



بیستمین دوره مسابقات ملی مهارت

(مرحله کشوری)

رشته : تعمیر و نگهداری هواپیما

کد جهانی رشته : ۱۴

مدت زمان پروژه ها : 14 ساعت



۱- توضیحات مختصر پروژه ها :

مسابقات در ۴ بخش مختلف به تفکیک ماژول برگزار می گردد.

۲- دستورالعمل اجرای پروژه

دستورالعمل هر یک از ماژول ها به ترتیب در ادامه ذکر شده است.

۳- نحوه چیدمان کارگاهی (براساس تعداد رقابت کننده و فضای سایت مسابقه)

شرکت کنندگان در مرکز عملیاتی مرکز تعمیرات سنگین فرودگاه امام هواپیمایی ماهان پروژه ها را انجام خواهند داد.

۴- نقشه های پروژه

نقشه های پروژه ها و مستندات مربوطه به صورت چاپی در اختیار شرکت کنندگان قرار داده می شود.

۳- جدول ارزشیابی :

هر بخش به تفکیک با جزئیات در جدول ارزشیابی مشخص شده است.

۴- جدول مواد مصرفی مورد نیاز :

موارد موردنیاز توسط مرکز تعمیرات سنگین هواپیمایی ماهان تامین می گردد.

۵- جدول تجهیزات و ابزار کارگاهی :

تجهیزات و ابزار های کارگاهی توسط مرکز تعمیرات سنگین هواپیمایی ماهان تامین می گردد.

۶- جدول ابزار همراه مورد نیاز رقابت کننده :

شرکت کنندگان نیاز به همراه داشتن ابزار یا تجهیزات ندارند.



Module A: Aircraft Initial Acceptance Inspection

Objective

To test the Competitors ability to carry out an aircraft initial acceptance inspection in accordance with manufacturer's recommendations and company procedures.

Time : 2 hours

Process

PART 1

Carry out an **Independent Control Check** in accordance with company procedures. Details of the affected system will be provided in the form of a verbal briefing by your supervisor. **Maintenance Log** (Page 4). This information is to be transcribed on to a Task Card and attached to the provided Journey Logbook.

PART 2

Carry out an Aircraft Acceptance Inspection in accordance with the aircraft maintenance manual. Record findings on the Aircraft Defect Report (Page 5). The findings are to be transcribed on to a Task Card and attached to the provided Journey Logbook. Only defects affecting airworthiness will be considered. Findings found as a result of the Independent Control Check will not be considered.

NOTES

- Do not correct any defects or findings during the inspections
- The **“Judge”** and **“Supervisor”** is the same individual with respects to this module.
- The backside of the Contestant Document can be used for notes and is not subject to evaluation. Only the Tasks Cards will be evaluated.

You are an aircraft maintenance employee of WS Aviation who holds a company Aircraft Certification Authority (ACA). You arrive at work in the morning ready to begin your shift. Your supervisor informs you that the night shift has carried out a series of tasks. Your job is to carry out an Independent Control Check and an Aircraft



Initial Acceptance Inspection before the aircraft leaves the overhaul hangar. It will be your decision whether or not the aircraft is in a condition to be returned to the pilot.

REFERENCE DOCUMENT

- Aircraft Flight Manual (Extracts)
- Aircraft Maintenance Manual
- Independent Control Check Authorization Record

DEFECT DESCRIPTION		Initial
(include Flight Manual or Maintenance Manual reference for clarity)		
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		



