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FINAL TECHNICAL REPORT ON CALIBRATABLE PRESSURE SWITCH

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Oxnard, California

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2230 Statham Boulevard
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FINAL TECHNICAL REPORT ON CALIBRATABLE PRESSURE SWITCH

PREPARED FOR
NATIONAL AERONAUTICS
AND
SPACE ADMINISTRATION

GEORGE C MARSHALL
SPACE FLIGHT CENTER

Huntsville, Alabama 35012

CONTRACT NAS8-20566
CONTROL NO. 1-6-52-01070(IF) & 51 (IF)

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1.0 ABSTRACT

This contract was issued to Statham Instruments to cover a program for the design, development, fabrication, qualification testing, and delivery of 2 each, Electronic Pressure Switches: The pressure switches were specified in NASA Specification 20M42121, Revision A, dated September 15, 1965, entitled "Switches, Absolute Pressure, Electronic". The contract consisted of the following four phases:

- Phase I Design and Development
- Phase II Fabrication of 2 each, pre-flight certification switches
- Phase III Pre-flight certification testing
- Phase IV Fabrication and delivery of 2 each, production pressure switches

This report is the final technical report for this contract. It covers the work performed during the entire contract in a comprehensive manner and is self-contained Detailed technical information was previously supplied in the monthly technical progress reports submitted during the contract period

2.0 SUMMARY

A four phase project was undertaken, and successfully completed, to develop a Calibratable Electronic Pressure Switch in accordance with George C. Marshall Space Flight Center Specification 20M42121 This contract was received on March 7, 1966 and work immediately commenced on Phase 1 This phase was for the basic design and development of the Pressure Switch designated as Statham Instruments,Inc Model SP 111

The salient features of NASA/MSFC Specification 20M42121 were a high accuracy pressure switch, rugged vibration environment, wide temperature range extending to the cryogenic region, and a separate pressure calibration port which is isolated from the system pressure port. Statham Instruments had extensive prior experience with analog output pressure transducers capable of meeting the accuracy and environmental requirements. These transducers consisted of a thin film strain gage sensing element and an integrally packaged solid-state electronic feedback amplifier using the Statham "amplibridge" principle.

To produce a pressure switch using this basic analog pressure transducer required the development of an electronic switch and an isolated pressure calibration feature

The electronic and mechanical design underwent several design transformations culminating in a design consisting of the following basic features·

1. Thin film strain gage sensing element employing a double-diaphragm and bending beam.
2. Amplibridge analog amplifier

2.0 SUMMARY (continued)

3. Trigger circuit

4. Power switch

A prototype transducer was built and thoroughly tested. Test results were generally within specified limits except for system-to-calibration port pressure correlation. Phase I work was completed on August 31, 1966 and this design was submitted for approval. Design approval and authorization to proceed with Phases II and III was received on September 21, 1966. The specification was revised to allow a bias betwen the system and calibration port switching pressures while still retaining the original tolerance between all switches of the same type. Two Preflight Certification Pressure Switches were fabricated in Phase II and tested in Phase III in accordance with the contract and an approved test procedure. The pressure switches satisfactorily passed the test requirements, the formal test results and design drawings were submitted to NASA/MSFC for approval on May 31, 1967

Approval of Phases II and III and authorization to proceed with Phase IV was received on September 14, 1967 Two production pressure switches were fabricated in accordance with the approved design drawings and tested in accordance with an approved acceptance test procedure The pressure switches satisfactorily passed the specification requirements and were submitted for delivery on April 30, 1968 thereby completing the contract.

3.0 INTRODUCTION

Pressure switches are divided into the two general classes of mechanical and electronic. The primary difference lies in the method of obtaining the switch function The mechanical approach has been the conventional design used for most applications It consists of a diaphragm, a bellows, or similar element which displaces as a result of applied pressure and ultimately actuates an electrical switch at a discrete pressure The mechanical switch requires no electrical power input. It is entirely passive and mechanical in nature except for the electrical switch function output. It requires a relatively large mechanical displacement to actuate the electrical switch and is thereby susceptible to errors in a high vibration environment.

The electronic pressure switch differs markedly from the mechanical switch in that the switching function is obtained electrically by means of a trigger or voltage comparator circuit. This switching mechanism does not require a mechanical displacement in itself However, it does require an anlog voltage input to the trigger or comparator circuit. This analog voltage input is derived from a diaphragm or bellows, similar to the mechanical pressure switch, and an electrical pickoff. The significant difference being the electrical pickoff requires a much smaller mechanical displacement and therefore can be designed to be significantly less susceptible to a vibration environment. The electronic switch does require electrical power input and has active circuit elements.

3.0 INTRODUCTION (continued)

Statham Instruments, Inc. had extensive experience prior to the contract in the design and manufacture of precision pressure transducers with an analog voltage output. The latest design consisted of a thin film strain gage sensing element and a solid-state feedback amplifier using the Statham amplibridge principle. This existing design was therefore used as the basic analog pressure sensing element of the calibratable pressure switch and did not require additional development work under this contract In order to develop the pressure switch, work was performed on the additional features unique to the calibratable pressure switch, namely, the pressure calibration feature, electronic trigger operating from an analog voltage, and electronic power switch, and system integration with the analog pressure transducer.

The thin film strain gage pressure transducer manufactured by Statham consists of two basic types The first type, shown in Figure 1, is a flexure with the strain gages deposited on the back side The strain gages measure the pressure induced stress pattern in the flexure. The second type, shown in Figure 2, is a beam-diaphragm combination. The diaphragm acts as a force collector and transmits a pressure induced force to a bending beam. The strain gages are deposited on the bending beam and measure the force induced stress pattern in the beam. Within the common design configurations, the flexure-type sensing element is generally limited to ranges of 100 psi and greater. The diaphragm beam type is typically used for ranges lower than 100 psi but can also be designed for higher ranges.

3.0 INTRODUCTION (continued)

The Statham "amplibridge" amplifier is shown conceptually in Figure 3. It is a solid state servo amplifier which incorporates the entire amplifier as well as the strain gage bridge in the feedback loop. The amplifier consists of a two stage differential input and differential output circuit. The circuit was designed to amplify the typical strain gage signal of 10 to 30 mV to an output level of 5 volts.

4.0 PHASE I

4.1 Strain Gage Sensor

The specification required that the switch actuate at 25 psia and withstand 75 psia without impairment of performance. Considering only the sensing element, it would follow that a 75 psia full scale transducer would be used However, the analog signal for switching would only be one-third as much as desired from an overall system requirement. This would necessitate an increase of 3 in amplifier gain In view of the high accuracy requirement and the low temperature operation where amplifier gain is a prime important consideration, it was decided that a 25 psia full scale transducer is required. Adequate overload protection in the form of a positive stop was then required to prevent the 75 psia pressure from impairing the performance.

Two basic types of sensing elements used for pressure transducers were described in the Introduction Section of this report. For both types an overload protection is effected by limiting the travel of the center of the diaphragm with an overload stop For the beam transducer, the bending beam and strain gages are effectively prevented from being overstressed while the overpressure is developed across the diaphragm With proper design, this overpressure is within the elastic limit of the diaphragm and will not impair the switch performance For the flexure type transducer, the overpressure developed across the diaphragm produces additional stresses in the strain gages, even though the upscale deflection of the center of the diaphragm has been limited by the stop Thus, the beam type appears

4.1 Strain Gage Sensor (continued)

better suited for this overload application. However, the diaphragm type is simpler mechanically and less vibration sensitive.

Initially, prototypes of both sensor types were constructed and evaluated for this application. Based on test data and a theoretical analysis it became readily apparent that the beam-diaphragm-beam type sensing element was superior to the flexure type for this contract. The primary reasons were:

1. The 25 psia range was difficult to obtain in the flexure type sensor.
2. Marginal overload capability for the flexure type sensor
3. The diaphragm-beam type sensing element was more adaptable to the pressure calibration feature requirement

After the initial prototypes, all work was suspended on the flexure type sensing element. The final mechanical configuration of the diaphragm-beam sensing element was determined by the calibration feature requirement and is described in that section of the report.

4.2 REMOTE PRESSURE CALIBRATION

The specification required that the pressure switch be capable of remote calibration checkout using a pressure stimulus. The calibration pressure system was required to be isolated from the measuring pressure system without the use of check valves or similar devices. To accomplish this design feature required two separate pressure actuated diaphragms coupled to the sensing beam. The measuring (primary) input is hereafter referred to as the system pressure

4.2 Remote Pressure Calibration (continued)

and the calibration input as the calibration pressure

The calibration feature of the pressure switch required a correlation of 0.2 psi (0 8%) between system and calibration pressurization. This specification required a precise match between the effective areas of the two systems, or some method of adjustment to assure the 0 2 psi correlation. Initially, prototypes were fabricated using a finite stiffness calibration pressure bellows with a controlled gap to the system's pressure diaphragm. By adjusting this gap, the required correlation could be maintained on a production basis. In addition, with the optimum calibration bellows stiffness and gap, the calibration bellows does not require a positive system pressure to prevent chattering against the sensing diaphragm under vibration.

This approach was reviewed with NASA/MSFC personnel and it was stated that the system pressure cannot be controlled and the calibration pressure correlation is desired over a wide range of system pressures Unfortunately, this stiff bellows adjustable gap technique was dependent on the actual value of system pressure and therefore was not an acceptable concept. This approach was discontinued in favor of a soft calibration diaphragm with essentially no stiffness.

The soft calibration diaphragm concept required a diaphragm stiffness of less than 0.2 psia (0.8%) in order to meet the system-to-calibration pressure specification requirement. Ideally, the calibration diaphragm stiffness should be zero, but this is theoretically not possible Due to physical and practical limitations on minimum diaphragm thickness

4.2 Remote Pressure Calibration (continued)

and maximum diameter allowable, a minimum limit of finite calibration diaphragm stiffness is achievable. In high pressure ranges it is possible to reduce the diaphragm stiffness to an insignificant percentage of the total stiffness and essentially achieve the intention of the specification. However, for a 25 psia range pressure switch this was not practical and a system-to-calibration pressure correlation bias outside the specification limit resulted.

The final design configuration is shown conceptually in Figure 4. Both the system and calibration diaphragms are identical in configuration. This assures constant correlation independent of system pressure value. The diaphragm design is for the minimum stiffness possible with the primary system stiffness supplied by the bending beam. This design concept assures the minimum practical systems-to-calibration pressure correlation. By using identical diaphragms for both the system and calibration diaphragm, a repeatable correlation factor (bias) is obtained. The mathematical force equations of the double diaphragm configuration of Figure 4 are.

System Pressure Operation

$$K_{t1} = K_{ds} + K_b \qquad (1)$$

Where K_{t1} = total stiffness

K_{ds} = system diaphragm stiffness

K_b = beam stiffness

4.2 Remote Pressure Calibration (continued)

Calibration Pressure Operation

$$K_{t2} = K_{dc} + K_{ds} + K_b \qquad (2)$$

Where K_{dc} = calibration diaphragm stiffness

Correlation

$$K_{t2} - K_{t1} = K_{dc} \qquad (3)$$

Thus, it is apparent that the correlation can be reduced to zero by reducing the calibration diaphragm stiffness to zero. Since this is not possible, a method of compensation is required to reduce the correlation error to zero.

During Phase I, a mechanical compensation method was conceived and evaluated on a preliminary prototype basis. This compensation technique is shown in Figure 5. It involves the use of a coupling spring between the calibration diaphragm and system diaphragm When calibration pressure is applied, the coupling spring is mechanically bypassed and Equation 2 is valid When system pressure is applied, the coupling spring is actuated and adds an additional stiffness term to Equation 1 and the force equation becomes.

$$K_{t1} = K_{ds} + K_b + K_c \qquad (4)$$

Where K_c = coupling spring stiffness

Thus, by proper design it is theoretically possible to reduce the correlation error to zero even though the calibration diaphragm has finite stiffness. The test results indicated that the concept was practical but required substantial additional development work.

4.2 Remote Pressure Calibration (continued)

Correlation (continued)

An alternate electrical method of compensation for system-to-calibration pressure correlation was also conceived during Phase I. This pressure switch is of the electronic type and uses an analog pressure transducer sensing element. Therefore, it is possible to electrically bias the pressure transducer when in the calibration mode to compensate for the correlation error. This technique requires the addition of an electrical switch, either internal or external to the pressure switch package, which would apply the required bias. This compensation concept was submitted to NASA/MSFC for consideration.

4.3 ELECTRONIC CIRCUIT

The electronic section of the pressure switch consists of the analog signal amplifier and the switching circuit. The amplifier raises the strain gage transducer millivolt signal to the voltage level required by the switching circuit. The amplifier concept was described in the Introduction Section of this report. The switching circuit consists of a trigger and a power switch. The trigger changes state at a discrete voltage input and provides the drive signal to the switch circuit Thus, an analog pressure signal is changed to a switch function. The trigger circuit permits independent electrical adjustment of both the switch point and the hysteresis. The electronic circuits of the pressure switch

4.3 ELECTRONIC CIRCUIT (continued)

are the convential type. The primary development effort required was to design these circuits for cryogenic operation with a switch rating of three amperes. The final circuit schematic is shown in Figure 6.

Transistor Q1 and diodes CR2 through CR5 form a regulated DC power supply which provides excitation voltage to the transducer bridge and B+ to the electronic circuits. A standard Statham cryogenic amplifier raises the millivolt output signal of the strain gage transducer to a high level voltage output.

The output of the amplifier is fed to a multi-stage flip-flop circuit consisting of transistors Q8 through Q12. Transistors Q13 through Q16 form the switching circuit. The output of the flip-flop is fed to the base of Q15. When this transistor saturates, the switching circuit causes Q13 to saturate in the conducting mode. Q13 is normally in the non-conducting or off mode. In this manner, the positive pole of the DC power line is fed to pin B of J1. Reverse polarity protection is provided by diodes CR1, CR8, CR9, and CR11.

For the pressure switch application of this contract, the optimum design centers were determined to be.

4 3 ELECTRONIC CIRCUIT (continued)

Bridge resistance:	700 ohms
Transducer sensitivity:	3 mv/V
Transducer excitation:	6.5 volts
Amplifier gain:	350
Output signal change from 0 to 25 psia:	6.8 volts
Output signal at the switch point:	0 volts

The electronic components were mechanically packaged on two flat circuit boards with the exception of the larger power dissipating components. These components were mounted on a heat sink which supported the circuit board. The electronic circuit assembly is shown in Figures 7 and 8. These figures are photographs of the prototype pressure switch built during Phase I. This prototype used solder type printed circuit board construction. The pressure switch for Phases II, III, and IV used the same type packaging except welded circuit connections replaced the soldered connection.

4.4 PRESSURE SWITCH SYSTEM

The final pressure switch configuration consisted of the assembly of the sub-systems previously described in this section The pressure switch is shown in Figures 9 and 10.

A Phase I prototype pressure switch was fabricated, using soldered electrical connections and tested for the critical parameter of the specification Test results are summarized in Tables 1 and 2 The prototype switch meets all the specification requirements except for the system-to-calibration port pressure correlation. A complete set of drawings was submitted for approval to proceed with Phase II.

TABLE I

SPIII S/N 14

System Port Switching Pressures

Temperature °F	Actuate No Load psia	Actuate 3 4 Amps psia	Deactuate No Load psia	Deactuate 3.4 Amps psia
+75	24.94 -	24.97	24.57	24.60
-150	25.17	25 17	24.90	24.91
+125	25.02	25.03	24.65	24.66
+ 75	24.94	24 97	24 57	24 60

Note: 28 V DC input

Calibration port at atmospheric pressure

TABLE II

SP111 S/N 14

TEST	PARAGRAPH	SPECIFICATION	RESULT
Temperature	4.3.4.2	± .5 psi error band	±.34 psi error band
Mounting Torque	3.2.2.2	Torque insensitive	Torque insensitive at 7 ft-lbs
Deactuated Switch Output	3.2 12	< 0.5 V DC	< 0.01 V DC
Voltage Drop	3.2.8	2.0 V DC maximum	1.41 V DC maximum
Sinusoidal Vibration	4.3 4.3.1	No chatter	No chatter
Voltage Regulation	3.2.11	Operate from 24 to 30 V DC	0.1% change at 24 V DC

5.0 Phase II

Design approval of the drawings submitted in Phase I was received. Revision B to specification 20M42121 was issued allowing a system-to-calibration point pressure bias of 2.0 psia-maximum with a correlation of 0 2 psia from switch-to-switch. Two preflight pressure switches were fabricated in accordance with these drawings. A preflight certification test procedure was written and submitted for approval.

6.0 Phase III

Model SP111 pressure switches S/N 34 and 35 were tested in accordance with the approved preflight certification test procedure. The test report for this Phase is included as Appendix I.

Data sheet pages 1 and 2 of Appendix I contain the initial readings on both switches, with all readings in tolerance. Noteworthy is the very low leakage in the deactuated mode, and the fact that 300% overload does not affect switching pressures. Page 3 contains Altitude Test results. As expected, a vacuum environment did not affect performance since the switches are hermetically sealed The functional data on Page 4 did not vary significantly from the initial readings

Temperature data are presented on Pages 5 and 6. Switch point variation between -150 and +125°F was only about one-half the allowable ±0.5 psi, and output voltage changed little. The functional data on Page 7 indicated no significant changes due to temperature exposure.

Page 8 presents the sinusoidal sweep data. Both units were pressure cycled during sinusoidal sweeps in three axes. Pre-vibration switch-on and switch-off pressures were determined to be 25.00 and 24.72 psia, respectively, for S/N 34, and 24.92 and 24.59 psia for S/N 35. Each switch was then vibrated in three axes while pressurized to within 0.3, 0.2 and 0.1 psi of its switch-on and switch-off pressures. At no time was any undesired switching action observed on either unit

6 0 Phase III (continued

Pressure was applied through the system port only, with the calibration port vented to system port pressure Switch output was fed directly into a 3300 cps galvanometer of the Honeywell Visicorder. No amplifier or relay, which might limit frequency response, was used in the output circuit.

Page 9 contains random vibration data. Each switch was manually pressurized through the system port; actuation and deactuation pressures were recorded five times in each axis. S/N 35 was not affected by the vibration, but S/N 34 suddenly required considerably more pressure to switch in the Z-axis, and continued high through the Y and X axis. The switching pressures returned to normal after overloading the unit to 75 psia. The probable cause of the discrepancy was dirt on the stop surface.

Page 10 of the data sheets indicates that neither switch changed significantly due to vibration up to the point where S/N 35 was found to be electrically shorted. This short was traced to a technician error, resulting from the application of up to 1000 volts D C. to the unit After S/N 35 was repaired, it was rerun, as shown on Page 10a, with satisfactory results.

Pages 11 through 17a contain Life Cycle data. S/N 34 developed a leak in the calibration diaphragm after 1500 cycles had been completed. Testing was completed through the system port. S/N 35 completed the entire Life Cycle test without incident, after the short circuit condition described above had been repaired.

6.0 Phase III (continued)

At the conclusion of the testing program, S/N 34 was machined open. A small crack was found in the center of the calibration diaphragm. Since this crack is in a relatively low stress area, a flaw in the metal appears to be the best explanation, especially in view of the good performance of S/N 35, and the very high burst pressure attained.

Operating time is documented on Page 18. Using a Statham flush diaphragm pressure transducer Model PG203TC-100-350, S/N 1516, it was determined that the shock wave requires approximately 6 milliseconds to travel from the shock tube trigger (start of sweep) to the transducer (response). The pressure switches exhibited an average of 9 milliseconds delay from start of sweep to switching Subtraction of the 6 millisecond shock tube delay gives an average operating time of 3 milliseconds. This number thus includes both the pneumatic delay in the system port and the electrical delay in the switching circuit. The functional tests of Page 19 revealed no anomalies in either unit after the response test

The Burst Pressure Test, pages 20 and 21, was run on a dummy unit which was not operable electrically, but of identical mechanical configuration to the qualification test units Pressure through the system port was increased in 100 psi increments until the calibration diaphragm ruptured at 1000 psig.

Acoustic Test data appears on Page 22. During the eight-minute test, the system ports were pressure cycled from atmospheric to about 30 psig. Pressure was monitored by the same pressure transducer used during vibration testing. Both switch outputs were fed directly into

6.0 Phase III (continued)

3300 cps galvanometers. No chatter or undesired switching occurred during the test Final functional data on Page 23 revealed no changes due to the acoustic environment.

Design changes were incorporated into the drawings to decrease the probability of reoccurence of the "dirt in the stop gap" and "fatigue of the calibration diaphragm" problems

These changes were

1 The thickness of the sensing beam was increased in order to reduce the stress at the switch point pressure. This permits increasing the gap between the overload stop and the diaphragm, while still limiting the overpressure stress level to the required value

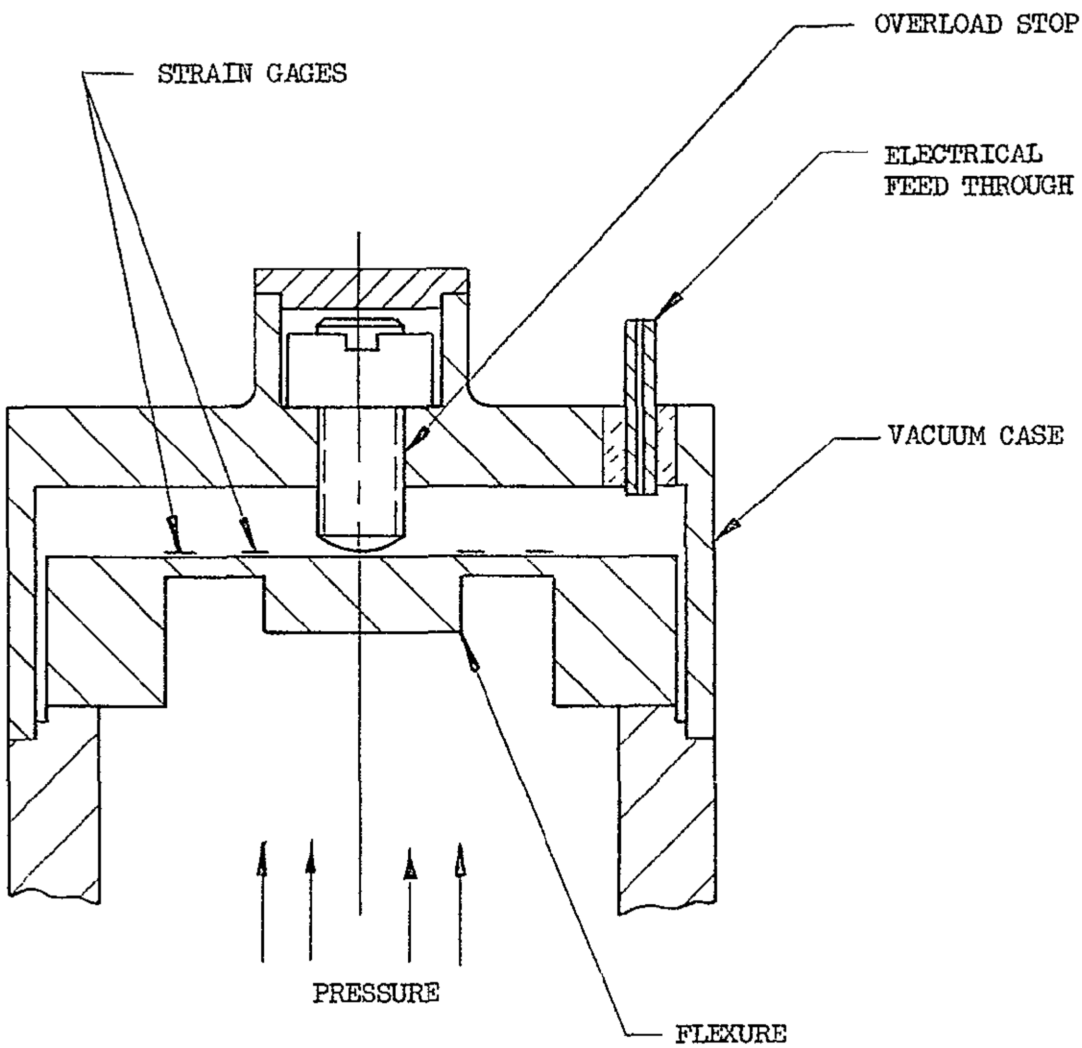
2 Three flushing holes were added to the frame This permits a thorough flushing of the "stop gap" just prior to welding the vacuum case.

3. The thickness of the sensing diaphragm was increased The method of attachment to the force collector was changed from spot welding to electron beam welding. This results in a lower and more even stress distribution.

A complete drawing package, including these design changes, along with the Preflight Certification Test Report, were submitted for approval.

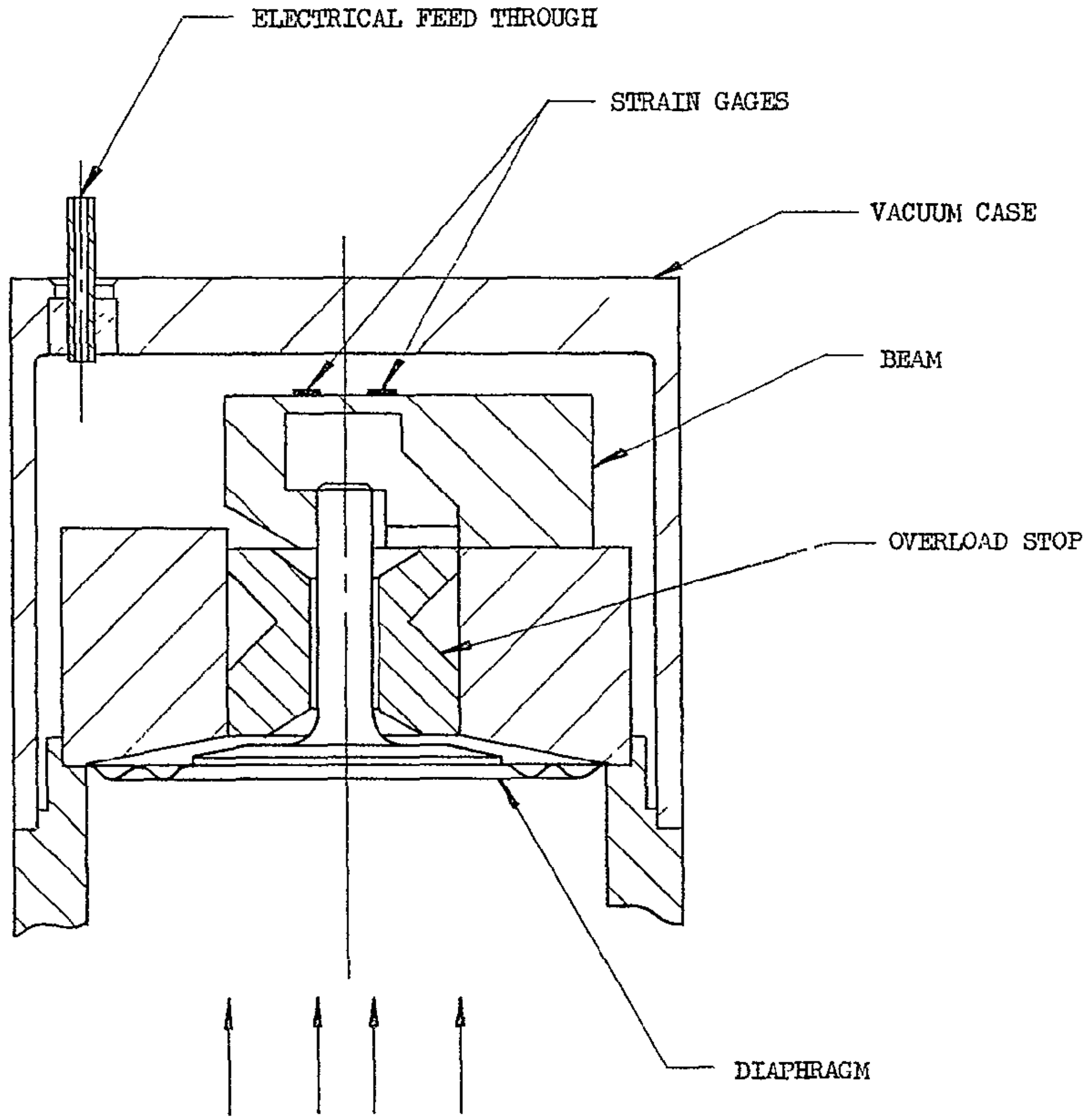
7.0 Phase IV

Model SP111 pressure switches SN 51 and 54 were fabricated in accordance with the approved design drawings of Phase III and tested in accordance with the approved Acceptance Test Procedure. These pressure switches satisfactorily met all requirements of the Acceptance Test Procedure and were delivered to NASA/MSFC. The test results are included as Appendix B.



