



JOHN F. KENNEDY SPACE CENTER

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CONSOLE, COMMON BULKHEAD
VACUUM MONITORING
MAINTENANCE AND CALIBRATION PROCEDURE

PREPARED BY:
MCDONNELL DOUGLAS CORPORATION
LOGISTICS SUPPORT
FLORIDA TEST CENTER

DSV4-303
D-IV NOVEMBER 22, 1968
REVISION 001

APOLLO/SATURN
LAUNCH OPERATIONS

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VOLUME ONE
CONSOLE, COMMON BULKHEAD
VACUUM MONITORING, PN 1A86793-1
MAINTENANCE PROCEDURE
1B57030

A. SCOPE

THIS DRAWING CONTAINS THE INSPECTION, SERVICING, AND CALIBRATION REQUIREMENTS AND THE PROCEDURES, AS APPLICABLE, WHICH ARE REQUIRED TO MAINTAIN THE COMMON BULKHEAD VACUUM MONITORING CONSOLE, MODEL DSV-4-303, PN 1A86793-1, IN A SERVICEABLE AND OPERATIONAL CONDITION. MINIMUM REMOVAL, REPLACEMENT, AND REPAIR INSTRUCTION ARE PROVIDED; DETAILED, WHERE NECESSARY, FOR COMPLEX REQUIREMENTS OR UNUSUAL CONDITIONS.

B. APPLICABLE DOCUMENTS

THE FOLLOWING SPECIFICATIONS AND STANDARDS (AND SUBSIDIARIES THEREOF), DRAWINGS, AND PUBLICATIONS FORM A PART OF THIS DRAWING TO THE EXTENT SPECIFIED HEREIN.

1. DOUGLAS DOCUMENTS

0-1-26115 VACUUM MONITOR SYSTEM CHECKOUT AND CALIBRATION

1A86793 CONSOLE, COMMON BULKHEAD VACUUM MONITORING

1B50957 CORROSION CONTROL PROCEDURES - SATURN

2. GOVERNMENT DOCUMENTS

MSFC-SPEC-164 CLEANLINESS OF COMPONENTS FOR USE IN OXYGEN, FUEL, AND PNEUMATIC SYSTEMS, SPECIFICATIONS FOR

10M01671 CLEANLINESS LEVELS, CLEANING, PROTECTION, AND INSPECTION PROCEDURES FOR PARTS, FIELD PARTS, ASSEMBLIES, SUBSYSTEMS, AND SYSTEMS FOR PNEUMATIC USE IN SUPPORT EQUIPMENT, SPECIFICATION FOR

3. VENDOR DOCUMENTS

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B. APPLICABLE DOCUMENTS

3150,881

OPERATING INSTRUCTIONS, KINNEY VACUUM DIVISION,
THE NEW YORK AIR BRAKE CO, BOSTON, MASS,

C. REQUIREMENTS

1. INSPECTION AND SERVICING

(A) TEST EQUIPMENT

KIT CHECKOUT ACCESSORIES, MODEL DSV-4-238, PN 7865700-1

(B) MATERIALS

GREASE, MIL-G-3545

OIL, KINNEY LUBE 220 KINNEY VACUUM DIVISION, THE NEW YORK AIR
BRAKE CO., BOSTON, MASS (33781)

(C) PARTS

GASKET, PN 0778-3, 1 EACH, KINNEY VACUUM DIVISION, THE NEW YORK
AIR BRAKE CO, BOSTON, MASS (33781)

SEAL, PN S0254

(D) POWER SOURCES

NITROGEN GAS, 750 PSIG, DRY, HIGH PURITY, MIL-P-27401, TYPE 1,
115 VAC, 60 CYCLES, SINGLE PHASE

2. CALIBRATION

SEE VOLUME TWO OF THIS PROCEDURE

3. POWER SOURCE

(CONTINUED)

C. REQUIREMENTS

NITROGEN GAS, 0-50 PSIG, DRY HIGH PURITY, MIL-P-27401, TYPE 1,

4. RECORDS

(A) REVISIONS

ALL NECESSARY REVISIONS TO THIS PROCEDURE DURING MAINTENANCE ACTIVITIES SHALL BE NOTED ON FORM 60-999-4A (QUALITY ENGINEERING REVISION DOCUMENTATION LOG SHEET) PROVIDED UNDER PARAGRAPH K (APPENDIX). REVISIONS MUST BE APPROVED BY LOGISTICS SUPPORT (SATURN/APOLLO LOGISTICS ENGINEERING) AND RELIABILITY ASSURANCE (QUALITY ENGINEERING), AND MUST RECEIVE CUSTOMER APPROVAL, IF REQUIRED, PRIOR TO CONTINUATION OF ANY MAINTENANCE. IF THE REVISION APPLIES TO FUTURE MAINTENANCE ACTIVITIES, IT IS SUBSEQUENTLY INCORPORATED BY DRAWING CHANGE AND EO RELEASE.

(B) DISPOSITION OF RECORDS

A REPRODUCIBLE OF THE COMPLETED AS-RUN REVISION SHEET(S) SHALL BE FORWARDED BY RELIABILITY ASSURANCE (QUALITY ENGINEERING) TO LOGISTICS SUPPORT (SATURN/APOLLO LOGISTICS ENGINEERING) AND RELIABILITY ASSURANCE FILES (PERMANENT).

5. SAFETY REQUIREMENTS

(A) THERE ARE NO UNUSUAL SAFETY HAZARDS INVOLVED IN THIS PROCEDURE AND THEREFORE NO SPECIAL PRECAUTIONS WILL BE REQUIRED.

(B) PERFORMANCE OF THIS PROCEDURE SHALL BE IN ACCORDANCE WITH THE DAC MSSD AND FLORIDA TEST CENTER SAFETY MANUAL PROVISIONS.

D. GENERAL INSTRUCTIONS

1. BECOME FAMILIAR WITH THE ENTIRE PROCEDURE BEFORE PROCEEDING WITH THE PERFORMANCE OF ANY MAINTENANCE.
2. STANDARD PROCEDURES WILL BE FOLLOWED IN INITIATING ACTION TO CORRECT ANY DISCREPANCIES DETECTED. (REFER TO PARAGRAPH J FOR REPAIR INFORMATION.)

(CONTINUED)

D. GENERAL INSTRUCTIONS

3. REMOVAL OR APPLICATION OF ELECTRICAL POWER/PNEUMATIC PRESSURE IS PROHIBITED WITHOUT THE EXPRESS CONSENT OF THE OPERATIONS ENGINEERING,
4. ANY TOOLS OR TEST EQUIPMENT REQUIRED FOR THE SUCCESSFUL COMPLETION OF A MAINTENANCE TASK MAY BE SUBSTITUTED BY THE APPROVED EQUAL,

E. INSPECTION

1. PRELIMINARY INSTRUCTIONS

- (A) ENSURE THAT ALL CONSOLE CIRCUIT BREAKERS ARE SET IN THE "OFF" POSITION,
- (B) DO NOT DISCONNECT ELECTRICAL CONNECTORS EXCEPT TO INVESTIGATE A SUSPECTED DEFECT,
- (C) RETURN ALL SWITCHES AND CONTROLS TO THEIR ORIGINAL POSITIONS AT THE COMPLETION OF MAINTENANCE,
- (D) INSPECTION SHALL BE ACCOMPLISHED IN CONJUNCTION WITH CALIBRATION,

2. INSPECTION INSTRUCTIONS

INSPECT THE FOLLOWING ITEMS FOR THE DISCREPANCIES OR CONDITIONS LISTED:

(A) COMMON BULKHEAD VACUUM MONITORING CONSOLE, PN 1A86793-1

- (1) CONSOLE EXTERIOR FOR CLEANLINESS, CORROSION, AND DAMAGE; CHIPPED OR PEELING PAINT; FILLER FOR DETERIORATION; LOOSE OR MISSING ATTACHING HARDWARE,
- (2) GAGES FOR SECURITY OF MOUNTING, CORROSION, AND INTERNAL MOISTURE; DIALS FOR CORROSION AND LEGIBILITY OF MARKINGS; POINTERS FOR DAMAGE AND CORROSION,
- (3) HAND VALVES FOR SECURITY OF MOUNTING, EASE OF OPERATION, AND CORROSION; HANDLES FOR SECURITY OF MOUNTING,

(CONTINUED)

E. INSPECTION

CRACKING, CHIPPING, OR DETERIORATION.

- (4) HAND REGULATOR FOR SECURITY OF MOUNTING, EASE OF OPERATION, AND CORROSION; HANDLE FOR SECURITY OF MOUNTING, CRACKING, CHIPPING, OR DETERIORATION,
- (5) GAGE TEST PORTS FOR SECURITY OF MOUNTING, CORROSION DAMAGE TO THREADS; PROTECTIVE CAPS FOR PRESENCE OF SEALING GASKETS, CORROSION, DAMAGE TO THREADS; CAP RETAINING CHAINS FOR SECURITY OF ATTACHMENT, CORROSION, OR DAMAGE,
- (6) TOGGLE SWITCH FOR SECURITY, DAMAGE, MISALIGNMENT, AND BINDING,
- (7) PLACARDS AND IDENTIFICATION PLATE FOR SECURITY AND LEGIBILITY,
- (8) DOORS FOR SECURITY, BINDING, AND DISTORTION; LOOSE OR WORN HINGES; LOOSE OR BINDING LOCKS OR LATCHES; DETERIORATED OR MISSING SEALS,
- (9) GAS SAMPLING BOTTLES FOR SECURITY, DAMAGE, AND CORROSION; CHIPPED OR PEELING PAINT; DETERIORATION OF RUBBER MOUNTS; HAND VALVES FOR SECURITY, DAMAGE, AND CORROSION, PIPING FOR SECURITY, CORROSION, AND DAMAGE,
- (10) CONNECTOR RECEPTACLES EXTERNALLY FOR SECURITY OF ATTACHMENT, DAMAGE, AND CORROSION; PROTECTIVE CAPS FOR STRIPPED THREADS, CLEANLINESS, AND DAMAGE; MISSING OR DETERIORATED GASKETS; LOOSE, MISSING, OR BROKEN ATTACHING CHAINS,
- (11) GAS SAMPLING PORT FOR SECURITY OF MOUNTING, CORROSION, AND DAMAGE TO THREADS; PROTECTIVE CAP FOR PRESENCE OF SEALING GASKET; CORROSION, AND DAMAGE TO THREADS; CAP RETAINING CHAIN FOR SECURITY OF ATTACHMENT, CORROSION, OR DAMAGE,
- (12) VACUUM PUMP VENT AND BULKHEAD RELIEF VENT FOR SECURITY, DAMAGE, OBSTRUCTIONS, AND CORROSION,
- (13) UPPER CONSOLE INTERIOR FOR THE FOLLOWING:
PIPING INSTALLATION FOR SECURITY OF MOUNTING, CORROSION, AND DAMAGE; ALIGNMENT OF TORQUE STRIPES,
WIRING INSTALLATION FOR CHAFING, CUTS, KINKS, EVIDENCE OF

(CONTINUED)

E. INSPECTION

OF OVERHEATING, AND LOOSE CONNECTIONS; LOOSE OR MISSING STRING TIES.

TERMINAL STRIPS FOR SECURITY; CRACKED, BROKEN, OR MISSING INSULATORS OR COVERS, LOOSE TERMINALS OR BUS BARS,

CIRCUIT BREAKERS FOR SECURITY, DAMAGE, BINDING, AND EVIDENCE OF OVERHEATING,

RELAYS AND SOCKETS FOR SECURITY, DAMAGE, AND LOOSE CONNECTIONS,

(14) LOWER CONSOLE INTERIOR FOR THE FOLLOWING:

WIRING INSTALLATION FOR CHAFING, CUTS KINKS, EVIDENCE OF OVERHEATING, AND LOOSE CONNECTIONS; LOOSE OR MISSING STRING TIES,

FUSE HOLDERS FOR SECURITY AND DAMAGE; BLOWN OR IMPROPERLY CONTACTING FUSES; IMPROPER FUSE RATING AND SIZE.
SEMI CONDUCTOR DEVICES FOR SECURITY, EVIDENCE OF OVERHEATING, AND CORROSION,

RELAY AND MOUNTING FOR SECURITY, DAMAGE, AND LOOSE CONNECTION,

TERMINAL STRIPS FOR SECURITY; CRACKED, BROKEN, OR MISSING INSULATORS OR COVERS; LOOSE TERMINALS OR BUS BARS,

PRESSURE SWITCHES FOR SECURITY, DAMAGE, AND CORROSION,

TRANSDUCER FOR SECURITY AND DAMAGE,

SOLENOID OPERATED VALVES FOR SECURITY OF MOUNTINGS, AND CORROSION,

RELIEF VALVE FOR SECURITY OF MOUNTING AND CORROSION;
INLET AND OUTLET PIPE CONNECTIONS FOR ALIGNMENT OF TORQUE STRIPES,

PIPING INSTALLATION FOR SECURITY OF MOUNTING, CORROSION, AND DAMAGE; CONNECTIONS FOR ALIGNMENT OF TORQUE STRIPES,

(15) VACUUM PUMP, LOCATED IN THE LOWER CONSOLE, FOR THE FOLLOWING:

SHOCK MOUNTS FOR SECURITY, ALIGNMENT, AND DETERIORATION.

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E. INSPECTION

VACUUM PUMP ASSEMBLY FOR CLEANLINESS, DAMAGE, AND
CORROSION; CHIPPED OR PEELING PAINT; PIPE FITTING FOR
ALIGNMENT OF TORQUE STRIPES; EVIDENCE OF OVERHEATING AND
OIL LEAKS.

OIL LEVEL SIGHT GLASS FOR CLEANLINESS AND DAMAGE,

DRIVE BELT FOR WEAR, NICKS, CUTS, FRAYING, AND
DETERIORATION,

BELT TENSION FOR PROPER ADJUSTMENT,

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E. INSPECTION

NOTE

THE BELT SHOULD NOT DEPRESS
MORE THAN ITS OWN THICKNESS
UNDER NORMAL THUMB
PRESSURE,

JUMPER ASSEMBLY FOR SECURITY, DAMAGE, AND CORROSION,

SEPARATOR TANK FOR SECURITY, CORROSION, EVIDENCE OF
LEAKS, DAMAGE, AND CHIPPED OR PEELING PAINT,

GAS BALLAST VALVE FOR SECURITY, DAMAGE, CORROSION, AND
EASE OF OPERATION,

SET CONSOLE CIRCUIT BREAKERS TO THE ON POSITION,

3. FUNCTIONAL TEST

FUNCTIONAL TEST WILL BE ACCOMPLISHED BY USING THE VACUUM SYSTEM
CHECKOUT AND OPERATION PROCEDURE DRAWING 0-1-26115,

NOTE

- FUNCTIONAL AND LEAK CHECKS
PERFORMED BY T.C.P.
0-1-26115 DO NOT HAVE TO BE
PERFORMED AT THE SAME TIME
AS MAINTENANCE

F. SERVICING

*****CAUTION*****

- * EXERCISE STANDARD *
- * PROCEDURES TO ENSURE *
- * THAT SYSTEM CLEANLINESS *
- * PER THE REQUIREMENTS OF *

(CONTINUED)

F, SERVICING

* MSFC-SPEC-164, FOR *
 * OXYGEN SERVICE IS *
 * MAINTAINED, *
 * *
 * PRIOR TO RECONNECTING *
 * ANY LINES TO THE *
 * VEHICLE, THE CONSOLE *
 * MUST BE PURGED, GAS *
 * SAMPLES MUST BE TAKEN *
 * FROM EACH SYSTEM *
 * OUTLET, PER STANDARD *
 * PROCEDURES, AND *
 * ANALYZED TO ENSURE THAT *
 * CLEANLINESS PER THE *
 * REQUIREMENTS OF *
 * MSFC-DWG 10N01671, *
 * LEVEL II HAS BEEN *
 * MAINTAINED, *
 * *

1. LUBRICATION

*****CAUTION*****
 * *
 * IF VACUUM PUMP DRIVE *
 * MOTOR HAS OIL CUPS *
 * PROVIDED, DISREGARD *
 * REMAINING PART OF PARA *
 * F.1 AND APPLY ONE OR *
 * TWO DROPS OF ELECTRIC *
 * MOTOR OR SAE 10 OIL IN *
 * EACH CUP, *
 * *

(A) VACUUM PUMP DRIVE MOTOR (AS REQUIRED)

(1) REMOVE VACUUM PUMP AND DRIVE MOTOR PER PARAGRAPH I,3.(D)

(2) LUBRICATE MOTOR WHEN REQUIRED AS FOLLOWS:

REMOVE AND WIPE CLEAN EACH BEARING AND MOTOR HOUSING

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F, SERVICING

BEARING CAVITY,

PACK EACH BEARING FULL, AND THE MOTOR HOUSING BEARING
CAVITY APPROXIMATELY 1/3 FULL OF MIL-G-3545 GREASE,

INSTALL BEARINGS IN MOTOR AND SECURELY TIGHTEN ALL
INSTALLATION HARDWARE,

(3) REPLACE VACUUM PUMP AND DRIVE MOTOR PER PARAGRAPH 1,3.(c)

2. REPLENISHMENT

*****CAUTION*****

*
* USE ONLY KINLUBE 220 *
* OIL TO SERVICE PUMPING *
* UNIT AS OTHER TYPE OILS *
* COULD DECREASE PUMP *
* EFFICIENCY, *
*

(A) PUMP LUBRICANT DRAIN PROCEDURE (AS REQUIRED)

NOTE

THE PUMP OIL SHOULD BE
CHANGED FOR EITHER OF THE
FOLLOWING REASONS:

WHEN OIL (BY VISUAL
INSPECTION) IS CONTAMINATED
WITH FOREIGN MATTER,
CHANGING OIL DECREASES THE
POSSIBILITY OF MECHANICAL
DAMAGE TO PUMP,

WHEN THE V-10 BULKHEAD
PRESSURE GAGE INDICATES A
DECREASE IN VACUUM AND
TAKES LONGER TO OBTAIN AND
ATTEMPTED CLEANUP WITH GAS

(CONTINUED)

F. SERVICING

BALLAST FAILS TO
SATISFACTORILY REMOVE THE
FOREIGN CONTAMINANTS,

- (1) REMOVE THE FIRST AND SECOND STAGE RESERVOIR DRAIN PLUGS,
- (2) WHILE FACING THE PUMP PULLEY, MANUALLY ROTATE THE PUMP CLOCKWISE WITH THE SUCTION OPEN TO ATMOSPHERIC PRESSURE AND THE PUMP EXHAUST COVERED, THIS SHORTENS DRAIN TIME AND ENSURES MAXIMUM DRAINAGE,
- (3) INSTALL THE FIRST AND SECOND STAGE RESERVOIR DRAIN PLUGS SECURELY,

(B) PUMP LUBRICANT FILL PROCEDURE

*****CAUTION*****

* ON COMPLETION OF FILL *
* PROCEDURE AND PRIOR TO *
* OPERATING PUMPING UNIT, *
* MANUALLY ROTATE THE *
* PUMP ONE REVOLUTION *
* CLOCKWISE WHILE FACING *
* THE PUMP PULLEY, THIS *
* VERIFIES THAT THE PUMP *
* OPERATES FREELY, AND *
* DISCHARGES ANY EXCESS *
* OIL IN THE WORKING *
* VOLUMES OF THE PUMP *
* INTO THE RESERVOIR, *
* FAILURE TO PERFORM THIS *
* OPERATION COULD RESULT *
* IN PUMP DAMAGE, *

- (1) REMOVE FIRST STAGE RESERVOIR FILL PLUG AND GASKET (GASKET IS RETAINED IN FILL PLUG GROOVE); REPLACE ORIGINAL GASKET WITH NEW GASKET, KINNEY PN 0778-3, IF DIRTY OR DAMAGED,
- (2) POUR APPROXIMATELY 1/3 PINT OF KINLUBE 220 OIL INTO FIRST STAGE RESERVOIR; INSTALL AND TIGHTEN RESEVOIR FILL PLUG,

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F. SERVICING

- (3) REMOVE SEPARATOR TANK FILL PLUG,
- (4) POUR ONE PINT OF KINLUBE 220 OIL INTO SEPARATOR TANK;
INSTALL AND TIGHTEN FILL PLUG,

NOTE

THE PROPER OIL LEVEL (WHEN
THE OIL IS APPROXIMATELY
CENTERED IN THE GLASS
LEVEL-SIGHT GAGE) IS TRULY
ESTABLISHED ONLY AFTER
SEVERAL MINUTES OF PUMP
OPERATION.

- (5) WHILE FACING THE PUMP PULLEY, MANUALLY ROTATE THE PUMP
ONE REVOLUTION IN A CLOCKWISE DIRECTION,
- (6) POSITION VACCUUM PUMP SWITCH TO ON,
OBSERVE THE LEVEL-SIGHT GAGE AND DETERMINE IF PROPER OIL
LEVEL IS ESTABLISHED,

NOTE

PERFORM STEP (7) ONLY IF
ADDITIONAL OIL IS REQUIRED,

- (7) REMOVE SEPARATOR TANK FILL PLUG AND ADD OIL IN SMALL
QUANTITIES, AS REQUIRED, UNTIL INDICATED OIL LEVEL IS
CENTERED IN THE LEVEL-SIGHT GAGE,
- (8) INSTALL FILL PLUG,
- (9) POSITION VACUUM PUMP SWITCH TO OFF,

3. PUMP LUBRICANT GAS BALLAST PROCEDURE

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F. SERVICING

NOTE

GAS BALLASTING IS APPLIED ONLY TO THE SECOND STAGE OF COMPOUND PUMPS. THE BALLAST VALVE ADMITS AIR AT ATMOSPHERIC PRESSURE TO THE PISTONS COMPRESSION SIDE DURING PART OF THE COMPRESSION CYCLE TO MINIMIZE THE CONDENSATION OF NONPERMANENT GASES OR VAPORS. THE DEGREE OF VALVE OPENING REQUIRED CAN ONLY BE ESTABLISHED BY TRIAL, AS THE AMOUNT OF ACCUMULATED CONDENSABLE VAPOR VARIES WITH DIFFERENT APPLICATIONS.

