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PUREX EXHAUST VENTILATION SYSTEM INSTALLATION TEST REPORT

W BUD BLACKABY

BWHC, Richland, WA 99352

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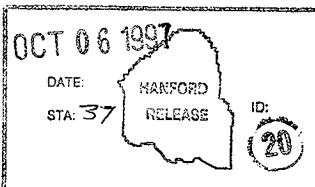
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Abstract: This Acceptance Test Report validates the testing performed, the exceptions logged and resolved and certifies this portion of the SAMCONS has met all design and test criteria to perform as an operational system.

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**PUREX EXHAUST VENTILATION
SYSTEM INSTALLATION ACCEPTANCE
TEST PROCEDURE**

**HNF-SD-CP-ATR-087
REVISION 0**

Prepared by: W. "Bud" Blackaby

MARCH 1997

PUREX EXH SYSTEM ACCEPTANCE TEST PROCEDURE

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2.0 PURPOSE/SCOPE

The proper installation of the PUREX exhaust ventilation system components and wiring will be systematically evaluated by performance of this procedure.

Proper operation of PUREX exhaust fan inlet, outlet, and vortex damper actuators and limit switches will be verified, using special test equipment, to be correct and installed wiring connections will be verified by operation of this equipment.

This test procedure will be performed entirely in the field and will not include any of the Surveillance and Monitoring and Control System (SAMCONS) computer stations or equipment.

This test is to be performed as a preliminary test to HNF-SD-CP-ATP-083, "PUREX Surveillance and Monitoring and Control System (SAMCONS) Acceptance Test Procedure", where the damper actuator limit switches will be set for proper actuator stroke and actuators will again be tested, using manual and automatic computer control.

2.0 REFERENCES

- 2.1 H-2-825909, "Instrumentation Loop Diagrams", Sheets 1 - 9
- 2.2 H-2-825910, "Instrumentation Logic Diagrams", Sheets 1 - 23

3.0 RESPONSIBILITIES

The following personnel will be required for the performance of this procedure:

- SAMCONS Cognizant Engineer: The individual assigned direct responsibility for the performance, preparation, and adequacy of the test.
- Test Director: The engineer assigned shift responsibility for performance of the test.
- Test Engineer: The engineer assigned to assist and relieve the Test Director during the performance of the test.
- Field Engineer (Field Personnel): A Test Engineer, Test Director, or Technician, and one or more instrument technicians or electricians, assigned to direct/verify/conduct field testing activities.

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Only personnel designated by the SAMCONS Cognizant Engineer are allowed to direct testing per this procedure, and perform equipment operating and control functions.

One engineer acting as either a Test Engineer or as a Test Director is required to be present during testing.

If, during testing, any indicated parameter or control function is not correct or appears to be malfunctioning, then the engineer conducting this test shall make a determination as to the feasibility of continuing testing. Since actual PUREX exhaust ventilation system actuator operation will occur during this test, there may be a safety impact to continuing the test and completing corrective actions later. A record of all noted deficiencies will be kept on Attachment 1, "Exception List".

At the completion of all testing, approval of all data collected and system performance shall be documented on Attachment 4, "Final Procedure Acceptance Sheet".

Any required changes to this procedure shall be approved by the SAMCONS Cognizant Engineer, or a designated representative, and may be made as "pen-and-ink" changes in all official and working copies of the procedure.

4.0 DESCRIPTION OF THE SYSTEM

The PUREX facility utilizes three ventilation exhaust fans, with inlet, outlet, and vortex dampers associated with each fan. Each exhaust fan damper actuator system consists of five actuators, two for the inlet dampers, two for the outlet dampers, and one for the fan vortex damper. Mounted on the barrel of each actuator are four limit switches which function to control the actuator stroke length and provide damper position indication. Two of the limit switches on each actuator provide actuator position feedback for actuator drive motor control while the other two limit switches on each actuator barrel provide input to the SAMCONS computers for actuator operation control and damper position control.

The portions of each fan damper actuation system to be tested include:

- Proper functioning of actuator limit switches
- Proper functioning of actuator drive motors
- Proper functioning of local limit switch actuation indicators
- Preliminary setting of actuator stroke length

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5.0 TEST CONDITIONS AND EQUIPMENT REQUIRED

5.1 Jumpers and Lifted Leads

In this procedure, there are several occasions when leads are lifted and landed at various terminals. Some of these leads will be energized. Hand and eye protection shall be worn, and insulated tools shall be used, when working on energized circuits (< 50 Vac), if required. The instrument leads must be energized to cause damper actuator movement.

5.2 Unexpected Alarms

If unexpected PUREX facility equipment alarms or abnormal indications are received during testing, testing evolutions shall be immediately suspended and actions, as prescribed in approved PUREX facility Alarm Response and Emergency Procedures, shall be taken by responsible PUREX facility personnel to place the equipment/facility in a safe, stable condition. When the reason for the unexpected condition is understood and resolved, then testing activities may be resumed after permission to do so is received from the SAMCONS Cognizant Engineer.

5.3 Prior to initiation of testing , and at the start of each shift during testing, test personnel shall be briefed on the scope of testing to be conducted during the shift. The briefing shall include any equipment to be operated or controlled during the shift. Additionally, a discussion of work in the facility that could affect testing shall also be held between the SAMCONS Cognizant Engineer and the acting Test Director in charge of the test to be conducted.

5.4 Prior to initiation of testing, the following items shall be verified:

5.4.1 Each damper actuator shall be installed on the respective actuator pedestal, disconnected from the respective damper linkage, and ready for operation in all respects.

Verified by: WB Blackaby 14-7-97
(Test Director) Date

5.4.2 All wiring and terminations shall be installed, terminated, and ready for operation in all respects.

Verified by: WB Blackaby 14-7-97
(Test Director) Date

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5.5 Prior to initiation of testing, the following equipment shall be available for use:

- 5.5.1 Insulated hand tools normally required for accessing equipment cabinets and terminal boards
- 5.5.2 Any personnel safety equipment required for performance of work on energized equipment (< 50 Vac).
- 5.5.3 Communications equipment (radios cellular phones), for communicating between personnel at all test locations.
- 5.5.4 Calibrated multi-meter, capable of measuring circuit resistance, and voltages to 120 Vac
- 5.5.5 Hall Effect limit switch test box, for limit switch testing
- 5.5.6 CDI Actuator Test/Setup box, for local operation of actuator drive motors

5.6 Attachment 2, "Measurement and Test Equipment Record Sheet", is included in Section 8.0 for recording data associated with M & TE used during the performance of this procedure.

5.7 All M & TE used to for testing shall be in current calibration and shall have documentation certifying that the calibration is traceable to a national standard.

PUREX EXH SYSTEM ACCEPTANCE TEST PROCEDURE

6.0 PROCEDURE

NOTES:

Sections 6.1 through 6.3 may be performed in any order.

Testing of exhaust fan inlet, outlet, and vortex dampers must be performed in a logical, step-by-step manner to avoid damage to equipment. Each damper actuator will be manually tested locally, with the actuator mounted on the pedestal base but disconnected from the damper linkage, using test control boxes. The test boxes will be connected to system terminals such that the maximum amount of wiring and terminations are verified with each test. After verification of proper actuator stroke and limit switch functions and setting of proper stroke lengths and limit switch positions, the actuators will be cycled using manual and automatic computer control, with the actuators disconnected. Finally, the actuators will be connected to the damper linkages and the dampers will be operated using manual and automatic computer control.

6.1 Exhaust Fan EF1-1 Inlet, Outlet, and Vortex Damper Testing

- 6.1.1 Ensure that the actuators for all inlet, outlet, and vortex dampers are properly mounted on pedestal bases and disconnected from the damper actuation linkages.
- 6.1.2 Ensure that all four limit switches are installed for each actuator and that the initial actuator stroke will be limited to approximately three and one-half inches.

NOTE:

Limit switch mounting positions (right-hand side of the actuator barrel or left-hand side of the actuator barrel) are established with actuator barrel being viewed from the motor end.

- 6.1.3 Ensure that type RP1 limit switches are mounted on the left-hand side of the actuator barrel and RP2 limit switches are mounted on the right-hand side of the actuator barrel.
- 6.1.4 Ensure that all wiring for actuator motors and limit switches is installed, connected, and ready to be energized.
- 6.1.5 Whenever electrical leads are lifted and landed, record required information on Appendix 4, "Lifted/Landed Leads Log Sheet" for each lead lifted/landed.
VERIFY, USING RELEASED LOOP WIRING DRAWING, THAT LEADS ARE RE-LANDED CORRECTLY.

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- 6.1.6 If, during limit switch and actuator testing, any unexpected conditions are encountered or if any unexpected equipment operation is noted, then immediately stop testing, inform the Test Director of the problem, and resume testing only when directed to do so by the Test Director.
- 6.1.7 Lift the 24 Vdc supply wire from the actuator controller at terminal TS3-EF1-1-1.
- 6.1.8 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS3-EF1-1-3.
- 6.1.9 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS3-EF1-1-11.
- 6.1.10 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS3-EF1-1-15.
- 6.1.11 Lift lead ZDR-CD-30-1A-9 and one end of the jumper from Terminal TS3-EF1-1-4.
- 6.1.12 Connect the Hall Effect limit switch test box test wire from TB-1 +24 Vdc to TS3-EF1-1-1.
- 6.1.13 Connect the Hall Effect limit switch test box test wire from TB-1 DC COM to TS3-EF1-1-7.
- 6.1.14 Connect the Hall Effect limit switch test box as follows for testing limit switches on the EF1-1 inlet damper 1A actuator:
 - Terminals ZOS-CD-30-1A, TB-1 to TS3-EF1-1-4 for the left-hand (RP1) extended limit switch.
 - Terminals ZCS-CD-30-1A, TB-3 to TS3-EF1-1-8 for the left-hand (RP1) retracted limit switch.
 - Terminals ZOR-CD-30-1A, TB-6 to TS3-EF1-1-12 for the right-hand (RP2) extended limit switch.
 - Terminals ZCR-CD-30-1A, TB-8 to TS3-EF1-1-16 for the right-hand (RP2) retracted limit switch.
- 6.1.15 Connect the 24 Vdc test power supply to TB-9 (+)24 Vdc and (-) DC Common on the Hall Effect limit switch test box.
- 6.1.16 Energize the 24 Vdc test power supply.

PUREX EXH SYSTEM ACCEPTANCE TEST PROCEDURE

NOTES

When a limit switch is actuated, a red light will be illuminated on the Hall Effect test box.

When a left-hand (RP1) type limit switch is actuated, the red light on the switch will be illuminated.

When a right-hand (RP2) type limit switch is actuated, the green light on the limit switch will not be illuminated.

6.1.17 Place a magnet near the left-hand retracted limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The red light on the limit switch is illuminated.

6.1.18 Remove the magnet and verify that both red lights are no longer illuminated.

6.1.19 Place a magnet near the right-hand retracted limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The green light on the limit switch is not illuminated.

6.1.20 Remove the magnet and verify that the red light on the test box is no longer illuminated and the green light on the switch is illuminated.

6.1.21 Place a magnet near the left-hand extended limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The red light on the limit switch is illuminated.

6.1.22 Remove the magnet and verify that both red lights are no longer illuminated.

6.1.23 Place a magnet near the right-hand extended limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The green light on the limit switch is not illuminated.

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- 6.1.24 Remove the magnet and verify that the red light on the test box is no longer illuminated and the green light on the switch is illuminated.
- 6.1.25 De-energize the 24 Vdc test power supply.
- 6.1.26 Disconnect the Hall Effect limit switch test box from the EF1-1 inlet damper 1A actuator terminals and re-lead all lifted leads.
- 6.1.27 Lift the 24 Vdc supply wire from the actuator controller at terminal TS3-EF1-1-31.
- 6.1.28 Lift the 2.2 KΩ “pull-up” (PU) resistor at terminal TS3-EF1-1-33.
- 6.1.29 Lift the 2.2 KΩ “pull-up” (PU) resistor at terminal TS3-EF1-1-41.
- 6.1.30 Lift the 2.2 KΩ “pull-up” (PU) resistor at terminal TS3-EF1-1-45.
- 6.1.31 Lift lead ZDR-CD-30-1B-9 and one end of the jumper from Terminal TS3-EF1-1-34.
- 6.1.32 Connect the Hall Effect limit switch test box test wire from TB-1 +24 Vdc to TS3-EF1-1-31.
- 6.1.33 Connect the Hall Effect limit switch test box test wire from TB-1 DC COM to TS3-EF1-1-47.
- 6.1.34 Connect the Hall Effect limit switch test box as follows for testing limit switches on the EF1-1 inlet damper 1B actuator:
 - Terminals ZOS-CD-30-1B, TB-1 to TS3-EF1-1-34 for the left-hand (RP1) extended limit switch.
 - Terminals ZCS-CD-30-1B, TB-3 to TS3-EF1-1-38 for the left-hand (RP1) retracted limit switch.
 - Terminals ZOR-CD-30-1B, TB-6 to TS3-EF1-1-42 for the right-hand (RP2) extended limit switch.
 - Terminals ZCR-CD-30-1B, TB-8 to TS3-EF1-1-46 for the right-hand (RP2) retracted limit switch.
- 6.1.35 Ensure that the 24 Vdc test power supply is still connected to TB-9 (+)24 Vdc and (-) DC Common on the Hall Effect limit switch test box.
- 6.1.36 Energize the 24 Vdc test power supply.

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PUREX EXH SYSTEM ACCEPTANCE TEST PROCEDURE

NOTES

When a limit switch is actuated, a red light will be illuminated on the Hall Effect test box.

When a left-hand (RP1) type limit switch is actuated, the red light on the switch will be illuminated.

When a right-hand (RP2) type limit switch is actuated, the green light on the limit switch will not be illuminated.

6.1.37 Place a magnet near the left-hand retracted limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The red light on the limit switch is illuminated.

6.1.38 Remove the magnet and verify that both red lights are no longer illuminated.

6.1.39 Place a magnet near the right-hand retracted limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The green light on the limit switch is not illuminated.

6.1.40 Remove the magnet and verify that the red light on the test box is no longer illuminated and the green light on the switch is illuminated.

6.1.41 Place a magnet near the left-hand extended limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The red light on the limit switch is illuminated.

6.1.42 Remove the magnet and verify that both red lights are no longer illuminated.

6.1.43 Place a magnet near the right-hand extended limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The green light on the limit switch is not illuminated.