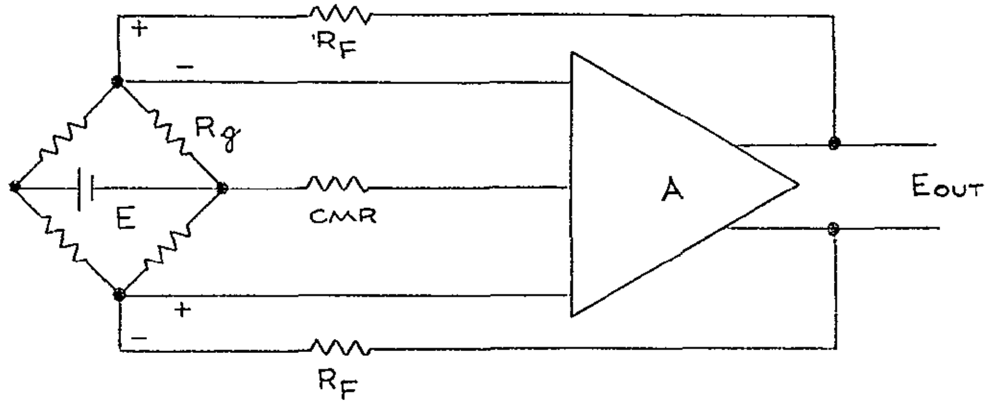
FLEXURE TYPE TRANSDUCER

FIGURE 1

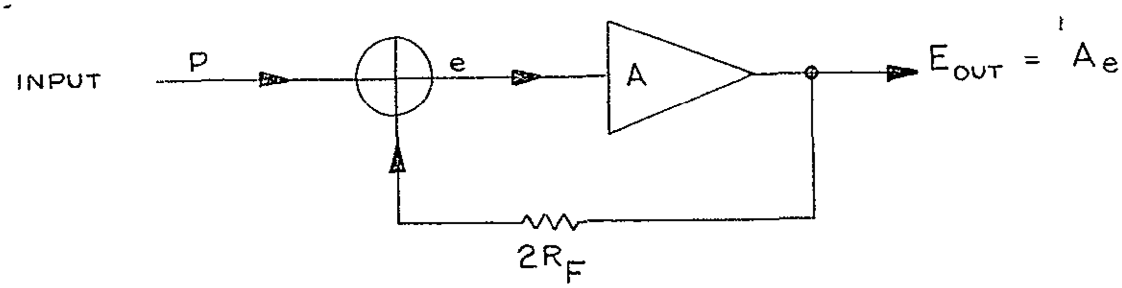


BEAM DIAPHRAGM TYPE TRANSDUCER

FIGURE 2

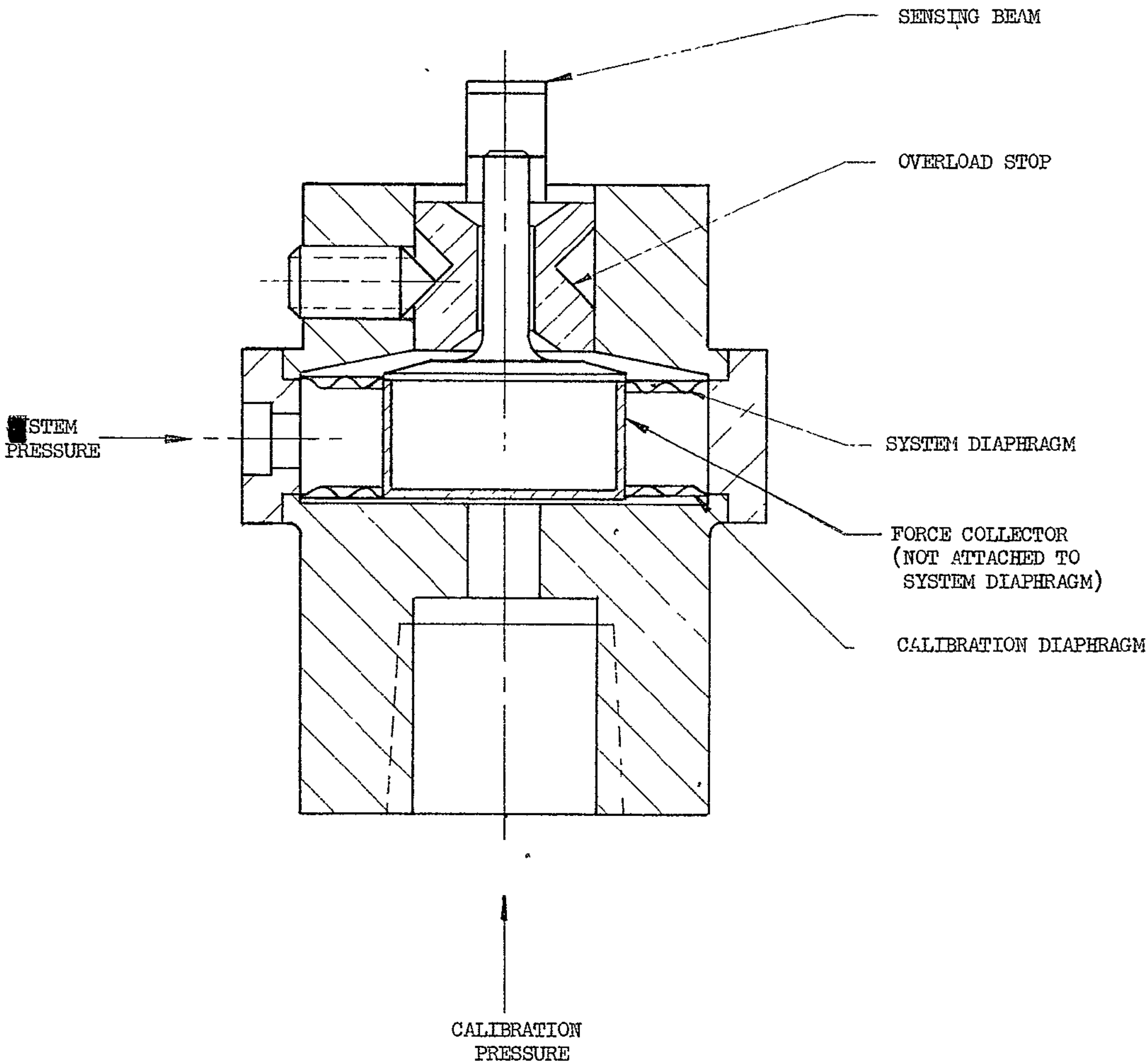


(a) FUNCTIONAL SCHEMATIC



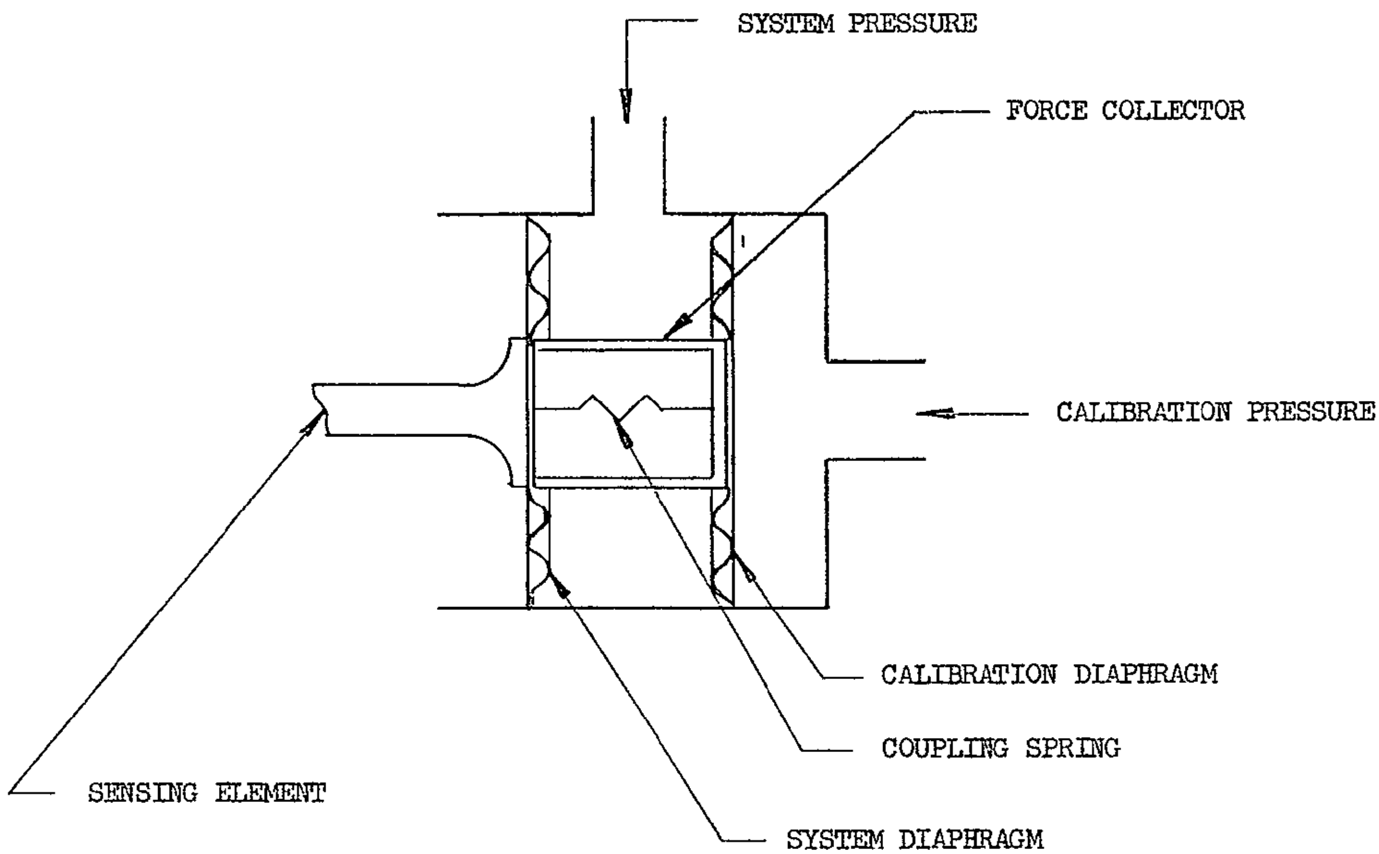
(b) SERVO EQUIVALENT

FIGURE 3. AMPLIBRIDE AMPLIFIER



DOUBLE DIAPHRAGM PRESSURE PORT

FIGURE 4



CALIBRATION DIAPHRAGM STIFFNESS COMPENSATION

FIGURE 5

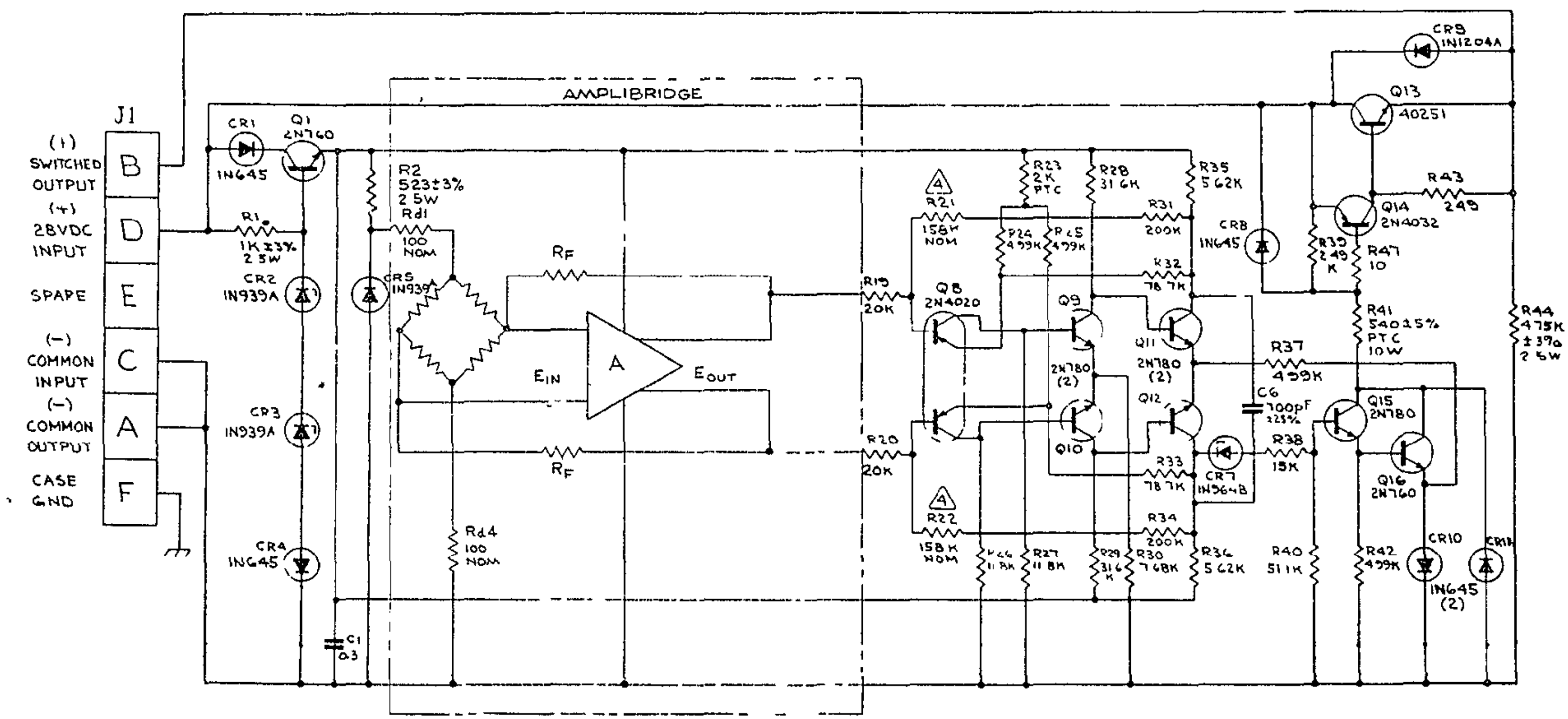


FIGURE 6 ELECTRONIC CIRCUIT SCHEMATIC

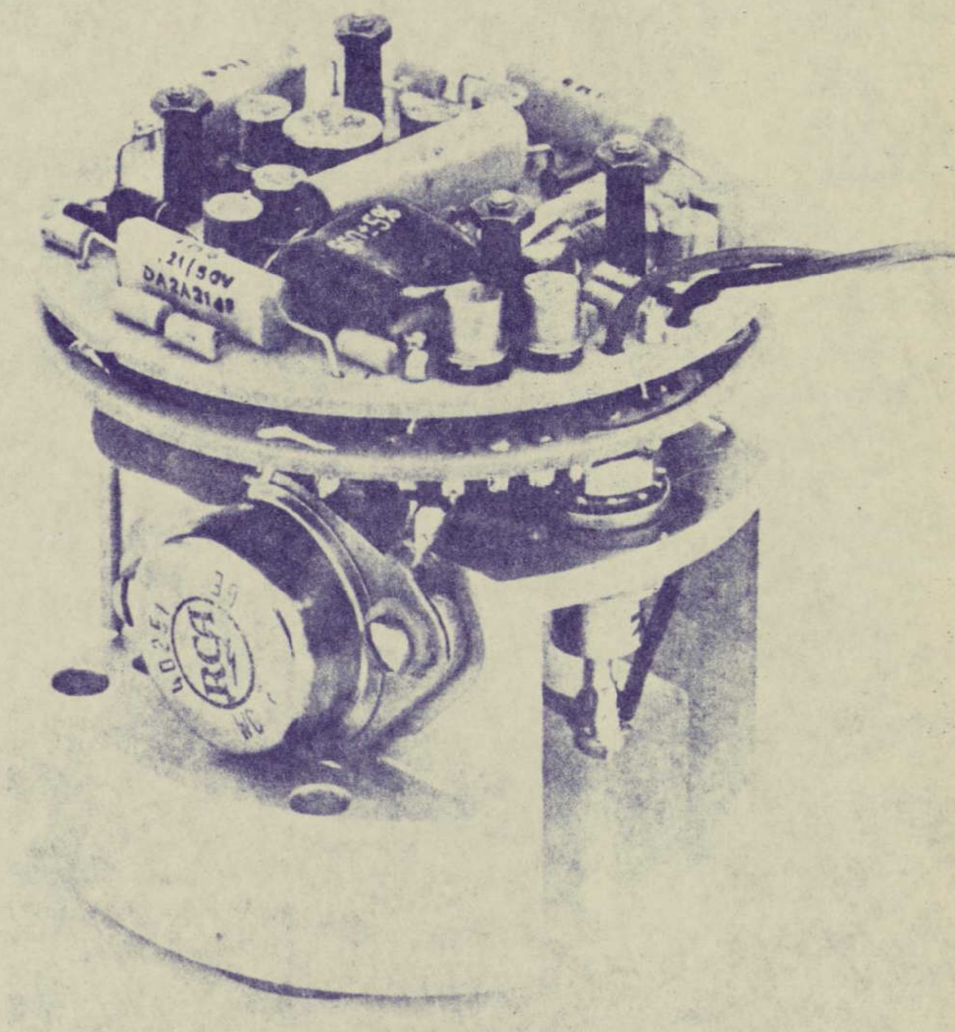


FIGURE 7

ELECTRONIC CIRCUIT, SP111 PRESSURE SWITCH
STATHAM INSTRUMENTS, INC.

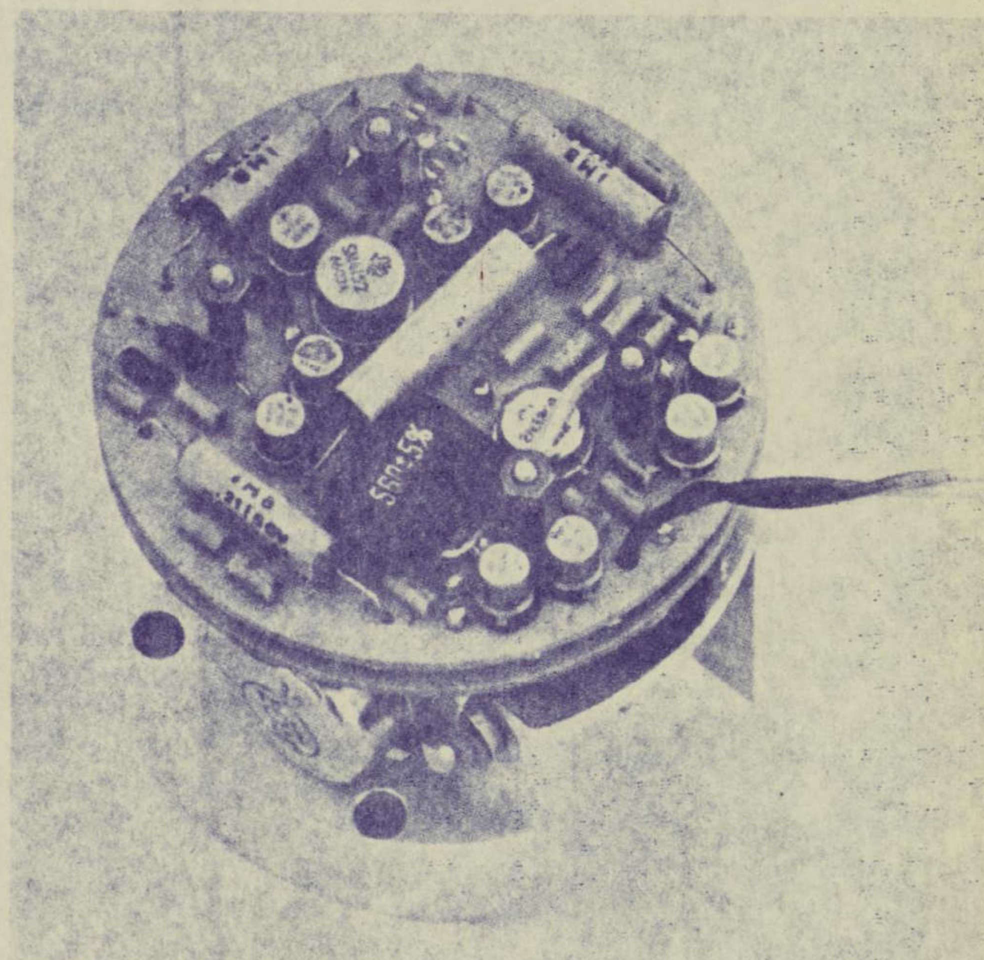


FIG. 8

ELECTRONIC CIRCUIT, SP111 PRESSURE SWITCH
STATHAM INSTRUMENTS, INC.

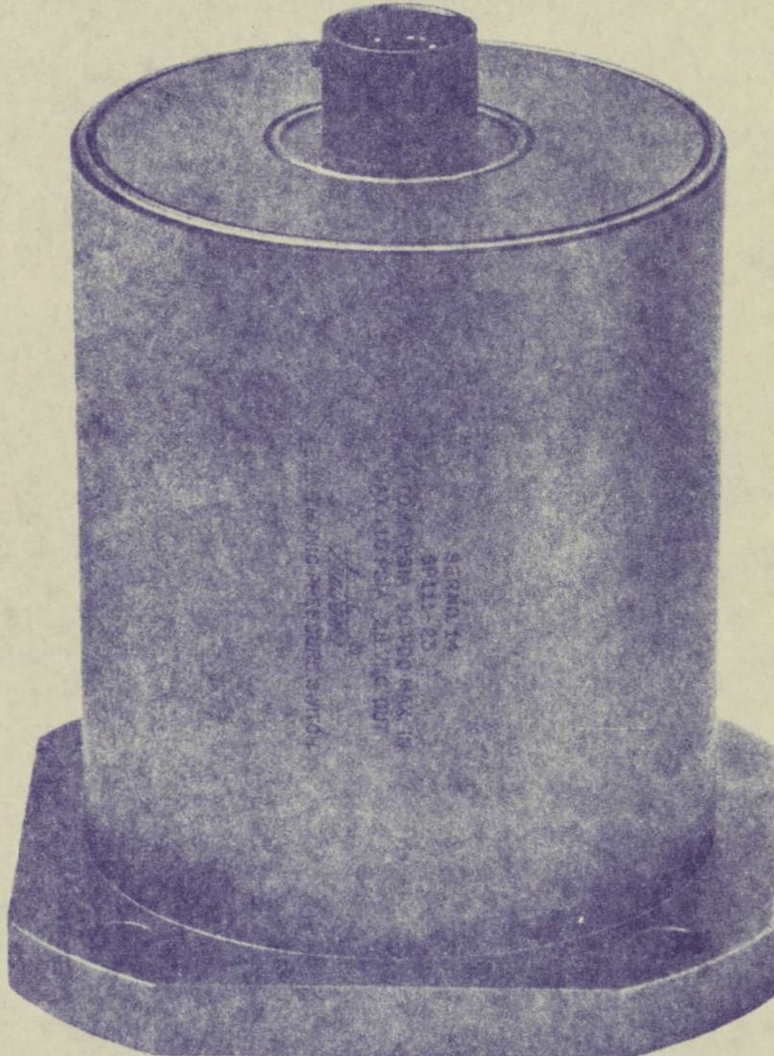


FIG. 9
SP111 ELECTRONIC PRESSURE SWITCH
STATHAM INSTRUMENTS, INC.

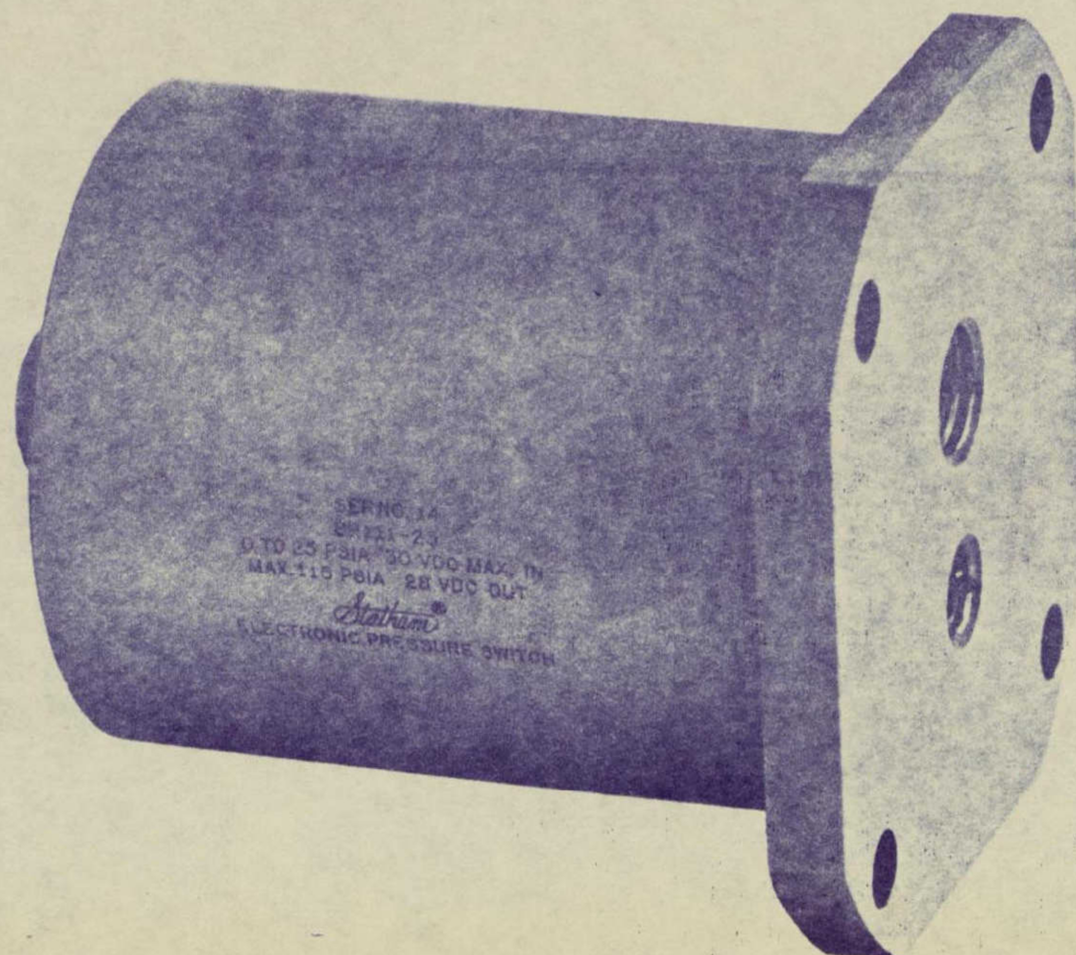


FIG. 10
SP111 ELECTRONIC PRESSURE SWITCH
STATHAM INSTRUMENTS, INC.

APPENDIX I

Preflight Certification Test Report

STATHAM INSTRUMENTS, INC.
12401 West Olympic Boulevard
Los Angeles, California 90064

PREFLIGHT CERTIFICATION TEST PROCEDURE FOR STATHAM MODEL SP111 CALIBRATABLE PRESSURE SWITCH IN ACCORDANCE WITH GEORGE C. MARSHALL SPACE FLIGHT CENTER SPECIFICATION 20M42121

PREPARED BY: A. Forzgerath — 11-22-66 Date

APPROVED BY: P. R. Ernie — 11-22-66 Date

APPROVED BY: L. A. Rozunko — 11-23-66 Date

APPROVED BY: G. M. Foza — 11-22-66 Date

CHANGE SHEET NO. 1

REVISION	DATE	PARAGRAPHS	CHANGES
A	12/15/66	4.2.1.2	Add Voltage Regulation Test.
A	12/15/66	4.3.3.3	Add Voltage Regulation Test.
B	2/27/67	4.2.3	Change insulation test voltage from 250 to 50 VDC.

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 This document contains the preflight certification test procedure for Statham Instruments, Inc., Calibratable Pressure Switch, Model SP111, referred to herein as the unit.

1.2 Data sheets, on which information gathered during these tests is to be recorded, are provided as part of this document.

2.0 SPECIFICATION REFERENCES

2.1 The following documents are referred to in this procedure. When requirements in such referenced documents are in conflict with the requirements of this test procedure, this procedure shall take precedence.

1. George C Marshall Space Flight Center. Specification 20M42121, Revision B, dated 9/13/66.
2. Statham Instruments, Inc. Outline Drawing No. 50494, no revision, dated 5/27/66.

3.0 GENERAL REQUIREMENTS

Unless otherwise specified in the body of this procedure the following general requirements shall apply to all qualification tests.

3.1 Witnesses

Any authorized representative of George C. Marshall Space Flight Center may witness any or all certification tests conducted by Statham Instruments, Inc. or any subcontractor. The Contracting Officer will be notified at least 48 hours before

3.1 Witnesses (Continued)

commencement of the certification test program or any change in scheduling.

3.2 Test Sequence

All tests shall be performed in the order presented. If any deviations from this sequence become necessary for scheduling or other reasons, such changes shall be approved by the Statham Program Manager and the Quality Control Director.

3.3 Test Conditions

3.3.1 Unless otherwise specified, all tests shall be performed at the following room ambient conditions

a) Temperature. 77 ± 18°F

b) Relative Humidity. 90% or less

c) Barometric Pressure: Local standard

3.3.2 Unless otherwise specified in the body of this procedure, the calibration port shall be open to the atmosphere during all testing through the system port, and the system port shall be open to the atmosphere during all testing through the calibration port.

3.4 Environmental Tolerances

a) Vibration amplitude: ± 3 db

b) Vibration frequency ± 5%

c) Humidity: + 5, - 0%

d) Temperature ± 3.6°F

3.5 Test Equipment Accuracy

Equipment used to measure test parameters shall have an accuracy of ± 10% or better of the test parameter.

3.6 Test Equipment

Equipment	Manufacturer and Model	Rated Accuracy
Digital Voltmeter	Cimron Corp. 6200A	±0 01% of reading
Power Supply	Trygon HR40-5B	-----------
Oscilloscope	Hewlitt Packard Co 130	± 5%
Humidity Chamber	Bemco W	± 2°F
Temperature Test Chamber	Statham Instruments, Inc. S D-6	Control Accuracy ± 0.25°
DC Voltmeter	Simpson 262	± 5%
Vibration Exciter	Ling B-300	-----------
Random Control	Ling ASDE 80	-----------
Accelerometer	Endevco 2213	± 2%
Vibration Fixture	Statham Instruments, Inc. T - 37246	N.A
Thermocouple Readout	Rubicon 2702	± 0.5% of reading
Megohmmeter	General Radio Co 1862-B	± 5% of reading
Acoustic Chamber Recorder	Northrop Norair	± 3 db
Pressure Gauge	Wallace & Tierman 30 psi and 147 psi	0 1% F S.
Helium Leak Detector	VEECO MS-9	Sensitivity 2X10-9 cc He/min

3.6 Test Equipment (Continued)

Test equipment is subject to change depending on equipment availability, certifications, and availability of equivalent or higher accuracy test equipment. Equipment calibration periods shall be as detailed in Statham Instruments, Inc., Quality Control Order 002.

4.0 TEST PROCEDURES

4.1 Pre-Test Examination

4.1.1 Check the exterior dimensions of the Pressure Switch per Statham Drawing No. 50494 and record any deviations on the data sheets.

4.1.2 Weigh each Pressure Switch and record the value on the data sheets.

4.2 Functional Test

4.2.1 Pressure Settings

1. Complete the test setup shown in Figure 1.
2. Activate and deactivate the switch four times by pressurizing the calibration port. Record the actuation and deactuation pressures each time. The third and fourth cycles shall be performed with input voltages of 24 and 30 VDC, respectively.
3. Pressurize the system port three times. Record the actuation and deactuation pressures each time.

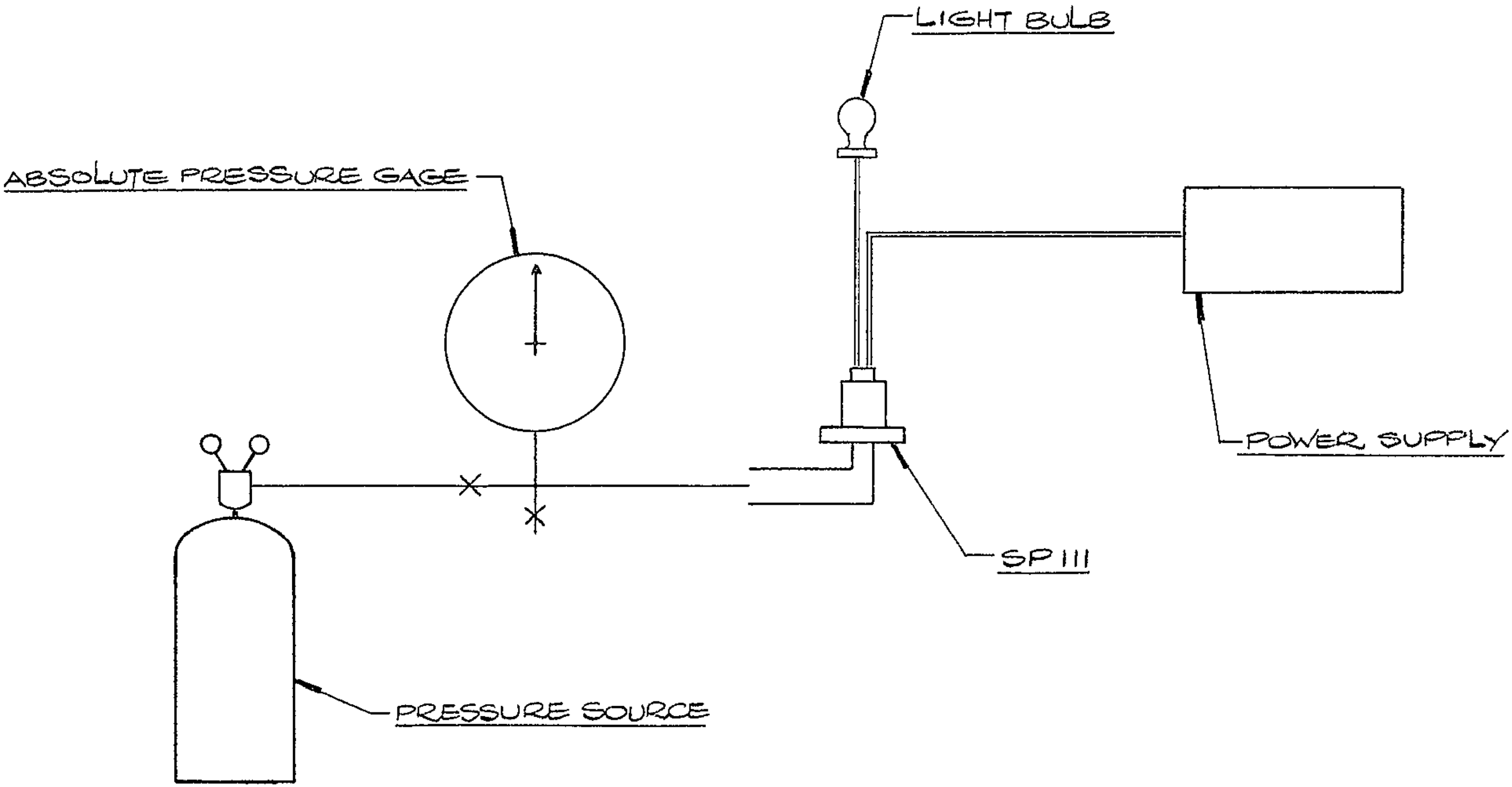


FIGURE 1

TEST SET UP FOR PRESSURE SETTINGS

4.2.2 Leakage Test

1. Complete the test setup shown in Figure 2.

2. Pressurize each port separately to 75 psia with helium.

3. Record any leakage observed.

4.2.3 Insulation Resistance

1. Using a Megohmmeter, measure the insulation resistance between each pin of Connector J, and the case at 50 VDC (except pin F). Record the lowest value obtained on the data sheets.

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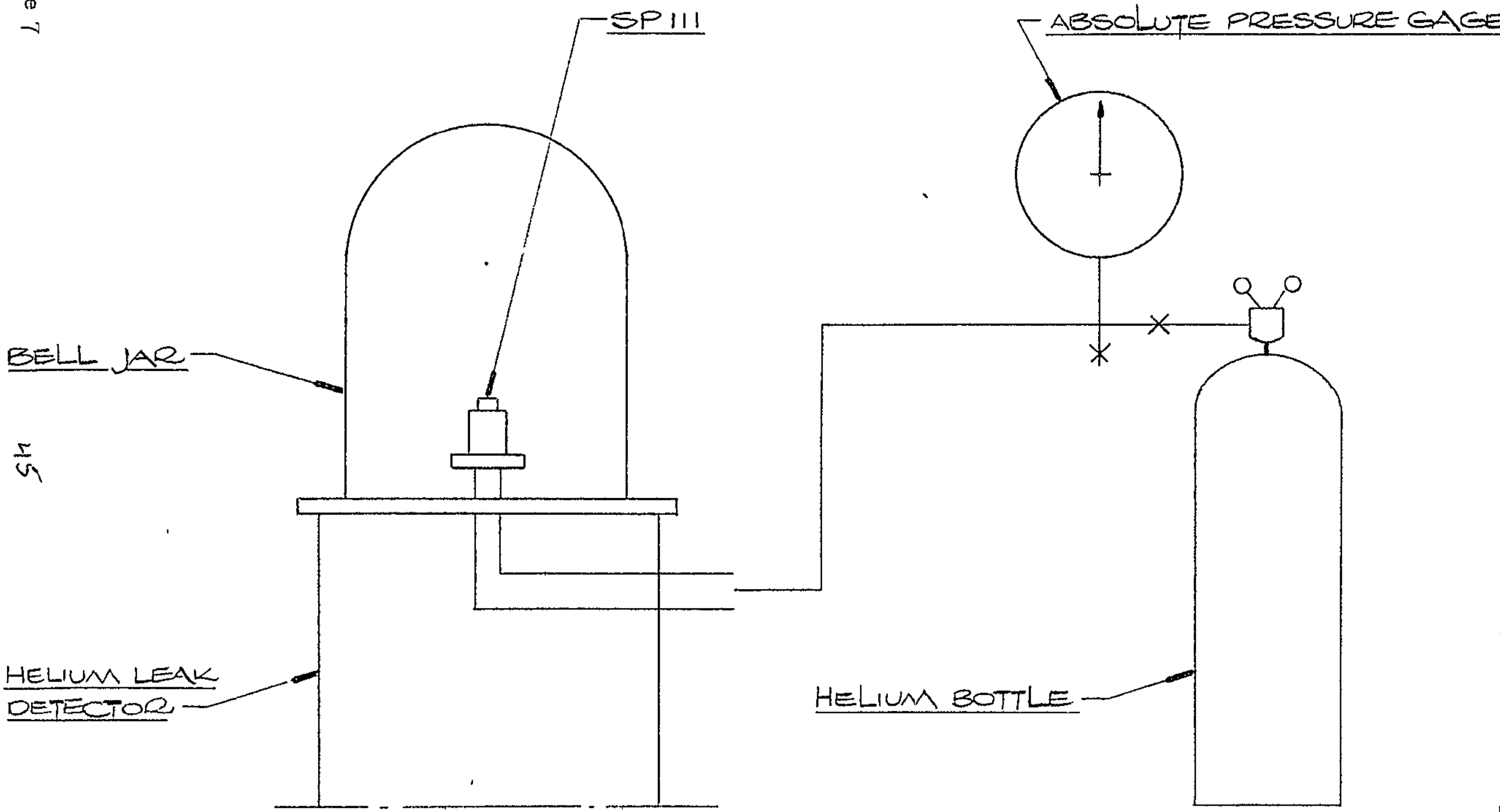

FIGURE 2

TEST SETUP FOR LEAKAGE TEST

4.2.4 Output Voltage

1. Complete the test setup shown in Figure 3.

2. Set the input voltage at 28.00 VDC.

3. Record the output voltage between pins A and B of Connector J_1, in both the actuated and the deactuated mode.

4.2.5 Operating Pressure

1. Pressurize the system port to 75 psia and hold for approximately 5 minutes.

2. Reduce the pressure to atmospheric, then determine and record actuation and deactuation pressures by pressurizing and depressurizing three times.

3. Repeat steps 1 and 2 by pressurizing the calibration port.

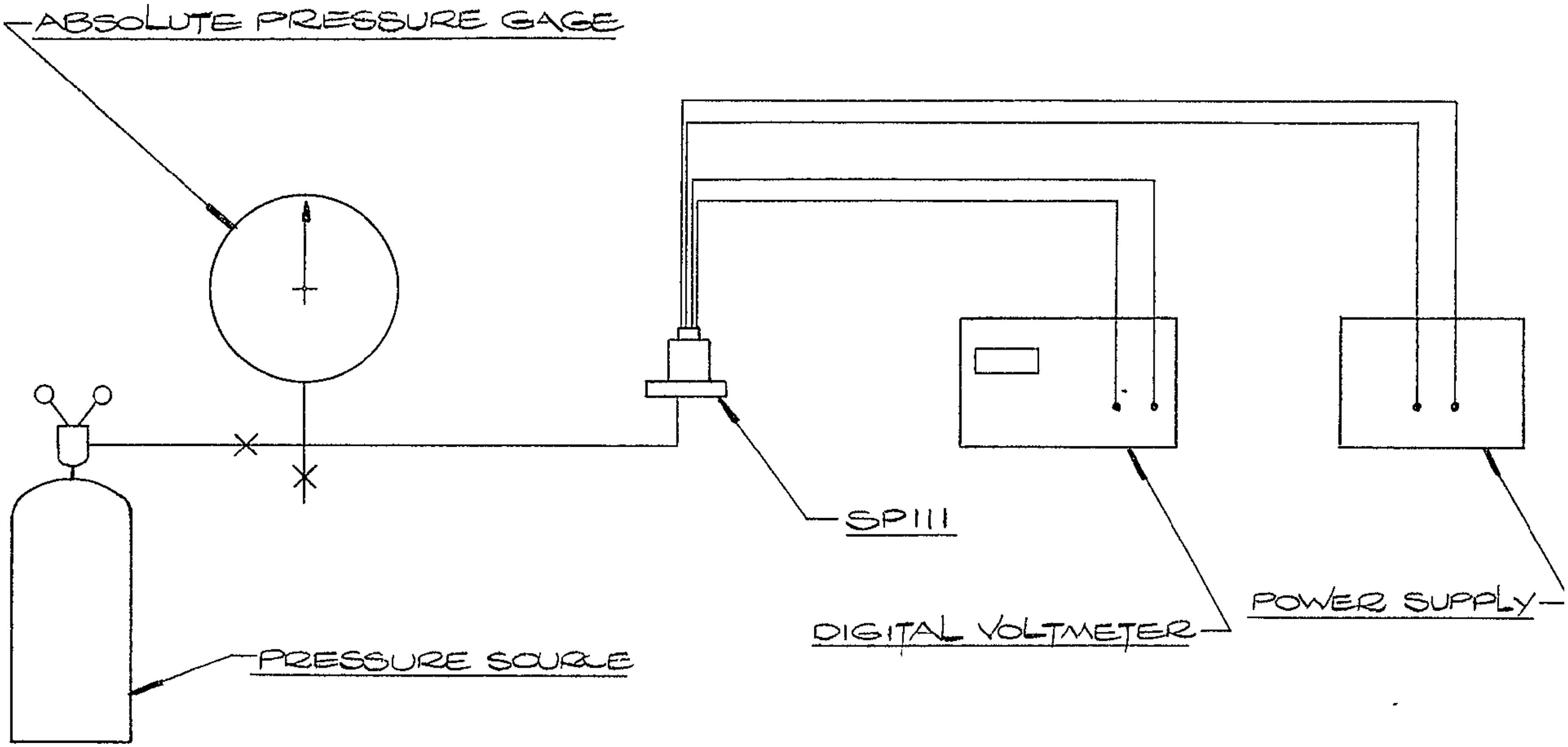

FIGURE 3

TEST SET UP FOR OUTPUT VOLTAGE TEST

4.3 Performance and Environmental Tests

4.3.1 Altitude

1. Complete the test setup of Figure 4.
2. When the pressure in the chamber has dropped below 0.5 psia, pressurize the switch three times through the system port. Record the actuation and deactuation pressures each time.
3. After 30 minutes minimum in the vacuum chamber, again pressurize the system port three times and record actuation and deactuation pressures.

