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AIRWORTHINESS EVALUATION NUH-1H HELICOPTER WITH GLOBAL POSITION--ETC(U)
MAY 77 C L THOMAS, T P BENSON

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1 OF 2
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USAAEFA PROJECT NO. 76-13

AIRWORTHINESS EVALUATION NUH-1H HELICOPTER WITH GLOBAL POSITIONING SYSTEM

FINAL REPORT

TOM P. BENSON
PROJECT ENGINEER

CHARLES L. THOMAS
MAJ, CE
US ARMY
PROJECT OFFICER/PILOT

MAY 1977

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UNITED STATES ARMY AVIATION ENGINEERING FLIGHT ACTIVITY
EDWARDS AIR FORCE BASE, CALIFORNIA 93523

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Pilot induced oscillation

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The United States Army Aviation Engineering Flight Activity conducted a limited airworthiness flight evaluation of an NUH-1H helicopter in which a prototype global positioning system (GPS) was installed. Flight tests were conducted at Edwards Air Force Base, California, between 18 and 27 January 1977. Nine test flights were conducted for a total of 11 productive flight hours. Testing was performed to determine the effect of GPS installation on vibration and pilot-induced oscillation

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20. Abstract

(PIO) characteristics of the NUH-1H helicopter. During this test, one deficiency and one shortcoming were noted. The deficiency was insufficient aft longitudinal control margin in rearward flight. The shortcoming was insufficient directional control margin in hover and low-speed flight. The deficiency and the shortcoming were a result of the gross weight and center of gravity of the helicopter after installation of the GPS, although both were within normal UH-1H operating limits. There was no significant effect on vibration characteristics or increase in PIO tendencies of the NUH-1H as a result of the GPS installation.

DEPARTMENT OF THE ARMY
HQ, US ARMY AVIATION RESEARCH AND DEVELOPMENT COMMAND
P O BOX 209, ST. LOUIS, MO 63166

DRDAV-EQA

OCT 27 1977

SUBJECT: Directorate for Research, Development and Engineering Position on the Conclusions and Recommendations of the Final Report on USAAEFA Project No. 76-13, Airworthiness Evaluation NUH-1H Helicopter with Global Positioning System, dated May 1977

SEE DISTRIBUTION

1. The Directorate for Research, Development and Engineering position on USAAEFA's conclusions and recommendations are provided herein. Paragraph numbers from the subject report are provided for reference.

a. Para 16. Concur with the general conclusions set forth.

b. Para 17. Concur with the stated deficiency for this test aircraft however it is noted that the insufficient aft longitudinal control margin is not a result attributable to the Global Positioning System installation but a characteristic of the basic UH-1H for forward center-of-gravity conditions. Numerous other data is available from the original UH-1D development program which indicates the aircraft to be satisfactory at the current published c.g. limits.

c. Para 18. Concur with the stated shortcoming however it is noted that the insufficient left pedal margin is not a result attributable to the Global Positioning System installation but a characteristic of the basic UH-1H at high gross weights and/or density altitudes.

d. Para 19. No operational problem is known to exist due to the control problem defined in this report. Additional analysis and specific testing dedicated to the purpose of defining a suitable operational envelope in terms of gross weight, center-of-gravity location and rearward flight or downwind hovering is required and will be planned for early 1978. Until this is done, current limits will not be changed.

e. Para 20. Concur with the intent of the stated restrictions however an alternative to the 10 knot limitation for downwind hover is that of limiting the forward center-of-gravity location. Additionally the current operation's manual contains adequate information in terms of a caution, warning and charts relative to the insufficient left pedal margin.

DRDAV-EQI

SUBJECT: Directorate for Research, Development and Engineering Position on the Conclusions and Recommendations of the Final Report on USAAEFA Project No. 76-13, Airworthiness Evaluation NUH-1H Helicopter with Global Positioning System, dated May 1977.

2. The Global Positioning System as installed and tested on the NUH-1H had no significant effect on the flying and handling characteristics and is therefore subject to the same operating information and restrictions as the basic UH-1H.

FOR THE COMMANDER:

WALTER A. RATCLIFF
Colonel, GS
Director of Development
and Engineering

TABLE OF CONTENTS

INTRODUCTION

BACKGROUND

1. The United States Army Aviation Engineering Flight Activity (USAAEFA) was directed by the United States Army Aviation Systems Command (AVSCOM)* to conduct a limited airworthiness flight evaluation of an NUH-1H helicopter with a prototype global positioning system (GPS) installed (ref 1, app A). The GPS tested was a prototype system designed for evaluation of the GPS concept. The final design will be significantly reduced in size and weight. The GPS project is under the guidance of the United States Air Force Headquarters, Space and Missile Organization (Hq SAMSO) at Los Angeles, California. The GPS was designed and constructed by General Dynamics Electronics Division, San Diego, California.

TEST OBJECTIVES

2. Test objectives were:

a. Evaluate vibration characteristics during ground runs and in flight, including GPS pallet resonances.

b. Determine if GPS pallets cause pilot-induced oscillation (PIO) tendencies.

c. Conduct an airworthiness evaluation which will serve as a basis for a safety-of-flight release for future prototype GPS testing.

DESCRIPTION

3. The NUH-1H test helicopter, serial number 66-60869, was manufactured by Bell Helicopter Textron. A detailed description of the standard UH-1H helicopter is contained in the operator's manual (ref 2, app A). The test aircraft was modified for installation and operation of the prototype GPS. A detailed description of the aircraft modification is contained in reference 3. Most of the modification was to the aircraft electrical system for powering the GPS and to the interior of the cargo compartment for installation of the GPS. A detailed description of test instrumentation installed in the test aircraft is presented in appendix B. Photographs of the test instrumentation are contained in appendix C.

*Since redesignated Army Aviation Research and Development Command.

4. The prototype GPS is composed of three components, with the main component located forward of the transmission housing. The approximate weight of the main component is 1336 pounds. The other two components are located on each side of the transmission housing with a combined weight of 496 pounds. A detailed description of the prototype GPS components is contained in reference 3, appendix A. Photographs of the installation are presented in appendix C.

TEST SCOPE

5. Flight testing of the NUH-1H with the GPS installation was conducted at Edwards Air Force Base, California, between 18 and 27 January 1977. Nine test flights consisting of 11 productive hours were conducted at the conditions shown in table 1. Flight limitations contained in the UH-1H operator's manual and the safety-of-flight release (ref 4, app A) were observed during the test.

TEST METHODOLOGY

6. The flight test methods used are described briefly in the Results and Discussion section of this report. Data analysis methods are discussed in appendix D.

Table 1. Flight Test Conditions.

Flight Regime	Average Gross Weight (lb)	Average Density Altitude (ft)	Average Ambient Temperature (°C)	Rotor Speed (rpm)	Calibrated Airspeed[1] (kt)	Remarks
Ground run	8550	2220	14	192 to 330	Zero	Ground-idle to flight-idle (192 to 370 rpm)
Hover[2]	8900	2160	14	314, 319, and 324	Zero	5, 10, and 15-foot skid heights
Low-speed flight	8900	1500	6	314 and 324	Zero to 30 KTAS[3] left and right	Skid height 10 and and 20 feet
					Zero to 30 KTAS forward	
					Zero to 13 KTAS rearward	
Climb	8780	4100	8	324	80	Maximum engine power
Forward flight	8900	4000	7	314 and 324	40 to 110	Level flight
Maneuvering flight[4]	8600	5000	8	314 and 324	40 to 110	Pushovers to pull-ups
	9100	5000	8	324	100	Pull-outs
	9240	4220	9	324	80	Windup turns, left
	8640	4120	8	324	80	Windup turns, right
Autorotational entry	9080	5000	6	324	50 to 100	Level flight
Autorotational descent	8760	5000	6	314, 319, and 324	60	---
Nap-of-the-earth	9160	1520	4	324	Zero to 100	---

[1]Unless otherwise noted.
[2]Step and pulse control inputs in lateral and longitudinal axes.
[3]KTAS: Knots true airspeed.
[4]Load factors: 0.25 to 2.0.

RESULTS AND DISCUSSION

GENERAL

7. A limited evaluation of the NUH-1H helicopter with GPS installed was performed to determine if increased aircraft vibration characteristics and PIO tendencies were associated with the installation. Results of these tests were compared with results from earlier evaluations of the UH-1H helicopter (refs 5 and 6, app A). Vibration levels recorded during this evaluation were low and had no effect on safety of flight. No PIO tendencies were noted during the evaluation. One deficiency and one shortcoming were noted during the evaluation which were the result of the change in aircraft gross weight and center of gravity (cg) because of the GPS installation. The deficiency was insufficient longitudinal control margin. The shortcoming was insufficient directional control margin.

VIBRATION CHARACTERISTICS

8. Vibration characteristics were evaluated throughout the test program. Particular emphasis was placed on evaluating the data recorded during hover, low-speed, climb, cruise, and maneuvering flight. Tests were conducted at the conditions listed in table 1. Vibration data were sensed by four triaxial accelerometers, one biaxial accelerometer, and two uniaxial accelerometers for the ten flight conditions presented. Transducer locations are shown in appendix B.

9. Due to the heavy internal load, the aircraft was tested only at heavy gross weight at a forward cg in the clean, doors-on configuration. Figures 1 through 80, appendix E, indicate that vibration amplitudes were low at all transducer locations during ground runs (at ground- and flight-idle), hover, and low-speed flight. Generally, the highest vibration levels recorded were those of the transmission, with the 4-per-rotor-revolution (4/rev) frequency being the highest (0.145g). The vibration levels of the main pallet and power converter chassis of the main pallet were generally less than 0.05g at all frequencies analyzed. There were no ground resonance tendencies noted during the evaluation.

10. Figures 81 through 128, appendix E, indicate that vibrations at all transducer locations during flights at 90 and 110 knots calibrated airspeed (KCAS) and maximum power climb at 80 KCAS were generally higher than those of the low-speed flight envelope, but still relatively low. The maximum vibrations encountered were those recorded from the transmission-located transducers. The maximum vibration recorded was 0.258g at 2/rev in the lateral axis.

11. Figures 129 through 160, appendix E, indicate that vibrations at all transducer locations during right and left 2g turns were higher than any other condition tested, but overall levels were less than 0.4g and much less than the maximum design level of the prototype GPS (1.5g). The highest vibrations recorded for the main pallet and power converter chassis were 0.145 and 0.150g for the longitudinal and

lateral axes, respectively. The vibrations of the main pallet and power converter chassis of the GPS installed equipment appear to be low and well below the GPS design level of 1.5g. Within the scope of this test, the vibration characteristics of the NUH-1H helicopter with GPS installed met the requirements of paragraph 3.7 of military specification MIL-H-8501A (ref 7, app A).

HANDLING QUALITIES

Pilot-Induced Oscillation Characteristics

12. Oscillatory control inputs of various amplitudes and frequencies were performed in a hover and at 90 KCAS to simulate PIO. All oscillations of the pallets were convergent and upon removal of the excitation were rapidly damped to the normal flight level. There appeared to be no condition where the natural frequency of the pallet was excited from either normal aircraft vibrations or PIO.

Low-Speed Flight Characteristics

Longitudinal Control Margin:

13. Tests were conducted by stabilizing in forward and rearward flight at airspeeds from zero to 35 KTAS in 5-knot increments by reference to a calibrated pace vehicle. At zero airspeed (hover over a fixed point) there were 4.64 inches of aft longitudinal control remaining (36 percent of total longitudinal control travel). At 10 KTAS in rearward flight, the aft longitudinal control margin was reduced to 2.19 inches (17 percent of total longitudinal control travel). At 13 KTAS in rearward flight, the longitudinal control was against the aft stop (zero control margin). A plot of control positions versus airspeed is presented in figure 161, appendix E. The insufficient aft longitudinal control margin at the test cg and weight greatly reduces the downwind hover capability of the NUH-1H. The test weight and cg are within the approved flight envelope of the UH-1H. This finding reflects a deficiency in the basic UH-1H approved flight envelope. This deficiency was previously reported in references 5 and 6, appendix A. Downwind hover should not be conducted in winds greater than 10 knots with GPS installed. The insufficient aft longitudinal control margin in rearward flight above 10 KTAS is a deficiency.

14. The UH-1H operator's manual does not warn the pilot that at forward cg and heavy gross weight combinations insufficient aft longitudinal control may exist. The operator's manual presently limits the pilot to a rearward airspeed of 30 knots or less. The following WARNING should be incorporated in the operator's manual.

WARNING

> At heavy gross weights with forward cg locations while hovering downwind, loss of aft longitudinal control may be experienced with winds greater than 10 knots.

Directional Control Margin:

15. In hover at zero wind conditions, left directional control margin was approximately 20 percent. At airspeeds less than translational lift airspeed (approximately 15 knots), left directional control margin was reduced even further. In a low-speed flight condition such as nap-of-the-earth flight, should a rapid right yaw rate be generated, there may be insufficient left pedal to stop the yaw. Additionally, with rapid power applications in hover or low-speed flight, directional control margin may be reduced to zero. For safety of flight, the NUH-1H helicopter with GPS installed should be restricted from rapid pedal turns to the right and from rapid power applications in hover or low-speed flight. The insufficient left pedal margin in low-speed flight is a shortcoming.

CONCLUSIONS

GENERAL

16. The following conclusions were reached upon completion of the evaluation:

a. There were no ground resonance tendencies with the GPS installation (para 10).

b. The vibrations of the main pallet and power converter chassis of the prototype GPS equipment were low and well below the design level of 1.5g and did not significantly amplify or affect the helicopter inherent vibrations (para 11).

c. There were no PIO tendencies as a result of the GPS installation (para 12).

d. One deficiency and one shortcoming were noted.

DEFICIENCY

17. The deficiency identified was insufficient aft longitudinal control margin in rearward flight above 10 KTAS (para 13).

SHORTCOMING

18. The shortcoming identified was insufficient left pedal margin in low-speed flight (para 15).

RECOMMENDATIONS

19. The following WARNING should be incorporated in the operator's manual (para 14):

WARNING

At heavy gross weights with forward cg locations while hovering downwind, loss of aft longitudinal control may be experienced with winds greater than 10 knots.

20. Incorporate the following restrictions in the safety-of-flight release for future NUH-1H prototype GPS tests:

a. Downwind hover is limited to 10 knots of relative tail wind.

b. Rapid right pedal turns will not be made.

c. Rapid power applications will not be made in hover or in low-speed flight.

APPENDIX A. REFERENCES

1. Letter, AVSCOM, DRSAV-EQI, 15 December 1976, subject: UH-1H Global Positioning System (GPS) Flight Test Program, Project No. 76-13.

2. Technical Manual, TM 55-1520-210-10, *Operator's Manual, Army Model UH-1D/H Helicopter*, 25 August 1971.

3. Technical Manual, DOO1155, *Class II Modification Documentation, UH-1H Helicopter, Part II*, September 1976.

4. Letter, AVSCOM, DRSAV-EQI, 14 January 1977, subject: Safety-of-Flight Release for Global Positioning System (NAVSTAR), JUH-1H S/N 66-00869.

5. Final Report, US Army Aviation Systems Test Activity (USAASTA), Project No. 71-18, *Tail Rotor Performance and Translational Flight Handling Qualities Test, UH-1H Helicopter*, January 1972.

6. Final Report, USAASTA, Project No. 66-04, *Engineering Test, UH-1H Helicopter, Phase D (Limited)*, November 1970.

7. Military Specification, MIL-H-8501A, *Helicopter Flying and Ground Handling Qualities; General Requirements For*, 7 September 1961, with Amendment 1, 3 April 1962.

APPENDIX B. INSTRUMENTATION

GENERAL

1. Flight test instrumentation was installed, calibrated, and maintained by USAAEFA personnel. This instrumentation was used to record vibration data and flight condition parameters.

