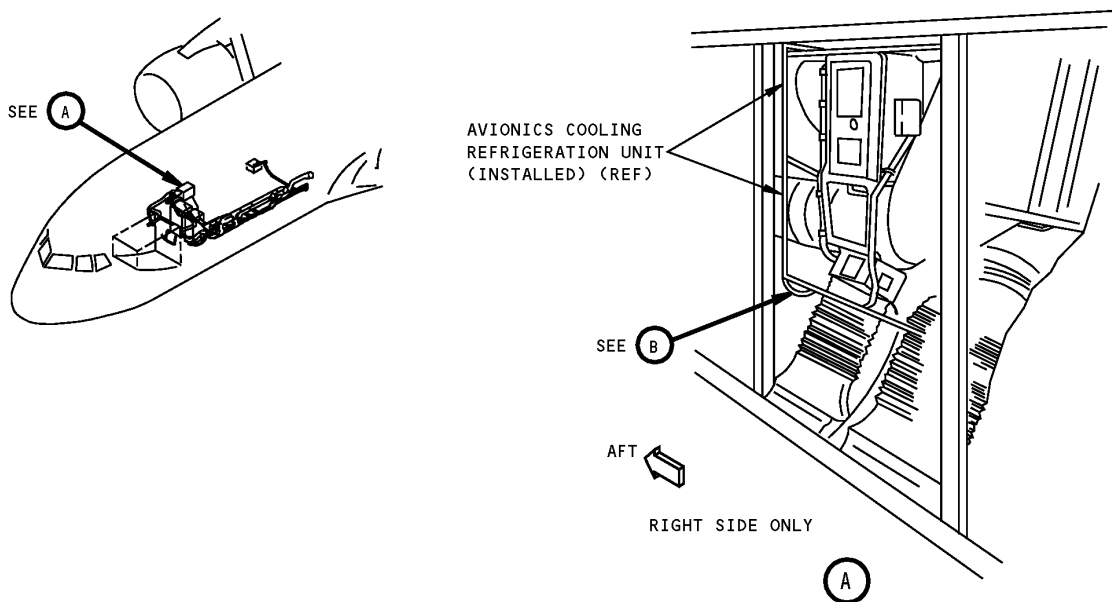
**COMPONENT MAINTENANCE:** NO

**USAGE & DESCRIPTION:** This equipment is used to remove/install the avionics cooling refrigeration unit (ACRU) located in the forward cargo compartment. Refer to AMM 21-58-00 for further usage instructions. This tool is used on 767-200/-300 airplanes. The tool consists of a ramp beam assembly, a ramp support assembly, turnbuckle assemblies and a pallet assembly. During removal, the ramp beam assembly slides under the ACRU and turnbuckle assemblies remove the load from the attach points. The ACRU is detached and lowered onto the ramp then rotated onto the component pallet assembly for transit.

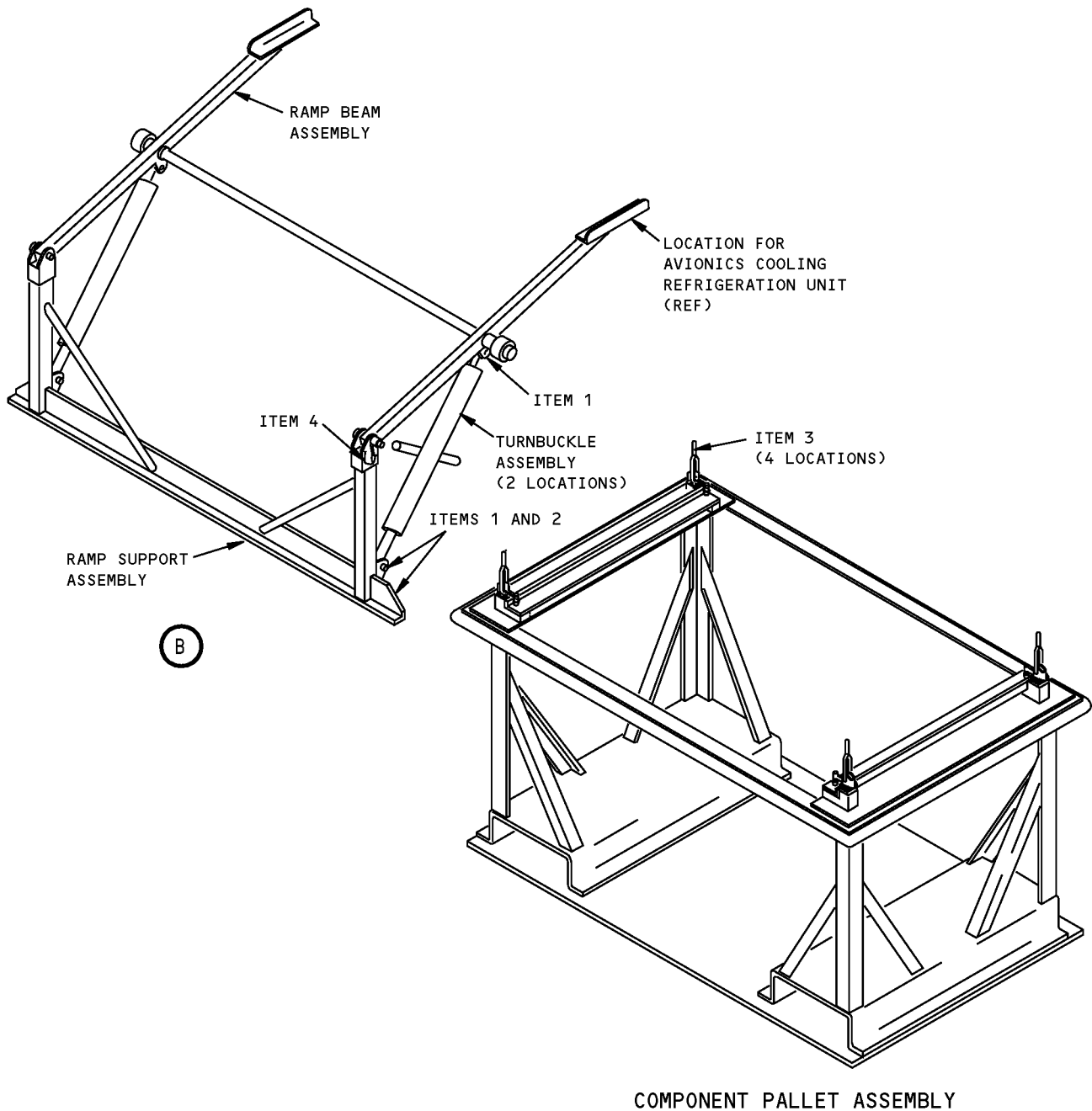
**NOTE:** The Avionics Cooling Refrigeration Unit was initially offered as an option on the early model 767-200/-300 airplanes. This unit is not used on later production airplanes.