4.3.2 Post-Altitude Functional Test

1 Repeat the tests of Paragraphs 4.2.1 through 4.2 4 and record the results on the data sheet

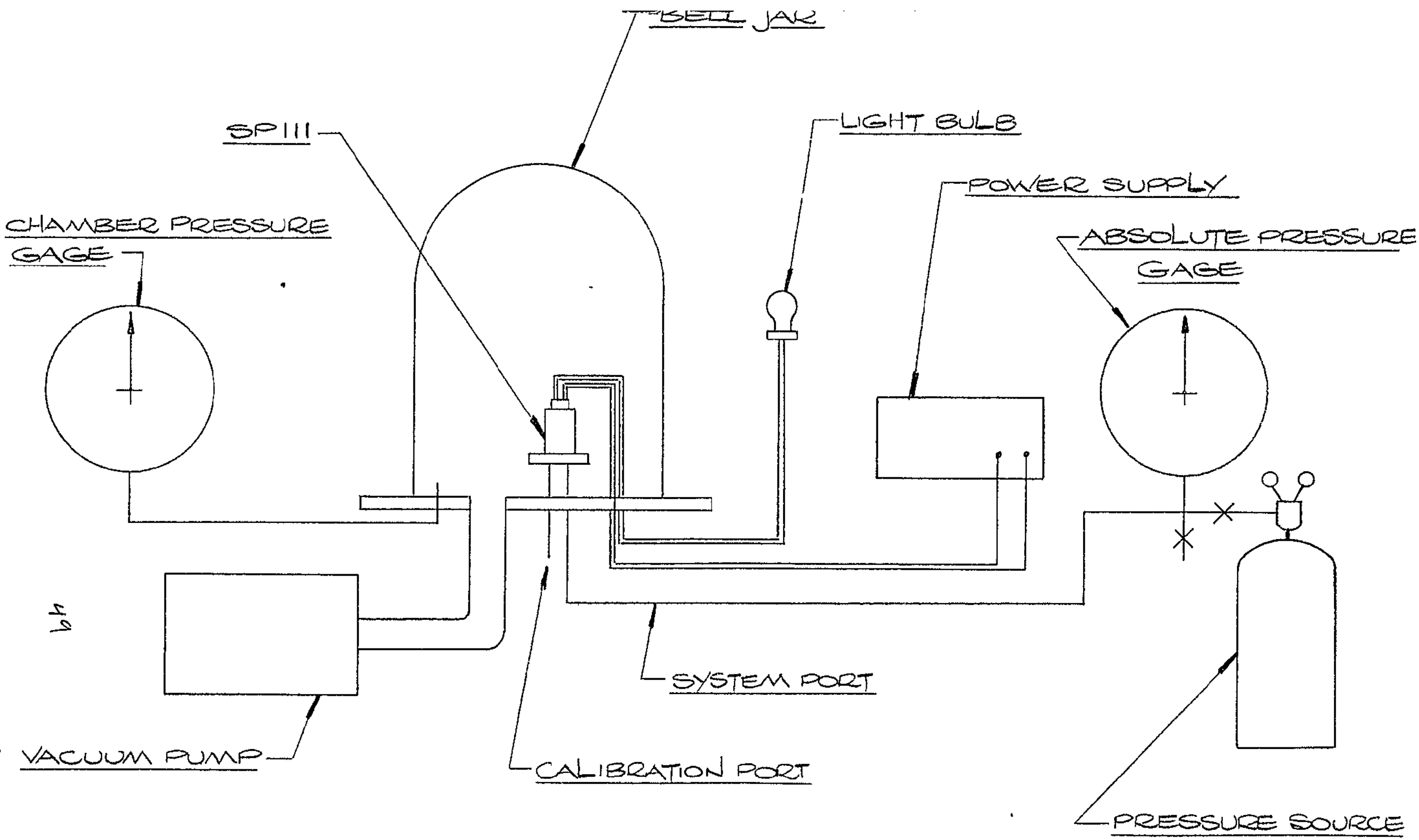

FIGURE 4

TEST SET UP FOR ALTITUDE TEST

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4.3.3 Temperature

1. Complete the test setup shown in Figure 5.
2. Set the input voltage to 28.00 VDC.
3. Measure actuation and deactuation pressures three times each through the system port and through the calibration port, at the following temperatures, in the order given: + 125°F, - 65°F, - 25°F, 0°F, + 30°F, + 125°F, -150°F, - 100°F, - 65°F, and 0°F. The switch is to be stablized a minimum of 30 minutes at each temperature. The second and third cycles shall be performed with input voltages of 24 and 30 VDC, respectively.
4. At each of the above temperatures, measure and record the switch output voltage in the actuated and in the deactuated mode.

4.3.4 Post-Temperature Functional Test

1. Repeat the tests of Paragraphs 4.2.1 through 4.2 4 and record the results on the data sheet.

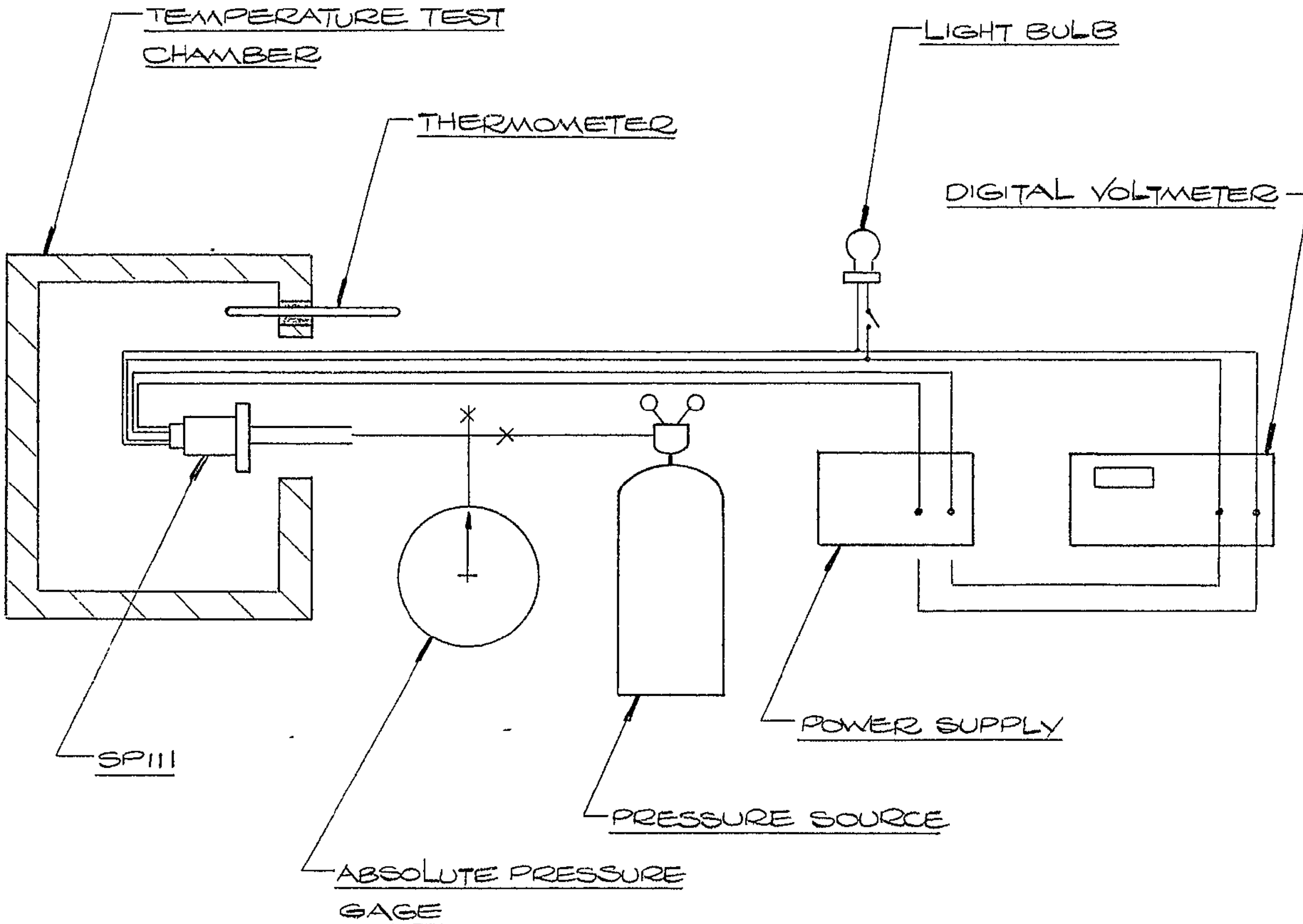

FIGURE 5

TEST SETUP FOR TEMPERATURE TEST

4.3.5 Sinusoidal Sweep Test

1. Complete the test setup shown in Figure 6, with the unit mounted in the Z-axis. (Ref. Figure 11 for definition of axes.)

2. Vibration levels shall be as follows

5 to 44 Hz.	0.3 in. D.A.
44 to 120 Hz.	30g peak
120 to 150 Hz	0 04 in. D.A.
150 to 2000 Hz.	45g peak

3. Pressurize and depressurize the system port three times to establish pre-vibration actuation and deactuation pressures. Record these settings if they differ appreciably from those obtained in Para 4.3.4 above

4. Perform one logarithmic sweep from 5 to 2000 Hz. at approximately one octave per minute During this sweep, pressurize and depressurize the system port from approximately 20 to approximately 30 psia at 25 ± 5 cycles per minute. Record pressure and switching action continuously

5. Pressurize the system port to the actuation pressure established in step 3, minus 0 30 psi, then sweep from 2000 to 5 Hz at approximately one octave per minute.

6. With the system port still pressurized to 0.30 psi below actuation pressure, check for chatter by sweeping slowly from 5 to 2000 to 5 Hz. Record any frequencies at which chatter or actuation occurs.

4.3.5 Sinusoidal Sweep Test (Continued)

7 If chatter or actuation occurs, repeat the sweep with the system port pressurized to 0.50 psi below actuation pressure, drop to 0.70 psi below actuation pressure if chatter or actuation still occurs.

8. If no chatter or actuation occurred during step 6, repeat the sweep with the system port pressurized to 0.20 psi below actuation pressure, raise to 0.10 psi below actuation pressure if no chatter or actuation occurred at 0.20 psi.

9. Pressurize the system port to 75 psia, then drop to the pre-vibration deactuation pressure plus 0.30 psi. Sweep slowly from 5 to 2000 to 5 Hz. Record any frequencies at which chatter or deactuation occurs.

10. If chatter or deactuation occurs, repeat the sweep with the system port pressurized to 0.50 psi above deactuation pressure, raise to 0.70 psi above deactuation pressure if chatter or deactuation still occurs.

11. If no chatter or deactuation occurred during step 9, repeat the sweep with the system port pressurized to 0.20 psi above deactuation pressure, drop to 0 10 psi above deactuation pressure if no chatter or deactuation occurred at 0.20 psi.

12. Repeat steps 1 through 11 with the unit mounted in the Y-axis.

13. Repeat steps 1 through 11 with the unit mounted in the X-axis.

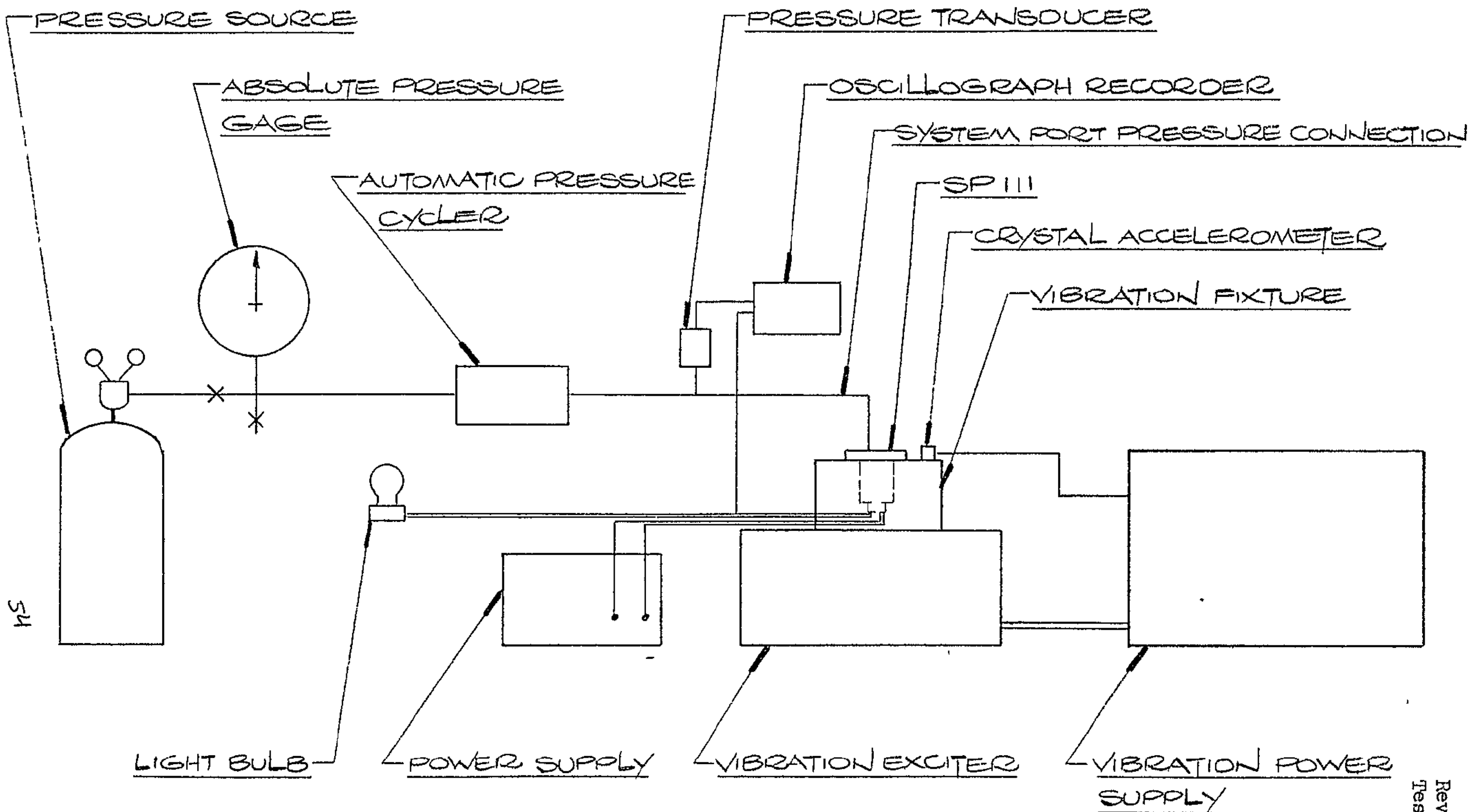

FIGURE 6

TEST SETUP FOR SINUSOIDAL VIBRATION

4.3.6 Random Vibration

1. Complete the test setup shown in Figure 7.
2. Vibration levels shall be as follows

20 to 50 Hz	0.12 g^2 per cps
50 to 160 Hz.	+ 9 db per octave
160 to 630 Hz.	3.2 g^2 per cps
630 to 2000 Hz.	- 9 db per octave

3. With the unit mounted in the Z-axis (Ref. Figure 11 for definition of axes), apply the input levels of step 2 for 5 minutes. Verify equalization by x-y plot. Manually pressurize and depressurize the system port at approximately one cycle per minute, and record at least 5 each actuation and deactuation pressures on the data sheet.
4. Repeat step 3 with the unit mounted in the y-axis
5. Repeat step 3 with the unit mounted in the x-axis

4.3.7 Post-Vibration Functional Test

1. Repeat the tests of Paragraphs 4 2.1 through 4.2.5 and record the results on the data sheets.

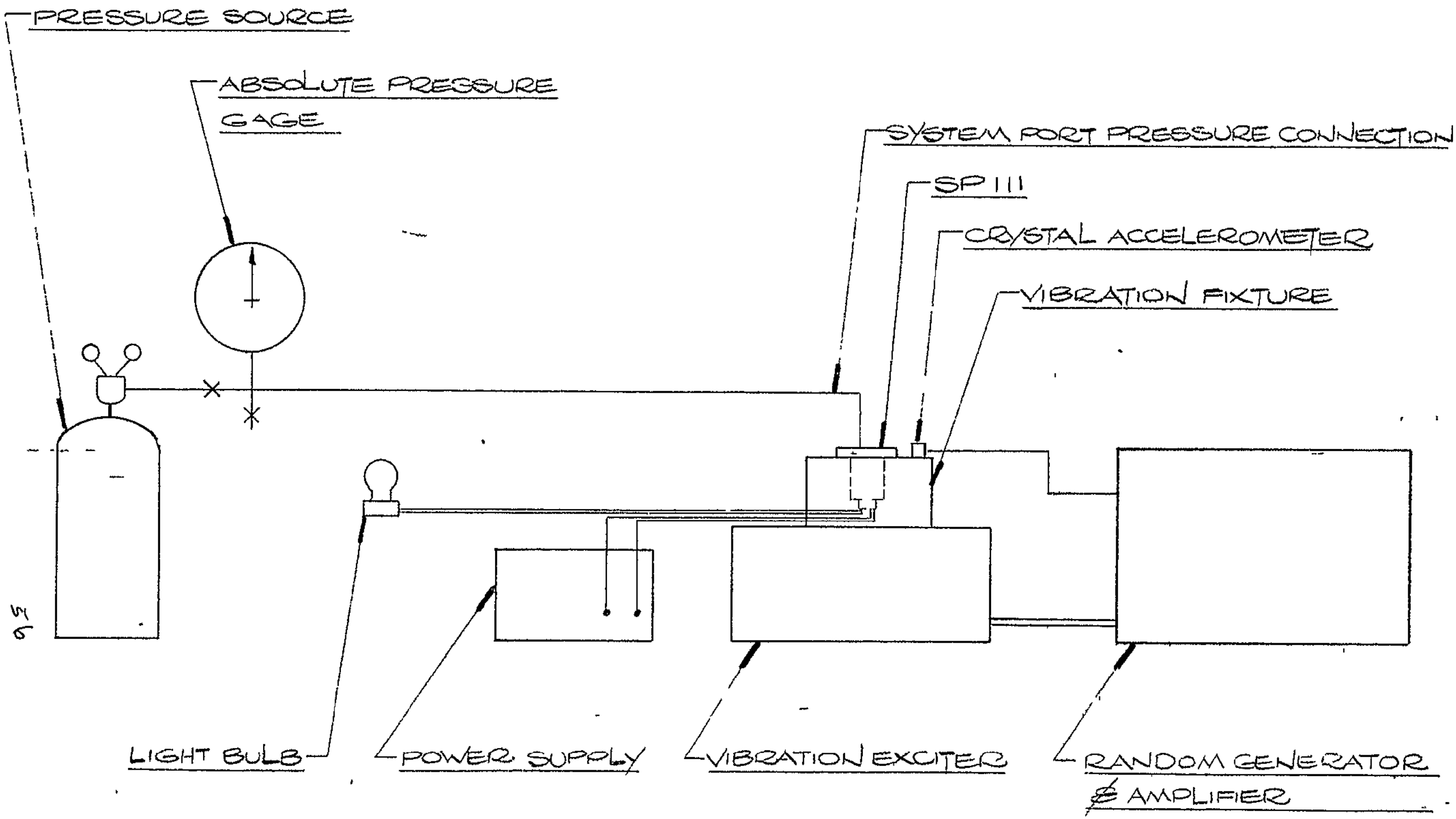

FIGURE 7

TEST SETUP FOR RANDOM VIBRATION

4.3.8 Life Cycle

1. Complete the test setup shown in Figure 8.
2. Adjust the load resistor so that 3.0 + 0.5 amps flow through the switch when actuated.
3. Adjust the cycler to provide 0 to 60 psig at 15 ± 5 cycles per minute.
4. Perform 500 pressure cycles through the calibration port.
5. Repeat the tests of Paragraphs 4.2.1 through 4.2.4 and record the results on the data sheets.
6. Perform another 500 pressure cycles through the calibration port (1000 total).
7. Repeat the tests of Paragraphs 4.2.1 through 4.2.4 and record the results on the data sheets.
8. Perform 500 pressure cycles through the system port.
9. Repeat the tests of Paragraphs 4.2.1 through 4.2.4 and record the results on the data sheets.
10. Perform another 500 pressure cycles through the system port (1000 total).
11. Repeat the tests of Paragraphs 4.2.1 through 4.2.4 and record the results on the data sheets
12. Perform another 500 pressure cycles through the system port (1500 total).
13 Repeat the tests of Paragraphs 4.2.1 through 4.2.4 and record the results on the data sheets.

4.3.8 Life Cycle (Continued)

14. Perform another 500 pressure cycles through the system port (2000 total).

15. Repeat the tests of Paragraphs 4.2.1 through 4.2.4 and record the results on the data sheets.

16. Perform another 500 pressure cycles through the system port (2500 total).

17. Repeat the tests of Paragraphs 4.2.1 through 4 2.5 and record the results on the data sheets.

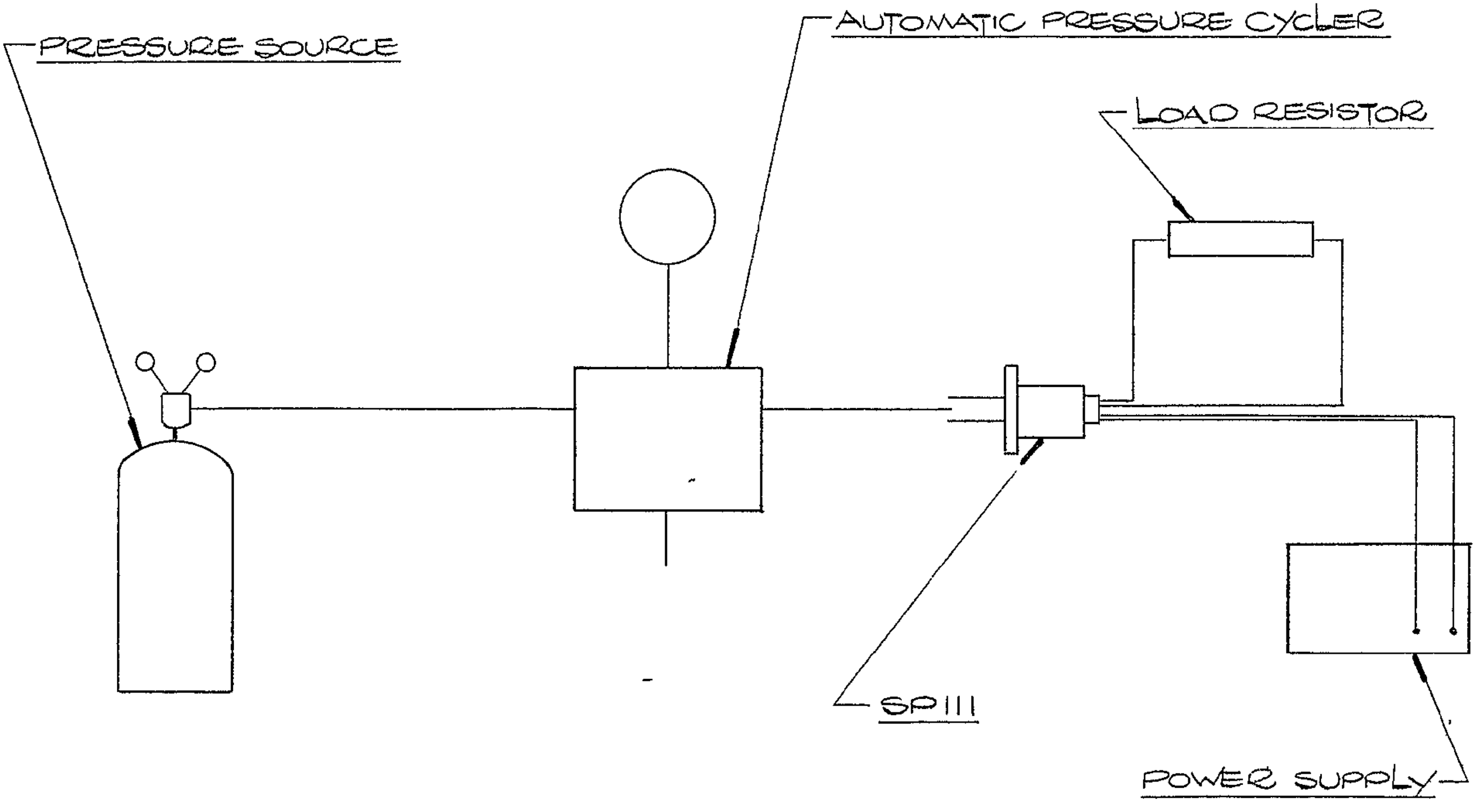

FIGURE 8

TEST SETUP FOR LIFE CYCLE

4.3.9 Operating Time

1. Complete the test setup shown in Figure 9.
2. Apply a step function input from 0 psig to approximately 30 psig to the system port three times. Photograph the switch output trace each time
3. From the photographs, determine the time interval between start of sweep and switching action.
4. From the time value obtained in Step 3 subtract the known time required by the shock wave to travel from the trigger to the switch mounting position. Record the result on the data sheet.

4.3 10 Post-Operating Time Functional Test

1. Repeat the tests of Paragraphs 4.2.1 through 4.2 4 and record the results on the data sheet.

4.3.11 Burst Test

1. The burst test is to be performed on one of the certification units or, preferably, on a unit of identical mechanical configuration
2. If a separate unit is used for this test, perform the Functional Tests of Paragraphs 4.2.1 through 4.2.4 for reference.
3. Apply 190 psia to each port separately for three minutes
4. If rupture has not occurred, repeat the tests of Paragraphs 4.2.1 through 4 2.4
5. Using oil as the pressure medium, pressurize the system port until rupture occurs and record this pressure on the data sheet.

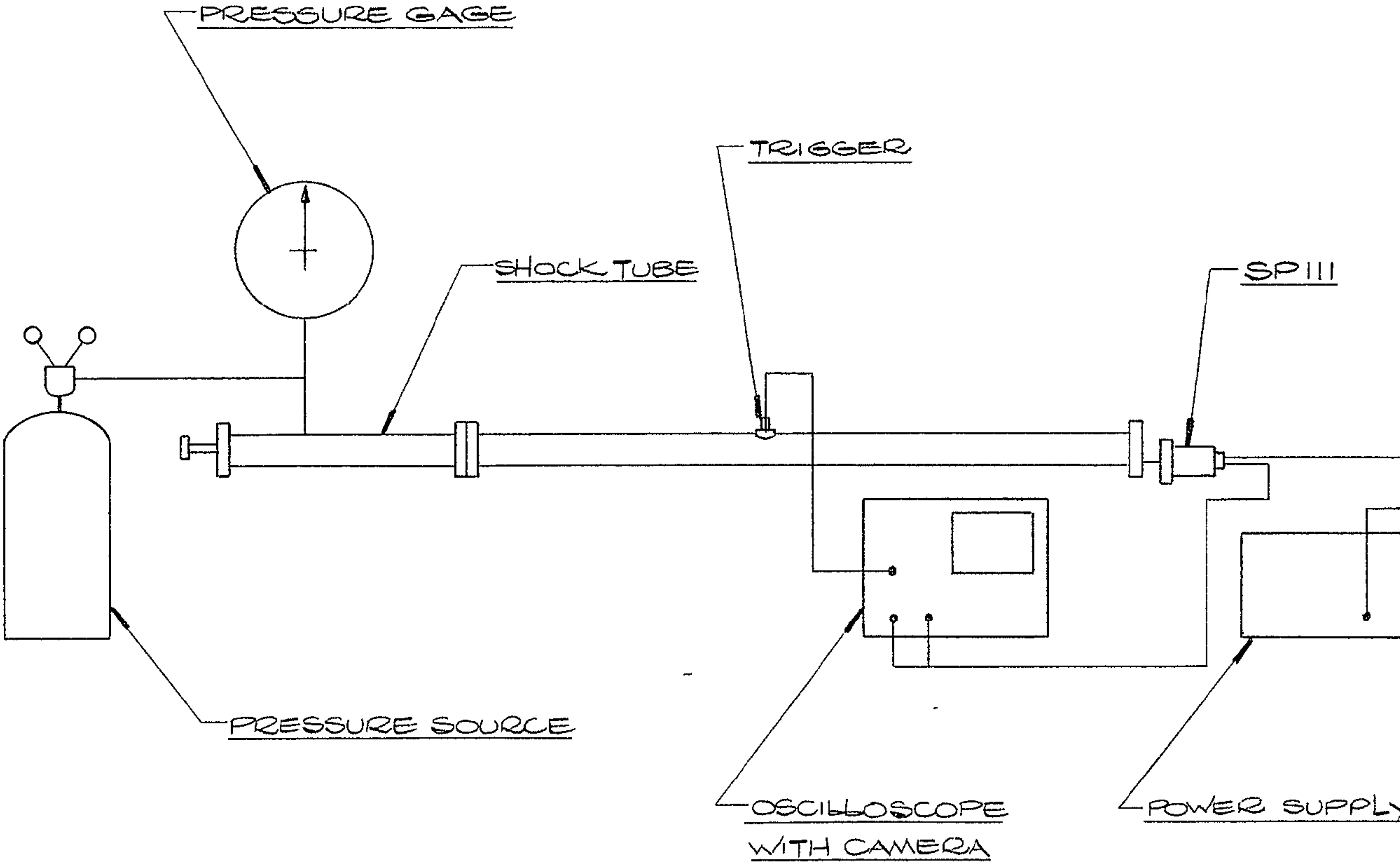

FIGURE 9

TEST SETUP FOR OPERATING TIME TEST

4.3.12 Acoustic Test

1. Complete the test setup shown in Figure 10
2. The acoustic levels are given in Table I.
3. Apply the overall level of Table I, reduced by 6 db, and measure the sound pressure levels at approximately 18 inches around the unit, using microphones. Note maximum and minimum values.
4. Raise the sound pressure level to the value of Table I and maintain for 8 minutes.
5. During the test, cycle the system port from 20 to 30 psig (approximately) at a rate of 5 ± 1 cycle per minute. Record pressure and switch output on the oscillograph.

4.3.13 Final Functional Test

1. Repeat the tests of Paragraphs 4 2.1 through 4 2 4 and record the results on the data sheet.

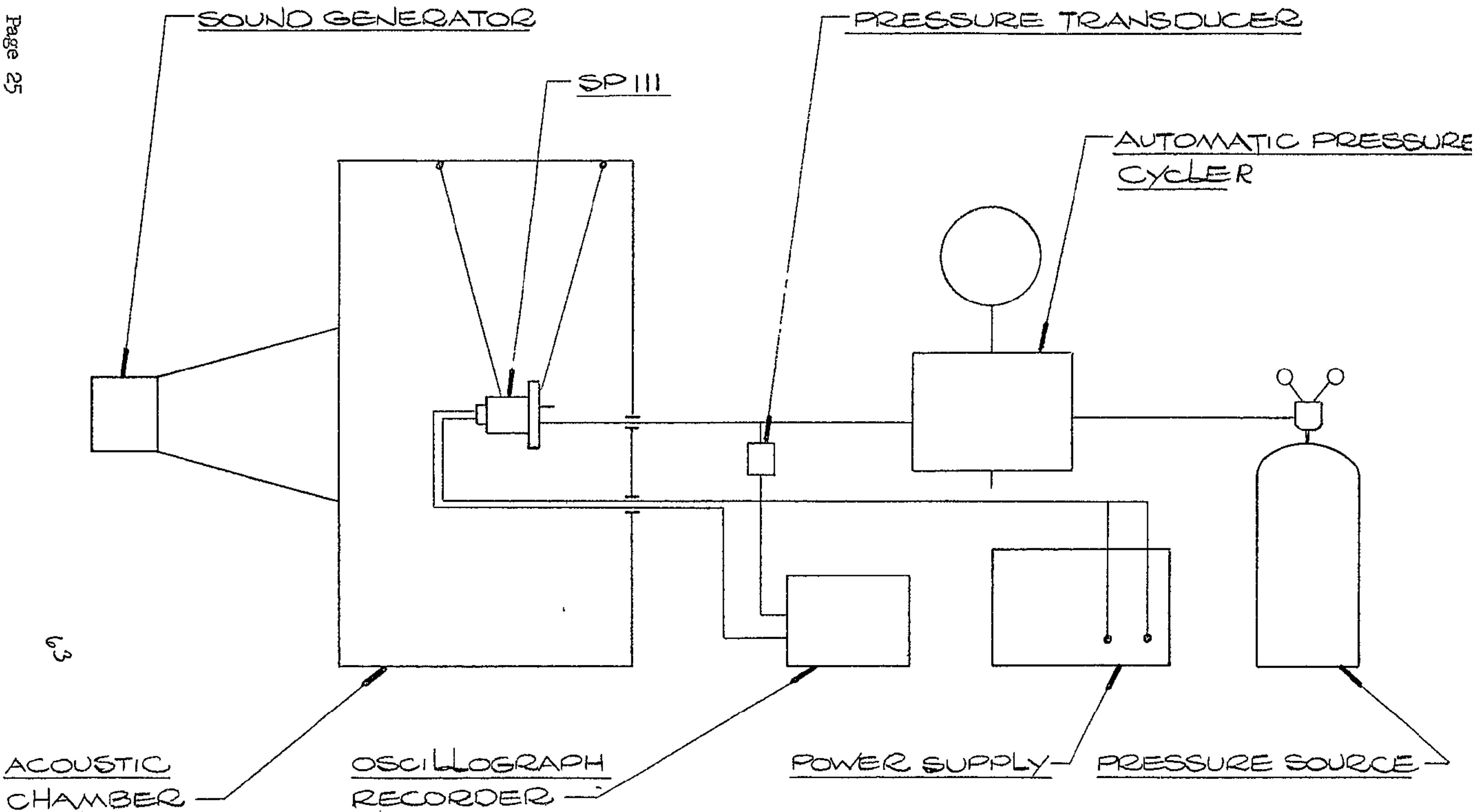

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FIGURE 10

TEST SET UP FOR ACOUSTIC TEST

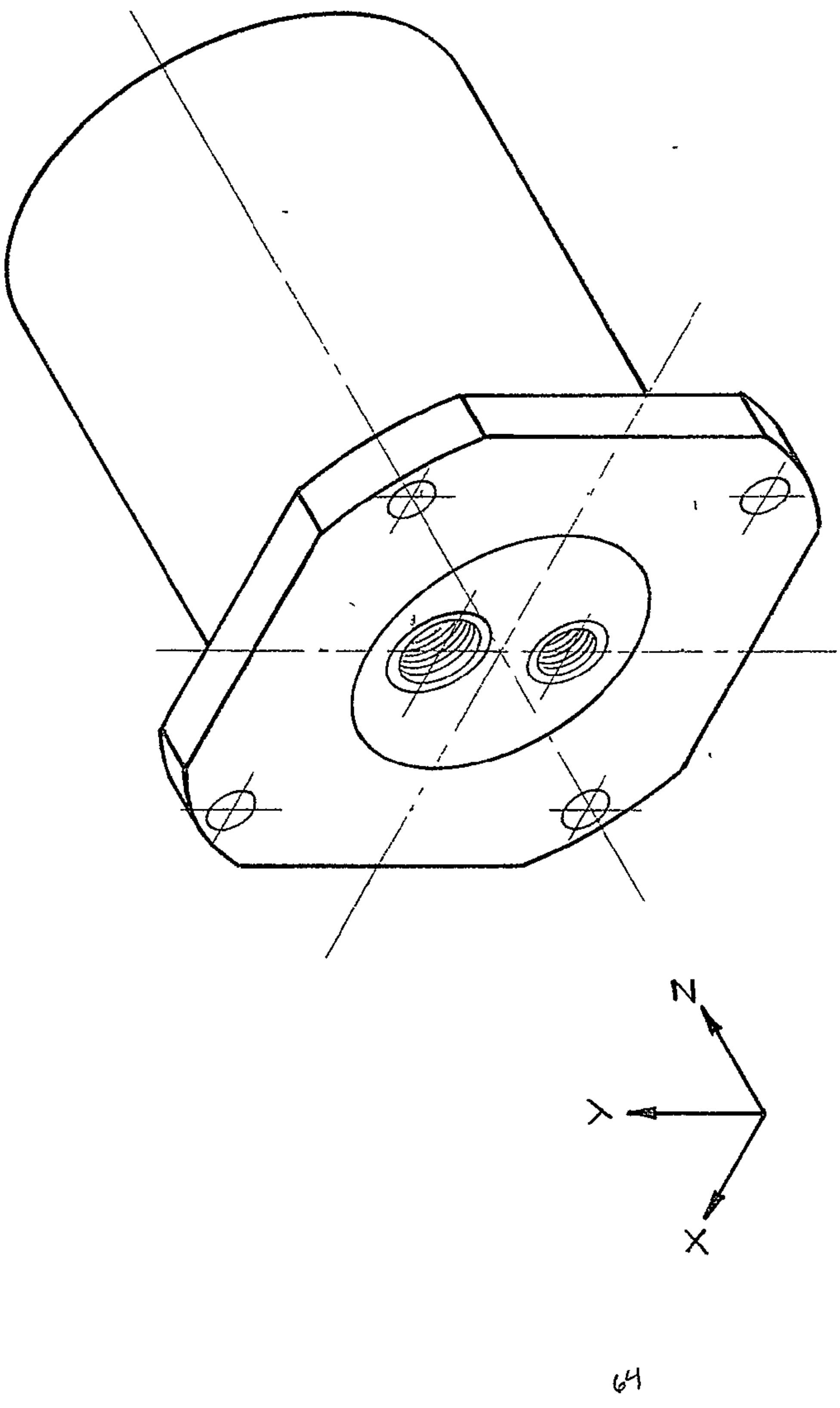

FIGURE 11
DEFINITION OF AXES

TABLE I

ACOUSTICAL LEVELS

One-Third Octave Band Geometric Mean Freq. (CPS)	Sound Pressure Levels (db)
5.0	124 0
6.3	127 0
8.0	130.0
10.0	133.0
12.5	136.0
16.0	138 5
20.0	141.0
25.0	142.5
31.5	146.0
40.0	147.5
50.0	148.5
63.0	149.0
80.0	149.0
100.0	148.5
125.0	147.5
160.0	146.5
200 0	143.5
250.0	141.0
315.0	138.5
400.0	135.5
500.0	133.0
630.0	130.0
800.0	127 0
1000.0	124.5
1250.0	121.0
1600.0	117.5
2000.0	114.5
2500.0	110.0
3150.0	107.0
4000.0	103.5
5000 0	100.5
6300.0	97.5
8000.0	94.5
10,000.0	91.5
Overall sound pressure level	157.0

One-Third Octave Band Acoustical Specifications in db re 2 X 10^{-5} N/M^2

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DATA SHEET

INITIAL FUNCTIONAL TEST AND EXAMINATION

TEST ENGINEER A. NOEGGERATH

TEST TECHNICIAN A. MERKO

WITNESSED BY B. BURNS

DATE OF TEST: 3 - 13 - 67

FACILITY STATHAM

STATHAM TP 3240 PARA.	TEST	REQUIREMENT		SN 34		SN 35		ACCEPTED BY
4.1.1	DIMENSIONAL CHECK	PER DRAWING NO. 50494						
4.1.2	WEIGHT	< 32 oz.		30.05 oz.		29.85 oz.		
4.2.1	PRESSURE SETTING		INPUT	ON	OFF	ON	OFF	
		CALIBRATION PORT ACTUATION WITHIN ± 2.0 PSI OF SYSTEM PORT ACTUATION POINT DEACTUATION WITHIN ± 2.0 PSI OF SYSTEM PORT DEACTUATION POINT	28V	26.11	25.81	26.56	26.22	
			28V	26.11	25.81	26.56	26.22	
			24V	26.12	25.82	26.56	26.23	
			30V	26.12	25.81	26.56	26.20	
			INPUT	ON	OFF	ON	OFF	
		SYSTEM PORT ACTUATION 24.875 to 25.125 PSIA DEACTUATION 0.15 to 0.50 PSI BELOW ACTUATION POINT	28V	25.01	24.72	24.99	24.66	
			28V	25.01	24.72	24.99	24.66	
			28V	25.01	24.72	24.99	24.66	
4.2.2	LEAKAGE TEST	< 2.0 CU. INCHES PER HOUR		NO LEAKAGE		NO LEAKAGE		

