

TCP NO. IV-24077
REVISION 003
DATE FEBRUARY 19, 1969
EFFECTIVITY AS-205 & SUBS
AS-503 & SUBS



**JOHN F. KENNEDY
SPACE CENTER**

**RELEASED
FOR AS 506**

IU PREPARATION FOR ERECTION

PREPARED BY:
IBM CORPORATION
CAPE KENNEDY FACILITY

**THIS TCP CONTAINS
HAZARDOUS OPERATIONS**

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EFFECTIVITY AS-205 & SUBS
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RELEASED
FOR AS **506**

IU PREPARATION FOR ERECTION

THIS TCP CONTAINS
HAZARDOUS OPERATIONS

CONTRACTOR

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FEB 18 1969

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LVO Section Chief

KSC OPERATIONS
APOLLO/SATURN TEST AND OPERATIONS CATALOG SHEET

PAGE 1 OF 2

1. TEST TITLE

IU PREPARATION FOR ERECTION

2. KSC TEST NUMBER

IV-24077

3. EFFECTIVITY 205 & SUBS
503 & SUBS

4. TEST OBJECTIVES

TO MECHANICALLY PREPARE THE INSTRUMENT UNIT FOR TRANSPORTATION, ERECTION, AND MATING WITH THE LAUNCH VEHICLE.

5. TEST DESCRIPTION/EQUIPMENT STATUS/CONFIGURATION

THIS TEST ☒ DOES ☐ DOES NOT CONTAIN HAZARDOUS OPERATIONS.

THE IU ACCESS DOOR IS REMOVED. LOOSE ITEMS ARE SECURED. THE HOISTING SLING IS ATTACHED TO THE UPPER PROTECTIVE RING AND THE LOWER PROTECTIVE RING IS LOOSEMED FROM THE IU. THE IU IS LIFTED FROM THE TRANSPORTER AND WEIGHTS ARE ATTACHED TO THE UPPER PROTECTIVE RING, AS REQUIRED, TO BRING THE IU INTO A LEVEL CONDITION. THE IU LOWER MATING SURFACE IS INSPECTED AND PREPARED FOR MATE. THE IU IS PLACED BACK ON THE TRANSPORTER AND THE HOISTING SLING IS REMOVED. THE TRANSPORTER IS INSPECTED AND CONFIGURED FOR MOVE. A FUNTIONAL CHECK OF THE UMBILICAL DOOR IS PERFORMED.

CONFIGURATION: IU ON TRANSPORTER IN STORAGE AREA.

PHASE: IA

TEST REQUIREMENTS

MSFC: N/A

B	2-7-9	REVISE BLOCKS 5 AND 17	<div style="display: flex; justify-content: space-between;"> <div> <i>Deuring</i> 2-4-69 Contractor Approval </div> <div> <i>W. Schmid</i> KSC Approval </div> </div>	
6. REV.	DATE	REASON		
7. CONTRACTOR APPROVAL		8. ORGANIZATION	9. DATE	
/ JOHN H. HANSEN		IBM K73	29 SEPTEMBER 1967	
10. NASA-KSC APPROVAL		11. ORGANIZATION	12. APPROVAL DATE	
S/ PAUL W. SCHMID		JD-25	10-9-67	

1. TEST TITLE

IU PREPARATION FOR ERECTION

2. KSC TEST NUMBER

IV-24077

3. EFFECTIVITY 205 & SUBS
503 & SUBS

13. LOCATION

LOW BAY/HGR.AF

14. COMPUTER PROC. IDENTIFICATION

NA

15. EST. TEST TIME

4 MEN - 8 HOURS

16. SUPPORT REQUIREMENTS

RD 4295, RD 40092, RD 40093

INTERSTAGE: NONE

OFF-COMPLEX: BENDIX

ON-COMPLEX: IBM QA
IBM MECHANICAL

17. OTHER APPLICABLE REFERENCE DOCUMENTATION

HT-322-13000

IV-26170

10Z22204 (IB)

IV-34066

10Z22501 (V)

18. ITEM CONTINUATION

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LIST OF EFFECTIVE PAGES

Insert latest changes; destroy superseded pages.

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IU PREPARATION FOR ERECTION

THE RESPONSIBLE SYSTEM ENGINEER WILL ANNOUNCE THE REVISION LEVEL AND ALL OUTSTANDING PROCEDURE CHANGE REQUESTS (PCR) OF THE PROCEDURE USED AS THE OFFICIAL TEST COPY TO ALL PERSONNEL INVOLVED IN THE TEST.

