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SACRAMENTO PLANT

REPORT NO. RN-S-0226

TO

AEC - NASA SPACE NUCLEAR PROPULSION OFFICE

NES DUCT INSTRUMENTATION
CHECKOUT PROCEDURE

MARCH 1966

NERVA PROGRAM

CONTRACT SNP-1

MASTER

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REPORT NO. RN-S-0226

NES DUCT INSTRUMENTATION
CHECKOUT PROCEDURE
MARCH 1966

ROCKET ENGINE OPERATIONS - NUCLEAR

NERVA PROGRAM

CONTRACT SNP-1

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UNCLASSIFIED

SK Yoder 3-30-66
CLASSIFYING OFFICER DATE

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SCOPE

This document is written to define the end-to-end functional test of instrumentation component used on the NES Duct. Both temporary and permanent instrumentation components are tested in accordance with this document. Additional information is required for some temporary transducers which are to be removed after the design demonstration test.

Each transducer, except thermocouples and piezoelectric accelerometers, will be shunt-calibrated to establish base line data.

Each transducer, except pressure transducers, will be excited and stimulated as an operational check. Pressure transducers will be excited and stimulated only if the shunt-calibration values vary from those values obtained during laboratory calibration.

Applicable portions of NES Duct Instrumentation Installation Procedure (as per REON Report RN-S-0225) must have been completed on the channel prior to performing this procedure.

H. M. Rice
Program Manager
REON

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1. GENERAL

1.1 Discrepancies noted in accomplishment of any section of this procedure shall be brought to the attention of the Assembly Engineer and Quality Control representatives for resolution.

1.2 A daily record of the checkout operation will be maintained by the shift engineer.

1.3 The electrical measuring equipment employed will carry a valid calibration sticker. The model numbers and serial numbers of the test equipment used will be recorded in the daily record of Paragraph 1.2, above.

1.4 All measurements taken will be recorded and verified by Quality Control on the appropriate Instrumentation Data Log Sheet.

1.5 NTO Standard Operation Procedures shall be used to supplement this document. In the event of conflict, the more restrictive shall apply: The cognizant NTO engineer shall determine the applicable procedure.

1.6 In the event an instrument is improperly excited (over-voltage applied, etc.) the occurrence shall be recorded in the daily log and Instrumentation Data Log Sheet NES-01 through -11, attached as Figures 1 through 11. Appropriate action shall be taken to determine if there has been damage to the unit.

1.7 NTO Health and Safety Instructions (RN-HSM-0001) shall be followed in the performance of this procedure.

1.8 NTO Engineering and Quality Control acceptance and sign off of each instrumentation channel will be accomplished on the individual Instrumentation Data Log Sheets.

1.9 Changes, additions and deletions of tolerances as specified shall be authorized in writing by the cognizant NTO engineer or his designated alternate.

1.10 Applicable portions of NES Duct Instrumentation Installation Procedures (RN-S-0225) shall have been completed prior to conducting the procedures of this document.

1.11 Three copies of completed Instrumentation Data Log Sheets are to be forwarded to Manager, REON Instrumentation, Dept. 7461, Component Development Division, Bldg. 2019, Sacramento.

2. REFERENCE MATERIAL

2.1 Drawings

2.1.1 Component Drawings

Thermocouple, Immersion - Chromel Alumel	1-236086-60
Transducer, Pressure 0-100 psia	248812
Transducer, Pressure 0-1000 psia	248816
Thermocouple, Immersion Chromel-Alumel	267624
Accelerometer, Electrical, Piezoelectric	701565
Limit Switch Assembly - Plunger Actuated Type	1013626
Thermocouple - Immersion, Chromel Alumel	1013627
Thermocouple - Surface Temperature Sensing Chromel Alumel	1013628
Thermocouple - Immersion, Chromel Alumel	1013629
Strain Gage Assembly, One Half Bridge, Weldable	1013630
Transducer, Vibration, Strain Gage - NES Duct	1013631
Transducer, Pressure, Strain Gage - NES Duct	1013633
Transducer, Pressure, Differential, Strain Gage - NES Duct	1013634
Thermocouple - Immersion, Chromel Alumel	1013635
Limit Switch Assembly, Roller Actuated Type	1013636
Transducer Pressure, Strain Gage - NES Duct Steam Header	1013641
Thermocouple, Surface Temperature Sensing, Chromel Alumel	1114821

2.1.2 Electrical Drawings

<u>Drawing Title</u>	<u>Drawing No.</u>
Schematic Diagram - Electrical Instrumentation	1114789
Schematic Diagram - Electrical Instrumentation Permanent	1115264