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- 6.1.44 Remove the magnet and verify that the red light on the test box is no longer illuminated and the green light on the switch is illuminated.
- 6.1.45 De-energize the 24 Vdc test power supply.
- 6.1.46 Disconnect the Hall Effect limit switch test box from the EF1-1 inlet damper 1B actuator terminals and re-land all lifted leads.
- 6.1.47 Lift the 24 Vdc supply wire from the actuator controller at terminal TS3-EF1-1-61.
- 6.1.48 Lift the 2.2 KΩ “pull-up” (PU) resistor at terminal TS3-EF1-1-63.
- 6.1.49 Lift the 2.2 KΩ “pull-up” (PU) resistor at terminal TS3-EF1-1-71.
- 6.1.50 Lift the 2.2 KΩ “pull-up” (PU) resistor at terminal TS3-EF1-1-75.
- 6.1.51 Lift lead ZDR-CD-30-2A-9 and one end of the jumper from Terminal TS3-EF1-1-64.
- 6.1.52 Connect the Hall Effect limit switch test box test wire from TB-1 +24 Vdc to TS3-EF1-1-61.
- 6.1.53 Connect the Hall Effect limit switch test box test wire from TB-1 DC COM to TS3-EF1-1-77.
- 6.1.54 Connect the Hall Effect limit switch test box as follows for testing limit switches on the EF1-1 inlet damper 2A actuator:
 - Terminals ZOS-CD-30-2A, TB-1 to TS3-EF1-1-64 for the left-hand (RP1) extended limit switch.
 - Terminals ZCS-CD-30-2A, TB-3 to TS3-EF1-1-68 for the left-hand (RP1) retracted limit switch.
 - Terminals ZOR-CD-30-2A, TB-6 to TS3-EF1-1-72 for the right-hand (RP2) extended limit switch.
 - Terminals ZCR-CD-30-2A, TB-8 to TS3-EF1-1-76 for the right-hand (RP2) retracted limit switch.
- 6.1.55 Ensure that the 24 Vdc test power supply is still connected to TB-9 (+)24 Vdc and (-) DC Common on the Hall Effect limit switch test box.
- 6.1.56 Energize the 24 Vdc test power supply.

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NOTES

When a limit switch is actuated, a red light will be illuminated on the Hall Effect test box.

When a left-hand (RP1) type limit switch is actuated, the red light on the switch will be illuminated.

When a right-hand (RP2) type limit switch is actuated, the green light on the limit switch will not be illuminated.

6.1.57 Place a magnet near the left-hand retracted limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The red light on the limit switch is illuminated.

6.1.58 Remove the magnet and verify that both red lights are no longer illuminated.

6.1.59 Place a magnet near the right-hand retracted limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The green light on the limit switch is not illuminated.

6.1.60 Remove the magnet and verify that the red light on the test box is no longer illuminated and the green light on the switch is illuminated.

6.1.61 Place a magnet near the left-hand extended limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The red light on the limit switch is illuminated.

6.1.62 Remove the magnet and verify that both red lights are no longer illuminated.

6.1.63 Place a magnet near the right-hand extended limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The green light on the limit switch is not illuminated.

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- 6.1.64 Remove the magnet and verify that the red light on the test box is no longer illuminated and the green light on the switch is illuminated.
- 6.1.65 De-energize the 24 Vdc test power supply.
- 6.1.66 Disconnect the Hall Effect limit switch test box from the EF1-1 outlet damper 2A actuator terminals and re-land all lifted leads.
- 6.1.67 Lift the 24 Vdc supply wire from the actuator controller at terminal TS3-EF1-1-91.
- 6.1.68 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS3-EF1-1-93.
- 6.1.69 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS3-EF1-1-101.
- 6.1.70 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS3-EF1-1-105.
- 6.1.71 Lift lead ZDR-CD-30-2B-9 and one end of the jumper from Terminal TS3-EF1-1-94.
- 6.1.72 Connect the Hall Effect limit switch test box test wire from TB-1 +24 Vdc to TS3-EF1-1-91.
- 6.1.73 Connect the Hall Effect limit switch test box test wire from TB-1 DC COM to TS3-EF1-1-108.
- 6.1.74 Connect the Hall Effect limit switch test box as follows for testing limit switches on the EF1-1 inlet damper 2B actuator:
 - Terminals ZOS-CD-30-2B, TB-1 to TS3-EF1-1-94 for the left-hand (RP1) extended limit switch.
 - Terminals ZCS-CD-30-2B, TB-3 to TS3-EF1-1-98 for the left-hand (RP1) retracted limit switch.
 - Terminals ZOR-CD-30-2B, TB-6 to TS3-EF1-1-102 for the right-hand (RP2) extended limit switch.
 - Terminals ZCR-CD-30-2B, TB-8 to TS3-EF1-1-106 for the right-hand (RP2) retracted limit switch.
- 6.1.75 Ensure that the 24 Vdc test power supply is still connected to TB-9 (+)24 Vdc and (-) DC Common on the Hall Effect limit switch test box.
- 6.1.76 Energize the 24 Vdc test power supply.

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NOTES

When a limit switch is actuated, a red light will be illuminated on the Hall Effect test box.

When a left-hand (RP1) type limit switch is actuated, the red light on the switch will be illuminated.

When a right-hand (RP2) type limit switch is actuated, the green light on the limit switch will not be illuminated.

6.1.77 Place a magnet near the left-hand retracted limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The red light on the limit switch is illuminated.

6.1.78 Remove the magnet and verify that both red lights are no longer illuminated.

6.1.79 Place a magnet near the right-hand retracted limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The green light on the limit switch is not illuminated.

6.1.80 Remove the magnet and verify that the red light on the test box is no longer illuminated and the green light on the switch is illuminated.

6.1.81 Place a magnet near the left-hand extended limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The red light on the limit switch is illuminated.

6.1.82 Remove the magnet and verify that both red lights are no longer illuminated.

6.1.83 Place a magnet near the right-hand extended limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The green light on the limit switch is not illuminated.

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6.1.84 Remove the magnet and verify that the red light on the test box is no longer illuminated and the green light on the switch is illuminated.

6.1.85 Lift the following leads in the SAMCONS Trailer at IR-9 and connect the CDI Actuator Test/Setup box to the lifted leads:

- TB1-4, M+, Wire Tag # TS-CD-30-2B-2
- TB1-3, M-, Wire Tag # TS-CD-30-2B-1

6.1.86 Connect the CDI Actuator Test/Setup box to a source of 120 Vac power.

NOTE:

Steps 6.1.87 through 6.1.96 will stroke EF1-1 2B outlet damper actuator.

6.1.87 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Extend" and press and release the "RUN" pushbutton to "jog" the actuator in the extended direction until the red light on the Hall Effect test box illuminates.

6.1.88 Verify that the red light on the left-hand extended limit switch is illuminated and the green light on the right-hand extended limit switch is not illuminated.

6.1.89 Measure and record the actuator position so that actuator stroke can be determined.

Actuator Position: 6 1/8 inches

6.1.90 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Retract" and "jog" the actuator in the retracted direction until the red light on the Hall Effect test box is not illuminated.

6.1.91 Verify that the red light on the left-hand extended limit switch is not illuminated and the green light on the right-hand extended limit switch is illuminated.

6.1.92 At the CDI Actuator Test/Setup box, "jog" the actuator in the retracted direction until the red light on the Hall Effect test box illuminates.

6.1.93 Verify that the red light on the left-hand retracted limit switch is illuminated and the green light on the right-hand retracted limit switch is not illuminated.

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6.1.94 Measure and record the actuator position.
Actuator Position: 2 1/4 inches

6.1.95 Subtract the measurement recorded in Step 6.1.94 from the measurement recorded in Step 6.1.89 to determine the actuator stroke and record the result below.
Actuator Stroke: 3 7/8 inches (3 1/2", nominal)

6.1.96 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Extend" and "jog" the actuator in the extended direction until the red light on the Hall Effect test box is not illuminated.

6.1.97 Verify that the red light on the left-hand retracted limit switch is not illuminated and the green light on the right-hand retracted limit switch is illuminated.

6.1.98 De-energize the 24 Vdc test power supply.

6.1.99 Disconnect the Hall Effect limit switch test box from the EF1-1 outlet damper 2B actuator terminals and re-land all lifted leads.

6.1.100 Lift the 24 Vdc supply wire from the actuator controller at terminal TS3-EF1-1-61.

6.1.101 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS3-EF1-1-63.

6.1.102 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS3-EF1-1-71.

6.1.103 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS3-EF1-1-75.

6.1.104 Lift lead ZDR-CD-30-2A-9 and one end of the jumper from Terminal TS3-EF1-1-64.

6.1.105 Connect the Hall Effect limit switch test box test wire from TB-1 +24 Vdc to TS3-EF1-1-61.

6.1.106 Connect the Hall Effect limit switch test box test wire from TB-1 DC COM to TS3-EF1-1-77.

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6.1.107 Connect the Hall Effect limit switch test box as follows for testing limit switches on the EF1-1 inlet damper 2A actuator:

- Terminals ZOS-CD-30-2A, TB-1 to TS3-EF1-1-64 for the left-hand (RP1) extended limit switch.
- Terminals ZCS-CD-30-2A, TB-3 to TS3-EF1-1-68 for the left-hand (RP1) retracted limit switch.
- Terminals ZOR-CD-30-2A, TB-6 to TS3-EF1-1-72 for the right-hand (RP2) extended limit switch.
- Terminals ZCR-CD-30-2A, TB-8 to TS3-EF1-1-76 for the right-hand (RP2) retracted limit switch.

6.1.108 Ensure that the 24 Vdc test power supply is still connected to TB-9 (+)24 Vdc and (-) DC Common on the Hall Effect limit switch test box.

6.1.109 Disconnect the CDI Test/Setup box from the EF1-1 outlet damper 2B actuator terminals and re-land all lifted leads.

6.1.110 Lift the following leads in the SAMCONS Trailer at IR-9 and connect the CDI Actuator Test/Setup box to the lifted leads:

- TB1-4, M+, Wire Tag # TS-CD-30-2A-2
- TB1-3, M-, Wire Tag # TS-CD-30-2A-1

6.1.111 Energize the 24 Vdc test power supply.

NOTE:

Steps 6.1.112 through 6.1.121 will stroke EF1-1 2A outlet damper actuator.

6.1.112 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Extend" and press and release the "RUN" pushbutton to "jog" the actuator in the extended direction until the red light on the Hall Effect test box illuminates.

6.1.113 Verify that the red light on the left-hand extended limit switch is illuminated and the green light on the right-hand extended limit switch is not illuminated.

6.1.114 Measure and record the actuator position so that actuator stroke can be determined.

Actuator Position: 6 1/8 inches

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6.1.115 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Retract" and "jog" the actuator in the retracted direction until the red light on the Hall Effect test box is not illuminated.

6.1.116 Verify that the red light on the left-hand extended limit switch is not illuminated and the green light on the right-hand extended limit switch is illuminated.

6.1.117 At the CDI Actuator Test/Setup box, "jog" the actuator in the retracted direction until the red light on the Hall Effect test box illuminates.

6.1.118 Verify that the red light on the left-hand retracted limit switch is illuminated and the green light on the right-hand retracted limit switch is not illuminated.

6.1.119 Measure and record the actuator position.
Actuator Position: 2 1/4 inches

6.1.120 Subtract the measurement recorded in Step 6.1.119 from the measurement recorded in Step 6.1.114 to determine the actuator stroke and record the result below.
Actuator Stroke: 3 7/8 inches (3 1/2", nominal)

6.1.121 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Extend" and "jog" the actuator in the extended direction until the red light on the Hall Effect test box is not illuminated.

6.1.122 Verify that the red light on the left-hand retracted limit switch is not illuminated and the green light on the right-hand retracted limit switch is illuminated.

6.1.123 De-energize the 24 Vdc test power supply.

6.1.124 Disconnect the Hall Effect limit switch test box from the EF1-1 outlet damper 2A actuator terminals and re-land all lifted leads.

6.1.125 Lift the 24 Vdc supply wire from the actuator controller at terminal TS3-EF1-1-31.

6.1.126 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS3-EF1-1-33.

6.1.127 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS3-EF1-1-41.

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- 6.1.128 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS3-EF1-1-45.
- 6.1.129 Lift lead ZDR-CD-30-1B-9 and one end of the jumper from Terminal TS3-EF1-1-34.
- 6.1.130 Connect the Hall Effect limit switch test box test wire from TB-1 +24 Vdc to TS3-EF1-1-31.
- 6.1.131 Connect the Hall Effect limit switch test box test wire from TB-1 DC COM to TS3-EF1-1-47.
- 6.1.132 Connect the Hall Effect limit switch test box as follows for testing limit switches on the EF1-1 inlet damper 1B actuator:
 - Terminals ZOS-CD-30-1B, TB-1 to TS3-EF1-1-34 for the left-hand (RP1) extended limit switch.
 - Terminals ZCS-CD-30-1B, TB-3 to TS3-EF1-1-38 for the left-hand (RP1) retracted limit switch.
 - Terminals ZOR-CD-30-1B, TB-6 to TS3-EF1-1-42 for the right-hand (RP2) extended limit switch.
 - Terminals ZCR-CD-30-1B, TB-8 to TS3-EF1-1-46 for the right-hand (RP2) retracted limit switch.
- 6.1.133 Ensure that the 24 Vdc test power supply is still connected to TB-9 (+)24 Vdc and (-) DC Common on the Hall Effect limit switch test box.
- 6.1.134 Disconnect the CDI Test/Setup box from the EF1-1 outlet damper 2A actuator terminals and re-land all lifted leads.
- 6.1.135 Lift the following leads in the SAMCONS Trailer at IR-9 and connect the CDI Actuator Test/Setup box to the lifted leads:
 - TB1-4, M+, Wire Tag # TS-CD-30-1B-2
 - TB1-3, M-, Wire Tag # TS-CD-30-1B-1
- 6.1.136 Energize the 24 Vdc test power supply..

NOTE:

Steps 6.1.137 through 6.1.146 will stroke EF1-1 1B inlet damper actuator.

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6.1.137 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Extend" and press and release the "RUN" pushbutton to "jog" the actuator in the extended direction until the red light on the Hall Effect test box illuminates.

6.1.138 Verify that the red light on the left-hand extended limit switch is illuminated and the green light on the right-hand extended limit switch is not illuminated.