Pilot/Engineer Panel

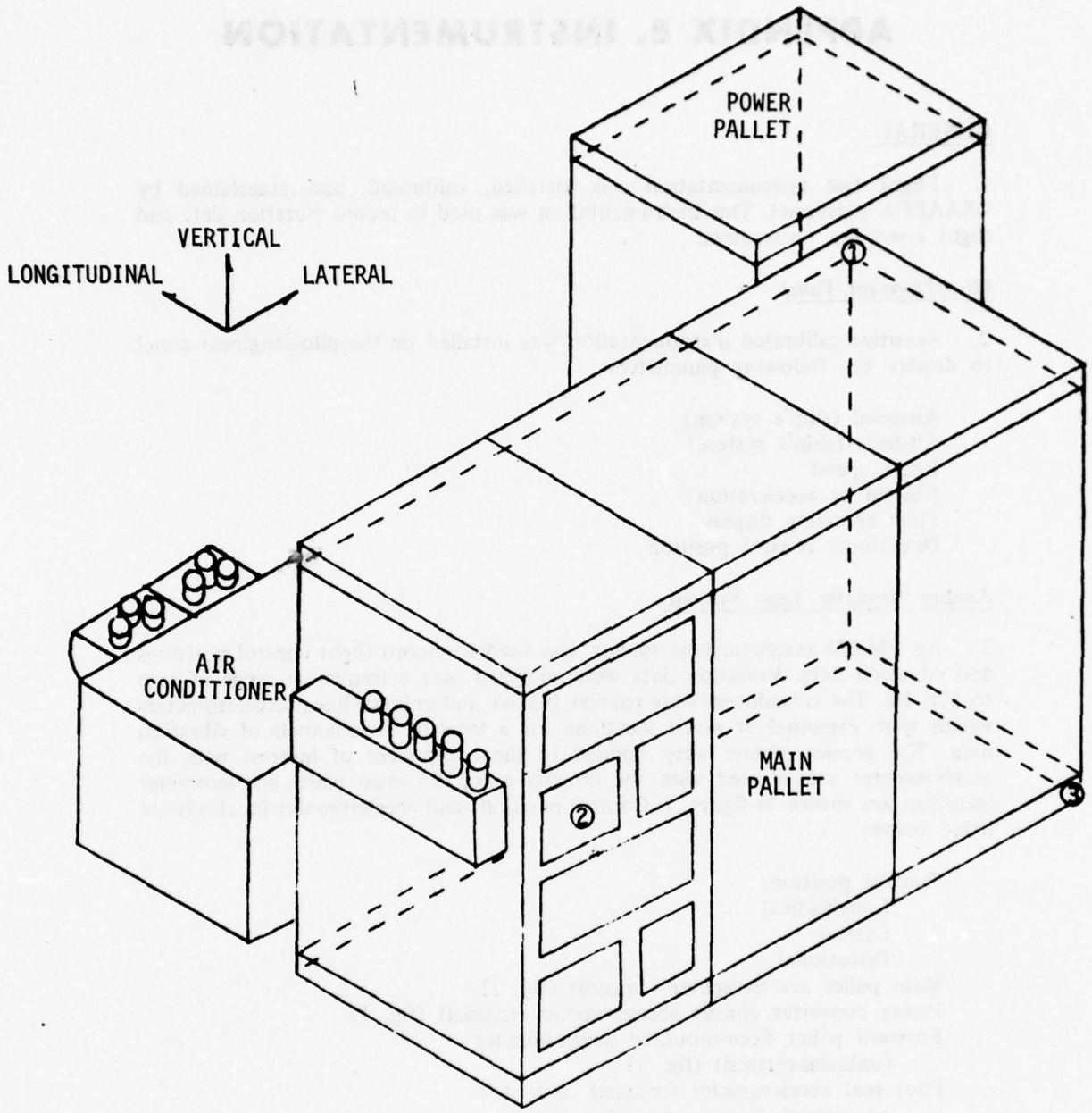
2. Sensitive calibrated instrumentation was installed on the pilot/engineer panel to display the following parameters:

Airspeed (ship's system)
Altitude (ship's system)
Rotor speed
Normal cg acceleration
Time encoding display
Directional control position

Analog Magnetic Tape System

3. An FM-FM magnetic tape system was used to record flight control positions and vibration data. Vibration data were analyzed over a frequency range of zero to 100 Hz. The transducers were triaxial, biaxial, and uniaxial linear accelerometers which were mounted at seven locations for a total of 16 channels of vibration data. The accelerometers were bonded to the component of interest with the accelerometer axis aligned with the aircraft axis. The main pallet accelerometer locations are shown in figure 1. Control positions and accelerometer locations are listed below.

Control position:
    Longitudinal
    Lateral
    Directional
Main pallet accelerometer (triaxial) (fig. 1)
Power converter chassis accelerometer (triaxial) (fig. 1)
Forward pallet floor-mounted accelerometer
    (uniaxial-vertical) (fig. 1)
Pilot seat accelerometer (triaxial), mounted
    on aircraft floor under pilot seat



LOCATION

1	MAIN PALLET TRIAXIAL ACCELEROMETER
2	POWER CONVERTER CHASSIS TRIAXIAL ACCELEROMETER
3	FORWARD FLOOR MOUNTED UNIAXIAL (VERTICAL) ACCELEROMETER

Figure 1. Accelerometer Location - Main Pallet.

Transmission (triaxial), mounted on upper forward transmission housing
Cyclic (biaxial-longitudinal and lateral), mounted on pilot cyclic control
Collective (uniaxial-vertical), mounted on pilot collective control

APPENDIX C. PHOTOGRAPHS

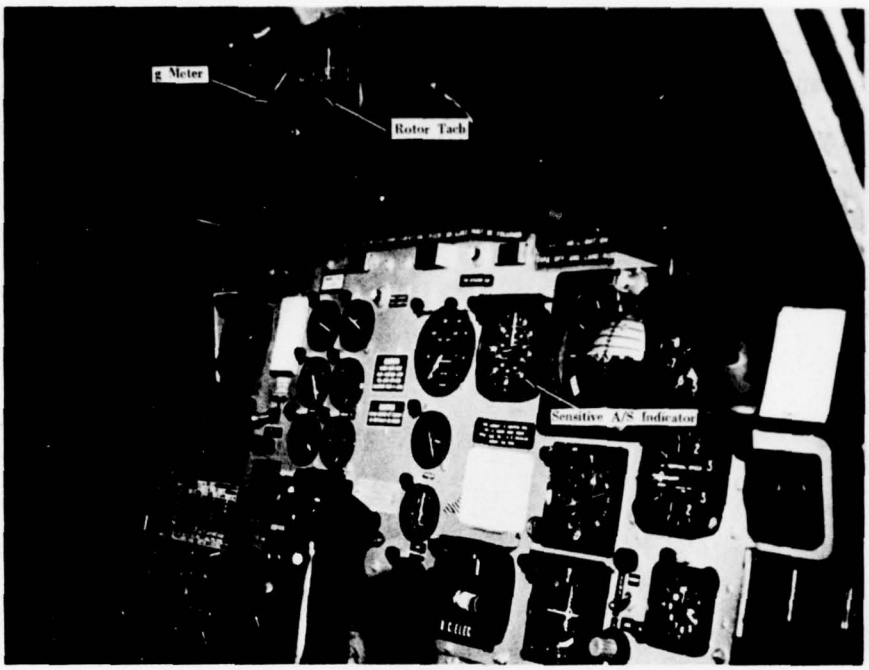


Photo 1. Test Aircraft Cockpit.

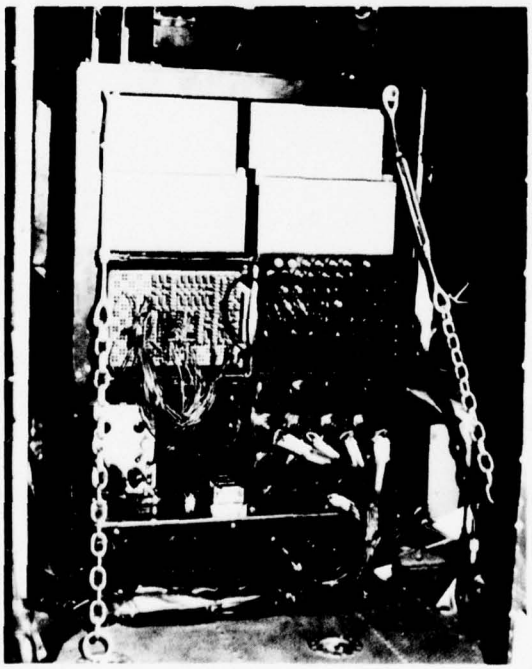


Photo 2. Right-Side View, FM-FM Magnetic Tape System.

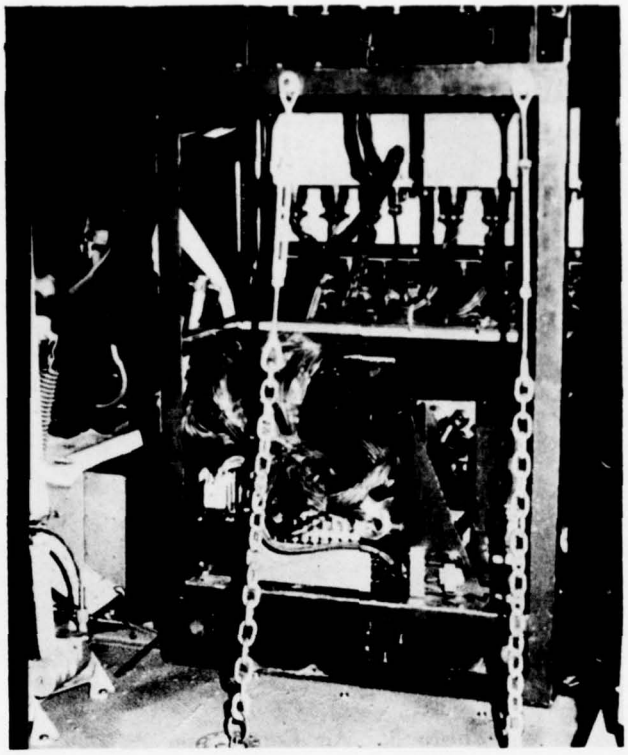


Photo 3. Left-Side View, FM-FM Magnetic Tape System.

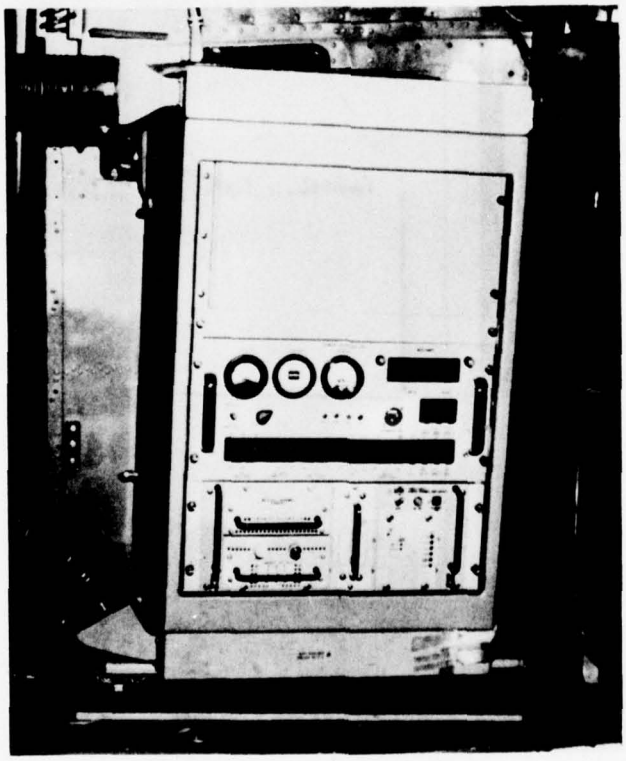


Photo 4. Power Converter Pallet.

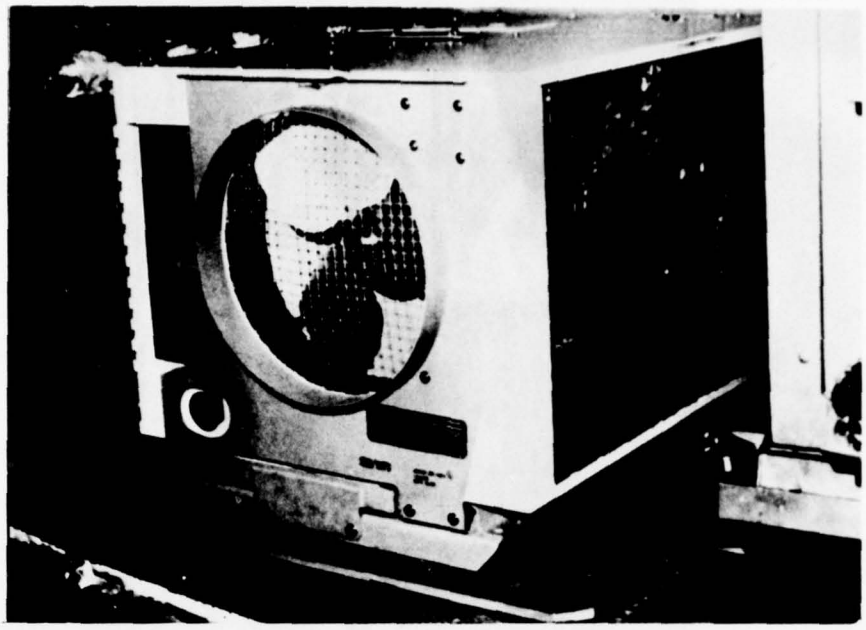


Photo 5. Air Conditioner Pallet.

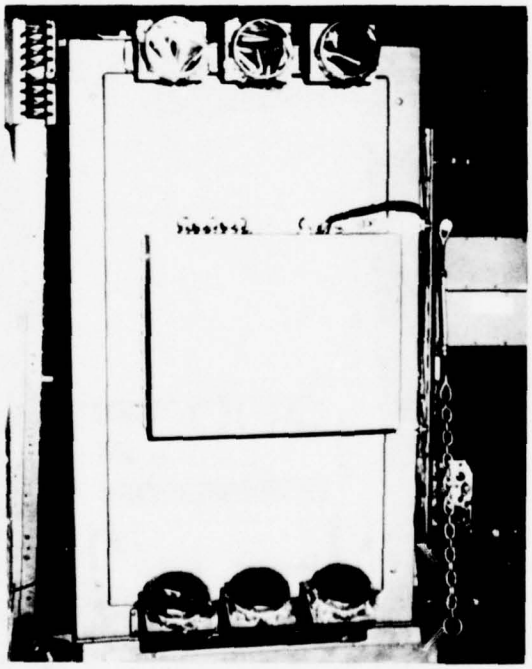


Photo 6. Main Pallet Right-Side View.

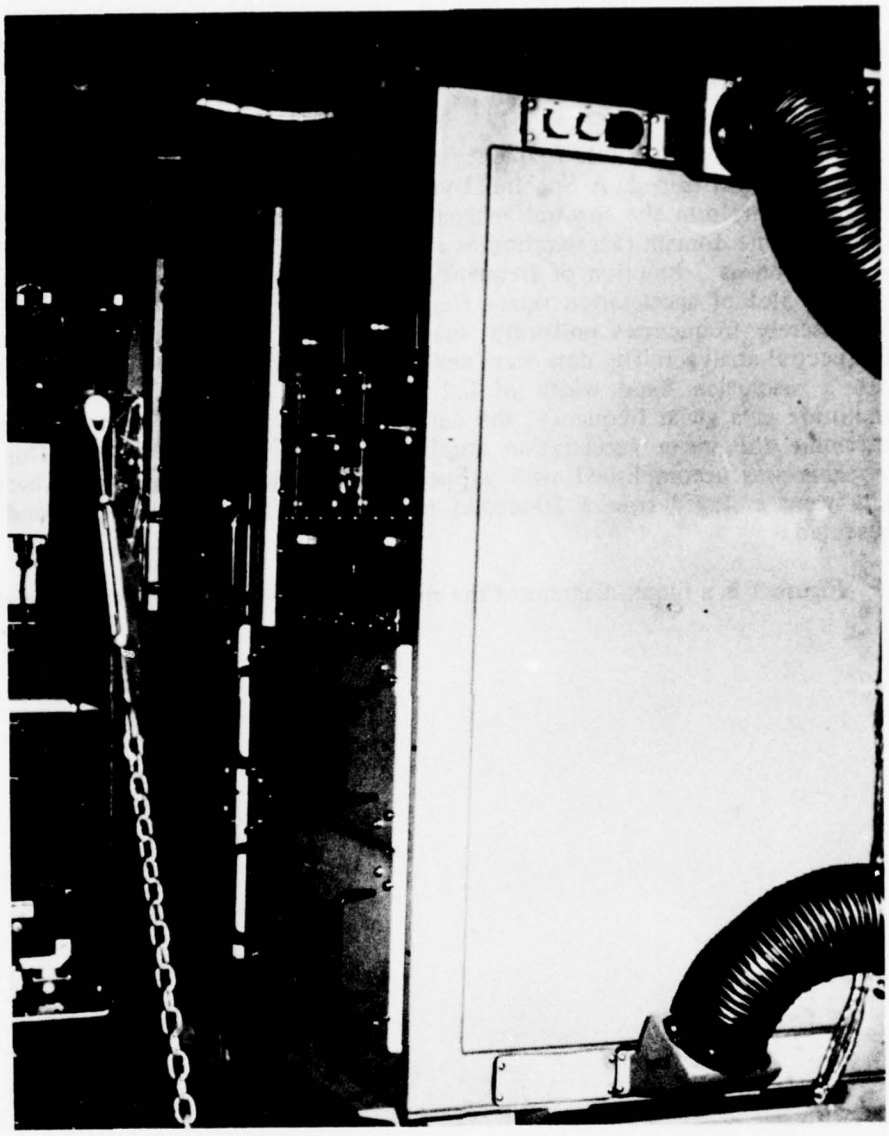


Photo 7. Main Pallet Left-Side View.