2.1.3 Assembly Drawings

<u>Drawing Title</u>	<u>Drawing No.</u>
Instrumentation Installation Permanent NES Duct	1114669
Instrumentation Installation, Temporary - Design Demonstration Test	1114686

2.1.4 Miscellaneous

Instruction Manual for Charge Amplifier System Model 039A

3. CHANNEL CHECKOUT DETAILS

3.1 PRESSURE TRANSDUCERS

(50-PT-203 through 210, 50-PT-221 through 226, 50-PT-239 and 50-PT-901 through 912)

Reference: Instrumentation Data Log Sheet NES 01

Applicable REON drawings:

AGC 1114789

AGC 1114669

AGC 1115264

AGC 1114686

Individual Calibration Sheets

Continuity and Insulation Resistance:

Measure and record the following resistance values in the complete channel at the signal conditioning equipment: (5) *

Input Resistance, Output Resistance, Pin B to Pin E, Pin C to Pin F (or the equivalent wires) measurement to be made at the signal conditioning equipment.

Measure the insulation resistance between a signal lead and ground.

Measure the insulation resistance between the shield and ground.

* Circled numbers refer to the operations to be recorded on the Instrumentation Data Log Sheet.

Shunt-Calibration Check

The rated input voltage shall be applied to the input leads. Record the applied voltage.

Apply shunt resistors across the proper leads in the following shunt steps:

0% F.S.

25% F.S.

50% F.S.

75% F.S.

NOTE: Shunt resistor values will be the same as those used in the last laboratory calibration.

Record the output voltage at each shunt step; recheck the excitation voltage and record. Verify proper polarity indication at recorder, meter, or digital indicator. (6)

If the output voltage at any of the above shunt steps exceeds the corresponding laboratory values by 1% or more, proceed with the stimulated transducer check listed below after notification of the Assembly Engines and Quality Control Representative. Otherwise, the Stimulated Transducer Check is not required.

Stimulated Transducer Check

Remove the transducer impulse line and seals. Pressurize the transducer at the pressure port to the rated full scale pressure or to some value exceeding 50% of full scale pressure. Applied pressure shall be recorded and shall be accurate to within 0.2% (Heise Gage or equivalent).

Measure the output voltage and record. Verify and record the polarity of the applied and output voltages. Verify proper indication or deflection at the recorder, meter or digital indicator. (7)

The Assembly Engineer and the Quality Control Representative shall provide disposition of the transducer.

Upon completion of the end-to-end checks, replace the impulse line (if removed) using new, unused seals. Torque the mounting hardware and tube fittings to their proper values and lockwire per the drawings while observing the precautions of RN-S-0225 and other appropriate drawings. Verify the mounting and lockwiring of the transducer with Quality Control. (8)

After conducting the Design Demonstration Test the following transducers will be removed, sent to the laboratory for calibration and shipped to REON, Sacramento, Attention: Manager, Dept. 7461, Bldg. 2019. (9) (10) (Copies of the Calibration Data to accompany the units)

50-PT-901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911 and 912.

All other pressure transducers are permanent and will be left installed for the life of the duct.

3.2 DIFFERENTIAL PRESSURE TRANSDUCERS

(50-FT-54 through 60 and 50-FT-72 through 79)

Reference: Instrumentation Data Log Sheet NES 07

AGC 1114669

AGC 1115264

Individual Calibration Sheets

Continuity and Insulation Resistance

Measure and record the following resistance values in the complete channel at the signal conditioning equipment. (5)

Input Resistance

Output Resistance

Pin B to Pin E

Pin C to Pin F

Measure the insulation resistance between a signal lead and ground.

Measure the insulation resistance between the shield and ground.

Shunt-Calibration Check

The rated input voltage shall be applied to the input leads. Record the applied voltage.

Apply shunt resistors across the proper leads in the following shunt steps:

0% F.S.
25% F.S.
50% F.S.
75% F.S.

NOTE: Shunt resistor values will be the same as those used in the last laboratory calibration.

Record the output voltage at each shunt step. Recheck the excitation voltage and record. Verify proper polarity indication at recorder, meter, or digital indicator. (6)

If the output voltage at any of the above shunt steps exceeds the corresponding laboratory values by 1% or more, proceed with the Stimulated Transducer Check listed below after notification of the Assembly Engineer and Quality Control Representative. Otherwise, the Stimulated Transducer Check is not required.