DATA SHEET
INITIAL FUNCTIONAL TEST AND EXAMINATION

TEST ENGINEER A. NOECKERATH
TEST TECHNICIAN A. MERKO
WITNESSED BY B. BURNS

DATE OF TEST 3-13-67
FACILITY STATHAM

STATHAM TP 3240 PARA.	TEST	REQUIREMENT	SN 34	SN 35	ACCEPTED BY
4 2 3	INSULATION RESISTANCE	> 50 MEG OHMS AT 50 VDC	> 5 K MEGS	> 5 K MEGS	
4 2 4	OUTPUT VOLTAGE	ACTUATED > 26 00 VDC	27 41	27.42	
		DEACTUATED < 0 5 VDC	001	.000	
4 2 5	OPERATING PRESSURE	AFTER 75 PSIA SYSTEM PORT ACTUATION 24 875 to 25 125 PSIA	25.04	24.99	
		DEACTUATION 0 15 to 0 50 PSI BELOW ACTUATION POINT	24.74	24 66	
		AFTER 75 PSIA CALIBRATION PORT ACTUATION WITHIN ± 2 0 PSI OF SYSTEM PORT ACTUATION POINT	2[illegible] 1[illegible]	26 5[illegible]	
		DEACTUATION WITHIN ± 2 0 PSI OF SYSTEM PORT DEACTUATION POINT	2[illegible] [illegible]	26.25	

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DATA SHEET

ALTITUDE TEST

TEST ENGINEER A. NOEGGERATH

TEST TECHINICAN: A. MERKO

WITNESSED BY B. BURNS

DATE OF TEST 3-16-67

FACILITY STATHAM

STATHAM TP 3240 PARA.	REQUIREMENT	SN 34		SN 35		ACCEPTED BY
		ON	OFF	ON	OFF	
4.3.1	INITIAL SYSTEM PORT READING	24.94	24.65	24.98	24.65	
	ACTUATION: 24.875 to 25.125 PSIA	24.94	24.66	24.98	24 65	
STEP 2	DEACTUATION 0.15 to 0.50 PSI BELOW ACTUATION POINT	24.94	24 66	24.98	24.65	
	AFTER 30 MIN. VACUUM	ON	OFF	ON	OFF	
STEP 3	SYSTEM PORT	24.95	24.66	24.97	24.65	
	ACTUATION 24.875 to 25.125 PSIA	24.95	24.67	24.97	24.65	
	DEACTUATION. 0.15 to 0.50 PSI BELOW ACTUATION POINT	24.95	24.67	24.97	24.65	

REMARKS VACUUM BETTER THAN 0.1 PSIA

DATA SHEET

POST-ALTITUDE FUNCTIONAL TEST

TEST ENGINEER A. NOEGGERATH

TEST TECHNICIAN A. MERKO

WITNESSED BY R. BURNS

PARA. 4.3.2

DATE OF TEST 3-16-67

FACILITY STATHAM

STATHAM TP 3240 PARA	TEST	REQUIREMENT		SN 34		SN 35		ACCEPTED BY
			INPUT	ON	OFF	ON	OFF	
4.2.1	PRESSURE SETTINGS	CALIBRATION PORT ACTUATION WITHIN ± 2.0 PSI OF SYSTEM PORT ACTUATION POINT DEACTUATION WITHIN ± 2.0 PSI OF SYSTEM PORT DEACTUATION POINT	28V	26.11	25.80	26 59	26.24	
				26.11	25.80	26.59	26.24	
			24V	26.11	25,81	26.59	26.24	
			30V	26.10	25.80	26.59	26.24	
		SYSTEM PORT ACTUATION 24 875 to 25.125 PSIA DEACTUATION 0.15 to 0.50 PSI BELOW ACUTATION POINT	INPUT	ON	OFF	ON	OFF	
			28V	25.00	24.71	25.00	24.66	
				25.00	24.72	24.99	24.66	
				25.01	24.72	24.99	24.66	
4.2.2	LEAKAGE TEST	< 2.0 CU INCHES PER HOUR		NO LEAKAGF		NO LEAKAGE		
4.2.3	INSUALTION RESISTANCE	> 50 MEG OHMS AT 50 VDC		> 1000K MEGS		> 1000K MEGS		
4.2.4	OUTPUT VOLTAGE	ACTUATED > 26 00 VDC		27 39		27.40		
		DEACTUATED < 0.5 VDC		.000		.001		

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DATA SHEET

TEMPERATURE TEST

TEST ENGINEER A. LOEGGERATH

TEST TECHNICIAN A. MERKO

WITNESSED BY B. BURNS

DATE OF TEST 3-17-67

FACILITY STATHAM

STATHAM TP 3240 PARA	REQUIREMENT		INPUT	SWITCH	+ 125 °F SN 34	+ 125 °F SN 35	-65° F SN 34	-65° F SN 35	-25° F SN 34	-25° F SN 35	0 °F SN 34	0 °F SN 35	+ 30° F SN 34	+ 30° F SN 35
4 3 3	ACTUATION AND DEACTUATION	SYSTEM PORT	28 V	ON	25.14	24.98	24.75	25.10	24.76	25.05	24.79	25.05	24.86	25.02
STEP 3	SETTING WITHIN ± 0.5 PSI OF ROOM TEMPERATURE VALUES			OFF	24.85	24.64	24.43	24.80	24.45	24.75	24.48	24.73	24.56	24.69
			24 V	ON	25.14	24.98	24.75	25.09	24.76	25.05	24.80	25.04	24.86	25.01
				OFF	24.86	24.64	24.43	24.80	24.45	24.75	24.50	24.73	24.57	24.79
			30 V	ON	25.14	24.97	24.74	25.09	24.75	25.05	24.79	25.04	24.86	25.02
				OFF	24.95	24.63	24.42	24.79	24.45	24.74	24.48	24.72	24.56	24.69
		CALIBRATION PORT	28 V	ON	26.24	26.54	25.83	26.70	25.85	26.65	25.89	26.64	25.96	26.61
				OFF	25.94	26.20	25.50	26.40	25.53	26.33	25.56	26.31	25.63	26.27
			24 V	ON	26.24	26.55	25.83	26.70	25.85	26.65	25.90	26.64	25.96	26.61
				OFF	25.95	26.21	25.50	26.40	25.53	26.34	25.57	26.31	25.64	26.27
			30 V	ON	26.24	26.54	25.83	26.69	25.65	26.65	25.89	26.63	25.95	26.61
				OFF	24.94	26.20	25.49	26.39	25.52	26.34	25.56	26.30	25.63	26.27
STEP 4	OUTPUT VOLTAGE ACTUATED > 26.00 VDC				27.43	27.45	27.22	27.22	27.24	27.25	27.31	27.29	27.32	27.33
	DEACTUATE < 0.5 VDC				.001	.001	.000	.000	.000	.000	.000	.000	.001	.000

DATA SHEET

TEMPERATURE TEST

TEST ENGINEER A. NOEGGERATH

TEST TECHNICIAN A. MERKO

WITNESSED BY B. BURNS

DATE OF TEST 3-17-67

FACILITY STATHAM

STATHAM TP 3240 PARA	REQUIREMENT				+ 125 °F		- 150 °F		-100° F		-65° F		0 ° F	
			INPUT	SWITCH	SN 34	SN 35	SN 34	SN 35	SN 34	SN 35	SN 34	SN 35	SN 34	SN 35
4.3.3 STEP 3	ACTUATION AND DEACTUATION SETTINGS WITHIN ± 0.5 PSI OF ROOM TEMPERATURE VALUES	SYSTEM PORT	28 V	ON	25.15	25.00	24.86	25.20	24.76	25.15	24.74	25.08	24 79	25.08
				OFF	24.86	24.66	24.60	24.95	24.46	24.87	24 44	24.78	24.49	24.72
			24 V	ON	25.15	25.00	24.86	25.18	24.76	25.15	24.74	25.08	24.80	25.04
				OFF	24.87	24 66	24.60	24.95	24.46	24.88	24.44	24.79	24.49	24.72
			30 V	ON	25.15	24.99	24.85	25.17	24.75	25.14	24.74	25.07	24.79	25.03
				OFF	24.86	24.65	24.59	24.94	24.46	24.87	24 43	24.78	24.48	24.70
		CALIBRATION PORT	28 V	ON	26.25	26.55	25.98	26.81	25 87	26.77	25.84	26.69	25.89	26.63
				OFF	25.96	26.21	25.70	26.55	25.54	26.48	25.52	26.37	25.57	26.30
			24 V	ON	26.25	26.56	25.96	26 81	25.87	26.76	25.84	26.68	25.90	26.62
				OFF	25.96	26.22	25.66	26.58	25.55	26.49	25 52	26.38	25.57	26.30
			30 V	ON	26.24	26.56	25.97	26.80	25.85	26.76	25.84	26.68	25.89	26.62
				OFF	25.94	26.21	25.67	26.57	25.54	26.48	25.52	26.38	25.52	26.30
STEP 4	OUTPUT VOLTAGE ACTUATED > 26.00 VDC				27 44	27.45	27.12	27.12	27.17	27.18	27.20	27.20	27.30	27.31
	DEACTUATED < 0.5 VDC				.001	.001	.001	.000	.000	.000	.001	.000	.000	.001

DATA SHEET

POST-TEMPERATURE FUNCTIONAL TEST

PARA. 4.3.4

TEST ENGINEER A. NOEGGERATH

TEST TECHNICIAN A. MERKO

WITNESSES BY B BURNS

DATE OF TEST 3 - 20 - 67

FACITITY STATHAM

STATHAM TP 3240 PARA.	TEST	REQUIREMENT	INPUT	SN 34 ON	SN 34 OFF	SN 35 ON	SN 35 OFF	ACCEPTED BY
4.2.1	PRESSURE SETTINGS	CALIBRATION PORT ACTUATION WITHIN ± 2.0 PSI OF SYSTEM PORT ACTUATION POINT DEACTUATION WITHIN ± 2.0 PSI OF SYSTEM PORT DEACTUATION POINT	28V	26.08	25.77	26.56	26.22	
				26.08	25.78	26.56	26.22	
			24V	26.09	25.80	26.55	26.22	
			30V	26.08	25.78	26.55	26.21	
		SYSTEM PORT ACTUATION 24.875 to 25.125 PSIA DEACTUATION 0.15 to 0.50 PSI BELOW ACTUATION POINT	INPUT	ON	OFF	ON	OFF	
			28V	24.92	24.70	24.97	24.65	
				24.99	24.70	24.97	24.65	
				24.99	24 70	24.97	24.65	
4.2.2	LEAKAGE TEST	< 2.0 CU. INCHES PER HOUR		NO LEAKAGE		NO LEAKAGE		
4.2.3	INSULATION RESISTANCE	> 50 MEG OHMS AT 50 VDC		>1000K MEGS		>1000K MEGS		
4.2.4	OUTPUT VOLTAGE	ACTUATED > 26.00 VDC		27.39		27.38		
		DEACTUATED < 0.5 VDC		.001		.001		

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DATA SHEET
SINUSOIDAL SWEEP TEST

TEST ENGINEER A. NOEGGERATH
TEST TECHNICIAN A. MERKO
WITNESSED BY B. BURNS

DATE OF TEST 3-24-67
FACILITY WYLE LABS

STATHAM TP 3240 PARA	REQUIREMENT	X-AXIS REMARKS		Y-AXIS REMARKS		Z-AXIS REMARKS		ACCEPTED BY
4 3.5	RESONANCE SEARCH	SN 34	SN 35	SN 34	SN 35	SN 34	SN 35	
								15 A

REMARKS NO RESONANCES FOUND. NO CHATTER WITHIN 0.3, 0.2, or 0.1 PSI OF SWITCH POINTS.
SEE OSCILLOGRAPH RECORDS, ROLLS 1 AND 2.

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TP 3240 Rev. B
Sheet 1 of 1

DATA SHEET
RANDOM VIBRATION

TEST ENGINEER A. NOEGGERATH

TEST TECHNICIAN A. MERKO

WITNESSED BY B. BURNS

DATE OF TEST 3 - 24 - 67

FACILITY WYLE LABS.

STATHAM TP 3240 PARA	REQUIREMENT		Z-AXIS SN 34	Z-AXIS SN 35	Y-AXIS SN 34	Y-AXIS SN 35	X-AXIS SN 34	X-AXIS SN 35	ACCEPTED BY
4 3 6	SYSTEM PORT ACTUATION SETTING WITHIN + .125 / - 250 PSI OF PRE-VIBRATION SETTING	1	25.07	25.00	25.48	25.00	25.38	25.00	
		2	25.07	25.00	25.48	25.01	25.38	25.00	
		3	25.08	25 00	25.47	25.06	25.40	25.00	
		4	27.20	25.00	25.48	25.04	25.38	25.00	
		5	25.85	25.00	25.48	25.03	25.39	25.00	
	SYSTEM PORT DEACTUATION SETTING WITHIN + 250 / - 125 PSI OF PRE-VIBRATION SETTING	1	24.80	24.69	24.90	24.68	24.86	24.66	
		2	24.81	24.69	24 94	24.64	24.86	24.66	
		3	24.81	24.69	24.93	24.75	24.88	24.67	
		4	25.00	24.69	24.92	24.68	24.88	24.67	
		5	25.05	24.69	24.94	24.68	24.90	24 67	
	MINIMUM DIFFERENTIAL 0 15 PSI	1	.27	.31	.58	.32	.52	.34	
		2	.26	.31	.54	.37	.52	.34	
		3	.27	.31	.54	.31	.52	.33	
		4	2.20	.31	.56	.36	.50	.33	
		5	.80	.31	.54	.35	.49	.33	

REMARKS SEE OSCILLOGRAPH RECORD, ROLL NO. 2.

DATA SHEET

POST-VIBRATION FUNCTIONAL TEST

TEST ENGINEER A. NOEGGERATH

TEST TECHNICIAN A. MERKO

WITNESSED BY B. BURNS

PARA. 4.3.7

DATE OF TEST 3 - 28 - 67

FACILITY STATHAM

STATHAM TP 3240 PARA.	TEST	REQUIREMENT	INPUT	SN 34 ON	SN 34 OFF	SN 35 ON	SN 35 OFF	ACCEPTED BY
4.2.1	PRESSURE SETTINGS	CALIBRATION PORT ACTUATION WITHIN ± 2.0 PSI OF SYSTEM PORT ACTUATION POINT DEACTUATION WITHIN ± 2.0 PSI OF SYSTEM PORT DEACTUATION POINT	28V	26.04	25.73	26.52	26.18	
			28V	26.04	25.74	26.52	26.18	
			24V	26.04	25.74	26.53	26.19	
			30V	26.04	25.74	26.53	26.18	
		SYSTEM PORT. ACTUATION 24.875 to 25.125 PSIA DEACTUATION 0.15 to 0.50 PSI BELOW ACTUATION POINT	INPUT	ON	OFF	ON	OFF	
			28V	24.98	24.69	24.97	24.63	
				24.98	24.69	24.97	24.63	
				24.98	24.69	24.96	24.63	
4.2.2	LEAKAGE TEST	< 2.0 CU. INCHES PER HOUR		NO LEAKAGE				
4.2.3	INSULATION RESISTANCE	> 50 MEG OHMS AT 50 VDC		> 5K MEGS		1000 OHMS TO CASE OVERVOLTAGE FAILURE		
4.2.4	OUTPUT VOLTAGE	ACTUATED > 26.00 VDC		27.31		27.33		
		DEACTUATED < 0.5 VDC		.001		.001		
4.2.5	OPERATING PRESSURE	AFTER 75 PSIA THROUGH SYSTEM PORT SYSTEM PORT ACTUATION 24.875 to 25.125 PSIA DEACTUATION 0.15 to 0.50 PSI BELOW ACTUATION		ON	OFF	ON	OFF	
				25.00	24.70	24.96	24.63	
				25.00	24.71	24.96	24.63	
				25.00	24.71	24.96	24.63	
		AFTER 75 PSIA THROUGH CALIBRATION PORT CALIBRATION PORT ACTUATION WITHIN ± 2.0 PSI OF SYSTEM PORT ACTUATION POINT DEACTUATION WITHIN ± 2.0 PSI OF SYSTEM PORT DEACTUATION POINT		ON	OFF	ON	OFF	
				26.07	25.76	26.53	26.17	
				26.07	25.76	26.53	26.18	
				26.07	25.76	26.53	26.18	

DATA SHEET

POST-VIBRATION FUNCTIONAL TEST

TEST ENGINEER A. NOEGGERATH
TEST TECHNICIAN A. MERKO
WITNESSED BY B. BURNS

PARA. 4.3.7

DATE OF TEST: 4 - 18 -67
FACILITY. STATHAM

STATHAM TP 3240 PARA.	TEST	REQUIREMENT		SN 35			ACCEPTED BY
4.2.1	PRESSURE SETTINGS	CALIBRATION PORT ACTUATION WITHIN ± 2.0 PSI OF SYSTEM PORT ACTUATION POINT DEACTUATION WITHIN ± 2.0 PSI OF SYSTEM PORT DEACTUATION POINT	INPUT	ON	OFF		
			28V	26.51	26.17		
				26.51	26.17		
			24V	26.51	26.17		
			30V	26.51	26.17		
		SYSTEM PORT ACTUATION 24.875 to 25.125 PSIA DEACTUATION 0.15 to 0.50 PSI BELOW ACTUATION POINT	INPUT	ON	OFF		
			28V	24.98	24.65		
				24.98	24.65		
				24.98	24.65		
4.2.2	LEAKAGE TEST	< 2.0 CU. INCHES PER HOUR		NO LEAKAGE			
4.2.3	INSULATION RESISTANCE	> 50 MEG OHMS AT 50 VDC		>5K MEGS			
4.2.4	OUTPUT VOLTAGE	ACTUATED > 26.00 VDC		27 41			
		DEACTUATED < 0.5 VDC		.001			
4.2.5	OPERATING PRESSURE	AFTER 75 PSIA THROUGH SYSTEM PORT SYSTEM PORT ACTUATION 24.875 to 25.125 PSIA DEACTUATION 0.15 to 0.50 PSI BELOW ACTUATION		ON	OFF		
				24.98	24.65		
				24.98	24.65		
				24.98	24.65		
96		AFTER 75 PSIA THROUGH CALIBRATION PORT CALIBRATION PORT ACTUATION: WITHIN ± 2.0 PSI OF SYSTEM PORT ACTUATION POINT DEACTUATION WITHIN ± 2.0 PSI OF SYSTEM PORT DEACTUATION POINT		ON	OFF		
				26.50	26.15		
				26.50	26.15		
				26.50	26.15		

REMARKS REFERENCE CALIBRATION AFTER REPAIR.

DATA SHEET

LIFE CYCLE

PARA. 4.3.8

STEP 5

TEST ENGINEER A. NOEGGERATH

TEST TECHNICIAN A. MERKO

WITNESSED BY B. BURNS

DATE OF TEST 4 - 7 - 67

FACILITY STATHAM

STATHAM TP 3240 PARA.	TEST	REQUIREMENT	INPUT	SN 34 ON	SN 34 OFF	ACCEPTED BY
4.2.1	PRESSURE SETTINGS	CALIBRATION PORT ACTUATION WITHIN ± 2.0 PSI OF SYSTEM PORT ACTUATION POINT DEACTUATION. WITHIN ± 2.0 PSI OF SYSTEM PORT DEACTUATION POINT	28V	26.12	25.83	
				26.13	25.82	
			24V	26.14	25.84	
			30V	26.12	25.82	
		SYSTEM PORT ACTUATION: 24.875 to 25.125 PSIA DEACTUATION 0.15 to 0.50 PSI BELOW ACTUATION POINT	INPUT	ON	OFF	
			28V	25.01	24.73	
				25.01	24.73	
				25.01	24.73	
4.2.2	LEAKAGE TEST	< 2.0 CU. INCHES PER HOUR		NO LEAKAGE		
4.2.3	INSULATION RESISTANCE	> 50 MEG OHMS AT 50 VDC		> 5K MEGS		
4.2.4	OUTPUT VOLTAGE	ACTUATED > 26.00 VDC		27.40		
		DEACTUATED < 0.5 VDC		.001		

DATA SHEET

LIFE CYCLE

PARA. 4.3.8

STEP 7

TEST ENGINEER: A. NOZOGERATH

TEST TECHNICIAN: A. MERKO

WITNESSED BY: B. BURES

DATE OF TEST. 4 - 7 - 67

FACILITY. STATHAM

STATHAM TP 3240 PARA.	TEST	REQUIREMENT	INPUT	SN 34 ON	OFF			ACCEPTED BY
4.2.1	PRESSURE SETTINGS	CALIBRATION PORT: ACTUATION: WITHIN ± 2.0 PSI OF SYSTEM PORT ACTUATION POINT DEACTUATION. WITHIN ± 2.0 PSI OF SYSTEM PORT DEACTUATION POINT	28V	26.11	25.82			
				26.11	25.82			
			24V	26.11	25.81			
			30V	26.11	25.81			
		SYSTEM PORT: ACTUATION: 24.875 to 25.125 PSIA DEACTUATION: 0.15 to 0.50 PSI BELOW ACTUATION POINT	INPUT	ON	OFF			
			28V	24.98	24.70			
				24.98	24.70			
				24.98	24.70			
4.2.2	LEAKAGE TEST	<2.0 CU. INCHES PER HOUR		NO LEAKAGE				
4.2.3	INSULATION RESISTANCE	>50 MEG OHMS AT 50 VDC		>5K MEGS				
4.2.4	OUTPUT VOLTAGE	ACTUATED: > 26.00 VDC		27.40				
		DEACTUATED: < 0.5 VDC		.001				

DATA SHEET
LIFE CYCLE
PARA. 4.3.8
STEP 5

TEST ENGINEER A. NOEGGERATH
TEST TECHNICIAN A. MERKO
WITNESSED BY B. BURNS

DATE OF TEST: 4 - 18 - 67
FACILITY STATHAM

STATHAM TP 3240 PARA.	TEST	REQUIREMENT		SN 35				ACCEPTED BY
4.2.1	PRESSURE SETTINGS	CALIBRATION PORT ACTUATION WITHIN ± 2.0 PSI OF SYSTEM PORT ACTUATION POINT DEACTUATION WITHIN ± 2.0 PSI OF SYSTEM PORT DEACTUATION POINT	INPUT	ON	OFF			
			28V	26.52	26.15			
				26.50	26.15			
			24V	26.50	26.15			
			30V	26.50	26.15			
		SYSTEM PORT ACTUATION: 24.875 to 25.125 PSIA DEACTUATION 0.15 to 0.50 PSI BELOW ACTUATION POINT	INPUT	ON	OFF			
			28V	24.95	24.62			
				24.94	24.62			
				24.94	24.62			
4.2.2	LEAKAGE TEST	< 2.0 CU. INCHES PER HOUR		NO LEAKAGE				
4.2.3	INSULATION RESISTANCE	> 50 MEG OHMS AT 50 VDC		>5K MEGS				
4.2.4	OUTPUT VOLTAGE	ACTUATED > 26.00 VDC		27.39				
		DEACTUATED < 0.5 VDC		.001				

DATA SHEET

LIFE CYCLE

PARA. 4.3.8

STEP 7

TEST ENGINEER. A. MORGENRATH

TEST TECHNICIAN: A. MORRO

WITNESSED BY: B. BURNS

DATE OF TEST: 4-18-67

FACILITY: STATHAM

STATHAM TP 3240 PARA.	TEST	REQUIREMENT	INPUT	SN 35 ON	SN 35 OFF		ACCEPTED BY
4.2.1	PRESSURE SETTINGS	CALIBRATION PORT: ACTUATION: WITHIN ± 2.0 PSI OF SYSTEM PORT ACTUATION POINT DEACTUATION. WITHIN ± 2.0 PSI OF SYSTEM PORT DEACTUATION POINT	28V	26.50	26.12		
				26.48	26.12		
			24V	26.48	26.13		
			30V	26.48	26.13		
		SYSTEM PORT: ACTUATION: 24.875 to 25.125 PSIA DEACTUATION: 0.15 to 0.50 PSI BELOW ACTUATION POINT	28V	24.92	24.58		
				24.92	24.58		
				24.92	24.58		
4.2.2	LEAKAGE TEST	< 2.0 CU. INCHES PER HOUR		NO LEAKAGE			
4.2.3	INSULATION RESISTANCE	> 50 MEG OHMS AT 50 VDC		> 5K MEGS			
4.2.4	OUTPUT VOLTAGE	ACTUATED: > 26.00 VDC		27.39			
		DEACTUATED: < 0.5 VDC		.001			

DATA SHEET
LIFE CYCLE
PARA. 4.3.8
STEP 9

TEST ENGINEER: A. NOGGERATH
TEST TECHNICIAN: A. MERED
WITNESSED BY: B. BURNS

DATE OF TEST. 4 - 7 - 67
FACILITY: STATHAM

STATHAM TP 3240 PARA.	TEST	REQUIREMENT		SN 34				ACCEPTED BY
			INPUT	ON	OFF			
4.2.1	PRESSURE SETTINGS	CALIBRATION PORT: ACTUATION: WITHIN ± 2.0 PSI OF SYSTEM PORT ACTUATION POINT DEACTUATION WITHIN ± 2.0 PSI OF SYSTEM PORT DEACTUATION POINT	28V					
			24V					
			30V					
		SYSTEM PORT:	INPUT	ON	OFF			
		ACTUATION: 24.875 to 25.125 PSIA DEACTUATION 0.15 to 0.50 PSI BELOW ACTUATION POINT	28V	24.99	24.70			
				24.99	24.71			
				24.99	24.71			
4.2.2	LEAKAGE TEST	< 2.0 CU. INCHES PER HOUR		NO LEAKAGE				
4.2.3	INSULATION RESISTANCE	> 50 MEG OHMS AT 50 VDC		> 5K MEGS				
4.2.4	OUTPUT VOLTAGE	ACTUATED > 26.00 VDC		27.41				
		DEACTUATED < 0.5 VDC		.000				

DATA SHEET

LIFE CYCLE

PARA. 4.3.8

STEP 9

TEST ENGINEER: A. NOEGGERATH

TEST TECHNICIAN: A. MERKO

WITNESSED BY: B. BURNS

DATE OF TEST: 4 - 18 - 67

FACILITY STATHAM

STATHAM TP 3240 PARA.	TEST	REQUIREMENT	INPUT	SN 35 ON	SN 35 OFF			ACCEPTED BY
4.2.1	PRESSURE SETTINGS	CALIBRATION PORT: ACTUATION: WITHIN ± 2.0 PSI OF SYSTEM PORT ACTUATION POINT DEACTUATION. WITHIN ± 2.0 PSI OF SYSTEM PORT DEACTUATION POINT	28V	26.48	26.12			
			28V	26.48	26.12			
			24V	26.47	26.12			
			30V	26.47	26.12			
		SYSTEM PORT: ACTUATION: 24.875 to 25.125 PSIA DEACTUATION: 0.15 to 0.50 PSI BELOW ACTUATION POINT	INPUT	ON	OFF			
			28V	24.94	24.61			
			28V	24.94	24.61			
			28V	24.94	24.61			
4.2.2	LEAKAGE TEST	< 2.0 CU. INCHES PER HOUR		NO LEAKAGE				
4.2.3	INSULATION RESISTANCE	> 50 MEG OHMS AT 50 VDC		> 5K MEGS				
4.2.4	OUTPUT VOLTAGE	ACTUATED > 26.00 VDC		27.39				
		DEACTUATED < 0.5 VDC		.002				

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DATA SHEET

LIFE CYCLE

PARA. 4.3.8

STEP 11

TEST ENGINEER. A. NOEGGERATH
TEST TECHNICIAN A. MERKO
WITNESSED BY: B. BURES

DATE OF TEST: 4 - 7 - 67
FACILITY: STATHAM

STATHAM TP 3240 PARA.	TEST	REQUIREMENT		SN 34			ACCEPTED BY
4.2.1	PRESSURE SETTINGS	CALIBRATION PORT: ACTUATION: WITHIN ± 2.0 PSI OF SYSTEM PORT ACTUATION POINT DEACTUATION. WITHIN ± 2.0 PSI OF SYSTEM PORT DEACTUATION POINT	INPUT	ON	OFF		
			28V				
			24V				
			30V				
		SYSTEM PORT: ACTUATION: 24.875 to 25.125 PSIA DEACTUATION: 0.15 to 0.50 PSI BELOW ACTUATION POINT	INPUT	ON	OFF		
			28V	24.97	24.68		
				24.97	24.68		
				24.97	24.68		
4.2.2	LEAKAGE TEST	< 2.0 CU. INCHES PER HOUR		NO LEAKAGE			
4.2.3	INSULATION RESISTANCE	> 50 MEG OHMS AT 50 VDC		> 5K MEGS			
4.2.4	OUTPUT VOLTAGE	ACTUATED: > 26.00 VDC		27.42			
		DEACTUATED: ≤ 0.5 VDC		.001			

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DATA SHEET
LIFE CYCLE

PARA. 4.3.8
STEP 11

TEST ENGINEER. A. NOEGGERATH
TEST TECHNICIAN A. MIRKO
WITNESSED BY: R. BURNS

DATE OF TEST: 4-18-67
FACILITY: STATHAM

STATHAM TP 3240 PARA.	TEST	REQUIREMENT	SN 35			ACCEPTED BY
			INPUT	ON	OFF	
4.2.1	PRESSURE SETTINGS	CALIBRATION PORT: ACTUATION: WITHIN ± 2.0 PSI OF SYSTEM PORT ACTUATION POINT DEACTUATION: WITHIN ± 2.0 PSI OF SYSTEM PORT DEACTUATION POINT	28V	26.45	26.10	
			28V	26.45	26.10	
			24V	26.45	26.10	
			30V	26.45	26.10	
			INPUT	ON	OFF	
		SYSTEM PORT: ACTUATION: 24.875 to 25.125 PSIA DEACTUATION: 0.15 to 0.50 PSI BELOW ACTUATION POINT	28V	24.93	24.59	
			28V	24.93	24.59	
			28V	24.93	24.59	
4.2.2	LEAKAGE TEST	< 2.0 CU. INCHES PER HOUR	NO LEAKAGE			
4.2.3	INSULATION RESISTANCE	> 50 MEG OHMS AT 50 VDC	> 5K MEGS			
4.2.4	OUTPUT VOLTAGE	ACTUATED > 26.00 VDC	27.40			
		DEACTUATED < 0.5 VDC	.002			

DATA SHEET

LIFE CYCLE

PARA. 4.3.8

STEP 13

TEST ENGINEER A. NORDGERATH
TEST TECHNICIAN A. MERKO
WITNESSED BY B. BURNS

DATE OF TEST: 4 - 10 - 67
FACILITY STATHAM

STATHAM TP 3240 PARA.	TEST	REQUIREMENT	SN 34					ACCEPTED BY
			INPUT	ON	OFF			
4.2.1	PRESSURE SETTINGS	CALIBRATION PORT: ACTUATION: WITHIN ± 2.0 PSI OF SYSTEM PORT ACTUATION POINT DEACTUATION WITHIN ± 2.0 PSI OF SYSTEM PORT DEACTUATION POINT	28V					
			24V					
			30V					
		SYSTEM PORT: ACTUATION: 24.875 to 25.125 PSIA DEACTUATION: 0.15 to 0.50 PSI BELOW ACTUATION POINT	INPUT	ON	OFF			
			28V	24.99 24.99 24.99	24.70 24.70 24.70			
4.2.2	LEAKAGE TEST	< 2.0 CU. INCHES PER HOUR	NO LEAKAGE					
4.2.3	INSULATION RESISTANCE	> 50 MEG OHMS AT 50 VDC	> 5K MEGS					
4.2.4	OUTPUT VOLTAGE	ACTUATED > 26.00 VDC	27.41					
		DEACTUATED < 0.5 VDC	.001					

DATA SHEET

LIFE CYCLE

PARA. 4.3.8

STEP 13

TEST ENGINEER· A. NORGGERATH

TEST TECHNICIAN A. MERKO

WITNESSED BY: B. BURNS

DATE OF TEST: 4 - 19- 67

FACILITY: STATHAM

STATHAM TP 3240 PARA.	TEST	REQUIREMENT	SN 35				ACCEPTED BY
4.2.1	PRESSURE SETTINGS	CALIBRATION PORT: ACTUATION: WITHIN ± 2.0 PSI OF SYSTEM PORT ACTUATION POINT DEACTUATION WITHIN ± 2.0 PSI OF SYSTEM PORT DEACTUATION POINT	INPUT	ON	OFF		d/15
			28V	26.46	26.10		
				26.45	26.10		
			24V	26.45	26.10		
			30V	26.45	26.10		
		SYSTEM PORT: ACTUATION: 24.875 to 25.125 PSIA DEACTUATION: 0.15 to 0.50 PSI BELOW ACTUATION POINT	INPUT	ON	OFF		
			28V	24.92	24.58		
				24.92	24.58		
				24.92	24.58		
4.2.2	LEAKAGE TEST	< 2.0 CU. INCHES PER HOUR	NO LEAKAGE				d/15
4.2.3	INSULATION RESISTANCE	> 50 MEG OHMS AT 50 VDC	> 5K MEGS				d/15
4.2.4	OUTPUT VOLTAGE	ACTUATED > 26.00 VDC	27.39				d/15
		DEACTUATED < 0.5 VDC	.001				

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DATA SHEET

LIFE CYCLE

PARA. 4.3.8

STEP 15

TEST ENGINEER A. NOEGGERATH
TEST TECHNICIAN A. MERKO
WITNESSED BY R. BURNS

DATE OF TEST: 4 - 11 - 67
FACILITY STATHAM

STATHAM TP 3240 PARA.	TEST	REQUIREMENT	INPUT	SN 34 ON	SN 34 OFF		ACCEPTED BY
4.2.1	PRESSURE SETTINGS	CALIBRATION PORT ACTUATION: WITHIN ± 2.0 PSI OF SYSTEM PORT ACTUATION POINT DEACTUATION WITHIN ± 2.0 PSI OF SYSTEM PORT DEACTUATION POINT	28V				
			24V				
			30V				
		SYSTEM PORT: ACTUATION: 24.875 to 25.125 PSIA DEACTUATION 0.15 to 0.50 PSI BELOW ACTUATION POINT	28V	24.98 24.98 24.98	24.68 24.68 24.68		
4.2.2	LEAKAGE TEST	< 2.0 CU. INCHES PER HOUR		NO LEAKAGE			
4.2.3	INSULATION RESISTANCE	> 50 MEG OHMS AT 50 VDC		> 5K MEGS			
4.2.[illegible]	[illegible]PUT [illegible]ITAGE	ACTUATED > 26.00 VDC		27.37			
		D[illegible]CTUATED < 0.5 VDC		.000			

DATA SHEET

LIFE CYCLE

PARA. 4.3.8

STEP 15

TEST ENGINEER A. NOEGGERATH

TEST TECHNICIAN A. MERKO

WITNESSED BY: B. BURNS

DATE OF TEST: 4-19-67

FACILITY: STATHAM

STATHAM TP 3240 PARA.	TEST	REQUIREMENT	INPUT	SN 35 ON	SN 35 OFF			ACCEPTED BY
4.2.1	PRESSURE SETTINGS	CALIBRATION PORT: ACTUATION: WITHIN ± 2.0 PSI OF SYSTEM PORT ACTUATION POINT DEACTUATION WITHIN ± 2.0 PSI OF SYSTEM PORT DEACTUATION POINT	28V	26.46	26.12			
				26.46	26.12			
			24V	26.46	26.12			
			30V	26.46	26.12			
			INPUT	ON	OFF			
		SYSTEM PORT: ACTUATION: 24.875 to 25.125 PSIA DEACTUATION: 0.15 to 0.50 PSI BELOW ACTUATION POINT	28V	24.93	24.59			
				24.93	24.59			
				24.93	24.59			
4.2.2	LEAKAGE TEST	< 2.0 CU. INCHES PER HOUR		NO LEAKAGE				
4.2.3	INSULATION RESISTANCE	> 50 MEG OHMS AT 50 VDC		> 5K MEGS				
4.2.4	OUTPUT VOLTAGE	ACTUATED: > 26.00 VDC		27.40				
		DEACTUATED < 0.5 VDC		.001				

DATA SHEET

POST-VIBRATION FUNCTIONAL TEST

TEST ENGINEER A. NOEGGERATH
TEST TECHNICIAN A. MERKO
WITNESSED BY B. BURNS

PARA. 4.3.8
STEP 17

DATE OF TEST 4 - 11 - 67
FACILITY STATHAM

STATHAM TP 3240 PARA.	TEST	REQUIREMENT	INPUT	SN 34 ON	SN 34 OFF	ON	OFF	ACCEPTED BY
4.2.1	PRESSURE SETTINGS	CALIBRATION PORT	INPUT	ON	OFF			
		ACTUATION WITHIN ± 2.0 PSI OF SYSTEM PORT ACTUATION POINT	28V					
		DEACTUATION WITHIN ± 2.0 PSI OF SYSTEM PORT DEACTUATION POINT	24V					
			30V					
		SYSTEM PORT	INPUT	ON	OFF			
		ACTUATION 24.875 to 25.125 PSIA	28V	25.00	24.71			
		DEACTUATION 0.15 to 0.50 PSI BELOW ACTUATION POINT		25.01	24.72			
				25.01	24.72			
4.2.2	LEAKAGE TEST	< 2.0 CU. INCHES PER HOUR		NO LEAKAGE				
4.2.3	INSULATION RESISTANCE	> 50 MEG OHMS AT 50 VDC		> 5X MEGS				
4.2.4	OUTPUT VOLTAGE	ACTUATED > 26.00 VDC		27.37				
		DEACTUATED < 0.5 VDC		.000				
4.2.5	OPERATING PRESSURE	AFTER 75 PSIA THROUGH SYSTEM PORT		ON	OFF	ON	OFF	
		SYSTEM PORT ACTUATION 24.875 to 25.125 PSIA		25.00	24.72			
		DEACTUATION 0.15 to 0.50 PSI BELOW ACTUATION		25.01	24.72			
				25.01	24.72			
		AFTER 75 PSIA THROUGH CALIBRATION PORT		ON	OFF			
		CALIBRATION PORT ACTUATION WITHIN ± 2.0 PSI OF SYSTEM PORT ACTUATION POINT						
		DEACTUATION WITHIN ± 2.0 PSI OF SYSTEM PORT DEACTUATION POINT						

DATA SHEET

POST-VIBRATION FUNCTIONAL TEST

TEST ENGINEER A. KOLOGRATH

TEST TECHNICIAN A. MERKO

WITNESSED BY B. BURNS

PARA. 4.3.8

STEP 17

DATE OF TEST 4 - 19 - 67

FACILITY STATHAM

STATHAM TP 3240 PARA.	TEST	REQUIREMENT	INPUT	SN 35 ON	SN 35 OFF		ACCEPTED BY
4.2.1	PRESSURE SETTINGS	CALIBRATION PORT	INPUT	ON	OFF		
		ACTUATION WITHIN ± 2.0 PSI OF SYSTEM PORT ACTUATION POINT	28V	26.47	26.12		
		DEACTUATION WITHIN ± 2.0 PSI OF SYSTEM PORT DEACTUATION POINT		26.47	26.12		
			24V	26.47	26.12		
			30V	26.47	26.12		
		SYSTEM PORT	INPUT	ON	OFF		
		ACTUATION 24.875 to 25.125 PSIA	28V	24.93	24.60		
		DEACTUATION 0.15 to 0.50 PSI BELOW ACTUATION POINT		24.93	24.59		
				24.93	24.59		
4.2.2	LEAKAGE TEST	< 2.0 CU. INCHES PER HOUR		NO LEAKAGE			
4 2.3	INSULATION RESISTANCE	> 50 MEG OHMS AT 50 VDC		> 5K MEGS			
4.2.4	OUTPUT VOLTAGE	ACTUATED > 26.00 VDC		27.39			
		DEACTUATED < 0.5 VDC		.001			
[illegible]	OPERATING PRESSURE	AFTER 75 PSIA THROUGH SYSTEM PORT		ON	OFF		
		SYSTEM PORT ACTUATION 24.875 to 25.125 PSIA		24.93	24.58		
		DEACTUATION 0.15 to 0.50 PSI BELOW ACTUATION		24.93	24.58		
				24.93	24.58		
		AFTER 75 PSIA THROUGH CALIBRATION PORT		ON	OFF		
		CALIBRATION PORT ACTUATION WITHIN ± 2.0 PSI OF SYSTEM PORT ACTUATION POINT		26.48	26.13		
		DEACTUATION WITHIN ± 2.0 PSI OF SYSTEM PORT DEACTUATION POINT		26.48	26.13		
				26.48	26.-3		

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DATA SHEET
OPERATING TIME

TEST ENGINEER A. NOEGGERATH
TEST TECHNICIAN A. MERKO
WITNESSED BY B. BURNS

DATE OF TEST 5 - 2 - 67
FACILITY STATHAM

STATHAM TP 3240 PARA	REQUIREMENT	SN 34	SN 35	ACCEPTED BY
4 3 9 STEP 3		TIME 9 msec	TIME 9 msec	
STEP 4		SUBTRACT CONSTANT TIME	6 msec	
STEP 4	OPERATING TIME < 10 MILLISECONDS	3 msec	3 msec	

REMARKS SEE OSCILLOSCOPE TRACE PHOTOGRAPHS A, 25, 26, 27, 28, 29, 30.