APPENDIX D. DATA ANALYSIS METHODS

1. Because of the discrete frequency content of the data, a narrow-band spectral analysis was performed. A Spectral Dynamics 301 real time spectral analyzer was utilized to perform the spectral analysis. This spectral analysis converted the data from the time domain (acceleration as a function of time) to the frequency domain (acceleration as a function of frequency). The output of the spectral analysis was a digital plot of acceleration versus frequency composed of acceleration values at 500 discrete frequencies uniformly spaced over the selected frequency range of the spectral analyzer. The data were analyzed on the zero- to 100-Hz analysis range with a resolution band width of 0.2 Hz. Because of the random variation in amplitude at a given frequency, the data were averaged over a period of time to determine the mean acceleration amplitude for each test condition. This data averaging was accomplished with a Spectral Dynamics 302B ensemble averager. Data were averaged over a 20-second time interval for all the flight conditions presented.

2. Figure 1 is a block diagram of the spectral analysis data processing procedures.

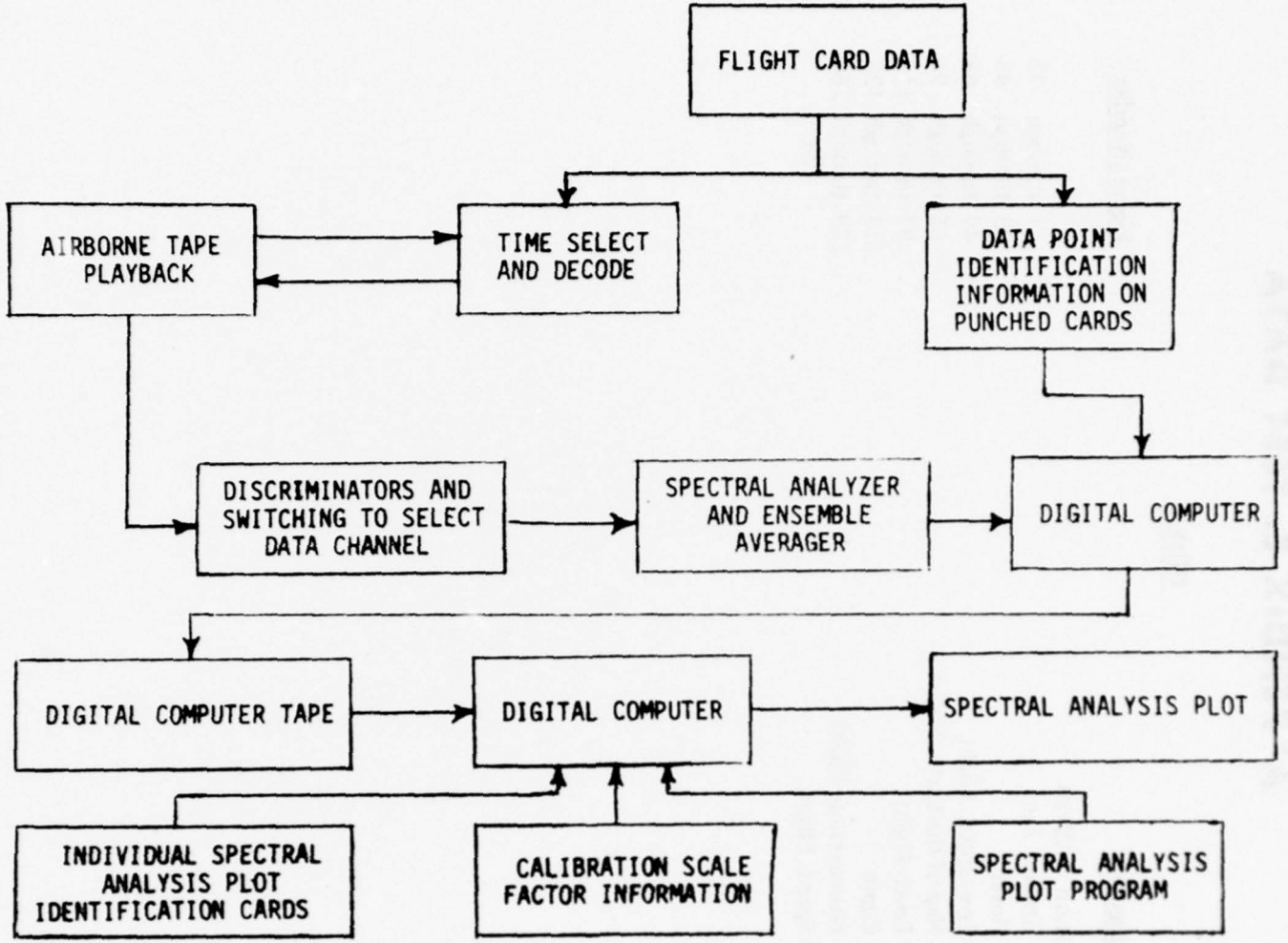


Figure 1. Vibration Data Spectral Analysis Procedure.

APPENDIX E. TEST DATA

INDEX

FIGURE 1

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

LOCATION PALLET — FUNDAMENTAL FREQUENCY IS 3.20 HZ

AXIS LONGITUDINAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8620	152.6 (FWD)	0.0 (MID)	2220	14.0	192.00	ZERO	GROUND RUN	CLEAN

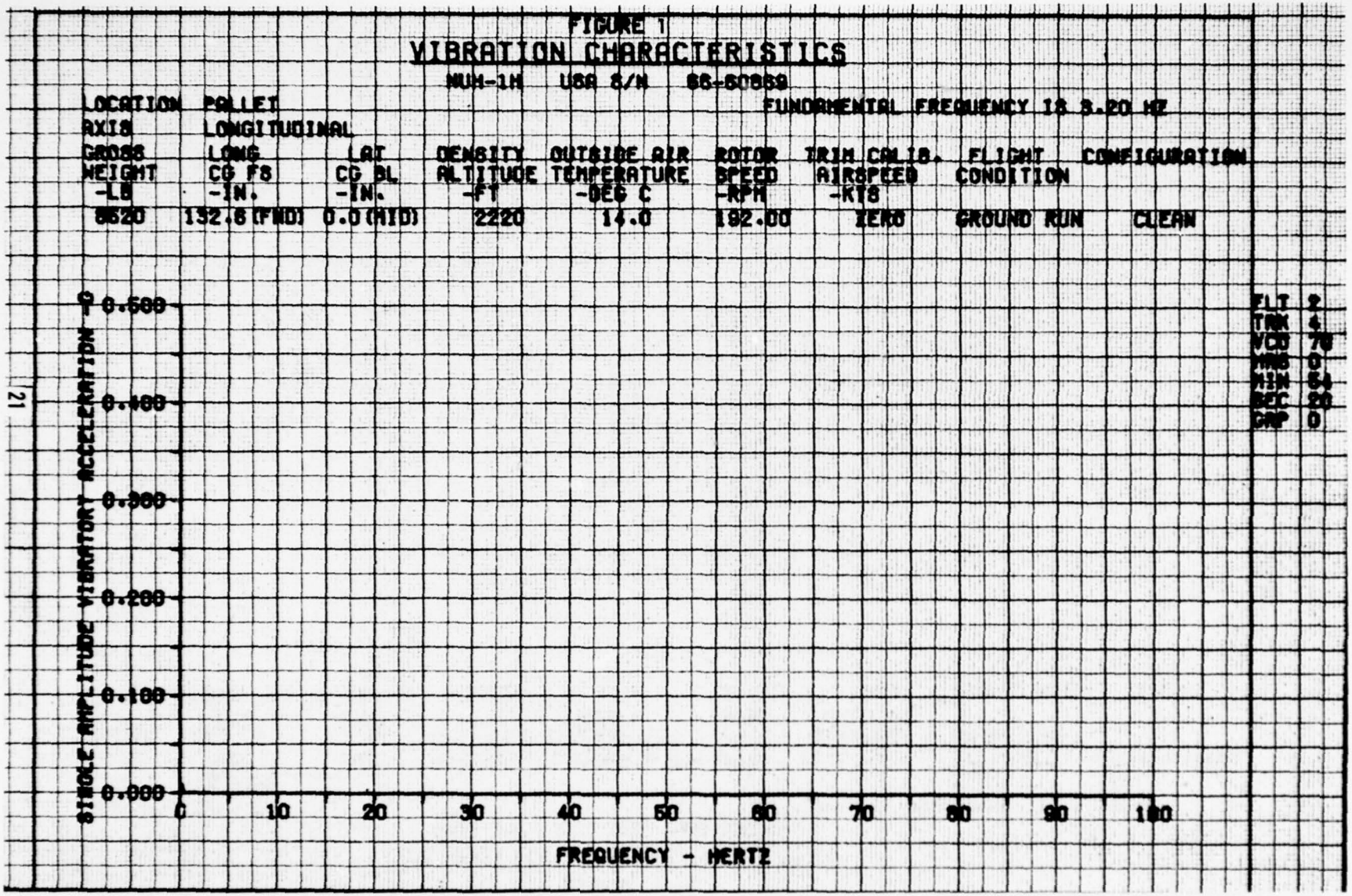


FIGURE 2

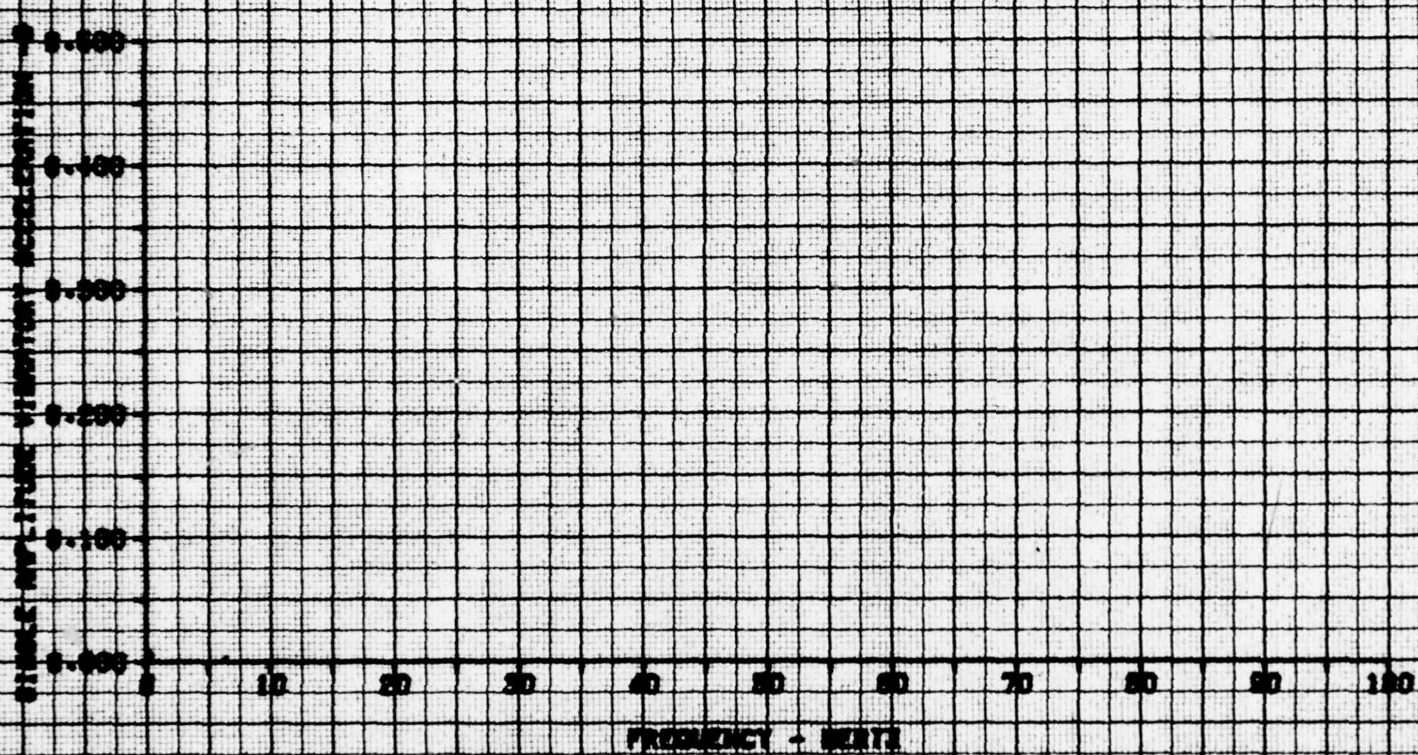
VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

FUNDAMENTAL FREQUENCY IS 3.20 HZ

LOCATION PALLET
AXIS LATERAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
5820	132.8 (FWD)	0.0 (MID)	2220	14.0	192.00	ZERO	GROUND RUN	CLEAN



FLT 2
TNK 4
VCD 86
WNB 0
MIN 54
SEC 20
CMP 0

FIGURE 3

VIBRATION CHARACTERISTICS

MUH-1N USN S/N 80-00000

FUNDAMENTAL FREQUENCY IS 3.20 HZ

LOCATION	PALLET								
AXIS	VERTICAL								
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
9500	132.6 (FWD)	0.0 (MID)	2220	14.8	102.00	ZERO	GROUND RUN	CLEAN

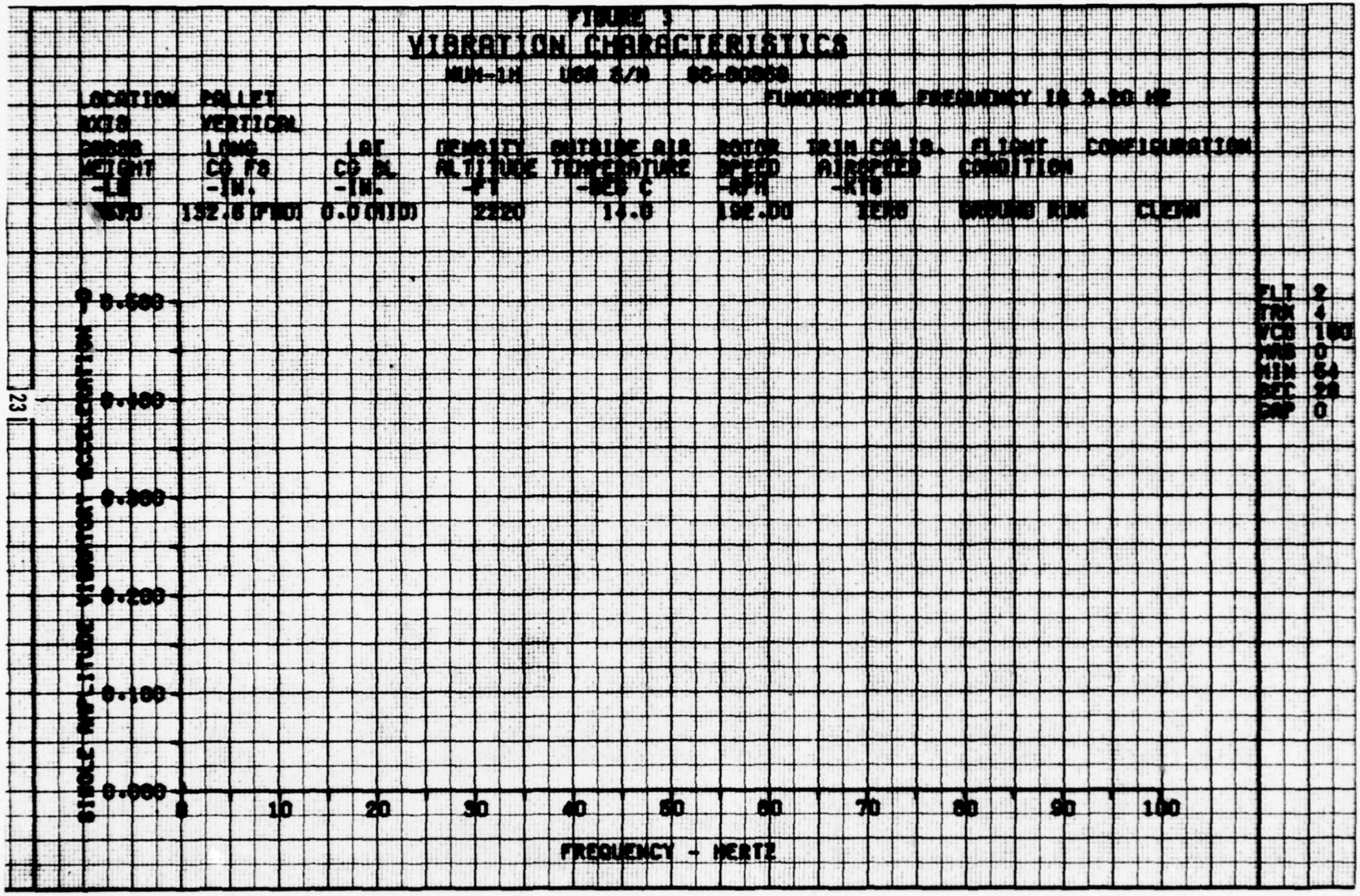


FIGURE 4

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60868

FUNDAMENTAL FREQUENCY IS 3.20 HZ

LOCATION	PILOT SEAT							
AXIS	LONGITUDINAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8520	132.6 (FWD)	0.0 (MID)	2220	14.0	192.00	ZERO	GROUND RUN	CLEAN