**WEIGHT:** 53 lbs (24 kg)

**DIMENSIONS:** 26 x 29 x 48 inches (660 x 737 x 1219 mm)



**Avionics Cooling Refrigeration Unit Location  
Figure 1**



**Avionics Cooling Refrigeration Unit Removal/Installation Equipment**  
**Figure 2**





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## ILLUSTRATED TOOL AND EQUIPMENT MANUAL

REPAIRABLE/REPLACEABLE PARTS			
ITEM NO.	PART NO.	NOMENCLATURE	VENDOR CODE
1	NAS1336C5C12D	BALL LOCKPIN	
2	CL-22-KA-10-LR	LANYARD	V99862
3	52010	CLAMP	V71913
4	NAS1336C5C16D	BALL LOCKPIN	



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## **ILLUSTRATED TOOL AND EQUIPMENT MANUAL**

**PART NUMBER: A21012-1**

**NAME:** TEST GAUGE - INSTRUMENT COOLING MONITOR SYSTEM

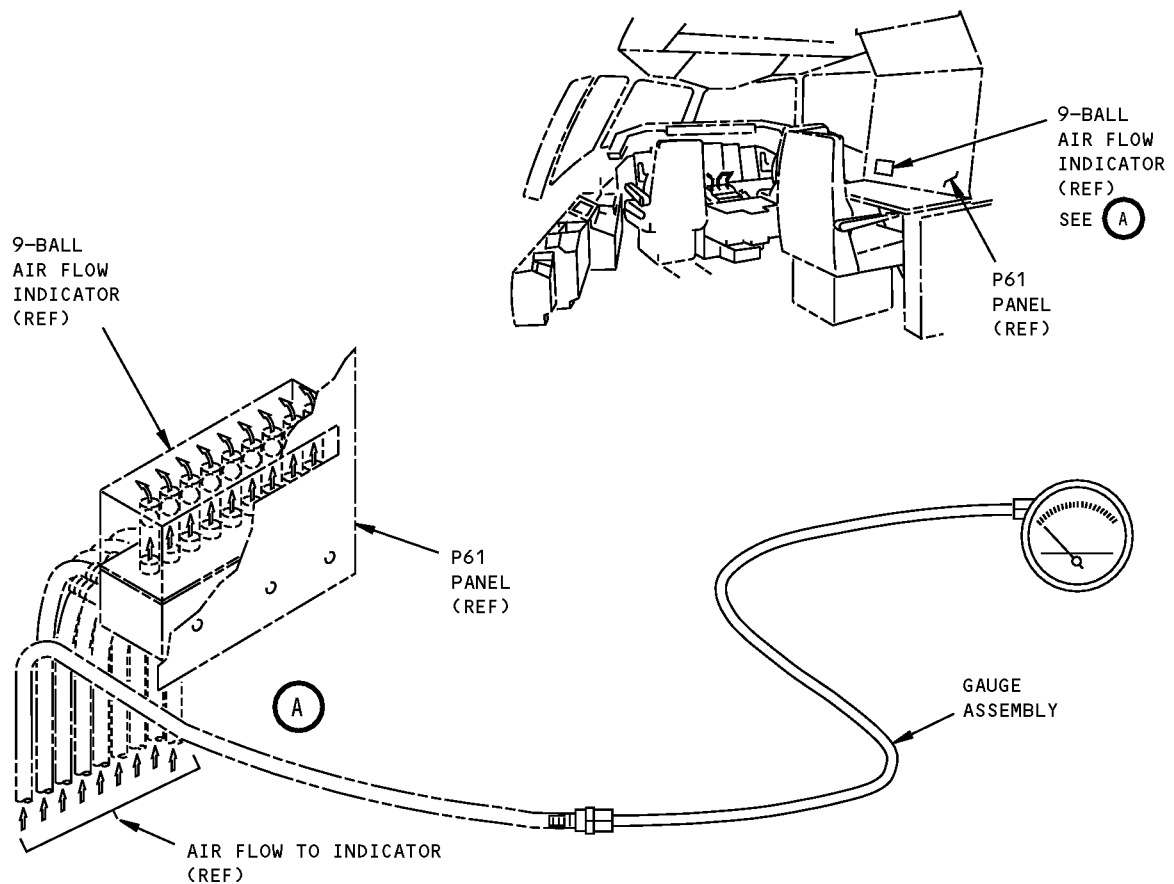
**AIRPLANE MAINTENANCE:** YES

**COMPONENT MAINTENANCE:** NO

**USAGE & DESCRIPTION:** This tool is used to measure the instrument cooling monitor system air pressure. Verification of adequate air pressure allows dispatch of airplane for extended range operation with the instrument cooling monitor system inoperative. This tool consists of a gauge assembly and a storage box. Refer to AMM 21-58-34 and the Dispatch Deviations Guide 2-21-58-12.0 for further usage information.

**WEIGHT:** 2 lbs (1 kg) (excluding box)

**DIMENSIONS:** 3 x 5 x 10 inches (76 x 127 x 254 mm) (excluding box)



**Instrument Cooling Monitor System Test Gauge  
Figure 1**



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## ILLUSTRATED TOOL AND EQUIPMENT MANUAL

**PART NUMBER: A21007-1**

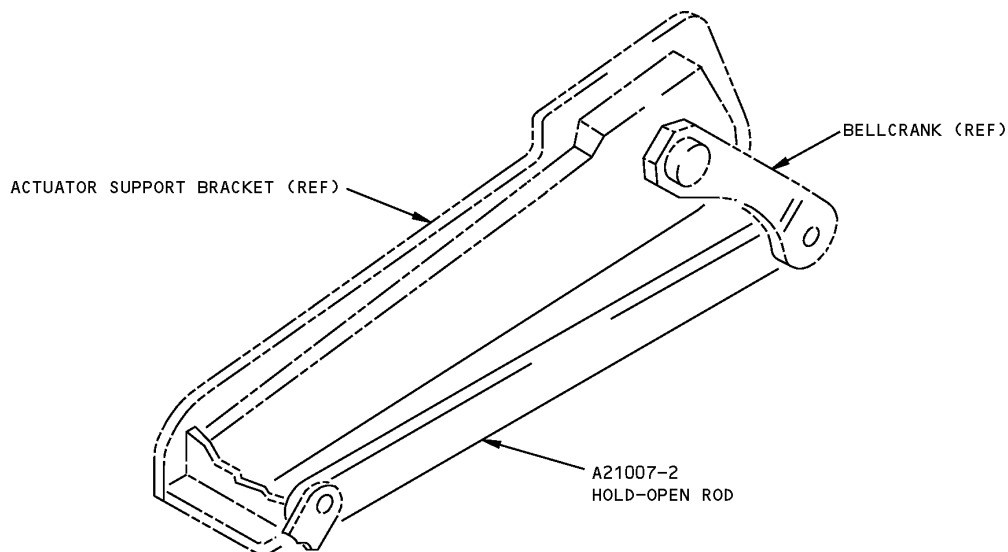
**NAME:** HOLD-OPEN ROD - RAM AIR DOOR, FLIGHT DISPATCH