Module B: Metal Structure Fabrication/Repair

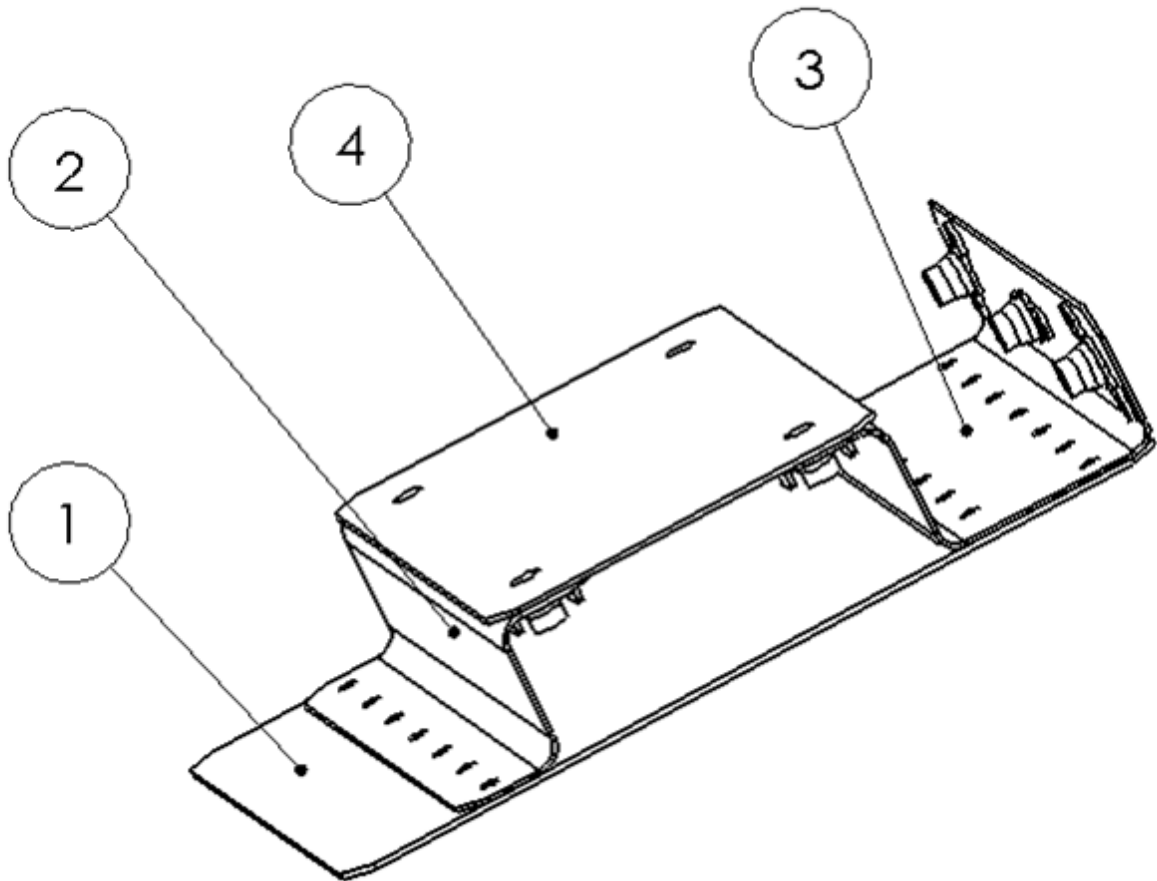
Objective

Assembly of an electrical box on 2 Z bend which themselves will be assembled by riveting on a support plate. In accordance with AC43-13

Time Allotted

Four hours

3D View of the Project





Description

- Part N°1 : Support plate in 2024 of thickness 0.040 inches
- Part N°2 : Z bend made of 2024 of 0.032 inches thickness, assembled on the part 1 by rivets MS20426AD 4- ?? (You will determine the length) , carry out countersink on the part N°1 side
- Part N°3 : Z and U bend made of 2024 of thickness 0.032 inches, assembled on the part 1 by rivets MS20426AD4-?? (You will determine the length), carry out countersink on the side of the part N°1. The part N°3 will be positioned at the level of the part N°1 (flush)
- Part N°4 : Positioning plate made in 2024 thickness 0.040 inches. This part will be used to position the 2 Z bend in order to ensure the length of the holes of the electrical box.
- There are two types of anchor nuts. The diameter of the final holes on the anchor nut are:
 - 5.1 mm for the fixed ones
 - 6 mm for the floating ones
- Anchor nuts will be riveted with rivets MS20426 AD3- ??(You will determine the length).

Process

Materials

- Each contestant will receive the following:
- Sheet Metal Tool Kit
- Drawing (see annex 1)
- One 250mm x 250mm piece of 2024 x 0.040 inches aluminium
- One 250mm x 250mm piece of 2024 x 0.032 inches aluminium
- Anchor nuts $\phi 5 \times 3$
- Floating nut plate $\phi 5 \times 4$
- Screw $\phi 5 \times 7$
- A selection of MS20426 AD rivets of various lengths
- Anchor Nut Fixing Jig



Steps

- 1 Calculate the dimensions for flat layout. (Calculations to be made in this file, see below)
- 2 Determine required rivets length
- 3 Form Part 1,2,3: make the assembly shown in the drawing in accordance with Standard Practices
- 4 Complete the self-check card.
- 5 Install the electrical box in place of the part
- 6 Hand the assembly to expert for checking.