FLT	2
TRK	5
VCD	25
HRS	0
MIN	54
SEC	20
GRP	0

SINGLE AMPLITUDE VIBRATORY ACCELERATION

0.600
0.400
0.300
0.200
0.100
0.000

0 10 20 30 40 50 60 70 80 90 100

FREQUENCY - HERTZ

FIGURE 5

VIBRATION CHARACTERISTICS

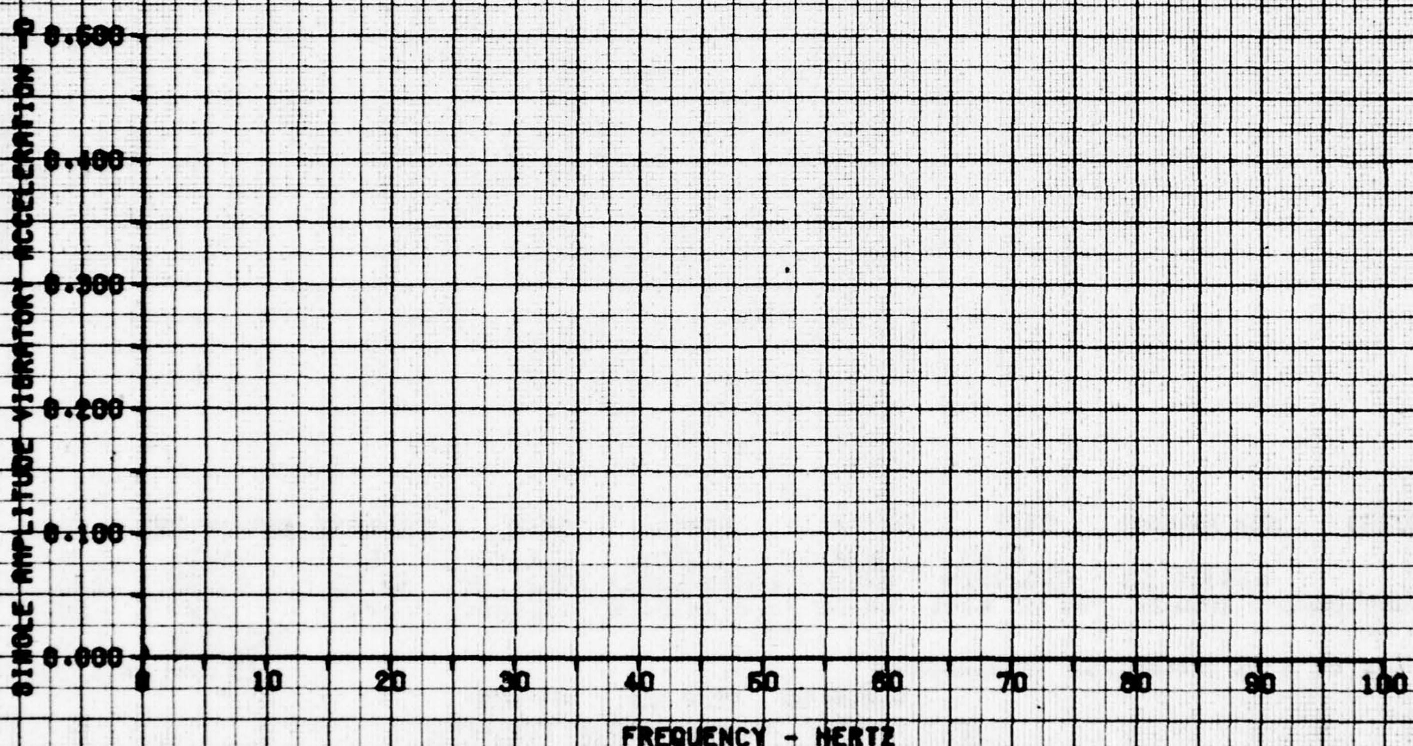
NUH-1H USA S/N 66-60869

LOCATION PILOT SEAT

AXIS LATERAL

FUNDAMENTAL FREQUENCY IS 3.20 HZ

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8520	132.8 (FWD)	0.0 (MID)	2220	14.0	192.00	ZERO	GROUND RUN	CLEAN



FLT 2
TRN 6
VCB 48
HRS 0
MIN 54
SEC 28
GRP 0

FIGURE 6

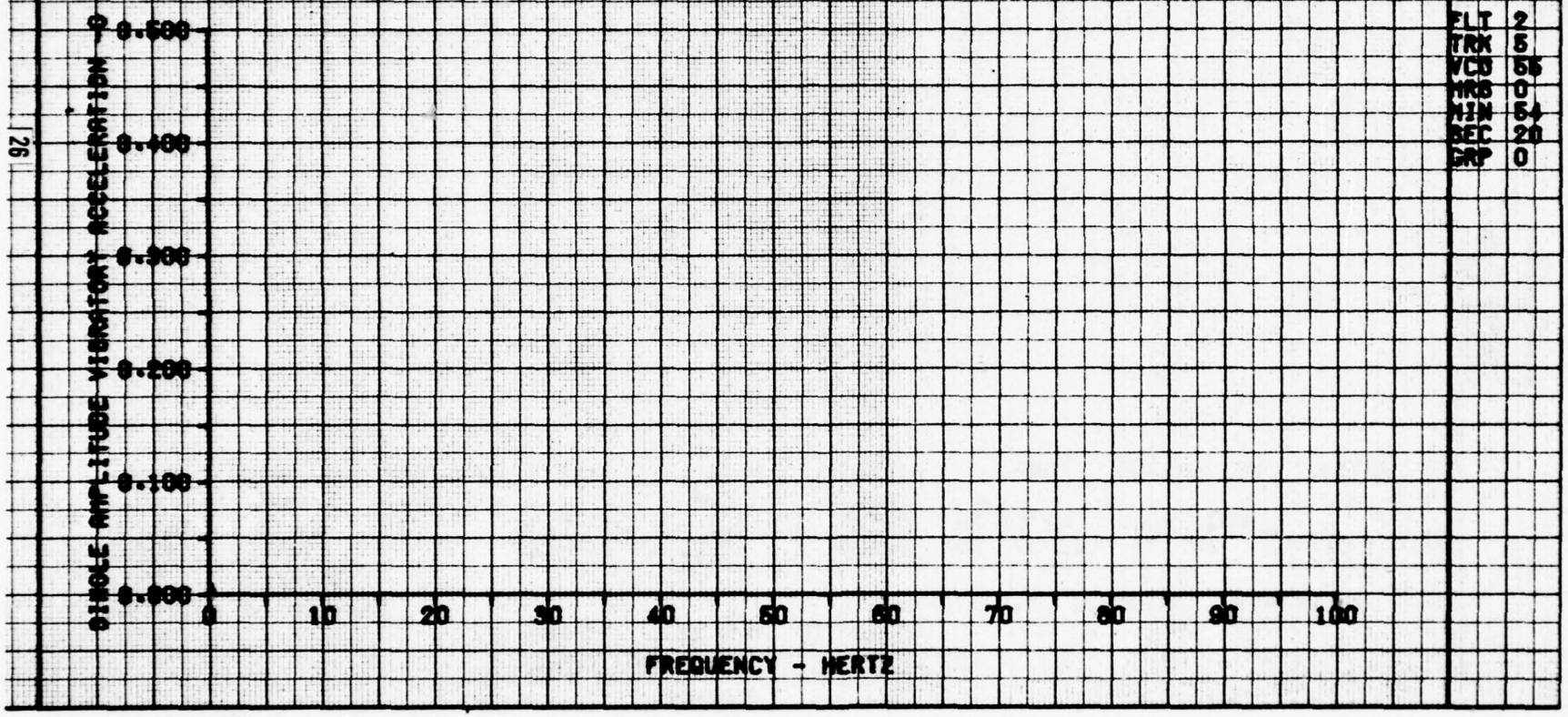
VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60868

FUNDAMENTAL FREQUENCY IS 3.20 HZ

LOCATION PALLET
AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8520	132.6(FWD)	0.0(MID)	2220	14.0	192.00	ZERO	GROUND RUN	CLEAN



FLT	2
TRK	5
VCD	55
HRS	0
MIN	54
SEC	20
GRP	0

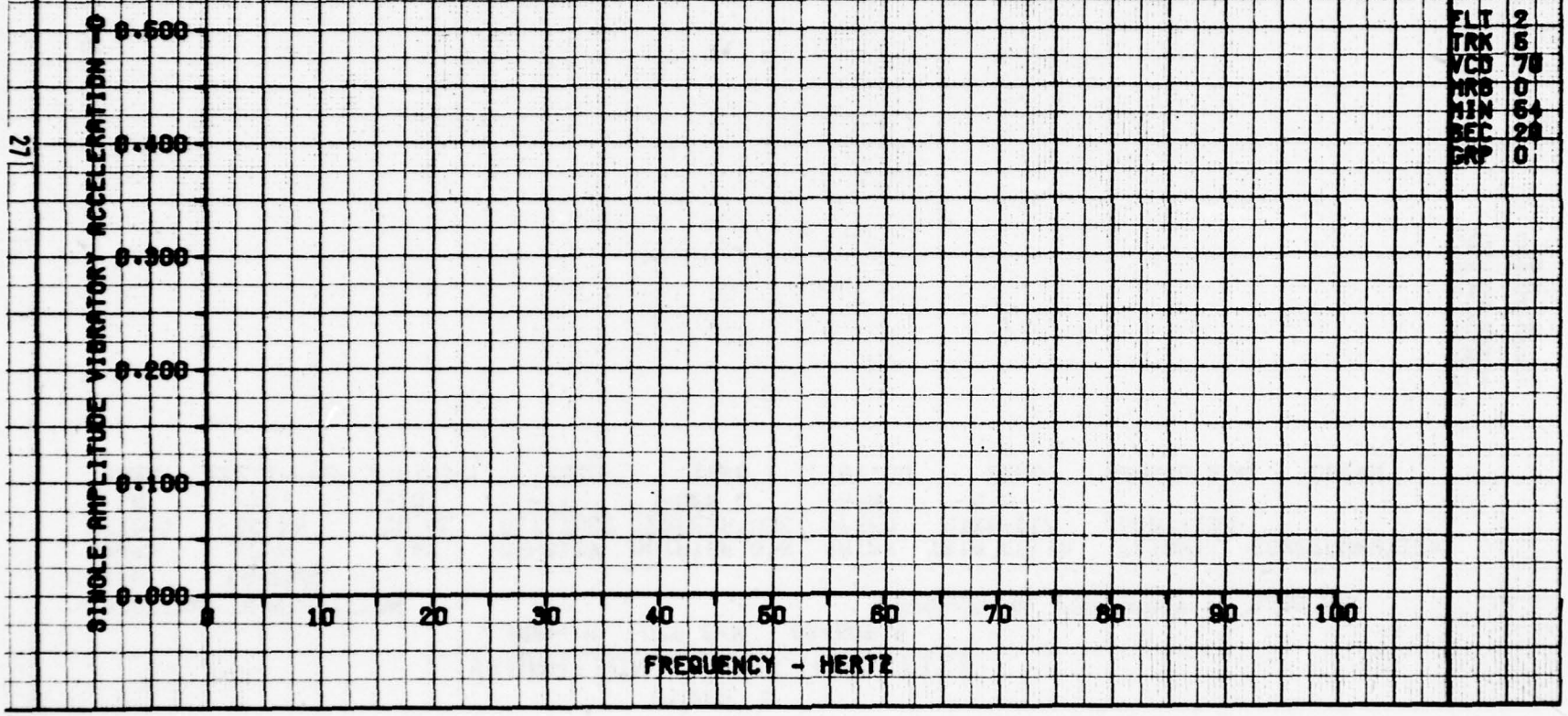
FIGURE 7

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-00000

FUNDAMENTAL FREQUENCY IS 3.20 HZ

LOCATION	TRANSMITTION							
AXIS	LONGITUDINAL							
GROSS WEIGHT -LB	LONG. CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8520	192.6 (FWD)	0.0 (MID)	2220	14.0	192.00	ZERO	GROUND RUN	CLEAN



FLT	2
TRK	5
VCD	78
HRS	0
MIN	54
SEC	28
GRP	0

FIGURE 8

VIBRATION CHARACTERISTICS

UH-1H USA S/N 66-60869

FUNDAMENTAL FREQUENCY IS 3.20 HZ

LOCATION AXIS	TRANSMITTION LATERAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8520	132.6 (FWD)	0.0 (MID)	2220	14.0	192.00	ZERO	GROUND RUN	CLEAN

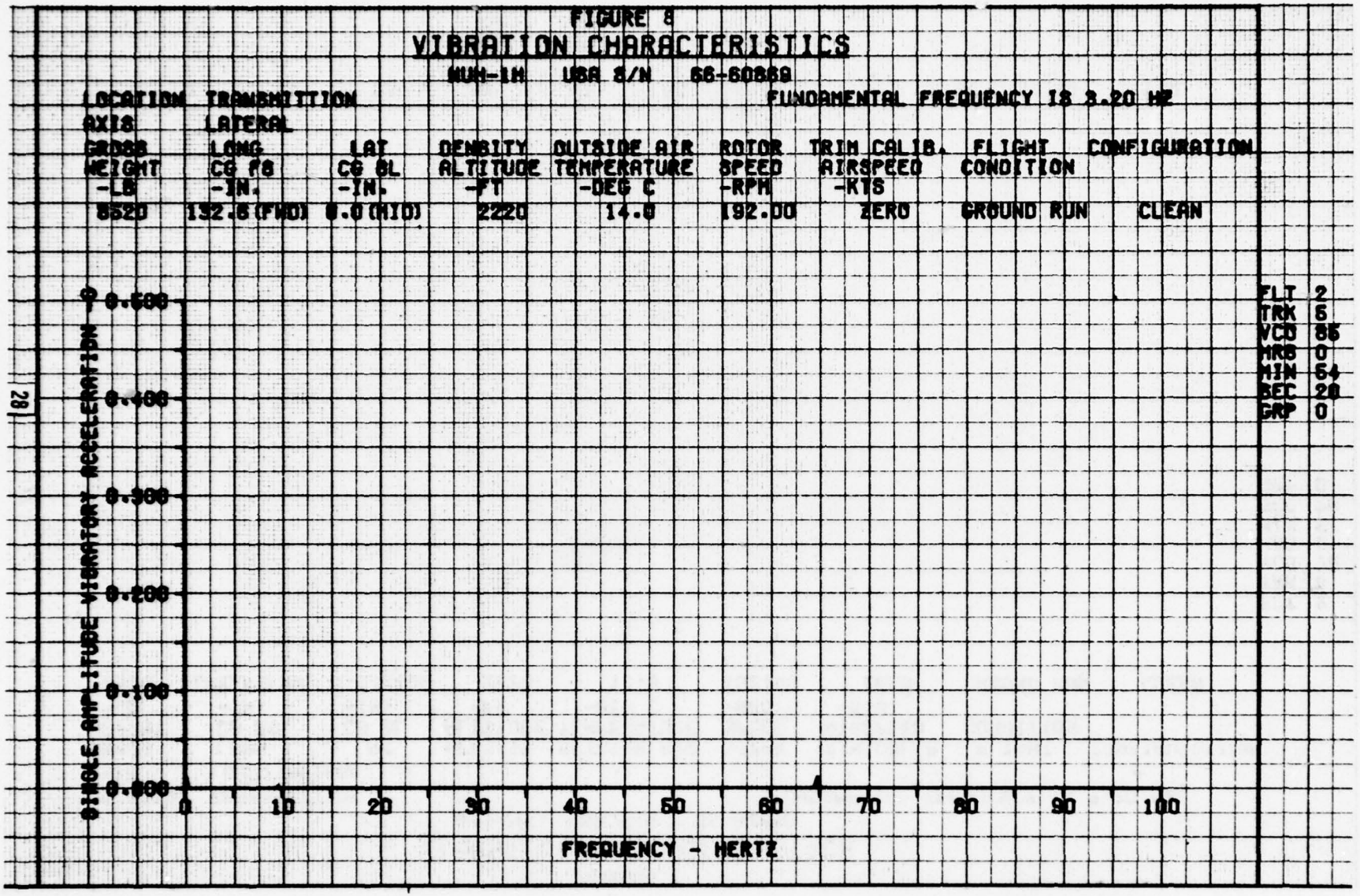


FIGURE 9

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

FUNDAMENTAL FREQUENCY IS 3.20 HZ

LOCATION	TRANSMITTION							
AXIS	VERTICAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8520	132.6 (FWD)	0.0 (MID)	2220	14.0	192.00	ZERO	GROUND RUN	CLEAN