**AIRPLANE MAINTENANCE:** YES

**COMPONENT MAINTENANCE:** NO

**USAGE & DESCRIPTION:** This tool is used to lock ram air inlet and exhaust doors in fully open position. Usage is covered in document D6-30T002 "Dispatch Deviation DDG 21-53-1 Guide". This tool is used on 767-200, -200ER, -300 and -300ER airplanes. This tool is not used on 767-400. 767-400 does not have arm air exit doors or actuators. The 767-400 ram air inlet door actuator incorporates an integral fixed link that is equivalent to the A21007 hold open rod for locking the arm air inlet door in the open position. Refer to AMM 21-53-03, configuration 2 for the 767-400 arm air inlet configuration. The tool consists of a -2 bar assembly and a -3 box assembly.

**DIMENSIONS:** 1 x 4 x 13 inches (25 x 102 x 330 mm)



**Flight Dispatch Ram Air Door Hold-Open Rod  
Figure 1**



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## ILLUSTRATED TOOL AND EQUIPMENT MANUAL

**PART NUMBER: A21009-1**

**NAME:** BLANKING PLATE - EQUIPMENT COOLING MONITOR

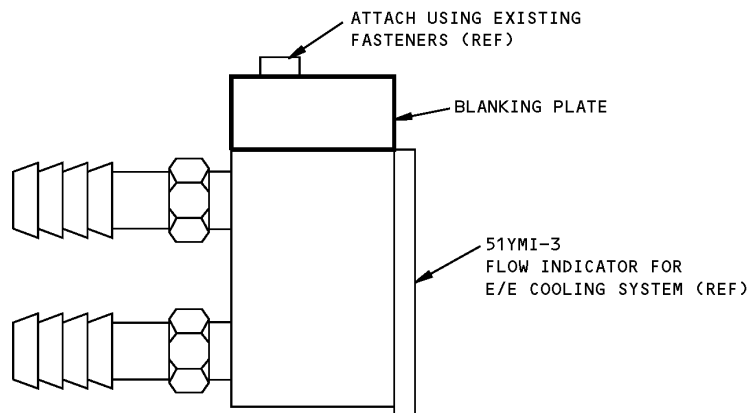
**AIRPLANE MAINTENANCE:** YES

**COMPONENT MAINTENANCE:** NO

**USAGE & DESCRIPTION:** This tool is used to cover the lower portion of the equipment cooling monitor indicator when the upper portion is removed to restrict debris from entering the monitor and to allow the equipment cooling system to operate when the indicator is removed for cleaning. See AMM 21-58-34 for complete usage information. The tool consists of a -2 storage box assembly and a -3 blanking plate.

**WEIGHT:** 1 lb (0.45 kg) (excluding box)

**DIMENSIONS:** 3.5 x 4 x 8 inches (89 x 102 x 203 mm) (with storage box)



**Equipment Cooling Monitor Blanking Plate  
Figure 1**



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## **ILLUSTRATED TOOL AND EQUIPMENT MANUAL**

**PART NUMBER: B21005-1, -10**

**NAME:** CLEANING WAND EQUIPMENT - HEAT EXCHANGER

**AIRPLANE MAINTENANCE:** YES

**COMPONENT MAINTENANCE:** NO

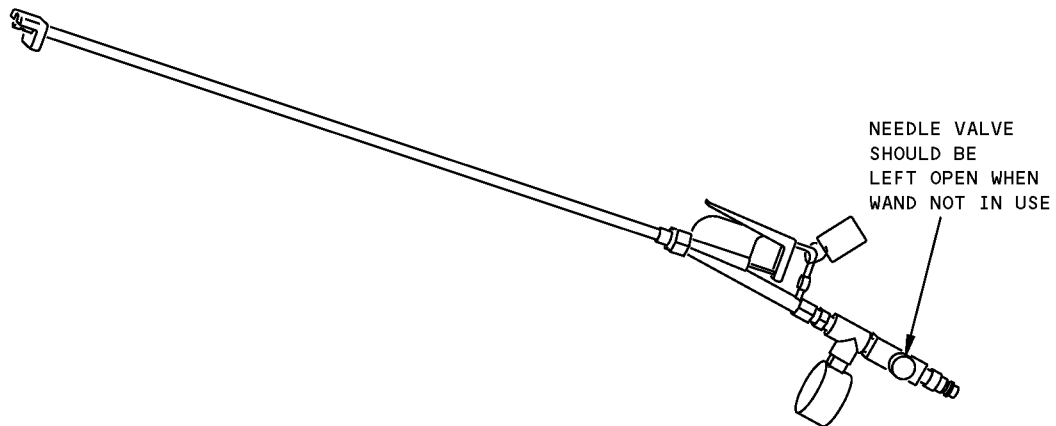
**USAGE & DESCRIPTION:** This tool is used for in-site cleaning of the secondary heat exchanger. This tool is used on Allied Signal heat exchangers on 767-200 and -300 only. The 767-400 has Hamilton-Standard air conditioning packs (No equivalent tool is required). Refer to AMM 21-51-02 for complete usage instructions. The -1 tool consists of a -2 outlet plenum cleaning wand and a -3 inlet cleaning wand and -4 storage box assembly. The -10 tool consists of a -11 outlet plenum cleaning wand and a -3 inlet cleaning wand and a -16 storage box assembly.