Stimulated Transducer Check

Remove the high pressure impulse line and seals. Remove the low pressure impulse line and seals. Pressurize the transducer at the high pressure port to a pressure equivalent to the rated full scale differential pressure. Applied pressure shall be recorded and shall be accurate to within 0.2% (Heise Gage or equivalent)

Measure the output voltage and record. Verify and record the polarity of the applied and output voltages. Verify proper indication or deflection at the recorder, meter or digital indicator. (7)

The Assembly Engineer and the Quality Control Representative shall provide disposition of the transducer.

Upon completion of the end-to-end checks, replace the impulse lines (if removed) using new, unused seals. Torque the mounting hardware and tube fittings, to their proper valves and lockwire per the drawings while observing the precautions of RN-S-0225 and other appropriate drawings. Verify the mounting and lockwiring of the transducer with Quality Control. ⑧

NOTE: Flow measurement 50-FT-60 is bi-directional and the transducer should be checked with pressure applied to the low pressure side as well as the high pressure side, should it be necessary to perform the stimulated check on this transducer.

3.3 THERMOCOUPLES - IMMERSION - CHROMEL/ALUMEL

(50-TE-57 through 61, 50-TE-66 through 68, 50-TE-75 through 79, 50-TE-83 through 90, and 50-TE-158, 159 and 320, 50-TE-901 through 903)

Reference: Instrument Data Log Sheet NES 02 and NES 09

AGC 1114689

AGC 1114669

AGC 1115264

AGC 1114686

Individual Calibration Sheets

Continuity

Measure and record the following resistance values in the complete channel at the signal conditioning equipment: (3)

Chromel-to-Alumel

Chromel-to-Shield

Alumel-to-Shield

Shield-to-Ground

Stimulated Transducer Check

Carefully remove the probe from the boss and apply heat with a heat gun to the thermocouple junction. Record the polarity of output and proper deflection or indication at the recorder, meter, or digital indicator. (4)

Upon completion of the stimulation check, carefully re-install the probe in the boss observing the precautions of RN-S-0225 and the applicable drawing. Torque to final value and verify the torque and lockwire with Quality Control. (5)

After completion of the Design Demonstration Test, remove the probes 50-TE-901 through 903, recalibrate and return to REON, Sacramento; Attention: Manager, Dept. 7461, Bldg. 2019. (2 copies of the calibration data to accompany the unit.) ⑥

3.4 THERMOCOUPLE SURFACE MEASUREMENT CHROMEL/ALUMEL

(50-TE-164 through 167 and 50-TE-904 through 907)

Reference: Instrumentation Data Log Sheet NES 03 and NES 10

This procedure is identical to that for the probes but the thermocouples may be stimulated as mounted with a heat gun.

After completion of the Design Demonstration Test, thermocouples 50-TE-904 through 907 may be removed at the discretion of the cognizant NTO Engineer. If removed, ship to REON, Sacramento, Attention: Manager, Dept. 7461, Bldg. 2019.

3.5 STRAIN GAGE - WELDABLE HALF BRIDGE

(50-STG-4 through 7, 50-STG-11 through 19 and 50-STG-901 through 914)

Reference: Instrumentation Data Log Sheet NES 05

AGC 1114789 AGC 1114669

AGC 1115264 AGC 1114686

Individual Calibration Sheets

Continuity and Insulation Resistance

Measure and record the following resistance values in the complete channel at the signal conditioning equipment. (5)

Input Resistance

Pin B-C (Blk to Grn)

Pin B-A (Blk to Red)

Pin C to Pin F (Grn to Blu)

Pin A to Pin E (Red to Or)

Measure and record the insulation resistance between the circuit and the shield.

Measure and record the insulation resistance between the shield and ground.

Stimulated Transducer Check

Not applicable.

Shunt Calibration Check

Balance the signal output with the rated excitation voltage applied. Record the applied voltage.

Apply the shunt resistors at the signal conditioning equipment.

25% F. S.

50% F. S.

75% F. S.

100% (Shunt values based on percentage of 3000 microinches/inch strain as full scale)

Record the output voltage for each shunt condition. Verify proper polarity indication at recorder, meter, or digital indicator. (6)

Upon completion of Design Demonstration Test, disconnect the temporary strain gage extension cables as indicated in REON Report RN-S-0225.