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DATA SHEET

POST-OPERATING TIME FUNCTIONAL TEST

PARA. 4.3.10

TEST ENGINEER A. NOEGGERATH

TEST TECHNICIAN A. MERKC

WITNESSED BY B. BURNS

DATE OF TEST 5 - 2 - 67

FACILITY STATHAM

STATHAM TP 3240 PARA.	TEST	REQUIREMENT	INPUT	SN 34 ON	SN 34 OFF	SN 35 ON	SN 35 OFF	ACCEPTED BY
4.2.1	PRESSURE SETTINGS	CALIBRATION PORT ACTUATION WITHIN ± 2.0 PSI OF SYSTEM PORT ACTUATION POINT DEACTUATION WITHIN ± 2.0 PSI OF SYSTEM PORT DEACTUATION POINT	28V			26.47	26.13	
						26.48	26.13	
			24V			26.47	26.13	
			30V			26.47	26.13	
		SYSTEM PORT ACTUATION 24.875 to 25.125 PSIA DEACTUATION 0.15 to 0.50 PSI BELOW ACTUATION POINT	28V	25.01	24.73	24.93	24.60	
				25.01	24.73	24.93	24.60	
				25.01	24.73	24.93	24.60	
4.2.2	LEAKAGE TEST	< 2.0 CU. INCHES PER HOUR		NO LEAKAGE		NO LEAKAGE		
4.2.3	INSULATION RESISTANCE	> 50 MEG OHMS AT 50 VDC		> 5K MEGS		5 MEGS		
4.2.4	OUTPUT VOLTAGE	ACTUATED > 26.00 VDC		27.39		27.40		
		DEACTUATED < 0.5 VDC		.001		.001		

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DATA SHEET
BURST PRESSURE

TEST ENGINEER A. MOEGGERATH
TEST TECHNICIAN A. MERKO
WITNESSED BY B. BURNS

PARA 4 3 11
STEP 2

DATE OF TEST 4 - 14 -67
FACILITY STATHAM

STATHAM TP 3240 PARA	TEST	REQUIREMENT	SN 29	SN	ACCEPTED BY
4 2 1	PRESSURE SETTINGS	SYSTEM PORT ACTUATION 24 875 to 25 125 PSIA DEACTUATION 0 15 to 0 50 PSI BELOW ACTUATION POINT			
		CALIBRATION PORT ACTUATION WITHIN ± 2 0 PSI OF SYSTEM PORT ACTUATION POINT DEACTUATION WITHIN ± 2 0 PSI OF SYSTEM PORT DEACTUATION POINT			
4 2 2	LEAKAGE TEST	< 2 0 CU INCHES PER HOUR			
4 2 3	INSULATION RESISTANCE	> 50 MEG OHMS AT 50 VDC			
4 2 4	OUTPUT VOLTAGE	ACTUATED > 26 00 VDC			
		DEACTUATED < 0 5 VDC			

REMARKS DUMMY UNIT - NOT OPERABLE ELECTRICALLY

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R5

DATA SHEET
BURST PRESSURE

TEST ENGINEER A. NOEGERRATH

TEST TECHNICIAN A. MERKO

WITNESSED BY B. BURNS

PARA 4 3 11
STEP 4

DATE OF TEST 4 - 14 - 67

FACILITY STATHAM

STATHAM TP 3240 PARA	TEST	REQUIREMENT	SN 29	SN	ACCEPTED BY
4 2 1	PRESSURE SETTINGS	SYSTEM PORT ACTUATION 24 875 to 25 125 PSIA DEACTUATION 0 15 to 0 50 PSI BELOW ACTUATION POINT			
		CALIBRATION PORT ACTUATION WITHIN ± 2 0 PSI OF SYSTEM PORT ACTUATION POINT DEACTUATION WITHIN ± 2 0 PSI OF SYSTEM PORT DEACTUATION POINT			
4 2 2	LEAKAGE TEST	< 2 0 CU INCHES PER HOUR			
4 2.3	INSULATION RESISTANCE	> 50 MEG OHMS AT 50 VDC			
4 2 4	OUTPUT VOLTAGE	ACTUATED > 26 00 VDC			
		DEACTUATED < 0 5 VDC			
4 3 11 STEP 5	SYSTEM PORT BURST PRESSURE	> 190 PSIA	> 900 PSIG < 1000 PSIG		

REMARKS USED OIL DEADWEIGHT TESTER, 100 PSI INCREMENTS.
CALIBRATION DIAPHRAGM RUPTURED AT 1000 PSIG.

DATA SHEET
ACOUSTIC TEST

TEST ENGINEER A. NOEGGERATH
TEST TECHNICIAN A. MERKO
WITNESSED BY B. BURNS

DATE OF TEST 5 - 8 - 67
FACILITY NORTHROP NORAIR

STATHAM TP 3240 PARA	REQUIREMENT	SN 34	SN 35	ACCEPTED BY
4 3 12	NO CHATTER	NO CHATTER	NO CHATTER	

REMARKS SEE OSCILLOGRAPH RECORD, ROLL NO. 3

DATA SHEET

FINAL FUNCTIONAL TEST

PARA. 4.3.13

TEST ENGINEER A. NOEGGERATH
TEST TECHNICIAN A. MERKO
WITNESSED BY B. BURNS

DATE OF TEST 5 - 8 - 67
FACILITY STATHAM

STATHAM TP 3240 PARA.	TEST	REQUIREMENT	INPUT	SN 34 ON	SN 34 OFF	SN 35 ON	SN 35 OFF	ACCEPTED BY
4.2.1	PRESSURE SETTINGS	CALIBRATION PORT ACTUATION WITHIN ± 2.0 PSI OF SYSTEM PORT ACTUATION POINT DEACTUATION WITHIN ± 2.0 PSI OF SYSTEM PORT DEACTUATION POINT	28V			26.42	26.06	
			28V			26.42	26.06	
			24V			26.42	26.06	
			30V			26.42	26.06	
		SYSTEM PORT ACTUATION 24.875 to 25.125 PSIA DEACTUATION 0.15 to 0.50 PSI BELOW ACTUATION POINT	28V	25.03	24.74	24.94	24.60	
				25.03	24.74	24.94	24.60	
				25.03	24.74	24.94	24.60	
4.2.2	LEAKAGE TEST	< 2.0 CU. INCHES PER HOUR		NO LEAKAGE		NO LEAKAGE		
4.2.3	INSULATION RESISTANCE	> 50 MEG OHMS AT 50 VDC		> 5K MEGS		> 5 MEGS		
4.2.4	OUTPUT VOLTAGE	ACTUATED > 26.00 VDC		27.39		27.40		
		DEACTUATED < 0.5 VDC		.001		.001		

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TEST REPORT

REPORT NO 48580

OUR JOB NO 48580

YOUR P O NO KC 28274

CONTRACT NAS 8-20566

WYLE LABORATORIES / El Segundo, California • EA 2 1763 • OR 8 4251 • TWX 213 322 5415 • Cable WYLAB

24 Pages

STATHAM INSTRUMENTS, INC.
12401 WEST OLYMPIC BLVD.
LOS ANGELES, CALIFORNIA

DATE 6 APRIL 1967

VIBRATION TEST

ON

TWO PRESSURE SWITCHES, P/N SP111-25

SERIAL NUMBERS 34 AND 35

FOR

STATHAM INSTRUMENTS, INC.

STATE OF CALIFORNIA
COUNTY OF LOS ANGELES } ss

B. M. BLEAK, being duly sworn, deposes and says: That the information contained in this report is the result of complete and carefully conducted tests and is to the best of his knowledge true and correct in all respects

B. M Bleak

SUBSCRIBED and sworn to before me this 6 day of APRIL, 19 67

Notary Public in and for the County of Los Angeles, State of California

My Commission expires 20 JULY, 19 70

TEST BY ELECTRONICS DEPARTMENT

TEST WITNESS

DCAS-QAR VERIFICATION

QUALITY CONTROL APPROVAL

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1.0 REFERENCES

1.1 STATHAM INSTRUMENTS PURCHASE ORDER NUMBER KC 28274, CHANGE NUMBER 3.

2.0 PROCEDURES AND RESULTS

2.1 VIBRATION TEST

2.1.1 THE SPECIMENS WERE SUBJECTED TO VIBRATION IN EACH OF THREE AXIS, X, Y AND Z, AT THE FOLLOWING LEVELS:

SINE

5-44 Hz AT 0.3 INCH DOUBLE AMPLITUDE
44 - 120 Hz AT 30G PEAK
120-150 Hz AT 0.04 INCH DOUBLE AMPLITUDE
150-2000 Hz AT 45G PEAK

DURATION. APPROXIMATELY 1 HOUR PER AXIS.

RANDOM

20-50 Hz AT $0.12G^2/Hz$
50-160 Hz AT +9 DB/OCTAVE
160-630 Hz AT $3.2\ G^2/Hz$
630-2000 Hz AT -9DB/OCTAVE

DURATION: 5 MINUTES PER AXIS.

SINE VIBRATION WAS COMPLETED ON BOTH SPECIMENS BEFORE RANDOM VIBRATION WAS INITIATED

2.1.2 AT THE CONCLUSION OF THE ABOVE, THE SPECIMENS EXHIBITED NO EVIDENCE OF PHYSICAL DAMAGE OR PERFORMANCE DETERIORATION AS A RESULT OF THIS TEST.

WYLE LABORATORIES

DATA SHEET

Test Title VIBRATION

Customer STATHAM | Job No 48580
Date Test Started MARCH 23, 1967
Part No. SP111-25 | Date Test Completed
S/N 34 & 35 | Amb Temp. 70°
Spec STATHAM T.P. 3240 | Photo YES
Para 4.3.5 – 4.3.6 | Test Med N/A
Specimen Temp Room Amb
Specimen PRESSURE SWITCH

TWO SPECIMENS TO BE TESTED IN EACH OF THREE AXES. (X, Y, Z).

SINE

LEVELS: 5-44 HZ @ .3" DA.
44-120 HZ @ 30 G PK
120-150 HZ @ .04" DA
150-2000 HZ @ 45 G PK

DURATION: APPROXIMATELY 1 HOUR PER AXIS.
(AS PER CUSTOMER INSTRUCTIONS, 1 OCTAVE/MIN. – & 2 OCTAVES/MIN) – (SEE DATA SHEETS) –

RANDOM

LEVELS: 20-50 HZ @ 0.12 G^2/HZ
50-160 HZ @ +9 db/OCTAVE
160-630 HZ @ 3.2 G^2/HZ
630-2000 HZ @ -9 db/OCTAVE

DURATION: 5 MIN. PER AXIS

NOTE: SINE VIBRATION TO BE COMPLETED ON BOTH SPECIMENS BEFORE RANDOM VIBRATION IS INITIATED.

Tested By Rick Barker
Specimen Meets Spec Requirements YES ☑ NO ☐
Witness ______ Date ______
Sheet No 1 of 14
Approved R Bluu Date 3/27/67

W 614 A

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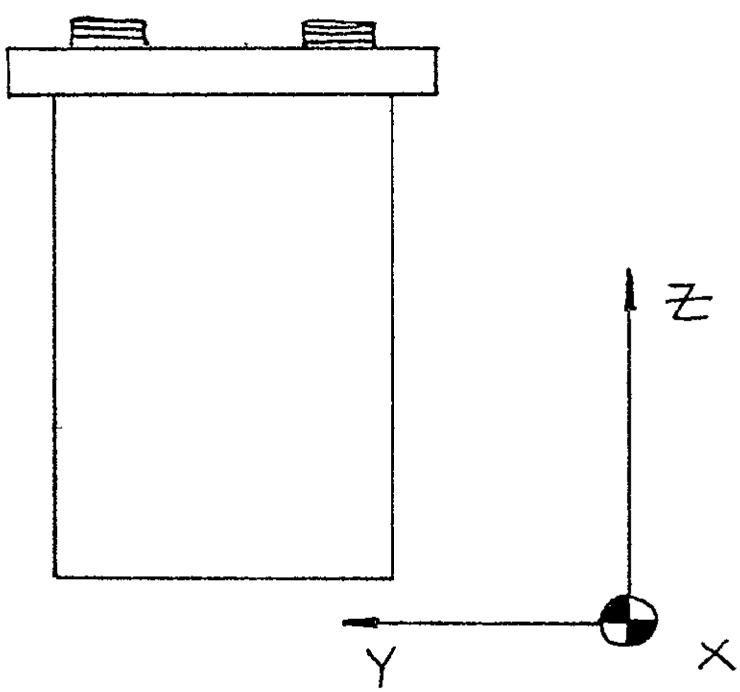
WYLE LABORATORIES

DATA SHEET

CUSTOMER: P STATHAM
Test Title: VIBRATION
Specimen: PRESSURE SWITCH
Part No: SP1H-25
Job No: 48580
S/N: 34 #35
Date: 3-23-67



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W 614 B

WYLE LABORATORIES

SPECIMEN: PRESSURE SWITCH
CUSTOMER: STATHAM
PART NO.: SP 111-25
S/N: 34 & 35

JOB NO.: 48580
DATE: 24 MARCH 67
TEST BY: Rick Barber
WITNESS:

TEST: SINUSOIDAL & RANDOM VIBRATION

EQUIPMENT	MANUFACTURER	MODEL No.	SERIAL No.	RANGE	WYLE No.	CALIBRATION LAST	CALIBRATION DUE	ACCY
VIBRATION EXCITER	LING	B-300	-	8,000 LBS (SINE)	6811	N/A		N/A
POWER AMPLIFIER	LING	175/240	QUAD #1	175 KVA	6375	N/A		N/A
RANDOM CONSOLE	LING	ASDE80	-	80 CHANNEL	6812	PRIOR TO	USE	± .5db
TIMER (RANDOM)	STANDARD	0-60	-	60 MIN	6389	10-5-66	4-5-67	± 0.1 SEC
SINUSOIDAL SERVO CONTROL	B & K	1018	-	5-10,000 HZ	3432	2-17-67	5-17-67	± 1%
TIMER (SINE)	STANDARD	0-60	-	60 MIN	6837	10-5-66	4-5-67	± 0.1 sec
X-Y PLOTTER	MOSELEY	135	-	VARIABLE	1058	1-18-67	4-18-67	± 1% FS
CONTROL ACCELEROMETER	ENDEVCO	2213	WY 26	10,000 G's	2411	3-9-67	6-20-67	± 5%
HEAD ACCELEROMETER	ENDEVCO	2213	AB80	10,000 G's	6475	3-9-67	6-20-67	± 5%

W 614 C

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DYNAMICS SECTION
VIBRATION TEST DATA SHEET
SINE VIBRATION

JOB No. 48580
SHEET 4 OF 14
I D No. S/N 35

DATE	TIME	AXIS	TEMP (°F)	SINUSOIDAL FREQ. (CPS)	DISP. ("DA)	ACCEL (±G)	TEST TIME (MIN.)	COMMENTS	NAME
								TEST REQUIREMENT	
3/23	1100	Z	Amb	5-44	.3	—		S/N 35 ; SWEEP FROM 5-2000 HZ	
	1109			44-120	—	30		COMPLETED WITH NO APPARENT DAMAGE	
				120-150	.04	—		TO THE SPECIMEN.	
				150-2000	—	45	8'53"	R. Breen	
3/23	1110	Z	Amb	Above Levels				S/N 35 ; SWEEP FROM 2000-5 HZ	
	1119						8'40"	COMPLETED WITH NO APPARENT DAMAGE	
								TO THE SPECIMEN.	
								R. Breen	
3/23	1120	Z	Amb	Above Levels				S/N 35 ; SWEEP FROM 5-2000 HZ	
	1124						4'24"	COMPLETED WITH NO APPARENT DAMAGE	
								TO THE SPECIMEN.	
								R. Breen	
3/23	1125	Z	Amb	Above Levels				S/N 35 ; SWEEP FROM 2000-5 HZ	
	1129						4'28	COMPLETED WITH NO APPARENT DAMAGE	
								TO THE SPECIMEN	
								R. Breen	
3/23	1129	Z	Amb	Above Levels				S/N 35 SWEEP FROM 5-2000 HZ	
	1133						4'27"	COMPLETED WITH NO APPARENT DAMAGE	
								TO THE SPECIMEN.	
								R. Breen	

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PAGE NO 9

V589

SIGNED: R. Breen

JOB NO. 48580

SHEET 5 OF 14

I D No. S/N 35

DYNAMICS SECTION
VIBRATION TEST DATA SHEET
SINE VIBRATION

DATE	TIME	AXIS	TEMP (°F)	SINUSOIDAL FREQ. (CPS)	DISP. ("DA)	ACCEL (±G)	TEST TIME (MIN)	COMMENTS	NAME
								TEST REQUIREMENT	
3/23	1133	Z	Amb	5-44	.3	—		S/N 35 SWEEP FROM 2000-5 HZ	
	1138			44-120	—	30		COMPLETED WITH NO APPARENT DAMAGE	
				120-150	.104	—		TO THE SPECIMEN.	
				150-2000	—	45	4'35	R Bruen	
3/23	1138	Z	Amb	Above Levels				S/N 35 SWEEP FROM 5-2000 HZ	
	1142						4'20	COMPLETED WITH NO APPARENT DAMAGE	
								TO THE SPECIMEN.	
								R Bruen	
3/23	1320	Z	Amb	Above Levels				S/N 35 CYCLE FROM 5-2000-5 HZ	
	1329						9'21"	COMPLETED WITH NO APPARENT DAMAGE	
								TO THE SPECIMEN.	
								R. Bruen	
3/23	1330	Z	Amb	Above Levels				S/N 35 CYCLE FROM 5-2000-5 HZ	
	1339						9'13"	COMPLETED WITH NO APPARENT DAMAGE	
								TO THE SPECIMEN.	
								R Bruen	
3/23	1400	Z	Amb	Above Levels				S/N 35 CYCLE FROM 5-2000-5 HZ	
	1409						9'5"	COMPLETED WITH NO APPARENT DAMAGE	
								TO THE SPECIMEN.	
								R Bruen	

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REPORT NO 48580

PAGE NO 7

SIGNED: R Bruen

DYNAMICS SECTION
VIBRATION TEST DATA SHEET
SINE VIBRATION

JOB [redacted]58[redacted]
SHEET 6 OF 14
I D No. S/N 34

DATE	TIME	AXIS	TEMP (°F)	SINUSOIDAL FREQ. (CPS)	SINUSOIDAL DISP. ("DA)	SINUSOIDAL ACCEL. (±G)	TEST TIME (MIN)	COMMENTS	NAME
								TEST REQUIREMENT	
2-23	1417	Z	Amb	5-44	.3	—		S/N 34 SWEEP FROM 5-2000 HZ COMPLETED	
	1426			44-120	—	30		WITH NO APPARENT DAMAGE TO THE	
				120-150	.04	—		SPECIMEN.	
				150-2000	—	45	8'40"	R Breen	
2-23	1428	Z	Amb	Above	Levels			S/N 34 SWEEP FROM 2000-5 HZ COMPLETED	
	1436						8'26	WITH NO APPARENT DAMAGE TO THE	
								SPECIMEN.	
								R Breen	
2-23	1440	Z	Amb	Above	Levels			S/N 34 SWEEP FROM 5-2000 HZ COMPLETED	
	1444						4'14	WITH NO APPARENT DAMAGE TO THE	
								SPECIMEN	
								R Breen	
2-23	1445	Z	Amb	Above	Levels			S/N 34 SWEEP FROM 2000-5 HZ COMPLETED	
	1449						4'20	WITH NO APPARENT DAMAGE TO THE	
								SPECIMEN.	
								R Breen	
2/23	1449	Z	Amb	Above	Levels			S/N 34 SWEEP FROM 5-2000 HZ COMPLETED	
	1453						4'16"	WITH NO APPARENT DAMAGE TO THE	
								SPECIMEN.	
								R Breen	

APPENDIX

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SIGNED: R Breen

REPORT NO 48580
PAGE NO 8

DYNAMICS SECTION
VIBRATION TEST DATA SHEET
SINE VIBRATION

JOB [redacted]. [redacted]
SHEET 7 OF 14
I D No. S/N 34

DATE	TIME	AXIS	TEMP (°F)	SINUSOIDAL FREQ. (CPS)	SINUSOIDAL DISP. ("DA)	SINUSOIDAL ACCEL (±G)	TEST TIME (MIN)	COMMENTS	NAME
								TEST REQUIREMENT	
2/23	1453	Z	Amb	5-44	.3	—		S/N 34 SWEEP FROM 2000-5 HZ	
	1457			44-120	—	30		Completed with NO APPARENT DAMAGE TO	
				120-150	.04	—		THE SPECIMEN	
				150-2KC	—	45	4'20	R Bruen	
2/23	1457	Z	Amb	Above	Levels			S/N 34 SWEEP FROM 5-2000 HZ	
	1501						4'15	Completed with NO APPARENT DAMAGE	
								TO THE SPECIMEN. R Bruen	
2/23	1506	Z	Amb	Above	Levels			S/N 34 Cycle from 5-2000-5 HZ	
	1515						8'45"	Completed with NO APPARENT	
								DAMAGE.	
								R Bruen	
2/23	1516	Z	Amb	Above	Levels			S/N 34 Cycle FROM 5-2000-5 HZ	
	1525						8'50"	Completed with NO APPARENT DAMAGE	
								TO THE SPECIMEN	
								R Bruen	
2/23	1526	Z	Amb	Above	Levels			S/N 34 Cycle FROM 5-2000-5 HZ	
	1535						8'52"	Completed with NO APPARENT DAMAGE	
								TO THE SPECIMEN.	
								R Bruen	

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REPORT NO 48580
PAGE NO 9

W589

SIGNED: R Bruen

DYNAMICS SECTION
VIBRATION TEST DATA SHEET
SINE VIBRATION

I D No. S/N 34

DATE	TIME	AXIS	TEMP (°F)	SINUSOIDAL FREQ. (CPS)	SINUSOIDAL DISP. ("DA)	SINUSOIDAL ACCEL. (±G)	TEST TIME (MIN.)	COMMENTS	NAME
								TEST REQUIREMENT	
3/23	1550	Y	Amb	5-44	.3	—		S/N 34 SWEEP FROM 5-2000 HZ	
	1559			44-120	—	30		Completed with no Apparent	
				120-150	.04	—		damage to the specimen.	
				150-2000	—	45	8'31"	R Bueu	
3/23	1600	Y	Amb	Above Levels				S/N 34 Cycle From 2000-5-2000 HZ	
	1613						12'50"	2000-5 HZ @ 1min/oct 5-2000 @ 2oct/min	
								Completed with no Apparent damage	
								to the specimen.	
								R Bueu	
3/23	1614	Y	Amb	Above Levels				S/N 34 Cycle From 2000-5-2000 HZ	
	1622						8'35"	COMPLETED WITH NO APPARENT DAMAGE	
								Vea	
3/23	1622	Y	AMB	ABOVE LEVELS				S/N 34 CYCLE FROM 2000-5-2000 HZ	
	1630						8'38"	COMPLETED WITH NO APPARENT DAMAGE	
								Vea	
3/23	1633	Y	AMB	ABOVE LEVELS				S/N 34 CYCLE FROM 5-2000-5 HZ	
	1642						8'24"	COMPLETED WITH NO APPARENT DAMAGE.	
								Vea	
3/23	1643	Y	AMB.	ABOVE LEVELS				S/N 34 CYCLE FROM 5-2000-5 HZ	
	1651						8'20"	COMPLETED WITH NO APPARENT DAMAGE	
								Vea	

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SIGNED: R Bueu

APPENDIX

DYNAMICS SECTION
VIBRATION TEST DATA SHEET
SINE VIBRATION

JOB [redacted]
SHEET 9 OF 14
I D No. S/N 34

DATE	TIME	AXIS	TEMP (°F)	SINUSOIDAL FREQ. (CPS)	DISP. ("DA)	ACCEL (±G)	TEST TIME (MIN)	COMMENTS	NAME
								TEST REQUIREMENT	
3/23/67	1651	Y	AMB	5-44	.3	—		S/N 34 CYCLE FROM 5-2000-5 HZ	
	1700			44-120	—	30	8'29"	COMPLETED WITH NO APPARENT DAMAGE.	
				120-150	.04	—			
				150-2000	—	45			
24 MARCH	0820	X	AMB	ABOVE LEVELS	ABOVE	LEVELS		S/N 34 CYCLE 5-2000-5 HZ (1 OCTAVE/MIN)	
	0840						17'40"	RUN COMPLETED N.A.D. Rick Barber	
24 MAR	0840	X	AMB	ABOVE	LEVELS			S/N 34 (2 OCTAVES/MIN) (SWEEP WITH 5-2000 4-20)	
	0845						4'28"	RUN COMPLETED NAD Rick Barber	
24/MAR	~~0845~~	X	AMB	ABOVE	LEVELS			S/N 34 (2 OCTAVES/MIN) CYCLE (2000-5-2000 Hz)	
	0854				9'33"		~~9'33"~~	RUN COMPLETED N.A.D. Rick Barber	
24/MAR	0855	X	AMB	ABOVE	LEVELS			S/N 34 (2 OCTAVES/MIN) CYCLE 2000-5-2000 HZ	
	0904						9'25	RUN COMPLETED Rick Barber	
24/MAR	0905	X	AMB	ABOVE	LEVELS			S/N 34 (2 OCTAVES/MIN) CYCLE 5-2000-5 HZ	
	0915						9'25"	RUN COMPLETED N.A.D. Rick Barber	
24/MAR	0916	X	AMB	ABOVE	LEVELS			S/N 34. (2 OCTAVES/MIN) CYCLE 5-2000-5 Hz	
	0925						9'22"	RUN COMPLETED Rick Barber	

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REPORT NO 48580
PAGE NO 11

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SIGNED: R. Barber

DYNAMICS SECTION
VIBRATION TEST DATA SHEET
SINE VIBRATION

I D No. S/N 34

DATE	TIME	AXIS	TEMP (°F)	SINUSOIDAL FREQ. (CPS)	DISP. ("DA)	ACCEL (±G)	TEST TIME (MIN)	COMMENTS	NAME
								TEST REQUIREMENT	
24/MAR	0926	X	AMB	5-44	.3	–		S/N 34 2 OCTAVES/MIN 5-2000-5 HZ	
				44-120	–	30			
				120-150	.04	–			
	0935			150-2000	–	45	9'21"	RUN COMPLETED – Rick Barber	

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SIGNED: R. Breen

DYNAMICS SECTION
VIBRATION TEST DATA SHEET
SINE VIBRATION

JOB NO. ~~48580~~

SHEET 11 OF 14

I D No. S/N 35

DATE	TIME	AXIS	TEMP (°F)	SINUSOIDAL FREQ. (CPS)	DISP. ("DA)	ACCEL (±G)	TEST TIME (MIN.)	COMMENTS	NAME
24/MAR		X Y		5-44	.3	—		TEST REQUIREMENT	
	0940	Y		44-120	—	30		S/N 35 1 OCTAVES/MIN SWEEP ~~CYCLE~~ (5-2000 HZ)	
				120-150	.04	—			
	0948			150-2000	—	45	8'07"	RUN COMPLETED Rick Barber	
24/MAR	0950	Y	AMB	ABOVE	LEVELS			S/N 35 1 OCTAVES/MIN SWEEP ~~CYCLE~~ (2000-5 HZ)	
	0958						8'03"	RUN COMPLETED Rick Barber	
24/MAR	1005	Y	AMB	ABOVE	LEVELS			S/N 35 * 2 OCTAVES/MIN (50°/MIN) SWEEP ~~CYCLE~~ (5-2000 HZ)	
	1009						3'50"	RUN COMPLETED - Rick Barber	
24/MAR	1010	Y	AMB	ABOVE	LEVELS			S/N 35 * 2 OCTAVES/MIN (50°/MIN) CYCLE (2000-5-2000)	
	1018						7'30"	RUN COMPLETED Rick Barber	
24/MAR	1020	Y	AMB	ABOVE	LEVELS			S/N 35 * 2 OCTAVES/MIN (50°/MIN) CYCLE (5-2000-5 HZ)	
	1027						7'11"	RUN COMPLETED - Rick Barber	
24/MAR	1028	Y	AMB	ABOVE	LEVELS			S/N 35 * 2 OCTAVES/MIN (50°/MIN) CYCLE (5-2000-5 HZ)	
	1035						7'08"	RUN COMPLETED - Rick Barber	
								(COMPLETE CYCLE = 7 MIN APPROX)	
							*	NOTE: CUSTOMER REQUESTED ACCELERATION OF SCANNING SPEED @ 2 OCTAVE/MIN LEVEL (50°/MIN)	

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SIGNED: R Barber

APPENDIX

REPORT NO 48580

PAGE NO 13

DYNAMICS SECTION
VIBRATION TEST DATA SHEET
SINE VIBRATION

JOB NO. 48580
SHEET 12 OF 14
I D No. S/N 35

DATE	TIME	AXIS	TEMP (°F)	SINUSOIDAL FREQ. (CPS)	SINUSOIDAL DISP. ("DA)	SINUSOIDAL ACCEL (±G)	TEST TIME (MIN)	COMMENTS	NAME
24/MAR		X		5-44	.3	—		TEST REQUIREMENT	
24/MAR	1040	X	AMB	44-120	—	30		S/N 35 1 OCTAVE/MIN SWEEP CYCLE 5-2000 Hz	
	1048			120-150	.04	—	7'41"	RUN COMPLETED Rick Barber	
				150-2000	—	45			
24/MAR	1050	X	AMB	ABOVE	LEVELS			S/N 35 1 OCTAVES/MIN. SWEEP 2000-5 Hz	
	1056							SCANNING SPEED ACCELERATED AS PER CUSTOMER	
							5'40"	RUN COMPLETED Rick Barber	
24/MAR	1056	X	AMB	ABOVE	LEVELS			S/N 35 *2 OCTAVES/MIN SWEEP CYCLE 5-2000 Hz	
	1100						3'49"	RUN COMPLETED Rick Barber 4-20	
24/MAR	1100	X	AMB	ABOVE	LEVELS			S/N 35 *2 OCTAVES/MIN CYCLE 2000-5-2000	
	1108						7'10"	RUN COMPLETED Rick Barber	
24/MAR	1110	X	AMB	ABOVE	LEVELS			S/N 35 *2 OCTAVES/MIN CYCLE 5-2000-5	
	1117						7'08"	RUN COMPLETED — Rick Barber	
24/MAR	1117	X	AMB	ABOVE	LEVELS			S/N 35 *2 OCTAVES/MIN CYCLE 5-2000-5	
	1124						7'10"	RUN COMPLETED — Rick Barber	

* NOTE: CUSTOMER REQUESTED ACCELERATION OF SCANNING SPEED @ 2 OCT/MIN LEVEL. (COMPLETE CYCLE = 7' MIN)

APPENDIX

REPORT NO 48580
PAGE NO 12

V589

SIGNED: R. Barber

DYNAMICS SECTION
VIBRATION TEST DATA SHEET
RANDOM VIBRATION

JOB NO. 48580
SHEET 13 OF 14
I D NO. S/N 34

DATE	TIME	AXIS	TEMP (F)	RANDOM FREQ. (CPS)	RANDOM PSD (G^2/CPS)	RANDOM ACCEL (GRMS)	TEST TIME (MIN)	COMMENTS	NAME
24/MAR		XYZ	AMB	20-50	0.12	49	5/MIN/AXIS	TEST REQUIREMENT	
24/MAR	1330	Z	AMB	50-160	+db			S/N 34 PLOT # 3	
				160-630	3.2				
	1335			630-2000	-9db		5 MIN	RUN COMPLETED	Rick Baker
24/MAR	1345	'Y'	AMB	ABOVE	LEVELS			S/N 34 PLOT # 4	
	1350						5 MIN	RUN COMPLETED	Rick Baker
24/MAR	1355	~~X~~ X	AMB	ABOVE	LEVELS			S/N 34 PLOT # 5	
	1400						5 MIN	RUN COMPLETED	Rick Baker

1703R Q. C. Form Approval

SIGNED: R. Baker

DYNAMICS SECTION
VIBRATION TEST DATA SHEET
RANDOM VIBRATION

JOB No. 48580
SHEET 14 OF 14
I D No. S/N 35

DATE	TIME	AXIS	TEMP (F)	RANDOM FREQ. (CPS)	RANDOM PSD (G^2/CPS)	RANDOM ACCEL (GRMS)	TEST TIME (MIN)	COMMENTS	NAME
24/MAR		X Y Z	AMB	20-50	0.12	49.	5 MIN/AXIS	TEST REQUIREMENT	
24/MAR	1320	Z	AMB	50-160	+9db			S/N 35 PLOT # 2	
				160-630	3.2				
	1325			630-2000	-9db		5 MIN.	RUN COMPLETED	Rick Barber
24/MAR	1405	Y	AMB	ABOVE LEVELS				S/N 35 PLOT # 6	
	1410						5 MIN	RUN COMPLETED	Rick Barber
24/MAR	1415	X	AMB	ABOVE LEVELS				S/N 35 PLOT # 7	
	1420						5 MIN	RUN COMPLETED	Rick Barber

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V-03R Q. C. Form Approval ~~Root~~