**WEIGHT:** 5 lbs (2.3 kg) (excluding box)

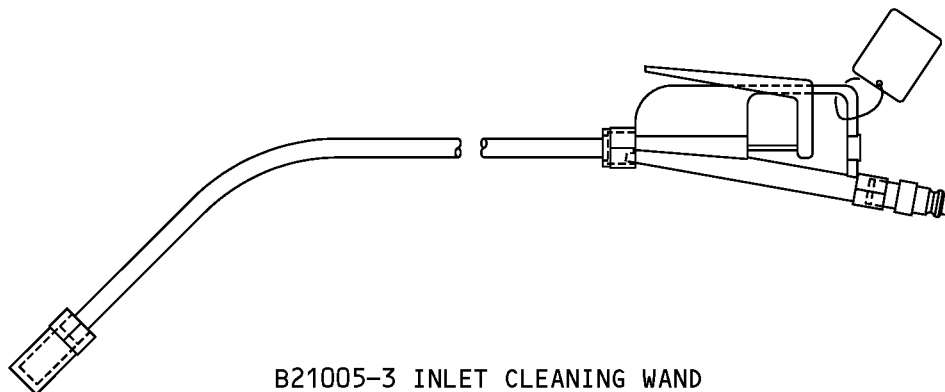
**DIMENSIONS:** 12 x 36 inches (305 x 914 mm) (excluding box)

**NOTE:** B21005-10 replaces B21005-1 for future procurement.

## ILLUSTRATED TOOL AND EQUIPMENT MANUAL



B21005-2 OUTLET CLEANING WAND (SHOWN)  
B21005-11 OUTLET CLEANING WAND (SIMILIAR)



Heat Exchanger Cleaning Wand Equipment  
Figure 1



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## ILLUSTRATED TOOL AND EQUIPMENT MANUAL

**PART NUMBER: A21011-1, -6**

**NAME:** TEST EQUIPMENT - LOW LIMIT VALVE

**AIRPLANE MAINTENANCE:** YES

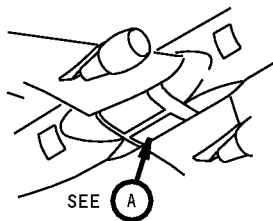
**COMPONENT MAINTENANCE:** NO

**USAGE & DESCRIPTION:** This equipment is used to perform the air conditioning low limit control valve LLCV pneumatic check. It is used in conjunction with a customer furnished air source (15 PSI minimum). This equipment only applicable for Allied-Signal LLCV installed on 767-200 and -300 airplanes. This equipment is not applicable for Hamilton-Standard LLCV installed on 767-400 airplanes. Refer to AMM 21-51-11 for further usage instructions. The -1 consists of one -2 low pressure gauge assembly, one -3 high pressure gauge assembly and a -4 storage box assembly. The -6 consists of one -7 gauge assembly, one -8 gauge assembly and a -9 storage box assembly.

**WEIGHT:** 5 lbs (2.3 kg) (excluding box)

**DIMENSIONS:** 5 x 10 x 10 inches (127 x 254 x 254 mm) (excluding box)

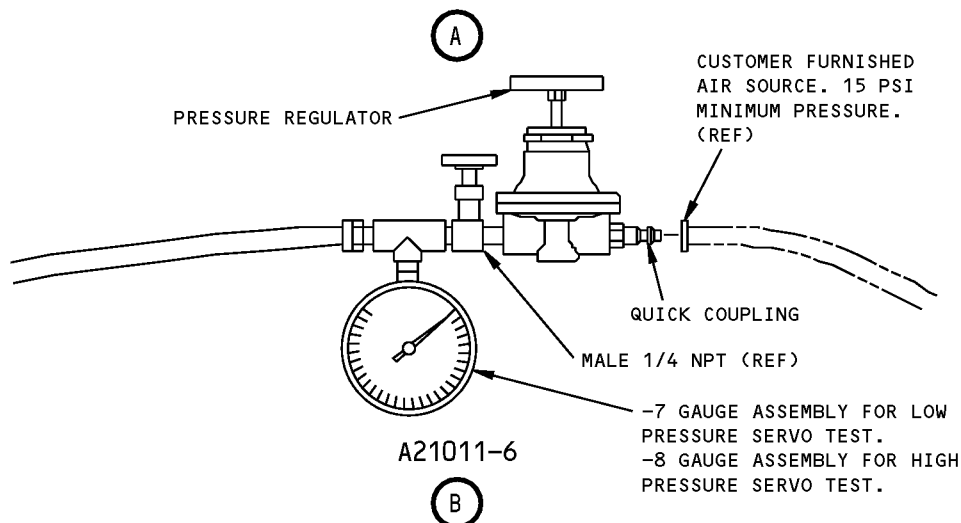
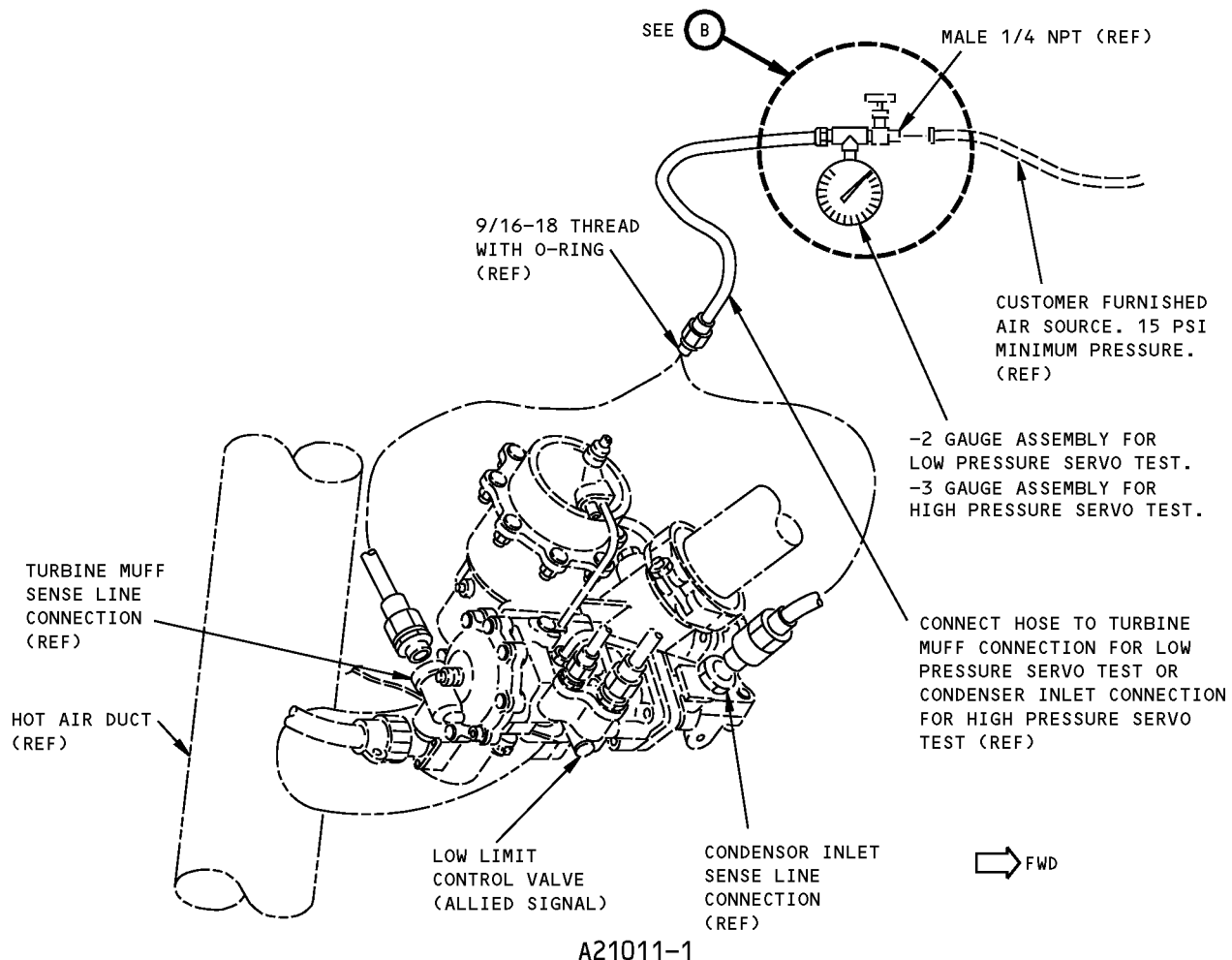
**NOTE:** A21011-6 replaces A21011-1 for future procurement.