3.6 ACCELEROMETER - STRAIN GAGE

(50-XVT-1 through 9)

Reference: Instrumentation Data Log Sheet NES 11
AGC 1114669 AGC 1115264
Individual Calibration Sheets

Continuity and Insulation Resistance

Measure and record the following resistance values in the complete channel at the signal conditioning equipment: (4)

Input Resistance

Output Resistance

Pin B to Pin E

Pin C to Pin F

Measure the insulation resistance between a signal lead and ground.

Measure the insulation resistance between the shield and ground.

Stimulated Transducer Check

Apply the input voltage and record the value. Orient the sensitive axis in a vertical direction with the transducer base at the bottom. Balance the circuit to zero output and invert the transducer. Verify and record the polarity of the applied and output voltages. Verify proper indication at the bar graph or analog tape. (5)

Shunt Calibration Check

Apply the shunt resistors across the proper leads in the following shunt steps:

0% F. S.
25% F. S.
50% F. S.
75% F. S.

Record the output voltage at each shunt step. Recheck and record the applied excitation voltage. Record and verify proper polarity indication at the bar graph or analog tape. (6)

Upon completion of the end-to-end check, install the transducer on its mounting block with the hardware provided as indicated on AGC 1114669. Insure that the proper transducer is oriented in the correct axis per the drawing. Verify the mounting torque and lockwiring with Quality Control. (7) (8)

NOTE: If a portable vibration table is available it is desirable to stimulate the transducer in a true vibration situation, time permitting.

3.7 ACCELEROMETER - PIEZOELECTRIC (50-XVT-901 thru 915)

Reference: Instrumentation Data Log Sheet NES 06
AGC 1114669
Individual Calibration Sheets

Continuity and Insulation Resistance

These measurements were made re. RN-S-0225.

Stimulated Transducer Check

Remove the transducer from the mount and stimulate it with a light tap on the base. Use a rubber hammer or similar plastic material to avoid excessive shock. Verify proper deflection on the strip chart or at the analog tape.

Shunt Calibration Check

Not applicable.

Upon completion of the stimulation check, remount the transducer assembly on the appropriate mounting block per AGC 1114669 insuring that the proper transducer is oriented in the correct axis per the drawing. Torque the screws to the final value, and lockwire per the drawing. (7)

Verify the torque and lockwire with Quality Control. (8)

NOTE: If a portable vibration table is available it is desirable to stimulate the transducer in a true vibration situation, time permitting.

3.8 LIMIT SWITCH (50-LMS-1 thru 4 and 50-LMS-9 thru 11)

Reference: Instrumentation Data Log Sheet NES 08
AGC 1114669

Continuity

Continuity - Measure with the plunger free on complete channel. (4)

Pin B to Pin C (or wire connected to designated pins)

Pin A to Pin C

Pin A to Pin B

Measure with the plunger depressed

Pin A to Pin B

Pin C to Pin A

Pin C to Pin B

Stimulated Transducer Check

With the 28 volt dc supply energized, activate the switch by depressing the plunger. Note and verify proper signal with the switch plunger depressed (lamp indication). Record the proper occurrence. (5)

Upon completion of the functional test, lockwire the mounting hardware per the drawing and verify with Quality Control. (6)

Miscellaneous Items:

GN₂/Disconnect Assembly

Instrumentation Data Log Sheet NES 04

Reference: AGC 1115248 Frame Assy, Remote Disconnect - GN₂ Line Assy
AGC 1114669.

Supply 90 psi air to the air motor to activate disconnect to disengage joint assembly. (2)

NOTE: After functional test is completed, the gasket is to be replaced and the joint fully torque shut. Torque assemblies at hex-shaft next to universal joint.

Remove the used seal and replace with unused seal (3) . Manually shut the joint. Torque all joints 50 ± 10 in/lbs.

Disconnect upper conoseal clamp actuation line 39-GN-1-AS at each of the four (4) air motors and plug line. Using dry GN_2 , proof pressure test system at 190 ± 10 psi and leak check entire system at 100 ± 10 psi.

Proof pressure test buffer zone purge line 50-GN-1/4-AS and steam bellows purge line 67-GN-1/2-AS at 20-23 psi and leak check at 15 ± 1 psi.

Allowable leakage rates for lines 39-GN-1-AS, 50-GN-1/4-AS, and 67-GN-1/2-AS is .002 psi/sec.