QV-----

A. EQUIPMENT

1. IU BALANCING WEIGHTS AND ATTACHING CLAMPS (IBM 67-906-019).
2. IU HOISTING TOOL (HT-322-13000).

VERTICAL EXTENSION CABLES SHOULD NOT BE USED.

3. MECHANIC'S GENERAL PURPOSE TOOL SET.
4. WORK PLATFORM AND/OR STEPLADDERS, IF REQUIRED.
5. HARD HATS.
6. ALIGNMENT GUSSET PLATES (IBM-67-906-018).
7. SAFETY GOGGLES OR FACESHIELDS.
8. COTTON COVERALLS.
9. NEOPRENE GLOVES, CLEAN RAGS OR SOFT ABSORBANT TOWELS.
10. ALODINE 1200 SOLUTION.
11. TURCO 4251 SOLUTION.
12. DISTILLED WATER.
13. ALCOHOL OR OTHER DEGREASING SOLVENT.
14. KEY FOR SHOCK RECORDERS.
15. ADJUSTABLE TORQUE WRENCH WITH CURRENT CERTIFICATION.

I-4

QV-----
I-4

B. SPECIAL REQUIREMENTS

1. IN ORDER TO PERFORM THE TRIAL LIFT OF THE IU, A CRANE AND CRANE OPERATOR WILL BE REQUIRED.

NOTE

IBM PERSONNEL CERTIFIED FOR CRANE
OPERATION MAY OPERATE THE CRANE.

I-4

2. TIRE SERVICING EQUIPMENT MAY BE REQUIRED TO INFLATE TRANSPORTER FIRES.
 - (A) TIRE PRESSURE GAUGE.
 - (B) INFLATION PUMP, COMPRESSOR, OR TANK; 45 PSI WORKING PRESSURE OR FACILITY PRESSURE SOURCE.
3. A CONTROL AREA WILL BE ESTABLISHED AND MAINTAINED TO INSURE PERSONNEL SAFETY IN THE EVENT OF A CRANE MALFUNCTION. LOADS SHALL NOT BE HOISTED OR TRANSPORTED OVER NON-ESSENTIAL PERSONNEL UNDER ANY CIRCUMSTANCES.
4. THE SAFETY SUPERVISOR OR HIS REPRESENTATIVE WILL MONITOR THE OPERATION TO INSURE IT IS CONDUCTED IN SUCH A MANNER AS TO PRECLUDE INJURY TO EITHER PERSONNEL OR EQUIPMENT.
5. EXTERIOR BUILDING DOORS WILL BE CLOSED, IF NECESSARY, TO PREVENT EXCESS AIR MOVEMENT.
6. JANITORIAL SERVICES MAY BE REQUIRED TO CLEAN THE HOISTING AREA PRIOR TO PERFORMANCE OF OPERATING STEPS OF THIS PROCEDURE.
7. ESSENTIAL PERSONNEL:

ENGINEER - 1
TECHNICIANS - 4
QUALITY INSPECTOR - 1

I-

NOTE

THE ACTUAL NUMBER OF PERSONNEL
MAY VARY AT THE DISCRETION OF
THE ENGINEER IN CHARGE.

8. NOTIFY KSC SAFETY REPRESENTATIVE PRIOR TO START OF HOISTING OPERATION.
9. DEGREASING SOLVENT PERSONNEL PERFORMING DEGREASING OR ALODINING OPERATIONS MUST WEAR SAFETY GOGGLES OR FACESHIELDS, COTTON COVERALLS AND NEOPRENE GLOVES FOR PROTECTION.

10. THE IU CABLE TRAY COVERS MUST BE INSTALLED FOR OPERATIONS INVOLVING THE OVERHEAD CRANE.

I-4

C. PREPARATIONS

1. ASSESS IU CONFIGURATION (ARE HEAVY COMPONENTS INSTALLED, ETC.) TO DETERMINE APPROXIMATE LOCATION OF BALANCING WEIGHTS.
2. VERIFY THAT THE HOISTING TOOL (HT-322-13000) HAS BEEN ADJUSTED AND PROOF LOADED PER IV-26170 WITHIN 2 MONTHS PRIOR TO SCHEDULED USE.
3. VISUALLY INSPECT THE HOISTING TOOL FOR THE CONDITION OF STRUCTURAL MEMBERS, WELDS, CABLES, AND HARDWARE.
4. THE HOISTING AREA IS TO BE CLEAN AND FREE OF OBSTRUCTIONS.
5. CHECK TRANSPORTER FOR READINESS TO MOVE.
 - (A) BOTH REAR WHEEL SWIVELS SHOULD BE LOCKED IN THE FORWARD POSITION PRIOR TO MOVING IN FORWARD DIRECTION.
 - (B) TIRE PRESSURE SHOULD BE 33-37 PSIG.
6. VERIFY THAT SHOCK RECORDERS WILL OPERATE BY OPERATING THE UNITS AND OBSERVING MOVEMENT OF CHART PAPER.