**Air Conditioning Low Limit Control Valve Location  
Figure 1**



## ILLUSTRATED TOOL AND EQUIPMENT MANUAL



Low Limit Control Valve Test Equipment  
Figure 2



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## ILLUSTRATED TOOL AND EQUIPMENT MANUAL

**PART NUMBER: A21013-50**

**NAME:** HOIST ADAPTER EQUIPMENT - AIR CONDITIONING PACK

**AIRPLANE MAINTENANCE:** YES

**COMPONENT MAINTENANCE:** NO

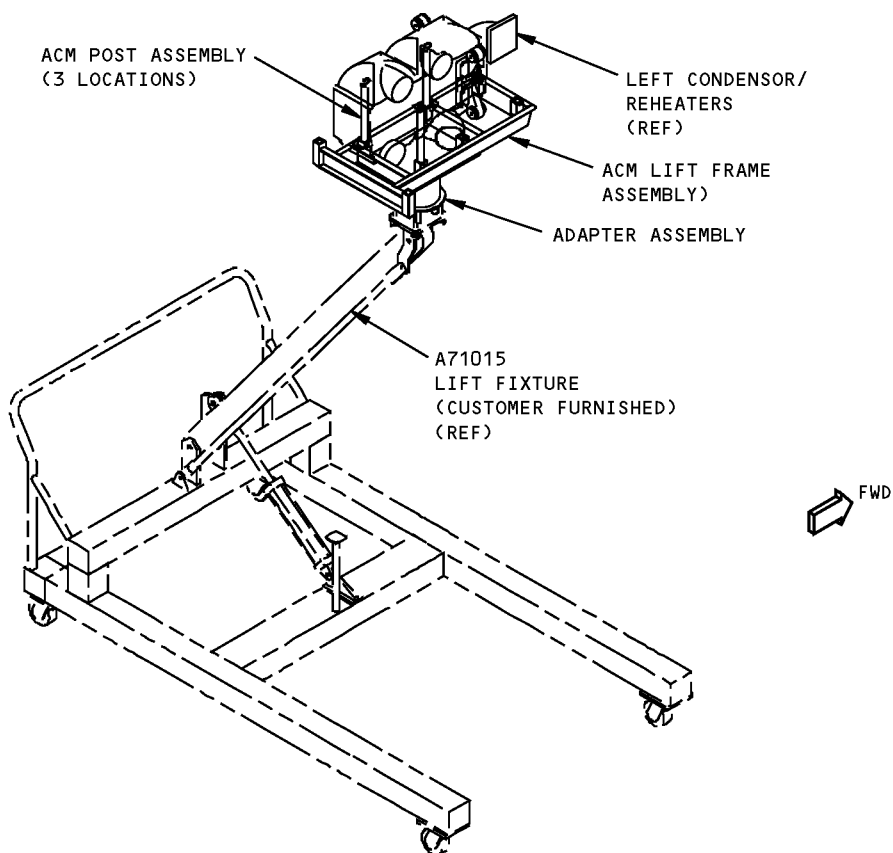
**USAGE & DESCRIPTION:** This tool is used to remove and install air conditioning pack components; air cycle machines, condensor/reheaters, and heat exchangers. This tool is used in conjunction with A71015 Lift Fixture-Engine Accessory. Refer to AMM 21-51-03, AMM 21-51-30, AMM 21-51-31, AMM 21-51-34 and AMM 21-51-50 for further usage instructions. This tool is used on the 767-400 airplanes only. This tool consists of the following:

QUANTITY	NOMENCLATURE	PART NUMBER
1	ADAPTER ASSEMBLY	A21013-2
1	AIR CYCLE MACHINE LIFT FRAME ASSEMBLY	A21013-3
1	HX LIFT FRAME ASSEMBLY	A21013-4
3	AIR CYCLE MACHINE POST ASSEMBLY	A21013-5
1	INBOARD HX POST ASSEMBLY	A21013-52
1	OUTBOARD HX POST ASSEMBLY	A21013-51
1	SOCKET ASSEMBLY	A21013-7
1	WING BOLT ASSEMBLY	A21013-8
6	BOLT	A21013-10
8	NUT	A21013-11
14	WASHER	A21013-12
1	SPANNER WRENCH	A21013-44
1	COVER	A21013-48
1	STORAGE BOX ASSEMBLY	A21013-9