SIGNED: R Barber

PAGE NO 16
REPORT NO 48580

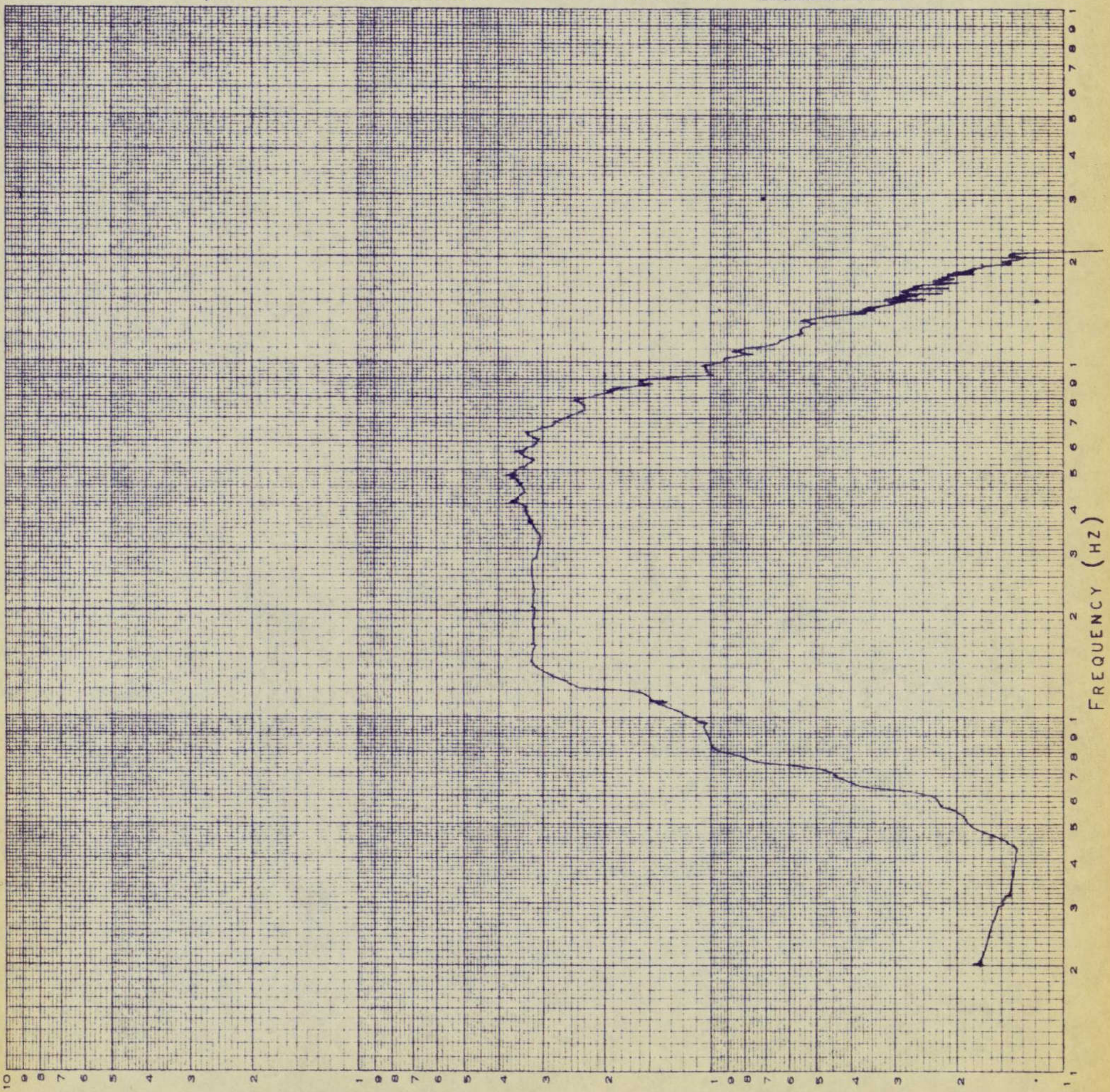
REPORT NUMBER 48580

PAGE NUMBER 17

JOB NUMBER 48580 DATE 24 MARCH 67

P/N ______ AXIS BARE FIXTURE

S/N EQUALIZATION TOTAL GRMS 49.02



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PLOT #1

Report Number 48580

Page Number 18

Job Number 48580

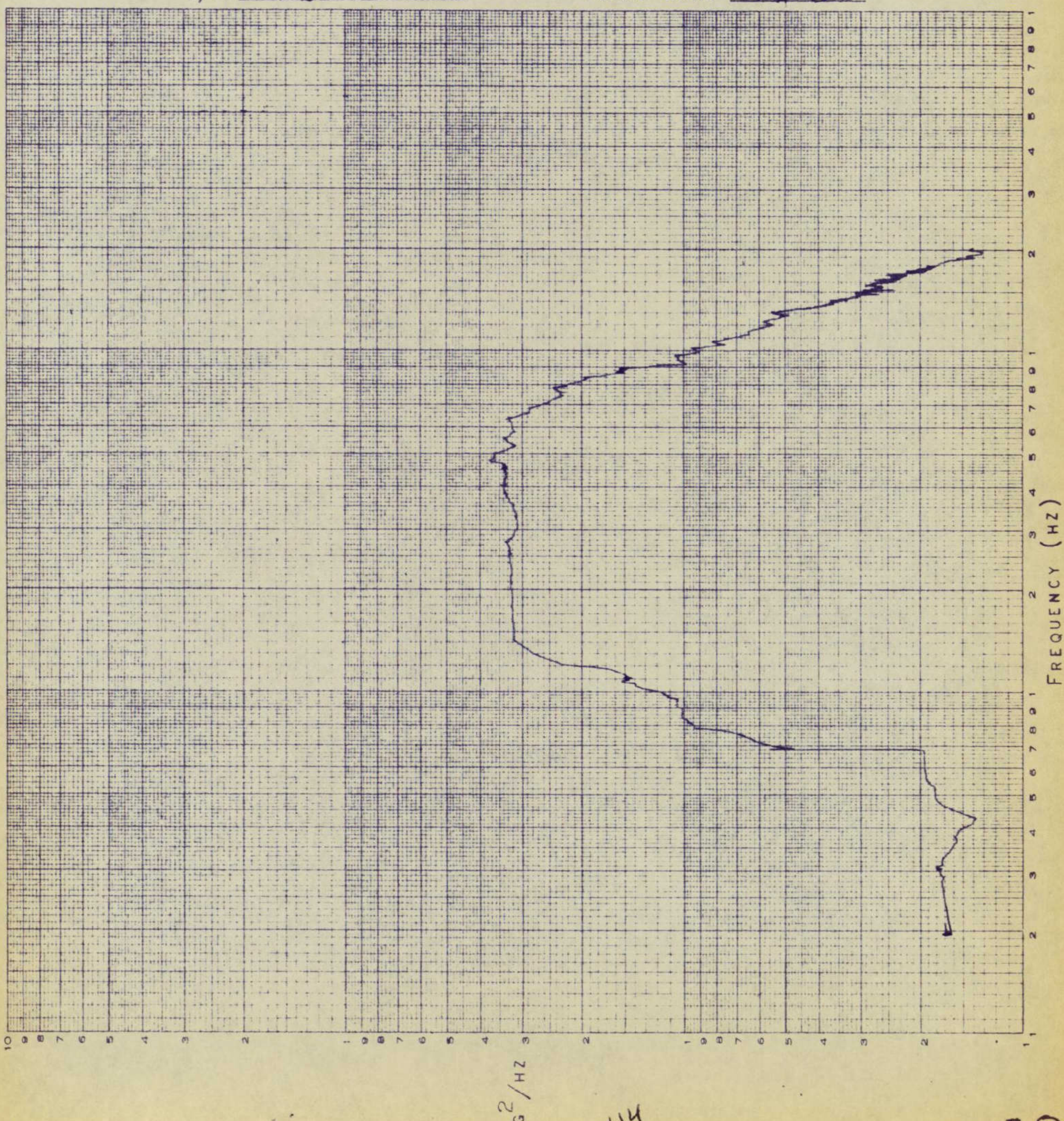
Date 24 MARCH 67

P/N SP III-25

Axis Z

S/N 35

Total GRMS 49.02



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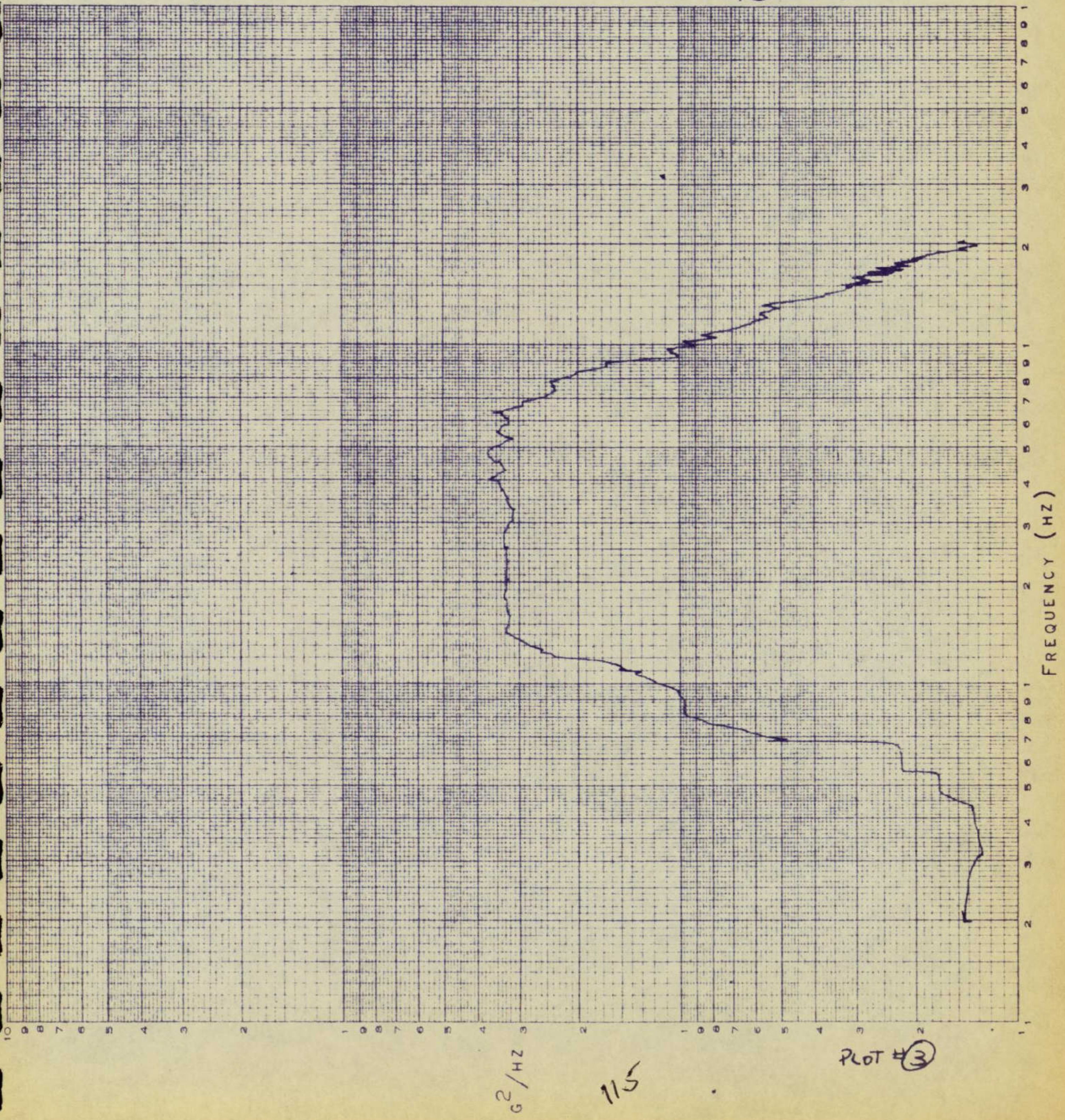
PLOT II ②

JOB NUMBER 48580
DATE 24 MARCH 67

P/N SP 111-25
AXIS Z

S/N 34
TOTAL GRMS 49.02



PLOT #3

115

Report Number 48580

Page Number 20

Job Number 48580

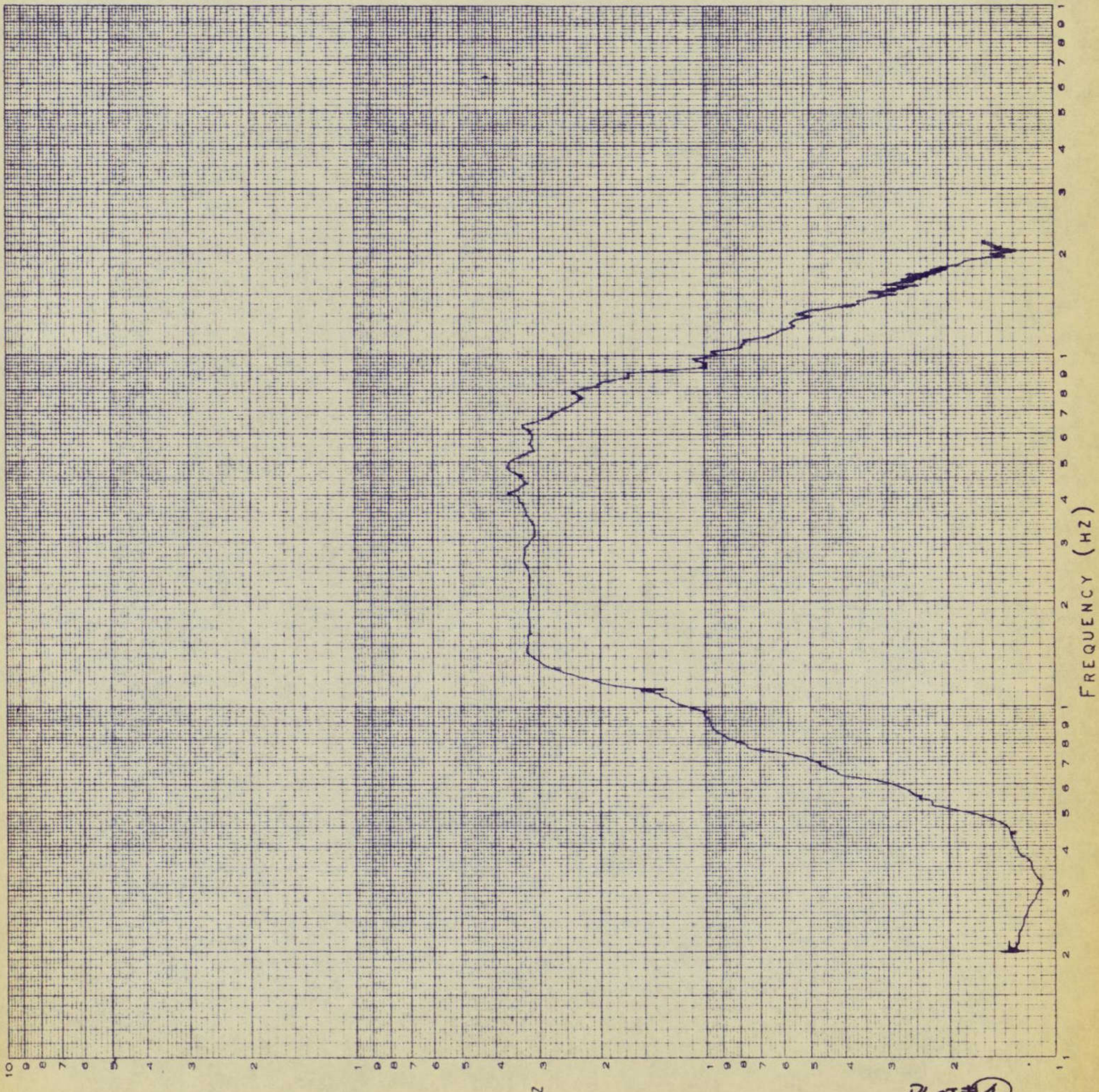
Date 24 MARCH 67

P/N SP 111-25

Axis Y

S/N 34

Total grms 49.02



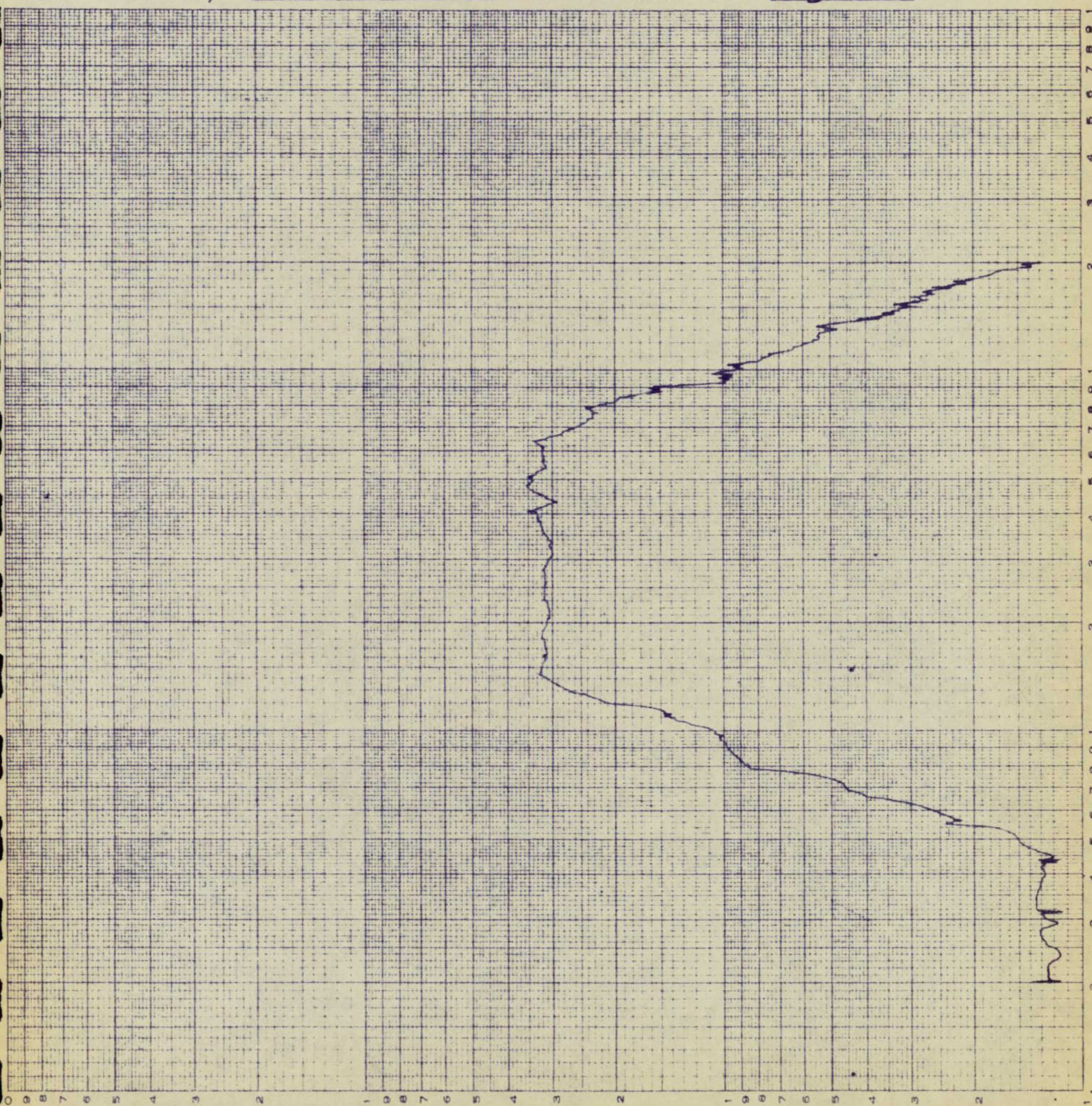
PLOT #4

116

JOB NUMBER 48580 DATE 24 MARCH 67

P/N SP 111-25 AXIS X

S/N 34 TOTAL GRMS 49.02



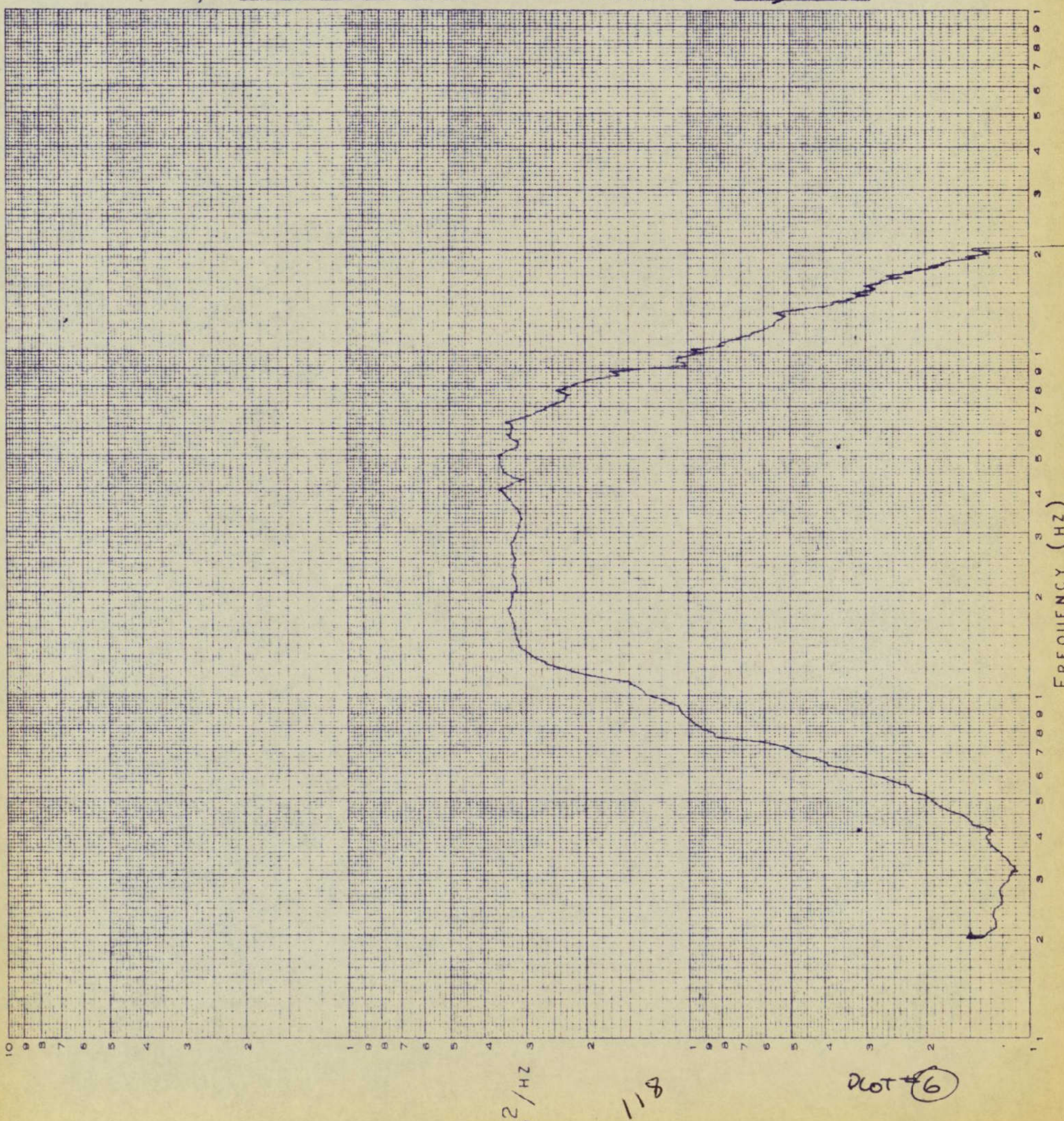
117

PLOT #5

JOB NUMBER 48580 DATE 24 MARCH 67

P/N SP-111-25 AXIS Y

S/N 35 TOTAL GRMS 49.02



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PLOT #6

REPORT NUMBER 23

PAGE NUMBER

JOB NUMBER 48580

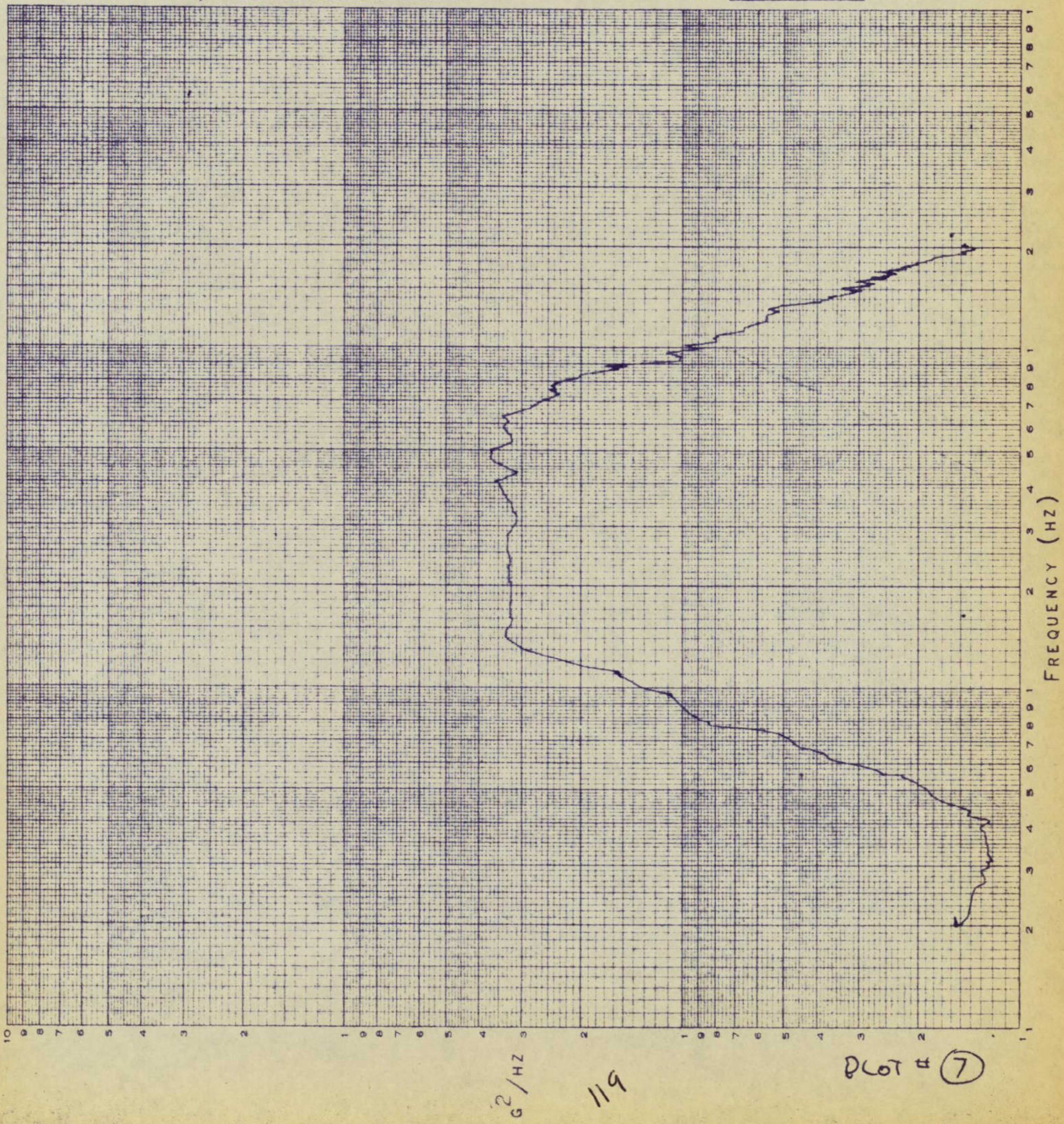
DATE 24 MARCH 67

P/N SP 111-25

AXIS X

S/N 35

TOTAL GRMS 49.02



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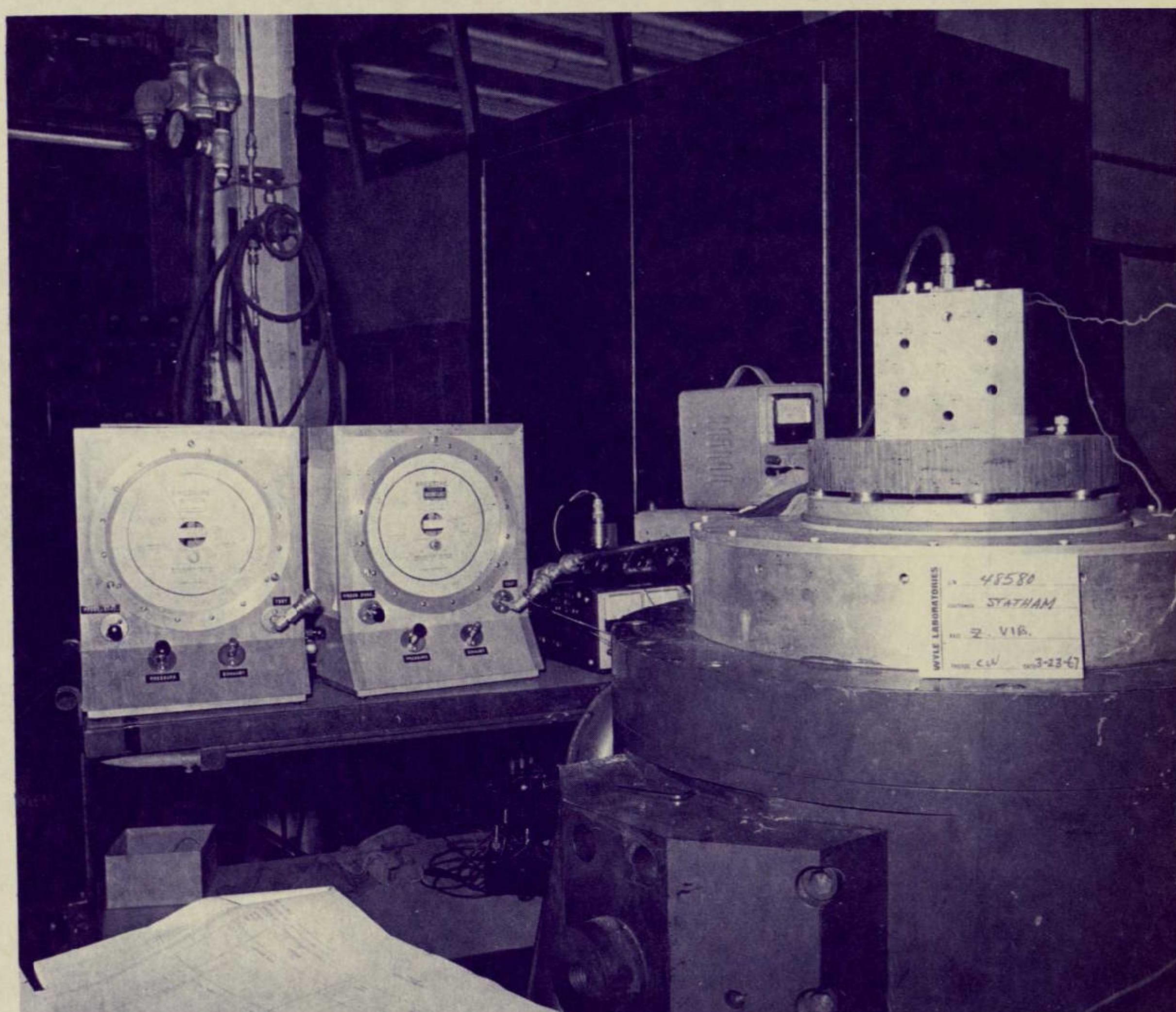
PLOT # 7



TEST SETUP

3930-67-581
RBJ:DLB:vb

NORTHROP NORAIR

19 May 1967

Statham Instruments, Inc.
12401 West Olympic Boulevard
Los Angeles, California 90064

Attention: Mr. J. D. Blake, Purchasing Manager

Reference: A) Statham Instruments Purchase Order No. KC 29962
B) Northrop Norair Test Work Order No. 95274

Enclosure: 1) Photograph of Test Setup
2) Photograph of Specimen Monitoring Setup
3) Negatives of Enclosed Photographs (2)

Gentlemen:

Subject: Acoustic Noise Test of Pressure Switches

In accordance with the provisions of the referenced purchase authority, two (2) of your SP 111-25 Pressure Switches, serial numbers 34 and 35, were subjected to a reverberant acoustic test. The test was performed in the Engineering Laboratories of Northrop Corporation, Norair Division, Hawthorne, California on 8 May 1967.

The specimens were suspended by a spring mount system within the Norair 170 cubic foot Reverberant Chamber as shown in the enclosed photograph (1). The microphones shown in the photograph were used to monitor the sound field. A Noraircoustic Generator MK V was used to provide the random sound energy directed at the specimens.

The test was witnessed by Barbara B. Burns and Messrs A. Noeggerath and A. Merko of Statham Instruments, Inc. Specimen operation before, during and after the test was monitored by the listed personnel. Enclosure (2) is a photograph of the specimen monitoring setup.

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Sound field exposure was for eight (8) minutes at an overall sound pressure level of 157 dB. One-third octave band analysis of empty chamber and typical test spectrums are tabulated below. The spectrum was as close to the requested levels as facility limitations permitted.

	Sound Pressure Level (dB: re .0002 dynes/cm^2)		
One-third Octave Band Geometric Mean Frequency (Hz)	Requested	Empty Chamber	Typical Test Average
20.0	141.0	-	-
25.0	142.5	- *	- *
31.5	146.0	-	-
40.0	147.5	120.0	121.0
50.0	148.5	135.0	139.0
63.0	149.0	143.0	146.0
80.0	149.0	146.0	146.0
100.0	148.5	149.0	146.0
125.0	147.5	140.0	142.0
160.0	146.5	149.0	148.0
200.0	143.5	144.0	144.0
250.0	141.0	145.0	146.0
315.0	138.5	146.0	146.0
400.0	135.5	147.0	148.0
500.0	133.0	143.0	145.0
630.0	130.0	141.0	144.0
800.0	127.0	142.0	144.0
1000.0	124.5	142.0	143.0
1250.0	121.0	140.0	142.0
1600.0	117.5	139.0	140.0
2000.0	114.5	138.0	139.0
2500.0	110.0	137.0	137.0
3150.0	107.0	135.0	135.0
4000.0	103.5	133.0	135.0
5000.0	100.5	134.0	134.0
6300.0	97.5	133.0	133.0
8000.0	94.5	130.0	131.0
10000.0	91.5	128.0	129.0
Overall	157.0	157.0	157.0

* The 1/3 octave band levels at these mean frequencies were below the dynamic range of the recording equipment. The octave band level of these frequencies was measured and was as follows:

Octave Band Geometric Mean Frequency (Hz)	Requested	Empty Chamber	Typical Test
25.0	147.2	115.0	115.0

The following test equipment was used to provide and monitor the acoustic environment:

1 - Noraircoustic Generator MK V
3 - Altec 21BR200 Microphones
2 - B & K Type 2409 Electronic Voltmeters
1 - B & K Type 2111 Audio Frequency Spectrometer
1 - B & K Type 2305C Level Recorder
2 - Special Test Setups Within the Norair 170 Cubic Foot Reverberant Chamber

All equipment is currently within a cycle inspection period with the next cycle due 12 May 1967.

Northrop Norair appreciates the opportunity of providing this testing service for you. If we can be of further assistance, please contact out organization and your requirements will receive prompt attention.