INSTRUMENTATION DATA LOG SHEET

NES 01

PRESSURE-STRAIN GAGE

AGC PART NO _____

MPG _____

SERIAL NO _____

MEAS. NO _____

TAG NO. 50-PT _____

RECEIVING INSPECTION ①	VISUAL		ELECTRICAL		LOCATE & MOUNT ②		INST. ELEC ③		INSTALL TUBE ④	
	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL
PERFORMED										
Q.C. VERIFIED										

OPERATION	END TO END ⑤		SHUNT CAL ⑥		STIMULATE ⑦		TORQUE & LOCKWIRE ⑧			
	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL
PERFORMED										
Q.C. VERIFIED										

OPERATION	POST TEST SHUNT ⑨		REMOVAL* ⑩	
	DATE	INITIAL	DATE	INITIAL
PERFORMED				
Q.C. VERIFIED				

① ELECTRICAL INSPECTION (RECEIVING) PER INDIVIDUAL CALIB SHEETS											
PIN G OR CASE TO PIN	A	B	C	D	E	F	PIN TO PIN	D C	A B	B E	C F
MEGOHMS											

③ INSTALLATION ELECTRICAL TEST											
SHIELD TO WIRE	RED	BLK	GRN	WHT	OR	BLUE	WIRE TO WIRE	WHT OR GRN	RED BLK	BLK OR	GRN BLU
MEGOHMS											

⑤ END TO END CHECK											
GROUND TO	SHIELD	PIN					PIN TO PIN	D C	A B	B E	C F
MEGOHMS							OHMS				

⑥ SHUNT CAL		⑨
SHUNT	READING	POST TEST
0%		
25%		
50%		
75%		
POS TERM		
PROPER DEFLECTION		

⑦ STIMULATE	
PSI APPLIED	READING
POS TERM	
PROPER DEFLECTION	
EXC VOLTAGE	

NTO ENGR ACCEPTANCE	DATE	NTO Q.C. ACCEPTANCE	DATE

* APPLIES TO 50-PT-901 THRU 50-PT-912

Figure 1

INSTRUMENTATION DATA LOG SHEET
TEMPORARY THERMOCOUPLE - CHROMEL / ALUMEL (PROBE)

NES 02

AGC PART NO. _____ MFG _____

RECEIVING INSPECTION ①	VISUAL		ELECTRICAL		ELEC. INST ②		CONT & INS RES ③		STIMULATED CHECK ④		TORQUE ⑤		TAG NO.
	DATE	INIT.	DATE	INIT.	DATE	INIT.	DATE	INIT.	DATE	INIT.	DATE	INIT.	
PERFORMED													50-TE-901
Q.C. VERIFIED													
PERFORMED													50-TE-902
Q.C. VERIFIED													
PERFORMED													50-TE-903
Q.C. VERIFIED													

① ELECTRICAL INSPECTION (RECEIVING) *					② ELECTRICAL - INSTALLED			
TAG NO.	CR - AL	CR TO CASE	AL TO CASE	SHLD TO CASE	CR-AL PIN TO PIN	CR TO GND PIN TO PIN	AL TO GND PIN TO PIN	SHLD TO CONN BODY
50 TE 901					Box 55B015 023D 023C	Box 55B015 023D 023A	Box 55B015 023C 023A	023A
50 TE 902					121 135	121 136	135 136	136
50 TE 903					123 124	123 137	124 137	137

③ CONTINUITY AND INSULATION RESISTANCE (CHANNEL)					④ STIMULATED CHECK POS WIRE	⑥ REMOVE AND CALIBRATE
TAG NO	CR -AL	CR TO SHLD	AL TO SHLD	SHLD TO GND		
50 TE 901						
50 TE 902						
50 TE 903						

* PER INDIVIDUAL CALIB SHEETS

NTC ENGR. ACCEPTANCE	DATE	NTC Q.C. ACCEPTANCE	DATE

Figure 2

INSTRUMENTATION DATA LOG SHEET
 TEMPORARY THERMOCOUPLE - CHROMEL/ALUMEL (SURFACE)

NES 03

AGC PART NO. _____ MFG. _____

RECEIVING INSPECTION ①	VISUAL		ELECTRICAL		WELD MOUNT ②		ELEC. INST ③		CONT & INS RESISTANCE ④		STIMULATED CHECK ⑤		TAG NO
	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL	DT	INIT	DT	INIT	
PERFORMED													50-TE-904
Q.C. VERIFIED													
PERFORMED													50-TE-905
Q.C. VERIFIED													
PERFORMED													50-TE-906
Q.C. VERIFIED													
PERFORMED													50-TE-907
Q.C. VERIFIED													

① ELECTRICAL INSPECTION (RECEIVING) *					② ELECTRICAL INSPECTION (INSTALLED)			
	PIN A TO PIN B	PIN A TO PIN C	PIN B TO PIN C	PIN C TO OUTER SHLD	YEL TO RED	YEL TO SHIELD	RED TO SHIELD	
50 TE 904								
50 TE 905								
50 TE 906								
50 TE 907								