- (1) POSITION VACUUM PUMP SWITCH TO ON,
- (2) GRADUALLY ROTATE THE GAS BALLAST VALVE TO OPEN, UNTIL THE INDICATION ON THE VG-10 VACUUM PRESSURE GAGE RETURNS TO THE VALUE RECORDED AT THE COMPLETION OF LAST OIL REPLENISHMENT. IF THIS INDICATION CANNOT BE ATTAINED WITHIN 10 MINUTES, PROCEED WITH REPLENISHMENT PROCEDURE PER PARAGRAPH F.2,
- (3) ROTATE GAS BALLAST VALVE TO FULLY CLOSE,
- (4) POSITION VACUUM PUMP SWITCH TO OFF,

4. AGE CONTROL ITEMS

(A) IDENTIFICATION

VERIFY THE COMPONENTS LISTED IN TABLE 1, AGE CONTROL ITEMS, HAVE NOT EXCEEDED THE 24 QUARTER INSTALLED LIFE PERIOD ALLOWED BY MSFC-STD-105

(B) INSPECTION

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F. SERVICING

VISUALLY INSPECT INSTALLATION DATE STAMPED ON COMPONENT AND/OR NOTED ON THE AGE CONTROL DOCUMENTATION IN EQUIPMENT LOG BOOK, EACH COMPONENT FOUND TO BE OUT OF THE ALLOWABLE USAGE PERIOD OR FOR WHICH AGE CONTROL ITEM REPLACEMENT WILL BECOME DUE PRIOR TO THE NEXT SCHEDULED INSPECTION DATE, SHALL BE REFURBISHED BY REMOVAL AND REPLACEMENT.

G. CALIBRATION

SEE VOLUME TWO OF THIS PROCEDURE

H. CERTIFICATION

1. CERTIFICATION INSTRUCTIONS

- (A) COMPLETE ASSEMBLY OUTLINE OR FABRICATION ORDER, VERIFYING THAT THE EQUIPMENT IS IN ACCEPTABLE CONDITION AND HAS MET THE REQUIREMENTS DESIGNATED IN PARAGRAPH E, F, AND G.
- (B) COMPLETE ALL ENTRIES ON PREVENTIVE MAINTENANCE PROGRAM RECORD, FORM 68-634.
- (C) AFFIX PREVENTIVE MAINTENANCE COMPLETED DECAL, FORM 60-1567-1, TO EQUIPMENT.
 - (1) ENTER NEXT DUE DATE ON DECAL. (THE NEXT DUE DATE SHALL BE EITHER THE INSPECTION, SERVICING, OR CALIBRATION NEXT DUE DATE, WHICHEVER OCCURS FIRST, AS REFLECTED ON THE PREVENTIVE MAINTENANCE PROGRAM RECORD.)
 - (2) VALIDATE DECAL WITH QUALITY CONTROL STAMP.

2. CERTIFICATION INTERVAL-MAXIMUM

(A) INSPECTION

THE PERIOD OF TIME BETWEEN INSPECTIONS OF THIS EQUIPMENT SHALL

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H. CERTIFICATION

NOT EXCEED 180 DAYS, EXCEPT FOR PARAGRAPH E,2,(A) STEPS (1), (2), (3), (4), (5), (6), (7), (8), (9), (10), (11), (12), WHICH SHALL BE ACCOMPLISHED EVERY 90 DAYS.

(B) SERVICING

THE PERIOD OF TIME BETWEEN SERVICINGS OF THIS EQUIPMENT SHALL NOT EXCEED 90 DAYS EXCEPT PARAGRAPH F,1,(A) AND F,2,(A) WHICH SHALL BE PERFORMED AS REQUIRED.

(C) CALIBRATION

THE PERIOD OF TIME BETWEEN CALIBRATIONS OF THIS EQUIPMENT SHALL NOT EXCEED 180 DAYS WHEN EQUIPMENT IS IN OPERATIONAL STATUS.

I. REMOVAL AND REPLACEMENT

*****WARNING*****

* ENSURE THAT ALL *
* ELECTRICAL POWER IS OFF *
* AND SYSTEM IS *
* DEPRESSURIZED PRIOR TO *
* STARTING MAINTENANCE, *
* SYSTEM WILL BE *
* DEPRESSURIZED PER TCP *
* I-D-26115 *
* *

*****CAUTION*****

* ALL NEW OR USED PARTS *
* SHALL BE PROCESSED FOR *
* CLEANLINESS PER THE *
* REQUIREMENTS OF DRAWING *
* 10M01671 AND MSFC-SPEC- *
* 164, *
* *
* EXERCISE STANDARD *

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I. REMOVAL AND REPLACEMENT

* PROCEDURES TO ENSURE *
* THAT SYSTEM CLEANLINESS *
* PER THE REQUIREMENTS OF *
* MSFC-SPEC-164, FOR *
* OXYGEN SERVICE IS *
* MAINTAINED, *
* *
* PRIOR TO RECONNECTING *
* ANY LINES TO THE *
* VEHICLE, THE CONSOLE *
* MUST BE PURGED, GAS *
* SAMPLES MUST BE TAKEN *
* FROM EACH SYSTEM *
* OUTLET, PER STANDARD *
* PROCEDURES, AND *
* ANALYZED TO ENSURE THAT *
* CLEANLINESS PER THE *
* REQUIREMENTS OF MSFC *
* DWG-10M01671, LEVEL II *
* HAS BEEN MAINTAINED, *
* *

1. PRESSURE GAGE (VG-10), PN 1377SS-X0B2

(A) MATERIALS

GREASE, MIL-G-4343

LEAK TEST SOLUTION, AMS-3159

(B) PARTS

GASKET, PN S0046712, 1 EACH

SEAL, PN S025404, 1 EACH

(C) TOOLS

ADAPTER (1/4 IN., 3/8 IN. DRIVE), PN TM-1, SNAP-ON TOOLS CORP.
(95719)

WRENCH, CROWFOOT FLARENUT (1/16 IN., 1/4 IN. DRIVE), PN

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1. REMOVAL AND REPLACEMENT

AN-8508-9, SNAP-ON TOOLS CORP, (55719)

WRENCH, TORQUE (0-300 IN LB, 3/8 IN, DRIVE) PN TO-25, SNAP-ON TOOLS CORP, (55719)

(D) REMOVAL

-----7-

- (1) DISCONNECT PIPING AND DISCARD SEAL,
- (2) REMOVE GAGE FROM CONSOLE,
- (3) REMOVE RESTRICTOR AND DISCARD GASKET,

(E) REPLACEMENT

-----7-----

- (1) APPLY A THIN FILM OF MIL-G-4343 GREASE TO NEW GASKET, PN S0046T12, AND INSTALL ON FITTING,
- (2) INSTALL FITTING REPLACEMENT GAGE PER REQUIREMENTS OF AND10064,
- (3) INSTALL REPLACEMENT GAGE IN CONSOLE,
- (4) CONNECT PIPING TO GAGE USING NEW SEAL, PN S0254C4; TIGHTEN LINE FITTINGS WITH A TORQUE WRENCH PER THE REQUIREMENTS OF MSFC-DWG-10509303,

(F) LEAKCHECK PROCEDURE

-----7-----

- (1) PRESSURIZE SYSTEM PER TCP 0-1-26115
- (2) APPLY LEAK TEST SOLUTION, AMS-3159, TO GAGE FITTING AND PIPE CONNECTION; NO LEAKAGE ALLOWED,
- (3) DEPRESSURIZE SYSTEM PER TCP 0-1-26115,
- (4) PAINT TORQUE STRIPE ON FITTINGS,

2. PRESSURE GAGE (VG-74), PN S0206A12

-----7-----

(A) MATERIALS

-----7-----

GREASE, MIL-G-4343

(CONTINUED)

I. REMOVAL AND REPLACEMENT

LEAK TEST SOLUTION, AMS-3159

(B) PARTS

GASKET, PN S0046T12, 1 EACH

SEAL, PN S0254C4, 1 EACH

(C) TOOLS

ADAPTER, (1/4 IN., 3/8 IN. DRIVE), PN TM-1, SNAP-ON TOOLS CORP., (55719)

WRENCH, CROWFOOT FLARENUT (9/16 IN, 1/4 IN. DRIVE), PN AN-8500-9, SNAP-ON TOOLS CORP., (55719)

WRENCH, TORQUE (0-300 IN LB, 3/8 IN. DRIVE), PN TQ-25, SNAP-ON TOOLS CORP., (55719)

(D) REMOVAL

(1) DISCONNECT PIPING AND DISCARD SEAL,

(2) REMOVE GAGE FROM CONSOLE,

(3) REMOVE RESTRICTOR AND DISCARD GASKET,

(E) REPLACEMENT

(1) APPLY A THIN FILM OF MIL-G-4343 GREASE TO NEW GASKET, PN S0046T12, AND INSTALL ON FITTING,

(2) INSTALL FITTING IN REPLACEMENT GAGE PER REQUIREMENTS OF AND10064,

(3) INSTALL GAGE IN CONSOLE,

(4) CONNECT PIPING TO GAGE USING NEW SEAL, PN S0254C4, TIGHTEN LINE FITTINGS WITH A TORQUE WRENCH PER THE REQUIREMENTS OF MSFC-DWG-10509303,

(F) LEAKCHECK PROCEDURE

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1. REMOVAL AND REPLACEMENT

- (1) PRESSURIZE SYSTEM PER TCP 0-I-26115
- (2) APPLY LEAK TEST SOLUTION, AMS-3159, TO GAGE FITTING AND PIPE CONNECTION; NO LEAKAGE ALLOWED.
- (3) DEPRESSURIZE SYSTEM PER TCP 0-I-26115
- (4) PAINT TORQUE STRIPE ON FITTINGS.

3. HIGH VACUUM COMPOUND PUMP, MODEL KC-8

(A) MATERIALS

GREASE, MIL-G-4343

LEAK TEST SOLUTION, AMS-3159

(B) PARTS

GASKET, PN S0046T119, 1 EACH

SEAL, PN S0254C8, 4 EACH

SEAL, PN S0254C16, 2 EACH

(C) TOOLS

WRENCH, CROWFOOT FLARENUT (7/8 IN, 3/8 IN, DRIVE), PN AN-8508-14, SNAP-ON TOOLS CORP. (55719)

WRENCH, CROWFOOT FLARENUT (1-1/2 IN, 1/2 IN, DRIVE), PN AN8508-24, SNAP-ON TOOLS CORP. (55719)

WRENCH, TORQUE (0-600 IN LB, 3/8 IN, DRIVE), PN TQ-50A, SNAP-ON TOOLS CORP. (55719)

WRENCH, TORQUE (0-3000 IN LB, 1/2 IN, DRIVE), PN TQ-251, SNAP-ON TOOLS CORP. (55719)

(D) REMOVAL

(CONTINUED)

I. REMOVAL AND REPLACEMENT

- (1) REMOVE BULKHEAD RELIEF VENT TUBE ASSEMBLY, PN 1A88492-1, AND DISCARD SEALS,
- (2) REMOVE VACUUM PUMP DISCHARGE TUBE ASSEMBLY, PN 1B65481-1, AND DISCARD SEALS,
- (3) REMOVE VACUUM PUMP INLET TUBE ASSEMBLY, PN 1A88466-1, AND DISCARD SEALS,
- (4) DISCONNECT ELECTRICAL WIRES FROM PUMP MOTOR,
- (5) REMOVE FOUR NUTS AND WASHERS FROM PUMP MOUNTING SCREWS,
- (6) REMOVE GROUND STRAP FROM MOUNTING SCREW,
- (7) REMOVE VACUUM PUMP ASSEMBLY FROM CONSOLE,
- (8) REMOVE INLET TUBE FITTING AND DISCARD GASKET,

(E) REPLACEMENT

- (1) APPLY A THIN FILM OF MIL-G-4343 GREASE TO NEW GASKET, PN S0046T119, AND INSTALL ON FITTING,
- (2) INSTALL FITTING ON VACUUM PUMP PER REQUIREMENTS OF AND10064,
- (3) INSTALL VACUUM PUMP ASSEMBLY IN CONSOLE,
- (4) INSTALL GROUND STRAP AND WASHER ON MOUNTING SCREW,
- (5) INSTALL FOUR WASHERS AND NUTS ON MOUNTING SCREWS AND TIGHTEN SECURELY,
- (6) INSTALL VACUUM PUMP INLET TUBE ASSEMBLY, PN 1A88466-1, USING NEW SEALS, PN S0254C8, TIGHTEN LINE FITTINGS WITH TORQUE WRENCH PER THE REQUIREMENTS OF MSFC-DWG-10509303,
- (7) INSTALL BULKHEAD RELIEF VENT TUBE ASSEMBLY, PN 1A88492-1, USING NEW SEALS, PN S0254C16, TIGHTEN LINE FITTINGS WITH A TORQUE WRENCH PER THE REQUIREMENTS OF MSFC-DWG-10509303,
- (8) INSTALL VACUUM PUMP DISCHARGE TUBE ASSEMBLY, PN 1B65481-1, USING NEW SEALS, PN S0254C8, TIGHTEN LINE FITTINGS WITH A TORQUE WRENCH PER THE REQUIREMENTS OF MSFC-DWG-

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1. REMOVAL AND REPLACEMENT

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(9) CONNECT ELECTRICAL LEADS TO PUMP MOTOR,

NOTE

REFER TO PARA E.6 FOR
VACUUM PUMP CHECK AFTER
REPLACEMENT

(F) LEAKCHECK PROCEDURE

- (1) PRESSURIZE SYSTEM PER TCP 0-I-26115
- (2) APPLY LEAK TEST SOLUTION, AMS-3159, TO FITTINGS OF VACUUM PUMP AND TUBE ASSEMBLIES, PN 1A88466-1, 1A88492-1, AND 1B65481-1; NO LEAKAGE ALLOWED.
- (3) DEPRESSURIZE SYSTEM PER TCP 0-I-26115
- (4) PAINT TORQUE STRIPE ON FITTINGS.

4. HAND REGULATOR (N-56), PN 1A88459-1

(A) MATERIALS

GREASE, MIL-G-4343

LEAK TEST SOLUTION, AMS-3159

(B) PARTS

GASKET, PN S0046T14, 2 EACH

SEAL, PN S0254C4, 1 EACH

SEAL, PN S0254C6, 1 EACH

(C) TOOLS

(CONTINUED)

I. REMOVAL AND REPLACEMENT

ADAPTER (1/4 IN., 3/8 IN. DRIVE), PN TM-1, SNAP-ON TOOLS CORP, (55719)

WRENCH, CROWFOOT FLARENUT (1/16 IN., 1/4 IN. DRIVE), PN AN-8508-9, SNAP-ON TOOLS CORP, (55719)

WRENCH, CROWFOOT FLARENUT (11/16 IN., 3/8 IN. DRIVE), PN AN-8508-11, SNAP-ON TOOLS CORP, (55719)

WRENCH, CROWFOOT FLARENUT (13/16 IN., 3/8 IN. DRIVE), PN AN-8508-13, SNAP-ON TOOLS CORP, (55719)

WRENCH, TORQUE (0-300 IN LB, 3/8 IN. DRIVE), PN TQ-25, SNAP-ON TOOLS CORP, (55719)

WRENCH, TORQUE (0-600 IN LB, 3/8 IN. DRIVE), PN TQ-50A, SNAP-ON TOOLS CORP, (55719)

(D) REMOVAL

- (1) DISCONNECT PIPING AND DISCARD SEALS,
- (2) REMOVE CAPNUT AND HANDLE,
- (3) REMOVE REGULATOR FROM CONSOLE,
- (4) REMOVE FITTINGS FROM REGULATOR AND DISCARD GASKETS,

(E) REPLACEMENT

- (1) APPLY A THIN FILM OF MIL-G-4343 GREASE TO NEW GASKET, PN S0046T14, AND INSTALL FITTINGS,
- (2) INSTALL FITTINGS ON REPLACEMENT REGULATOR PER REQUIREMENTS OF AND10064,
- (3) INSTALL REGULATOR IN CONSOLE,
- (4) CONNECT TUBE ASSEMBLY, PN 1A88495-1, USING NEW SEAL, PN S025404, TIGHTEN LINE FITTINGS WITH A TORQUE WRENCH PER THE REQUIREMENTS OF MSFC-DWG-10509303,
- (5) CONNECT TUBE ASSEMBLY, PN 1A98258-1, USING NEW SEAL, PN S025406, AND TIGHTEN LINE FITTINGS WITH A TORQUE WRENCH PER THE REQUIREMENTS OF MSFC-DWG-10509303.

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1. REMOVAL AND REPLACEMENT

(6) INSTALL HANDLE AND CAPNUT,

(F) LEAKCHECK PROCEDURE

(1) PRESSURIZE SYSTEM PER 0-1-26115

(2) APPLY LEAK TEST SOLUTION, AMS-3159, TO FITTINGS; NO
LEAKAGE ALLOWED.

(3) DEPRESSURIZE SYSTEM PER 0-1-26115

(4) PAINT TORQUE STRIPE ON FITTINGS.

5. SOLENOID VALVES (VS-15 AND VS-16), PN 1A59721-1

(A) MATERIALS

GREASE, MIL-G-4343

LEAK TEST SOLUTION, AMS-3159

(B) PARTS

GASKET, PN S0046T123, 2 EACH

SEAL, PN S0254C8, 2 EACH

(C) TOOLS

WRENCH, CROWFOOT FLARENUT (7/8 IN., 3/8 IN. DRIVE), PN AN 8508-14, SNAP-ON TOOLS CORP. (55719)

WRENCH, CROWFOOT FLARENUT (1-5/8 IN., 1/2 IN. DRIVE), PN AN-8508-26, SNAP-ON TOOLS CORP. (55719)

WRENCH, TORQUE (0-600 IN LB, 3/8 IN. DRIVE), PN TQ-50A, SNAP-ON TOOLS CORP. (55719)

WRENCH, TORQUE (0-3000 IN LB, 1/2 IN. DRIVE), PN TQ-251, SNAP-ON TOOLS CORP. (55719)

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I. REMOVAL AND REPLACEMENT

(D) REMOVAL

- (1) REMOVE ELECTRICAL CONNECTORS FROM TOP AND BOTTOM OF VALVE,
- (2) DISCONNECT PIPING AND DISCARD SEALS,
- (3) REMOVE VALVE FROM CONSOLE,
- (4) REMOVE FITTINGS FROM VALVE AND DISCARD GASKET,

(E) REPLACEMENT

- (1) APPLY A THIN FILM OF MIL-G-4343 TO NEW GASKETS, PN S0046T123, AND INSTALL ON FITTINGS,
- (2) INSTALL FITTINGS IN REPLACEMENT VALVE PER REQUIREMENTS, OF AND10064,
- (3) INSTALL VALVE IN CONSOLE,
- (4) CONNECT PIPING TO VALVE USING NEW SEALS, PN S025408, TIGHTEN LINE FITTINGS WITH A TORQUE WRENCH PER THE REQUIREMENTS OF MSFC-DWG-10509303,
- (5) INSTALL ELECTRICAL CONNECTORS TO TOP AND BOTTOM OF VALVE,

(F) LEAKCHECK PROCEDURE

- (1) PRESSURIZE SYSTEM PER TCP O-I-26115
- (2) APPLY LEAK TEST SOLUTION, AMS-3159, TO FITTINGS; NO LEAKAGE ALLOWED,
- (3) DEPRESSURIZE SYSTEM PER TCP O-I-26115
- (4) PAINT TORQUE STRIPE ON FITTINGS,

6. SOLENOID VALVES, PN 1A8846-1 (VS-18, VS-19, VS-20, VS-21, VS-22, AND VS-23) AND PN 1A88561-503 (VS-17)

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1. REMOVAL AND REPLACEMENT

(A) MATERIAL

LEAK TEST SOLUTION, AMS-3159

(B) PARTS

SEAL, PN S0294C4, 2 EACH

(C) TOOLS

ADAPTER, (1/4 IN., 3/8 IN. DRIVE), PN TM-1, SNAP-ON TOOLS CORP. (55719)

WRENCH, CROWFOOT FLARENUT (9/16 IN., 1/4 IN. DRIVE), PN AN-8508-9, SNAP-ON TOOLS CORP. (55719)

WRENCH, TORQUE (0-300 IN LB, 3/8 IN. DRIVE), PN TO-25, SNAP-ON TOOLS CORP. (55719)

(D) REMOVAL

- (1) REMOVE PIPING AND DISCARD SEALS,
- (2) REMOVE ELECTRICAL WIRES FROM TERMINAL STRIP,
- (3) REMOVE STRING TIES RETAINING WIRES,
- (4) REMOVE VALVE FROM CONSOLE,
- (5) REMOVE FITTINGS FROM VALVE,

(E) REPLACEMENT

- (1) INSTALL FITTINGS IN REPLACEMENT VALVE AND TIGHTEN SECURELY,
- (2) INSTALL VALVE IN CONSOLE,
- (3) CONNECT ELECTRICAL WIRES TO TERMINAL STRIP,
- (4) ATTACH STRING TIES TO RETAIN WIRES,

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1. REMOVAL AND REPLACEMENT

- (5) CONNECT PIPING TO VALVE USING NEW SEALS, PN S025404, TIGHTEN LINE FITTING WITH A TORQUE WRENCH PER THE REQUIREMENTS OF MSFC-DWG-10509303.