I-4

QV-----

QV-----

QV-----

QV-----

I-4

D. OPERATING STEPS

QV-----

1. REMOVE IU PROTECTIVE COVERING.

NOTE

COVERING MAY HAVE BEEN REMOVED
PRIOR TO START OF THE TEST.

***** CAUTION *****
*
* DO NOT ALLOW INSIDE OF *
* COVER TO TOUCH THE FLOOR. *
* USE EXTREME CARE TO AVOID *
* DAMAGE TO IU. *
*

2. SCRIBE A VERTICAL INDEX MARK ON ANY TWO ALIGNMENT BRACKETS (10M15046) EXTEND SCRIBE LINE TO MARK UPPER AND LOWER PROTECTIVE RINGS. (IF NOT PREVIOUSLY ACCOMPLISHED.) I-4
3. REMOVE THE ALIGNMENT BRACKET NEAREST THE DOOR AND STORE HARDWARE FOR REUSE. (IF NOT PREVIOUSLY ACCOMPLISHED.) I-4
4. REMOVE IU ACCESS DOOR PER PROCEDURE IV-34046. (IF NOT PREVIOUSLY ACCOMPLISHED.) I-4
5. INSTALL ALIGNMENT GUSSET PLATE~~D~~. (P/N IBM 67-906-018).
6. REINSTALL ALIGNMENT BRACKET (10M15046) I-4
(A) TORQUE HARDWARE TO 20-25 INCH-POUNDS.
7. VERIFY HARDWARE ATTACHING UPPER PROTECTIVE RING TO THE IU IS INSTALLED (88 REQD.) AND TORQUED. (TORQUE TO 100±10 IN-LBS IF REQUIRED.) I-4
8. TIE IU TRANSPORTER BRAKES IN OFF POSITION AND TURN "ON" SHOCK RECORDERS. REMOVE PEN CLAMPS AND MARK ON STRIP CHART, TIME, DATE, AND REASON FOR TURNING ON SHOCK RECORDER. I-4
9. ATTACH THE BALANCING WEIGHTS TO THE IU UPPER PROTECTIVE RING IF REQUIRED. I-4
10. MOVE IU AND TRANSPORTER FROM TEMPORARY STORAGE AREA AND POSITION IN SUCH A WAY THAT THE OVERHEAD CRANE AND HOISTING TOOL CAN BE POSITIONED OVER THE IU. ADJUST TIRE PRESSURE IF REQUIRED. I-4
11. ATTACH OVERHEAD CRANE HOOK TO HOISTING TOOL (HT-322-13000) AND POSITION HOISTING TOOL OVER IU. I-4
12. ATTACH HOISTING TOOL TO IU UPPER PROTECTIVE RING AT TWELVE ATTACHMENT POINTS, AND INSTALL PINS FROM OUTSIDE IU. QV-----
I-4

NOTE

INSURE THE HOISTING PINS ARE SECURE. I-4

13. REMOVE ALL ATTACHING HARDWARE BETWEEN THE IU LOWER FLANGE AND THE LOWER PROTECTIVE RING. RETAIN ALL HARDWARE FOR REUSE. QV-----
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REMOVE THE TEMPORARY WORK PLATFORM RAILING TO PROVIDE ACCESS FOR INSPECTION OF THE IU LOWER MATING SURFACE.

14. SLOWLY RAISE THE IU FROM THE TRANSPORTER AND LEVEL IT WITHIN TWO INCHES BY ADJUSTING POSITION OF WEIGHTS OR ADDING WEIGHTS.

QV-----

NOTE

IN NO CASE SHALL THE LOWEST POINT MEASURED COINCIDE WITH THE IU ACCESS DOOR OPENING.

15. MARK THE LOCATION OF THE WEIGHTS ON THE IU UPPER PROTECTIVE RING.
16. COMPLETE ATTACHED SKETCH TO RECORD THE WEIGHTS USED AND THE POINTS OF APPLICATION FOR FUTURE USE.
17. MARK THE POSITION OF THE HOISTING TOOL WITH RESPECT TO THE IU UPPER PROTECTIVE RING.
18. INSPECT THE IU LOWER MATING SURFACE TO VERIFY THE ALODINE COATING IS INTACT. REMOVE ALL BURRS & SURFACE MARS. DEGREASE USING ALCOHOL OR EQUAL.