6.1.139 Measure and record the actuator position so that actuator stroke can be determined.

Actuator Position: 7 1/4 inches EF1-1 (1B ACTUATOR)

6.1.140 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Retract" and "jog" the actuator in the retracted direction until the red light on the Hall Effect test box is not illuminated.

6.1.141 Verify that the red light on the left-hand extended limit switch is not illuminated and the green light on the right-hand extended limit switch is illuminated.

6.1.142 At the CDI Actuator Test/Setup box, "jog" the actuator in the retracted direction until the red light on the Hall Effect test box illuminates.

6.1.143 Verify that the red light on the left-hand retracted limit switch is illuminated and the green light on the right-hand retracted limit switch is not illuminated.

6.1.144 Measure and record the actuator position.

Actuator Position: 3 5/8 inches

6.1.145 Subtract the measurement recorded in Step 6.1.144 from the measurement recorded in Step 6.1.139 to determine the actuator stroke and record the result below.

Actuator Stroke: 3 3/4 inches (3 1/2", nominal)

6.1.146 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Extend" and "jog" the actuator in the extended direction until the red light on the Hall Effect test box is not illuminated.

6.1.147 Verify that the red light on the left-hand retracted limit switch is not illuminated and the green light on the right-hand retracted limit switch is illuminated.

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6.1.148 De-energize the 24 Vdc test power supply.

6.1.149 Disconnect the Hall Effect limit switch test box from the EF1-1 inlet damper 1B actuator terminals and re-land all lifted leads.

6.1.150 Lift the 24 Vdc supply wire from the actuator controller at terminal TS3-EF1-1-1.

6.1.151 Lift the 2.2 KΩ “pull-up” (PU) resistor at terminal TS3-EF1-1-3.

6.1.152 Lift the 2.2 KΩ “pull-up” (PU) resistor at terminal TS3-EF1-1-11.

6.1.153 Lift the 2.2 KΩ “pull-up” (PU) resistor at terminal TS3-EF1-1-15.

6.1.154 Lift lead ZDR-CD-30-1A-9 and one end of the jumper from Terminal TS3-EF1-1-4.

6.1.155 Connect the Hall Effect limit switch test box test wire from TB-1 +24 Vdc to TS3-EF1-1-1.

6.1.156 Connect the Hall Effect limit switch test box test wire from TB-1 DC COM to TS3-EF1-1-17.

6.1.157 Connect the Hall Effect limit switch test box as follows for testing limit switches on the EF1-1 inlet damper 1A actuator:

- Terminals ZOS-CD-30-1A, TB-1 to TS3-EF1-1-4 for the left-hand (RP1) extended limit switch.
- Terminals ZCS-CD-30-1A, TB-3 to TS3-EF1-1-8 for the left-hand (RP1) retracted limit switch.
- Terminals ZOR-CD-30-1A, TB-6 to TS3-EF1-1-12 for the right-hand (RP2) extended limit switch.
- Terminals ZCR-CD-30-1A, TB-8 to TS3-EF1-1-16 for the right-hand (RP2) retracted limit switch.

6.1.158 Ensure that the 24 Vdc test power supply is still connected to TB-9 (+)24 Vdc and (-) DC Common on the Hall Effect limit switch test box.

6.1.159 Disconnect the CDI Test/Setup box from the EF1-1 inlet damper 1B actuator terminals and re-land all lifted leads.

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6.1.160 Lift the following leads in the SAMCONS Trailer at IR-9 and connect the CDI Actuator Test/Setup box to the lifted leads:

- TB1-4, M+, Wire Tag # TS-CD-30-1A-2
- TB1-3, M-, Wire Tag # TS-CD-30-1A-1

6.1.161 Energize the 24 Vdc test power supply.

NOTE:

Steps 6.1.162 through 6.1.171 will stroke EF1-1 1A inlet damper actuator.

6.1.162 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Extend" and press and release the "RUN" pushbutton to "jog" the actuator in the extended direction until the red light on the Hall Effect test box illuminates.

6.1.163 Verify that the red light on the left-hand extended limit switch is illuminated and the green light on the right-hand extended limit switch is not illuminated.

6.1.164 Measure and record the actuator position so that actuator stroke can be determined.

Actuator Position: 7 3/8 inches

6.1.165 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Retract" and "jog" the actuator in the retracted direction until the red light on the Hall Effect test box is not illuminated.

6.1.166 Verify that the red light on the left-hand extended limit switch is not illuminated and the green light on the right-hand extended limit switch is illuminated.

6.1.167 At the CDI Actuator Test/Setup box, "jog" the actuator in the retracted direction until the red light on the Hall Effect test box illuminates.

6.1.168 Verify that the red light on the left-hand retracted limit switch is illuminated and the green light on the right-hand retracted limit switch is not illuminated.

6.1.169 Measure and record the actuator position.

Actuator Position: 3 5/8 inches

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6.1.170 Subtract the measurement recorded in Step 6.1.169 from the measurement recorded in Step 6.1.164 to determine the actuator stroke and record the result below.

Actuator Stroke: 3 3/4 inches (3½", nominal)

6.1.171 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Extend" and "jog" the actuator in the extended direction until the red light on the Hall Effect test box is not illuminated.

6.1.172 Verify that the red light on the left-hand retracted limit switch is not illuminated and the green light on the right-hand retracted limit switch is illuminated.

6.1.173 De-energize the 24 Vdc test power supply.

6.1.174 Disconnect the CDI Test/Setup box from the EF1-1 inlet damper 1A actuator terminals and re-land all lifted leads.

6.1.175 Disconnect the Hall Effect limit switch test box from the EF1-1 inlet damper 1A actuator terminals and re-land all lifted leads.

6.1.176 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS3-EF1-1-127.

6.1.177 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS3-EF1-1-123.

6.1.178 Connect the Hall Effect limit switch test box as follows for testing limit switches on the EF1-1 vortex damper actuator:

- Terminals ZOR-CD-30-3 to TS3-EF1-1-124 for the right-hand (RP2) extended limit switch.
- Terminals ZCR-CD-30-3 to TS3-EF1-1-128 for the right-hand (RP2) retracted limit switch.

6.1.179 Place a magnet near the right-hand retracted limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The green light on the limit switch is not illuminated.

6.1.180 Remove the magnet and verify that the red light on the test box is no longer illuminated and green light on the limit switch is illuminated.

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6.1.181 Place a magnet near the right-hand extended limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The green light on the limit switch is not illuminated.

6.1.182 Remove the magnet and verify that the red light on the test box is no longer illuminated and green light on the limit switch is illuminated.

6.1.183 Perform continuity checks between wiring terminals listed in Table A, "EF1-1 Vortex Damper Wiring" and initial the "CHECK SAT INITIALS" column if continuity checks are satisfactory.

Table A: EF1-1 Vortex Damper Wiring

FROM JB-CD-30-3 TS-CD-30-3A	TO MARSHALLING PANEL TS3-EF1-1	CHECK SAT INITIALS	FROM JB-CD-30-3 TS-CD-30-3A	TO MARSHALLING PANEL TS3-EF1-1	CHECK SAT INITIALS
TERMINAL 9	TERMINAL 131	W3 ^{item 1} Lg sh. 5	TERMINAL 22	TERMINAL 149	W3
TERMINAL 10	TERMINAL 132	W3	TERMINAL 23	TERMINAL 150	W3
TERMINAL 11	TERMINAL 134	W3 ^{item 2} Lg sh. 2	TERMINAL 25	TERMINAL 152	W3
TERMINAL 12	TERMINAL 135	W3	TERMINAL 26	TERMINAL 153	W3 *
TERMINAL 16	TERMINAL 140	W3	TERMINAL 27	TERMINAL 155	W3 *
TERMINAL 17	TERMINAL 141	W3	TERMINAL 28	TERMINAL 156	W3
TERMINAL 18	TERMINAL 143	W3	TERMINAL 29	TERMINAL 158	W3 *
TERMINAL 19	TERMINAL 144	W3	TERMINAL 30	TERMINAL 159	W3
TERMINAL 20	TERMINAL 146	W3	TERMINAL 31	TERMINAL 161	W3
TERMINAL 21	TERMINAL 147	W3	TERMINAL 32	TERMINAL 162	W3
FROM TS-CD-30-3B	TO ZDR-CD-30-3		FROM TS-CD-30-3B	TO ZDR-CD-30-3	
TERMINAL 1	TERM. EARTH	W3	TERMINAL 3	TERM. MTRS	W3
TERMINAL 2	TERM. MTRR	W3	TERMINAL 4	TERM. MTRT	W3

* See Test Log, sheet 5. EXCEPTION #1

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6.2 Exhaust Fan EF1-2 Inlet, Outlet, and Vortex Damper Testing

- 6.2.1 Ensure that the actuators for all inlet, outlet, and vortex dampers are properly mounted on pedestal bases and disconnected from the damper actuation linkages.
- 6.2.2 Ensure that all four limit switches are installed for each actuator and that the initial actuator stroke will be limited to approximately three and one-half inches.

NOTE:

Limit switch mounting positions (right-hand side of the actuator barrel or left-hand side of the actuator barrel) are established with actuator barrel being viewed from the motor end.

- 6.2.3 Ensure that type RP1 limit switches are mounted on the left-hand side of the actuator barrel and RP2 limit switches are mounted on the right-hand side of the actuator barrel.
- 6.2.4 Ensure that all wiring for actuator motors and limit switches is installed, connected, and ready to be energized.
- 6.2.5 Whenever electrical leads are lifted and landed, record required information on Appendix A "Lifted/Landed Leads Log Sheet" for each lead lifted/landed. *VERIFY, USING RELEASED LOOP WIRING DRAWINGS, THAT LEADS ARE RECANDED CORRECTLY.*
- 6.2.6 If, during limit switch and actuator testing, any unexpected conditions are encountered or if any unexpected equipment operation is noted, then immediately stop testing, inform the Test Director of the problem, and resume testing only when directed to do so by the Test Director.
- 6.2.7 Lift the 24 Vdc supply wire from the actuator controller at terminal TS4-EF1-2-1.
- 6.2.8 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS4-EF1-2-3.
- 6.2.9 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS4-EF1-2-11.
- 6.2.10 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS4-EF1-2-15.
- 6.2.11 Lift lead ZDR-CD-31-1A-9 and one end of the jumper from Terminal TS4-EF1-2-4.
- 6.2.12 Connect the Hall Effect limit switch test box test wire from TB-1 +24 Vdc to TS4-EF1-2-1.

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- 6.2.13 Connect the Hall Effect limit switch test box test wire from TB-1 DC COM to TS4-EF1-2-17.
- 6.2.14 Connect the Hall Effect limit switch test box as follows for testing limit switches on the EF1-2 inlet damper 1A actuator:
 - Terminals ZOS-CD-31-1A, TB-1 to TS4-EF1-2-4 for the left-hand (RP1) extended limit switch.
 - Terminals ZCS-CD-31-1A, TB-3 to TS4-EF1-2-8 for the left-hand (RP1) retracted limit switch.
 - Terminals ZOR-CD-31-1A, TB-6 to TS4-EF1-2-12 for the right-hand (RP2) extended limit switch.
 - Terminals ZCR-CD-31-1A, TB-8 to TS4-EF1-2-16 for the right-hand (RP2) retracted limit switch.
- 6.2.15 Connect the 24 Vdc test power supply to TB-9 (+)24 Vdc and (-) DC Common on the Hall Effect limit switch test box.
- 6.2.16 Energize the 24 Vdc test power supply.

NOTES

When a limit switch is actuated, a red light will be illuminated on the Hall Effect test box.

When a left-hand (RP1) type limit switch is actuated, the red light on the switch will be illuminated.

When a right-hand (RP2) type limit switch is actuated, the green light on the limit switch will not be illuminated.

- 6.2.17 Place a magnet near the left-hand retracted limit switch and verify the following:
 - The red light on the Hall Effect test box is illuminated.
 - The red light on the limit switch is illuminated.
- 6.2.18 Remove the magnet and verify that both red lights are no longer illuminated.

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6.2.19 Place a magnet near the right-hand retracted limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The green light on the limit switch is not illuminated.

6.2.20 Remove the magnet and verify that the red light on the test box is no longer illuminated and the green light on the switch is illuminated.

6.2.21 Place a magnet near the left-hand extended limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The red light on the limit switch is illuminated.

6.2.22 Remove the magnet and verify that both red lights are no longer illuminated.

6.2.23 Place a magnet near the right-hand extended limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The green light on the limit switch is not illuminated.

6.2.24 Remove the magnet and verify that the red light on the test box is no longer illuminated and the green light on the switch is illuminated.

6.2.25 De-energize the 24 Vdc test power supply.

6.2.26 Disconnect the Hall Effect limit switch test box from the EF1-2 inlet damper 1A actuator terminals and re-land all lifted leads.

6.2.27 Lift the 24 Vdc supply wire from the actuator controller at terminal TS4-EF1-2-31.

6.2.28 Lift the 2.2 KΩ “pull-up” (PU) resistor at terminal TS4-EF1-2-33.

6.2.29 Lift the 2.2 KΩ “pull-up” (PU) resistor at terminal TS4-EF1-2-41.

6.2.30 Lift the 2.2 KΩ “pull-up” (PU) resistor at terminal TS4-EF1-2-45.

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- 6.2.31 Lift lead ZDR-CD-31-1B-9 and one end of the jumper from Terminal TS4-EF1-2-34.
- 6.2.32 Connect the Hall Effect limit switch test box test wire from TB-1 +24 Vdc to TS4-EF1-2-31.
- 6.2.33 Connect the Hall Effect limit switch test box test wire from TB-1 DC COM to TS4-EF1-2-47.
- 6.2.34 Connect the Hall Effect limit switch test box as follows for testing limit switches on the EF1-2 inlet damper 1B actuator:
 - Terminals ZOS-CD-31-1B, TB-1 to TS4-EF1-2-34 for the left-hand (RP1) extended limit switch.
 - Terminals ZCS-CD-31-1B, TB-3 to TS4-EF1-2-38 for the left-hand (RP1) retracted limit switch.
 - Terminals ZOR-CD-31-1B, TB-6 to TS4-EF1-2-42 for the right-hand (RP2) extended limit switch.
 - Terminals ZCR-CD-31-1B, TB-8 to TS4-EF1-2-46 for the right-hand (RP2) retracted limit switch.
- 6.2.35 Ensure that the 24 Vdc test power supply is still connected to TB-9 (+)24 Vdc and (-) DC Common on the Hall Effect limit switch test box.
- 6.2.36 Energize the 24 Vdc test power supply.