(F) LEAKCHECK PROCEDURE

- (1) PRESSURIZE SYSTEM PER TCP 0-1-26115
(2) APPLY LEAK TEST SOLUTION, AMS-3159, TO FITTINGS; NO LEAKAGE ALLOWED.
(3) DEPRESSURIZE SYSTEM PER TCP 0-1-26115
(4) PAINT TORQUE STRIPE ON FITTINGS.

7. BELLOWS SEALED ANGLE VALVE, PN R-100-P (VH-67 AND VH-68)

(A) MATERIALS

GREASE, MIL-G-4343
LEAK TEST SOLUTION, AMS-3159

(B) PARTS

GASKET, PN S0046T119, 2 EACH
SEAL, PN S025408, 2 EACH

(C) TOOLS

WRENCH, CROWFOOT FLARENUT (7/8 IN., 3/8 IN. DRIVE), PN AN-8508-14, SNAP-ON TOOLS CORP. (55719)

WRENCH, CROWFOOT FLARENUT (1-3/8 IN., 1/2 IN. DRIVE), PN AN-8508-22, SNAP-ON TOOLS CORP. (55719)

WRENCH, TORQUE (0-600 IN LB, 3/8 IN. DRIVE), PN TQ-50A, SNAP-ON TOOLS CORP. (55719)

WRENCH, TORQUE (0-1600 IN LB, 1/2 IN. DRIVE), PN TQ-151, SNAP-ON TOOLS CORP. (55719)

(CONTINUED)

I. REMOVAL AND REPLACEMENT

(D) REMOVAL

- (1) REMOVE HANDLE,
- (2) REMOVE PIPING AND DISCARD SEALS,
- (3) REMOVE VALVE FROM CONSOLE,
- (4) REMOVE FITTINGS FROM VALVE AND DISCARD O-RING,

(E) REPLACEMENT

- (1) APPLY A THIN FILM OF MIL-G-4343 GREASE TO NEW GASKETS, PN S0046T119, AND INSTALL ON FITTINGS,
- (2) INSTALL FITTINGS IN REPLACEMENT VALVE PER REQUIREMENTS OF AND10064,
- (3) INSTALL VALVE IN CONSOLE
- (4) CONNECT PIPING TO VALVE USING NEW SEALS, PN S0254C8, TIGHTEN LINE FITTINGS WITH A TORQUE WRENCH PER THE REQUIREMENTS OF MSFC-DWG-10509303,
- (5) INSTALL HANDLE.

(F) LEAKCHECK PROCEDURE

- (1) PRESSURIZE SYSTEM PER TCP 0-I-26115
- (2) APPLY LEAK TEST SOLUTION, AMS-3159, TO FITTINGS; NO LEAKAGE ALLOWED,
- (3) DEPRESSURIZE SYSTEM PER TCP 0-I-26115
- (4) PAINT TORQUE STRIPE ON FITTINGS,

8. HAND VALVES VH-70 AND VH-71, PN 1A88464-1

(A) MATERIALS

GREASE, MIL-G-4343

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I. REMOVAL AND REPLACEMENT

LEAK TEST SOLUTION, AMS-3159

(B) PARTS

GASKET, PN S0046T12, 2 EACH

SEAL, PN S025404, 1 EACH

(C) TOOLS

ADAPTER (1/4 IN., 3/8 IN. DRIVE), PN TM-1, SNAP-ON TOOLS CORP. (55719)

WRENCH, CROWFOOT FLARENUT (9/16 IN., 1/4 IN. DRIVE), PN AN-8508-9, SNAP-ON TOOLS CORP. (55719)

WRENCH, CROWFOOT FLARENUT (11/16 IN., 3/8 IN. DRIVE), PN AN-8508-11, SNAP-ON TOOLS CORP. (55719)

WRENCH, TORQUE (0-300 IN LB, 3/8 IN. DRIVE), PN TQ-25, SNAP-ON TOOLS CORP. (55719)

(D) REMOVAL

- (1) DISCONNECT PIPING AND DISCARD SEAL,
- (2) REMOVE VALVE FROM BOTTLE,
- (3) REMOVE FITTINGS FROM VALVE AND DISCARD GASKET,

(E) REPLACEMENT

- (1) APPLY A THIN FILM OF MIL-G-4343 GREASE TO NEW GASKETS, PN S0046T12, AND INSTALL FITTINGS,
- (2) INSTALL FITTINGS IN REPLACEMENT VALVE PER REQUIREMENTS OF AND10064,
- (3) INSTALL VALVE ON BOTTLE AND TIGHTEN SECURELY,
- (4) CONNECT PIPING TO VALVE USING NEW SEALS, PN S025404, TIGHTEN LINE FITTINGS WITH A TORQUE WRENCH PER THE REQUIREMENTS OF NSFC-DWG-10509303,

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I. REMOVAL AND REPLACEMENT

(F) LEAKCHECK PROCEDURE
=====

- (1) PRESSURIZE SYSTEM PER TCP 0-1-26115
- (2) APPLY LEAK TEST SOLUTION, AMS-3159, TO FITTING; NO LEAKAGE ALLOWED.
- (3) DEPRESSURIZE SYSTEM PER TCP 0-1-26115
- (4) PAINT TORQUE STRIPE ON FITTINGS

9. HAND VALVES (NH-181, NH-182 AND VH-74), PN 3864056-1
=====

(A) MATERIALS
=====

GREASE, MIL-G-4343
LEAK TEST SOLUTION, AMS-3159

(B) PARTS
=====

GASKET, PN S0046T17, 2 EACH
SEAL, PN S0254C6, 2 EACH

(C) TOOLS
=====

ADAPTER (1/4 IN., 3/8 IN. DRIVE), PN TM-1, SNAP-ON TOOLS CORP, (55719)
WRENCH, CROWFOOT FLARENUT (9/16 IN., 1/4 IN. DRIVE), PN TM-1, SNAP-ON TOOLS CORP, (55719)
WRENCH, CROWFOOT FLARENUT (11/16 IN., 3/8 IN. DRIVE), PN AN-8508-11, SNAP-ON TOOLS CORP, (55719)
WRENCH, TORQUE (0-300 IN LB, 3/8 IN. DRIVE), PN TQ-25, SNAP-ON TOOLS CORP, (55719)

(D) REMOVAL
=====

(CONTINUED)

I. REMOVAL AND REPLACEMENT

- (1) REMOVE HANDLE,
- (2) DISCONNECT PIPING AND DISCARD SEALS,
- (3) REMOVE VALVE FROM CONSOLE,
- (4) REMOVE FITTINGS FROM VALVE AND DISCARD GASKET,

(E) REPLACEMENT

- (1) APPLY A THIN FILM OF MIL-G-4343 GREASE TO NEW GASKETS, PN S0046T12, AND INSTALL ON FITTINGS,
- (2) INSTALL FITTINGS IN REPLACEMENT VALVE PER REQUIREMENTS OF AND10064,
- (3) INSTALL VALVE IN CONSOLE,
- (4) CONNECT PIPING TO VALVE USING NEW SEALS, PN S025404 AND TIGHTEN LINE FITTINGS WITH A TORQUE WRENCH PER THE REQUIREMENTS OF MSFC-DWG-10509303,
- (5) INSTALL HANDLE,

(F) LEAKCHECK PROCEDURE

- (1) PRESSURIZE SYSTEM PER TCP 0-1-26115
- (2) APPLY LEAK TEST SOLUTION, AMS-3159, TO GAGE FITTING AND PIPE CONNECTION,
- (3) DEPRESSURIZE SYSTEM PER TCP 0-1-26115
- (4) PAINT TORQUE STRIPE ON FITTINGS,

10. HAND VALVES (NH-180 AND NH-187), PN 3864056-501

(A) MATERIALS

GREASE, MIL-G-4343

LEAK TEST SOLUTION, AMS-3159

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1. REMOVAL AND REPLACEMENT

(B) PARTS

GASKET, PN S0046T17, 2 EACH

SEAL, PN S0254C6, 2 EACH

(C) TOOLS

WRENCH, CROWFOOT FLARENUT (1 IN., 3/8 IN. DRIVE), PN AN-8505-16, SNAP-ON TOOLS CORP. (55719)

WRENCH, CROWFOOT FLARENUT (11/16 IN., 3/8 IN. DRIVE), PN AN-8508-11, SNAP-ON TOOLS CORP. (55719)

WRENCH, TORQUE (0-600 IN LB, 3/8 IN. DRIVE), PN TQ-50A, SNAP-ON TOOLS CORP. (55719)

(D) REMOVAL

(1) REMOVE HANDLE.

(2) DISCONNECT PIPING AND DISCARD SEALS.

(3) REMOVE VALVE FROM CONSOLE.

(4) REMOVE FITTINGS FROM VALVE AND DISCARD GASKETS.

(E) REPLACEMENT

(1) APPLY A THIN FILM OF MIL-G-4343 GREASE TO NEW GASKET, PN S0046T17, AND INSTALL IN FITTINGS.

(2) INSTALL FITTINGS IN REPLACEMENT VALVE PER REQUIREMENTS OF AND10064.

(3) INSTALL VALVE IN CONSOLE.

(4) CONNECT PIPING TO VALVE USING NEW SEALS, PN S0254C6, TIGHTEN LINE FITTINGS WITH A TORQUE WRENCH PER THE REQUIREMENTS OF MSFC-DWG-10509303.

(5) INSTALL HANDLE.

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I. REMOVAL AND REPLACEMENT

(F) LEAKCHECK PROCEDURE

- (1) PRESSURIZE SYSTEM PER TCP 0-1-26115
- (2) APPLY LEAK TEST SOLUTION, AMS-3159, TO FITTINGS; NO LEAKAGE ALLOWED.
- (3) DEPRESSURIZE SYSTEM PER TCP 0-1-26115
- (4) PAINT TORQUE STRIPE ON FITTINGS.

J. REPAIR

CORRECT CORROSION DISCREPANCIES PER DRAWING 1850957.

1. COMMON BULKHEAD VACUUM MONITORING CONSOLE, PN 1A86798-1

REPAIR SHALL BE ACCOMPLISHED BY REMOVAL OF ANY DEFECTIVE COMPONENT AND REPLACEMENT WITH A LIKE COMPONENT OF KNOWN SERVICEABILITY, REFER TO PARAGRAPH I, FOR DETAILED REMOVAL AND REPLACEMENT PROCEDURE.

2. HIGH VACUUM COMPOUND PUMP, MODEL KC-8

(A) PARTS

- GASKET, CYLINDER COVER, PN 802489, 1 EACH
- GASKET, FILLER AND DRAIN PLUG, PN 0778-3, 2 EACH
- O-RING, SHAFT SEAL HOUSING, PN 050227, 2 EACH
- O-RING, CYLINDER COVER WINDOW, PN 050222, 1 EACH
- SEAL, CENTER WALL, PN 072035, 1 EACH
- SHAFT SEAL ASSEMBLY, PN 065046, 1 EACH
- SPRING, VALVE, PN 0621-5, 2 EACH

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VALVE, PN 0668-26, 1 EACH

* KINNEY VACUUM COMPANY, VENDOR CODE (33781).

(B) REPAIR INSTRUCTIONS

REFER TO KINNEY VACUUM OPERATING MANUAL NO. 3150,8,82

VERIFICATION TEST

PERFORM VERIFICATION TEST PER KINNEY VACUUM OPERATING MANUAL
NO. 3151,8, PAGE 13, CHECKING PUMP PERFORMANCE.

(C) PACKAGING

NOT APPLICABLE

3. SOLENOID VALVE, PN 1A59721-1 (VS-16 AND VS-15)

(A) PARTS

KIT, PARTS, KS-22B, 1 EACH, VACCO VALVE CO, (VENDOR CODE
99517)

(B) REPAIR INSTRUCTIONS

REFER TO VACCO VALVE CO, DRAWING 6555-C FOR REPAIR INSTRUCTIONS

(C) VERIFICATION TEST

PERFORM VERIFICATION TEST PER DRAWING 1A59721, PRODUCTION TEST
REQUIREMENTS.

(D) PACKAGING

AFTER VERIFICATION TEST, PROCESS AND PACKAGE COMPONENTS FOR
LIQUID OXYGEN SERVICE PER THE REQUIREMENTS OF MSFC-SPEC-164.

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4. REGULATOR, PN 1A68459-1

(A) PARTS

NOTE

THE FOLLOWING PARTS ARE
SUPPLIES BY GROVE VALVE
AND REGULATOR CO. (VENDOR
CODE 26505)

DIAPHRAGM, PN 090-02204, 1 EACH

INNER DIAPHRAGM GASKET, PN 021-00704, 2 EACH

OUTER DIAPHRAGM GASKET, PN 021-02204, 2 EACH

VALVE, PN 101-01557, 2 EACH

(B) REPAIR INSTRUCTIONS

REFER TO GROVE DRAWINGS W-15L-A01, W-15L-A01-3, AND W-15L-B01-2

(C) VERIFICATION TEST

PERFORM VERIFICATION TEST PER DRAWING 1A68459, PRODUCTION TEST
REQUIREMENTS.

(D) PACKAGING

AFTER VERIFICATION TEST, PROCESS AND PACKAGE COMPONENT FOR
LIQUID OXYGEN SERVICE PER THE REQUIREMENTS OF MSFC-SPEC-164.

K. APPENDIX

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K. APPENDIX

1. TABLE 1 ACE CONTROL ITEMS
2. FIGURE 1, SCHEMATIC-COMMON BULKHEAD VACUUM MONITORING CONSOLE
3. REVISION SHEETS

VERIFY THAT ANY NECESSARY REVISIONS TO THIS PROCEDURE DURING MAINTENANCE ACTIVITIES ARE NOTED ON FORM 60-999-3-4A (QUALITY ENGINEERING REVISION DOCUMENTATION LOG SHEET) AND APPROVED BY LOGISTICS SUPPORT (SATURN/APOLLO LOGISTICS ENGINEERING) AND RELIABILITY ASSURANCE (QUALITY ENGINEERING). ALSO VERIFY THAT CUSTOMER APPROVAL IS OBTAINED, IF REQUIRED, THE DISPOSITION OF REVISION SHEETS SHALL BE PER PARAGRAPH C.3.(B).

TABLE 1. AGE CONTROL ITEMS

COMPONENT		VENDOR		AGE COMPONENTS		REF. PARA.	
PART NO.	NOMENCLATURE	PART NO.	NAME	PART NO.	NOMENCLATURE	REM/ REPL.	REPAIR
KC-8	High Vacuum Compound Pump	KC-8	Kinney Vacuum Div. The New York Air Brake Co.	0050222	O-ring	9.3	10.1.1
				050227	O-ring		
				051010	V-Belt		
				065027	Shaft Seal Assembly		
				072004	Seal, Center Wall		
				0778-1	Gasket, Cylinder Cover		
				0778-3	Gasket, Filler & Brain Plug		
R-100P	Bellows Sealed Angle Valve	R-100P	Vacuum Electronics Corp.	0011-223 2000-413	O-ring Seat Seal	9.7	
1A59721-1	Valve 1 Inch, Solenoid Vacuum 2-way	VSD-305-2C-MS	Vacco Industries	Commercial VSD-305P-2C-3	O-ring Seat	9.5	10.1.2
5991-C	Micro Switch Assembly	5991-C		B180-010	O-ring		
				B180-012	O-ring		
				B180-225	O-ring		
				KS-288	Spare Parts Kit		
				B180-012	O-ring		
				B180-032	O-ring		
				21051-A	Seat		
1A86793-1	Console, Cannon Bulkhead, Vacuum Monitoring	N/A	N/A	NAS1598C04Y NAS1598C08Y NAS1598C11Y NAS1598C12Y NAS1598C21Y NAS1598C23Y NAS1598C3Y NAS1598C4Y NAS1598C5Y NAS1598C6Y NAS1598C7Y	Washer Washer Washer Washer Washer Washer Washer Washer Washer Washer Washer	10.1	

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TABLE 1. AGE CONTROL ITEMS (Continued)

COMPONENT		VENDOR		AGE COMPONENTS		REF. PARA.	
PART NO.	NOMENCLATURE	PART NO. *	NAME	PART NO.	NOMENCLATURE	REM/ REPL.	REPAIR
1A88458-1	Valve Check, 1 1/2 in Vacuum	CVO-OIP-407-24M	Vacco Industries	B180-219 B180-228	O-ring O-ring		
1A88460-1	Valve Solenoid, 1 inch, N.C. two-way	LM821027V	Automatic Switch Co.	FV-68-153 Item 10 Item 12 Item 14 Item 17 NOTE: Parts identified by item number on Automobile Switch drawing HVA-30-849.	Spare Parts Kit Valve Gasket Pilot Disc Disc Quad-Ring		
1A88461-1	Valve Solenoid, 1/4 inch two-way	LB826264	Automatic Switch Co.	FV-68-038 Item 5 NOTE: Parts identified by item number on Automatic Switch drawing HVA-36-874.	Spare Parts kit Valve Body Gasket	9.6	
1A88461-503	Valve Solenoid, 1/4 inch two-way	LMX82670	Automatic Switch Co.	FV-68-047 Item 1B Item 6 NOTE: Parts identified by item number on Automatic Switch drawing HVA-30-849.	Spare Parts Kit O-ring Seal Valve Body Gasket		

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TABLE 1. AGE CONTROL ITEMS (Continued)

COMPONENT		VENDOR		AGE COMPONENTS		REF. PARA	
PART NO.	NOMENCLATURE	PART NO.	NAME	PART NO.	NOMENCLATURE	REM/ REPL.	REPAIR
1A88464-1	Valve, Hand 1/4	30-1101-304	Tescom Corp.	38-1100-30	Spare Parts Kit	9.8	
				5200-009067	O-ring		
				5200-020097	O-ring		
1B29666-1	Valve, Relief-Pneumatic, Purge, Low Pressure	P11-533	James, Pond, and Clark	MS28775-213	Packing		
				5018-19	O-ring		
1B69418-1	Gasket, Gage						
1B69419-1	Gasket, Regulator						
1B69551-1	Gasket, Valve						
3864056-1	Valve, Hand, 3000 and 6000 psi	NVA-6P-401-2MG-4-0	Vacco Industries	KNV-117	Spare Parts Kit	9.9	
				180-008	O-ring		
				180-110	O-ring		
				6227-3-80	O-ring		
				6227-8-70	O-ring		
3864056-501	Valve, Hand, 3000 and 6000 psi	NVA-6P-403-2G-03	Vacco Industries	KNV-151	Spare Parts Kit	9.10	
				N180-012			
				N180-111			
				N180-113			
				N180-114			
				N180-212			

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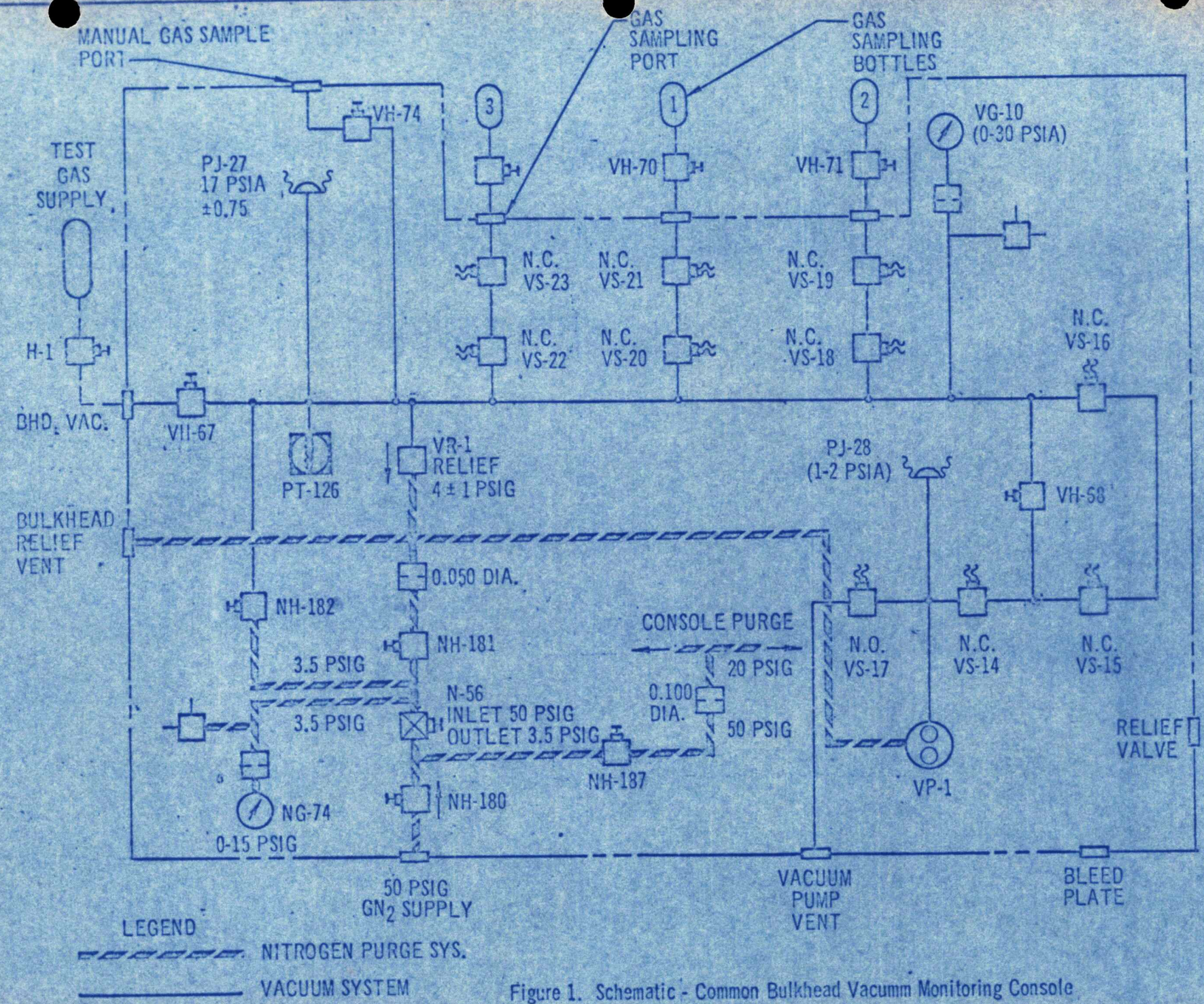


Figure 1. Schematic - Common Bulkhead Vacuum Monitoring Console

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VOLUME TWO

CONSOLE, COMMON BULKHEAD
VACUUM MONITORING, PN 1A86793-1
CALIBRATION, PROCEDURE

A. REFERENCE DOCUMENTS

1. DAC DRAWINGS

- (A) 1A86793 CONSOLE, COMMON BULKHEAD VACUUM MONITORING
- (B) 1B65479 SCHEMATIC, COMMON BULKHEAD VACUUM MONITORING CONSOLE,

B. OPERATING STATIONS

NOT APPLICABLE

C. TEST EQUIPMENT

NOTE

CALIBRATING EQUIPMENT
MINIMUM USE SPECIFICATIONS
HAVE BEEN SELECTED TO
ENSURE COMPLIANCE WITH
MEASUREMENT TRACEABILITY
REQUIREMENTS. RECOMMENDED
STANDARDS OR COMBINATIONS
SHOULD COMPRISE A
MEASUREMENT SYSTEM WITH AN
UNCERTAINTY OF BETWEEN ONE-
FOURTH AND ONE-TENTH OF THE
UNCERTAINTY OF THE UNIT
UNDER TEST (UUT),

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C, TEST EQUIPMENT

TABLE 1

EQUIPMENT AND POWER		MINIMUM USE SPECIFICATIONS	RECOMMENDED EQUIPMENT
1,	CALIBRATION STANDARDS		
(A)	ABSOLUTE PRESSURE TEST GAGE	RANGE: 0-30 PSIA ACCURACY: ± 0.1 PSI	PRESSURE TRANSFER STANDARD, SEEGER'S MODEL SS-2455A-60 OR WALLACE & TIENNAN FA253.
2,	SUPPORT EQUIPMENT		
(A)	VACUUM PUMP	RANGE: BELOW 1 PSIA	MODEL DSV-4-187 OR KINNEY MODEL KQ8
(B)	REGULATED GAGE ASSEMBLIES	RANGES: 6000 PSI AND 500 PSI	ANY
3,	POWER REQUIREMENTS		
ELECTRICAL		110 TO 120V, 60 HZ, 5 AMPS	LINE POWER

NOTE

EQUIPMENT MEETING MINIMUM
USE SPECIFICATIONS EITHER
DIRECTLY OR BY APPLICATION
OF CORRECTION FACTORS MAY
BE SUBSTITUTED FOR
RECOMMENDED EQUIPMENT.