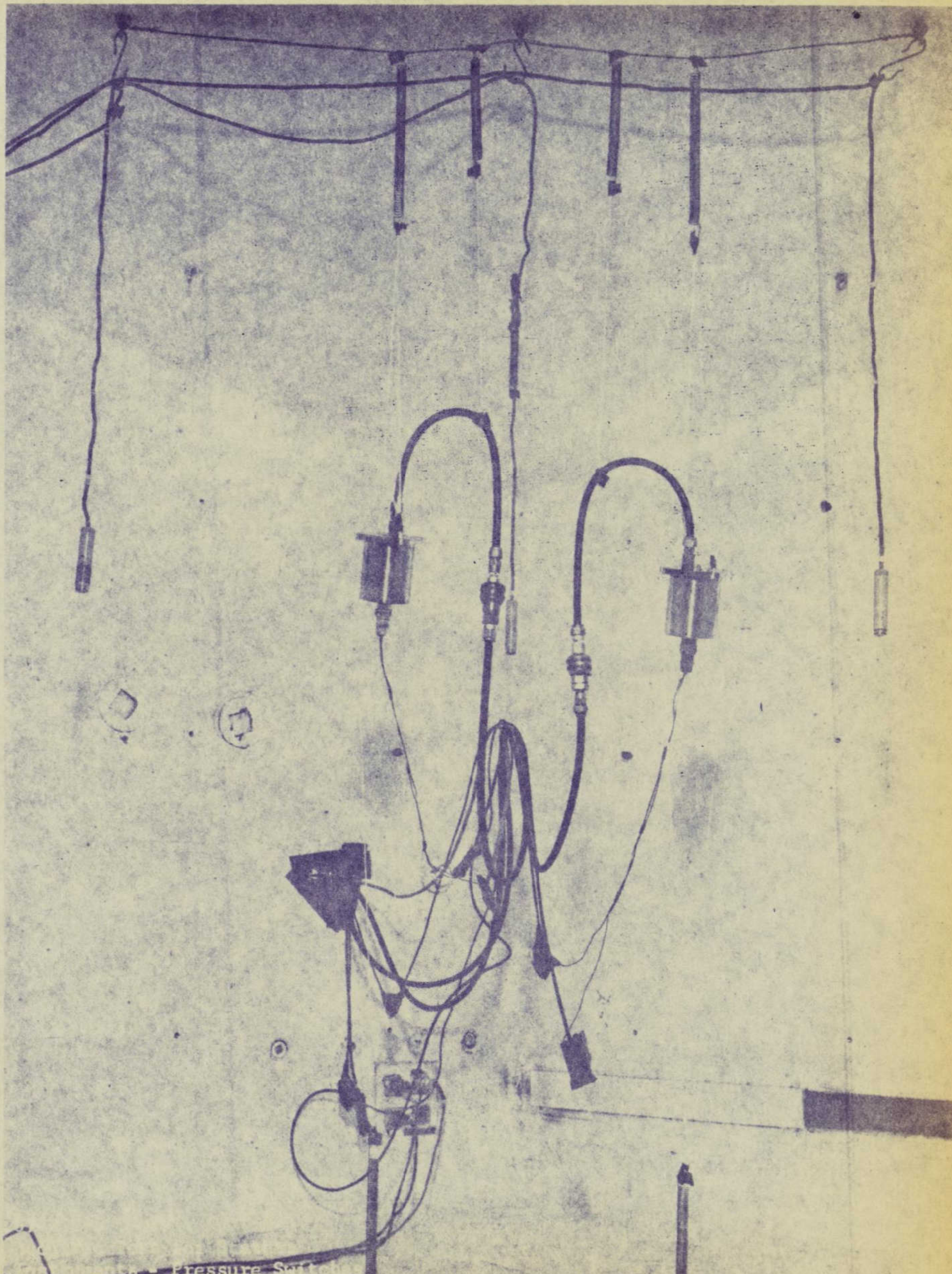
Very truly yours,

R B Jackman

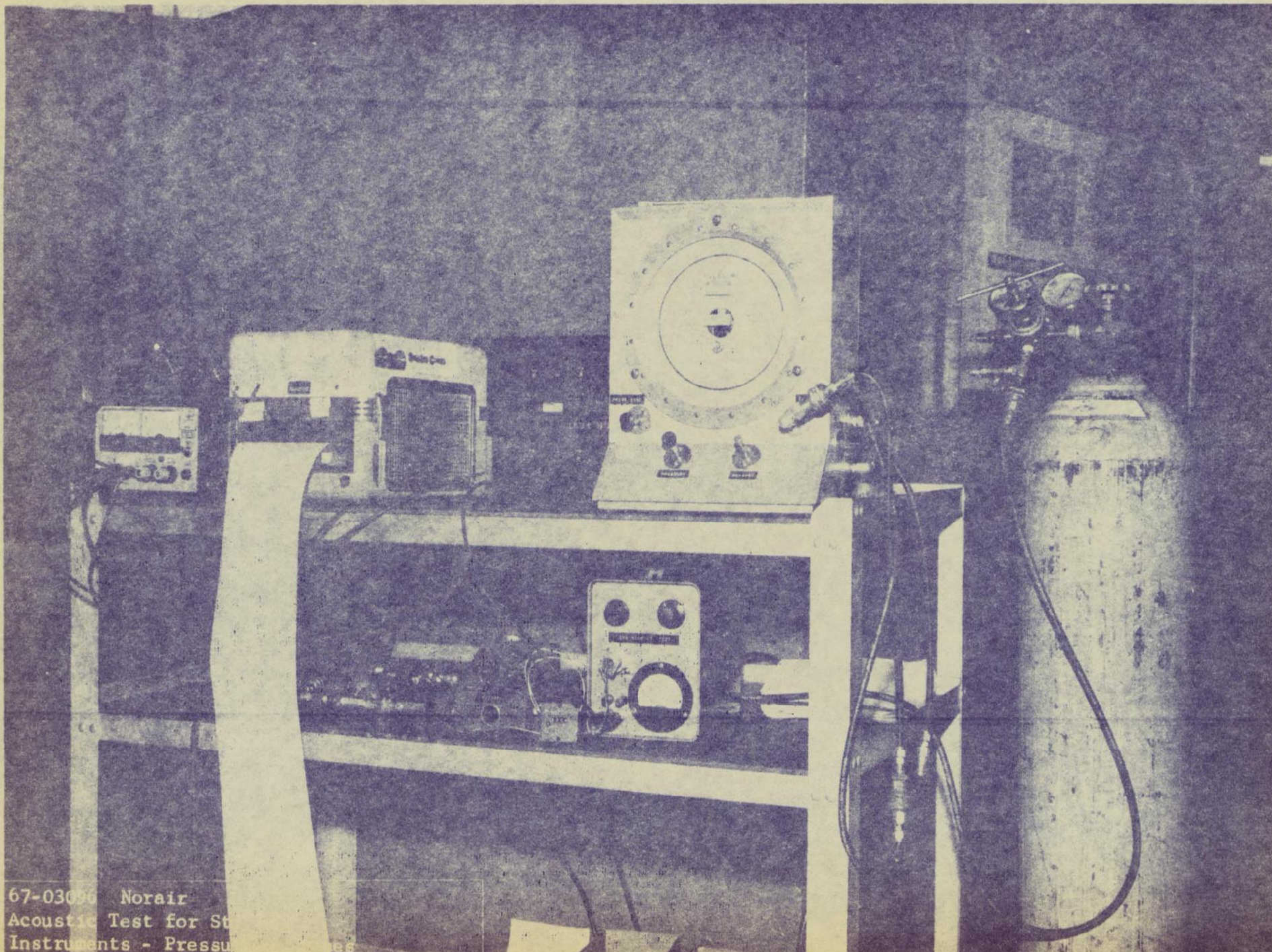
R. B. Jackman
Chief of Engineering Laboratories

H. L. Miles

H. L. Miles
USAFQA Representative


Pressure

125



67-03096 Norair
Acoustic Test for St
Instruments - Pressu es

APPENDIX II

Acceptance Test Report

FIGURE 1

STATHAM INSTRUMENTS, INC.
12401 WEST OLYMPIC BOULEVARD
LOS ANGELES, CALIFORNIA 90064

TEST DATA REPORT FOR SWITCH,

ABSOLUTE PRESSURE, ELECTRONIC

Date: March 28, 1968

Statham Model SP111-25

Serial Number 51

MSFC Specification Control Drawing
20M42121, Paragraph 4.4.2

Statham Instruments' Test Procedure
2240, Revision ____

NOTE: Paragraph references within the body of this report which appear in parentheses apply to MSFC Specification 20M42121; others refer to Statham Test Procedure 2240.

ACCEPTANCE:

L. A. Romuko
Statham Quality Assurance

7-18-68
Date

[illegible signature]
DCASR/QAR

18 Jul 68
Date

INSPECTION

4.0 (4.3.2) EXAMINATION OF PRODUCT

Visual	(Free of burrs, etc.)	
Connector	(DR60309-10-6PP-Au-R)	
Dimensional	(Per Drawing 50494)	
Identification	(Per Drawing 50495)	
Weight	(< 2.0 lbs.)	1 lb. 14 oz.

5.0 (4.3.3) FUNCTIONAL & PERFORMANCE

5.1 (4.3.3.2) Pressure Settings

	Calibration Port	System Port (Requirement*)	Difference (< 2.0 PSI)
Actuate	25.577 PSIA	25.045 PSIA	0.532 PSI
Deactuate	25.180 PSIA	24 555 PSIA	0.625 PSI
Actuate	25.575 PSIA	25 039 PSIA	0.536 PSI
Deactuate	25.170 PSIA	24 554 PSIA	0.616 PSI
Actuate	25.563 PSIA	25.030 PSIA	0.533 PSI
Deactuate	25.157 PSIA	24.546 PSIA	0.611 PSI
Actuate	25.550 PSIA		
Deactuate	25.140 PSIA		

(* Actuation Pressure: 24.875 to 25.125 PSIA
Deactuation Pressure: 0.15 to 0.5 PSI lower than actuation)

5.2 (4.3.3.3) Leakage Test and Operating Pressure
(< .0091 cc/sec at 75 PSIA for Five Minutes)
System Port
Calibration Port

5.3 (4.3.3.4) Insulation Resistance
(> 50 megohms at 50 volts DC) >10K Megohms

5.4 (4.3.3.5) Output Voltage
Actuated (> 26.0 volts DC) 26.85 Volts
Deactuated (0 to 0.5 volts DC) 0.00 Volts

INSPECTION

5.5 (4.3.4.1) Altitude (System Port)
(0 to 0.5 PSIA atmosphere)

	Actuation (24.875 - 25.125 PSIA)	Deactuation (0.15 - 0.5 PSI Below Actuation)
1)	25.057 PSIA	24.641 PSIA
2)	25.050 PSIA	24.622 PSIA
3)	25.044 PSIA	24.614 PSIA
(After 30 Minutes - 0 to 0.5 PSIA atmosphere)		
1)	25.042 PSIA	24.615 PSIA
2)	25.049 PSIA	24.608 PSIA
3)	25.042 PSIA	24.598 PSIA

5.6 (4.3.3) Functional Verification

5.1 (4.3.3.2) Pressure Settings

	Calibration Port	System Port (Requirement*)	Difference (< 2.0 PSI)
Actuate	25.573 PSIA	25.012 PSIA	0.561 PSI
Deactuate	25.172 PSIA	24.592 PSIA	0.590 PSI
Actuate	25.583 PSIA	25.021 PSIA	0.562 PSI
Deactuate	25.173 PSIA	24.582 PSIA	0.591 PSI
Actuate	25.576 PSIA	25.009 PSIA	0.567 PSI
Deactuate	25.165 PSIA	24.585 PSIA	0.580 PSI
Actuate	25.565 PSIA		
Deactuate	25 160 PSIA		

(* Actuation Pressure: 24.875 to 25.125 PSIA
Deactuation Pressure: 0.15 to 0.5 PSI lower than actuation)

5.2 (4.3.3.3) Leakage Test and Operating Pressure
(< .0091 cc/sec at 75 PSIA for Five Minutes)
System Port
Calibration Port

5.3 (4.3.3.4) Insulation Resistance
(> 50 megohms at 50 volts DC) > 30K Megohms

5.4 (4.3.3.5) Output Voltage
Actuated (> 26.0 volts DC) 26.51 Volts
Deactuated (0 to 0.5 volts DC) 0.01 Volts

Inspection

5.7 (4.3.4.2) Temperature

Standard 25.007 PSIA at Room Temperature

Temperature Degree F	Calibration Port		System Port (±0.5 PSI from Standard)		Difference (<2.0 PSI)
	Actuate	Deactuate	Actuate	Deactuate	
+125	25.58	25.19	24.95	24.53	0.630
	25.58	25.19	24.94	24.52	0.640
	25.58	25.19	24.94	24.52	0.640
	25.58	25.19	26.69VDC	0.00VDC	
-65	25.97	25.61	25.31	24.97	0.660
	25.97	25.61	25.31	24.97	0.660
	25.97	25.61	25.31	24.97	0.660
	25.97	25.61	26.64VDC	0.00VDC	
-25	25.93	25.56	25.25	24.90	0.680
	25.93	25.56	25.24	24.90	0.690
	25.93	25.56	25.24	24.90	0.690
	25.93	25.56	26.67VDC	0.00VDC	
0	25.89	25.51	25.21	24.84	0.680
	25.89	25.51	25.20	24.85	0.690
	25.89	25.51	25.20	24.85	0.690
	25.89	25.51	26.67VDC	0.00VDC	
+30	25.84	25.44	25.15	24.78	0.690
	25.84	25.44	25.15	24.78	0.690
	25.84	25.44	25.14	24.78	0.700
	25.84	25.44	26.68VDC	0.00VDC	
+125	25.58	25.18	24.94	24.52	0.640
	25.57	25.18	24.94	24.51	0.630
	25.57	25.18	24.94	24.51	0.630
	25.57	25.18	26.70VDC	0.00VDC	
-150	25.94	25.63	25.31	25.03	0.630
	25.94	25.63	25.31	25.03	0.630
	25.94	25.63	25.31	25.02	0.630
	25.94	25.63	26.61VDC	0.00VDC	
-100	26.00	25.67	25.34	25.03	0.660
	26.00	25.67	25.34	25.03	0.660
	26.01	25.67	25.34	25.02	0.670
	26.01	25.67	26.64VDC	0.00VDC	
-65	26.01	25.65	25.33	24.99	0.680
	26.01	25.65	25.33	24.99	0.680
	26.01	25.66	25.33	24.99	0.680
	26.01	25.66	26.66VDC	0.00VDC	
0	25.90	25.52	25.23	24.86	0.670
	25.90	25.53	25.22	24.86	0.680
	25.91	25.53	25.22	24.86	0.690
	25.90	25.52	26.67VDC	0.00VDC	

INSPECTION

5.8 (4.3.3) Functional Verification

5.1 (4.3.3.2) Pressure Settings

	Calibration Port	System Port (Requirement*)	Difference (< 2.0 PSI
Actuate	25.71 PSIA	25.05 PSIA	-0.660 PSI
Deactuate	25.32 PSIA	24.64 PSIA	0.680 PSI
Actuate	25.71 PSIA	25.05 PSIA	0.660 PSI
Deactuate	25.32 PSIA	24.64 PSIA	0.680 PSI
Actuate	25.71 PSIA	25.05 PSIA	0.660 PSI
Deactuate	25.32 PSIA	24.64 PSIA	0.680 PSI
Actuate	25.71 PSIA		
Deactuate	25.32 PSIA		

(* Actuation Pressure: 24.875 to 25.125 PSIA
Deactuation Pressure: 0.15 to 0.5 PSI lower than actuation)

5.2 (4.3.3.3) Leakage Test and Operating Pressure
(< .0091 cc/sec at 75 PSIA for Five Minutes)
System Port
Calibration Port

5.3 (4.3.3.4) Insulation Resistance
(> 50 megohms at 50 volts DC) 30K Megohms

5.4 (4.3.3.5) Output Voltage
Actuated (> 26.0 volts DC) 26.69 Volts
Deactuated (0 to 0.5 volts DC) 0.00 Volts

5.9 (4.3.4.3.2) Vibration

1. Actuation Pressure 25.06 PSIA
   Deactuation Pressure 24.66 PSIA
2. Actuation Pressure 25.06 PSIA
   Deactuation Pressure 24.68 PSIA
3. Actuation Pressure 25.06 PSIA
   Deactuation Pressure 24.68 PSIA
4. Actuation Pressure 25.06 PSIA
   Deactuation Pressure 24.68 PSIA
5. Actuation Pressure 25.06 PSIA
   Deactuation Pressure 24.69 PSIA

No Chatter

INSPECTION

5.10 (4.3.3) Functional Verification

5.1 (4.3.3.2) Pressure Settings

	Calibration Port	System Port (Requirement*)	Difference (< 2.0 PSI)
Actuate	25.732 PSIA	25.037 PSIA	0.695 PSI
Deactuate	25.338 PSIA	24.611 PSIA	0.727 PSI
Actuate	25.734 PSIA	25 032 PSIA	0.702 PSI
Deactuate	25.329 PSIA	24.598 PSIA	0.731 PSI
Actuate	25.732 PSIA	25.015 PSIA	0.717 PSI
Deactuate	25.327 PSIA	24.593 PSIA	0.734 PSI
Actuate	25.724 PSIA		
Deactuate	25.319 PSIA		

(* Actuation Pressure: 24.875 to 25.125 PSIA
Deactuation Pressure: 0.15 to 0.5 PSI lower than actuation)

5.2 (4.3.3.3) Leakage Test and Operating Pressure
(< .0091 cc/sec at 75 PSIA for Five Minutes)
System Port
Calibration Port

5.3 (4.3.3.4) Insulation Resistance
(> 50 megohms at 50 volts DC) > 20K Megohms

5.4 (4.3.3.5) Output Voltage
Actuated (> 26.0 volts DC) 26 66 Volts
Deactuated (0 to 0.5 volts DC) 0.00 Volts

W.

WYLE LABORATORIES / El Segundo California 322 1763 678-4251 TWX 910-348 6699 Cable WYLAB

TEST REPORT

REPORT NO 49745

OUR JOB NO 49745

YOUR P O NO KH 40539

CONTRACT n a

Statham Instruments
12401 West Olympic
Los Angeles, California

9-Page Report

DATE 9 April 1968

VIBRATION TEST

1 0 REFERENCES

1 1 Statham Instruments, Incorporated Test Procedure Number 2240, Revision A, dated 21 August 1967.

1 2 Statham Instruments Purchase Order Number KH 40539

2.0 PROCEDURES AND RESULTS

2 1 Random Vibration

2 1 1 Two (2) Pressure Switches, Model Number SP111d-25, Serial Numbers 51 and 54, were subjected to random vibration in accordance with Paragraph 5.9 of Reference 1.1, above.

Performance testing, as necessary, was done by Statham Instruments personnel

2.1 2 The specimens exhibited no visual evidence of damage as a result of this test.

Note. Verification of markings by Wyle personnel identified specimen Model Number as SP111d-25

ELECTRONICS DEPARTMENT

STATE OF CALIFORNIA
COUNTY OF LOS ANGELES } ss

B. M Bleak, being duly sworn, deposes and says That the information contained in this report is the result of complete and carefully conducted tests and is to the best of his knowledge true and correct in all respects

SEAL

B. M. Bleak

~~Director, Western Test Div.~~

SUBSCRIBED and sworn to before me this 9 day of April, 19 68

Eleanor M Fuerst

Notary Public in and for the County of Los Angeles, State of California.

My Commission expires 28 Feb, 19 72

TEST BY Warren Muller
Test Engineer

[signature]
Department Manager

TEST WITNESS

QUALITY CONTROL [signature]

133

WYLE LABORATORIES

DATA SHEET

Test Title RANDOM VIBRATION

Customer STATHAM

Part No SB1111d-25

S/N 51154

Spec STATHAM TP. 2240

Para 5.9.2.

Job No 49745

Date Test Started 4-3-68

Date Test Completed 4-3-68

Amb. Temp $70 \pm 20°F$

Photo NO

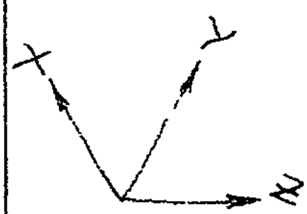
Test Med NA

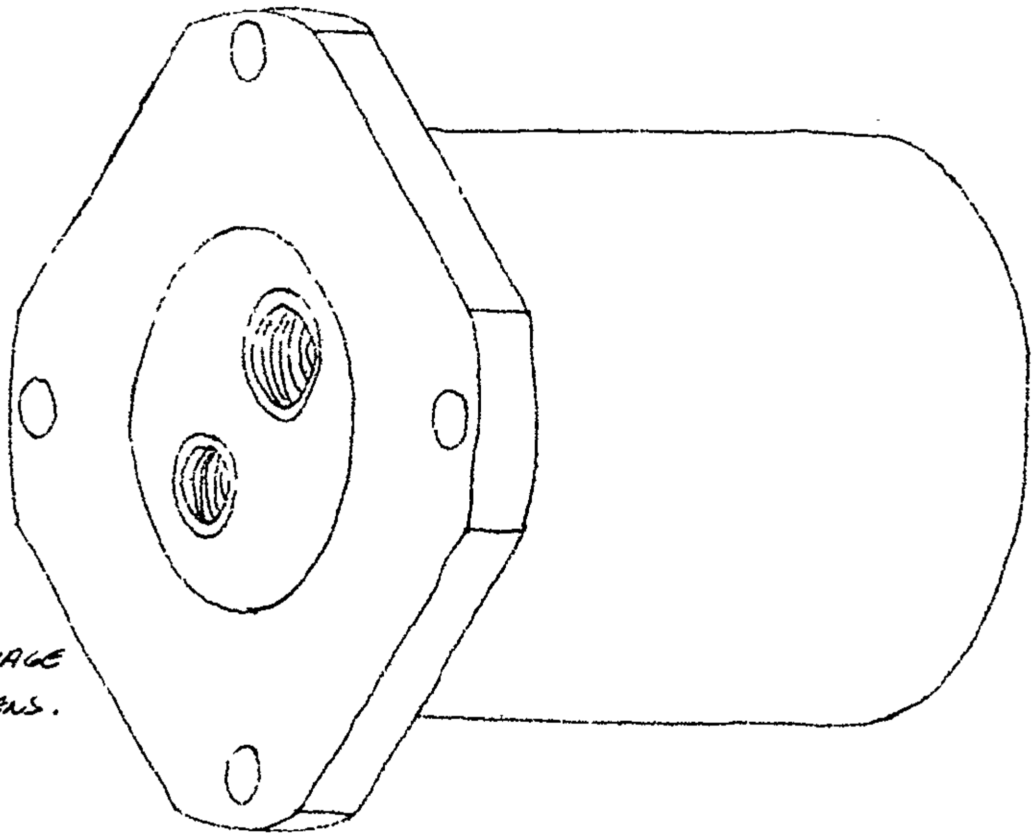
Specimen Temp AMB

Specimen PRESSURE SWITCH

THE TEST SPECIMENS WERE SUBJECTED TO THE FOLLOWING RANDOM VIBRATION LEVELS IN THE Z AXIS ONLY.

20-50 HZ @ $.12\ g^2/HZ$
50-160 HZ @ +9db
160-630 HZ @ $3.2\ g^2/HZ$
630-2000 HZ @ -9db 50 grms





TEST RESULTS:
NO APPARENT DAMAGE TO TEST SPECIMENS.

Specimen Meets Spec Requirements YES [X] NO [ ]

Tested By [signature]
Witness ____ Date ____
Sheet No 1 of 4
Approved [signature] Date 4-4-68

134

W 614 A

WYLE LABORATORIES

SPECIMEN PRESSURE SWITCH
CUSTOMER STATHAM
PART NO. PWSR S~~B~~111d-25
S/N 51&54
TEST: RANDOM VIBRATION

JOB NO. 49795
DATE 4-3-68
TEST BY KUAm
WITNESS —

EQUIPMENT	MANUFACTURER	MODEL NO.	SERIAL NO.	RANGE	WYLE NO.	CALIBRATION LAST	CALIBRATION DUE	ACCY
POWER AMPLIFIER	LING	50/70	NA	50 KVA	6379	NA	NA	NA
VIBRATION EXCITER	LING	B-300	NA	8,000 lbs/SINE	91603	NA	NA	NA
RANDOM CONSOLE	LING	ASDE80	NA	85 CHANNEL	6812	PRIOR TO TEST		
RMS METER	B&K	—	NA	1,000 VAC	30812	1-26-68	4-26-68	MFG SPEC
TIMER	STANDARD	—	NA	0-60	6389	10-12-67	4-12-68	±.1 SEC
XY PLOTTER	MOSLEY	135	NA	10 INCH	1058	2-9-68	6-9-68	±1% FS
CHARGE AMP	UNHOLTZ DICKIE	8PMCV	NA	4,000 g	4549	2-19-68	8-19-68	±2%
ACCELEROMETER	ENDEVCO	2272	NV87	4,000 g	6567	1-16-68	4-16-68	±5%

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Report Number 49745
Page Number 3

W 614 C

WYLE LABORATORIES

DATA SHEET

Customer STATHAM

Job No. 49745

Date 4-3-68

Specimen PRESSURE SWITCH

RECEIVING INSPECTION

No of Specimens Received: Two

Record identification information exactly as it appears on the tag or specimen·

Manufacturer STATHAM

Part numbers SP111d-25

How does identification information appear: (name plate, tag, painted, imprinted, etc.)

IMPRINTED

Serial Numbers * 51
54

Examination Visual, for evidence of damage, poor workmanship, or other defects, and completeness of identification

Inspection Results. There was no visible evidence of damage to the specimens unless noted below

*If additional space is required for serial numbers, use an additional page, or reference first functional test data sheet (if applicable)

Inspected By [signature]

Sheet No 3 of 4

Approved ______ Date ______

W614 Q C Form Approval [signature]

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DYNAMICS SECTION
VIBRATION TEST DATA SHEET
RANDOM VIBRATION

JOB NO. 94145
SHEET 4 OF 4
I D No. S/N 51 & 54

DATE	TIME	AXIS	TEMP (F)	RANDOM FREQ. (CPS)	PSD (G^2/CPS)	ACCEL (GRMS)	TEST TIME (MIN)	COMMENTS	NAME
		Z	AMB	20-50	.12 g^2/Hz		*	TEST REQUIREMENT	
				50-160	+9 db			* CUSTOMER DETERMINATION.	
				160-630	3.2 g^2/Hz				
				630-2000	-9 db	50			
4/3	1125	Z	AMB	ABOVE LEVELS				S/N 54	
	1127						1'39"	VIBRATION COMPLETE, NO APPARENT DAMAGE	[illegible]
4/3	1130	Z	AMB	ABOVE LEVELS				S/N 51	
	1132						1'40"	VIBRATION COMPLETE, NO APPARENT DAMAGE	[illegible]

REPORT NO. 7713

PAGE NO. 5

...03R Q. C. Form Approval [illegible]

SIGNED: R Brun

Job Number 49745

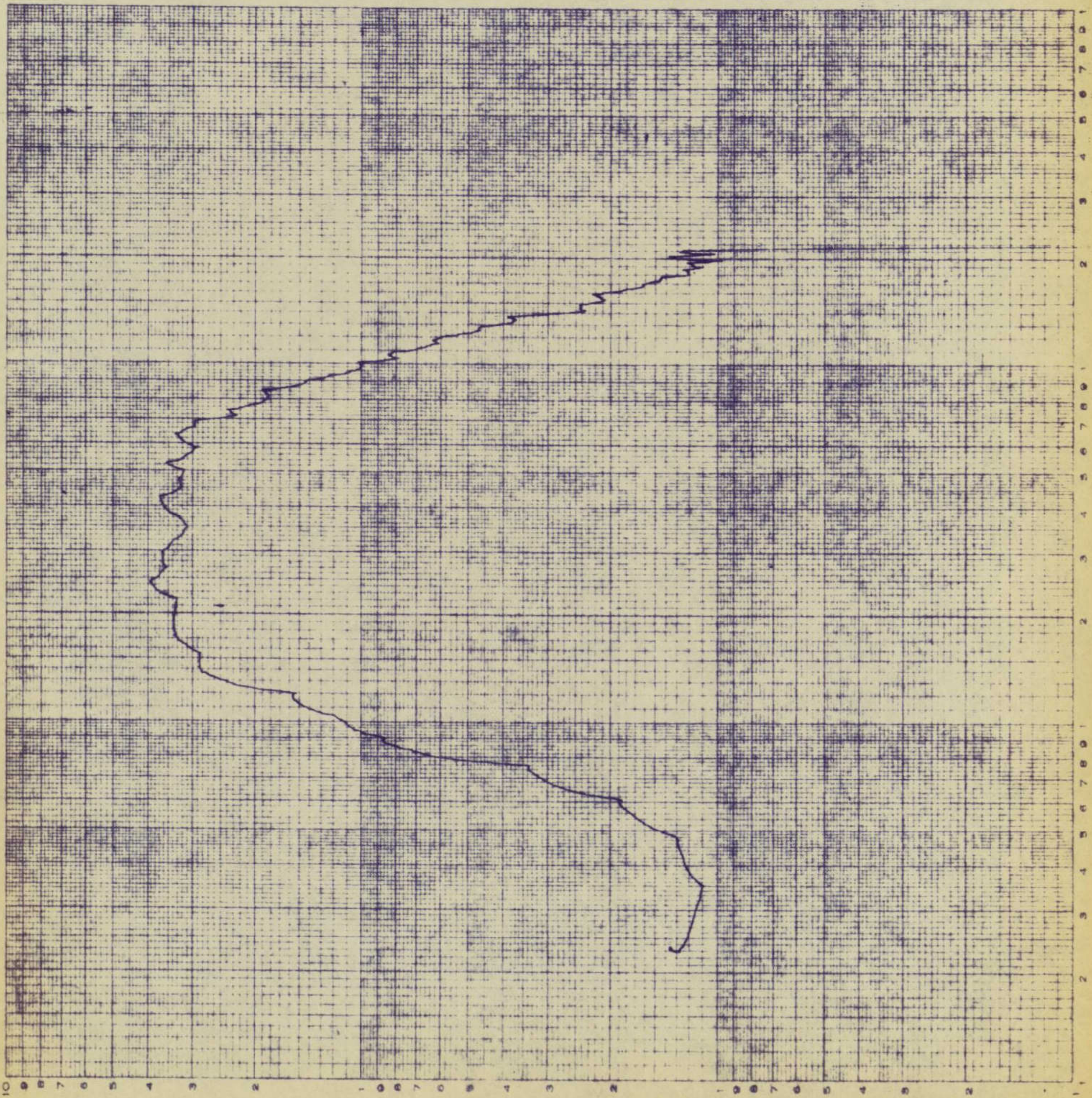
Date 4-3-68

P/N NA

Axis CALIB

S/N

Total GRMS 5.0



W 752

WYLE LABORATORIES

Report Number 49745

Page Number 7

Job Number 49745

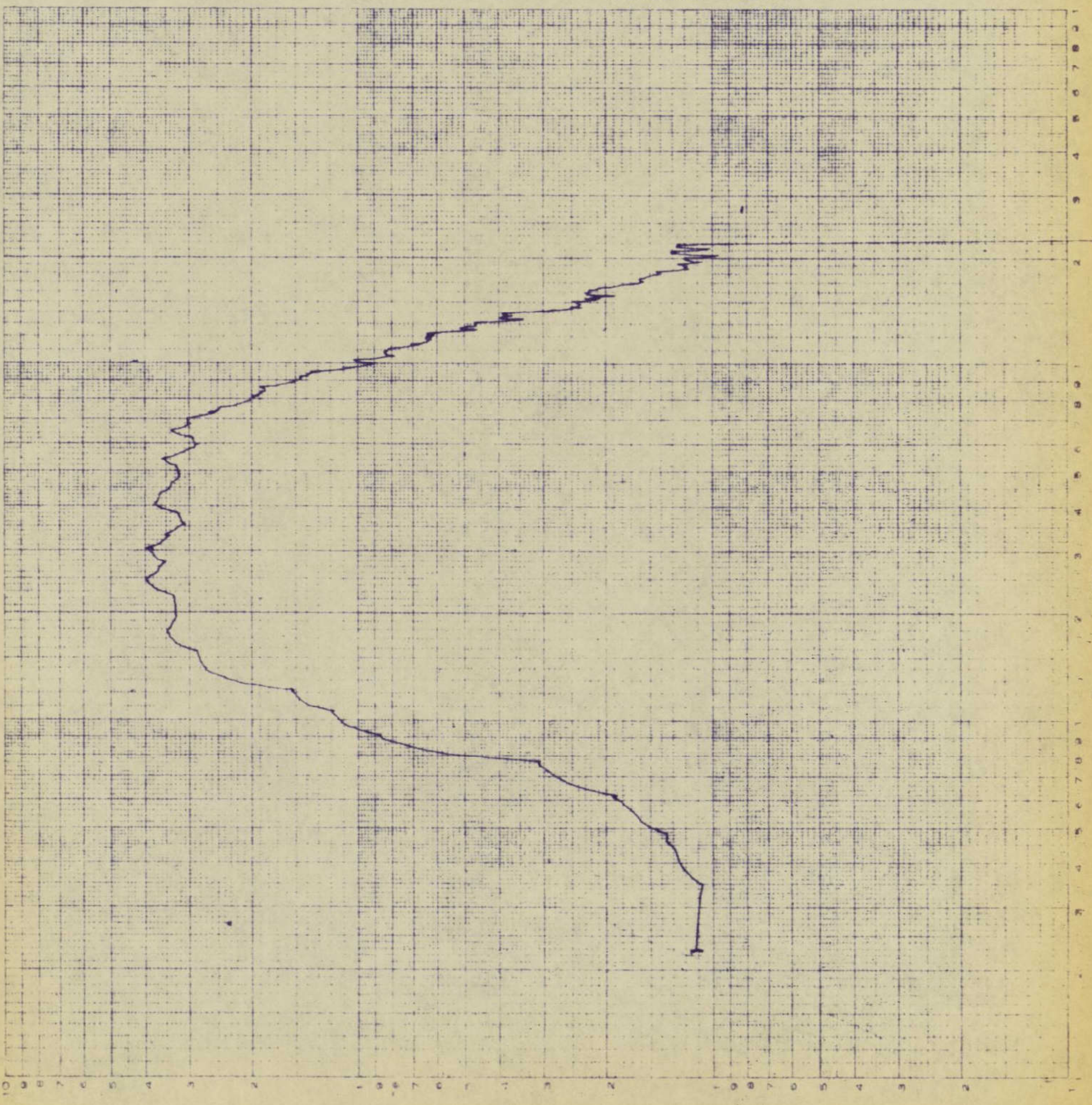
Date 9-3-68

P/N NA

Axis EQUALIZATION

S/N

Total GRMS 50



W 752

139

WYLE LABORATORIES

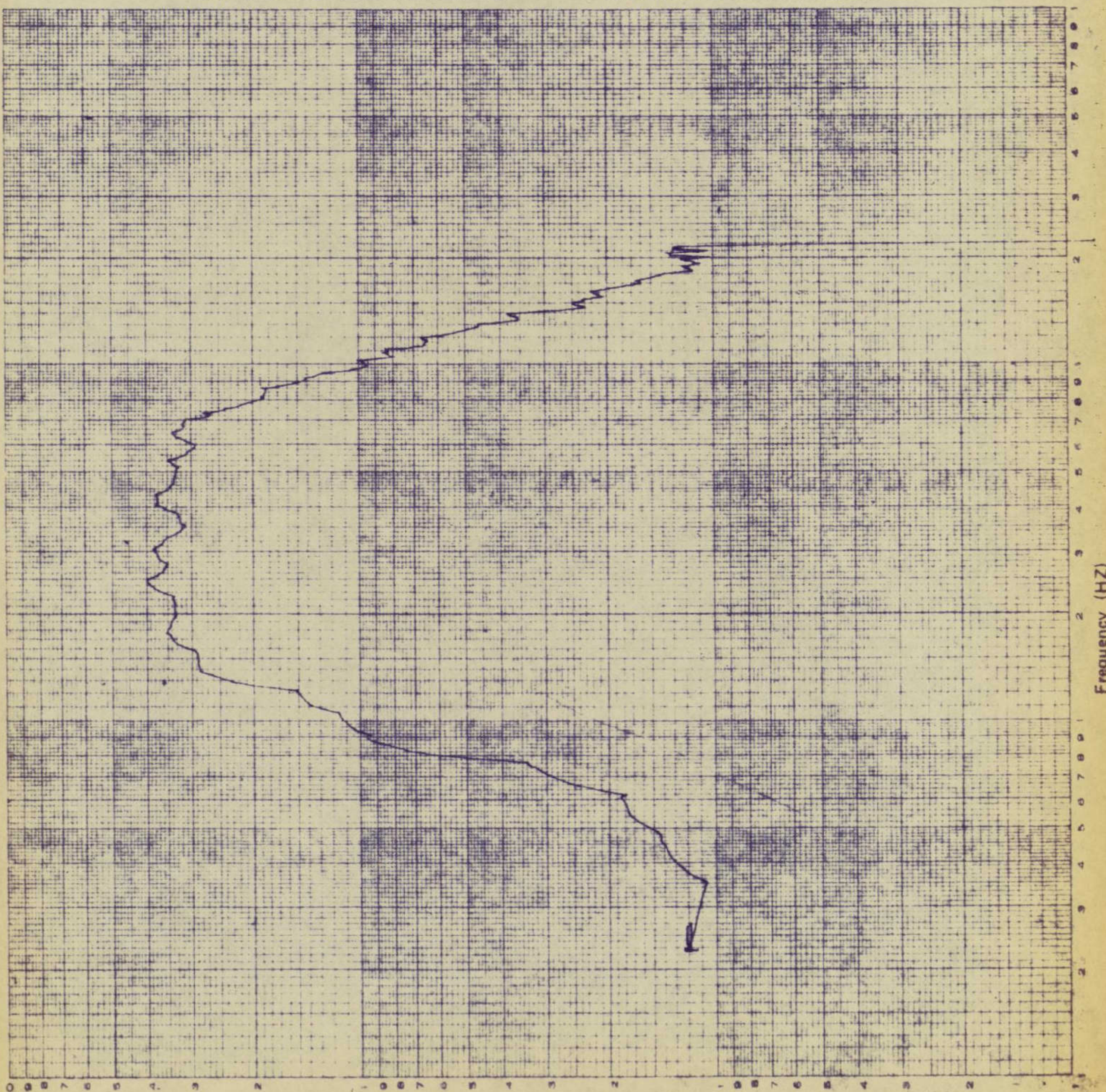
Report Number 49745

Page Number 8

Job Number 49745 Date 4-3-68

P/N SP111d-25 Axis Z

S/N 51 Total GRMS 50 [illegible]



W 752

G^2/HZ

140

Job Number 49745 Date 4-3-68

P/N SP111d-25 Axis Z

S/N 54 Total GRMS 50

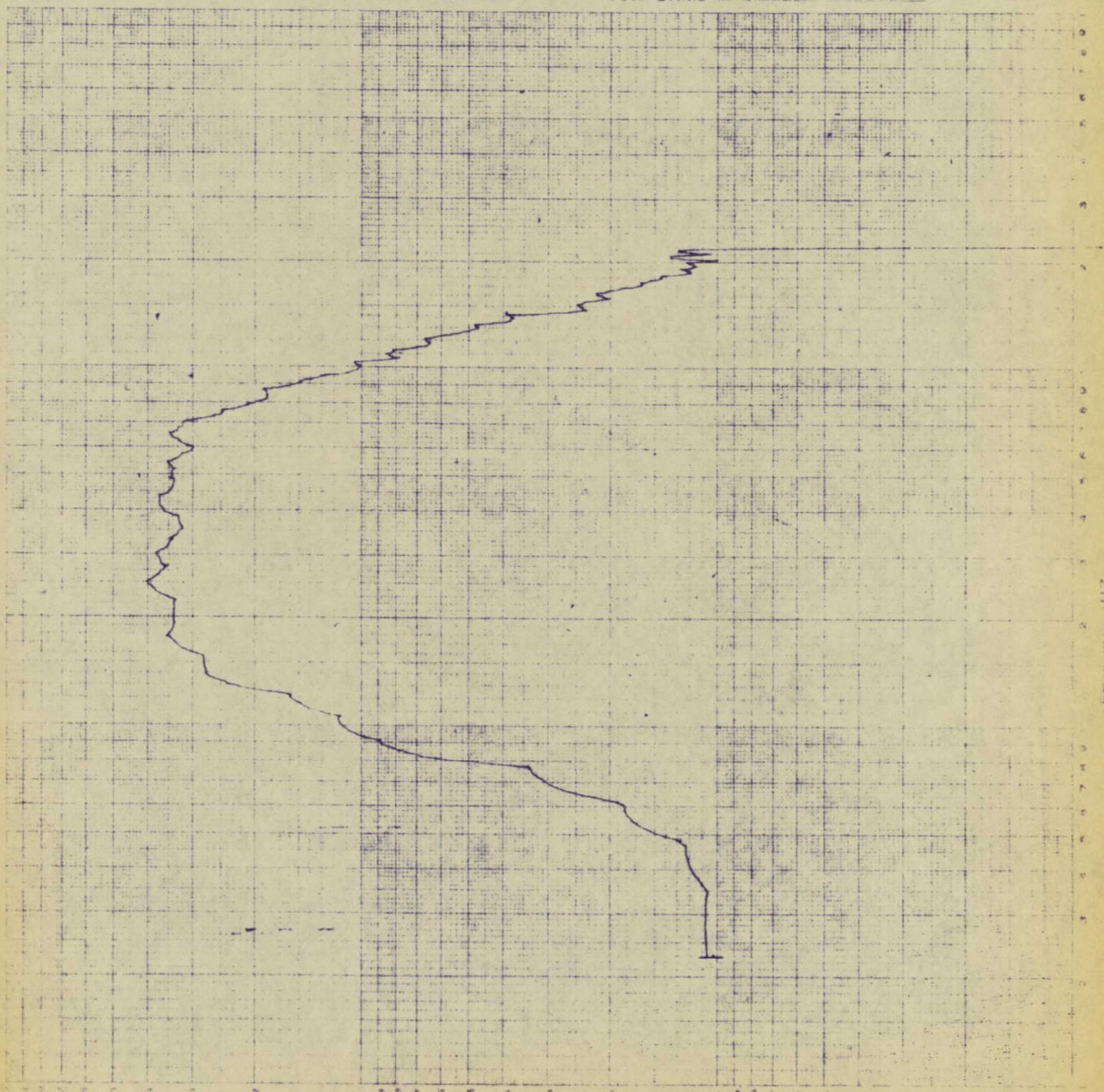


FIGURE 1

STATHAM INSTRUMENTS, INC.
12401 WEST OLYMPIC BOULEVARD
LOS ANGELES, CALIFORNIA 90064

TEST DATA REPORT FOR SWITCH,

ABSOLUTE PRESSURE, ELECTRONIC

Date: March 23, 19[illegible]

Statham Model SP111-25

Serial Number 54

MSFC Specification Control Drawing
20M42121, Paragraph 4.4.2

Statham Instruments' Test Procedure
2240, Revision ______

NOTE: Paragraph references within the body of this report which appear in parentheses apply to MSFC Specification 20M42121; others refer to Statham Test Procedure 2240.