NOTES

When a limit switch is actuated, a red light will be illuminated on the Hall Effect test box.

When a left-hand (RP1) type limit switch is actuated, the red light on the switch will be illuminated.

When a right-hand (RP2) type limit switch is actuated, the green light on the limit switch will not be illuminated.

- 6.2.37 Place a magnet near the left-hand retracted limit switch and verify the following:
 - The red light on the Hall Effect test box is illuminated.
 - The red light on the limit switch is illuminated.

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6.2.38 Remove the magnet and verify that both red lights are no longer illuminated.

6.2.39 Place a magnet near the right-hand retracted limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The green light on the limit switch is not illuminated.

6.2.40 Remove the magnet and verify that the red light on the test box is no longer illuminated and the green light on the switch is illuminated.

6.2.41 Place a magnet near the left-hand extended limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The red light on the limit switch is illuminated.

6.2.42 Remove the magnet and verify that both red lights are no longer illuminated.

6.2.43 Place a magnet near the right-hand extended limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The green light on the limit switch is not illuminated.

6.2.44 Remove the magnet and verify that the red light on the test box is no longer illuminated and the green light on the switch is illuminated.

6.2.45 De-energize the 24 Vdc test power supply.

6.2.46 Disconnect the Hall Effect limit switch test box from the EF1-2 inlet damper 1B actuator terminals and re-land all lifted leads.

6.2.47 Lift the 24 Vdc supply wire from the actuator controller at terminal TS4-EF1-2-61.

6.2.48 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS4-EF1-2-63.

6.2.49 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS4-EF1-2-71.

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6.2.50 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS4-EF1-2-75.

6.2.51 Lift lead ZDR-CD-31-2A-9 and one end of the jumper from Terminal TS4-EF1-2-64.

6.2.52 Connect the Hall Effect limit switch test box test wire from TB-1 +24 Vdc to TS4-EF1-2-61.

6.2.53 Connect the Hall Effect limit switch test box test wire from TB-1 DC COM to TS4-EF1-2-77.

6.2.54 Connect the Hall Effect limit switch test box as follows for testing limit switches on the EF1-2 ~~inlet~~ damper 2A actuator:
OUTLET W2

- Terminals ZOS-CD-31-2A, TB-1 to TS4-EF1-2-64 for the left-hand (RP1) extended limit switch.
- Terminals ZCS-CD-31-2A, TB-3 to TS4-EF1-2-68 for the left-hand (RP1) retracted limit switch.
- Terminals ZOR-CD-31-2A, TB-6 to TS4-EF1-2-72 for the right-hand (RP2) extended limit switch.
- Terminals ZCR-CD-31-2A, TB-8 to TS4-EF1-2-76 for the right-hand (RP2) retracted limit switch.

6.2.55 Ensure that the 24 Vdc test power supply is still connected to TB-9 (+)24 Vdc and (-) DC Common on the Hall Effect limit switch test box.

6.2.56 Energize the 24 Vdc test power supply.

NOTES

When a limit switch is actuated, a red light will be illuminated on the Hall Effect test box.

When a left-hand (RP1) type limit switch is actuated, the red light on the switch will be illuminated.

When a right-hand (RP2) type limit switch is actuated, the green light on the limit switch will not be illuminated.

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PUREX EXH SYSTEM ACCEPTANCE TEST PROCEDURE

6.2.57 Place a magnet near the left-hand retracted limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The red light on the limit switch is illuminated.

6.2.58 Remove the magnet and verify that both red lights are no longer illuminated.

6.2.59 Place a magnet near the right-hand retracted limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The green light on the limit switch is not illuminated.

6.2.60 Remove the magnet and verify that the red light on the test box is no longer illuminated and the green light on the switch is illuminated.

6.2.61 Place a magnet near the left-hand extended limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The red light on the limit switch is illuminated.

6.2.62 Remove the magnet and verify that both red lights are no longer illuminated.

6.2.63 Place a magnet near the right-hand extended limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The green light on the limit switch is not illuminated.

6.2.64 Remove the magnet and verify that the red light on the test box is no longer illuminated and the green light on the switch is illuminated.

6.2.65 De-energize the 24 Vdc test power supply.

6.2.66 Disconnect the Hall Effect limit switch test box from the EF1-2 outlet damper 2A actuator terminals and re-land all lifted leads.

PUREX EXH SYSTEM ACCEPTANCE TEST PROCEDURE

6.2.67 Lift the 24 Vdc supply wire from the actuator controller at terminal TS4-EF1-2-91.

6.2.68 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS4-EF1-2-93.

6.2.69 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS4-EF1-2-101.

6.2.70 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS4-EF1-2-105.

6.2.71 Lift lead ZDR-CD-31-2B-9 and one end of the jumper from Terminal TS4-EF1-2-94.

6.2.72 Connect the Hall Effect limit switch test box test wire from TB-1 +24 Vdc to TS4-EF1-2-91.

6.2.73 Connect the Hall Effect limit switch test box test wire from TB-1 DC COM to TS4-EF1-2-108.

6.2.74 Connect the Hall Effect limit switch test box as follows for testing limit switches on the EF1-2 ^{damper} _{OUTLET} 2B actuator:

- Terminals ZOS-CD-31-2B, TB-1 to TS4-EF1-2-94 for the left-hand (RP1) extended limit switch.
- Terminals ZCS-CD-31-2B, TB-3 to TS4-EF1-2-98 for the left-hand (RP1) retracted limit switch.
- Terminals ZOR-CD-31-2B, TB-6 to TS4-EF1-2-102 for the right-hand (RP2) extended limit switch.
- Terminals ZCR-CD-31-2B, TB-8 to TS4-EF1-2-106 for the right-hand (RP2) retracted limit switch.

6.2.75 Ensure that the 24 Vdc test power supply is still connected to TB-9 (+)24 Vdc and (-) DC Common on the Hall Effect limit switch test box.

6.2.76 Energize the 24 Vdc test power supply.

NOTES

When a limit switch is actuated, a red light will be illuminated on the Hall Effect test box.

When a left-hand (RP1) type limit switch is actuated, the red light on the switch will be illuminated.

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PUREX EXH SYSTEM ACCEPTANCE TEST PROCEDURE

When a right-hand (RP2) type limit switch is actuated, the green light on the limit switch will not be illuminated.

6.2.77 Place a magnet near the left-hand retracted limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The red light on the limit switch is illuminated.

6.2.78 Remove the magnet and verify that both red lights are no longer illuminated.

6.2.79 Place a magnet near the right-hand retracted limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The green light on the limit switch is not illuminated.

6.2.80 Remove the magnet and verify that the red light on the test box is no longer illuminated and the green light on the switch is illuminated.

6.2.81 Place a magnet near the left-hand extended limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The red light on the limit switch is illuminated.

6.2.82 Remove the magnet and verify that both red lights are no longer illuminated.

6.2.83 Place a magnet near the right-hand extended limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The green light on the limit switch is not illuminated.

6.2.84 Remove the magnet and verify that the red light on the test box is no longer illuminated and the green light on the switch is illuminated.

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PUREX EXH SYSTEM ACCEPTANCE TEST PROCEDURE

6.2.85 Lift the following leads in the SAMCONS Trailer at IR-9 and connect the CDI Actuator Test/Setup box to the lifted leads:

- TB1-4, M+, Wire Tag # TS-CD-31-2B-2
- TB1-3, M-, Wire Tag # TS-CD-31-2B-1

6.2.86 Connect the CDI Actuator Test/Setup box to a source of 120 Vac power.

NOTE:

Steps 6.2.87 through 6.2.96 will stroke EF1-2 2B outlet damper actuator.

6.2.87 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Extend" and press and release the "RUN" pushbutton to "jog" the actuator in the extended direction until the red light on the Hall Effect test box illuminates.

6.2.88 Verify that the red light on the left-hand extended limit switch is illuminated and the green light on the right-hand extended limit switch is not illuminated.

6.2.89 Measure and record the actuator position so that actuator stroke can be determined.

Actuator Position: 7 1/4 " inches

6.2.90 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Retract" and "jog" the actuator in the retracted direction until the red light on the Hall Effect test box is not illuminated.

6.2.91 Verify that the red light on the left-hand extended limit switch is not illuminated and the green light on the right-hand extended limit switch is illuminated.

6.2.92 At the CDI Actuator Test/Setup box, "jog" the actuator in the retracted direction until the red light on the Hall Effect test box illuminates.

6.2.93 Verify that the red light on the left-hand retracted limit switch is illuminated and the green light on the right-hand retracted limit switch is not illuminated.

6.2.94 Measure and record the actuator position.

Actuator Position: 3 1/6 inches

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PUREX EXH SYSTEM ACCEPTANCE TEST PROCEDURE

6.2.95 Subtract the measurement recorded in Step 6.2.94 from the measurement recorded in Step 6.2.89 to determine the actuator stroke and record the result below.

Actuator Stroke: 4 3/16 inches (3 1/2", nominal)

6.2.96 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Extend" and "jog" the actuator in the extended direction until the red light on the Hall Effect test box is not illuminated.

6.2.97 Verify that the red light on the left-hand retracted limit switch is not illuminated and the green light on the right-hand retracted limit switch is illuminated.

6.2.98 De-energize the 24 Vdc test power supply.

6.2.99 Disconnect the Hall Effect limit switch test box from the EF1-2 outlet damper 2B actuator terminals and re-lead all lifted leads.

6.2.100 Lift the 24 Vdc supply wire from the actuator controller at terminal TS4-EF1-2-61.

6.2.101 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS4-EF1-2-63.

6.2.102 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS4-EF1-2-71.

6.2.103 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS4-EF1-2-75.

6.2.104 Lift lead ZDR-CD-31-2A-9 and one end of the jumper from Terminal TS4-EF1-2-64.

6.2.105 Connect the Hall Effect limit switch test box test wire from TB-1 +24 Vdc to TS4-EF1-2-61.

6.2.106 Connect the Hall Effect limit switch test box test wire from TB-1 DC COM to TS4-EF1-2-77.

PUREX EXH SYSTEM ACCEPTANCE TEST PROCEDURE

6.2.107 Connect the Hall Effect limit switch test box as follows for testing limit switches on the EF1-2 ^{outlet} damper 2A actuator:

OUTLET 2A

- Terminals ZOS-CD-31-2A, TB-1 to TS4-EF1-2-64 for the left-hand (RP1) extended limit switch.
- Terminals ZCS-CD-31-2A, TB-3 to TS4-EF1-2-68 for the left-hand (RP1) retracted limit switch.
- Terminals ZOR-CD-31-2A, TB-6 to TS4-EF1-2-72 for the right-hand (RP2) extended limit switch.
- Terminals ZCR-CD-31-2A, TB-8 to TS4-EF1-2-76 for the right-hand (RP2) retracted limit switch.

6.2.108 Ensure that the 24 Vdc test power supply is still connected to TB-9 (+)24 Vdc and (-) DC Common on the Hall Effect limit switch test box.

6.2.109 Disconnect the CDI Test/Setup box from the EF1-2 outlet damper ^{2A} ~~2B~~ actuator terminals and re-land all lifted leads.

6.2.110 Lift the following leads in the SAMCONS Trailer at IR-9 and connect the CDI Actuator Test/Setup box to the lifted leads:

- TB1-4, M+, Wire Tag # TS-CD-31-2A-2
- TB1-3, M-, Wire Tag # TS-CD-31-2A-1

6.2.111 Energize the 24 Vdc test power supply.

NOTE:

Steps 6.2.112 through 6.2.121 will stroke EF1-2 2A outlet damper actuator.

6.2.112 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Extend" and press and release the "RUN" pushbutton to "jog" the actuator in the extended direction until the red light on the Hall Effect test box illuminates.

6.2.113 Verify that the red light on the left-hand extended limit switch is illuminated and the green light on the right-hand extended limit switch is not illuminated.

6.2.114 Measure and record the actuator position so that actuator stroke can be determined.

Actuator Position: 6 3/4" inches

PUREX EXH SYSTEM ACCEPTANCE TEST PROCEDURE

6.2.115 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Retract" and "jog" the actuator in the retracted direction until the red light on the Hall Effect test box is not illuminated.

6.2.116 Verify that the red light on the left-hand extended limit switch is not illuminated and the green light on the right-hand extended limit switch is illuminated.

6.2.117 At the CDI Actuator Test/Setup box, "jog" the actuator in the retracted direction until the red light on the Hall Effect test box illuminates.

6.2.118 Verify that the red light on the left-hand retracted limit switch is illuminated and the green light on the right-hand retracted limit switch is not illuminated.

6.2.119 Measure and record the actuator position.
Actuator Position: 2 1/8 inches

6.2.120 Subtract the measurement recorded in Step 6.2.119 from the measurement recorded in Step 6.2.114 to determine the actuator stroke and record the result below.
Actuator Stroke: 3 7/8¹¹ inches (3 1/2", nominal)

6.2.121 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Extend" and "jog" the actuator in the extended direction until the red light on the Hall Effect test box is not illuminated.

6.2.122 Verify that the red light on the left-hand retracted limit switch is not illuminated and the green light on the right-hand retracted limit switch is illuminated.

6.2.123 De-energize the 24 Vdc test power supply.

6.2.124 Disconnect the Hall Effect limit switch test box from the EF1-2 outlet damper 2A actuator terminals and re-land all lifted leads.

6.2.125 Lift the 24 Vdc supply wire from the actuator controller at terminal TS4-EF1-2-31.

6.2.126 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS4-EF1-2-33.

6.2.127 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS4-EF1-2-41.