D, RECORDS

1, CERTIFICATION RECORDS

(CONTINUED)

D. RECORDS

2. WHEN REQUESTED BY ENGINEERING (FORM A270-Q-98) SHALL BE MADE FOR EACH PERFORMANCE OF THIS PROCEDURE,

ANY DEVIATIONS THAT MAY BE REQUIRED SHALL BE DOCUMENTED ON THE CALIBRATION DATA REPORT AND APPROVED BY THE COGNIZANT ENGINEER,

DATA SHEETS, CHARTS, AND/OR PRINTOUTS PRODUCED IN THE PERFORMANCE OF THIS PROCEDURE SHALL BE COMPILED IN THE LOG RECORD BOOK AND TOGETHER WITH THE PROCEDURE CALIBRATION DATA REPORT, SHALL CONSTITUTE THE CERTIFICATION RECORDS,

3. CERTIFICATION

UPON COMPLETION OF THE TEST, ENTER THE INFORMATION ON THE CERTIFIED STICKER (FORM 28-319B) AND AFFIX TO THE DEVICE TO ATTEST THE CALIBRATION,

E. SAFETY

NO UNUSUAL SAFETY HAZARDS WILL BE ENCOUNTERED DURING THE PERFORMANCE OF THIS CPC,

PERFORMANCE OF THIS PROCEDURE SHALL BE IN ACCORDANCE WITH THE DAC MSSD AND FLORIDA TEST CENTER SAFETY MANUAL PROVISIONS,

F. TIME CYCLE/SIGNIFICANT ITEMS

NOT APPLICABLE

G. ENGINEERING WALK-AROUND

MEASUREMENTS ENGINEERING OR DESIGNEE SHALL BE TASK LEADER AND SHALL PERFORM A GENERAL INSPECTION PRIOR TO TEST COMMENCEMENT TO VERIFY THAT ALL EQUIPMENT USED DURING THIS CALIBRATION, BEARS A CURRENT CERTIFICATION STICKER AND TO ENSURE THAT THE EQUIPMENT IS FREE OF OBVIOUS PHYSICAL OR ELECTRICAL DEFECTS,

(CONTINUED)

G. ENGINEERING WALK-AROUND

THE COGNIZANT DESIGN GROUP OF DEVELOPMENT ENGINEERING, A41-865, SHALL BE INFORMED PRIOR TO EACH CALIBRATION FOR EFFORT COORDINATION.

H. PREPARATIONS

1. UUT CALIBRATION METHODS AND SPECIFICATIONS

TABLE II

ITEM AND CHARACTERISTIC	PERFORMANCE SPECIFICATIONS
(A) PRESSURE GAGE (VG-10)	RANGE: 1 TO 30 PSIA (TESTED: 0 TO 20 PSIA) ACCURACY: ± 0.2 PSIA, BELOW 6 PSIA ± 1 PSIA, ABOVE 6 PSIA
(B) PRESSURE GAGE (NG-74)	RANGE: 0-15 PSIG (TESTED: 0 TO 10.5 PSIG) ACCURACY: ± 0.4 PSI

NOTE

THE FOLLOWING ITEMS TESTED
FOR SATURN 1B ONLY.

(C) PRESSURE TRANSDUCER (PT-126)	TESTED AT: 0, 5, AND 25 PSIA
(D) PRESSURE TRANSDUCER (PJ-27)	ACTION: 17 ± 0.75 PSIA
(E) PRESSURE TRANSDUCER (PJ-28)	ACTION: 1.5 ± 0.5 PSIA
(F) RELIEF VALVE (VR-1)	ACTION: 18.7 ± 1 PSIA

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I. CALIBRATION

1. PREPARATION FOR PRESSURIZATION (FOR SATURN 1B ONLY)

- (A) CLOSE ALL UNIT UNDER TEST (UUT) HAND VALVES EXCEPT NH-182,
- (B) CLOSE UUT REGULATOR N-56,
- (C) INSTALL THE CALIBRATING PRESSURE GAGE ON THE UUT MANUAL SAMPLE PORT,
- (D) OPEN THE UUT HAND VALVE VH-74,
- (E) COORDINATE WITH THE PROPULSION DEPARTMENT AND OBTAIN THE USE OF THE DSV-48-433 PNEUMATIC CONSOLE TO SUPPLY GN2, REGULATED TO 50 +/- 10 PSIG, AT HAND VALVE NH-179 ON UUT.

NOTE

IF GN2 FROM THE DSV-48-433 CONSOLE IS NOT AVAILABLE, ADJUST THE ARGON PANEL CONTROLS TO OBTAIN 50 +/- 10 PSIG ARGON PRESSURE TO HAND VALVE NH-178. IN THIS EVENT, MENTALLY SUBSTITUTE ARGON FOR GN2 AND NH-178 FOR NH-179, WHENEVER GN2 AND NH-179 APPEAR IN THIS PROCEDURE. (IN THIS PROCEDURE ARGON AND GN2 ARE INTERCHANGEABLE, HOWEVER SINCE GN2 IS CHEAPER IT SHOULD BE USED WHENEVER AVAILABLE.)

- (F) DISCONNECT THE 1/4 INCH BULKHEAD VACUUM LINE FROM HAND VALVE VH-67. INSTALL A PRESSURE PLUG ON THE 1/4 INCH VACUUM LINE; HAND VALVE VH-67 MUST BE CLOSED,
- (G) COORDINATE WITH C4TC AND C4NR TO REQUEST OR VERIFY POWER ON PER I-21117, APPENDIX FIGURE 5, I.E. 115 VAC TO PLUG J3 VIA CABLE 1A88395-501, 115 VAC TO PLUG J1 VIA CABLE 1A88393-503, AND 28 VDC TO PLUG J2 VIA CABLE 1826535-1,

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1. CALIBRATION

- (H) U4ET CLOSE CIRCUIT BREAKERS CB1, CB2, AND CB3,
- (I) COORDINATE WITH C4TC AND C4VM TO PLACE THE DSV-4-305 VACUUM MONITOR CONSOLE IN OPERATION,
- (J) INSTALL A PRESSURE CAP ON THE UUT AUXILLARY PUMP PORT,
- (K) INSTALL PRESSURE CAPS ON ALL UUT SAMPLE PORTS THAT DO NOT HAVE SAMPLE BOTTLES INSTALLED, IF SAMPLE BOTTLES ARE INSTALLED, CLOSE SAMPLE BOTTLE HAND VALVES,
- (L) REMOVE PRESSURE CAPS, IF INSTALLED, ON THE BULKHEAD RELIEF PORT AND THE VACUUM PUMP PORT,

2. PRESSURIZATION & EVACUATION PROCEDURE (FOR SATURN 1B ONLY)

NOTE

THE FOLLOWING PROCEDURE IS WRITTEN TO FACILITATE CALIBRATION OF ALL GAGES, METERS, TRANSDUCERS, THE RELIEF VALVE, AND THE PERFORMANCE OF THE DSV-4-303 LEAK CHECK. REFER TO TABLE 1 TO BECOME FAMILIAR WITH THE PRESSURE RANGE THAT IS ASSOCIATED WITH THE VARIOUS EQUIPMENT TO BE TESTED OR ADJUSTED AND THE PARAGRAPHS IN WHICH THE TEST IS OUTLINED.

NOTE

THE REASON THE PRESSURIZATION (1.2.) AND CALIBRATION (1.3.) IS NOT COMBINED, IS TO FACILITATE THE ACCOMPLISHMENT OF ANY ONE COMPONENT CALIBRATION SEPERATELY IF THE NEED

(CONTINUED)

1. CALIBRATION

ARISES

(A) EVACUATE TO 0.0 ± 0.5 PSIA.

NOTE

IF PRESSURE OR VACUUM
CANNOT BE HELD AND A LEAK
IN THE SYSTEM IS SUSPECTED,
PERFORM LEAK CHECK PER
PARAGRAPHS 1,2,(H) AND
1,3,(G).

- (1) PLACE THE VACUUM PUMP ON-OFF TOGGLE SWITCH IN THE ON POSITION.
- (2) OPEN HAND VALVE VH-68.
- (3) ALLOW THE VACUUM PUMP TO RUN UNTIL THE CALIBRATING GAGE HAS STABILIZED AT A PRESSURE BELOW 0.5 PSIA. AFTER GAGE STABILIZATION, CLOSE HAND VALVE VH-68. ALLOW VACUUM PUMP TO OPERATE UNTIL THE TEST AT THIS PRESSURE IS COMPLETE. IF VACUUM DECAYS SLIGHTLY, REOPEN VH-68, (SEE PAR. 1,3,(C)).
- (4) AFTER TEST AT THIS PRESSURE IS COMPLETE, PLACE THE VACUUM PUMP SWITCH IN THE OFF POSITION AND OPEN HAND VALVE VH-68.
- (5) OPEN NH-179 AND NH-180.
- (6) SLOWLY OPEN N-56 AND PRESSURIZE THE CONSOLE TO APPROXIMATELY 20 PSIA.
- (7) CLOSE N-56, NH-180 AND NH-179.
- (8) OPEN NH-181 AND ALLOW SYSTEM PRESSURE TO LOWER UNTIL AMBIENT PRESSURE IS REACHED.
- (9) CLOSE NH-181 AND VH-68.
- (B) EVACUATE TO 1.5 ± 0.5 PSIA.

(CONTINUED)

I. CALIBRATION

- (1) OPEN HAND VALVES NH=179, NH=180, NH=182 AND VH=68.
- (2) CRACK OPEN THE N=56 REGULATOR AND IMMEDIATELY PLACE THE VACUUM PUMP SWITCH IN THE ON POSITION.

NOTE

IF THE VACUUM PUMP FAILS TO RUN OR MALFUNCTIONS, CLOSE THE N=56 REGULATOR TO PREVENT OVER PRESSURIZING THE CONSOLE COMPONENTS AND REFER TO VOLUME 1 OF THIS PROCEDURE.

- (3) ADJUST N=56 AS NECESSARY TO BRING PRESSURE DOWN VERY SLOWLY AND FINALLY STOP JUST BELOW THE PRESSURE AT WHICH PJ=28 PRESSURE TRANSDUCER ACTUATES CAUSING THE VACUUM MONITOR PANEL (VMP) PUMP VACUUM NORMAL INDICATOR TO ILLUMINATE.
- (4) IF STEP 1.2.(B)(3) CANNOT BE ACCOMPLISHED USING N=56 ONLY, OPEN N=56 AND THEN ADJUST HAND VALVE VH=67 AS NECESSARY TO ACCOMPLISH STEP 1.2.(B)(3).
- (5) HOLD THE PRESSURE AT A POINT JUST BELOW THE ACTUATION PRESSURE OF PJ=28 FOR AS LONG AS REQUIRED TO COMPLETE THE TEST OR CALIBRATION AT THIS PRESSURE SEE PARAGRAPHS 1.3.(A) AND 1.3.(E).
- (6) SLOWLY INCREASE THE OPENING OF N=56 (AND/OR VH=67 IF REQUIRED) IN ORDER TO DETERMINE THE RELEASE PRESSURE OF PJ=28 AS SIGNIFIED BY VMP PUMP VACUUM OVER PRESSURE INDICATOR ON, REF PARAGRAPH 1.3.(E).
- (7) REPEAT PARAGRAPHS 1.2.(B)(3) THROUGH 1.2.(B)(6) AS REQUIRED TO COMPLETE THE TEST BEING PERFORMED.
- (8) CLOSE HAND VALVE VH=67 IF USED AND ALLOW THE VACUUM PUMP TO RUN SEVERAL MINUTES TO REMOVE ALL AIR FROM THE SYSTEM. N=56 IS TO REMAIN OPEN DURING THIS OPERATION. IF VH=67 WAS NOT USED DURING STEPS 1.2.(B)(3) THROUGH 1.2.(B)(6), DISREGARD STEP 1.2.(B)(8).

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I. CALIBRATION

- (9) PLACE VACUUM PUMP SWITCH IN THE OFF POSITION AND ADJUST N-56 AS REQUIRED TO PRESSURIZE THE UUT TO APPROXIMATELY 20 PSIA THEN CLOSE HAND VALVES NH-179, NH-180 AND CLOSE N-56 REGULATOR.
- (10) OPEN HAND VALVE NH-181 AND ALLOW SYSTEM PRESSURE TO VENT TO APPROXIMATELY 14.7 PSIA, CLOSE HAND VALVES NH-181 AND VH-68.
- (C) EVACUATE TO 5.0 $\pm$ 0.0/0.5 PSIA,
 - (1) VERIFY HAND VALVE VH-68 IS CLOSED.
 - (2) PLACE VACUUM PUMP SWITCH IN THE ON POSITION.
 - (3) ADJUST HAND VALVE VH-68 AS REQUIRED TO SLOWLY LOWER UUT PRESSURE TO 5.0 $\pm$ 0.0/0.5 THEN CLOSE VH-68.
 - (4) HOLD SYSTEM AT THIS PRESSURE AS LONG AS NECESSARY TO PERMIT COMPLETION OF THE TEST OR CALIBRATION AT THIS PRESSURE, SEE PARAGRAPHS 1.3.(A) AND 1.3.(C).
 - (5) PLACE VACUUM PUMP SWITCH IN THE OFF POSITION AND OPEN HAND VALVE VH-68.
 - (6) OPEN HAND VALVES NH-179 AND NH-180.
 - (7) ADJUST REGULATOR N-56 AS REQUIRED TO PRESSURIZE THE UUT SYSTEM TO APPROXIMATELY 20 PSIA, CLOSE N-56.
 - (8) OPEN HAND VALVE NH-181 AND ALLOW THE SYSTEM TO VENT TO THE ATMOSPHERE.
 - (9) CLOSE HAND VALVES NH-179, NH-180, AND VH-68.
- (D) AMBIENT PRESSURE, 14.7 $\pm$ 0.5 PSIA.

NOTE

IF AMBIENT PRESSURE IS TO BE ATTAINED AS ONE OF A SERIES OF PRESSURES, SEE TABLE III, EACH FUNCTION IN 1.2 ENDS IN THE ATTAINMENT OF AMBIENT PRESSURE.

(CONTINUED)

I. CALIBRATION

THEREFORE, IF PARAGRAPH
1.2.(C) HAS JUST BEEN
ACCOMPLISHED, THE UUT IS AT
AMBIENT PRESSURE AND NO
FURTHER ACTION IS NECESSARY
TO SUPPORT TESTS OR
CALIBRATION AT THIS
PRESSURE, SEE PARAGRAPH
1.3.(A) AND 1.3.(B).

NOTE

IF THE NOTE ABOVE IS NOT
APPLICABLE, RATHER THAN
INTRODUCE RAW AIR INTO THE
UUT SYSTEM, PROCEED WITH
STEP 2.2.(D), (1).

- (1) OPEN HAND VALVES NH-179 & NH-180,
 - (2) OPEN N-56 AND PRESSURIZE THE UUT TO APPROXIMATELY 20 PSIA,
 - (3) CLOSE VALVES NH-179, NH-180, AND N-56,
 - (4) OPEN HAND VALVE NH-181 AND ALLOW THE UUT TO VENT TO ATMOSPHERE, CLOSE NH-181,
 - (5) SEE PARAGRAPHS 1.3.(A) AND 1.3.(B) FOR TESTS AND CALIBRATION AT AMBIENT PRESSURE (14.7 +/- 0.5 PSIA),
- (E) PRESSURIZATION TO 17.0 +/- 0.75,
- (1) OPEN HAND VALVES NH-179 AND NH-180,
 - (2) SLOWLY OPEN REGULATOR N-56 AND SLOWLY BRING UUT SYSTEM PRESSURE TO THE ACTUATION PRESSURE OF PJ-27 PRESSURE TRANSDUCER, CLOSE N-56.

NOTE

ACTUATION PRESSURE OF PJ-27
IS SIGNIFIED BY VMP VACUUM

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1. CALIBRATION

SUPPLY OPEN INDICATOR ON,

- (3) HOLD UUT SYSTEM PRESSURE UNTIL TESTS AND CALIBRATION AT THIS PRESSURE ARE COMPLETE, SEE PARAGRAPHS 1.3.(B) AND 1.3.(D),
- (4) SLOWLY OPEN HAND VALVE NH-181 AND LOWER UUT PRESSURE UNTIL PJ-27 TRANSDUCER RELEASES,

NOTE

RELEASE OF PJ-27 IS
SIGNIFIED BY VMP VACUUM
SUPPLY CLOSED LIGHT ON,

- (5) OPEN NH-181 AND ALLOW UUT TO VENT TO ATMOSPHERE, CLOSE NH-181,
- (F) PRESSURIZATION TO 18.7 ± 1.0 PSIA,
 - (1) OPEN HAND VALVES NH-179 AND NH-180, PLACE VACUUM SUPPLY SWITCH ON THE VMP IN THE EMERGENCY CLOSE POSITION,
 - (2) VERIFY HAND VALVES VH-67, VH-68, AND NH-181 ARE CLOSED,
 - (3) PLACE THUMB OVER THE BULKHEAD RELIEF PORT AND SLOWLY OPEN REGULATOR N-56. PRESSURIZE UUT SYSTEM UNTIL FLOW IS FELT AT THE BULKHEAD RELIEF PORT,

NOTE

FLOW FROM THE BULKHEAD
RELIEF PORT SIGNIFYS THAT
VR-1 RELIEF VALVE HAS
OPENED,

- (4) HOLD SYSTEM PRESSURE AT THIS POINT UNTIL TESTS AND CALIBRATION ARE COMPLETE; SEE PARAGRAPHS 1.3.(A), 1.3.(E) AND 1.3.(F),

(CONTINUED)

I. CALIBRATION

- (5) RAISE SYSTEM PRESSURE TO APPROXIMATELY 20 PSIA, THEN SLOWLY CLOSE N-56 UNTIL FLOW STOPS AT THE BULKHEAD RELIEF PORT. CLOSE NH-179, NH-180 AND N-56,
- (6) OPEN NH-181 AND ALLOW THE UUT TO VENT TO THE ATMOSPHERE, CLOSE NH-181,
- (7) PLACE VACUUM SUPPLY SWITCH ON VMP IN THE OFF POSITION.