Self Check Card

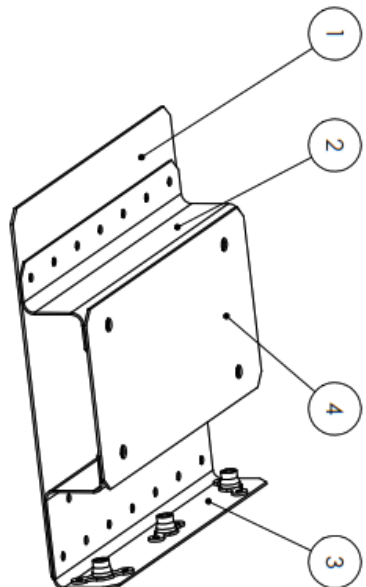
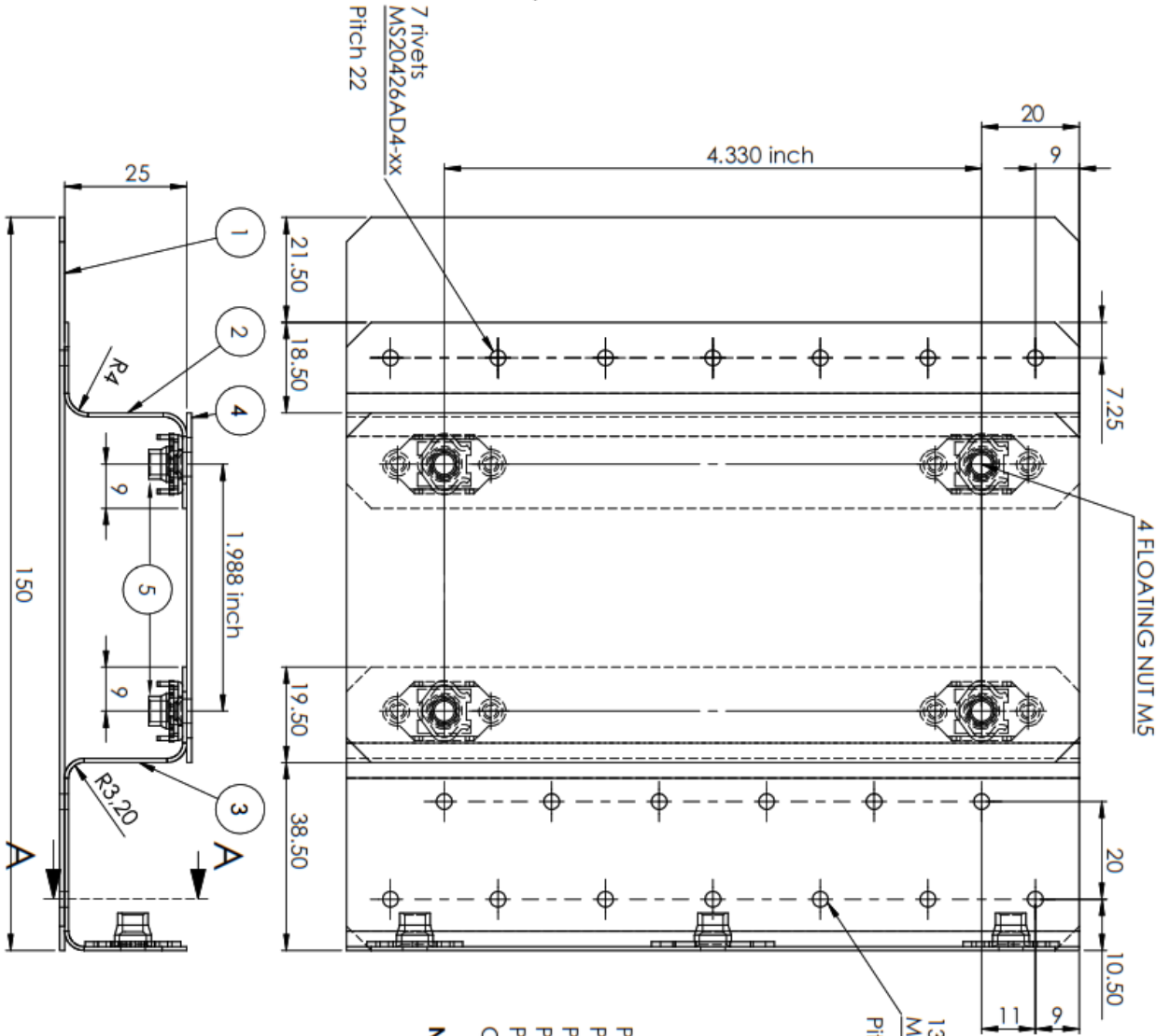
Description	Value raised
Part 1	
150 ±0.5	
150 ±0.5	
Chamfer 45°	
Part 2	
Grain direction/Material Selection	
150 ±0.5	
19.5 ±0.5	
19.3 ±0.5	
25 ±0.5	
Chamfer 45 °	
Bend radius	
Floating nuts part 2	
20 ±0.5	
9 ±0.5	
4.330 inches (±0.5mm)	
Rivet head smoothness (+0.2 / 0)	(indicate the correct number of rivet)
Shop head rivet (rivure des rivets)	(indicate the correct number of rivet)
Part 3	
Grain direction/Material Selection	
150 ±0.5	