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- 6.2.128 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS4-EF1-2-45.
- 6.2.129 Lift lead ZDR-CD-31-1B-9 and one end of the jumper from Terminal TS4-EF1-2-34.
- 6.2.130 Connect the Hall Effect limit switch test box test wire from TB-1 +24 Vdc to TS4-EF1-2-31.
- 6.2.131 Connect the Hall Effect limit switch test box test wire from TB-1 DC COM to TS4-EF1-2-47.
- 6.2.132 Connect the Hall Effect limit switch test box as follows for testing limit switches on the EF1-2 inlet damper 1B actuator:
 - Terminals ZOS-CD-31-1B, TB-1 to TS4-EF1-2-34 for the left-hand (RP1) extended limit switch.
 - Terminals ZCS-CD-31-1B, TB-3 to TS4-EF1-2-38 for the left-hand (RP1) retracted limit switch.
 - Terminals ZOR-CD-31-1B, TB-6 to TS4-EF1-2-42 for the right-hand (RP2) extended limit switch.
 - Terminals ZCR-CD-31-1B, TB-8 to TS4-EF1-2-46 for the right-hand (RP2) retracted limit switch.
- 6.2.133 Ensure that the 24 Vdc test power supply is still connected to TB-9 (+)24 Vdc and (-) DC Common on the Hall Effect limit switch test box.
- 6.2.134 Disconnect the CDI Test/Setup box from the EF1-2 outlet damper 2A actuator terminals and re-land all lifted leads.
- 6.2.135 Lift the following leads in the SAMCONS Trailer at IR-9 and connect the CDI Actuator Test/Setup box to the lifted leads:
 - TB1-4, M+, Wire Tag # TS-CD-31-1B-2
 - TB1-3, M-, Wire Tag # TS-CD-31-1B-1
- 6.2.136 Energize the 24 Vdc test power supply.

NOTE:

Steps 6.2.137 through 6.2.146 will stroke EF1-2 1B inlet damper actuator.

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6.2.137 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Extend" and press and release the "RUN" pushbutton to "jog" the actuator in the extended direction until the red light on the Hall Effect test box illuminates.

6.2.138 Verify that the red light on the left-hand extended limit switch is illuminated and the green light on the right-hand extended limit switch is not illuminated.

6.2.139 Measure and record the actuator position so that actuator stroke can be determined.

Actuator Position: 7 1/2 inches

6.2.140 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Retract" and "jog" the actuator in the retracted direction until the red light on the Hall Effect test box is not illuminated.

6.2.141 Verify that the red light on the left-hand extended limit switch is not illuminated and the green light on the right-hand extended limit switch is illuminated.

6.2.142 At the CDI Actuator Test/Setup box, "jog" the actuator in the retracted direction until the red light on the Hall Effect test box illuminates.

6.2.143 Verify that the red light on the left-hand retracted limit switch is illuminated and the green light on the right-hand retracted limit switch is not illuminated.

6.2.144 Measure and record the actuator position.

Actuator Position: 3 1/2 inches

6.2.145 Subtract the measurement recorded in Step 6.2.144 from the measurement recorded in Step 6.2.139 to determine the actuator stroke and record the result below.

Actuator Stroke: 4 inches (3 1/2", nominal)

6.2.146 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Extend" and "jog" the actuator in the extended direction until the red light on the Hall Effect test box is not illuminated.

6.2.147 Verify that the red light on the left-hand retracted limit switch is not illuminated and the green light on the right-hand retracted limit switch is illuminated.

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6.2.148 De-energize the 24 Vdc test power supply.

6.2.149 Disconnect the Hall Effect limit switch test box from the EF1-2 inlet damper 1B actuator terminals and re-land all lifted leads.

6.2.150 Lift the 24 Vdc supply wire from the actuator controller at terminal TS4-EF1-2-1.

6.2.151 Lift the 2.2 KΩ “pull-up” (PU) resistor at terminal TS4-EF1-2-3.

6.2.152 Lift the 2.2 KΩ “pull-up” (PU) resistor at terminal TS4-EF1-2-11.

6.2.153 Lift the 2.2 KΩ “pull-up” (PU) resistor at terminal TS4-EF1-2-15.

6.2.154 Lift lead ZDR-CD-31-1A-9 and one end of the jumper from Terminal TS4-EF1-2-4.

6.2.155 Connect the Hall Effect limit switch test box test wire from TB-1 +24 Vdc to TS4-EF1-2-1.

6.2.156 Connect the Hall Effect limit switch test box test wire from TB-1 DC COM to TS4-EF1-2-17.

6.2.157 Connect the Hall Effect limit switch test box as follows for testing limit switches on the EF1-2 inlet damper 1A actuator:

- Terminals ZOS-CD-31-1A, TB-1 to TS4-EF1-2-4 for the left-hand (RP1) extended limit switch.
- Terminals ZCS-CD-31-1A, TB-3 to TS4-EF1-2-8 for the left-hand (RP1) retracted limit switch.
- Terminals ZOR-CD-31-1A, TB-6 to TS4-EF1-2-12 for the right-hand (RP2) extended limit switch.
- Terminals ZCR-CD-31-1A, TB-8 to TS4-EF1-2-16 for the right-hand (RP2) retracted limit switch.

6.2.158 Ensure that the 24 Vdc test power supply is still connected to TB-9 (+)24 Vdc and (-) DC Common on the Hall Effect limit switch test box.

6.2.159 Disconnect the CDI Test/Setup box from the EF1-2 inlet damper 1B actuator terminals and re-land all lifted leads.

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6.2.160 Lift the following leads in the SAMCONS Trailer at IR-9 and connect the CDI Actuator Test/Setup box to the lifted leads:

- TB1-4, M+, Wire Tag # TS-CD-31-1A-2
- TB1-3, M-, Wire Tag # TS-CD-31-1A-1

6.2.161 Energize the 24 Vdc test power supply.

NOTE:

Steps 6.2.162 through 6.2.171 will stroke EF1-2 1A inlet damper actuator.

6.2.162 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Extend" and press and release the "RUN" pushbutton to "jog" the actuator in the extended direction until the red light on the Hall Effect test box illuminates.

6.2.163 Verify that the red light on the left-hand extended limit switch is illuminated and the green light on the right-hand extended limit switch is not illuminated.

6.2.164 Measure and record the actuator position so that actuator stroke can be determined.

Actuator Position: 7 1/2 inches

6.2.165 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Retract" and "jog" the actuator in the retracted direction until the red light on the Hall Effect test box is not illuminated.

6.2.166 Verify that the red light on the left-hand extended limit switch is not illuminated and the green light on the right-hand extended limit switch is illuminated.

6.2.167 At the CDI Actuator Test/Setup box, "jog" the actuator in the retracted direction until the red light on the Hall Effect test box illuminates.

6.2.168 Verify that the red light on the left-hand retracted limit switch is illuminated and the green light on the right-hand retracted limit switch is not illuminated.

6.2.169 Measure and record the actuator position.

Actuator Position: 3 1/2 inches

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PUREX EXH SYSTEM ACCEPTANCE TEST PROCEDURE

6.2.170 Subtract the measurement recorded in Step 6.2.169 from the measurement recorded in Step 6.2.164 to determine the actuator stroke and record the result below.

Actuator Stroke: 4 inches (3½ ", nominal)

6.2.171 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Extend" and "jog" the actuator in the extended direction until the red light on the Hall Effect test box is not illuminated.

6.2.172 Verify that the red light on the left-hand retracted limit switch is not illuminated and the green light on the right-hand retracted limit switch is illuminated.

6.2.173 De-energize the 24 Vdc test power supply.

6.2.174 Disconnect the CDI Test/Setup box from the EF1-2 inlet damper 1A actuator terminals and re-land all lifted leads.

6.2.175 Disconnect the Hall Effect limit switch test box from the EF1-2 inlet damper 1A actuator terminals and re-land all lifted leads.

6.2.176 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS4-EF1-2-127.

6.2.177 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS4-EF1-2-123.

6.2.178 Connect the Hall Effect limit switch test box as follows for testing limit switches on the EF1-2 vortex damper actuator:

- Terminals ZOR-CD-31-3 to TS4-EF1-2-124 for the right-hand (RP2) extended limit switch.
- Terminals ZCR-CD-31-3 to TS4-EF1-2-128 for the right-hand (RP2) retracted limit switch.

6.2.179 Place a magnet near the right-hand retracted limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The green light on the limit switch is not illuminated.

6.2.180 Remove the magnet and verify that the red light on the test box is no longer illuminated and green light on the limit switch is illuminated.

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6.2.181 Place a magnet near the right-hand extended limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The green light on the limit switch is not illuminated.

6.2.182 Remove the magnet and verify that the red light on the test box is no longer illuminated and green light on the limit switch is illuminated.

6.2.183 Perform continuity checks between wiring terminals listed in Table B, "EF1-2 Vortex Damper Wiring" and initial the "CHECK SAT INITIALS" column if continuity checks are satisfactory.

Table B: EF1-2 Vortex Damper Wiring

FROM JB-CD-31-3 TS-CD-31-3A	TO MARSHALLING PANEL TS3-EF1-2	CHECK SAT INITIALS	FROM JB-CD-31-3 TS-CD-31-3A	TO MARSHALLING PANEL TS3-EF1-2	CHECK SAT INITIALS
TERMINAL 9	TERMINAL 131	W33	TERMINAL 22	TERMINAL 149	W33
TERMINAL 10	TERMINAL 132	W33	TERMINAL 23	TERMINAL 150	W33
TERMINAL 11	TERMINAL 134	W33	TERMINAL 25	TERMINAL 152	W33
TERMINAL 12	TERMINAL 135	W33	TERMINAL 26	TERMINAL 153	W33 *
TERMINAL 16	TERMINAL 140	W33	TERMINAL 27	TERMINAL 155	W33 *
TERMINAL 17	TERMINAL 141	W33	TERMINAL 28	TERMINAL 156	W33
TERMINAL 18	TERMINAL 143	W33	TERMINAL 29	TERMINAL 158	W33 *
TERMINAL 19	TERMINAL 144	W33	TERMINAL 30	TERMINAL 159	W33
TERMINAL 20	TERMINAL 146	W33	TERMINAL 31	TERMINAL 161	W33
TERMINAL 21	TERMINAL 147	W33	TERMINAL 32	TERMINAL 162	W33
FROM TS-CD-31-3B	TO ZDR-CD-31-3		FROM TS-CD-31-3B	TO ZDR-CD-31-3	
TERMINAL 1	TERM. EARTH	W33	TERMINAL 3	TERM. MTRS	W33
TERMINAL 2	TERM. MTRR	W33	TERMINAL 4	TERM. MTRT	W33

* See Test Log, page 8. — EXCEPTION #2

PUREX EXH SYSTEM ACCEPTANCE TEST PROCEDURE

6.3 Exhaust Fan EF1-3 Inlet, Outlet, and Vortex Damper Testing

- 6.3.1 Ensure that the actuators for all inlet, outlet, and vortex dampers are properly mounted on pedestal bases and disconnected from the damper actuation linkages.
- 6.3.2 Ensure that all four limit switches are installed for each actuator and that the initial actuator stroke will be limited to approximately three and one-half inches.

NOTE:

Limit switch mounting positions (right-hand side of the actuator barrel or left-hand side of the actuator barrel) are established with actuator barrel being viewed from the motor end.

- 6.3.3 Ensure that type RP1 limit switches are mounted on the left-hand side of the actuator barrel and RP2 limit switches are mounted on the right-hand side of the actuator barrel.
- 6.3.4 Ensure that all wiring for actuator motors and limit switches is installed, connected, and ready to be energized.
- 6.3.5 Whenever electrical leads are lifted and landed, ~~record required information on Appendix A, "Lifted/Landed Leads Log Sheet," for each lead lifted/landed. VERIFY, USING RELEASED LOOP WIRING DRAWING, THAT LEADS ARE RELANDED CORRECTLY.~~
WBS
- 6.3.6 If, during limit switch and actuator testing, any unexpected conditions are encountered or if any unexpected equipment operation is noted, then immediately stop testing, inform the Test Director of the problem, and resume testing only when directed to do so by the Test Director.
- 6.3.7 Lift the 24 Vdc supply wire for the actuator controller at terminal TS5-EF1-3-1.
- 6.3.8 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS5-EF1-3-3.
- 6.3.9 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS5-EF1-3-11.
- 6.3.10 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS5-EF1-3-15.
- 6.3.11 Connect the Hall Effect limit switch test box test wire from TB-1 +24 Vdc to TS5-EF1-3-1.
- 6.3.12 Connect the Hall Effect limit switch test box test wire from TB-1 DC COM to TS5-EF1-3-17.

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6.3.13 Connect the Hall Effect limit switch test box as follows for testing limit switches on the EF1-3 inlet damper 1A actuator:

- Terminals ZOS-CD-32-1A, TB-1 to TS5-EF1-3-4 for the left-hand (RP1) extended limit switch.
- Terminals ZCS-CD-32-1A, TB-3 to TS5-EF1-3-8 for the left-hand (RP1) retracted limit switch.
- Terminals ZOR-CD-32-1A, TB-6 to TS5-EF1-3-12 for the right-hand (RP2) extended limit switch.
- Terminals ZCR-CD-32-1A, TB-8 to TS5-EF1-3-16 for the right-hand (RP2) retracted limit switch.

6.3.14 Connect the 24 Vdc test power supply to TB-9 (+)24 Vdc and (-) DC Common on the Hall Effect limit switch test box.

6.3.15 Energize the 24 Vdc test power supply.

NOTES

When a limit switch is actuated, a red light will be illuminated on the Hall Effect test box.

When a left-hand (RP1) type limit switch is actuated, the red light on the switch will be illuminated.

When a right-hand (RP2) type limit switch is actuated, the green light on the limit switch will not be illuminated.

6.3.16 Place a magnet near the left-hand retracted limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The red light on the limit switch is illuminated.

6.3.17 Remove the magnet and verify that both red lights are no longer illuminated.

6.3.18 Place a magnet near the right-hand retracted limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The green light on the limit switch is not illuminated.

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6.3.19 Remove the magnet and verify that the red light on the test box is no longer illuminated and the green light on the switch is illuminated.

6.3.20 Place a magnet near the left-hand extended limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The red light on the limit switch is illuminated.

6.3.21 Remove the magnet and verify that both red lights are no longer illuminated.

6.3.22 Place a magnet near the right-hand extended limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The green light on the limit switch is not illuminated.

6.3.23 Remove the magnet and verify that the red light on the test box is no longer illuminated and the green light on the switch is illuminated.

6.3.24 De-energize the 24 Vdc test power supply.

6.3.25 Disconnect the Hall Effect limit switch test box from the EF1-3 inlet damper 1A actuator terminals and re-land all lifted leads.