NOTE

IF PARAGRAPH 1,2,(G) IS TO
BE ACCOMPLISHED IMMEDIATELY
DISREGARD STEP 1,2,(F),(7),

(G) PRESSURIZE TO $25 \pm 0.0/-0.5$ PSIA,

- (1) INSTALL A PRESSURE CAP ON THE BULKHEAD RELIEF PORT, REMOVE AND CAP THE VACUUM PUMP DISCHARGE LINE,
- (2) OPEN HAND VALVES NH-179 AND NH-180, PLACE VACUUM SUPPLY SWITCH ON THE VMP IN THE EMERGENCY CLOSE POSITION,
- (3) VERIFY HAND VALVE NH-182 IS OPEN AND NH-181, VH-67 AND VH-68 ARE CLOSED,
- (4) SLOWLY OPEN REGULATOR N-56 AND PRESSURIZE THE UUT UNTIL AN INDICATION OF $25.0 \pm 0.0/-0.5$ PSIA IS OBTAINED AT THE CALIBRATING GAGE. CLOSE N-56,
- (5) HOLD $25.0 \pm 0.0/-0.5$ PSIA UNTIL TESTING AT THIS PRESSURE IS COMPLETED, SEE PARAGRAPHS 1.3(A), 1.3(B), AND 1.3(C).
- (6) REMOVE THE PRESSURE CAP FROM THE BULKHEAD RELIEF PORT AND OPEN HAND VALVE NH-181, VENT UUT TO ATMOSPHERIC PRESSURE, CLOSE NH-181, NH-180, AND NH-179,
- (7) REMOVE THE PRESSURE CAP FROM THE VACUUM PUMP DISCHARGE LINE AND REINSTALL IT ON THE VACUUM PUMP. PLACE SUPPLY VALVE SWITCH ON VMP IN THE OFF POSITION.

(CONTINUED)

1. CALIBRATION

NOTE

IF THE LEAK CHECK AT 29
PSIA IS TO BE ACCOMPLISHED
IMMEDIATELY AFTER PARAGRAPH
1.2,(G), DISREGARD STEP
1.2,(G)(7).

(H) PRESSURIZATION TO 29.0 $\pm$ 0.5 PSIA.

- (1) INSTALL A PRESSURE CAP ON ALL UNCAPPED PORTS.
- (2) REMOVE AND CAP BOTH THE VACUUM PUMP INTAKE AND EXHAUST LINES.
- (3) VERIFY CIRCUIT BREAKER CB1 AND CB3 ARE CLOSED.
- (4) OPEN CIRCUIT BREAKER CB2.
- (5) CLOSE HAND VALVES NH-187 AND VH-67.
- (6) OPEN HAND VALVES NH-182, NH-181 AND VH-68.
- (7) PLACE ALL SAMPLE VALVE SWITCHES ON THE VMP IN THE ON POSITION.
- (8) PLACE VACUUM SUPPLY SWITCH ON THE VMP IN THE OPEN POSITION.
- (9) PLACE THE VACUUM PUMP ON-OFF TOGGLE SWITCH ON THE UUT IN THE ON POSITION.
- (10) OPEN HAND VALVES NH-179 AND NH-180.
- (11) SLOWLY OPEN REGULATOR N-56 UNTIL THE TEST GAGE INDICATES 29 $\pm$ 0.5 PSIA. CLOSE N-56, REOPEN AND RECLOSE N-56 AS REQUIRED TO MAINTAIN 29 $\pm$ 0.5 PSIA.
- (12) HOLD 29 $\pm$ 0.5 PSIA IN THE UUT SYSTEM UNTIL THE LEAK CHECK IS COMPLETE. SEE PARAGRAPH 1.3,(G).
- (13) REMOVE THE PRESSURE CAP FROM THE BULKHEAD VACUUM PORT AND OPEN VH-67. ALLOW UUT SYSTEM PRESSURE TO VENT TO THE ATMOSPHERE. CLOSE VH-67.
- (14) PLACE ALL SWITCHES ON THE VMP AND UUT IN THE CLOSE OR OFF POSITION. CLOSE CB-2.

(CONTINUED)

1. CALIBRATION

(15) UNCAP AND REINSTALL BOTH VACUUM PUMP INTAKE AND EXHAUST LINES.

(16) CLOSE HAND VALVES NH-179 & NH-180.

3. TEST AND CALIBRATION OF VACUUM MONITOR CONSOLE AND VACUUM MONITOR PANEL COMPONENTS. (SATURN 1B ONLY).

(A) VG-10 ABSOLUTE PRESSURE GAGE CALIBRATION.

- (1) USING THE PROCEDURE OUTLINED IN 1.2, TEST THE VG-10 AT EACH PRESSURE LEVEL LISTED. AT EACH TEST PRESSURE LEVEL, THE VG-10 MUST AGREE WITH THE CALIBRATING GAGE WITHIN $\pm 0,6$ PSIA. RECORD ALL DATA IN TABLE III.

TEST PRESSURES (PSIA)

0	-0	+ 0,5
1,5	-0,5	+ 0,5
5,0	-0,5	+ 0
14,7	-0,5	+ 0,5
17,0	-0,75	+ 0,75
18,7	-1,0	+ 1,0
25,0	-0,5	+ 0
29,0	-0,5	+ 0,5

- (2) IF THE GAGE IS OUT OF TOLERANCE, ADJUST THE CALIBRATION MECHANISM. IF THIS FAILS, REPLACE THE GAGE WITH AN EQUIVALENT PART, APPROPRIATELY IDENTIFIED.

(B) NG-74 GAGE CALIBRATION

- (1) USING THE PROCEDURE OUTLINED IN 1.2, TEST THE NG-74 AT EACH ABSOLUTE PRESSURE LEVEL LISTED. AT EACH TEST PRESSURE LEVEL, THE NG-74 MUST (AFTER CONVERSION) AGREE WITH THE CALIBRATING GAGE WITHIN $\pm 0,4$ PSIA. RECORD ALL DATA IN TABLE III.

NOTE

NOTE ATMOSPHERIC PRESSURE,
AS INDICATED BY THE
CALIBRATING GAGE AT STEP
1.2.(D), MUST BE ADDED TO

(CONTINUED)

I. CALIBRATION

EACH NG-74 READING TO
CONVERT FROM GAGE TO
ABSOLUTE PRESSURE,

TEST PRESSURES (PSIA)	"APPROXIMATE" (PSIG)
14.7 ±0.5 ±0.5	0
17.0 ±0.75 ±0.75	2.3
18.7 ±1.0 ±1.0	4.0
25 ±0 ±0.5	10.3

- (2) IF THE GAGE IS OUT OF TOLERANCE, ADJUST THE CALIBRATION MECHANISM, IF THIS FAILS, REPLACE THE GAGE WITH AN EQUIVALENT PART, APPROPRIATELY IDENTIFIED,

(C) PT-126 PRESSURE TRANSDUCER AND VMP PRESSURE METER CALIBRATION,

- (1) CALIBRATE THE VMP PRESSURE METER FOR CONSOLE AT PRESSURES OF 0.0 ±0.5/-0, 5.0 ±0/-0.5, AND 25 ±0/-0.5 PSIA ON PT-126 PRESSURE TRANSDUCER,
- (2) ADJUST POT R-14 ON VMP TO CALIBRATE THE METER AT 0.0 ±0.5/-0 PSIA,
- (3) ADJUST POT R-16 ON VMP TO CALIBRATE THE METER AT 5.0 ±0/-0.5 PSIA,
- (4) ADJUST POT R-15 ON VMP TO CALIBRATE THE METER AT 25 ±0/-0.5 PSIA,
- (5) ATTAIN REQUIRED PRESSURES PER PARAGRAPH 1.1 AND 1.2,
- (6) RECORD DATA CALLED FOR IN TABLE III,
- (7) IF THE VMP PRESSURE METER CANNOT BE CALIBRATED AND IT IS SUSPECTED THAT PT-126 IS MALFUNCTIONING, REPLACE PT-126 AND REPEAT 1.3.(C)
- (8) IF AFTER ACCOMPLISHMENT OF STEP 1.3.(6)(7), THE VMP METER CANNOT BE CALIBRATED, REPLACE THE POTENTIOMETERS AND/OR METER SUSPECTED OF MALFUNCTIONING AND REPEAT PARAGRAPH 1.3.(C),

(CONTINUED)

I. CALIBRATION

(D) PJ-27 PRESSURE TRANSDUCER

- (1) DETERMINE THE ACTUATION PRESSURES (BOTH OPEN AND CLOSE) OF PJ-27 PRESSURE TRANSDUCER, SEE TABLE III,
- (2) RECORD INFORMATION CALLED FOR IN TABLE III,
- (3) ATTAIN PRESSURE PER PARAGRAPH 1.1, AND 1.2,
- (4) IF ACTUATION POINTS ARE NOT WITHIN THE RANGE OF 17.0 $\pm$ 0.75 PSIA, REPLACE THE TRANSDUCER AND REPEAT PARAGRAPH 1.3.(D),

(E) PJ-28 PRESSURE TRANSDUCER,

- (1) DETERMINE THE NORMAL ACTUATION POINT PRESSURE AND OVER PRESSURE ACTUATION POINT PRESSURE OF PJ-28 PRESSURE TRANSDUCER, SEE TABLE 1,
- (2) RECORD DATA CALLED FOR ON TABLE 1,
- (3) ATTAIN REQUIRED PRESSURE PER PARAGRAPHS 1.1 AND 1.2,
- (4) IF ACTUATION POINTS ARE NOT WITHIN THE PRESSURE RANGE OF 1.5 $\pm$ 0.5 PSIA, REPLACE PJ-28 PRESSURE TRANSDUCER AND REPEAT PARAGRAPH 1.3.(E),

(F) VR-1 RELIEF VALVE

- (1) DETERMINE THE PRESSURE AT WHICH VR-1 RELIEF VALVE OPENS AND ALSO THE PRESSURE AT WHICH IT CLOSSES, SEE TABLE III,
- (2) RECORD DATA ON TABLE III,
- (3) ATTAIN REQUIRED PRESSURE PER PARAGRAPH 1.1, AND 1.2,
- (4) IF THE OPENING AND CLOSING PRESSURE OF VR-1 IS NOT WITHIN THE PRESSURE RANGE OF 18.7 $\pm$ 1.0 PSIA, REPLACE VR-1 AND REPEAT PARAGRAPH 1.3.(F),

(G) LEAK CHECK OF DSV-4-303 VACUUM MONITOR CONSOLE,

- (1) ATTAIN LEAK CHECK PRESSURE PER PARAGRAPH 1.1 & 1.2,
- (2) PERFORM LEAK CHECK WITH BUBBLE SOLUTION, AMS3159B PER DPM2422. APPLY SOLUTION TO ALL CONNECTIONS, LINES AND FITTINGS IN THE DSV-4-303 VACUUM MONITOR CONSOLE, NO

(CONTINUED)

I. CALIBRATION

LEAKAGE IS ALLOWED.

(3) IF LEAKS ARE FOUND, REPAIR AS REQUIRED AND REPEAT PARAGRAPH I.3.(G),

(4) RECORD COMMENTS ON TABLE III.

4. VG-10 ABSOLUTE PRESSURE GAGE TEST (FOR SATURN V ONLY)

- (A) THE 1/4 INCH BULKHEAD VACUUM LINE SHALL BE DISCONNECTED FROM HAND VALVE VH-67, A PRESSURE PLUG SHALL BE INSTALLED ON THE 1/4 INCH VACUUM LINE.
- (B) CLOSE ALL CONSOLE HAND VALVES AND REGULATORS,
- (C) CONNECT THE EQUIPMENT AS SHOWN IN FIGURE 1,
- (D) OPEN VALVE VH-68,
- (E) TURN ON EXTERNAL VACUUM PUMP AND OPERATE THE ISOLATION AND BLEED VALVES TO TEST THE VG-10 AT THE FOLLOWING VALUES, EACH INDICATION MUST BE WITHIN TOLERANCE LIMITS LISTED:

UUT
TEST VALUES (PSIA)

STANDARD GAGE
TOLERANCE LIMITS (PSIA)

1,5	1,3 TO 1,7
2	1,8 TO 2,2
3	2,8 TO 3,2
4	3,8 TO 4,2
5	4,8 TO 5,2
6	5,7 TO 6,3
10	9 TO 11

- (F) CLOSE ISOLATION VALVE, OPEN BLEED AND TURN OFF EXTERNAL VACUUM PUMP,
- (G) REMOVE THE EXTERNAL VACUUM PUMP SETUP AND REGAP THE EMERGENCY VACUUM PUMP PORT,
- (H) CONNECT ADDITIONAL EQUIPMENT AS SHOWN IN FIGURE 2,
- (I) OPEN VH-74 AND CLOSE VH-68,
- (J) OPERATE THE TEST SETUP TO OBTAIN AN INDICATION OF 20 PSIA AT VG-10, THE STANDARD SHALL INDICATE WITHIN 19 TO 21 PSIA,

(CONTINUED)

I. CALIBRATION

(K) SHUTOFF INPUT PRESSURE AND BLEED CONSOLE THRU STANDARD GAGE BLEED VALVE.

5. NG-74 PRESSURE GAGE TEST (FOR SATURN V ONLY)

(A) OPEN NH-181.

(B) OPERATE THE TEST SETUP TO PRESSURIZE NG-74 TO 10 PSIG.

(C) BLEED TO ATMOSPHERIC AND REPEAT TWO TIMES.

(D) RECORD ATMOSPHERIC PRESSURE.

(E) TEST NG-74 AT 5 AND 10 PSIG. THE STANDARD GAGE MUST INDICATE WITHIN ± 0.4 PSIG OF UUT INDICATIONS AFTER CONVERSION.

NOTE

CONVERT PSIA TO PSIG BY
SUBTRACTING ATMOSPHERIC
PRESSURE VALUE FROM EACH
STANDARD GAGE INDICATION.

(F) BLEED TO ATMOSPHERIC, DISCONNECT THE SETUP AND RECAP ALL PORTS.

J. APPENDIX.

1. FIGURES

(A) FIGURE 1

(B) FIGURE 2

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J. APPENDIX,

END OF TEST PROCEDURE Q-IV-36830

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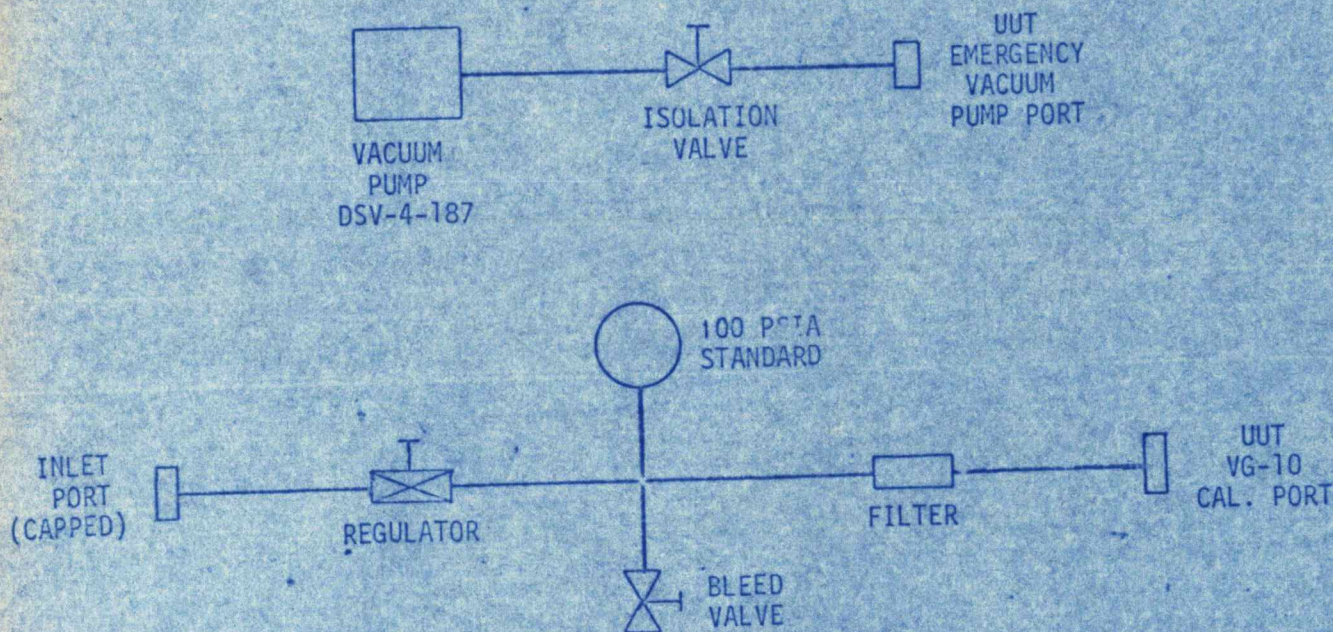


FIGURE 1. VACUUM SETUP (SAT V)

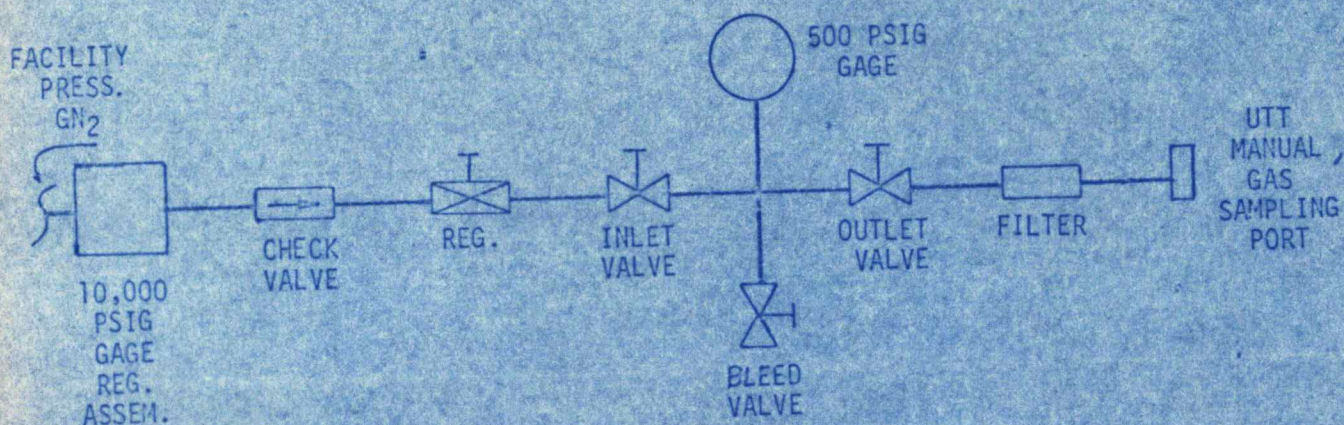


FIGURE 2. PRESSURE SETUP (SAT V)



ITEM	PAGE	STEP	REVISIONS	SYM

QUALITY ENGINEERING REVISION DOCUMENTATION LOG SHEET

ASSEMBLY NAME

UNIT NO. & MODEL

DOUGLAS
AIRCRAFT COMPANY, INC

CODE IDENT NO.

18355

SIZE

A

0-IV-36830

SHEET **5**

ITEM

PAGE

DELS

REVISIONS

QUALITY ENGINEERING REVISION DOCUMENTATION LOG SHEET

UNIT NO. & MODEL

ASSEMBLY NAME

DOUGLAS
AIRCRAFT COMPANY, INC

CODE	IDENT NO.	SIZE
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
10	10	10
11	11	11
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100	100	100

18555

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0-1V-36830

SHEET

TITLE

CONSOLE, COMMON BULKHEAD VACUUM MONITORING MODEL 303 MAINTENANCE PROCEDURE.

DISPOSITIONS

- 1 FABRICATION EFFECTIVITY MUST CONFORM ASSY INSTAL USAGE OF CHANGED OR PRIOR PARTS ACCEPTABLE
- 2 PARTS MUST CONFORM AT NOTED EFFECTIVITY
- 3 REWORK AS NOTED
- 4 SCRAP
- 5 NOTED

EXTRA E O

* NOTED

ENGRG TIME CHG

3889-

9101

EWO

WRO

A41-

604

IPWO

EXTRA DWG

* NOTED

CUSTOMER

CUSTOMER AUTH

DESIGN SECTION

AGC7

ALP1

KCDD

DWG TO BE
MADE OR
CHANGED

YES

NO

PATTERN
DIE HOLD
AFFECTED

YES

NO

RELEASE STOP
ORDER DATED

E.O. MADE BY

R. P. CULPEPPER

DESIGN APPROVAL

L. R. Deaton

CHECK E O

STRENGTH

RELEASE & MATERIAL

12-5-8
SWIRLEY

CHANGE CONTROL

DWG MADE OR CHG BY

R. P. CULPEPPER

PROJ ENGR

CHECK DWG

H/12-5-68

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*COPIES TO: M. HERNANDEZ, A3-751
L. R. DEATON, A41-751
F. C. SCHERMER, A41-273 (2 COPIES)

ENGINEERING CONCURRENCE *[Signature]*EL&S CONCURRENCE *[Signature]*

REASON: DRAWING REVISED TO NASA KEYPUNCH FORMAT
FROM 1B57030 C

FOR USE AT A41 ONLY

A41

CCCB

DESIGN SCHEDULE

DWG. NO.

SCHEDULE

DCREO

APPROVED

DISAPPROVED

FOR

PRIOR TO

AFTER

0-IV-36830

AUTH. BY

DATE

YES

NO

CLASS

LOG

DATE

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I. REMOVAL AND REPLACEMENT

10509303.

(9) CONNECT ELECTRICAL LEADS TO PUMP MOTOR.

NOTE

REFER TO PARA E.6 FOR
VACUUM PUMP CHECK AFTER
REPLACEMENT

(F) LEAKCHECK PROCEDURE

- (1) PRESSURIZE SYSTEM PER TCP 0-1-26115
- (2) APPLY LEAK TEST SOLUTION, AMS-3159, TO FITTINGS OF VACUUM PUMP AND TUBE ASSEMBLIES, PN 1A88466-1, 1A88492-1, AND 1B65481-1; NO LEAKAGE ALLOWED.
- (3) DEPRESSURIZE SYSTEM PER TCP 0-1-26115
- (4) PAINT TORQUE STRIPE ON FITTINGS.