ACCEPTANCE:

Statham Quality Assurance	7-15-65 Date
DCASR/QAR	16 JUL 65 Date

INSPECTION

4.0 (4.3.2) EXAMINATION OF PRODUCT

Visual	(Free of burrs, etc.)	
Connector	(DR60309-10-6PP-Au-R)	
Dimensional	(Per Drawing 50494)	
Identification	(Per Drawing 50495)	
Weight	(< 2.0 lbs.) 1 lb. 14 oz.	

5.0 (4.3.3) FUNCTIONAL & PERFORMANCE

5.1 (4.3.3.2) Pressure Settings

	Calibration Port	System Port (Requirement*)	Difference (< 2.0 PSI)
Actuate	25.737 PSIA	24.980 PSIA	0.757 PSI
Deactuate	25.396 PSIA	24.673 PSIA	0.723 PSI
Actuate	25.733 PSIA	24.974 PSIA	0.759 PSI
Deactuate	25.394 PSIA	24.667 PSIA	0.727 PSI
Actuate	25.726 PSIA	24.969 PSIA	0.757 PSI
Deactuate	25.[illegible]9 PSIA	[illegible]669 PSIA	0.727 PSI
Actuate	25.721 PSIA		
Deactuate	25.394 PSIA		

(* Actuation Pressure: 24.875 to 25.125 PSIA
Deactuation Pressure: 0.15 to 0.5 PSI lower than actuation)

5.2 (4.3.3.3) Leakage Test and Operating Pressure
(< .0091 cc/sec at 75 PSIA for Five Minutes)
System Port
Calibration Port

5.3 (4.3.3.4) Insulation Resistance
(> 50 megohms at 50 volts DC) >50K Megohms

5.4 (4.3.3.5) Output Voltage
Actuated (> 26.0 volts DC) 26.72 Volts
Deactuated (0 to 0.5 volts DC) 0.00 Volts

INSPECTION

5.5 (4.3.4.1) Altitude (System Port)
(0 to 0.5 PSIA atmosphere)

	Actuation (24.875 - 25.125 PSIA)	Deactuation (0.15 - 0.5 PSI Below Actuation)
1)	24.981 PSIA	24.679 PSIA
2)	24.979 PSIA	24.680 PSIA
3)	24.977 PSIA	24.671 PSIA
(After 30 Minutes - 0 to 0.5 PSIA atmosphere)		
1)	24.976 PSIA	24.664 PSIA
2)	24.962 PSIA	24.653 PSIA
3)	24.961 PSIA	24.653 PSIA

5.6 (4.3.3) Functional Verification

5.1 (4.3.3.2) Pressure Settings

	Calibration Port	System Port (Requirement*)	Difference (< 2.0 PSI)
Actuate	25.655 PSIA	24.992 PSIA	0.663 PSI
Deactuate	25.324 PSIA	24.681 PSIA	0.643 PSI
Actuate	25.657 PSIA	24.983 PSIA	0.674 PSI
Deactuate	25.324 PSIA	24.684 PSIA	0.640 PSI
Actuate	25.656 PSIA	24.982 PSIA	0.674 PSI
Deactuate	25.318 PSIA	24.683 PSIA	0.635 PSI
Actuate	25.649 PSIA		
Deactuate	25.314 PSIA		

(* Actuation Pressure: 24.875 to 25.125 PSIA
Deactuation Pressure: 0.15 to 0.5 PSI lower than actuation)

5.2 (4.3.3.3) Leakage Test and Operating Pressure
(< .0091 cc/sec at 75 PSIA for Five Minutes)
System Port
Calibration Port

5.3 (4.3.3.4) Insulation Resistance
(> 50 megohms at 50 volts DC) ≥100K Megohms

5.4 (4.3.3.5) Output Voltage
Actuated (> 26.0 volts DC) 26.35 Volts
Deactuated (0 to 0.5 volts DC) 0.01 Volts

Inspection

5.7 (4.3.4.2) Temperature

Standard 24.991 PSIA at Room Temperature

Temperature Degree F	Calibration Port		System Port (±0.5 PSI from Standard)		Difference (<2.0 PSI)
	Actuate	Deactuate	Actuate	Deactuate	
+125	25.73	25.42	24.90	24.62	0.830
	25.73	25.41	24.90	24.62	0.830
	25.73	25.41	24.90	24.62	0.830
	25.73	25.41	26.58VDC	0.00VDC	
-65	25.85	25.56	25.10	24.85	0.750
	25.86	25.56	25.09	24.85	0.770
	25.86	25.56	25.10	24.84	0.760
	25.86	25.56	26.40VDC	0.00VDC	
-25	25.97	25.64	25.19	24.90	0.780
	25.96	25.64	25.19	24.90	0.770
	25.96	25.64	25.19	24.90	0.770
	25.96	25.64	26.43VDC	0.00VDC	
0	25.96	25.62	25.16	24.86	0.800
	25.95	25.62	25.15	24.86	0.800
	25.95	25.62	25.15	24.86	0.800
	25.95	25.62	26.45VDC	0.00VDC	
+30	25.92	25.58	25.10	24.82	0.820
	25.91	25.57	25.10	24.81	0.810
	25.91	25.57	25.10	24.81	0.810
	25.91	25.57	26.47VDC	0.00VDC	
+125	25.74	25.42	24.90	24.63	0.840
	25.73	25.42	24.90	24.62	0.830
	25.73	25.42	24.89	24.62	0.840
	25.73	25.42	26.59VDC	0.00VDC	
-150	26.01	25.38	25.23	24.75	0.780
	25.99	25.40	25.23	24.75	0.760
	26.02	25.38	25.23	24.75	0.790
	26.02	25.37	26.36VDC	0.00VDC	
-100	26.01	25.56	25.26	24.86	0.750
	26.01	25.56	25.26	24.86	0.750
	26.01	25.56	25.26	24.86	0.750
	26.01	25.56	26.38VDC	0.00VDC	
-65	26.03	25.72	25.24	24.96	0.790
	26.02	25.71	25.23	24.96	0.790
	26.01	25.70	25.23	24.95	0.780
	26.01	25.70	26.41VDC	0.00VDC	
0	26.01	25.68	25.20	24.91	0.810
	26.01	25.68	25.19	24.90	0.820
	26.01	25.68	25.19	24.90	0.820
	26.00	25.68	26.45VDC	0.00VDC	

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INSPECTION

5.8 (4.3.3) Functional Verification

5.1 (4.3.3.2) Pressure Settings

	Calibration Port	System Port (Requirement*)	Difference (< 2.0 PSI
Actuate	25.84 PSIA	25.00 PSIA	0.840 PSI
Deactuate	25.53 PSIA	24.73 PSIA	0.800 PSI
Actuate	25.84 PSIA	25.00 PSIA	0.840 PSI
Deactuate	25.53 PSIA	24.72 PSIA	0.810 PSI
Actuate	25.84 PSIA	25.00 PSIA	0.840 PSI
Deactuate	25.53 PSIA	24.72 PSIA	0.810 PSI
Actuate	25.84 PSIA		
Deactuate	25.53 PSIA		

(* Actuation Pressure. 24.875 to 25.125 PSIA
Deactuation Pressure· 0.15 to 0.5 PSI lower than actuation)

5.2 (4.3.3.3) Leakage Test and Operating Pressure
(< .0091 cc/sec at 75 PSIA for Five Minutes)
<u>System Port</u>
<u>Calibration Port</u>

5.3 (4.3.3.4) Insulation Resistance
(> 50 megohms at 50 volts DC) 100K Megohms

5.4 (4.3.3.5) Output Voltage
<u>Actuated</u> (> 26.0 volts DC) 26.53 Volts
<u>Deactuated</u> (0 to 0.5 volts DC) 0.00 Volts

5.9 (4.3.4.3.2) Vibration

1. Actuation Pressure 25.04 PSIA
   Deactuation Pressure 24.74 PSIA
2. Actuation Pressure 25.04 PSIA
   Deactuation Pressure 24.76 PSIA
3. Actuation Pressure 25.04 PSIA
   Deactuation Pressure 24.77 PSIA
4. Actuation Pressure 25.04 PSIA
   Deactuation Pressure 24.76 PSIA
5. Actuation Pressure 25.04 PSIA
   Deactuation Pressure 24.77 PSIA

No Chatter

INSPECTION

5.10 (4.3.3) Functional Verification

5.1 (4.3.3.2) Pressure Settings

	Calibration Port	System Port (Requirement*)	Difference (< 2.0 PSI)
Actuate	25.84 PSIA	25.02 PSIA	0.820 PSI
Deactuate	25.52 PSIA	24.73 PSIA	0.790 PSI
Actuate	25.84 PSIA	25.02 PSIA	0.820 PSI
Deactuate	25 52 PSIA	24.72 PSIA	0 800 PSI
Actuate	25.84 PSIA	25.02 PSIA	0.820 PSI
Deactuate	25.52 PSIA	24.72 PSIA	0.800 PSI
Actuate	25.84 PSIA		
Deactuate	25.52 PSIA		

(* Actuation Pressure: 24.875 to 25.125 PSIA
Deactuation Pressure: 0.15 to 0.5 PSI lower than actuation)

5.2 (4.3.3.3) Leakage Test and Operating Pressure
(< .0091 cc/sec at 75 PSIA for Five Minutes)
System Port
Calibration Port

5.3 (4.3.3.4) Insulation Resistance
(> 50 megohms at 50 volts DC) 200K Megohms

5.4 (4.3.3.5) Output Voltage
Actuated (> 26.0 volts DC) 26.52 Volts
Deactuated (0 to 0.5 volts DC) 0.00 Volts

TEST REPORT

WYLE LABORATORIES / El Segundo California 322 1763 678-4261 TWX 910 348-6699 Cable WYLAB

REPORT NO 49745
OUR JOB NO 49745
YOUR P O. NO KH 40539
CONTRACT n a

Statham Instruments
12401 West Olympic
Los Angeles, California

9-Page Report

DATE 9 April 1968

VIBRATION TEST

1 0 REFERENCES

1 1 Statham Instruments, Incorporated Test Procedure Number 2240, Revision A, dated 21 August 1967

1 2 Statham Instruments Purchase Order Number KH 40539

2.0 PROCEDURES AND RESULTS

2 1 Random Vibration

2 1 1 Two (2) Pressure Switches, Model Number SP111d-25, Serial Numbers 51 and 54, were subjected to random vibration in accordance with Paragraph 5 9 of Reference 1 1, above.

Performance testing, as necessary, was done by Statham Instruments personnel

2.1 2 The specimens exhibited no visual evidence of damage as a result of this test.

Note: Verification of markings by Wyle personnel identified specimen Model Number as SP111d-25.

ELECTRONICS DEPARTMENT

STATE OF CALIFORNIA }
COUNTY OF LOS ANGELES } ss

B. M Bleak, being duly sworn, deposes and says That the information contained in this report is the result of complete and carefully conducted tests and is to the best of his knowledge true and correct in all respects

B. M Bleak

SEAL

~~Director, Western Test Div.~~

SUBSCRIBED and sworn to before me this 9 day of April 19 68

Eleanor M Fuerst

Notary Public in and for the County of Los Angeles, State of California

My Commission expires 28 Feb, 19 72

TEST BY Warren Muller
Test Engineer

A. Alba
Department Manager

TEST WITNESS

QUALITY CONTROL [illegible]

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WYLE LABORATORIES

DATA SHEET

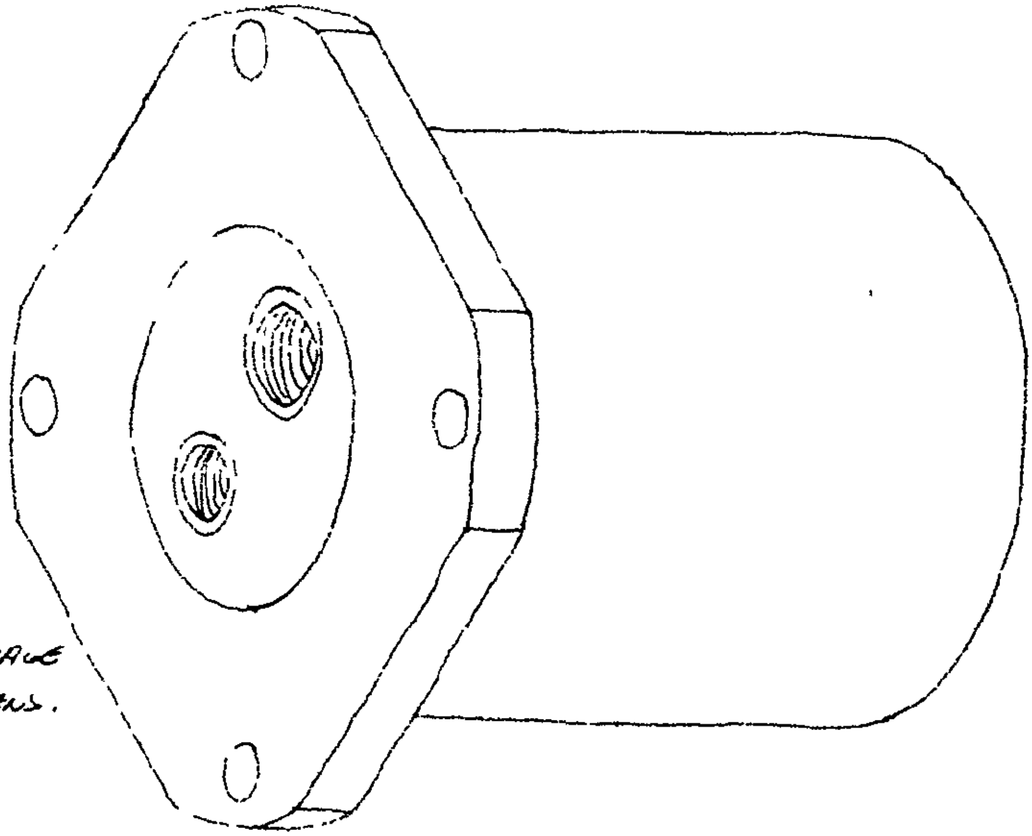
Test Title: RANDOM VIBRATION

Customer	STATHAM	Job No	49745
	OXNR	Date Test Started	4-3-68
Part No	SB1114-25	Date Test Completed	4-3-68
S/N	51¢54	Amb Temp	70±20°F
Spec	STATHAM TP. 2240	Photo	NO
Para	5.9.2.	Test Med	NA
		Specimen Temp	AMB

Specimen: PRESSURE SWITCH

THE TEST SPECIMENS WERE SUBJECTED TO THE FOLLOWING RANDOM VIBRATION LEVELS IN THE Z AXIS ONLY.

20-50 HZ @ $.12\ g^2/HZ$
50-160 HZ @ +9db
160-630 HZ @ $3.2\ g^2/HZ$
630-2000 HZ @ -9db   50 gRMS



TEST RESULTS:
NO APPARENT DAMAGE TO TEST SPECIMENS.

Specimen Meets Spec Requirements YES X NO

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Tested By: [signature]
Witness: Date:
Sheet No 1 of 4
Approved: [signature] Date 4-4-68

W 614 A

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WYLE LABORATORIES

SPECIMEN PRESSURE SWITCH
CUSTOMER STATHAM
PART NO. SP111d-25
S/N 51854

JOB NO. 49745
DATE 4-3-68
TEST BY KVAM
WITNESS —

TEST: RANDOM VIBRATION

EQUIPMENT	MANUFACTURER	MODEL No.	SERIAL No.	RANGE	WYLE No.	CALIBRATION LAST	CALIBRATION DUE	ACCY
POWER AMPLIFIER	LING	50/70	NA	50 KVA	6379	NA	NA	NA
VIBRATION EXCITER	LING	B-300	NA	8,000 lbs/SINE	71603	NA	NA	NA
RANDOM CONSOLE	LING	ASDE80	NA	85 CHANNEL	6812	PRIOR TO TEST		
RMS METER	B&K	—	NA	1,000 VAC	30812	1-26-68	4-26-68	MFG SPEC
TIMER	STANDARD	—	NA	0-60	6389	10-12-67	4-12-68	±.1 SEC
XY PLOTTER	MOSLEY	135	NA	10 INCH	1058	2-9-68	6-9-68	±1% FS
CHARGE AMP	UNHOLTZ DICKIE	8PMCV	NA	1,000 g	9549	2-19-67	8-19-68	±2%
ACCELEROMETER	ENDEVCO	2272	NV87	1,000 g	6567	1-16-68	4-16-68	±5%

W 614 C

WYLE LABORATORIES

DATA SHEET

Customer STATHAM Job No. 49745
Date 4-3-68

Specimen PRESSURE SWITCH

RECEIVING INSPECTION

No of Specimens Received Two

Record identification information exactly as it appears on the tag or specimen:

Manufacturer STATHAM

Part numbers SP111d-25

How does identification information appear (name plate, tag, painted, imprinted, etc)

IMPRINTED

Serial Numbers * 51
54

Examination Visual, for evidence of damage, poor workmanship, or other defects, and completeness of identification.

Inspection Results There was no visible evidence of damage to the specimens unless noted below.

*If additional space is required for serial numbers, use an additional page, or reference first functional test data sheet (if applicable)

Inspected By

Sheet No 3 of 4

Approved Date

W614 Q C Form Approval

DYNAMICS SECTION
VIBRATION TEST DATA SHEET
RANDOM VIBRATION

JOB NO. 49745
SHEET 4 OF 4
I D NO. S/N 51 & 54

DATE	TIME	AXIS	TEMP (F)	RANDOM FREQ. (CPS)	RANDOM PSD (G^2/CPS)	RANDOM ACCEL (GRMS)	TEST TIME (MIN)	COMMENTS	NAME
		Z	AMB	20-50	.12 g^2/Hz		*	TEST REQUIREMENT	
				50-160	+9db			*CUSTOMER DETERMINATION.	
				160-630	3.2 g^2/Hz				
				630-2000	-9db	50			
4/3	1125	Z	AMB	ABOVE LEVELS				S/N 54	
	1127						1'39"	VIBRATION COMPLETE, NO APPARENT DAMAGE	[illegible]
4/3	1130	Z	AMB	ABOVE LEVELS				S/N 51	
	1132						1'40"	VIBRATION COMPLETE, NO APPARENT DAMAGE	[illegible]

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W603R Q. C. Form Approval [illegible]

SIGNED: R Brun

REPORT NO. ____
PAGE NO. 5

WYLE LABORATORIES

Report Number 49745

Page Number 6

Job Number 49745

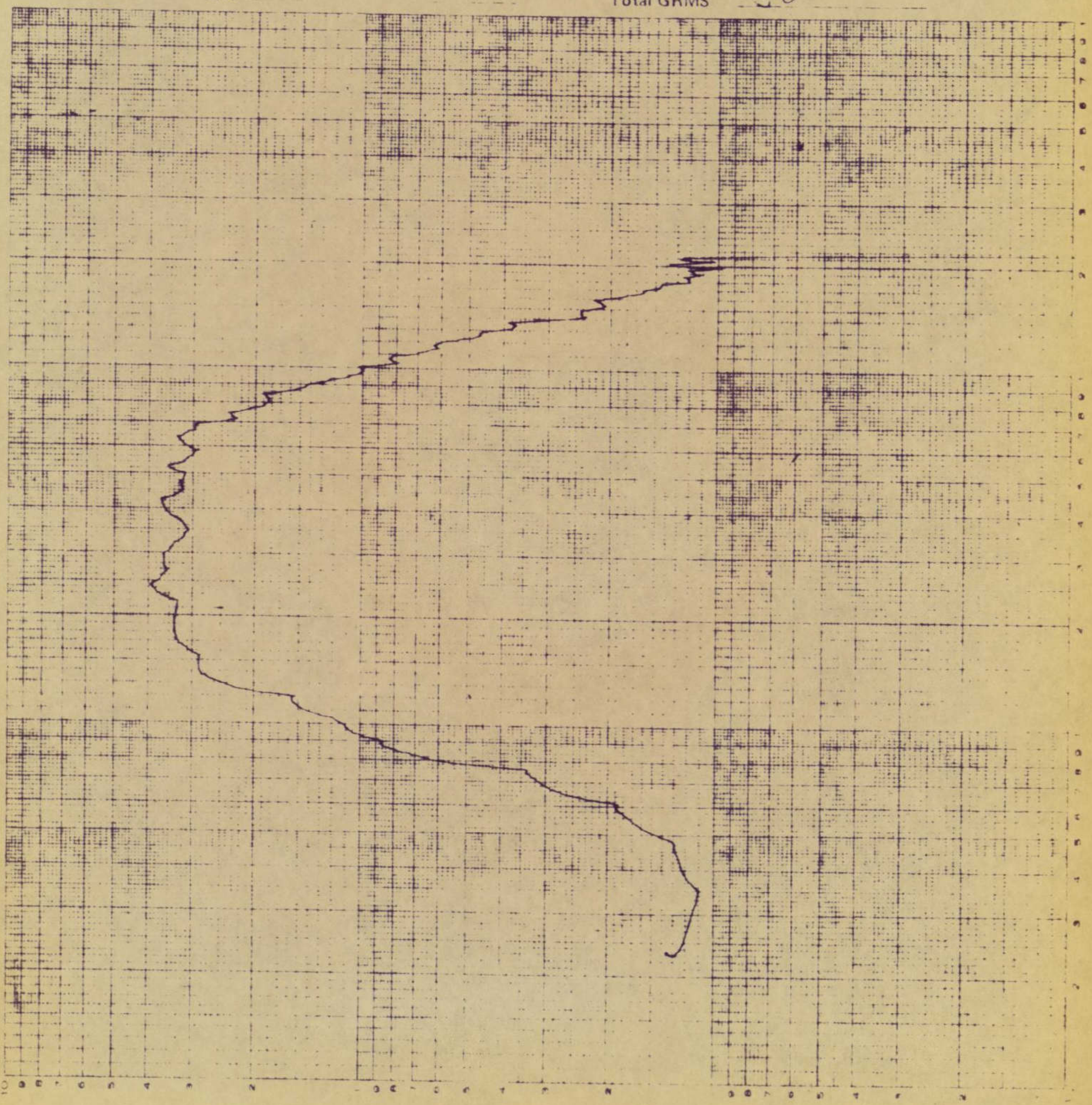
Date 4-3-68

P/N NA

Axis CALIB

S/N

Total GRMS 5.0



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Job Number 49745

Date 9-3-68

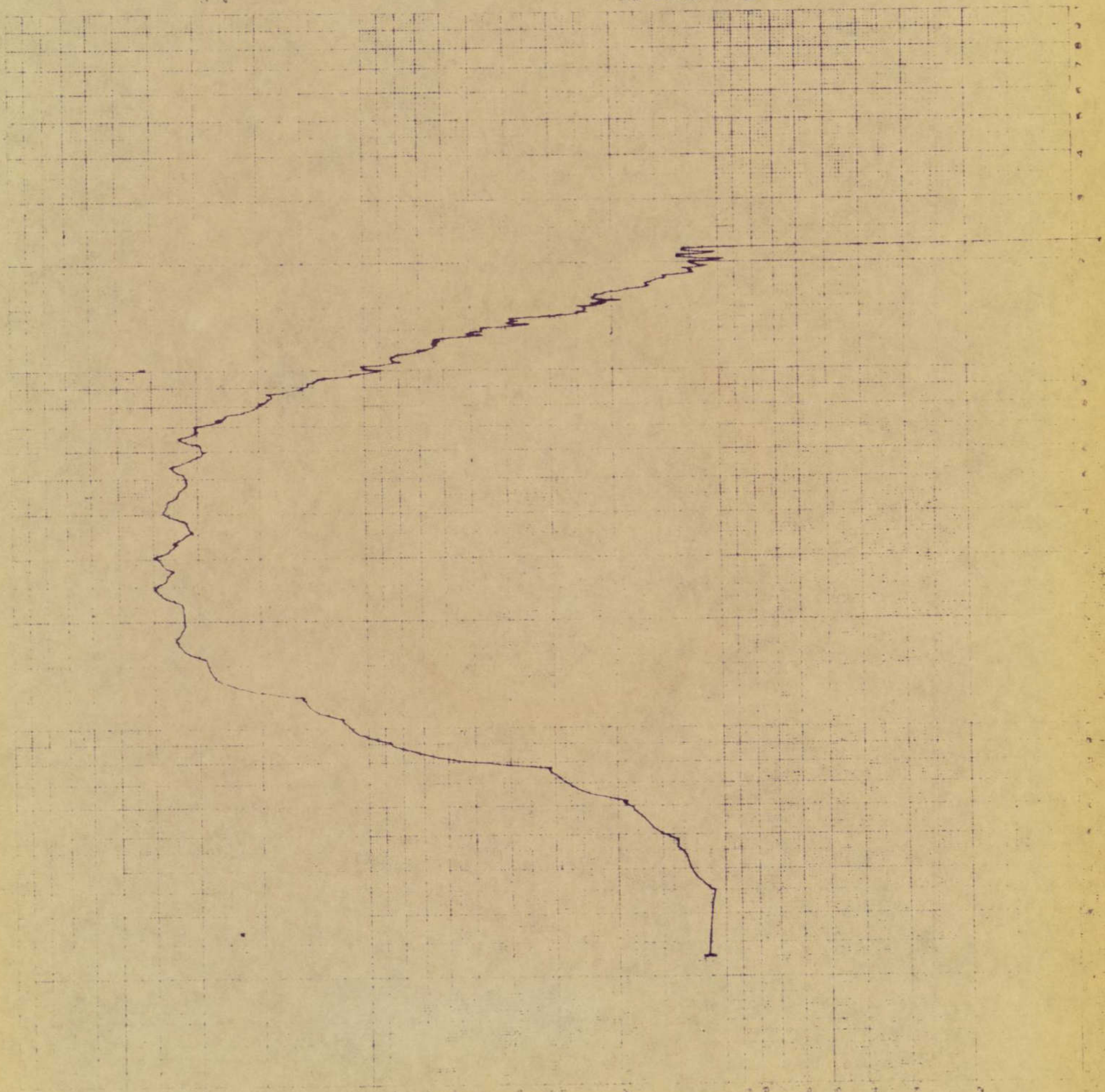
P/N NA

Axis EQUALIZATION

S/N

Total GRMS 50

KLK

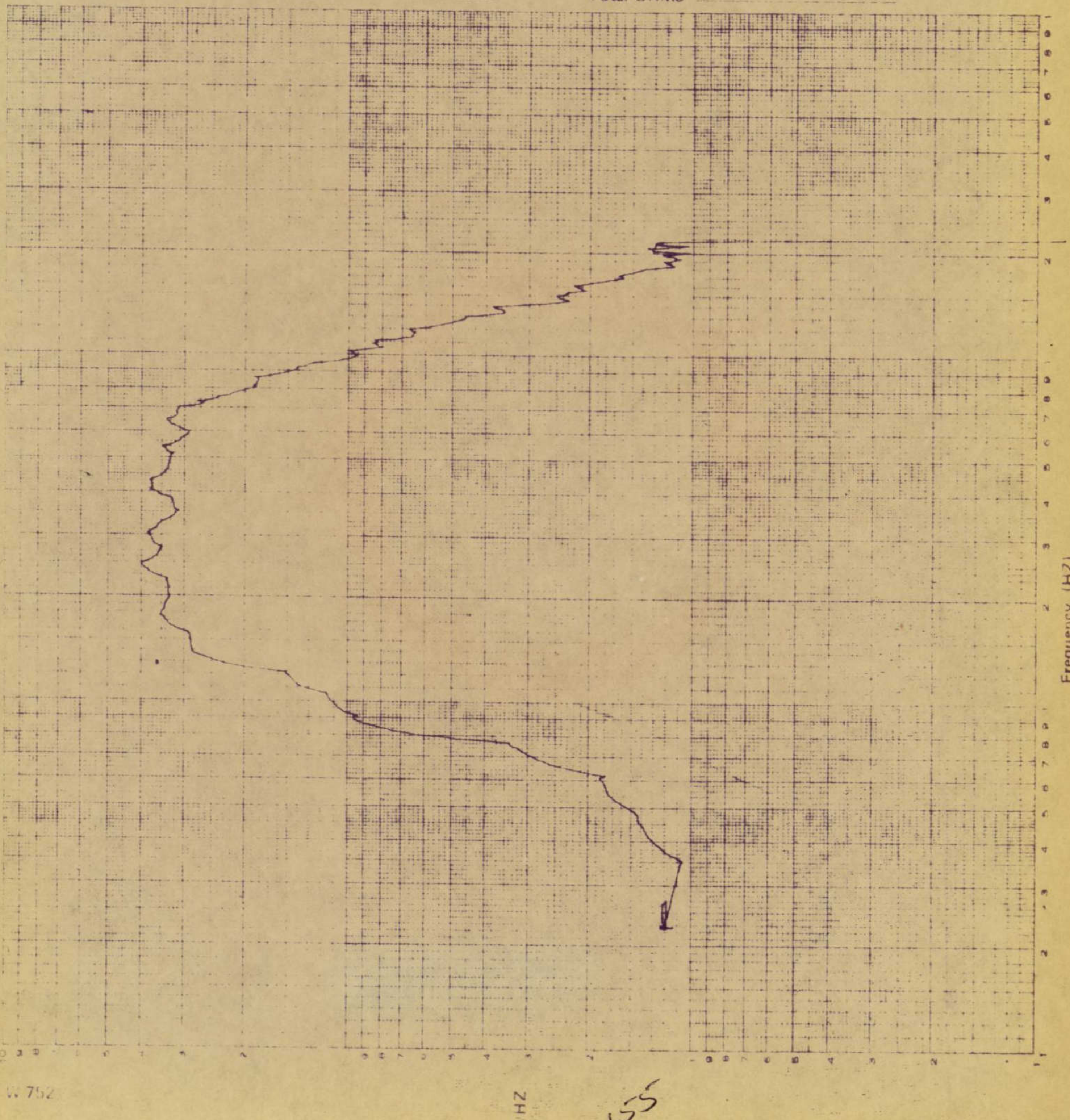


WYLE LABORATORIES

Job Number 49745 Date 4-3-68

P/N SP111d-25 Axis Z

S/N 51 Total GRMS 50 ~~ZYX~~



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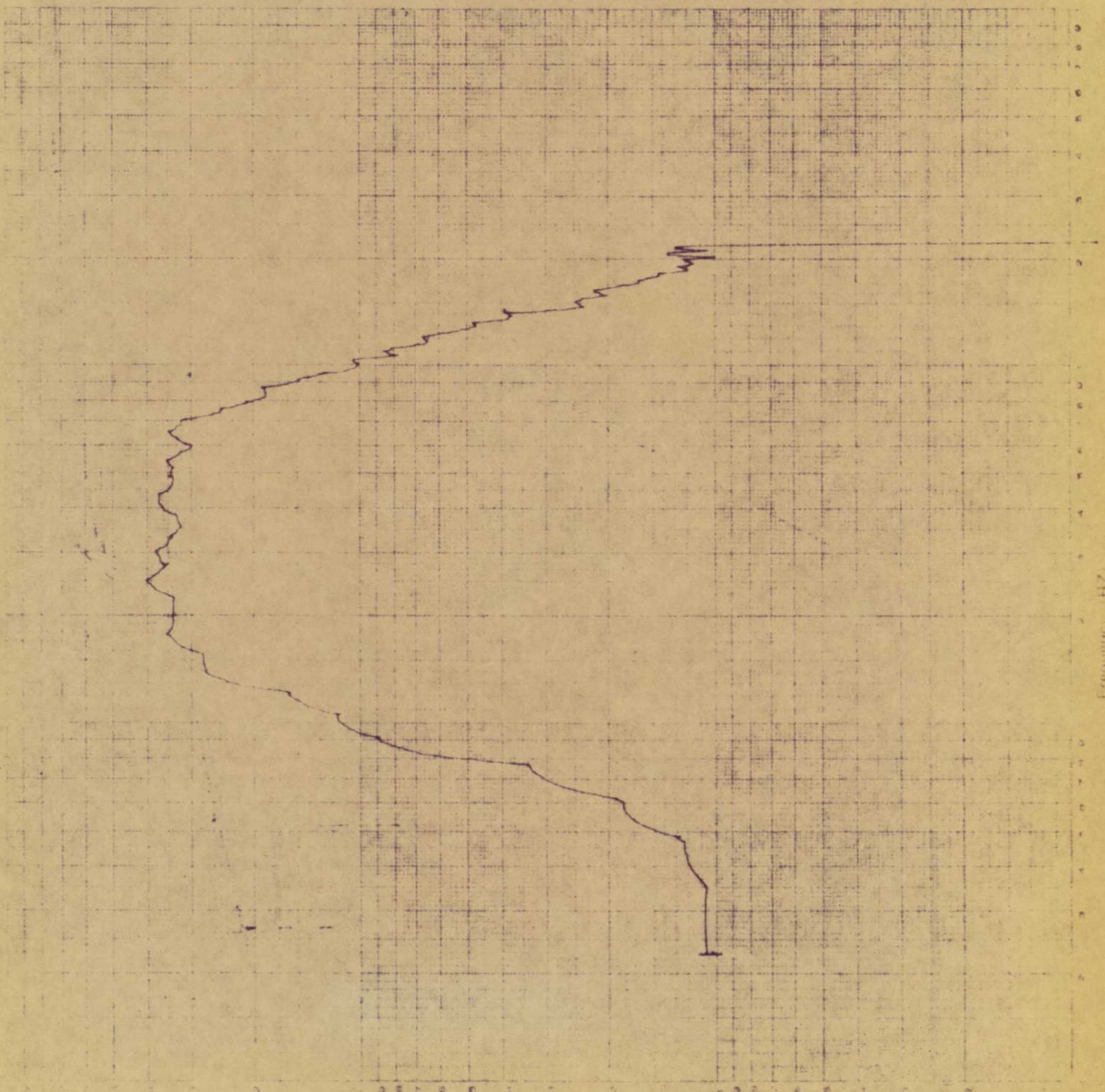
W 752

Job Number 49745 Date 4-3-68

P.N SP111d-25 Axis Z

S.N 54 Total GRMS 50



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