6.3.26 Lift the 24 Vdc supply wire for the actuator controller at terminal TS5-EF1-3-31.

6.3.27 Lift the 2.2 KΩ “pull-up” (PU) resistor at terminal TS5-EF1-3-33.

6.3.28 Lift the 2.2 KΩ “pull-up” (PU) resistor at terminal TS5-EF1-3-41.

6.3.29 Lift the 2.2 KΩ “pull-up” (PU) resistor at terminal TS5-EF1-3-45.

6.3.30 Connect the Hall Effect limit switch test box test wire from TB-1 +24 Vdc to TS5-EF1-3-31.

6.3.31 Connect the Hall Effect limit switch test box test wire from TB-1 DC COM to TS5-EF1-3-47.

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6.3.32 Connect the Hall Effect limit switch test box as follows for testing limit switches on the EF1-3 inlet damper 1B actuator:

- Terminals ZOS-CD-32-1B, TB-1 to TS5-EF1-3-34 for the left-hand (RP1) extended limit switch.
- Terminals ZCS-CD-32-1B, TB-3 to TS5-EF1-3-38 for the left-hand (RP1) retracted limit switch.
- Terminals ZOR-CD-32-1B, TB-6 to TS5-EF1-3-42 for the right-hand (RP2) extended limit switch.
- Terminals ZCR-CD-32-1B, TB-8 to TS5-EF1-3-46 for the right-hand (RP2) retracted limit switch.

6.3.33 Ensure that the 24 Vdc test power supply is still connected to TB-9 (+)24 Vdc and (-) DC Common on the Hall Effect limit switch test box.

6.3.34 Energize the 24 Vdc test power supply.

NOTES

When a limit switch is actuated, a red light will be illuminated on the Hall Effect test box.

When a left-hand (RP1) type limit switch is actuated, the red light on the switch will be illuminated.

When a right-hand (RP2) type limit switch is actuated, the green light on the limit switch will not be illuminated.

6.3.35 Place a magnet near the left-hand retracted limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The red light on the limit switch is illuminated.

6.3.36 Remove the magnet and verify that both red lights are no longer illuminated.

6.3.37 Place a magnet near the right-hand retracted limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The green light on the limit switch is not illuminated.

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6.3.38 Remove the magnet and verify that the red light on the test box is no longer illuminated and the green light on the switch is illuminated.

6.3.39 Place a magnet near the left-hand extended limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The red light on the limit switch is illuminated.

6.3.40 Remove the magnet and verify that both red lights are no longer illuminated.

6.3.41 Place a magnet near the right-hand extended limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The green light on the limit switch is not illuminated.

6.3.42 Remove the magnet and verify that the red light on the test box is no longer illuminated and the green light on the switch is illuminated.

6.3.43 De-energize the 24 Vdc test power supply.

6.3.44 Disconnect the Hall Effect limit switch test box from the EF1-3 inlet damper 1B actuator terminals and re-land all lifted leads.

6.3.45 Lift the 24 Vdc supply wire for the actuator controller at terminal TS5-EF1-3-61.

6.3.46 Lift the 2.2 KΩ “pull-up” (PU) resistor at terminal TS5-EF1-3-63.

6.3.47 Lift the 2.2 KΩ “pull-up” (PU) resistor at terminal TS5-EF1-3-71.

6.3.48 Lift the 2.2 KΩ “pull-up” (PU) resistor at terminal TS5-EF1-3-75.

6.3.49 Connect the Hall Effect limit switch test box test wire from TB-1 +24 Vdc to TS5-EF1-3-61.

6.3.50 Connect the Hall Effect limit switch test box test wire from TB-1 DC COM to TS5-EF1-3-77.

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6.3.51 Connect the Hall Effect limit switch test box as follows for testing limit switches on the EF1-3 inlet damper 2A actuator:
OUTLET N&3

- Terminals ZOS-CD-32-2A, TB-1 to TS5-EF1-3-64 for the left-hand (RP1) extended limit switch.
- Terminals ZCS-CD-32-2A, TB-3 to TS5-EF1-3-68 for the left-hand (RP1) retracted limit switch.
- Terminals ZOR-CD-32-2A, TB-6 to TS5-EF1-3-72 for the right-hand (RP2) extended limit switch.
- Terminals ZCR-CD-32-2A, TB-8 to TS5-EF1-3-76 for the right-hand (RP2) retracted limit switch.

6.3.52 Ensure that the 24 Vdc test power supply is still connected to TB-9 (+)24 Vdc and (-) DC Common on the Hall Effect limit switch test box.

6.3.53 Energize the 24 Vdc test power supply.

NOTES

When a limit switch is actuated, a red light will be illuminated on the Hall Effect test box.

When a left-hand (RP1) type limit switch is actuated, the red light on the switch will be illuminated.

When a right-hand (RP2) type limit switch is actuated, the green light on the limit switch will not be illuminated.

6.3.54 Place a magnet near the left-hand retracted limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The red light on the limit switch is illuminated.

6.3.55 Remove the magnet and verify that both red lights are no longer illuminated.

6.3.56 Place a magnet near the right-hand retracted limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The green light on the limit switch is not illuminated.

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6.3.57 Remove the magnet and verify that the red light on the test box is no longer illuminated and the green light on the switch is illuminated.

6.3.58 Place a magnet near the left-hand extended limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The red light on the limit switch is illuminated.

6.3.59 Remove the magnet and verify that both red lights are no longer illuminated.

6.3.60 Place a magnet near the right-hand extended limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The green light on the limit switch is not illuminated.

6.3.61 Remove the magnet and verify that the red light on the test box is no longer illuminated and the green light on the switch is illuminated.

6.3.62 De-energize the 24 Vdc test power supply.

6.3.63 Disconnect the Hall Effect limit switch test box from the EF1-3 outlet damper 2A actuator terminals and re-land all lifted leads.

6.3.64 Lift the 24 Vdc supply wire for the actuator controller at terminal TS5-EF1-3-91.

6.3.65 Lift the 2.2 KΩ “pull-up” (PU) resistor at terminal TS5-EF1-3-93.

6.3.66 Lift the 2.2 KΩ “pull-up” (PU) resistor at terminal TS5-EF1-3-101.

6.3.67 Lift the 2.2 KΩ “pull-up” (PU) resistor at terminal TS5-EF1-3-105.

6.3.68 Connect the Hall Effect limit switch test box test wire from TB-1 +24 Vdc to TS5-EF1-3-91.

6.3.69 Connect the Hall Effect limit switch test box test wire from TB-1 DC COM to TS5-EF1-3-108.

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6.3.70 Connect the Hall Effect limit switch test box as follows for testing limit switches on the EF1-3 inlet damper 2B actuator:
OUTLET 2B

- Terminals ZOS-CD-32-2B, TB-1 to TS5-EF1-3-94 for the left-hand (RP1) extended limit switch.
- Terminals ZCS-CD-32-2B, TB-3 to TS5-EF1-3-98 for the left-hand (RP1) retracted limit switch.
- Terminals ZOR-CD-32-2B, TB-6 to TS5-EF1-3-102 for the right-hand (RP2) extended limit switch.
- Terminals ZCR-CD-32-2B, TB-8 to TS5-EF1-3-106 for the right-hand (RP2) retracted limit switch.

6.3.71 Ensure that the 24 Vdc test power supply is still connected to TB-9 (+)24 Vdc and (-) DC Common on the Hall Effect limit switch test box.

6.3.72 Energize the 24 Vdc test power supply.

NOTES

When a limit switch is actuated, a red light will be illuminated on the Hall Effect test box.

When a left-hand (RP1) type limit switch is actuated, the red light on the switch will be illuminated.

When a right-hand (RP2) type limit switch is actuated, the green light on the limit switch will not be illuminated.

6.3.73 Place a magnet near the left-hand retracted limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The red light on the limit switch is illuminated.

6.3.74 Remove the magnet and verify that both red lights are no longer illuminated.

6.3.75 Place a magnet near the right-hand retracted limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The green light on the limit switch is not illuminated.

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6.3.76 Remove the magnet and verify that the red light on the test box is no longer illuminated and the green light on the switch is illuminated.

6.3.77 Place a magnet near the left-hand extended limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The red light on the limit switch is illuminated.

6.3.78 Remove the magnet and verify that both red lights are no longer illuminated.

6.3.79 Place a magnet near the right-hand extended limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The green light on the limit switch is not illuminated.

6.3.80 Remove the magnet and verify that the red light on the test box is no longer illuminated and the green light on the switch is illuminated.

6.3.81 Lift the following leads in the SAMCONS Trailer at IR-9 and connect the CDI Actuator Test/Setup box to the lifted leads:

- TB1-4, M+, Wire Tag # TS-CD-32-2B-2
- TB1-3, M-, Wire Tag # TS-CD-32-2B-1

6.3.82 Connect the CDI Actuator Test/Setup box to a source of 120 Vac power.

NOTE:

Steps 6.3.83 through 6.3.92 will stroke EF1-3 2B outlet damper actuator.

6.3.83 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Extend" and press and release the "RUN" pushbutton to "jog" the actuator in the extended direction until the red light on the Hall Effect test box illuminates.

6.3.84 Verify that the red light on the left-hand extended limit switch is illuminated and the green light on the right-hand extended limit switch is not illuminated.

PUREX EXH SYSTEM ACCEPTANCE TEST PROCEDURE

6.3.85 Measure and record the actuator position so that actuator stroke can be determined.

Actuator Position: 7 1/8 inches

6.3.86 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Retract" and "jog" the actuator in the retracted direction until the red light on the Hall Effect test box is not illuminated.

6.3.87 Verify that the red light on the left-hand extended limit switch is not illuminated and the green light on the right-hand extended limit switch is illuminated.

6.3.88 At the CDI Actuator Test/Setup box, "jog" the actuator in the retracted direction until the red light on the Hall Effect test box illuminates.

6.3.89 Verify that the red light on the left-hand retracted limit switch is illuminated and the green light on the right-hand retracted limit switch is not illuminated.

6.3.90 Measure and record the actuator position.

Actuator Position: 3 1/8 inches

6.3.91 Subtract the measurement recorded in Step 6.3.90 from the measurement recorded in Step 6.3.85 to determine the actuator stroke and record the result below.

Actuator Stroke: 4.0 inches (3 1/2", nominal)

6.3.92 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Extend" and "jog" the actuator in the extended direction until the red light on the Hall Effect test box is not illuminated.

6.3.93 Verify that the red light on the left-hand retracted limit switch is not illuminated and the green light on the right-hand retracted limit switch is illuminated.

6.3.94 De-energize the 24 Vdc test power supply.

6.3.95 Disconnect the Hall Effect limit switch test box from the EF1-3 outlet damper 2B actuator terminals and re-land all lifted leads.

6.3.96 Lift the 24 Vdc supply wire for the actuator controller at terminal TS5-EF1-3-61.

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6.3.97 Lift the 2.2 KΩ “pull-up” (PU) resistor at terminal TS5-EF1-3-63.

6.3.98 Lift the 2.2 KΩ “pull-up” (PU) resistor at terminal TS5-EF1-3-71.

6.3.99 Lift the 2.2 KΩ “pull-up” (PU) resistor at terminal TS5-EF1-3-75.

6.3.100 Connect the Hall Effect limit switch test box test wire from TB-1 +24 Vdc to TS5-EF1-3-61.

6.3.101 Connect the Hall Effect limit switch test box test wire from TB-1 DC COM to TS5-EF1-3-77.

6.3.102 Connect the Hall Effect limit switch test box as follows for testing limit switches on the EF1-3 inlet damper 2A actuator:

- Terminals ZOS-CD-32-2A, TB-1 to TS5-EF1-3-64 for the left-hand (RP1) extended limit switch.
- Terminals ZCS-CD-32-2A, TB-3 to TS5-EF1-3-68 for the left-hand (RP1) retracted limit switch.
- Terminals ZOR-CD-32-2A, TB-6 to TS5-EF1-3-72 for the right-hand (RP2) extended limit switch.
- Terminals ZCR-CD-32-2A, TB-8 to TS5-EF1-3-76 for the right-hand (RP2) retracted limit switch.

6.3.103 Ensure that the 24 Vdc test power supply is still connected to TB-9 (+)24 Vdc and (-) DC Common on the Hall Effect limit switch test box.

6.3.104 Disconnect the CDI Test/Setup box from the EF1-3 outlet damper 2B actuator terminals and re-land all lifted leads.

6.3.105 Lift the following leads in the SAMCONS Trailer at IR-9 and connect the CDI Actuator Test/Setup box to the lifted leads:

- TB1-4, M+, Wire Tag # TS-CD-32-2A-2
- TB1-3, M-, Wire Tag # TS-CD-32-2A-1

6.3.106 Energize the 24 Vdc test power supply.

NOTE:

Steps 6.3.107 through 6.3.116 will stroke EF1-3 2A outlet damper actuator.

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6.3.107 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Extend" and press and release the "RUN" pushbutton to "jog" the actuator in the extended direction until the red light on the Hall Effect test box illuminates.

6.3.108 Verify that the red light on the left-hand extended limit switch is illuminated and the green light on the right-hand extended limit switch is not illuminated.

6.3.109 Measure and record the actuator position so that actuator stroke can be determined.

Actuator Position: 7.0 inches

6.3.110 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Retract" and "jog" the actuator in the retracted direction until the red light on the Hall Effect test box is not illuminated.

6.3.111 Verify that the red light on the left-hand extended limit switch is not illuminated and the green light on the right-hand extended limit switch is illuminated.

6.3.112 At the CDI Actuator Test/Setup box, "jog" the actuator in the retracted direction until the red light on the Hall Effect test box illuminates.

6.3.113 Verify that the red light on the left-hand retracted limit switch is illuminated and the green light on the right-hand retracted limit switch is not illuminated.

6.3.114 Measure and record the actuator position.

Actuator Position: 3 11/16 inches

6.3.115 Subtract the measurement recorded in Step 6.3.114 from the measurement recorded in Step 6.3.109 to determine the actuator stroke and record the result below.

Actuator Stroke: 3 15/16 inches (3 1/2", nominal)

6.3.116 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Extend" and "jog" the actuator in the extended direction until the red light on the Hall Effect test box is not illuminated.

6.3.117 Verify that the red light on the left-hand retracted limit switch is not illuminated and the green light on the right-hand retracted limit switch is illuminated.

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6.3.118 De-energize the 24 Vdc test power supply.

6.3.119 Disconnect the Hall Effect limit switch test box from the EF1-3 outlet damper 2A actuator terminals and re-land all lifted leads.