4. HAND REGULATOR (N-56), PN 1A88459-1

(A) MATERIALS

GREASE, MIL-G-4343

LEAK TEST SOLUTION, AMS-3159

(B) PARTS

GASKET, PN S0046T14, 2 EACH

SEAL, PN S025404, 1 EACH

SEAL, PN S025406, 1 EACH

(C) TOOLS

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I. REMOVAL AND REPLACEMENT

ADAPTER (1/4 IN., 3/8 IN. DRIVE), PN TM-1, SNAP-ON TOOLS CORP, (55719)

WRENCH, CROWFOOT FLARENUT (1/16 IN., 1/4 IN. DRIVE), PN AN-8508-9, SNAP-ON TOOLS CORP, (55719)

WRENCH, CROWFOOT FLARENUT (11/16 IN., 3/8 IN. DRIVE), PN AN-8508-11, SNAP-ON TOOLS CORP, (55719)

WRENCH, CROWFOOT FLARENUT (13/16 IN., 3/8 IN. DRIVE), PN AN-8508-13, SNAP-ON TOOLS CORP, (55719)

WRENCH, TORQUE (0-300 IN LB, 3/8 IN. DRIVE), PN TQ-25, SNAP-ON TOOLS CORP, (55719)

WRENCH, TORQUE (0-600 IN LB, 3/8 IN. DRIVE), PN TQ-50A, SNAP-ON TOOLS CORP, (55719)

(D) REMOVAL

- (1) DISCONNECT PIPING AND DISCARD SEALS,
- (2) REMOVE CAPNUT AND HANDLE,
- (3) REMOVE REGULATOR FROM CONSOLE,
- (4) REMOVE FITTINGS FROM REGULATOR AND DISCARD GASKETS,

(E) REPLACEMENT

- (1) APPLY A THIN FILM OF MIL-G-4343 GREASE TO NEW GASKET, PN S0046T14, AND INSTALL FITTINGS,
- (2) INSTALL FITTINGS ON REPLACEMENT REGULATOR PER REQUIREMENTS OF AND10064,
- (3) INSTALL REGULATOR IN CONSOLE,
- (4) CONNECT TUBE ASSEMBLY, PN 1A88495-1, USING NEW SEAL, PN S0254C4, TIGHTEN LINE FITTINGS WITH A TORQUE WRENCH PER THE REQUIREMENTS OF MSFC-DWG-10509303,
- (5) CONNECT TUBE ASSEMBLY, PN 1A96258-1, USING NEW SEAL, PN S0254C6, AND TIGHTEN LINE FITTINGS WITH A TORQUE WRENCH PER THE REQUIREMENTS OF MSFC-DWG-10509303.

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1. REMOVAL AND REPLACEMENT

(6) INSTALL HANDLE AND CAPNUT.

(F) LEAKCHECK PROCEDURE

(1) PRESSURIZE SYSTEM PER 0-1-26115

(2) APPLY LEAK TEST SOLUTION, AMS-3159, TO FITTINGS; NO
LEAKAGE ALLOWED.

(3) DEPRESSURIZE SYSTEM PER 0-1-26115

(4) PAINT TORQUE STRIPE ON FITTINGS.

5. SOLENOID VALVES (VS-15 AND VS-16), PN 1A59721-1

(A) MATERIALS
=====

GREASE, MIL-G-4343

LEAK TEST SOLUTION, AMS-3159

(B) PARTS
=====

GASKET, PN S0046T123, 2 EACH

SEAL, PN S0254C8, 2 EACH

(C) TOOLS
=====

WRENCH, CROWFOOT FLARENUT (7/8 IN., 3/8 IN. DRIVE), PN AN 8508-14, SNAP-ON TOOLS CORP. (55719)

WRENCH, CROWFOOT FLARENUT (1-5/8 IN., 1/2 IN. DRIVE), PN AN-8508-26, SNAP-ON TOOLS CORP. (55719)

WRENCH, TORQUE (0-600 IN LB, 3/8 IN. DRIVE), PN TQ-50A, SNAP-ON TOOLS CORP. (55719)

WRENCH, TORQUE (0-3000 IN LB, 1/2 IN. DRIVE), PN TQ-251, SNAP-ON TOOLS CORP. (55719)

(CONTINUED)

I. REMOVAL AND REPLACEMENT

(D) REMOVAL

- (1) REMOVE ELECTRICAL CONNECTORS FROM TOP AND BOTTOM OF VALVE,
- (2) DISCONNECT PIPING AND DISCARD SEALS,
- (3) REMOVE VALVE FROM CONSOLE,
- (4) REMOVE FITTINGS FROM VALVE AND DISCARD GASKET,

(E) REPLACEMENT

- (1) APPLY A THIN FILM OF MIL-G-4343 TO NEW GASKETS, PN S0046T123, AND INSTALL ON FITTINGS,
- (2) INSTALL FITTINGS IN REPLACEMENT VALVE PER REQUIREMENTS, OF AND10064,
- (3) INSTALL VALVE IN CONSOLE,
- (4) CONNECT PIPING TO VALVE USING NEW SEALS, PN S025408, TIGHTEN LINE FITTINGS WITH A TORQUE WRENCH PER THE REQUIREMENTS OF MSFC-DWG-10509303,
- (5) INSTALL ELECTRICAL CONNECTORS TO TOP AND BOTTOM OF VALVE,

(F) LEAKCHECK PROCEDURE

- (1) PRESSURIZE SYSTEM PER TQP 0-I-26115
- (2) APPLY LEAK TEST SOLUTION, AMS-3159, TO FITTINGS; NO LEAKAGE ALLOWED,
- (3) DEPRESSURIZE SYSTEM PER TQP 0-I-26115
- (4) PAINT TORQUE STRIPE ON FITTINGS,

6. SOLENOID VALVES, PN 1A8846-1 (VS-18, VS-19, VS-20, VS-21, VS-22, AND VS-23) AND PN 1A88561-503 (VS-17)
-

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1. REMOVAL AND REPLACEMENT

(A) MATERIAL

LEAK TEST SOLUTION, AMS-3159

(B) PARTS

SEAL, PN S0254C4, 2 EACH

(C) TOOLS

ADAPTER, (1/4 IN., 3/8 IN. DRIVE), PN TM-1, SNAP-ON TOOLS CORP. (55719)

WRENCH, CROWFOOT FLARENUT (9/16 IN., 1/4 IN. DRIVE), PN AN-8508-9, SNAP-ON TOOLS CORP. (55719)

WRENCH, TORQUE (0-300 IN LB, 3/8 IN. DRIVE), PN TO-25, SNAP-ON TOOLS CORP. (55719)

(D) REMOVAL

- (1) REMOVE PIPING AND DISCARD SEALS,
- (2) REMOVE ELECTRICAL WIRES FROM TERMINAL STRIP,
- (3) REMOVE STRING TIES RETAINING WIRES,
- (4) REMOVE VALVE FROM CONSOLE,
- (5) REMOVE FITTINGS FROM VALVE,

(E) REPLACEMENT

- (1) INSTALL FITTINGS IN REPLACEMENT VALVE AND TIGHTEN SECURELY,
- (2) INSTALL VALVE IN CONSOLE,
- (3) CONNECT ELECTRICAL WIRES TO TERMINAL STRIP,
- (4) ATTACH STRING TIES TO RETAIN WIRES,

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I. REMOVAL AND REPLACEMENT

- (5) CONNECT PIPING TO VALVE USING NEW SEALS, PN S025404, TIGHTEN LINE FITTING WITH A TORQUE WRENCH PER THE REQUIREMENTS OF MSFC-DWG-10509303.

(F) LEAKCHECK PROCEDURE

- (1) PRESSURIZE SYSTEM PER TCP Q-I-26115
(2) APPLY LEAK TEST SOLUTION, AMS-3159, TO FITTINGS; NO LEAKAGE ALLOWED.
(3) DEPRESSURIZE SYSTEM PER TCP Q-I-26115
(4) PAINT TORQUE STRIPE ON FITTINGS.

7. BELLOWS SEALED ANGLE VALVE, PN R-100-P (VH-67 AND VH-68)

(A) MATERIALS

GREASE, MIL-G-4343
LEAK TEST SOLUTION, AMS-3159

(B) PARTS

GASKET, PN S0046T119, 2 EACH
SEAL, PN S025408, 2 EACH

(C) TOOLS

WRENCH, CROWFOOT FLARENUT (7/8 IN., 3/8 IN. DRIVE), PN AN-8508-14, SNAP-ON TOOLS CORP. (55719)

WRENCH, CROWFOOT FLARENUT (1-3/8 IN., 1/2 IN. DRIVE), PN AN-8508-22, SNAP-ON TOOLS CORP. (55719)

WRENCH, TORQUE (0-600 IN LB, 3/8 IN. DRIVE), PN TQ-50A, SNAP-ON TOOLS CORP. (55719)

WRENCH, TORQUE (0-1800 IN LB, 1/2 IN. DRIVE), PN TQ-151, SNAP-ON TOOLS CORP. (55719)

(CONTINUED)

1. REMOVAL AND REPLACEMENT

(D) REMOVAL

- (1) REMOVE HANDLE,
- (2) REMOVE PIPING AND DISCARD SEALS,
- (3) REMOVE VALVE FROM CONSOLE,
- (4) REMOVE FITTINGS FROM VALVE AND DISCARD O-RING,

(E) REPLACEMENT

- (1) APPLY A THIN FILM OF MIL-G-4343 GREASE TO NEW GASKETS, PN S0046T119, AND INSTALL ON FITTINGS,
- (2) INSTALL FITTINGS IN REPLACEMENT VALVE PER REQUIREMENTS OF AND10064,
- (3) INSTALL VALVE IN CONSOLE
- (4) CONNECT PIPING TO VALVE USING NEW SEALS, PN S0254C8, TIGHTEN LINE FITTINGS WITH A TORQUE WRENCH PER THE REQUIREMENTS OF MSFC-DWG-10509303,
- (5) INSTALL HANDLE.

(F) LEAKCHECK PROCEDURE

- (1) PRESSURIZE SYSTEM PER TCP 0-1-26115
- (2) APPLY LEAK TEST SOLUTION, AMS-3159, TO FITTINGS: NO LEAKAGE ALLOWED,
- (3) DEPRESSURIZE SYSTEM PER TCP 0-1-26115
- (4) PAINT TORQUE STRIPE ON FITTINGS,

8. HAND VALVES VH-70 AND VH-71, PN 1A88464-1

(A) MATERIALS

GREASE, MIL-G-4343

(CONTINUED)

1. REMOVAL AND REPLACEMENT

LEAK TEST SOLUTION, AMS-3159

(B) PARTS

GASKET, PN S0046T12, 2 EACH

SEAL, PN S0254C4, 1 EACH

(C) TOOLS

ADAPTER (1/4 IN., 3/8 IN. DRIVE), PN TM-1, SNAP-ON TOOLS CORP., (55719)

WRENCH, CROWFOOT FLARENUT (9/16 IN., 1/4 IN. DRIVE), PN AN-8508-9, SNAP-ON TOOLS CORP., (55719)

WRENCH, CROWFOOT FLARENUT (11/16 IN., 3/8 IN. DRIVE), PN AN-8508-11, SNAP-ON TOOLS CORP., (55719)

WRENCH, TORQUE (0-300 IN LB, 3/8 IN. DRIVE), PN TQ-25, SNAP-ON TOOLS CORP., (55719)

(D) REMOVAL

(1) DISCONNECT PIPING AND DISCARD SEAL,

(2) REMOVE VALVE FROM BOTTLE,

(3) REMOVE FITTINGS FROM VALVE AND DISCARD GASKET,

(E) REPLACEMENT

(1) APPLY A THIN FILM OF MIL-G-4343 GREASE TO NEW GASKETS, PN S0046T12, AND INSTALL FITTINGS,

(2) INSTALL FITTINGS IN REPLACEMENT VALVE PER REQUIREMENTS OF AND10064.

(3) INSTALL VALVE ON BOTTLE AND TIGHTEN SECURELY,

(4) CONNECT PIPING TO VALVE USING NEW SEALS, PN S0254C4, TIGHTEN LINE FITTINGS WITH A TORQUE WRENCH PER THE REQUIREMENTS OF MSFC-DWG-10509303,

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I. REMOVAL AND REPLACEMENT

(F) LEAKCHECK PROCEDURE
=====

- (1) PRESSURIZE SYSTEM PER TCP 0-I-26115
- (2) APPLY LEAK TEST SOLUTION, AMS-3159, TO FITTING; NO LEAKAGE ALLOWED,
- (3) DEPRESSURIZE SYSTEM PER TCP 0-I-26115
- (4) PAINT TORQUE STRIPE ON FITTINGS

9. HAND VALVES (NH-181, NH-182 AND VH-74); PN 3864056-1
=====

(A) MATERIALS
=====

GREASE, MIL-G-4343

LEAK TEST SOLUTION, AMS-3159

(B) PARTS
=====

GASKET, PN S0046T17, 2 EACH

SEAL, PN S0254C6, 2 EACH

(C) TOOLS
=====

ADAPTER (1/4 IN., 3/8 IN. DRIVE), PN TM-1, SNAP-ON TOOLS CORP, (55719)

WRENCH, CROWFOOT FLARENUT (9/16 IN., 1/4 IN. DRIVE), PN TM-1, SNAP-ON TOOLS CORP, (55719)

WRENCH, CROWFOOT FLARENUT (11/16 IN., 3/8 IN. DRIVE), PN AN-6508-11, SNAP-ON TOOLS CORP, (55719)

WRENCH, TORQUE (0-300 IN LB, 3/8 IN. DRIVE), PN TQ-25, SNAP-ON TOOLS CORP, (55719)

(D) REMOVAL
=====

(CONTINUED)

I. REMOVAL AND REPLACEMENT

- (1) REMOVE HANDLE,
- (2) DISCONNECT PIPING AND DISCARD SEALS,
- (3) REMOVE VALVE FROM CONSOLE,
- (4) REMOVE FITTINGS FROM VALVE AND DISCARD GASKET,

(E) REPLACEMENT

- (1) APPLY A THIN FILM OF MIL-G-4343 GREASE TO NEW GASKETS, PN S0046T12, AND INSTALL ON FITTINGS,
- (2) INSTALL FITTINGS IN REPLACEMENT VALVE PER REQUIREMENTS OF AND10064,
- (3) INSTALL VALVE IN CONSOLE,
- (4) CONNECT PIPING TO VALVE USING NEW SEALS, PN S0254C4 AND TIGHTEN LINE FITTINGS WITH A TORQUE WRENCH PER THE REQUIREMENTS OF MSFC-DWG-10509303,
- (5) INSTALL HANDLE,

(F) LEAKCHECK PROCEDURE

- (1) PRESSURIZE SYSTEM PER TCP 0-1-26115
- (2) APPLY LEAK TEST SOLUTION, AMS-3159, TO GAGE FITTING AND PIPE CONNECTION,
- (3) DEPRESSURIZE SYSTEM PER TCP 0-1-26115
- (4) PAINT TORQUE STRIPE ON FITTINGS,

10. HAND VALVES (NH-180 AND NH-187), PN 3864056-501

(A) MATERIALS

GREASE, MIL-G-4343

LEAK TEST SOLUTION, AMS-3159

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I. REMOVAL AND REPLACEMENT

(B) PARTS

GASKET, PN S0046T17, 2 EACH

SEAL, PN S0254C6, 2 EACH

(C) TOOLS

WRENCH, CROWFOOT FLARENUT (1 IN., 3/8 IN. DRIVE), PN AN-8505-16, SNAP-ON TOOLS CORP. (55719)

WRENCH, CROWFOOT FLARENUT (11/16 IN., 3/8 IN. DRIVE), PN AN-8506-11, SNAP-ON TOOLS CORP. (55719)

WRENCH, TORQUE (0-600 IN LB, 3/8 IN. DRIVE), PN TQ-50A, SNAP-ON TOOLS CORP. (55719)

(D) REMOVAL

(1) REMOVE HANDLE.

(2) DISCONNECT PIPING AND DISCARD SEALS.

(3) REMOVE VALVE FROM CONSOLE.

(4) REMOVE FITTINGS FROM VALVE AND DISCARD GASKETS.

(E) REPLACEMENT

(1) APPLY A THIN FILM OF MIL-G-4343 GREASE TO NEW GASKET, PN S0046T17, AND INSTALL IN FITTINGS.

(2) INSTALL FITTINGS IN REPLACEMENT VALVE PER REQUIREMENTS OF AND10064.

(3) INSTALL VALVE IN CONSOLE.

(4) CONNECT PIPING TO VALVE USING NEW SEALS, PN S0254C6. TIGHTEN LINE FITTINGS WITH A TORQUE WRENCH PER THE REQUIREMENTS OF MSFC-DWG-10509303.

(5) INSTALL HANDLE.

(CONTINUED)

I. REMOVAL AND REPLACEMENT

(F) LEAKCHECK PROCEDURE

- (1) PRESSURIZE SYSTEM PER TCP 0-1-26115
- (2) APPLY LEAK TEST SOLUTION, AMS-3159, TO FITTINGS; NO LEAKAGE ALLOWED.
- (3) DEPRESSURIZE SYSTEM PER TCP 0-1-26115
- (4) PAINT TORQUE STRIPE ON FITTINGS.

J. REPAIR

CORRECT CORROSION DISCREPANCIES PER DRAWING 1850957.

1. COMMON BULKHEAD VACUUM MONITORING CONSOLE, PN 1A86798-1

REPAIR SHALL BE ACCOMPLISHED BY REMOVAL OF ANY DEFECTIVE COMPONENT AND REPLACEMENT WITH A LIKE COMPONENT OF KNOWN SERVICEABILITY, REFER TO PARAGRAPH I, FOR DETAILED REMOVAL AND REPLACEMENT PROCEDURE.

2. HIGH VACUUM COMPOUND PUMP, MODEL KC-8

(A) PARTS

- GASKET, CYLINDER COVER, PN 802489, 1 EACH
- GASKET, FILLER AND DRAIN PLUG, PN 0778-3, 2 EACH
- O-RING, SHAFT SEAL HOUSING, PN 050227, 2 EACH
- O-RING, CYLINDER COVER WINDOW, PN 050222, 1 EACH
- SEAL, CENTER WALL, PN 072039, 1 EACH
- SHAFT SEAL ASSEMBLY, PN 065046, 1 EACH
- SPRING, VALVE, PN 0621-9, 2 EACH

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VALVE, PN 0668-26, 1 EACH

* KINNEY VACUUM COMPANY, VENDOR CODE (33781).

(B) REPAIR INSTRUCTIONS

REFER TO KINNEY VACUUM OPERATING MANUAL NO. 3150,8,B1

VERIFICATION TEST

PERFORM VERIFICATION TEST PER KINNEY VACUUM OPERATING MANUAL NO. 3150,8, PAGE 13, CHECKING PUMP PERFORMANCE,

(C) PACKAGING

NOT APPLICABLE

3. SOLENOID VALVE, PN 1A59721-1 (VS-16 AND VS-15)

(A) PARTS

KIT, PARTS, KS-22B, 1 EACH, VACCO VALVE CO. (VENDOR CODE 99517)

(B) REPAIR INSTRUCTIONS

REFER TO VACCO VALVE CO. DRAWING 6555-C FOR REPAIR INSTRUCTIONS

(C) VERIFICATION TEST

PERFORM VERIFICATION TEST PER DRAWING 1A59721, PRODUCTION TEST REQUIREMENTS,

(D) PACKAGING

AFTER VERIFICATION TEST, PROCESS AND PACKAGE COMPONENTS FOR LIQUID OXYGEN SERVICE PER THE REQUIREMENTS OF MSFC-SPEC-164.

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J. REPAIR

4. REGULATOR, PN 1A68459-1

(A) PARTS

NOTE

THE FOLLOWING PARTS ARE
SUPPLIES BY GROVE VALVE
AND REGULATOR CO. (VENDOR
CODE 26505)

DIAPHRAGM, PN 090-02204, 1 EACH

INNER DIAPHRAGM GASKET, PN 021-00704, 2 EACH

OUTER DIAPHRAGM GASKET, PN 021-02204, 2 EACH

VALVE, PN 101-01557, 2 EACH

(B) REPAIR INSTRUCTIONS

REFER TO GROVE DRAWINGS W-15L-A01, W-15L-A01-3, AND W-15L-B01-2

(C) VERIFICATION TEST

PERFORM VERIFICATION TEST PER DRAWING 1A68459, PRODUCTION TEST
REQUIREMENTS.

(D) PACKAGING

AFTER VERIFICATION TEST, PROCESS AND PACKAGE COMPONENT FOR
LIQUID OXYGEN SERVICE PER THE REQUIREMENTS OF NSFC-SPEC-164.

K. APPENDIX

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K, APPENDIX

- 1, TABLE 1 ACE CONTROL ITEMS
- 2, FIGURE 1, SCHEMATIC-COMMON BULKHEAD VACUUM MONITORING CONSOLE
- 3, REVISION SHEETS

VERIFY THAT ANY NECESSARY REVISIONS TO THIS PROCEDURE DURING MAINTENANCE ACTIVITIES ARE NOTED ON FORM 60-999-3-4A (QUALITY ENGINEERING REVISION DOCUMENTATION LOG SHEET) AND APPROVED BY LOGISTICS SUPPORT (SATURN/APOLLO LOGISTICS ENGINEERING) AND RELIABILITY ASSURANCE (QUALITY ENGINEERING). ALSO VERIFY THAT CUSTOMER APPROVAL IS OBTAINED. IF REQUIRED, THE DISPOSITION OF REVISION SHEETS SHALL BE PER PARAGRAPH C.3.(B).