FLT 2
TRK 6
VCD 100
NRS 0
MIN 64
SEL 20
GRP 0

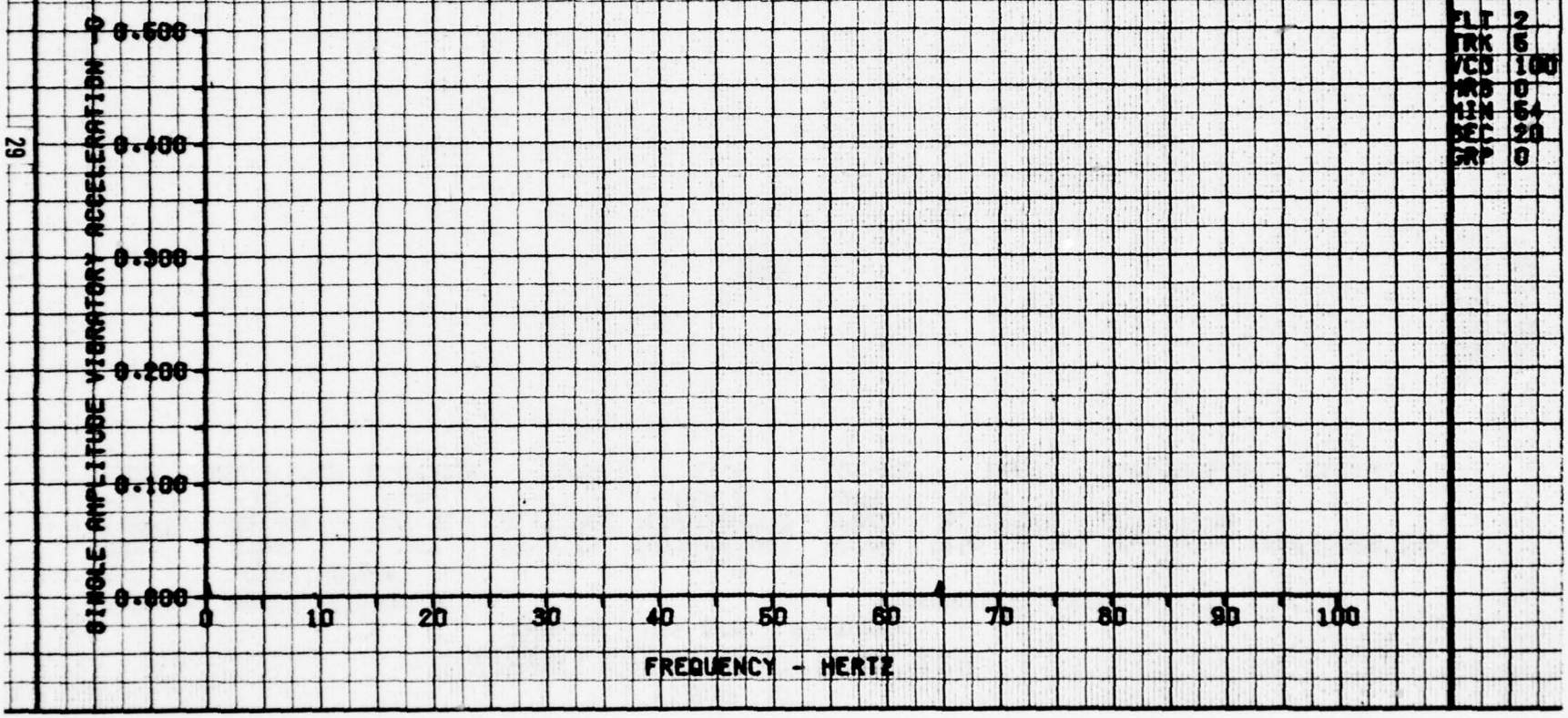


FIGURE 10

VIBRATION CHARACTERISTICS

NUM-1H USA S/N 66-60889

FUNDAMENTAL FREQUENCY IS 3.20 HZ

LOCATION	POWER CONVERTER							
AXIS	LONGITUDINAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8520	132.5 (FWD)	0.0 (MID)	2220	14.0	192.00	ZERO	GROUND RUN	CLEAN

FLT	2
TRK	6
VCD	25
HRS	0
MIN	51
SEC	20
DMP	0

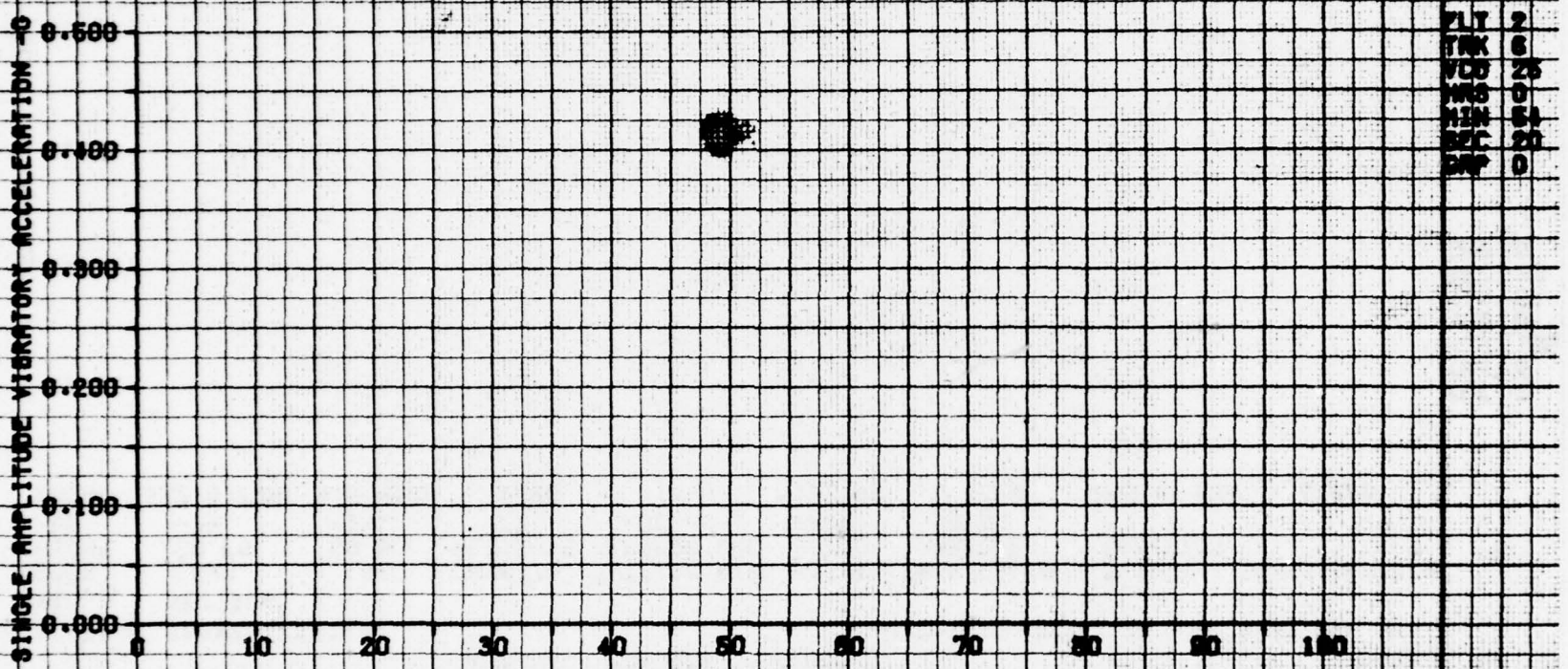


FIGURE 11

VIBRATION CHARACTERISTICS

NUM-1H USA S/N 66-60869

FUNDAMENTAL FREQUENCY IS 3.20 HZ

LOCATION AXIS	POWER CONVERTER LATERAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CAL IB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8520	132.6 (FWD)	0.0 (MID)	2220	14.0	192.00	ZERO	GROUND RUN	CLEAN

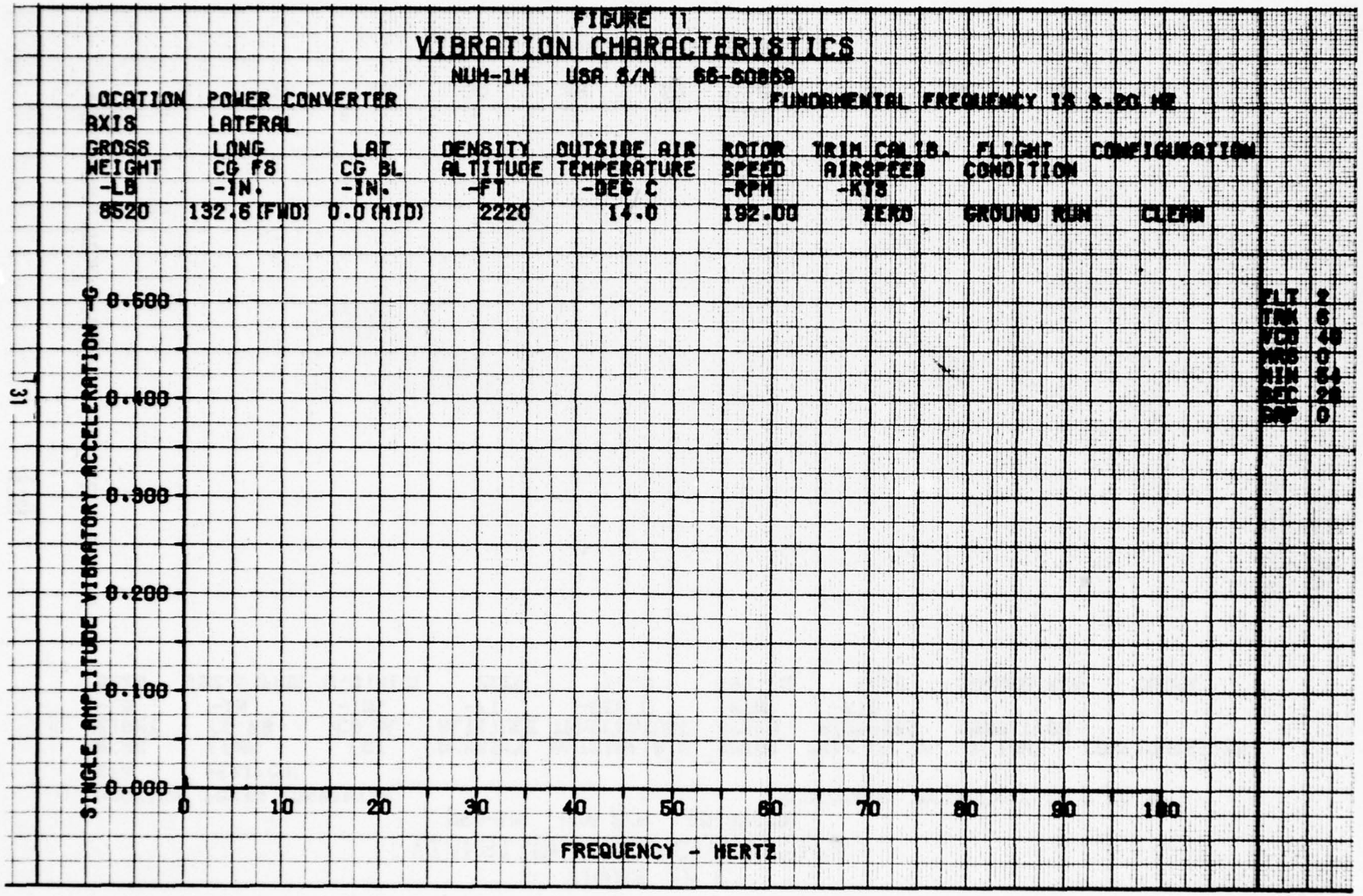


FIGURE 12

VIBRATION CHARACTERISTICS

NUM-1H USA S/N 66-60869

LOCATION POWER CONVERTER — FUNDAMENTAL FREQUENCY IS 3.20 HZ

AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8520	192.6 (FWD)	0.0 (MID)	2220	14.0	192.00	ZERO	GROUND RUN	CLEAN

FLT 2
TRK 6
VCO 56
MRS 0
MIN 54
SEC 20
GRP 0

SINGLE AMPLITUDE VIBRATORY ACCELERATION — g

0.600
0.400
0.300
0.200
0.100
0.000

0 10 20 30 40 50 60 70 80 90 100

FREQUENCY - HERTZ

FIGURE 13

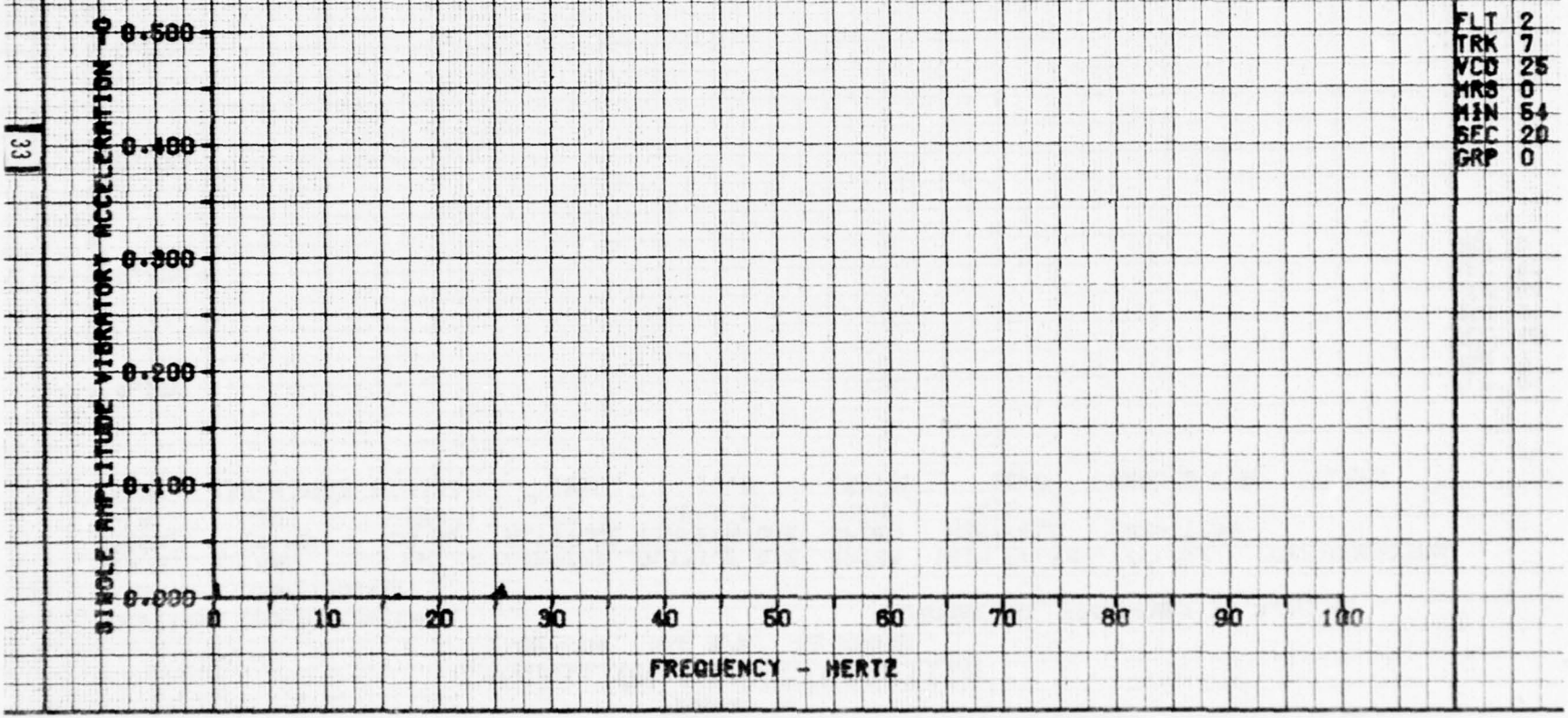
VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