6.3.120 Lift the 24 Vdc supply wire for the actuator controller at terminal TS5-EF1-3-31.

6.3.121 Lift the 2.2 KΩ “pull-up” (PU) resistor at terminal TS5-EF1-3-33.

6.3.122 Lift the 2.2 KΩ “pull-up” (PU) resistor at terminal TS5-EF1-3-41.

6.3.123 Lift the 2.2 KΩ “pull-up” (PU) resistor at terminal TS5-EF1-3-45.

6.3.124 Connect the Hall Effect limit switch test box test wire from TB-1 +24 Vdc to TS5-EF1-3-31.

6.3.125 Connect the Hall Effect limit switch test box test wire from TB-1 DC COM to TS5-EF1-3-47.

6.3.126 Connect the Hall Effect limit switch test box as follows for testing limit switches on the EF1-3 inlet damper 1B actuator:

- Terminals ZOS-CD-32-1B, TB-1 to TS5-EF1-3-34 for the left-hand (RP1) extended limit switch.
- Terminals ZCS-CD-32-1B, TB-3 to TS5-EF1-3-38 for the left-hand (RP1) retracted limit switch.
- Terminals ZOR-CD-32-1B, TB-6 to TS5-EF1-3-42 for the right-hand (RP2) extended limit switch.
- Terminals ZCR-CD-32-1B, TB-8 to TS5-EF1-3-46 for the right-hand (RP2) retracted limit switch.

6.3.127 Ensure that the 24 Vdc test power supply is still connected to TB-9 (+)24 Vdc and (-) DC Common on the Hall Effect limit switch test box.

6.3.128 Disconnect the CDI Test/Setup box from the EF1-3 outlet damper 2A actuator terminals and re-land all lifted leads.

6.3.129 Lift the following leads in the SAMCONS Trailer at IR-9 and connect the CDI Actuator Test/Setup box to the lifted leads:

- TB1-4, M+, Wire Tag # TS-CD-32-1B-2
- TB1-3, M-, Wire Tag # TS-CD-32-1B-1

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6.3.130 Energize the 24 Vdc test power supply.

NOTE:

Steps 6.3.131 through 6.3.140 will stroke EF1-3 1B inlet damper actuator.

6.3.131 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Extend" and press and release the "RUN" pushbutton to "jog" the actuator in the extended direction until the red light on the Hall Effect test box illuminates.

6.3.132 Verify that the red light on the left-hand extended limit switch is illuminated and the green light on the right-hand extended limit switch is not illuminated.

6.3.133 Measure and record the actuator position so that actuator stroke can be determined.

6 15/16
2 1/16 WB

Actuator Position: 2 1/16 WB inches

6.3.134 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Retract" and "jog" the actuator in the retracted direction until the red light on the Hall Effect test box is not illuminated.

6.3.135 Verify that the red light on the left-hand extended limit switch is not illuminated and the green light on the right-hand extended limit switch is illuminated.

6.3.136 At the CDI Actuator Test/Setup box, "jog" the actuator in the retracted direction until the red light on the Hall Effect test box illuminates.

6.3.137 Verify that the red light on the left-hand retracted limit switch is illuminated and the green light on the right-hand retracted limit switch is not illuminated.

6.3.138 Measure and record the actuator position.

3 1/16 WB 2 15/16

Actuator Position: 3 1/16 WB inches

6.3.139 Subtract the measurement recorded in Step 6.3.138 from the measurement recorded in Step 6.3.133 to determine the actuator stroke and record the result below.

Actuator Stroke: 4.0 inches (3 1/2", nominal)

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6.3.140 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Extend" and "jog" the actuator in the extended direction until the red light on the Hall Effect test box is not illuminated.

6.3.141 Verify that the red light on the left-hand retracted limit switch is not illuminated and the green light on the right-hand retracted limit switch is illuminated.

6.3.142 De-energize the 24 Vdc test power supply.

6.3.143 Disconnect the Hall Effect limit switch test box from the EF1-3 inlet damper 1B actuator terminals and re-land all lifted leads.

6.3.144 Lift the 24 Vdc supply wire for the actuator controller at terminal TS5-EF1-3-1.

6.3.145 Lift the 2.2 K Ω "pull-up" (PU) resistor at terminal TS5-EF1-3-3.

6.3.146 Lift the 2.2 K Ω "pull-up" (PU) resistor at terminal TS5-EF1-3-11.

6.3.147 Lift the 2.2 K Ω "pull-up" (PU) resistor at terminal TS5-EF1-3-15.

6.3.148 Connect the Hall Effect limit switch test box test wire from TB-1 +24 Vdc to TS5-EF1-3-1.

6.3.149 Connect the Hall Effect limit switch test box test wire from TB-1 DC COM to TS5-EF1-3-17.

6.3.150 Connect the Hall Effect limit switch test box as follows for testing limit switches on the EF1-3 inlet damper 1A actuator:

- Terminals ZOS-CD-32-1A, TB-1 to TS5-EF1-3-4 for the left-hand (RP1) extended limit switch.
- Terminals ZCS-CD-32-1A, TB-3 to TS5-EF1-3-8 for the left-hand (RP1) retracted limit switch.
- Terminals ZOR-CD-32-1A, TB-6 to TS5-EF1-3-12 for the right-hand (RP2) extended limit switch.
- Terminals ZCR-CD-32-1A, TB-8 to TS5-EF1-3-16 for the right-hand (RP2) retracted limit switch.

6.3.151 Ensure that the 24 Vdc test power supply is still connected to TB-9 (+)24 Vdc and (-) DC Common on the Hall Effect limit switch test box.

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6.3.152 Disconnect the CDI Test/Setup box from the EF1-3 inlet damper 1B actuator terminals and re-land all lifted leads.

6.3.153 Lift the following leads in the SAMCONS Trailer at IR-9 and connect the CDI Actuator Test/Setup box to the lifted leads:

- TB1-4, M+, Wire Tag # TS-CD-32-1A-2
- TB1-3, M-, Wire Tag # TS-CD-32-1A-1

6.3.154 Energize the 24 Vdc test power supply.

NOTE:

Steps 6.3.155 through 6.3.164 will stroke EF1-3 1A inlet damper actuator.

6.3.155 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Extend" and press and release the "RUN" pushbutton to "jog" the actuator in the extended direction until the red light on the Hall Effect test box illuminates.

6.3.156 Verify that the red light on the left-hand extended limit switch is illuminated and the green light on the right-hand extended limit switch is not illuminated.

6.3.157 Measure and record the actuator position so that actuator stroke can be determined.
Actuator Position: 7 5/16" inches

6.3.158 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Retract" and "jog" the actuator in the retracted direction until the red light on the Hall Effect test box is not illuminated.

6.3.159 Verify that the red light on the left-hand extended limit switch is not illuminated and the green light on the right-hand extended limit switch is illuminated.

6.3.160 At the CDI Actuator Test/Setup box, "jog" the actuator in the retracted direction until the red light on the Hall Effect test box illuminates.

6.3.161 Verify that the red light on the left-hand retracted limit switch is illuminated and the green light on the right-hand retracted limit switch is not illuminated.

PUREX EXH SYSTEM ACCEPTANCE TEST PROCEDURE

6.3.162 Measure and record the actuator position.
Actuator Position: 3 5/16" inches

6.3.163 Subtract the measurement recorded in Step 6.3.162 from the measurement recorded in Step 6.3.157 to determine the actuator stroke and record the result below.
Actuator Stroke: 4.0" inches (3 1/2", nominal)

6.3.164 At the CDI Actuator Test/Setup box, place the Extend/Retract switch in "Extend" and "jog" the actuator in the extended direction until the red light on the Hall Effect test box is not illuminated.

6.3.165 Verify that the red light on the left-hand retracted limit switch is not illuminated and the green light on the right-hand retracted limit switch is illuminated.

6.3.166 De-energize the 24 Vdc test power supply.

6.3.167 Disconnect the CDI Test/Setup box from the EF1-3 inlet damper 1A actuator terminals and re-land all lifted leads.

6.3.168 Disconnect the Hall Effect limit switch test box from the EF1-3 inlet damper 1A actuator terminals and re-land all lifted leads.

6.3.169 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS5-EF1-3-127.

6.3.170 Lift the 2.2 KΩ "pull-up" (PU) resistor at terminal TS5-EF1-3-123.

6.3.171 Connect the Hall Effect limit switch test box as follows for testing limit switches on the EF1-1 vortex damper actuator:

- Terminals ZOR-CD-32-3 to TS5-EF1-3-124 for the right-hand (RP2) extended limit switch.
- Terminals ZCR-CD-32-3 to TS5-EF1-3-128 for the right-hand (RP2) retracted limit switch.

PUREX EXH SYSTEM ACCEPTANCE TEST PROCEDURE

6.3.172 Place a magnet near the right-hand retracted limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The green light on the limit switch is not illuminated.

6.3.173 Remove the magnet and verify that the red light on the test box is no longer illuminated and green light on the limit switch is illuminated.

6.3.174 Place a magnet near the right-hand extended limit switch and verify the following:

- The red light on the Hall Effect test box is illuminated.
- The green light on the limit switch is not illuminated.

6.3.175 Remove the magnet and verify that the red light on the test box is no longer illuminated and green light on the limit switch is illuminated.

6.3.176 Perform continuity checks between wiring terminals listed in Table C, "EF1-3 Vortex Damper Wiring" and initial the "CHECK SAT INITIALS" column if continuity checks are satisfactory.

Table C: EF1-3 Vortex Damper Wiring

FROM JB-CD-32-3 TS-CD-32-3A	TO MARSHALLING PANEL TS3-EF1-3	CHECK SAT INITIALS	FROM JB-CD-32-3 TS-CD-32-3A	TO MARSHALLING PANEL TS3-EF1-3	CHECK SAT INITIALS
TERMINAL 9	TERMINAL 131	WBS	TERMINAL 22	TERMINAL 149	WBS
TERMINAL 10	TERMINAL 132	WBS	TERMINAL 23	TERMINAL 150	WBS
TERMINAL 11	TERMINAL 134	WBS	TERMINAL 25	TERMINAL 152	WBS
TERMINAL 12	TERMINAL 135	WBS	TERMINAL 26	TERMINAL 153	WBS *
TERMINAL 16	TERMINAL 140	WBS	TERMINAL 27	TERMINAL 155	WBS *
TERMINAL 17	TERMINAL 141	WBS	TERMINAL 28	TERMINAL 156	WBS
TERMINAL 18	TERMINAL 143	WBS	TERMINAL 29	TERMINAL 158	WBS *
TERMINAL 19	TERMINAL 144	WBS	TERMINAL 30	TERMINAL 159	WBS

* See EXCEPTION #3

PUREX EXH SYSTEM ACCEPTANCE TEST PROCEDURE

FROM JB-CD-32-3 TS-CD-32-3A	TO MARSHALLING PANEL TS3-EF1-3	CHECK SAT INITIALS	FROM JB-CD-32-3 TS-CD-32-3A	TO MARSHALLING PANEL TS3-EF1-3	CHECK SAT INITIALS
TERMINAL 20	TERMINAL 146	WBS	TERMINAL 31	TERMINAL 161	WBS
TERMINAL 21	TERMINAL 147	WBS	TERMINAL 32	TERMINAL 162	WBS
FROM TS-CD-32-3B	TO ZDR-CD-32-3		FROM TS-CD-32-3B	TO ZDR-CD-32-3	
TERMINAL 1	TERM. EARTH	WBS	TERMINAL 3	TERM. MTRS	WBS
TERMINAL 2	TERM. MTRR	WBS	TERMINAL 4	TERM. MTRT	WBS

7.0 TEST DATA SHEETS

None

3.0 ATTACHMENTS

Attachment 1, Exception List

Attachment 2, Measurement and Test Equipment Record Sheet

Attachment 3, Lifted/Landed Leads Log Sheet

Attachment 4, Final Procedure Acceptance Sheet

PUREX EXH SYSTEM ACCEPTANCE TEST PROCEDURE

EXCEPTION NUMBER	STEP NUMBER	EXCEPTION DESCRIPTION	EXCEPTION RESOLUTION	RESOLUTION APPROVED BY:	DATE RESOLVED
1	6.1.183	Wiring incorrectly bonded on terminals 153, 155 and 158.	DEFIN. DRAWING & ERROR WAS RE-LINED FOR ECN CORRECTION. H-2-825709, S4 3	WZhabay, ECN 638010	4-10-97
2	6.2.183	Same as above	Same as above	WZhabay, ECN 638010	4-14-97
3	6.3.176 183	Same as above	Same as above.	WZhabay ECN 638010	4-17-97

Attachment 1: Exception List

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PUREX EXH SYSTEM ACCURANCE TEST PROCEDURE

Attachment 2: Measurement and Test Equipment Record Sheet

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PUREX EXH SYSTEM ACCEPTANCE TEST PROCEDURE

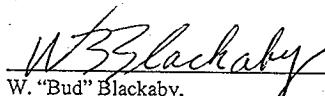
Attachment 3: Listed/Landed Leads Log Sheet

PUREX EXH SYSTEM ACCEPTANCE TEST PROCEDURE

Completion of this procedure has demonstrated that:

- The PUREX facility exhaust ventilation system damper actuators function correctly.
- The PUREX facility exhaust ventilation system damper actuator limit switches function correctly.
- The PUREX facility exhaust ventilation system damper actuators have been adjusted to stroke approximately three and one-half inches.
- All PUREX facility exhaust ventilation system damper actuator wiring and terminations have been verified to be installed and landed correctly.
- A record of all noted deficiencies was kept on Attachment 1, Exception List, and all recorded exceptions have been resolved and the resolutions approved.

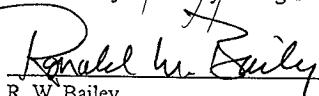
Approved by:


W. "Bud" Blackaby,
PUREX SAMCONS Cognizant Engineer,
PUREX Stabilization Project

4-20-97
Date


W. A. Peiffer
PUREX Project Activity Manager

4/26/97
Date


R. W. Bailey
PUREX Stabilization Project Manager
Facility Stabilization Project Manager

9/26/97
Date

Attachment 4: Final Procedure Acceptance Sheet

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TEST LOGDate: 4-7-97Page A-1 of A-11Test Procedure No. HNF-SD-CP-ATR-087

Conducted pre-test briefing with Test/Support personnel. Testing will commence with EFI-1, Inlet actuator 1A Hall-effect limit switches (HELS). The actuators are mounted on their support bases but NOT connected to the Inlet damper yoke. The HELS RPI (silver housing) & RP2 (gold housing) are mounted correctly. RPI on left and RP2 on the right side. Procedure steps 6.1 thru 6.1.25. for actuator 1A will be performed. Wiring lifted & PU resistors lifted, HELS Test box installed.