TABLE 1. AGE CONTROL ITEMS

COMPONENT		VENDOR		AGE COMPONENTS		REF. PARA.	
PART NO.	NOMENCLATURE	PART NO.	NAME	PART NO.	NOMENCLATURE	REM/ REPL.	REPAIR
KC-8	High Vacuum Compound Pump	KC-8	Kinney Vacuum Div. The New York Air Brake Co.	0050222 050227 051010 065027 072004 0778-1 0778-3	O-ring O-ring V-Belt Shaft Seal Assembly Seal, Center Wall Gasket, Cylinder Cover Gasket, Filler & Brain Plug	9.3	10.1.1
R-100P	Bellows Sealed Angle Valve	R-100P	Vacuum Electronics Corp.	0011-223 2000-413	O-ring Seat Seal	9.7	
1A59721-1 5991-C	Valve 1 Inch, Solenoid Vacuum 2-way Micro Switch Assembly	VSD-305-2C-MS 5991-C	Vacco Industries	Commercial VSD-305P-2C-3 B180-010 B180-012 B180-225 KS-288 B180-012 B180-032 21051-A	O-ring Seat O-ring O-ring O-ring Spare Parts Kit O-ring O-ring Seat	9.5	10.1.2
1A86793-1	Console, Cannon Bulkhead, Vacuum Monitoring	N/A	N/A	NAS1598C04Y NAS1598C08Y NAS1598C11Y NAS1598C12Y NAS1598C21Y NAS1598C23Y NAS1598C3Y NAS1598C4Y NAS1598C5Y NAS1598C6Y NAS1598C7Y	Washer Washer Washer Washer Washer Washer Washer Washer Washer Washer Washer		10.1

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TABLE 1. AGE CONTROL ITEMS (Continued)

COMPONENT		VENDOR		AGE COMPONENTS		REF. PARA.	
PART NO.	NOMENCLATURE	PART NO.	NAME	PART NO.	NOMENCLATURE	REM/ REPL.	REPAIR
1A88458-1	Valve Check, 1 1/2 inch Vacuum	CVO-01P-407-24M	Vacco Industries	B180-219 B180-228	O-ring O-ring		
1A88460-1	Valve Solenoid, 1 inch, N.C. two-way	LM821027V	Automatic Switch Co.	FV-68-153 Item 10 Item 12 Item 14 Item 17 NOTE: Parts identified by item number on Automobile Switch drawing HVA-30-849.	Spare Parts Kit Valve Gasket Pilot Disc Disc Quad-Ring		
1A88461-1	Valve Solenoid, 1/4 inch two-way	LB826264	Automatic Switch Co.	FV-68-038 Item 5 NOTE: Parts identified by item number on Automatic Switch drawing HVA-36-874.	Spare Parts kit Valve Body Gasket	9.6	
1A88461-503	Valve Solenoid, 1/4 inch two-way	LMX82670	Automatic Switch Co.	FV-68-047 Item 1B Item 6 NOTE: Parts identified by item number on Automatic Switch drawing HVA-30-849.	Spare Parts Kit O-ring Seal Valve Body Gasket		

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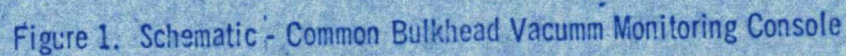
TABLE 1. AGE CONTROL ITEMS (Continued)

COMPONENT		VENDOR		AGE COMPONENTS		REF. PARA	
PART NO.	NOMENCLATURE	PART NO.	NAME	PART NO.	NOMENCLATURE	REN/ REPL.	REPAIR
1A88464-1	Valve, Hand 1/4	30-1101-304	Tescom Corp.	38-1100-30	Spare Parts Kit	9.8	
				5200-009067	O-ring		
				5200-020097	O-ring		
1B29666-1	Valve, Relief-Pneumatic, Purge, Low Pressure	P11-533	James, Pond, and Clark	MS28775-213	Packing		
				5018-19	O-ring		
1B69418-1	Gasket, Gage						
1B69419-1	Gasket, Regulator						
1B69551-1	Gasket, Valve						
3864056-1	Valve, Hand, 3000 and 6000 psi	NVA-6P-401-2MG-4-0	Vacco Industries	KNV-117	Spare Parts Kit	9.9	
				180-008	O-ring		
				180-110	O-ring		
				6227-3-80	O-ring		
				6227-8-70	O-ring		
3864056-501	Valve, Hand, 3000 and 6000 psi	NVA-6P-403-2G-03	Vacco Industries	KNV-151	Spare Parts Kit	9.10	
				N180-012			
				N180-111			
				N180-113			
				N180-114			
				N180-212			

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CONSOLE, COMMON BULKHEAD
VACUUM MONITORING, PN 1A86793-1
CALIBRATION, PROCEDURE

A. REFERENCE DOCUMENTS

1. DAC DRAWINGS

- (A) 1A86793 CONSOLE, COMMON BULKHEAD VACUUM MONITORING
- (B) 1B65479 SCHEMATIC, COMMON BULKHEAD VACUUM MONITORING CONSOLE,

B. OPERATING STATIONS

NOT APPLICABLE

C. TEST EQUIPMENT

NOTE

CALIBRATING EQUIPMENT
MINIMUM USE SPECIFICATIONS
HAVE BEEN SELECTED TO
ENSURE COMPLIANCE WITH
MEASUREMENT TRACEABILITY
REQUIREMENTS. RECOMMENDED
STANDARDS OR COMBINATIONS
SHOULD COMPRISE A
MEASUREMENT SYSTEM WITH AN
UNCERTAINTY OF BETWEEN ONE-
FOURTH AND ONE-TENTH OF THE
UNCERTAINTY OF THE UNIT
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C. TEST EQUIPMENT

TABLE I

EQUIPMENT AND POWER		MINIMUM USE SPECIFICATIONS	RECOMMENDED EQUIPMENT
1.	CALIBRATION STANDARDS		
(A)	ABSOLUTE PRESSURE TEST GAGE	RANGE: 0-30 PSIA ACCURACY: ± 0.1 PSI	PRESSURE TRANSFER STANDARD, SEEGERS MODEL SS-2455A-60 OR WALLACE & TIENNAN FA233.
2.	SUPPORT EQUIPMENT		
(A)	VACUUM PUMP	RANGE: BELOW 1 PSIA	MODEL DSV-4-137 OR KINNEY MODEL KQ8
(B)	REGULATED GAGE ASSEMBLIES	RANGES: 6000 PSI AND 500 PSI	ANY
3.	POWER REQUIREMENTS		
ELECTRICAL		110 TO 120V, 60 HZ, 5 AMPS	LINE POWER

NOTE

EQUIPMENT MEETING MINIMUM
USE SPECIFICATIONS EITHER
DIRECTLY OR BY APPLICATION
OF CORRECTION FACTORS MAY
BE SUBSTITUTED FOR
RECOMMENDED EQUIPMENT.

D. RECORDS

1. CERTIFICATION RECORDS

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D. RECORDS

2. WHEN REQUESTED BY ENGINEERING (FORM A270-Q-98) SHALL BE MADE FOR EACH PERFORMANCE OF THIS PROCEDURE.

ANY DEVIATIONS THAT MAY BE REQUIRED SHALL BE DOCUMENTED ON THE CALIBRATION DATA REPORT AND APPROVED BY THE COGNIZANT ENGINEER.

DATA SHEETS, CHARTS, AND/OR PRINTOUTS PRODUCED IN THE PERFORMANCE OF THIS PROCEDURE SHALL BE COMPILED IN THE LOG RECORD BOOK AND TOGETHER WITH THE PROCEDURE CALIBRATION DATA REPORT, SHALL CONSTITUTE THE CERTIFICATION RECORDS.

3. CERTIFICATION

UPON COMPLETION OF THE TEST, ENTER THE INFORMATION ON THE CERTIFIED STICKER (FORM 26-319B) AND AFFIX TO THE DEVICE TO ATTEST THE CALIBRATION.

E. SAFETY

NO UNUSUAL SAFETY HAZARDS WILL BE ENCOUNTERED DURING THE PERFORMANCE OF THIS CPC.

PERFORMANCE OF THIS PROCEDURE SHALL BE IN ACCORDANCE WITH THE DAC MSSD AND FLORIDA TEST CENTER SAFETY MANUAL PROVISIONS.

F. TIME CYCLE/SIGNIFICANT ITEMS

NOT APPLICABLE

G. ENGINEERING WALK-AROUND

MEASUREMENTS ENGINEERING OR DESIGNEE SHALL BE TASK LEADER AND SHALL PERFORM A GENERAL INSPECTION PRIOR TO TEST COMMENCEMENT TO VERIFY THAT ALL EQUIPMENT USED DURING THIS CALIBRATION, BEARS A CURRENT CERTIFICATION STICKER AND TO ENSURE THAT THE EQUIPMENT IS FREE OF OBVIOUS PHYSICAL OR ELECTRICAL DEFECTS.

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G. ENGINEERING WALK-AROUND

THE COGNIZANT DESIGN GROUP OF DEVELOPMENT ENGINEERING, A41-865, SHALL BE INFORMED PRIOR TO EACH CALIBRATION FOR EFFORT COORDINATION,

H. PREPARATIONS

1. UUT CALIBRATION METHODS AND SPECIFICATIONS

TABLE II

ITEM AND CHARACTERISTIC	PERFORMANCE SPECIFICATIONS
(A) PRESSURE GAGE (VG-10)	RANGE: 1 TO 30 PSIA (TESTED: 0 TO 20 PSIA) ACCURACY: ± 0.2 PSIA, BELOW 6 PSIA ± 1 PSIA, ABOVE 6 PSIA
(B) PRESSURE GAGE (NG-74)	RANGE: 0-15 PSIG (TESTED: 0 TO 10.3 PSIG) ACCURACY: ± 0.4 PSI

NOTE

THE FOLLOWING ITEMS TESTED
FOR SATURN 1B ONLY,

(C) PRESSURE TRANSDUCER (PT-126)	TESTED AT: 0, 5, AND 25 PSIA
(D) PRESSURE TRANSDUCER (PJ-27)	ACTUATION: 17 ± 0.75 PSIA
(E) PRESSURE TRANSDUCER (PJ-28)	ACTUATION: 1.5 ± 0.5 PSIA
(F) RELIEF VALVE (VR-1)	ACTUATION: 18.7 ± 1 PSIA

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I. CALIBRATION

1. PREPARATION FOR PRESSURIZATION (FOR SATURN 1B ONLY)

- (A) CLOSE ALL UNIT UNDER TEST (UUT) HAND VALVES EXCEPT NH-182,
- (B) CLOSE UUT REGULATOR N-56,
- (C) INSTALL THE CALIBRATING PRESSURE GAGE ON THE UUT MANUAL SAMPLE PORT,
- (D) OPEN THE UUT HAND VALVE VH-74,
- (E) COORDINATE WITH THE PROPULSION DEPARTMENT AND OBTAIN THE USE OF THE DSV-48-433 PNEUMATIC CONSOLE TO SUPPLY GN2, REGULATED TO 50 +/- 10 PSIG, AT HAND VALVE NH-179 ON UUT.

NOTE

IF GN2 FROM THE DSV-48-433 CONSOLE IS NOT AVAILABLE, ADJUST THE ARGON PANEL CONTROLS TO OBTAIN 50 +/- 10 PSIG ARGON PRESSURE TO HAND VALVE NH-178. IN THIS EVENT, MENTALLY SUBSTITUTE ARGON FOR GN2 AND NH-178 FOR NH 179, WHENEVER GN2 AND NH-179 APPEAR IN THIS PROCEDURE. (IN THIS PROCEDURE ARGON AND GN2 ARE INTERCHANGEABLE, HOWEVER SINCE GN2 IS CHEAPER IT SHOULD BE USED WHENEVER AVAILABLE.)

- (F) DISCONNECT THE 1/4 INCH BULKHEAD VACUUM LINE FROM HAND VALVE VH-67. INSTALL A PRESSURE PLUG ON THE 1/4 INCH VACUUM LINE, HAND VALVE VH-67 MUST BE CLOSED,
- (G) COORDINATE WITH C4TC AND C4NR TO REQUEST OR VERIFY POWER ON PER I-21117, APPENDIX FIGURE 5, I.E. 115 VAC TO PLUG J3 VIA CABLE 1A88395-501, 115 VAC TO PLUG J1 VIA CABLE 1A88393-503, AND 28 VDC TO PLUG J2 VIA CABLE 1B26535-1.

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I. CALIBRATION

- (H) U4ET CLOSE CIRCUIT BREAKERS CB1, CB2, AND CB3,
- (I) COORDINATE WITH C4TC AND C4VM TO PLACE THE DSV-4-305 VACUUM MONITOR CONSOLE IN OPERATION,
- (J) INSTALL A PRESSURE CAP ON THE UUT AUXILLARY PUMP PORT,
- (K) INSTALL PRESSURE CAPS ON ALL UUT SAMPLE PORTS THAT DO NOT HAVE SAMPLE BOTTLES INSTALLED, IF SAMPLE BOTTLES ARE INSTALLED, CLOSE SAMPLE BOTTLE HAND VALVES,
- (L) REMOVE PRESSURE CAPS, IF INSTALLED, ON THE BULKHEAD RELIEF PORT AND THE VACUUM PUMP PORT,

2. PRESSURIZATION & EVACUATION PROCEDURE (FOR SATURN 1B ONLY)

NOTE

THE FOLLOWING PROCEDURE IS WRITTEN TO FACILITATE CALIBRATION OF ALL GAGES, METERS, TRANSDUCERS, THE RELIEF VALVE, AND THE PERFORMANCE OF THE DSV-4-303 LEAK CHECK. REFER TO TABLE 1 TO BECOME FAMILIAR WITH THE PRESSURE RANGE THAT IS ASSOCIATED WITH THE VARIOUS EQUIPMENT TO BE TESTED OR ADJUSTED AND THE PARAGRAPHS IN WHICH THE TEST IS OUTLINED.

NOTE

THE REASON THE PRESSURIZATION (1.2.) AND CALIBRATION (1.3.) IS NOT COMBINED, IS TO FACILITATE THE ACCOMPLISHMENT OF ANY ONE COMPONENT CALIBRATION SEPERATELY IF THE NEED

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I. CALIBRATION

ARISES

(A) EVACUATE TO $0,0 \pm 0,5$ PSIA.

NOTE

IF PRESSURE OR VACUUM
CANNOT BE HELD AND A LEAK
IN THE SYSTEM IS SUSPECTED,
PERFORM LEAK CHECK PER
PARAGRAPHS I,2,(H) AND
I,3,(G).

- (1) PLACE THE VACUUM PUMP ON-OFF TOGGLE SWITCH IN THE ON POSITION.
 - (2) OPEN HAND VALVE VH-68.
 - (3) ALLOW THE VACUUM PUMP TO RUN UNTIL THE CALIBRATING GAGE HAS STABILIZED AT A PRESSURE BELOW $0,5$ PSIA. AFTER GAGE STABILIZATION, CLOSE HAND VALVE VH-68. ALLOW VACUUM PUMP TO OPERATE UNTIL THE TEST AT THIS PRESSURE IS COMPLETE. IF VACUUM DECAYS SLIGHTLY, REOPEN VH-68, (SEE PAR. I,3,(C)).
 - (4) AFTER TEST AT THIS PRESSURE IS COMPLETE, PLACE THE VACUUM PUMP SWITCH IN THE OFF POSITION AND OPEN HAND VALVE VH-68.
 - (5) OPEN NH-179 AND NH-180.
 - (6) SLOWLY OPEN N-56 AND PRESSURIZE THE CONSOLE TO APPROXIMATELY 20 PSIA.
 - (7) CLOSE N-56, NH-180 AND NH-179.
 - (8) OPEN NH-181 AND ALLOW SYSTEM PRESSURE TO LOWER UNTIL AMBIENT PRESSURE IS REACHED.
 - (9) CLOSE NH-181 AND VH-68.
- (B) EVACUATE TO $1,5 \pm 0,5$ PSIA.

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I. CALIBRATION

- (1) OPEN HAND VALVES NH=179, NH=180, NH=182 AND VH=68,
- (2) CRACK OPEN THE N=56 REGULATOR AND IMMEDIATELY PLACE THE VACUUM PUMP SWITCH IN THE ON POSITION,

NOTE

IF THE VACUUM PUMP FAILS TO RUN OR MALFUNCTIONS, CLOSE THE N-56 REGULATOR TO PREVENT OVER PRESSURIZING THE CONSOLE COMPONENTS AND REFER TO VOLUME 1 OF THIS PROCEDURE,

- (3) ADJUST N=56 AS NECESSARY TO BRING PRESSURE DOWN VERY SLOWLY AND FINALLY STOP JUST BELOW THE PRESSURE AT WHICH PJ=28 PRESSURE TRANSDUCER ACTUATES CAUSING THE VACUUM MONITOR PANEL (VMP) PUMP VACUUM NORMAL INDICATOR TO ILLUMINATE,
- (4) IF STEP I.2.(B)(3) CANNOT BE ACCOMPLISHED USING N=56 ONLY, OPEN N=56 AND THEN ADJUST HAND VALVE VH=67 AS NECESSARY TO ACCOMPLISH STEP I.2.(B)(3),
- (5) HOLD THE PRESSURE AT A POINT JUST BELOW THE ACTUATION PRESSURE OF PJ=28 FOR AS LONG AS REQUIRED TO COMPLETE THE TEST OR CALIBRATION AT THIS PRESSURE SEE PARAGRAPHS I.3.(A) AND I.3.(E),
- (6) SLOWLY INCREASE THE OPENING OF N=56 (AND/OR VH=67 IF REQUIRED) IN ORDER TO DETERMINE THE RELEASE PRESSURE OF PJ=28 AS SIGNIFIED BY VMP PUMP VACUUM OVER PRESSURE INDICATOR ON, REF PARAGRAPH I.3.(E),
- (7) REPEAT PARAGRAPHS I.2.(B)(3) THROUGH I.2.(B)(6) AS REQUIRED TO COMPLETE THE TEST BEING PERFORMED,
- (8) CLOSE HAND VALVE VH=67 IF USED AND ALLOW THE VACUUM PUMP TO RUN SEVERAL MINUTES TO REMOVE ALL AIR FROM THE SYSTEM, N=56 IS TO REMAIN OPEN DURING THIS OPERATION. IF VH=67 WAS NOT USED DURING STEPS I.2.(B)(3) THROUGH I.2.(B)(6), DISREGARD STEP I.2.(B)(8),

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I. CALIBRATION

- (9) PLACE VACUUM PUMP SWITCH IN THE OFF POSITION AND ADJUST N-56 AS REQUIRED TO PRESSURIZE THE UUT TO APPROXIMATELY 20 PSIA THEN CLOSE HAND VALVES NH-179, NH-180 AND CLOSE N-56 REGULATOR.
- (10) OPEN HAND VALVE NH-181 AND ALLOW SYSTEM PRESSURE TO VENT TO APPROXIMATELY 14.7 PSIA, CLOSE HAND VALVES NH-181 AND VH-68.
- (C) EVACUATE TO $5.0 \pm 0.0/0.5$ PSIA,
 - (1) VERIFY HAND VALVE VH-68 IS CLOSED.
 - (2) PLACE VACUUM PUMP SWITCH IN THE ON POSITION.
 - (3) ADJUST HAND VALVE VH-68 AS REQUIRED TO SLOWLY LOWER UUT PRESSURE TO $5.0 \pm 0.0/0.5$ THEN CLOSE VH-68.
 - (4) HOLD SYSTEM AT THIS PRESSURE AS LONG AS NECESSARY TO PERMIT COMPLETION OF THE TEST OR CALIBRATION AT THIS PRESSURE, SEE PARAGRAPHS 1.3.(A) AND 1.3.(C).
 - (5) PLACE VACUUM PUMP SWITCH IN THE OFF POSITION AND OPEN HAND VALVE VH-68.
 - (6) OPEN HAND VALVES NH-179 AND NH-180.
 - (7) ADJUST REGULATOR N-56 AS REQUIRED TO PRESSURIZE THE UUT SYSTEM TO APPROXIMATELY 20 PSIA, CLOSE N-56.
 - (8) OPEN HAND VALVE NH-181 AND ALLOW THE SYSTEM TO VENT TO THE ATMOSPHERE.
 - (9) CLOSE HAND VALVES NH-179, NH-180, AND VH-68.
- (D) AMBIENT PRESSURE, 14.7 ± 0.5 PSIA.

NOTE

IF AMBIENT PRESSURE IS TO BE ATTAINED AS ONE OF A SERIES OF PRESSURES, SEE TABLE III, EACH FUNCTION IN 1,2 ENDS IN THE ATTAINMENT OF AMBIENT PRESSURE.

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I. CALIBRATION

THEREFORE, IF PARAGRAPH
1.2.(C) HAS JUST BEEN
ACCOMPLISHED, THE UUT IS AT
AMBIENT PRESSURE AND NO
FURTHER ACTION IS NECESSARY
TO SUPPORT TESTS OR
CALIBRATION AT THIS
PRESSURE. SEE PARAGRAPH
1.3.(A) AND 1.3.(B).

NOTE

IF THE NOTE ABOVE IS NOT
APPLICABLE, RATHER THAN
INTRODUCE RAW AIR INTO THE
UUT SYSTEM, PROCEED WITH
STEP 2.2.(D),(1).

- (1) OPEN HAND VALVES NH-179 & NH-180,
 - (2) OPEN N-56 AND PRESSURIZE THE UUT TO APPROXIMATELY 20 PSIA,
 - (3) CLOSE VALVES NH-179, NH-180, AND N-56,
 - (4) OPEN HAND VALVE NH-181 AND ALLOW THE UUT TO VENT TO ATMOSPHERE, CLOSE NH-181,
 - (5) SEE PARAGRAPHS 1.3.(A) AND 1.3.(B) FOR TESTS AND CALIBRATION AT AMBIENT PRESSURE (14.7 +/- 0.5 PSIA),
- (E) PRESSURIZATION TO 17.0 +/- 0.75,
- (1) OPEN HAND VALVES NH-179 AND NH-180,
 - (2) SLOWLY OPEN REGULATOR N-56 AND SLOWLY BRING UUT SYSTEM PRESSURE TO THE ACTUATION PRESSURE OF PJ-27 PRESSURE TRANSDUCER, CLOSE N-56.