25 ±0.5	
39.3±0.5	
25 ±0.5	
19.5±0.5	
Chamfer 45 °	
Bend radius	

Floating nuts part 3	
20 ±0.5	
9 ±0.5	
4.330 inches (±0.5mm)	
Rivet head smoothness (+0.2 / 0)	(indicate the correct number of rivet)
Shop head rivet (rivure des rivets)	(indicate the correct number of rivet)
Anchor nuts part 3	
14 ±0.5	
61 ±0.5	
11±0.5	
Rivet head smoothness (+0.2 / 0)	(indicate the correct number of rivet)
Shop head rivet	(indicate the correct number of rivet)
Assembly of part3 /part1	
Rivet spacing distance :22 ±0,5	
Edge and first rivet distance : 9 ±0.5	
Rivet head smoothness (+0.2 / 0)	(indicate the correct number of rivet)
Shop head rivet	(indicate the correct number of rivet)
Part 3 flush to part 1 (±0.5)	
Assembly of part2 /part1	
Distance X (±0.5)	
Edge and first rivet distance : 9 ±0.5	
Rivet spacing distance :22 ±0,5	
Rivet head smoothness (+0.2 / 0)	(indicate the correct number of rivet)
Shop head rivet	(indicate the correct number of rivet)
Can the electrical box be mounted	
YES	NO



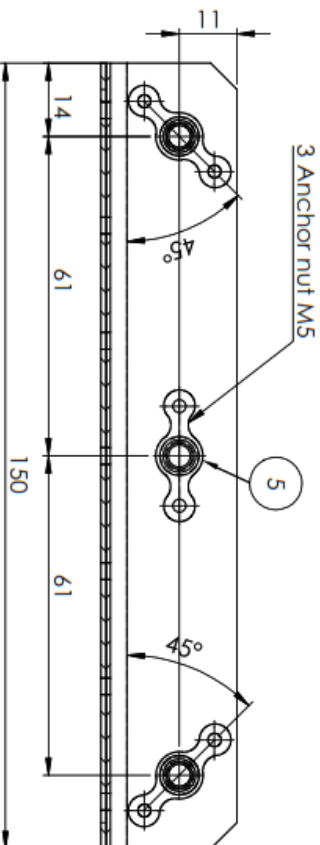


- PART 1 : sheet metal 2024 thickness 0.040 inch
- PART 2 : sheet metal 2024 thickness 0.032 inch Bend radius 4 mm
- PART 3 : sheet metal 2024 thickness 0.032 inch Bend radius 3.2 mm
- PART 4 : sheet metal 2024 thickness 0.040 inch
- PART 5 : anchor nut 11 mm
- Chamfer 45° : 5 mm tolerance +/- 0.5 mm

NOTE: MEASUREMENTS IN mm UNLESS OTHERWISE NOTED

SECTION A-A

SCALE 1:1





Module C : Gas Turbine Hot Section Inspection Module

GAS TURBINE HOT SECTION INSPECTION MODULE

COMPETITOR'S WORKING DOCUMENT

Defect Reports – First Stage Turbine Nozzle, Turbine Nozzle Shield Assembly, Combustion Case and Combustion Liner.