**WEIGHT:** 63 lbs (29 kg)

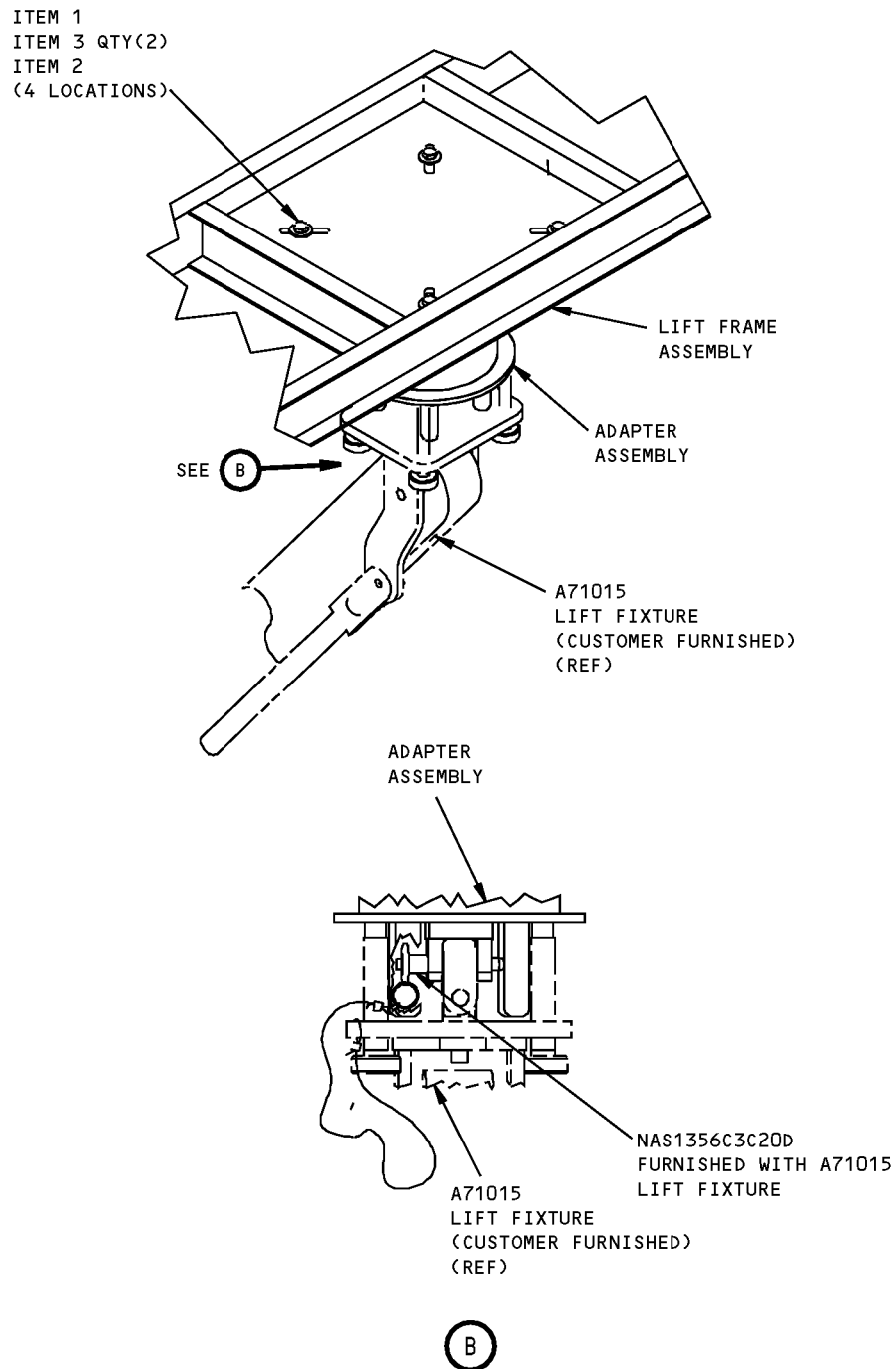
**DIMENSIONS:** 10 x 20 x 62 inches (254 x 508 x 1575 mm)

**NOTE:** A21013-50 supersedes A21013-1



**Air Conditioning Pack Hoist Adapter Equipment**  
**Figure 1 (Sheet 1 of 2)**

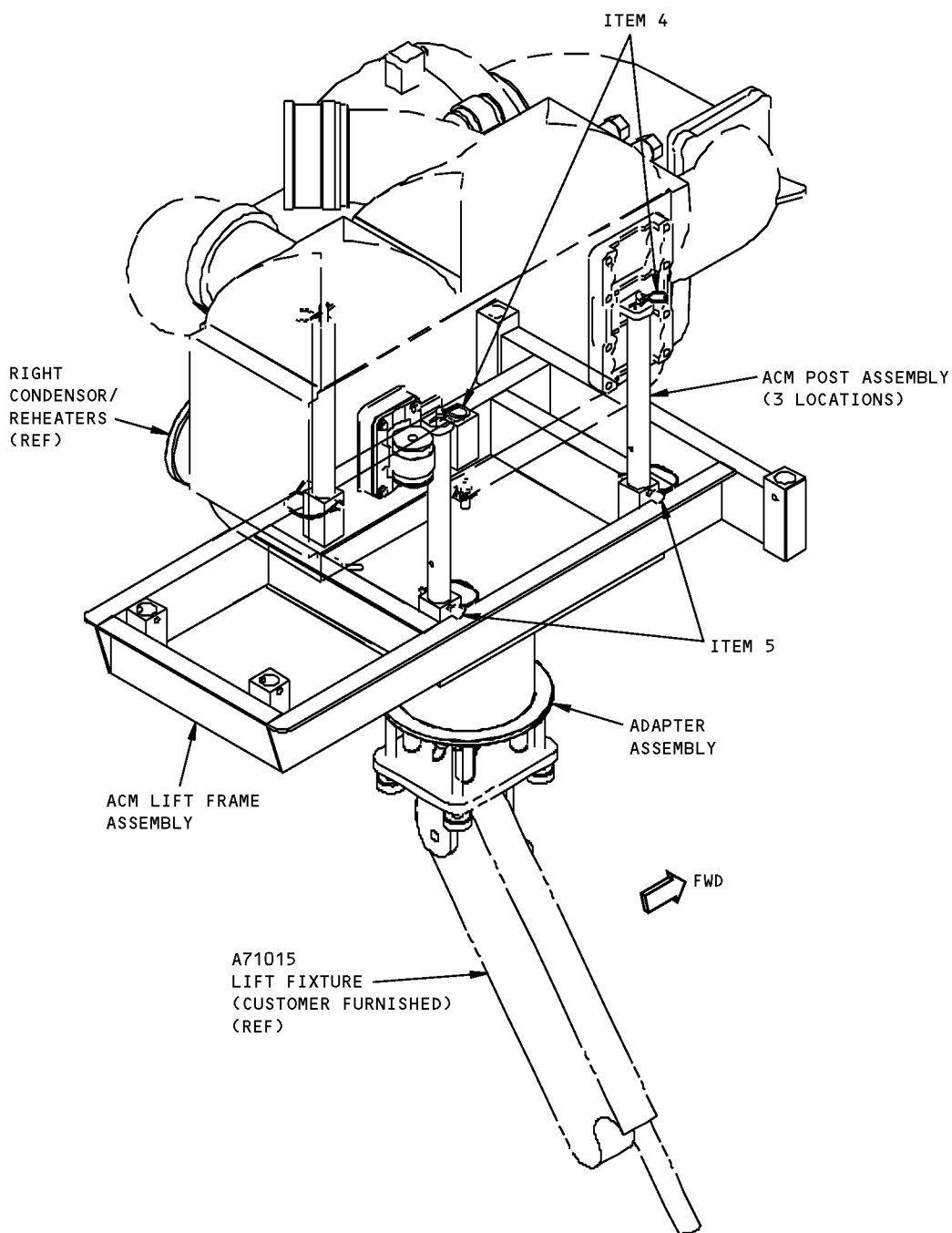
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**ILLUSTRATED TOOL AND EQUIPMENT MANUAL**