LOCATION COLLECTIVE CONTROL — FUNDAMENTAL FREQUENCY IS 3.20 HZ

AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8620	132.6 (FWD)	0.0 (MID)	2220	14.0	192.00	ZERO	GROUND RUN	CLEAN



FLT	2
TRK	7
VCD	25
HRS	0
MIN	54
SEC	20
GRP	0

FIGURE 14

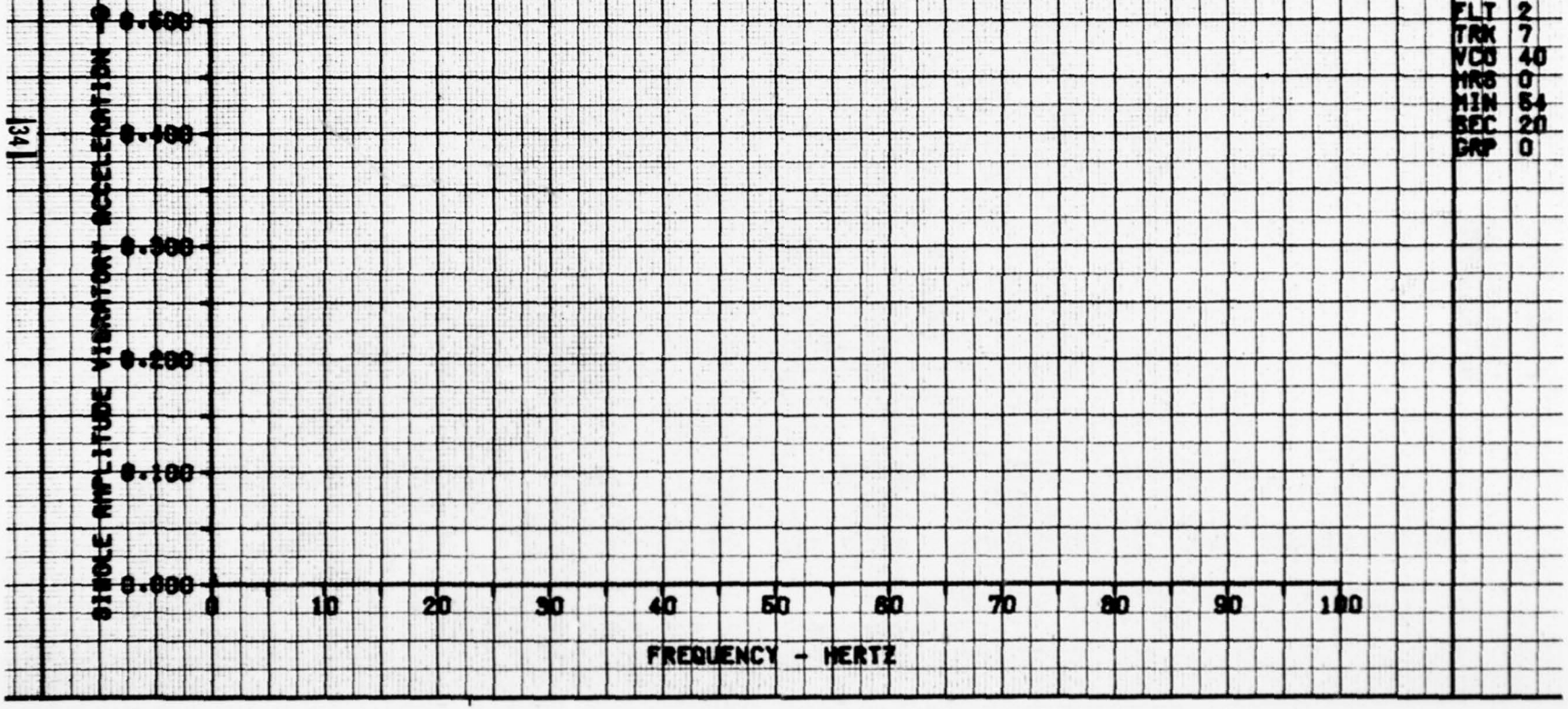
VIBRATION CHARACTERISTICS

UH-1H USA S/N 66-16859

FUNDAMENTAL FREQUENCY IS 3.20 HZ

LOCATION	CYCLIC CONTROL
AXIS	LONGITUDINAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8520	132.8 (FWD)	0.0 (MID)	2220	14.0	192.00	ZERO	GROUND RUN	CLEAN



FLT	2
TRK	7
VCO	40
MRS	0
MIN	54
SEC	20
GRP	0

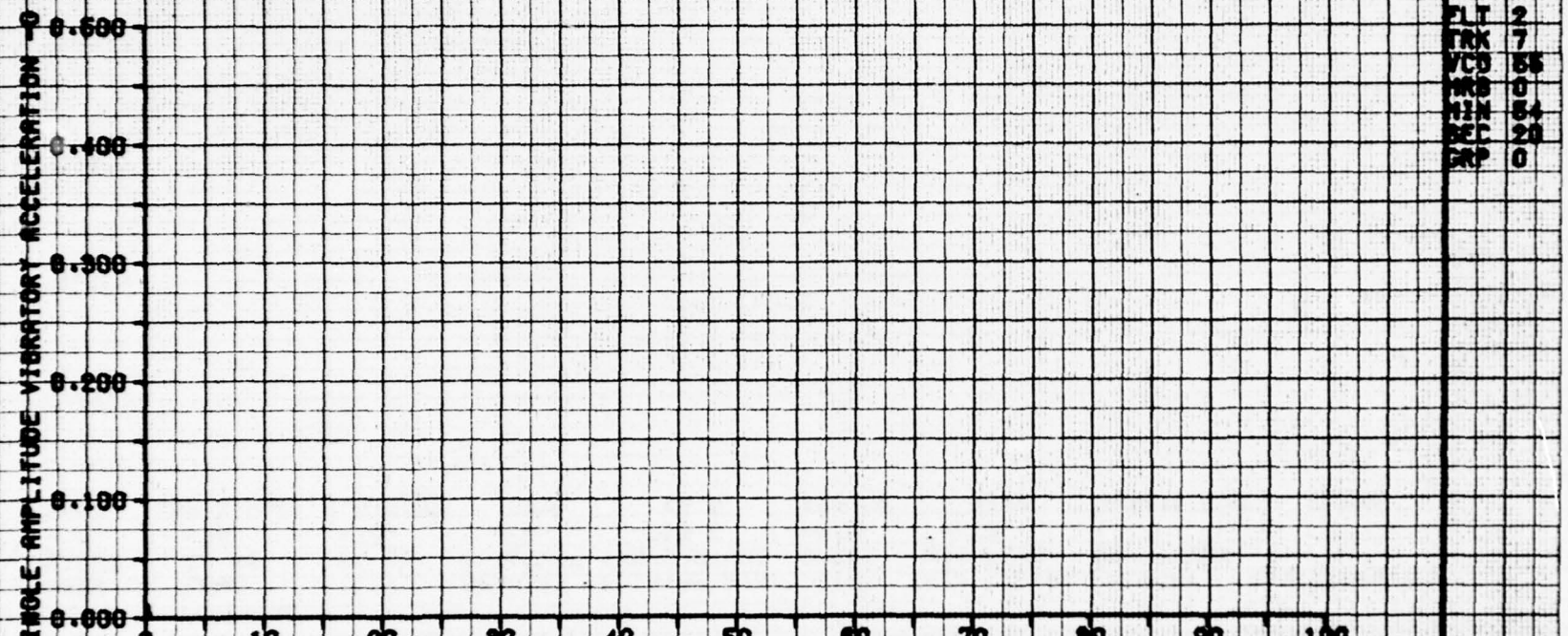
FIGURE 15

VIBRATION CHARACTERISTICS

NUM-1H USA S/N 66-00068

FUNDAMENTAL FREQUENCY IS 3.20 HZ

LOCATION	CYCLIC CONTROL							
AXIS	LATERAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8520	152.6 (FWD)	0.0 (MID)	2220	14.0	192.00	ZERO	GROUND RUN	CLEAN



FLT	2
TRK	7
YCD	55
MRB	0
MIN	54
SEC	20
GRP	0

FIGURE 16

VIBRATION CHARACTERISTICS

UH-1H USA S/N 66-00868

LOCATION FORWARD PALLET FLOOR MOUNT — FUNDAMENTAL FREQUENCY IS 3.20 HZ

AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8520	132.6(FWD)	0.0(MID)	2220	14.0	192.00	ZERO	GROUND RUN	CLEAN

SINGLE AMPLITUDE VIBRATORY ACCELERATION

0.600
0.400
0.300
0.200
0.100
0.000

0 10 20 30 40 50 60 70 80 90 100

FREQUENCY - HERTZ

FLT	2
TRK	7
VCB	70
HRS	0
MIN	54
SEC	28
DRP	0

FIGURE 17

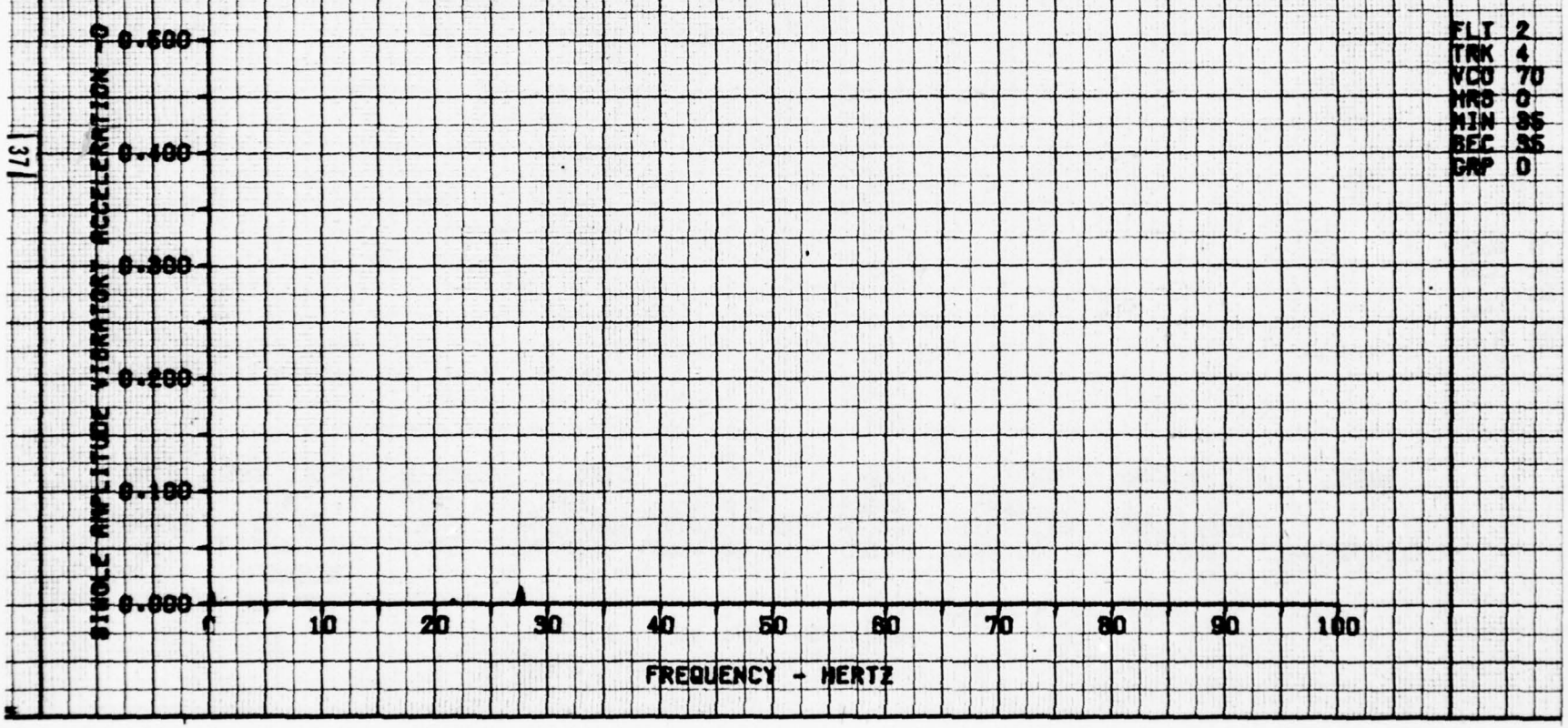
VIBRATION CHARACTERISTICS

MUH-1H USA S/N 66-60869

LOCATION PALLET — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS LONGITUDINAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8680	192.7 (FWD)	0.0 (MID)	2220	14.0	324.0	ZERO	GROUND RUN	CLEAN



FLT	2
TRK	4
VCO	70
HRS	0
MIN	35
SEC	35
GRP	0

FIGURE 18

VIBRATION CHARACTERISTICS

NUM-1H USA S/N 66-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	AXIS	GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
PALLET	LATERAL	8680	152.7 (FWD)	0.0 (MID)	2220	14.0	324.0	ZERO	GROUND RUN	CLEAN

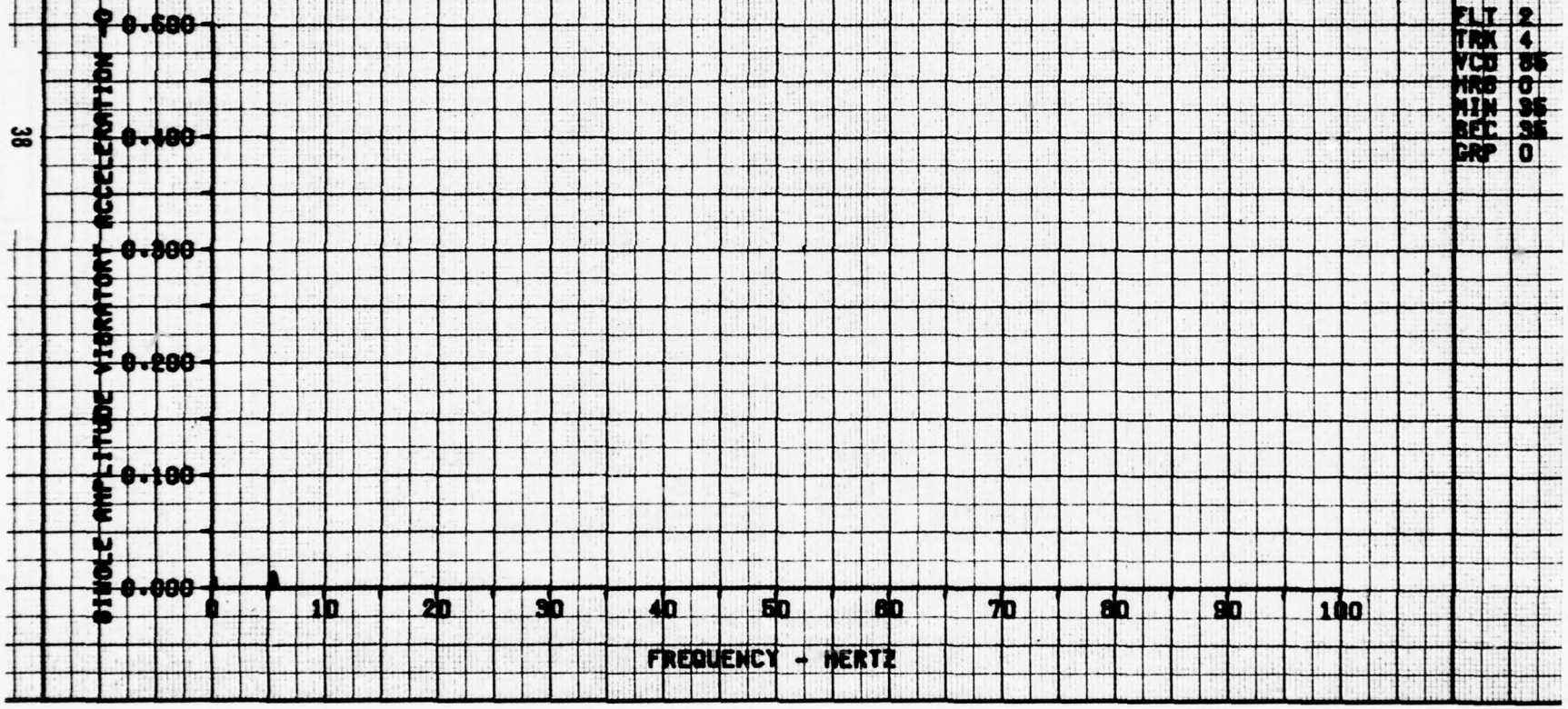


FIGURE 19

VIBRATION CHARACTERISTICS

MUH-1H USA S/N 88-80889

LOCATION PALLET
AXIS VERTICAL
FUNDAMENTAL FREQUENCY IS 5.40 HZ

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8500	132.7 (FWD)	0.0 (MID)	2220	14.0	324.0	ZERO	GROUND RUN	CLEAN