④ CONTINUITY AND INSULATION RESISTANCE (CHANNEL)					⑤ STIMULATED CHECK POS. WIRE
TAG NO.	CR-AL	CR-SHIELD	AL-SHIELD	SHLD-GRND	
50 TE 904					
50 TE 905					
50 TE 906					
50 TE 907					

NTO ENGR. ACCEPTANCE	DATE	NTO Q.C. ACCEPTANCE	DATE

* PER INDIVIDUAL CALIB. SHEETS

Figure 3

INSTRUMENTATION DATA LOG SHEET
INSTRUMENTATION BOOM & GN₂ DISCONNECT

NES 04

INSTRUMENTATION BOOM (AGC 103625)

① RETRACTION MECH. CHECK			② RETRACTION (FULL CABLE LOAD)	
	DATE	INITIAL	DATE	INITIAL
PERFORMED				
Q.C. VERIFICATION				

COMMENTS

NTC ENGR. ACCEPTANCE	DATE	NTC Q.C. ACCEPTANCE	DATE

GN₂ DISCONNECT ASSEMBLY (AGC 1115248)

① INSTALLATION COMPLETED			② OPERATIONAL CHECK		③ NEW GASKET INSTALLED		④ LEAK CHECK	
	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL
PERFORMED								
Q.C. VERIFICATION								

COMMENTS:

NTC ENGR. ACCEPTANCE	DATE	NTC Q.C. ACCEPTANCE	DATE

INSTRUMENTATION DATA LOG SHEET

NES 05

STRAIN GAGE (WELDABLE)

AGC PART NO. _____ MFG. _____

SERIAL NO. _____ MEAS. NO. _____ TAG NO. 50-STG-_____

RECEIVING INSPECTION ①	VISUAL		ELECTRICAL		LOC & MOUNT ②		CLAMP WELD ③		ELEC. INST. ④	
	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL
PERFORMED										
Q.C. VERIFIED										

OPERATION	ELEC. INSP. CHANNEL ⑤		SHUNT CAL ⑥		DISCONNECT * ⑦					
	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL				
PERFORMED										
Q.C. VERIFIED										

① ELECTRICAL INSPECTION (RECEIVING) PER INDIVIDUAL CALIB. SHEETS							
PIN C TO PINS TIED TOGETHER				PIN TO PIN	B C	B A C	A F E
MEGOHMS				OHMS			

④ ELECTRICAL INSPECTION (INSTALLED) (50 MA MAX CURRENT)							
SHIELD TO WIRE BUNDLE TIED TOGETHER				WIRE TO WIRE	BLK GRN	BLK RED	GRN BLU
MEGOHMS							

⑤ ELECTRICAL INSPECTION (CHANNEL) (50 MA MAX CURRENT)							
CIRCUIT TO SHIELD		SHIELD TO GROUND		WIRE TO WIRE	BLK GRN	BLK RED	GRN BLU
MEGOHMS							

⑥ SHUNT CALIB.	
RESIST.	POS TERM MV
25 %	
50 %	
75 %	
100 %	

NTO ENGR. ACCEPTANCE	DATE	NTO Q.C. ACCEPTANCE	DATE

* APPLIES TO 50-STG-901 THRU 50-STG-914 ONLY

Figure 5

INSTRUMENT DATA LOG SHEET
ACCELEROMETER (PIEZOELECTRIC)

NES 06

AGC PART NO. 701565

MFG. CLEVITE

SERIAL NO. _____

MEASUREMENT NO. _____

TAG NO. 50-KVT-

RECEIVING INSPECTION ①	VISUAL		ELECTRICAL		LOCATE & WELD BLOCK ②		LOCATE & WELD CLAMP ③		ELEC CHECK SOFT CABLE ④	
	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL
PERFORMED										
Q.C. VERIFIED										

CHARGE AMP INSTALL & INSPECT ⑤	CALIB UNIT		POWER SUPPLY		CHARGE AMP		OUTPUT CONN. MADE	
	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL
PERFORMED								
Q.C. VERIFIED								

OPERATION	STIMULATED XDUCER CHECK ⑥			PROPER AXIS VERIFICATION ⑦		TORQUE & LOCKWIRE ⑧	
	DATE	INITIAL	POLARITY VERIFIED	DATE	INITIAL	DATE	INITIAL
PERFORMED							
Q.C. VERIFIED							