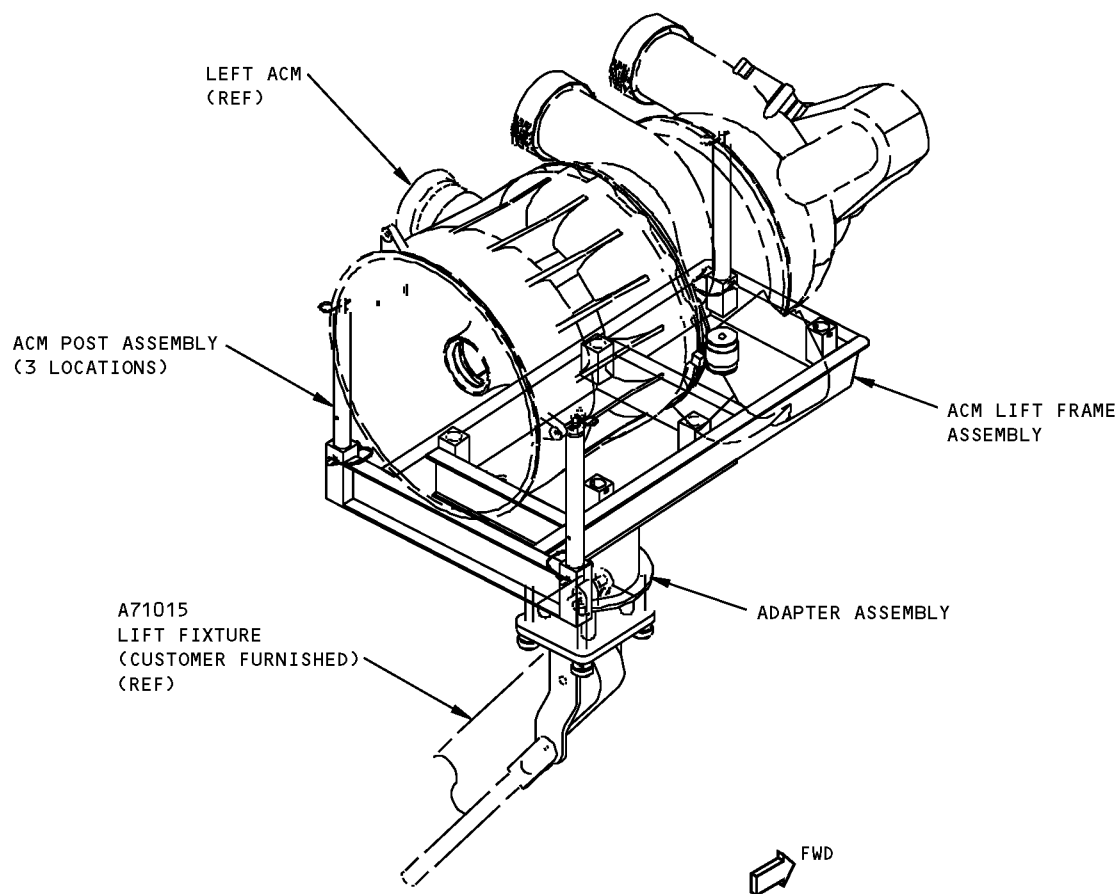
**NOTE:** TYPICAL ADAPTER TO LIFT FRAME ATTACHMENT.

**Air Conditioning Pack Hoist Adapter Equipment**  
**Figure 1 (Sheet 2 of 2)**

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**ILLUSTRATED TOOL AND EQUIPMENT MANUAL**