NOTE

ACTUATION PRESSURE OF PJ-27
IS SIGNIFIED BY VMP VACUUM

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1. CALIBRATION

SUPPLY OPEN INDICATOR ON,

- (3) HOLD UUT SYSTEM PRESSURE UNTIL TESTS AND CALIBRATION AT THIS PRESSURE ARE COMPLETE, SEE PARAGRAPHS 1.3.(B) AND 1.3.(D),
- (4) SLOWLY OPEN HAND VALVE NH-181 AND LOWER UUT PRESSURE UNTIL PJ-27 TRANSDUCER RELEASES,

NOTE

RELEASE OF PJ-27 IS
SIGNIFIED BY VMP VACUUM
SUPPLY CLOSED LIGHT ON,

- (5) OPEN NH-181 AND ALLOW UUT TO VENT TO ATMOSPHERE, CLOSE NH-181,

(F) PRESSURIZATION TO 18.7 +/- 1.0 PSIA,

- (1) OPEN HAND VALVES NH-179 AND NH-180, PLACE VACUUM SUPPLY SWITCH ON THE VMP IN THE EMERGENCY CLOSE POSITION,
- (2) VERIFY HAND VALVES VH-67, VH-68, AND NH-181 ARE CLOSED,
- (3) PLACE THUMB OVER THE BULKHEAD RELIEF PORT AND SLOWLY OPEN REGULATOR N-56. PRESSURIZE UUT SYSTEM UNTIL FLOW IS FELT AT THE BULKHEAD RELIEF PORT,

NOTE

FLOW FROM THE BULKHEAD
RELIEF PORT SIGNIFYS THAT
VR-1 RELIEF VALVE HAS
OPENED,

- (4) HOLD SYSTEM PRESSURE AT THIS POINT UNTIL TESTS AND CALIBRATION ARE COMPLETE; SEE PARAGRAPHS 1.3.(A), 1.3.(B) AND 1.3.(F),

(CONTINUED)

1. CALIBRATION

- (5) RAISE SYSTEM PRESSURE TO APPROXIMATELY 20 PSIA; THEN SLOWLY CLOSE N-56 UNTIL FLOW STOPS AT THE BULKHEAD RELIEF PORT. CLOSE NH-179, NH-180 AND N-56.
- (6) OPEN NH-181 AND ALLOW THE UUT TO VENT TO THE ATMOSPHERE. CLOSE NH-181.
- (7) PLACE VACUUM SUPPLY SWITCH ON VMP IN THE OFF POSITION.

NOTE

IF PARAGRAPH 1,2,(G) IS TO BE ACCOMPLISHED IMMEDIATELY DISREGARD STEP 1,2,(F),(7).

(G) PRESSURIZE TO $25 \pm 0,0/-0,5$ PSIA.

- (1) INSTALL A PRESSURE CAP ON THE BULKHEAD RELIEF PORT. REMOVE AND CAP THE VACUUM PUMP DISCHARGE LINE.
- (2) OPEN HAND VALVES NH-179 AND NH-180. PLACE VACUUM SUPPLY SWITCH ON THE VMP IN THE EMERGENCY CLOSE POSITION.
- (3) VERIFY HAND VALVE NH-182 IS OPEN AND NH-181, VH-67 AND VH-68 ARE CLOSED.
- (4) SLOWLY OPEN REGULATOR N-56 AND PRESSURIZE THE UUT UNTIL AN INDICATION OF $25,0 \pm 0,0/-0,5$ PSIA IS OBTAINED AT THE CALIBRATING GAGE. CLOSE N-56.
- (5) HOLD $25,0 \pm 0,0/-0,5$ PSIA UNTIL TESTING AT THIS PRESSURE IS COMPLETED. SEE PARAGRAPHS 1,3(A), 1,3(B), AND 1,3(C).
- (6) REMOVE THE PRESSURE CAP FROM THE BULKHEAD RELIEF PORT AND OPEN HAND VALVE NH-181. VENT UUT TO ATMOSPHERIC PRESSURE. CLOSE NH-181, NH-180, AND NH-179.
- (7) REMOVE THE PRESSURE CAP FROM THE VACUUM PUMP DISCHARGE LINE AND REINSTALL IT ON THE VACUUM PUMP. PLACE SUPPLY VALVE SWITCH ON VMP IN THE OFF POSITION.

(CONTINUED)

I, CALIBRATION

NOTE

IF THE LEAK CHECK AT 29
PSIA IS TO BE ACCOMPLISHED
IMMEDIATELY AFTER PARAGRAPH
1.2.(G), DISREGARD STEP
1.2.(G)(7).

(H) PRESSURIZATION TO 29.0 $\pm$ 0.5 PSIA.

- (1) INSTALL A PRESSURE CAP ON ALL UNCAPPED PORTS.
- (2) REMOVE AND CAP BOTH THE VACUUM PUMP INTAKE AND EXHAUST LINES.
- (3) VERIFY CIRCUIT BREAKER CB1 AND CB3 ARE CLOSED.
- (4) OPEN CIRCUIT BREAKER CB2.
- (5) CLOSE HAND VALVES NH-187 AND VH-67.
- (6) OPEN HAND VALVES NH-182, NH-181 AND VH-68.
- (7) PLACE ALL SAMPLE VALVE SWITCHES ON THE VMP IN THE ON POSITION.
- (8) PLACE VACUUM SUPPLY SWITCH ON THE VMP IN THE OPEN POSITION.
- (9) PLACE THE VACUUM PUMP ON-OFF TOGGLE SWITCH ON THE UUT IN THE ON POSITION.
- (10) OPEN HAND VALVES NH-179 AND NH-180.
- (11) SLOWLY OPEN REGULATOR N-56 UNTIL THE TEST GAGE INDICATES 29 $\pm$ 0.5 PSIA. CLOSE N-56. REOPEN AND RECLOSE N-56 AS REQUIRED TO MAINTAIN 29 $\pm$ 0.5 PSIA.
- (12) HOLD 29 $\pm$ 0.5 PSIA IN THE UUT SYSTEM UNTIL THE LEAK CHECK IS COMPLETE, SEE PARAGRAPH 1.3.(G).
- (13) REMOVE THE PRESSURE CAP FROM THE BULKHEAD VACUUM PORT AND OPEN VH-67. ALLOW UUT SYSTEM PRESSURE TO VENT TO THE ATMOSPHERE. CLOSE VH-67.
- (14) PLACE ALL SWITCHES ON THE VMP AND UUT IN THE CLOSE OR OFF POSITION. CLOSE CB-2.

(CONTINUED).

1. CALIBRATION

(15) UNCAP AND REINSTALL BOTH VACUUM PUMP INTAKE AND EXHAUST LINES.

(16) CLOSE HAND VALVES NH-179 & NH-180.

3. TEST AND CALIBRATION OF VACUUM MONITOR CONSOLE AND VACUUM MONITOR PANEL COMPONENTS, (SATURN 1B ONLY).

(A) VG-10 ABSOLUTE PRESSURE GAGE CALIBRATION.

- (1) USING THE PROCEDURE OUTLINED IN 1.2, TEST THE VG-10 AT EACH PRESSURE LEVEL LISTED. AT EACH TEST PRESSURE LEVEL, THE VG-10 MUST AGREE WITH THE CALIBRATING GAGE WITHIN ± 0.6 PSIA. RECORD ALL DATA IN TABLE III.

TEST PRESSURES (PSIA)

0	± 0	± 0.5
1.5	± 0.5	± 0.5
5.0	± 0.5	± 0
14.7	± 0.5	± 0.5
17.0	± 0.75	± 0.75
18.7	± 1.0	± 1.0
25.0	± 0.5	± 0
29.0	± 0.5	± 0.5

- (2) IF THE GAGE IS OUT OF TOLERANCE, ADJUST THE CALIBRATION MECHANISM. IF THIS FAILS, REPLACE THE GAGE WITH AN EQUIVALENT PART, APPROPRIATELY IDENTIFIED.

(B) NG-74 GAGE CALIBRATION

- (1) USING THE PROCEDURE OUTLINED IN 1.2, TEST THE NG-74 AT EACH ABSOLUTE PRESSURE LEVEL LISTED. AT EACH TEST PRESSURE LEVEL, THE NG-74 MUST (AFTER CONVERSION) AGREE WITH THE CALIBRATING GAGE WITHIN ± 0.4 PSIA. RECORD ALL DATA IN TABLE III.

NOTE

NOTE ATMOSPHERIC PRESSURE, AS INDICATED BY THE CALIBRATING GAGE AT STEP 1.2.(D), MUST BE ADDED TO

(CONTINUED)

I. CALIBRATION

EACH NG=74 READING TO
CONVERT FROM GAGE TO
ABSOLUTE PRESSURE,

TEST PRESSURES (PSIA)	"APPROXIMATE" (PSIG)
14,7 $\pm 0,5$ $\pm 0,5$	0
17,0 $\pm 0,75$ $\pm 0,75$	2,3
18,7 $\pm 1,0$ $\pm 1,0$	4,0
25 ± 0 $\pm 0,5$	10,3

- (2) IF THE GAGE IS OUT OF TOLERANCE, ADJUST THE CALIBRATION MECHANISM. IF THIS FAILS, REPLACE THE GAGE WITH AN EQUIVALENT PART, APPROPRIATELY IDENTIFIED,

(C) PT-126 PRESSURE TRANSDUCER AND VMP PRESSURE METER CALIBRATION,

- (1) CALIBRATE THE VMP PRESSURE METER FOR CONSOLE AT PRESSURES OF 0,0 $\pm 0,5$ $\pm 0,5$, 5,0 ± 0 $\pm 0,5$, AND 25 ± 0 $\pm 0,5$ PSIA ON PT-126 PRESSURE TRANSDUCER,
- (2) ADJUST POT R-14 ON VMP TO CALIBRATE THE METER AT 0,0 $\pm 0,5$ ± 0 PSIA,
- (3) ADJUST POT R-16 ON VMP TO CALIBRATE THE METER AT 5,0 ± 0 $\pm 0,5$ PSIA,
- (4) ADJUST POT R-15 ON VMP TO CALIBRATE THE METER AT 25 ± 0 $\pm 0,5$ PSIA,
- (5) ATTAIN REQUIRED PRESSURES PER PARAGRAPH 1,1 AND 1,2,
- (6) RECORD DATA CALLED FOR IN TABLE III,
- (7) IF THE VMP PRESSURE METER CANNOT BE CALIBRATED AND IT IS SUSPECTED THAT PT-126 IS MALFUNCTIONING, REPLACE PT-126 AND REPEAT 1,3.(C)
- (8) IF AFTER ACCOMPLISHMENT OF STEP 1,3.(C)(7), THE VMP METER CANNOT BE CALIBRATED, REPLACE THE POTENTIOMETERS AND/OR METER SUSPECTED OF MALFUNCTIONING AND REPEAT PARAGRAPH 1,3.(C),

(CONTINUED)

I. CALIBRATION

(D) PJ=27 PRESSURE TRANSDUCER

- (1) DETERMINE THE ACTUATION PRESSURES (BOTH OPEN AND CLOSE) OF PJ=27 PRESSURE TRANSDUCER, SEE TABLE III,
- (2) RECORD INFORMATION CALLED FOR IN TABLE III,
- (3) ATTAIN PRESSURE PER PARAGRAPH 1.1, AND 1.2,
- (4) IF ACTUATION POINTS ARE NOT WITHIN THE RANGE OF 17.0 $\pm$ 0.75 PSIA, REPLACE THE TRANSDUCER AND REPEAT PARAGRAPH 1.3.(D),

(E) PJ=28 PRESSURE TRANSDUCER.

- (1) DETERMINE THE NORMAL ACTUATION POINT PRESSURE AND OVER PRESSURE ACTUATION POINT PRESSURE OF PJ=28 PRESSURE TRANSDUCER, SEE TABLE 1,
- (2) RECORD DATA CALLED FOR ON TABLE 1,
- (3) ATTAIN REQUIRED PRESSURE PER PARAGRAPHS 1.1 AND 1.2,
- (4) IF ACTUATION POINTS ARE NOT WITHIN THE PRESSURE RANGE OF 1.5 $\pm$ 0.5 PSIA, REPLACE PJ=28 PRESSURE TRANSDUCER AND REPEAT PARAGRAPH 1.3.(E),

(F) VR=1 RELIEF VALVE

- (1) DETERMINE THE PRESSURE AT WHICH VR=1 RELIEF VALVE OPENS AND ALSO THE PRESSURE AT WHICH IT CLOSSES, SEE TABLE III,
- (2) RECORD DATA ON TABLE III,
- (3) ATTAIN REQUIRED PRESSURE PER PARAGRAPH 1.1, AND 1.2,
- (4) IF THE OPENING AND CLOSING PRESSURE OF VR=1 IS NOT WITHIN THE PRESSURE RANGE OF 18.7 $\pm$ 1.0 PSIA, REPLACE VR=1 AND REPEAT PARAGRAPH 1.3.(F),

(G) LEAK CHECK OF DSV-4-303 VACUUM MONITOR CONSOLE,

- (1) ATTAIN LEAK CHECK PRESSURE PER PARAGRAPH 1.1 & 1.2,
- (2) PERFORM LEAK CHECK WITH BUBBLE SOLUTION, AMS3159B PER DPM2422. APPLY SOLUTION TO ALL CONNECTIONS, LINES AND FITTINGS IN THE DSV-4-303 VACUUM MONITOR CONSOLE, NO

(CONTINUED)

I. CALIBRATION

LEAKAGE IS ALLOWED.

(3) IF LEAKS ARE FOUND, REPAIR AS REQUIRED AND REPEAT PARAGRAPH I.3.(G).

(4) RECORD COMMENTS ON TABLE III.

4. VG-10 ABSOLUTE PRESSURE GAGE TEST (FOR SATURN V ONLY)

- (A) THE 1/4 INCH BULKHEAD VACUUM LINE SHALL BE DISCONNECTED FROM HAND VALVE VH-67. A PRESSURE PLUG SHALL BE INSTALLED ON THE 1/4 INCH VACUUM LINE.
- (B) CLOSE ALL CONSOLE HAND VALVES AND REGULATORS.
- (C) CONNECT THE EQUIPMENT AS SHOWN IN FIGURE 1.
- (D) OPEN VALVE VH-68.
- (E) TURN ON EXTERNAL VACUUM PUMP AND OPERATE THE ISOLATION AND BLEED VALVES TO TEST THE VG-10 AT THE FOLLOWING VALUES. EACH INDICATION MUST BE WITHIN TOLERANCE LIMITS LISTED:

UUT TEST VALUES (PSIA)	STANDARD GAGE TOLERANCE LIMITS (PSIA)
1.5	1.3 TO 1.7
2	1.8 TO 2.2
3	2.8 TO 3.2
4	3.8 TO 4.2
5	4.8 TO 5.2
6	5.7 TO 6.3
10	9 TO 11

- (F) CLOSE ISOLATION VALVE, OPEN BLEED AND TURN OFF EXTERNAL VACUUM PUMP.
- (G) REMOVE THE EXTERNAL VACUUM PUMP SETUP AND RECAP THE EMERGENCY VACUUM PUMP PORT.
- (H) CONNECT ADDITIONAL EQUIPMENT AS SHOWN IN FIGURE 2.
- (I) OPEN VH-74 AND CLOSE VH-68.
- (J) OPERATE THE TEST SETUP TO OBTAIN AN INDICATION OF 20 PSIA AT VG-10. THE STANDARD SHALL INDICATE WITHIN 19 TO 21 PSIA.

(CONTINUED)

I. CALIBRATION

(K) SHUTOFF INPUT PRESSURE AND BLEED CONSOLE THRU STANDARD GAGE BLEED VALVE.

5. NG-74 PRESSURE GAGE TEST (FOR SATURN V ONLY)

(A) OPEN NH-181.

(B) OPERATE THE TEST SETUP TO PRESSURIZE NG-74 TO 10 PSIG.

(C) BLEED TO ATMOSPHERIC AND REPEAT TWO TIMES.

(D) RECORD ATMOSPHERIC PRESSURE.

(E) TEST NG-74 AT 5 AND 10 PSIG. THE STANDARD GAGE MUST INDICATE WITHIN ± 0.4 PSIG OF UUT INDICATIONS AFTER CONVERSION.

NOTE

CONVERT PSIA TO PSIG BY
SUBTRACTING ATMOSPHERIC
PRESSURE VALUE FROM EACH
STANDARD GAGE INDICATION.

(F) BLEED TO ATMOSPHERIC, DISCONNECT THE SETUP AND RECAP ALL PORTS.

J. APPENDIX.

1. FIGURES

(A) FIGURE 1

(B) FIGURE 2

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J. APPENDIX,

END OF TEST PROCEDURE 0-IV-36830

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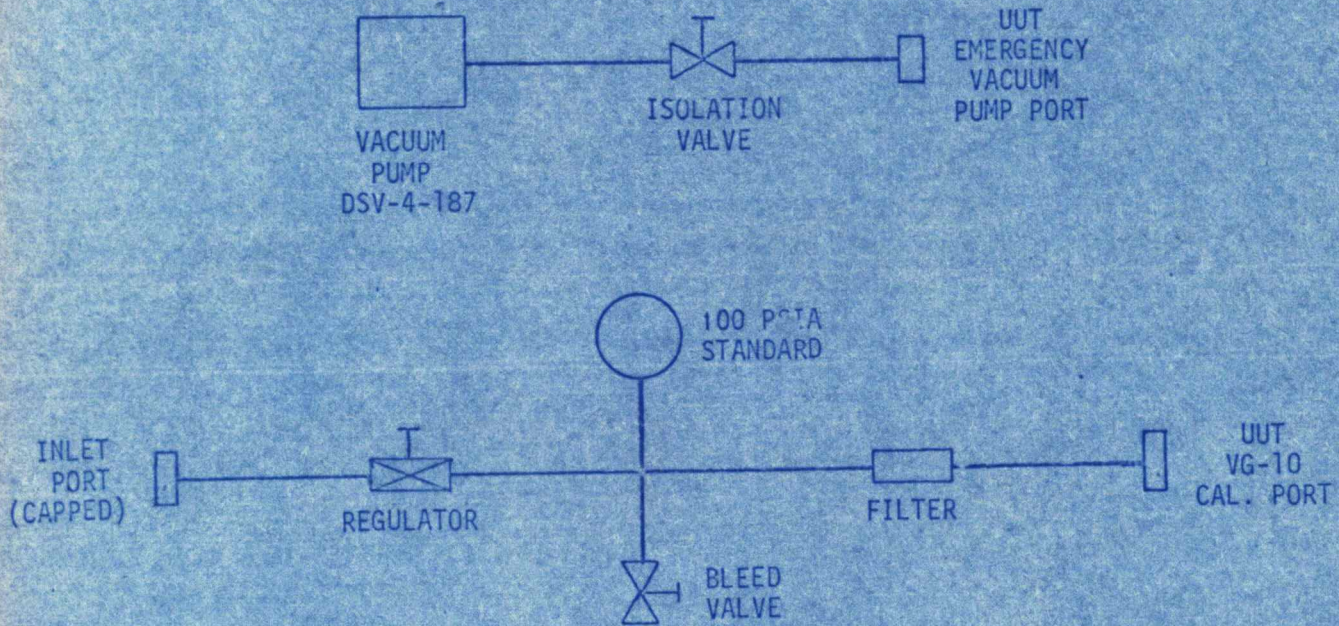


FIGURE 1. VACUUM SETUP (SAT V)

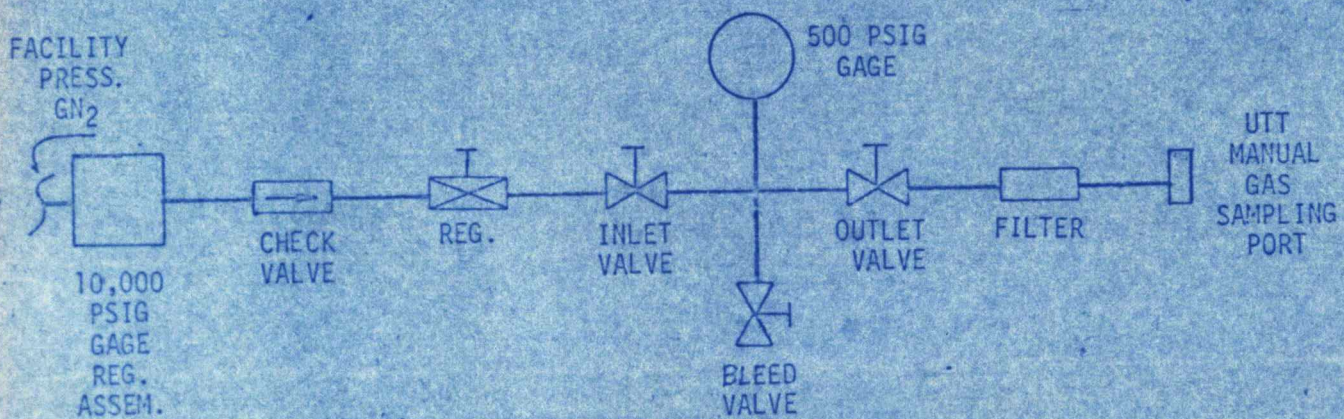


FIGURE 2. PRESSURE SETUP (SAT V)

[illegible]

SYM

ITEM

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UNIT NO. & MODEL

ASSEMBLY NAME

DOUGLAS
AIRCRAFT COMPANY, INC

CODE	IDENT NO.	SIZE
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
10	10	10
11	11	11
12	12	12
13	13	13
14	14	14
15	15	15
16	16	16
17	17	17
18	18	18
19	19	19
20	20	20
21	21	21
22	22	22
23	23	23
24	24	24
25	25	25
26	26	26
27	27	27
28	28	28
29	29	29
30	30	30
31	31	31
32	32	32
33	33	33
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