① ACCELEROMETER ASSEMBLY RECEIVING INSPECTION			
INSULATION RESISTANCE PIN TO CONN. BODY 80 MEGOHM MIN	CAPACITANCE PIN TO BODY 9.9 K pf MAX	CONNECTOR PIN TO OUTER SHEATH 1000 MEGOHMS	

④ ACCELEROMETER ASSY & CABLE ELEC. INSPECTION			
INSULATION RESISTANCE PIN TO CONN. BODY 40 MEGOHM MIN	CAPACITANCE PIN TO BODY 19.9 pf MAX		

WFO ENGR. ACCEPTANCE	DATE	WFO Q.C. ACCEPTANCE	DATE

Figure 6

INSTRUMENTATION DATA LOG SHEET
DIFFERENTIAL PRESSURE-STRAIN GAGE

NES 07

AGC PART NO _____ MFG _____
SERIAL NO _____ MEAS. NO _____ TAG NO. 50-PT- _____

RECEIVING INSPECTION ①	VISUAL		ELECTRICAL		LOCATE & WELD MTG BLOCK ②		INSTALLED ELEC CHECK ③		INSTALL TUBE ④	
	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL
PERFORMED										
Q.C. VERIFIED										

OPERATION	END TO END ⑤		SHUNT CAL ⑥		STIMULATE ⑦		TORQUE & LOCKWIRE ⑧			
	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL
PERFORMED										
Q.C. VERIFIED										

① ELECTRICAL INSPECTION (RECEIVING) PER INDIVIDUAL CALIB SHEETS											
PIN G TO	A	B	C	D	E	F	PIN TO PIN	D	A	B	C
MEGOHMS								C	B	E	F

③ INSTALLATION ELECTRICAL TEST											
SHIELD TO	RED	BLK	GRN	WHT	OR	BLU	WIRE TO WIRE	WHT GRN	RED BLK	BLK OR	GRN BLU
MEGOHMS											

⑤ END TO END CHECK											
GROUND TO	SHIELD	PIN					PIN TO PIN	D	A	B	C
MEGOHMS								C	B	E	F

⑥ SHUNT CAL	
SHUNT	READING
0 %	
25 %	
50 %	
75 %	
POS TERM	
PROPER DEFLECTION	

⑦ STIMULATE	
PSI APPLIED	READING
POS. TERM	
PROPER DEFLECTION	
EXC. VOLTAGE	

NTO ENGR ACCEPTANCE	DATE	NTO Q.C. ACCEPTANCE	DATE

Figure 7

INSTRUMENTATION DATA LOG SHEET

NES 08

LIMIT SWITCH

AGC PART NO. _____ MFG. _____
 SERIAL NO. _____ MEAS. NO. _____ TAG NO 50-LMS-_____

RECEIVING INSPECTION ①	VISUAL		ELECTRICAL		LOCATE & WELD CLAMP ②		INSTALLED ELEC CHECK ③		END TO END ④	
	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL
PERFORMED										
Q.C. VERIFIED										

OPERATION	STIMULATE ⑤		LOCKWIRE ⑥		
	DATE	INITIAL	DATE	INITIAL	
PERFORMED					
Q.C. VERIFIED					

① ELECTRICAL INSPECTION (RECEIVING) PFR INDIVIDUAL CALIB SHEETS											
SHEATH TO	A	B	C	CONTINUITY PLUNGER FREE	B / C	A / C	A / B	CONTINUITY PLUNGER DEP.	A / B	C / A	C / B
MEGOHMS				OHMS	SHORT				SHORT		

③ ELECTRICAL INSPECTION (INSTALLED)											
SHIELD TO	BLK	WHT	RED	CONTINUITY PLUNGER FREE	WHT / RED	BLK / RED	BLK / WHT	CONTINUITY PLUNGER DEP.	BLK / WHT	RED / BLK	RED / WHT
				OHMS	SHORT				SHORT		

④ END TO END											
				CONTINUITY PLUNGER FREE	B / C	A / C	A / B	CONTINUITY PLUNGER DEP.	A / B	C / A	C / B
				OHMS	SHORT				SHORT		

⑤ STIMULATE	
PLUNGER	LAMP
FREE	
DEPRESSED	

NTO ENGR. ACCEPTANCE	DATE	NTO Q.C. ACCEPTANCE	DATE

Figure 8

INSURUMENTATION DATA LOG SHEET
THERMOCOUPLE-CHROMFL-ALUMEL (PROBE)