FLT	2
TRK	4
VCD	100
HRS	0
MIN	35
SEC	35
DRP	0

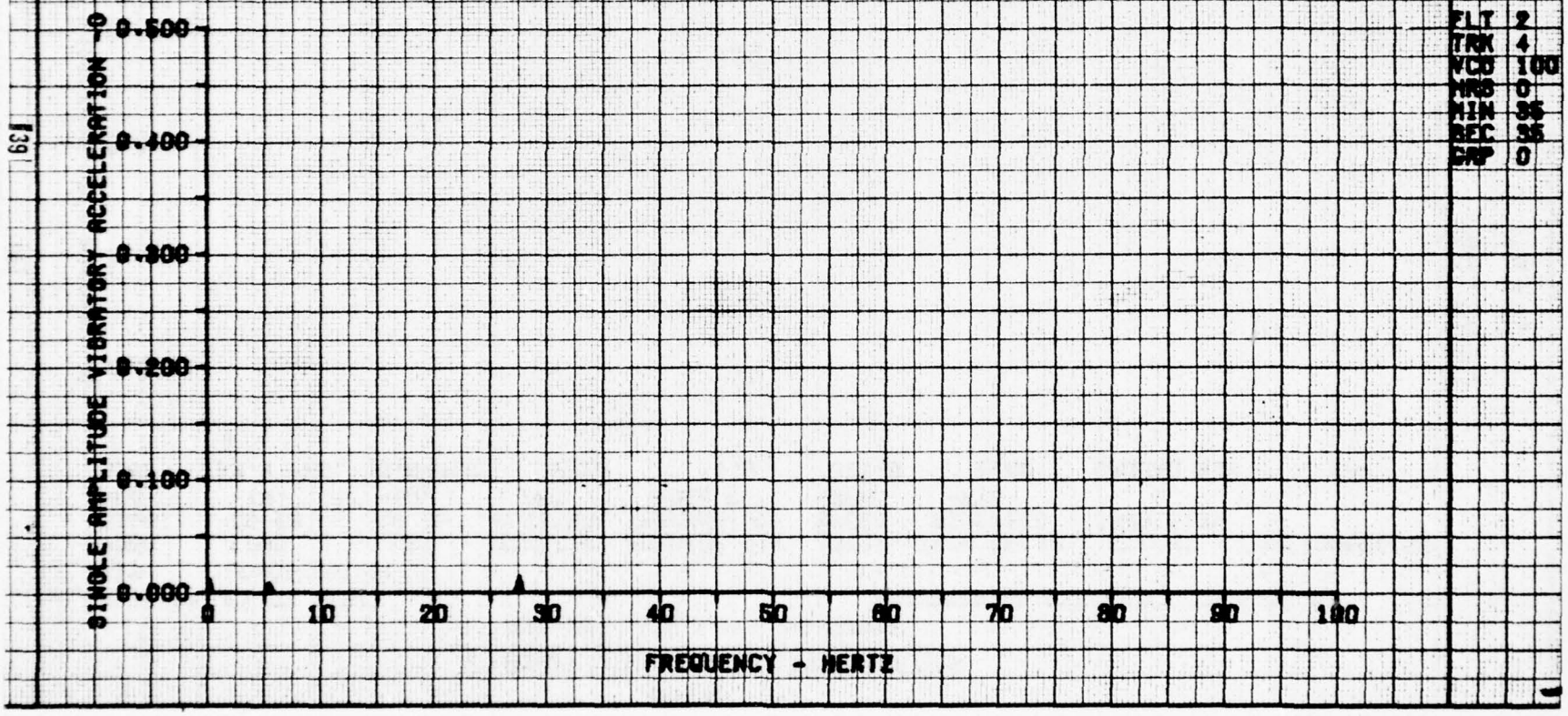


FIGURE 20

VIBRATION CHARACTERISTICS

NUM-1H USA S/N 66-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	PILOT SEAT							
AXIS	LONGITUDINAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8680	132.7 (FWD)	0.0 (MID)	2220	14.0	324.0	ZERO	GROUND RUN	CLEAN

FLT	2
TRK	5
VCO	25
HRB	0
MIN	35
REC	35
GRP	0

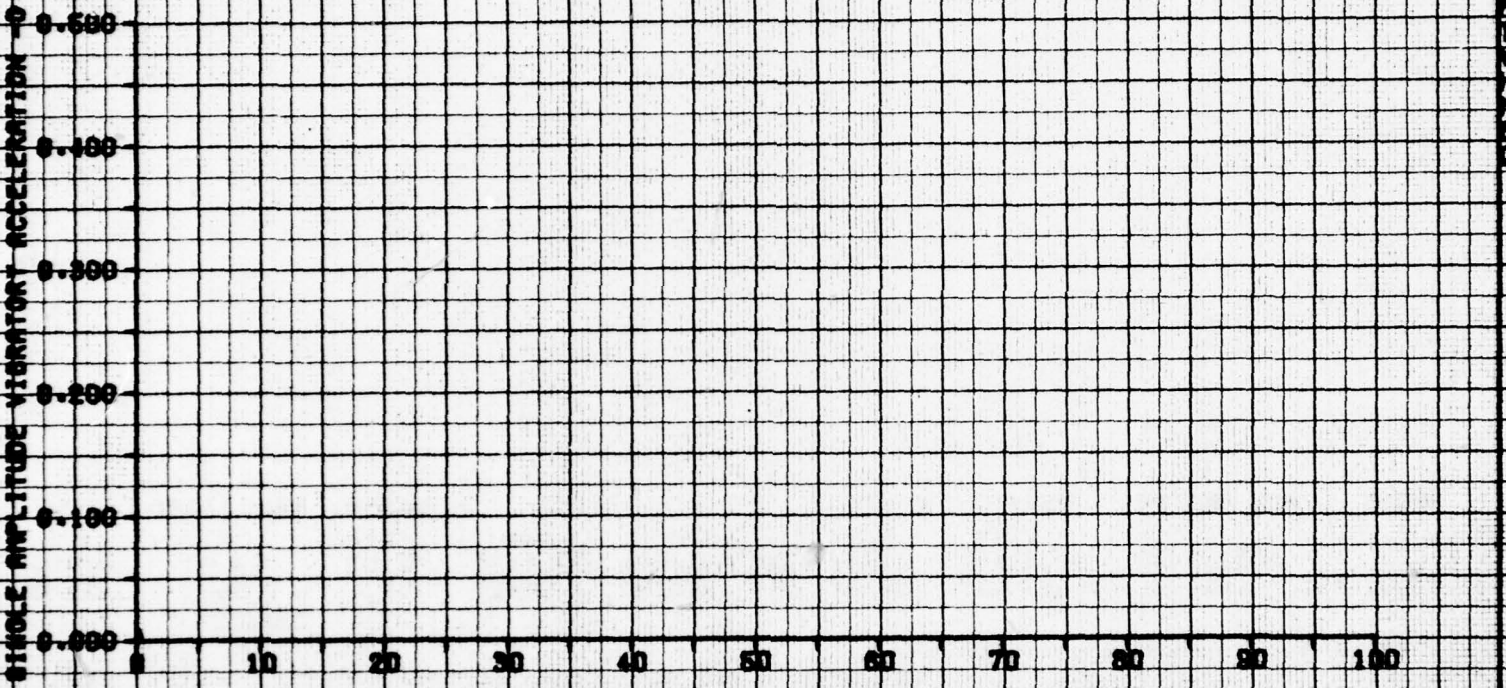


FIGURE 21

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	PILOT SEAT							
AXIS	LATERAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8500	192.7(FWD)	0.0(MID)	2220	14.0	324.0	ZERO	GROUND RUN	CLEAN

SINGLE AMPLITUDE VIBRATORY ACCELERATION - G

0.600
0.400
0.300
0.200
0.100
0.000

0 10 20 30 40 50 60 70 80 90 100

FREQUENCY - HERTZ

FLT	2
TRK	6
VCR	40
HRS	0
MIN	36
SEC	26
SRP	0

FIGURE 22

VIBRATION CHARACTERISTICS

UH-1H USA S/N 66-00869

LOCATION PILOT SEAT — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8580	132.7(FWD)	0.0(MID)	2220	14.0	324.0	ZERO	GROUND RUN	CLEAN

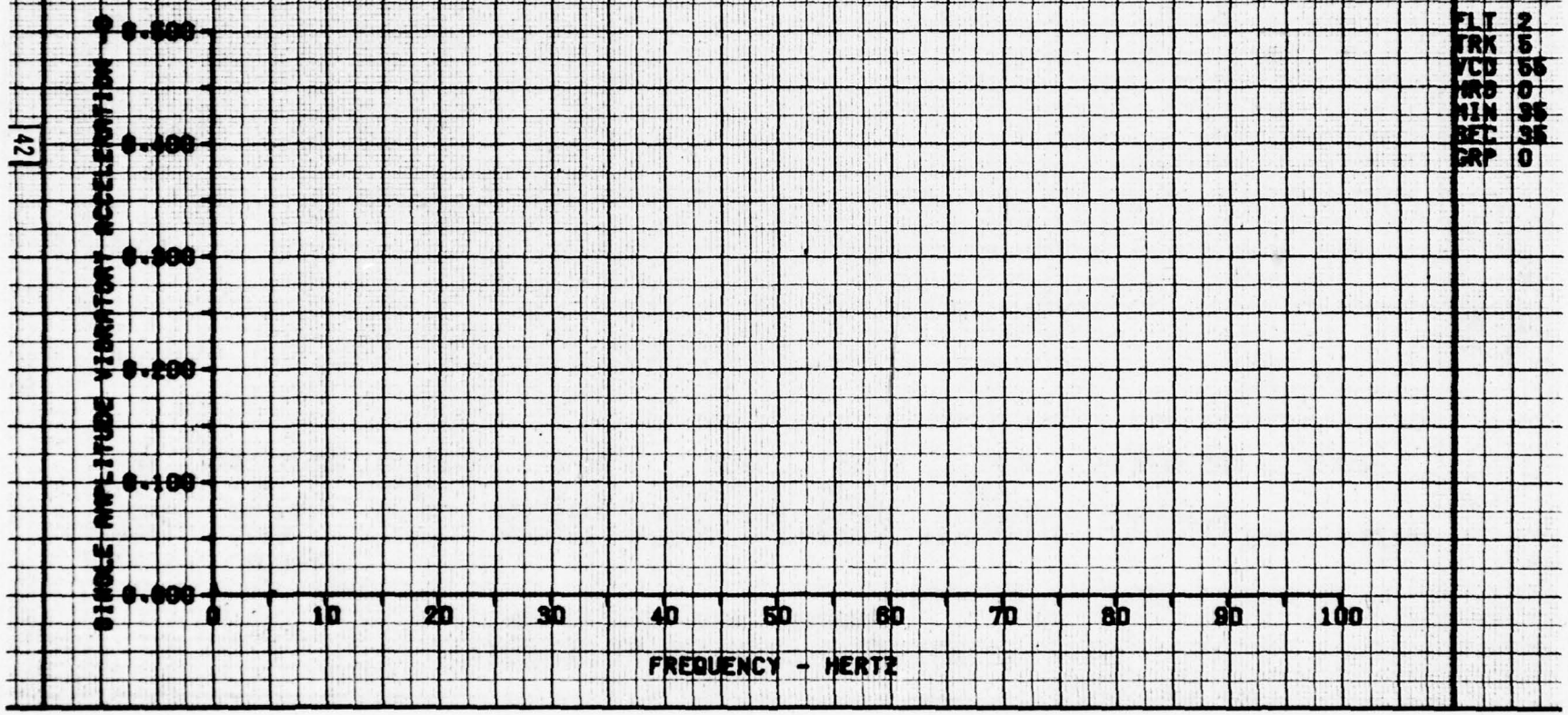


FIGURE 23

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-[illegible]

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	TRANSMITTION							
AXIS	LONGITUDINAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8580	132.7(FWD)	0.0(MID)	2220	14.0	324.0	ZERO	GROUND RUN	CLEAN

0:WHOLE AMPLITUDE VIBRATORY ACCELERATION - G

0.500
0.400
0.300
0.200
0.100
0.000

0 10 20 30 40 50 60 70 80 90 100

FREQUENCY - HERTZ

FIGURE 24

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-00869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	TRANSMITTION							
AXIS	LATERAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8680	132.7(FWD)	0.0(MID)	2220	14.0	324.0	ZERO	GROUND RUN	CLEAN

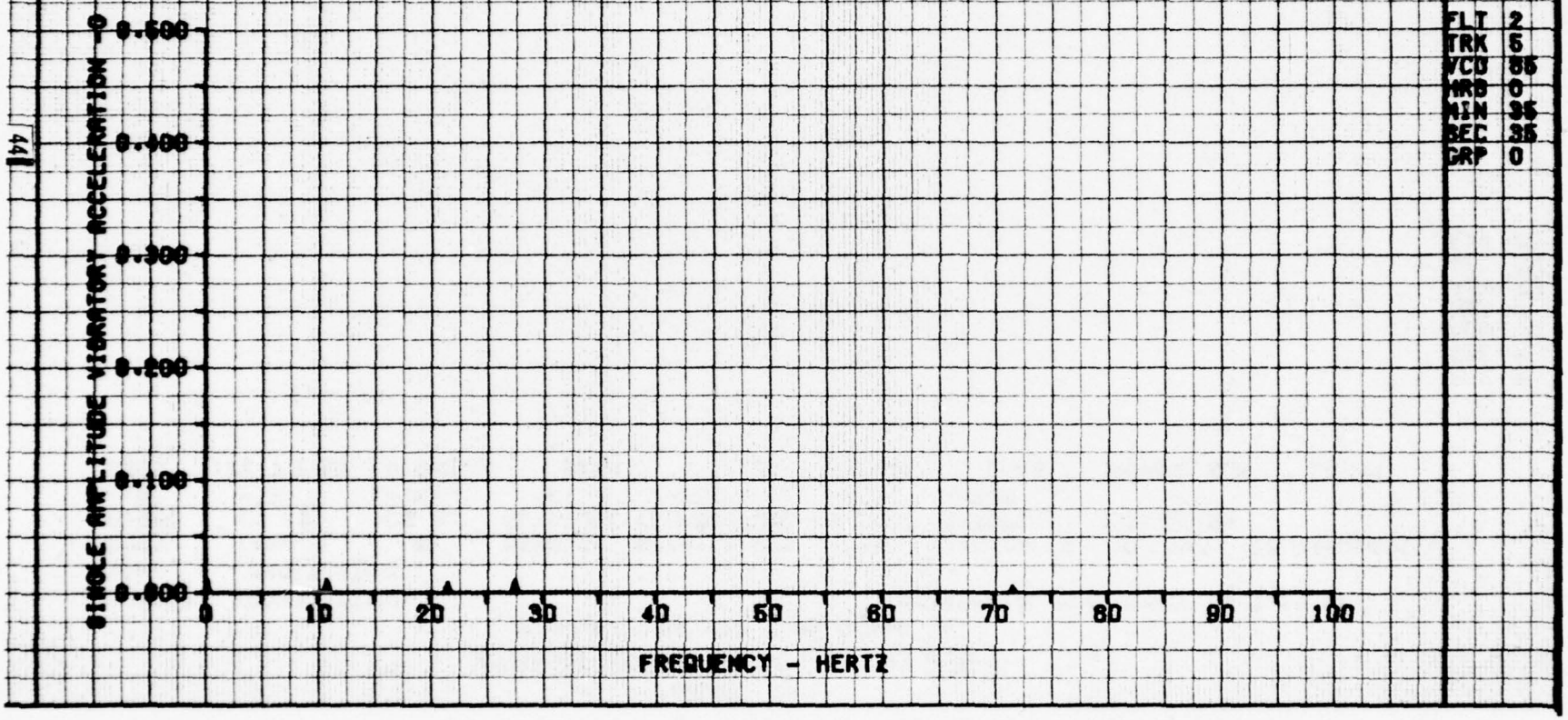


FIGURE 25

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-00869

LOCATION TRANSMITTION

AXIS VERTICAL

FUNDAMENTAL FREQUENCY IS 5.40 HZ

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8580	132.7(FWD)	0.0(MID)	2220	14.0	324.0	ZERO	GROUND RUN	CLEAN