QV-----

QV-----

QV-----

NOTE

IF ALODINE COATING HAS BEEN REMOVED OR DAMAGED, REPAIR PER STEPS D.18 THROUGH D.21 OTHERWISE PROCEED TO STEP D.22.

19. WASH THE DAMAGED AREA(S) WITH TURCO 4251 SOLUTION. REMOVE THE TURCO SOLUTION BY WIPING THE WASHED SURFACE WITH RAGS (OR EQUAL) RINSED WITH DISTILLED WATER, AND DRY. ALLOW TO AIR DRY FOR FIVE MINUTES.
20. APPLY ALODINE 1200 SOLUTION LIBERALLY TO THE AREA(S) TO BE TREATED. DO NOT ALLOW THE ALODINE SOLUTION TO DRY. USE AS MANY APPLICATIONS AS NECESSARY TO GET THE DESIRED COATING, ALLOWING APPROXIMATELY ONE MINUTE BETWEEN APPLICATIONS FOR REACTION.

QV-----

QV-----

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21. REMOVE THE ALODINE SOLUTION BY WIPING THE TREATED SURFACE WITH RAGS (OR EQUAL) RINSED IN DISTILLED WATER UNTIL THE PH OF THE WATER ON THE SURFACE IS AT LEAST 6.0. DRY WITH A CLEAN CLOTH OR KIMWIPE AND ALLOW FIVE MINUTES FOR AIR DRYING.

QV-----

22. LOOSEN THREE TRANSPORTER GUIDE BLOCKS, IF REQUIRED, AND GENTLY LOWER IU ON TRANSPORTER.

MAINTAIN ALIGNMENT OF IU WITH RESPECT TO THE TRANSPORTER BY POSITIONING SUCH THAT THE SCRIBE MARK ON THE ALIGNMENT BRACKETS IS IN LINE WITH THE SCRIBE MARK ON THE LOWER RING.

QV-----

23. CHECK THE OPERATION OF THE UMBILICAL DOOR.

- (A) UNLATCH AND RAISE THE UMBILICAL DOOR TO THE VERTICAL POSITION.
- (B) RELEASE THE UMBILICAL DOOR FROM THE VERTICAL POSITION AND ALLOW IT TO CLOSE AND LATCH.
- (C) REPEAT STEPS D.11 (A) AND (B) UNTIL THE DOOR IS OBSERVED TO LATCH PROPERLY THREE CONSECUTIVE TIMES.
- (D) VERIFY THAT THE UMBILICAL DOOR LATCHED PROPERLY THREE CONSECUTIVE TRIALS.

QV-----

E. SECURING STEPS

1. SECURE TRANSPORTER BRAKES.
2. INSTALL AT LEAST 25 OF THE MOUNTING BOLTS BETWEEN THE IU LOWER MATING SURFACE AND LOWER PROTECTIVE RING.
3. REINSTALL TEMPORARY WORK PLATFORM HANDRAILS REMOVED IN STEP D.13, IF REQUIRED.
4. DETACH HOISTING TOOL FROM IU UPPER PROTECTIVE RING. PREPARE AND STORE HOISTING TOOL.

NOTE

COVER MUST BE INSTALLED IF IU IS MOVED OUTSIDE OF BUILDING AND RAIN IS IMMINENT.

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5. REINSTALL PROTECTIVE COVER AND EXTERIOR SHIPPING PLASTIC COVERS ON IU, IF REQUIRED.

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IF NECESSARY, REMOVE WEIGHTS TO INSTALL PROTECTIVE COVER
AND STORE FOR RE-INSTALLATION, PRIOR TO ERECTION.

QV-----

6. REPOSITION IU TRANSPORTER AS REQUIRED, AND TURN "OFF" SHOCK RECORDERS, INSTALL PEN CLAMP AND MARK ON STRIP CHART, TIME, DATE, AND REASON FOR TURNING OFF SHOCK RECORDERS.

F. EMERGENCY PROCEDURE

1. STOP ALL OPERATIONS.
2. CLEAR THE AREA OF ALL PERSONNEL.

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* * * * * WARNING * * * * *
*
*   IN THE EVENT OF SLING OR CABLE   *
*   FAILURE, PERSONNEL WILL IMMEDIATE- *
*   LY MOVE TO A SAFE LOCATION, MAKING *
*   NO ATTEMPT TO PROTECT EQUIPMENT.  *
*
* * * * *

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3. ENGINEER IN CHARGE INVESTIGATE MALFUNCTION TO DETERMINE IF OR WHEN OPERATIONS WILL CONTINUE AND INITIATE SECURING STEPS IF OPERATIONS ARE TO BE DISCONTINUED.