Objective:	To test the competitor's ability to remove and install a Gas Turbine engine hot section in accordance with the Manufacturer's Maintenance manual including the use of either a rigid or flexible boroscope (as per the extra instructions provided at the competition). This work will be carried out in accordance with the appropriate Manufacturers Maintenance manual. During the Boroscope the engine shall be treated as a live engine in a live aircraft and the maintenance manual followed accordingly. During Boroscope the engine shall not be rotated from the horizontal position. After Boroscope the engine can be treated as removed from the airframe and rotated according to the operators requirements.
Time allotted:	4 hours
Process:	
1)	Remove fuel nozzle for internal access to the First Stage Turbine Nozzle that is to be inspected using a boroscope.
2)	Complete a defect report for the boroscope inspection of the First Stage Turbine Nozzle and Turbine Nozzle Shield assembly. Three defects are required to be identified, documented and submitted to progress to Step 3.
3)	Remove Combustion Can, Combustion Liner and supporting components for further visual inspection.
4)	Complete a defect report for all defects identified by the visual inspection (and in addition to any defects recorded in Process 2 above) of the First Stage Turbine Nozzle, Turbine Nozzle Shield Assembly, Combustion Case and Combustion Liner. Do not rectify any defects discovered.
5)	Re-install Combustion Can, Combustion Liner and supporting components that returns the hot section to the original starting condition.

**Defect Report – Boroscope Inspection**

Engine type: _____ Serial #: _____ Date Opened: _____

Defect #	Defect Description	Initials

Signature:	Print Name:	License Number:	Date:



Module D : Electrical Module

Objective

To test the Competitor's ability to alter and complete a circuitry of a given schematic and structural drawings applying the techniques iaw. the Standard Wiring Practices Manual and interpreting instructions in Work Order.

Time Allotted

Total of 3.5 hours

PROCESS

Part 1

Install hardware and lamp assembly/ assemblies. Prepare wire circuit board per attached Figure #1 (board drawing) and

- Boeing Standard Wiring Practices Manual 20-10-11 Para5B
- AC 21-99 Sect 2 Chap 4 (Cable Clamps)

If necessary, remove the wired and unwired contacts installed on the terminals per

- DMC286-2 Repair Kit instructions

Part 2

Prepare wiring for installation per Boeing SWPM 20-10-11 Para 11 and SPWM 20-10-11 Para 3 and 4.

Part 3

Install and crimp the pins and sockets for connectors D001, Doo2 and D003 and terminate per Figure two wiring diagram and

- Amphenol MIL-DTL-38999 and Amphenol MIL-DTL-26482 manuals
- DMC286-2 Repair Kit instructions (Assy of MIL-DTL-38999 Series III)

Part 4

Install and terminate wires to terminal block (TB), switches and circuit breaker per Figure two wiring diagram and

- AC 21-99 Sect 2 Chap 4 (Cable Clamps)
- Boeing SWPM 20-10-12 Para G (Clamping)
- Boeing SWPM 20-15-04 Para 2 (Insulation Removal)
- Boeing SWPM 20-15-21 Para 3 (Assembly of Terminal Lugs)

Part 5

Install and terminate wires to, switches per Figure two wiring diagram and

- AC 21-99 Sect 2 Chap 4 (Cable Clamps)
- Boeing SWPM 20-10-12 Para G (Clamping)
- Boeing SWPM 20-15-04 Para 2 (Insulation Removal)
- Boeing SWPM 20-15-21 Para A (Tag Crimping)

Part 6

Install and terminate wires to lamp assemblies per Figure two wiring diagram and.