NES 09

ACC PART NO. _____ MFG. _____
SERIAL NO. _____ MEAS. NO. _____ TAG NO. 50-TE-

RECEIVING INSPECTION ①	VISUAL		ELECTRICAL		ELEC. INST. ②		END TO GND ③		STIMULATE ④	
	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL
PERFORMED										
Q.C. VERIFICATION										

OPERATION	TORQUE & LOCKWIRE ⑤									
	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL
PERFORMED										
Q.C. VERIFICATION										

① ELECTRICAL INSPECTION (RECEIVING) *						② ELECTRICAL INSPECTION (INSTALLED)				
PIN TO PIN	A-B	A-C	B-C	C TO SHEATH		WIRE TO WIRE	YEL TO RED	YEL TO SHIELD	RED TO SHIELD	
OHMS						OHMS				

③ CONTINUITY (CHANNEL)					④ STIMULATE	
WIRE TO WIRE	CR TO AL	CR TO SHIELD	AL TO SHIELD	SHIELD TO GND	POS WIRE	
OHMS						
					PROPER DEFLECTION	

NTO ENGR. ACCEPTANCE	DATE	NTO Q.C. ACCEPTANCE	DATE

* PER INDIVIDUAL CALIB SHEETS

Figure 9

INSTRUMENTATION DATA LOG SHEET

NES 10

THERMOCOUPLE, CHROMEL-ALUMEL (SURFACE)

ACC PART NO. _____ MFG _____
SERIAL NO. _____ MEAS NO. _____ TAG NO. 50-TE-

RECEIVING INSPECTION ①	VISUAL		ELECTRICAL		ELEC. INST. ②		END TO END ③		STIMULATE ④	
	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL
PERFORMED										
Q.C. VERIFIED										

OPERATION	WELD MOUNT ⑤									
	DATE	INITIAL								
PERFORMED										
Q.C. VERIFIED										

① ELECTRICAL INSPECTION (RECEIVING) *						② ELECTRICAL INSPECTION (INSTALLED)			
PIN TO PIN	A B	A C	B C			WIRE TO WIRE	YEL RED	YEL SHLD	RED SHLD
OHMS						OHMS			

③ CONTINUITY (CHANNEL)					④ STIMULATE	
WIRE TO WIRE	CR TO AL	CR TO SHLD	AL TO SHLD	SHLD TO GND	POS. WIRE	
OHMS						
					PROPER DEFL.	

NTO ENGR. ACCEPTANCE	DATE	NTO Q.C. ACCEPTANCE	DATE

* PER INDIVIDUAL CALIB. SHEETS

Figure 10

INSTRUMENTATION DATA LOG SHEET
ACCELEROMETER (STRAIN GAGE)

NES 11

AGC PART NO. _____ MFG. _____
SERIAL NO. _____ MFG. NO. _____ TAG NO. 50-XVT-

RECEIVING INSPECTION ①	VISUAL		ELECTRICAL		LOCATE & WELD BLOCK & CLAMPS ②		INSTALLED ELEC CHECK ③		END TO END ④	
	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL
PERFORMED										
Q.C. VERIFIED										

OPERATION	STIMULATE ⑤		SHUNT CAL ⑥		AXIS ORIENTATION VERIFICATION ⑦		TORQUE & LOCKWIRE ⑧			
	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE	INITIAL
PERFORMED										
Q.C. VERIFIED										

① ELECTRICAL INSPECTION (RECEIVING) PER INDIVIDUAL CALIB. SHEETS										
PIN G TO	A	B	C	D	E	F	PIN TO PIN	D	A	B
MEG OHMS							OHMS	C	B	E
										F

③ INSTALLATION ELECTRICAL TEST										
SHIELD TO	RED	BLK	GRN	WH	OR	BLU	WIRE TO WIRE	WH	RED	BLK
MEG OHMS							OHMS	GRN	BLK	OR
										GRN
										BLU

④ END TO END										
GROUND TO	SHIELD	PIN					PIN TO PIN	D	A	B
MEG OHMS							OHMS	C	B	E
										F

⑤ STIMULATE		
OUTPUT		
INVERTED OUTPUT		POS TERM
EXC VOLTAGE		POS TERM
PROPER DEFECTION		

⑥ SHUNT CAL	
SHUNT	OUTPUT
0%	
25%	
50%	
75%	
POS TERM	
PROPER DEFLECT.	

NTC ENGR ACCEPTANCE	DATE	NTC Q.C. ACCEPTANCE	DATE

Figure 11