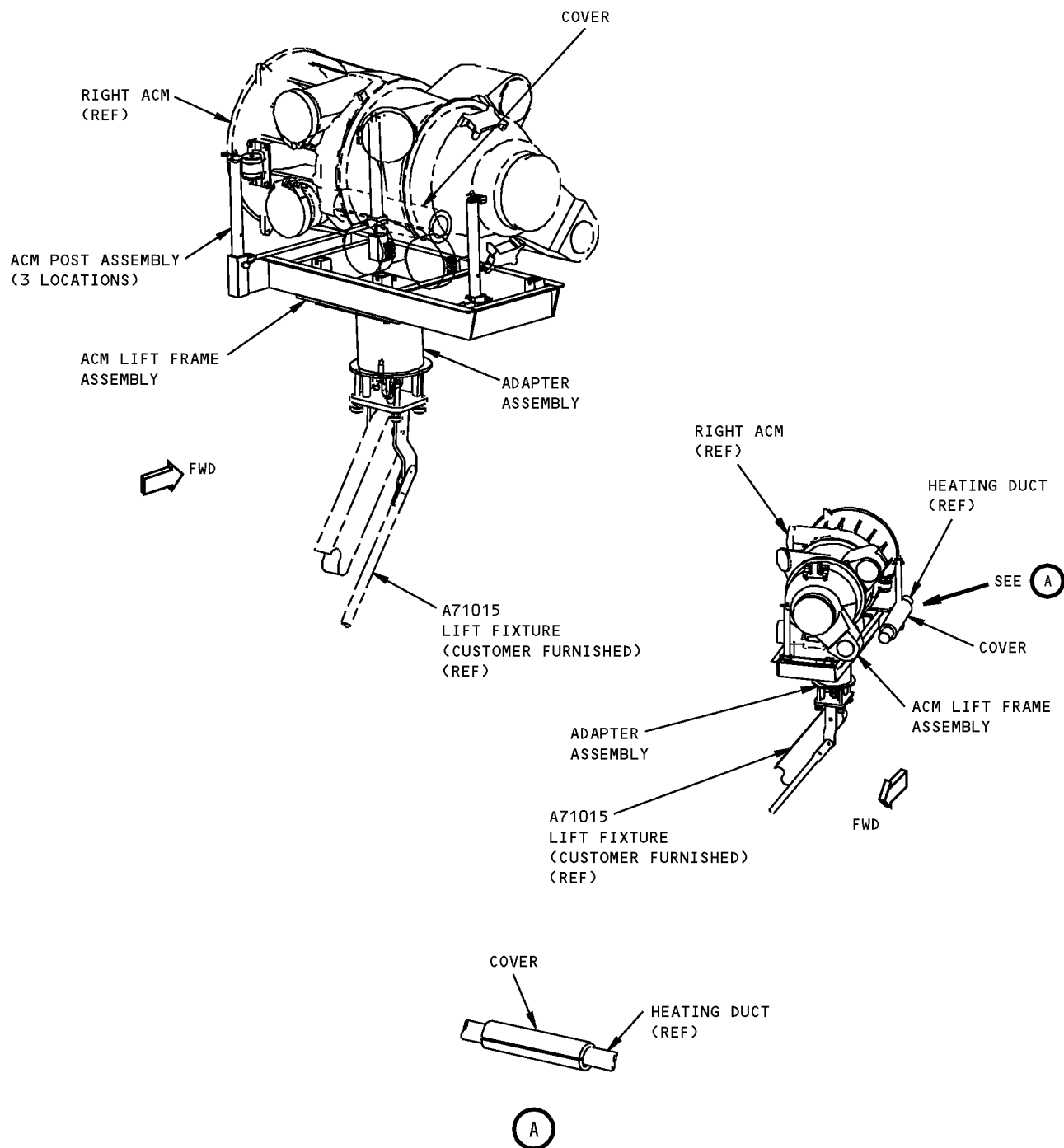


**Air Conditioning Pack Hoist Adapter Equipment (Condensor/Reheater)**  
**Figure 2**



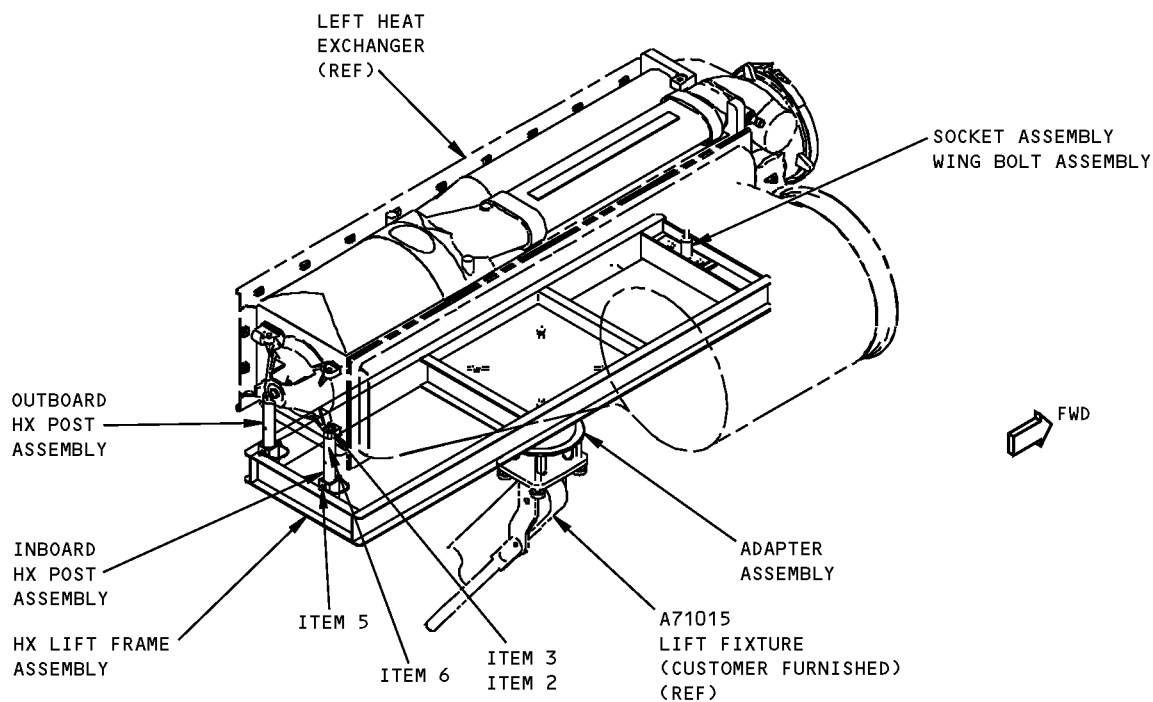
**Air Conditioning Pack Hoist Adapter Equipment (Air Cycle Machine)**  
**Figure 3 (Sheet 1 of 2)**

# 767 ILLUSTRATED TOOL AND EQUIPMENT MANUAL



**NOTE:** DURING RIGHT ACM HOISTING, USE COVER TO PROTECT FORWARD CARGO HEATING DUCT LOCATED ADJACENT TO AFT-INBOARD POST.

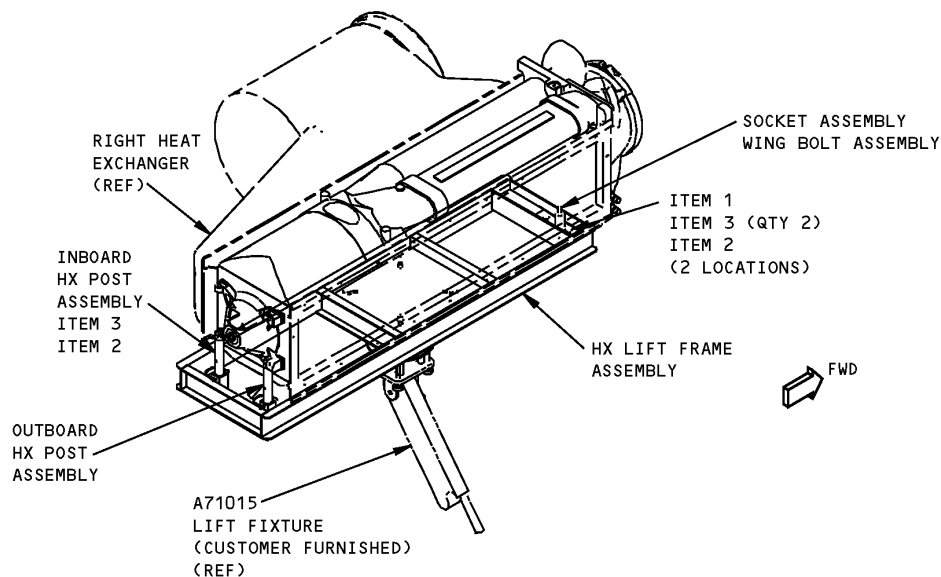
**Air Conditioning Pack Hoist Adapter Equipment (Air Cycle Machine)  
Figure 3 (Sheet 2 of 2)**



**Air Conditioning Pack Hoist Adapter Equipment (Heat Exchanger)**  
**Figure 4 (Sheet 1 of 2)**



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**ILLUSTRATED TOOL AND EQUIPMENT MANUAL**



**Air Conditioning Pack Hoist Adapter Equipment (Heat Exchanger)**  
**Figure 4 (Sheet 2 of 2)**

REPAIRABLE/REPLACEABLE PARTS			
ITEM NO.	PART NO.	NOMENCLATURE	VENDOR CODE
1	-10	BOLT	
2	-11	NUT	
3	-12	WASHER	
4	22-05	HAIRPIN COTTER	V7V765
5	28-01	SNAPPER PIN	V7V765
6	-46	SPRING PIN	