- AC 21-99 Sect 2 Chap 7 (Soldering)
- Boeing SWPM 20-10-14 Para 2 (Installation of heat shrinkable Sleeves)

Note: L1 = RED L2= GREEN,



Part 7

Do the continuity test for circuit

Part 8

Do the functional test for circuit

(This step verified by Expert)

Part 8

Complete the actions described in the Service Bulletin

DATA/MATERIAL PROVIDED

- Daniels DMC286-02 Maintenance/Repair Kit
- PIDG crimp tool AMP 47386-5
- Soldering Iron
- Power Supply 30VDC 2A
- Test Lead for power input (pre manufactured)
- Digital Multimeter
- Compressed air gun
- Hardware and tools for installing the connectors and clamps:
- Aircraft grade Wire AWG22,
- Connector, P/N JD38999/26WD97SN, QTY 1
- Connector, P/N JD38999/20WD97PN, QTY 1
- Backshell: P/N 620HS003NF15, QTY 2
- Connector Pin, P/N M39029/58-363, QTY 10
- Connector, P/N M39029/56-351, QTY 10
- Connector Pin, P/N M39029/56-352, QTY 6
- Connector Socket: P/N M39029/58-364, QTY 6
- Connector, P/N MS3124E12-10PY, QTY 1
- Connector Pin, P/N MS39029/31-240, QTY 12
- Filler Plug P/N: MS27488-20-2, QTY 20
- Filler Plug P/N: MS27488-16-2, QTY 20
- Light assembly, Dialight 609-1112-140F (24V, RED) , QTY 1
- Light assembly, Dialight 609-1212-140F (24V, GREEN) , QTY 1
- Toggle switch Qty:2, 1NT1-3, QTY 2
- Terminal Lugs: P/N AMP 31890, QTY 8
- P-Clamps Qty 3, P/N MS21919-WDG4, QTY 3
- Pre-printed shrink sleeve Wire ID:s
- Grommet AMB-1, AMB-1.6, QTY 20cm
- Shrink sleeve 1/4", QTY 20cm
- 3M Scotch 23 Black Self Amalgamating Tape 19mm, QTY 1m
- Self-Adhering Tape MIL-I-224444C, QTY 40cm
- Flux Pen,
- Soldering tin
- Desolder Braid Rosin
- Isoprophanol alcohol
- Lacing Cord (SES Sterling Lacing Cord Polyamide 1.4 mm x 200m)
- Cotton cloth
- Tiewraps 2,5mm, QTY 20
- Tiewrap gun



- Steel ruler 30cm

Data:

- Boeing SWPM ATA 20 (Extract)
- Amphenol MIL-DTL-38999 and MIL-DTL-26482 manual (Extract)
- AC 21-99 (Extract)