END OF TEST PROCEDURE IV-24077

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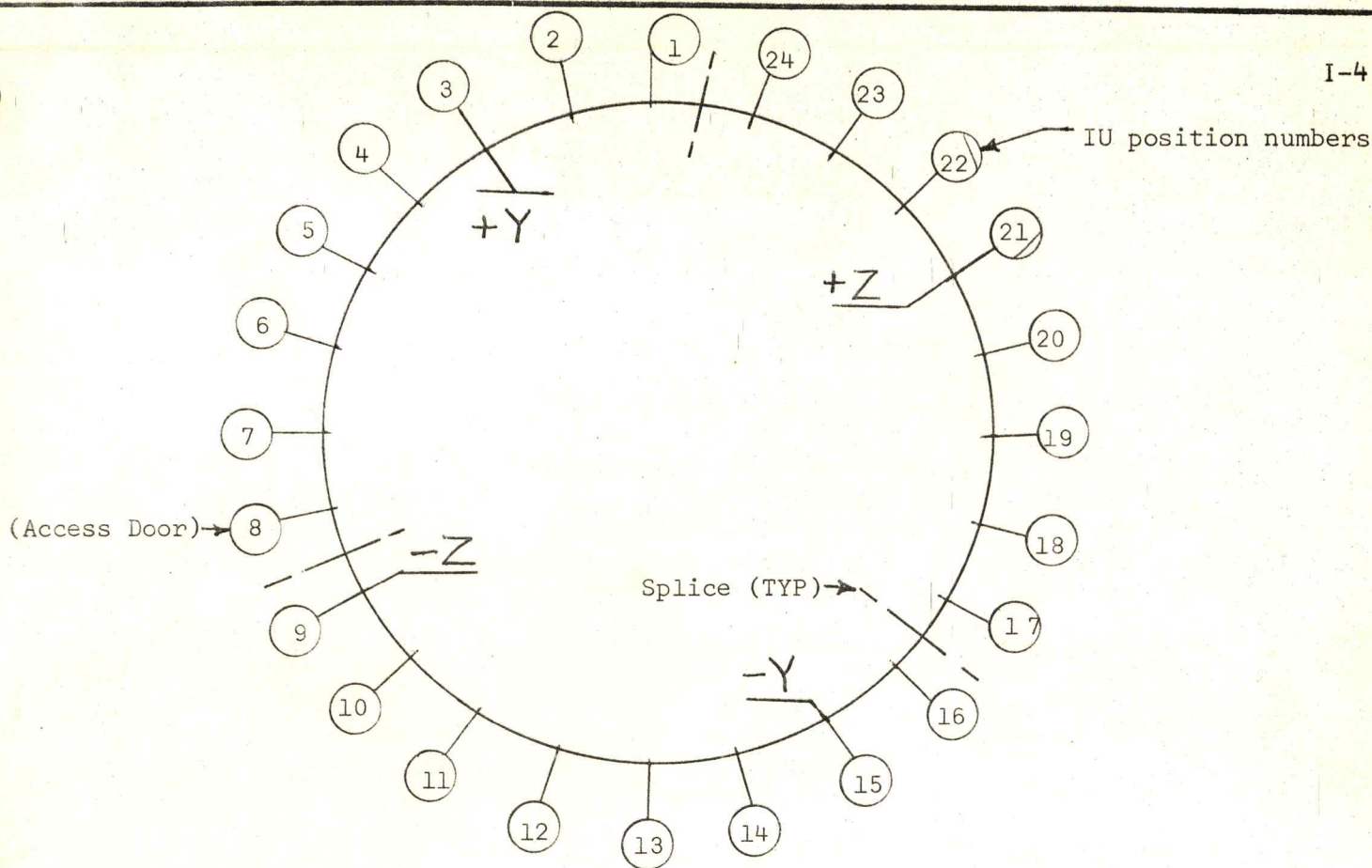
OPERATING PERSONNEL

TECHNICIAN(S)

QUALITY INSPECTOR(S)

PAD ENGINEER(S)

I-4



No. of Weights Installed	Location on Ring (See Note)	No. of Weights Installed	Location on Ring (See Note)

- NOTE: 1. Measure the distance, along the outside of the IU, from the center of the Z or Y axis locating pads (These are located near the top and bottom IU edges) to the center line of the weight.
2. Record this distance and direction (CW or CCW), measured from reference axis selected, in chart above.
3. Measurements shall be accurate within ± 2 inches.

SATURN V

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