Test magnet would not trip the HELS. Found a strong "horse shoe" magnet — all 4 HELS worked correctly. Removed test box and re-landed wiring.

Shifted test box to INLET actuator 1B, 1B not connected to damper yoke & HELS are installed correctly.

Performed magnet test — all 4 HELS worked correctly.

Removed HELS Test box and re-landed wiring & PU RESISTOR

COMPLETED STEPS: 6.1.26 → 6.1.46

HELS TESTED

TYPE	1A	TYPE	1B
(S) RPI	ZOS-CD-30-1A	(S) RPI	ZOS-CD-1B
(S) RPI	ZCS-CD-30-1A	(S) RPI	ZCS-CD-1B
(G) RP2	ZOR-CD-30-1A	(G) RP2	ZOR-CD-1B
(G) RP2	ZCR-CD-30-1A	(G) RP2	ZCR-CD-1B

(S) = SILVER HOUSING

(G) = GOLD HOUSING

NOTE: All re-landed leads verified

per released loop wiring drawings.

WB Schubel

TEST LOGDate: 9-8-97Page A-2 of A-11Test Procedure No. HNF-SD-CP-ATR-087

Began testing of HELS for EPI-1 outlet damper actuators 2A & 2B. Started @ 6.1.47. Actuators 2A & 2B are mounted on support bases and NOT connected to damper zokes. The HELS are installed correctly. Completed steps 6.1.47 thru 6.1.56 for setups. HELS test box installed & PV resistors & wiring lifted. Performed magnet test: steps 6.1.57 → 6.1.66. The four HELS operated properly. Disconnected HELS test box, relanded wiring and PV resistors.

Performed test steps: 6.1.67 → 6.1.76 for setup. HELS are installed correctly and actuators NOT connected to damper zokes.

Performed steps 6.1.77 thru 6.1.84. The 4 HELS operated correctly - for actuators 2A & 2B.

HELS TESTED

TYPE	OUTLET 2A	TYPE	OUTLET 2B
(S) RPI	ZOS-CD - 30-2A	(S) RPI	ZOS - CD - 30-2B
(S) RPI	ZCS-CD - 30-2A	(S) RPI	ZCS - CD - 30 - 2B
(G) RP2	ZOR-CD - 30-2A	(G) RP2	ZOR - CD - 30 - 2B
(G) RP2	ZCR-CD - 30-2A	(G) RP2	ZCR - CD - 30 - 2B

(S) = Silver housing

(G) = Gold housing.

NOTE: All leads relanded and verified per released loys wiring drawings.

WSS

W. B. Blackaby

Date: 4-9-97Page A-3 of A-11Test Procedure No. HNF-SD-CP-ATR-087

Began testing @ 6.1.85 after pre-test briefings with test crew. Actuator thrust takes will move and stroke from retracted to extend positions to measure and set up strokes. Test will begin with EFI-1, actuator 2B. Completed steps 6.1.85 thru 6.1.99 and recorded actuator stroke adjustments for 2B. Performed steps 6.1.100 thru ~~6.1.~~^{WPZ} 6.1.111 for set up for 2A actuator stroking. Removed CDI TEST box & reloaded 2B wiring. Performed 6.1.112 → 6.1.124 to complete stroke measurement of 2A actuator and reloaded all lifted leads.

Found actuator 2A motor leads reversed at local JB. Corrected this - drawing was correct - to successfully stroke 2A actuator. NOTE: The actuator will attempt to run in the opposite direction to that which is commanded. 2A was fully retracted; the extend command (w/wiring reversed) attempted to retract into the mechanical limits - this caused the controller to prove fuse to blow. Replacing fuse, rejoining not the wire and correcting lead terminators resolved problem. The actuator was extended and retracted several times to insure no damage occurred.

Note: The actual stroke length is approx. four inches. The inlet & outlet actuators can stroke up to six inches. This will allow ± one inch dead-zone prior to driving into the retracted or extend mechanical limits. In normal operation; and properly set up, these actuators should never be driven into mechanical limits in either direction. All belted leads verified per released loop wiring drawings. WTG Slackley.

TEST LOGDate: 4-9-97Page A-4 of A-11Test Procedure No. HNF-SD-CP-ATR-087

Began Q Test step 6.1.125 after pre-test briefing with crew. EF1-1 actuators 1B and then 1A (INLET actuators) will be stroked and measurements will be recorded. Neither actuator is connected to the danger zone. Performed test steps 6.1.125 thru 6.1.133 HELS test box. Performed / verified test steps 6.1.134, and completed test steps 6.1.135 & 6.1.136. Actuator 1B ready to stroke. Performed steps 6.1.137 → 6.1.149. 1B actuator extend & retract measurement recorded and stroke calculated & recorded.

Performed steps 6.1.150 → 6.1.158 and 6.1.159 to release wiring for 1B actuator. Performed 6.1.160 → 6.1.168 ¹⁶⁸ ~~167~~ W3 to stroke 1A actuator. Recorded extend & retract measurements, calculated stroke and recorded. All test equipment removed from 1A and all leads released. Concluded 1A actuator stroke measurement and testing by completing tests thru 6.1.168.

NOTE: All released leads verified per released loop wiring drawings.

WBS

WBS blackberry

TEST LOGDate: 4-10-97Page 1-5 of 1-11Test Procedure No. HNF-SD-CP-ATR-087

Began test of EFI-1 Vortex damper actuator with pre-test briefing, a visual inspection of actuator to verify vortex damper linkage is NOT connected to the actuator. Started test set-ups at 6.1.176 and performed steps 6.1.176 thru 6.1.182 to verify proper operation of the extend & retract (RP2) "gold" HEL switches. Hall-effect limit switches operated correctly.

Began continuity checks of remaining wiring with test step 6.1.183. Found the following problems:

1. White wire from left end of follow-up potentiometer is actually brown. The brown wire is terminated to TS-CD-30-2A, TERM 9 - and this is correct. Brown is ground.
2. The Black wire from right end of the potentiometer should terminate at TS-CD-30-2A, Term 11. The wire run from Term 11 to TS3-EFI-1-134 is correct - this is ^{WIRED} for +5VDC excitation.
3. Found HALL T AND HALL R ^{WIRED} INCORRECTLY AT THEIR TERMINATION POINTS AT VORTEX ACTUATOR CONTROLLER:

HALL T TS3-EFI-1-158 TS3-EFI-1-155

HALL R TS3-EFI-1-155 TS3-EFI-1-153

NOTE: The drawings H-2-825909, SH-3 FOR EFI-1 VORTEX DAMPER and H-2-825909, SH-6, FOR EFI-2 VORTEX DAMPER and H-2-825909, SH-9, FOR EFI-3 VORTEX DAMPER have been "AS-BUILT" and corrected to meet the changes above. This will occur by ECW'ing the existing drawings. (EXCEPTION #1)

W. Blacholy

TEST LOGDate: 4-11-97Page A-6 of AllTest Procedure No. HNF-SD-CP-ATR-087

Began testing of EFT-2 Inlet damper actuators with pre-test briefing and visual check of the Hall Effect Limit Switches. The 1A & 1B Inlet actuators are mounted on their pedestal bases and not connected to the damper zokes. The HELS are installed correctly. Performed steps 6.2.1 thru 6.2.16 for test set up for the 1A actuators HELS. Completed steps 6.2.17 thru 6.2.24 and verified proper operation of the limit switches. Shutdown power supply, disconnected limit switch test box and re-landed all leads using test steps thru 6.2.26. Verified re-landed leads per loop wiring drawings. Performed set-ups for actuator 1B using test steps 6.2.27 thru 6.2.36. Performed magnet test and verified proper operation of limit switches using test steps 6.2.37 thru 6.2.44. Removed power supply and test box and re-landed all leads using test steps 6.2.45 thru 6.2.46. NOTE: test box is the HALL Effect limit switch test box. Verified re-landed leads per loop wiring drawing.

Began test of EFT-2 Outlet damper actuators after visual check of actuators and HELS. 2A & 2B actuators are NOT connected to zokes and HELS are installed correctly. Performed test-setups per steps 6.2.47 thru 6.2.56. Performed steps 6.2.57^{thru 6.2.66} for the magnet test on actuator 2A. all limit switches operated properly. Setups for 2B using steps 6.2.67 thru 6.2.76. Performed magnet test and verified correct operation for the Left-hand Limit switches^{6.2.77 → 6.2.80}. Found the Right Hand EXTEND & RETRACT Limit switches reversed when mounted on Actuator barrel. Loosened set screws and re-positioned limit switches to proper position. Completed test successfully and removed test equipment and re-landed all leads. steps 6.2.81 → 6.2.84. Verified re-landed leads per loops using W33 black tape.

TEST LOGDate: 9-14-97Page A-7 of A-11Test Procedure No. HNF-SD-CP-ATR-087

Began testing with pre-test briefing - cautioned crew that we would be stroking the actuators for EPI-2 INLET 8' outlet dampers. Verified none of the actuators are connected to the danger zones. Begin at step 6.2.85 and EXTENDED Rehearsed actuator 2B. Measured the extend and retract positions and determined the actual stroke. Recorded same.

Performed steps 6.2.86 thru 6.2.99. Removed test box & isolated lead. Started at 6.2.100 for steps for actuator 2A. Performed extend and retract functions and determined stroke length. Removed actuator test box & Hall effect test box. Completed steps 6.2.100 thru 6.2.109. ^{the 2B & 2A} The 2B & 2A actuators responded properly and all Hall effect limit switches and (CE) indications were correct. ^{WBS}

Begin testing of 2A actuator stroke at steps 6.2.110 ^{extend & retract} → steps 6.2.120. Recorded data and recorded stroke length.

Performed steps 6.2.121 → 6.2.122 & verified correct limit switch operation. Performed steps 6.2.123 - 124 to remove Hall effect test box and re-lead all leads & verified. The actuators hall effect switches performed correctly and the stroke length was acceptable.

NOTE: All isolated leads were verified per released loop wiring drawing. WBS.

WBS
Blackaby

TEST LOGDate: 4-14-97Page 48 of 11Test Procedure No. HNF-SD-CP-ATR-087

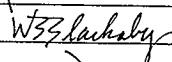
Began EFI-2, 101st Actuator 1B stroke measurement at test steps 6.2.125. Notified test crew actuator would stroke & extend & Retract. Performed test set-ups, connected test box and performed test thru 6.2.136. Measured Actuator EFI-2, 1B stroke. Performed steps thru 6.2.149. Relanded and verified all leads to drawing.

Began EFI-2, Inlet actuator 1A stroke measurement at step 6.2.150. Performed test set-ups thru 6.2.161. Measured actuator stroke thru 6.2.175. Relanded and verified all leads to drawing.

Began EFI-2, Vortex actuator limit switch test using magnet. Performed steps 6.2.176 → 6.2.182 successfully.

Began continuity test and found same mis-wiring as on the EFI-1 continuity test. Landed wiring correctly - same as EFI-1. See log sheet 5.

"AS-BUILT" ECW will correct the Lops wiring drawing - (EXCEPTION #2)



TEST LOGDate: 9-15-97Page A-9 of A-11Test Procedure No. HNF-SD-CP-ATR-087

Began test of EPI-3 Inlet damper actuators with test rigging and a visual inspection of actuators prior to beginning test. Actuators are mounted on pedestal bases - but not connected damper yoke.

All actuators limit switches are installed correctly; however the 1B retract limit ^(gold) switch cover has been damaged and does not provide a sealed cover. Will start test of 1A while repairing the damaged limit switch and installing a spare which is on-hand. performed Set-up steps 6.3.1 → 6.3.15. Performed magnet test successfully thru test steps 6.3.25, for damper 1A limit switches.

Performed set-up for 1B limit SW's. Test steps 6.3.26 thru 6.3.34. Performed magnet test successfully thru test steps 6.3.44.

Verified the relanding of all lifted leads for 1A & 1B actuator wiring per released loop wiring drawings.

Began test set-up for EPI-3, Outlet actuator 2A per Steps 6.3.45 → 6.3.53. Performed magnet test steps 6.3.54 → 6.3.63 ^{WS} successfully.

Performed test set-up for EPI-3, Outlet actuator 2B - steps 6.3.64 thru 6.3.72. Performed magnet test successfully thru test steps 6.3.73 → 6.3.80.

Relanded all lifted leads and verified per released loop wiring drawings.

WB Stanley

TEST LOGDate: 4-16-97Page A-10 of A-11Test Procedure No. HNF-SD-CP-ATR-087

Began test of the EFI-3, 2B outlet actuator stroke measurement with Test briefing. Perform test set up steps 6.3.81 → 6.3.82. Actuators will be stroked - but not connected to cladding yoke. Performed test steps 6.3.83 → 6.3.94^{and 6.3.95 WBS} and measured stroke, all indications were correct. Relanded leads and verified per released loop wiring drawings.

Performed steps 6.3.96 → 6.3.106 to stroke outlet actuator EFI-3, 2A. Performed steps 6.3.107 → 6.3.119, successfully. No exceptions.

Relanded all lifted leads per released loop wiring drawings.

Performed set up for stroking actuator EFI-3-1B inlet baffle actuator. Test steps 6.3.120 → 6.3.129, & 6.3.130, measured 1B actuator stroke per test steps 6.3.131 → 6.3.139 and verified limit switch indications per test steps 6.3.140 → 6.3.141. Disconnected equipment by test steps 6.3.142 → 6.3.143. Relanded all lifted leads and verified per released loop wiring drawings.

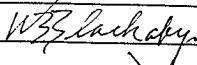
Performed set up to stroke EFI-3, 1A inlet baffle actuator per steps 6.3.144 → 6.3.154. Stroked actuator per steps 6.3.155 → 6.3.168. Relanded all lifted leads per released loop wiring drawing.

W3 Blackaby

TEST LOGDate: 4-17-97Page A-11 of A-11Test Procedure No. HNF-SD-CP-ATR-087

Began test of the Vortex damper actuator EPI-3-32 with test briefing. Performed visual inspection to verify actuator not connected to damper mechanism. Performed steps 6.3.169 → 6.3.175 (magnet test) to verify limit switch indications.

Performed continuity test and corrected wiring problem as first noted on page 5 of the test log. An ECN will be generated to correct the logic wiring drawing. Exception #3


WZ Blackaby