FIGURE #1 – ELECTRICAL BOARD DIAGRAM

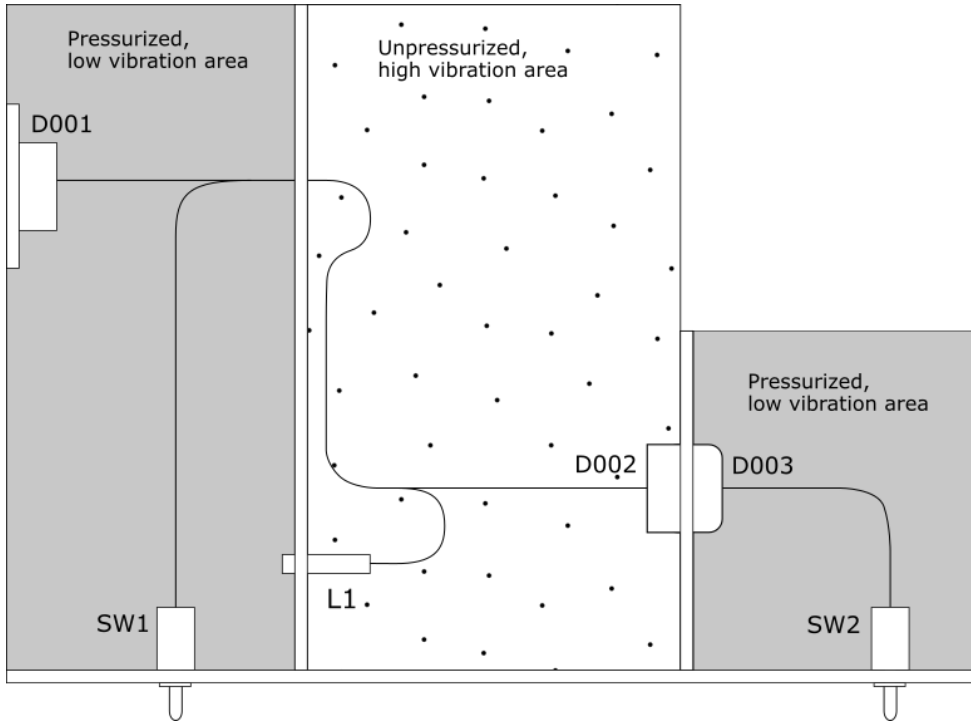
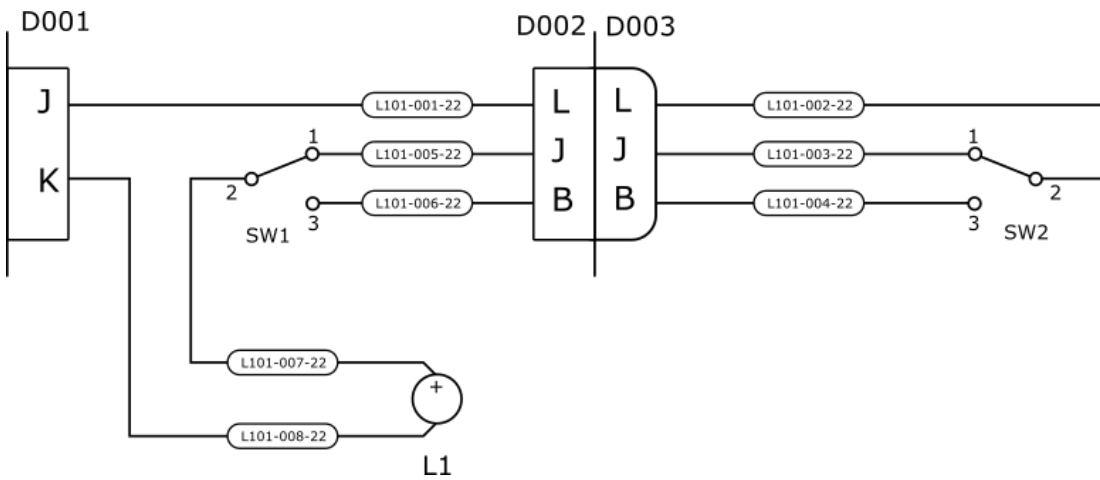


FIGURE #2 – WIRING DIAGRAM



LEGEND:

D001: MS3124E12-10PY

D002: JD38999/26WD97SN

D003: JD38999/26WD97SN

SW1, SW2: 1NT1-3

L1: Dialight 609-1112-140F



ارزشیابی

ارزشیابی :				
ملاحظات	نمره اکتسابی	بارم	شرح کار	ردیف
Module A: Aircraft Initial Acceptance Inspection				
		۵	Independent Control Check	۱
		۱۰	Aircraft Initial Acceptance Inspection	۲
		۵	Airmanship	۳
Module B – Metal structure fabrication/repair				
		۵	Calculation	۴
		۵	Form parts	۵
		۳	Floating nuts	۶
		۲	Anchor nuts	۷
		۱۰	Assembly part	۸
		۲	Installation of electrical box	۹
		۵	Personal protective equipment and process	۱۰
		۳	Area clean up	۱۱



Module C : Gas Turbine Hot Section Inspection Module

		۲	PPE	۱۲
		۴	Use and handling of the boroscope unit	۱۳
		۳	Properly completed defect report of the First Stage Turbine Nozzle using the boroscope	۱۴
		۳	Removal of all Relative Hot Section components	۱۵
		۴	Properly completed defect report of visual inspection of the First Stage Turbine Nozzle and removed components	۱۶
		۱۲	Correct installation of all Hot Section components	۱۷
		۲	Usage of the Manufacturer's Operators & Maintenance Manual for Hot Section Inspection	۱۸

Module D : Electrical Module

		۳	E1 Board preparation, Wiring and Looming	۱۹
		۲	E2 Use of Tools	۲۰
		۲	E3 Connector Contacts Installation and Termination	۲۱
		۲	E4 Terminal Lugs Crimping and Installation	۲۲
		۲	E5 Solder Terminations	۲۳
		۲	E6 Wire Circuitry Continuity Check/ Operational Test	۲۴



		۲	E7 Safe working practice and area clean-up/wastage of material	۲۵
		۱۰۰	Total	