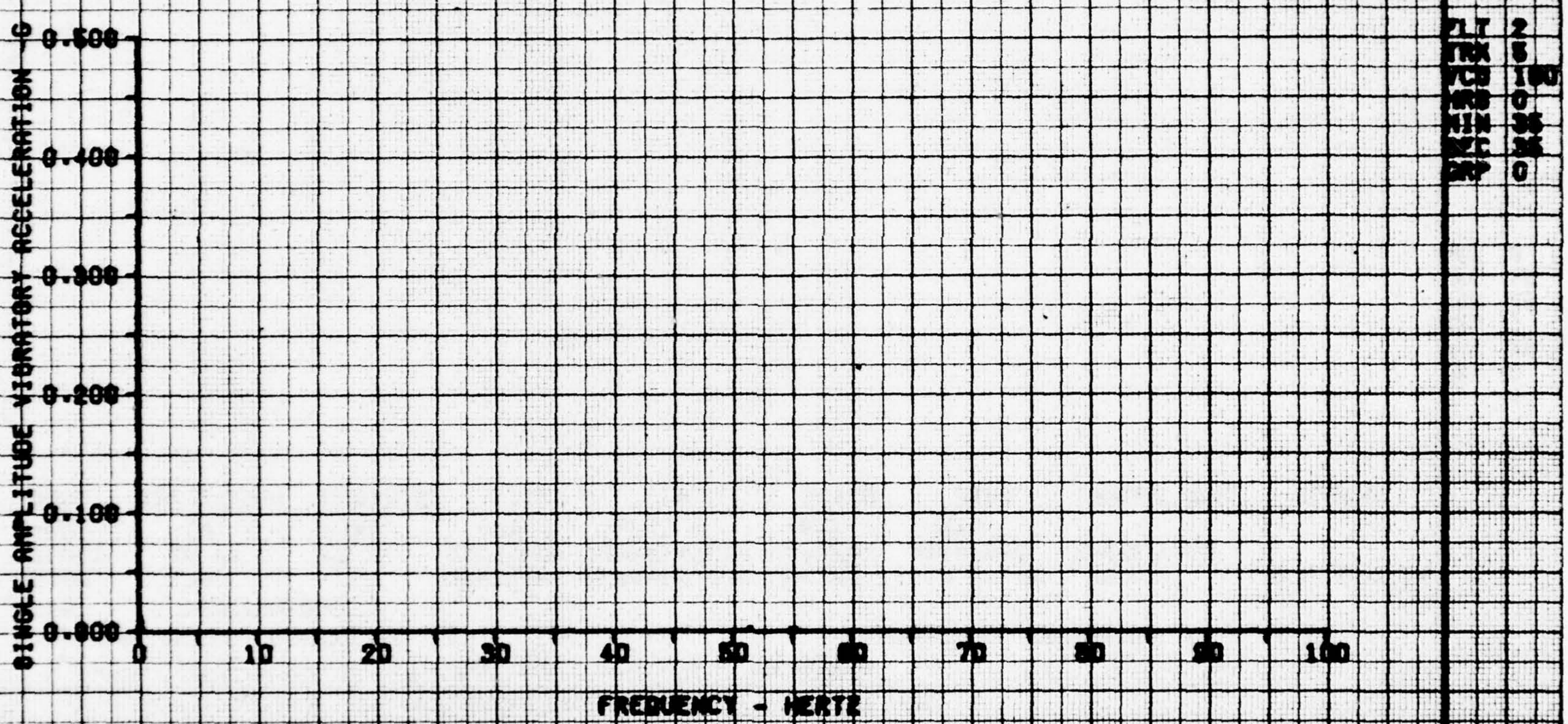


FIGURE 26

VIBRATION CHARACTERISTICS

HUH-1H USA S/N 68-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	AXIS	GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
POWER CONVERTER	LONGITUDINAL	8500	132.7(FWD)	0.0(MID)	2220	14.0	324.0	ZERO	GROUND RUN	CLEAN

FLT	2
TRK	6
VCB	25
HRB	0
MIN	95
SEC	35
DRP	0

SINGLE AMPLITUDE VIBRATORY ACCELERATION - G

0.500
0.400
0.300
0.200
0.100
0.000

0 10 20 30 40 50 60 70 80 90 100

FREQUENCY - HERTZ

191

FIGURE 27

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60868

LOCATION POWER CONVERTER — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS LATERAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8680	132.7 (FWD)	0.0 (MID)	2220	14.0	324.0	ZERO	GROUND RUN	CLEAN

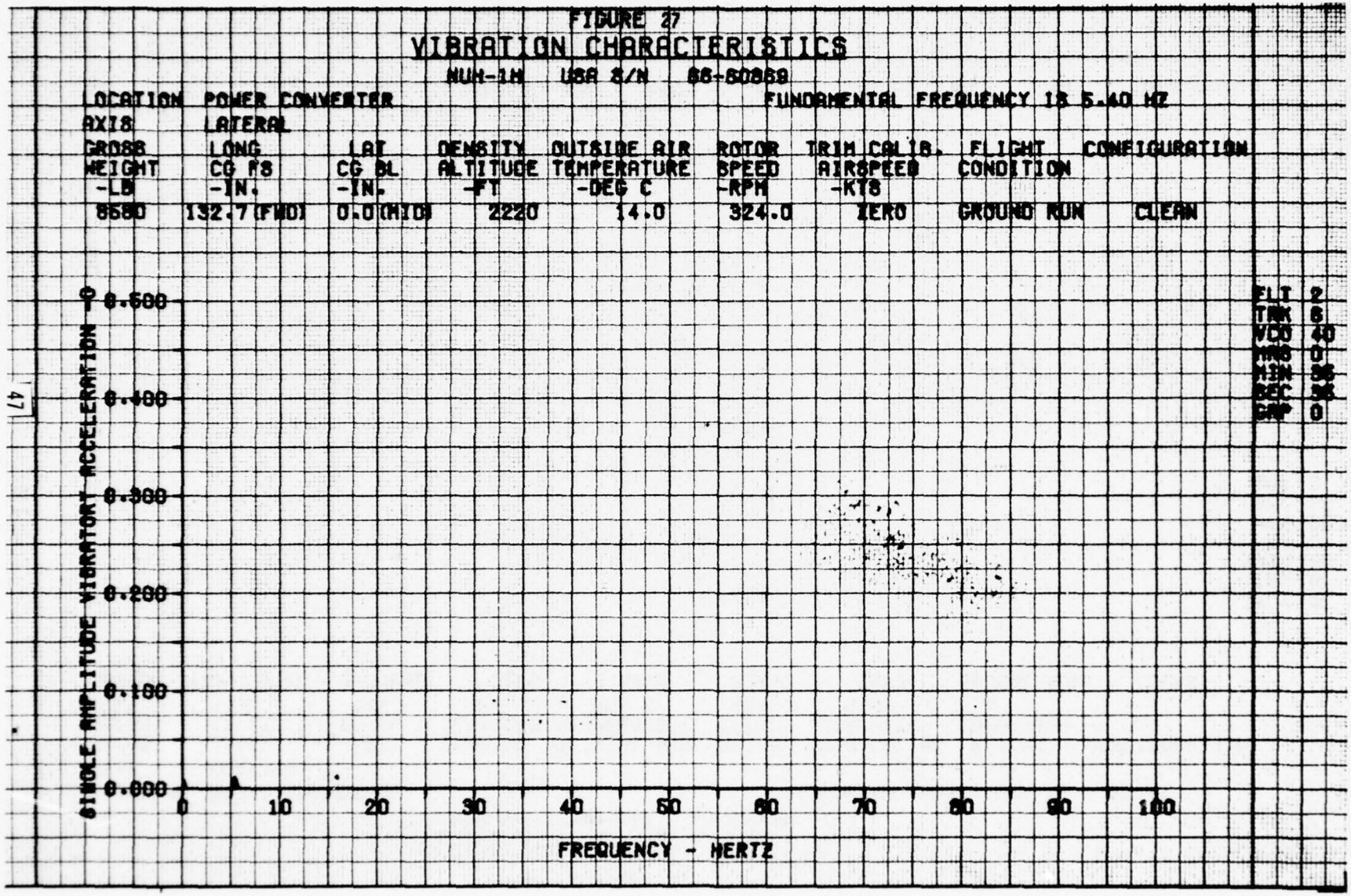


FIGURE 28

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

LOCATION POWER CONVERTER — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8580	132.7 (FWD)	0.0 (MID)	2220	14.0	324.0	ZERO	GROUND RUN	CLEAN

FLT	2
TRK	6
VCD	55
MRB	0
MIN	36
SEC	35
GRP	0

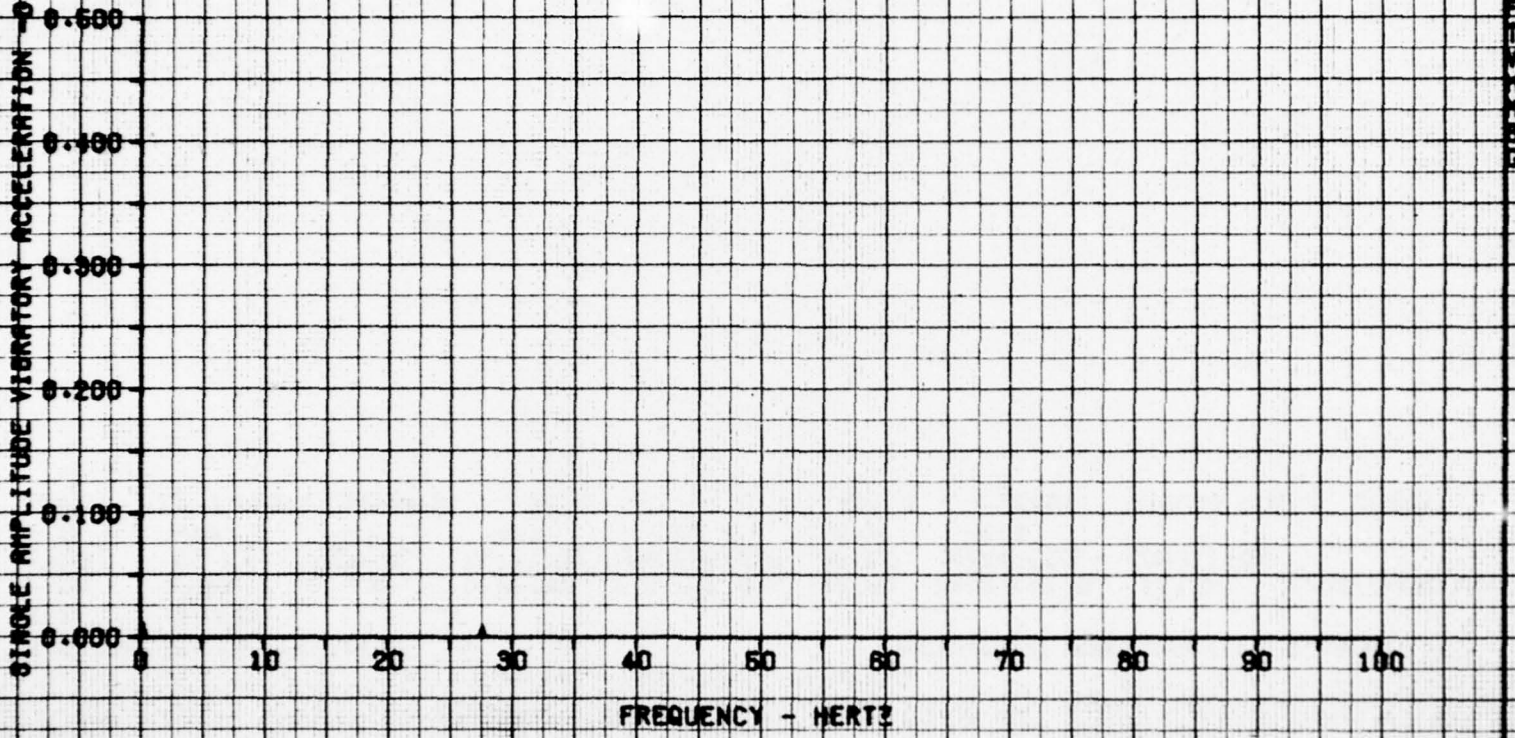


FIGURE 29

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

LOCATION COLLECTIVE CONTROL — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8580	132.7 (FWD)	0.0 (MID)	2220	14.0	324.0	ZERO	GROUND RUN	CLEAN

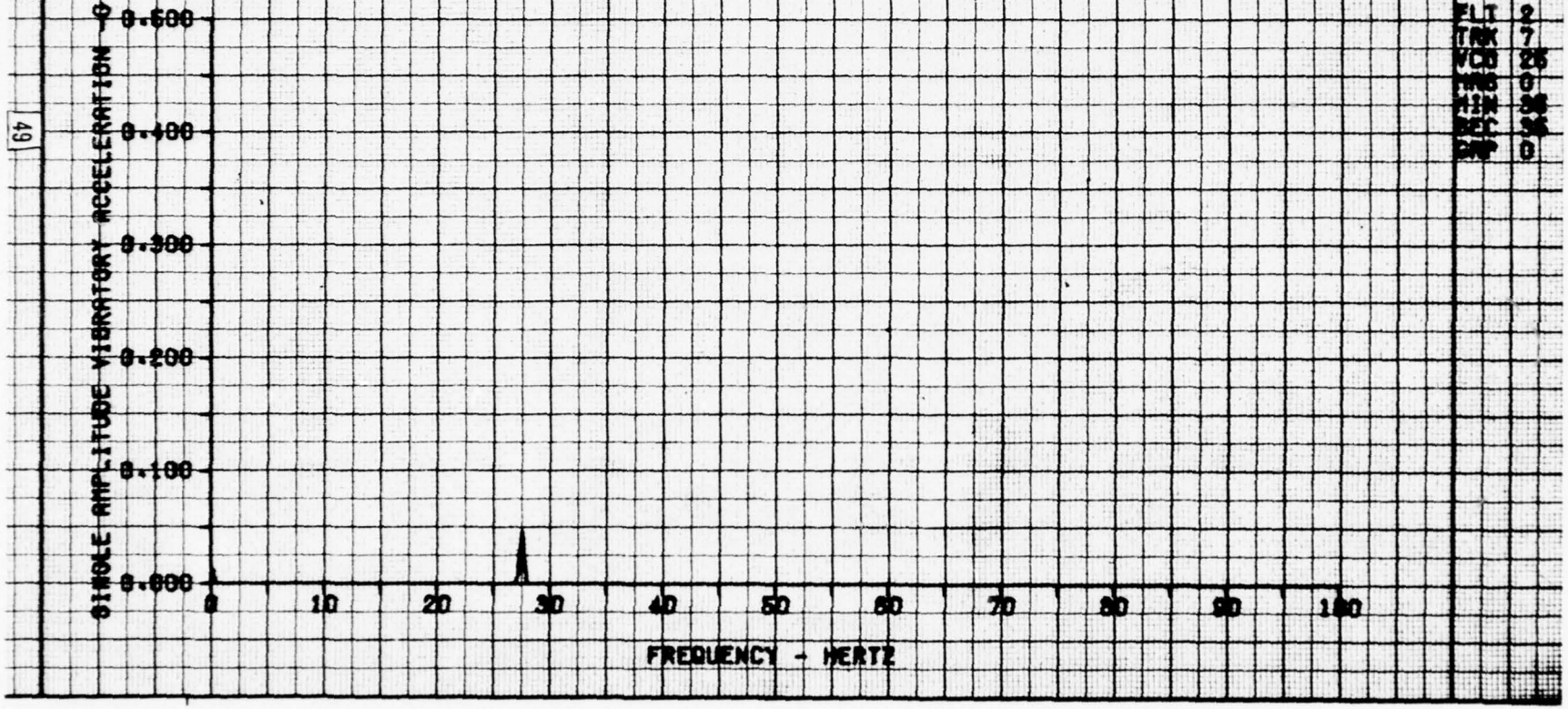


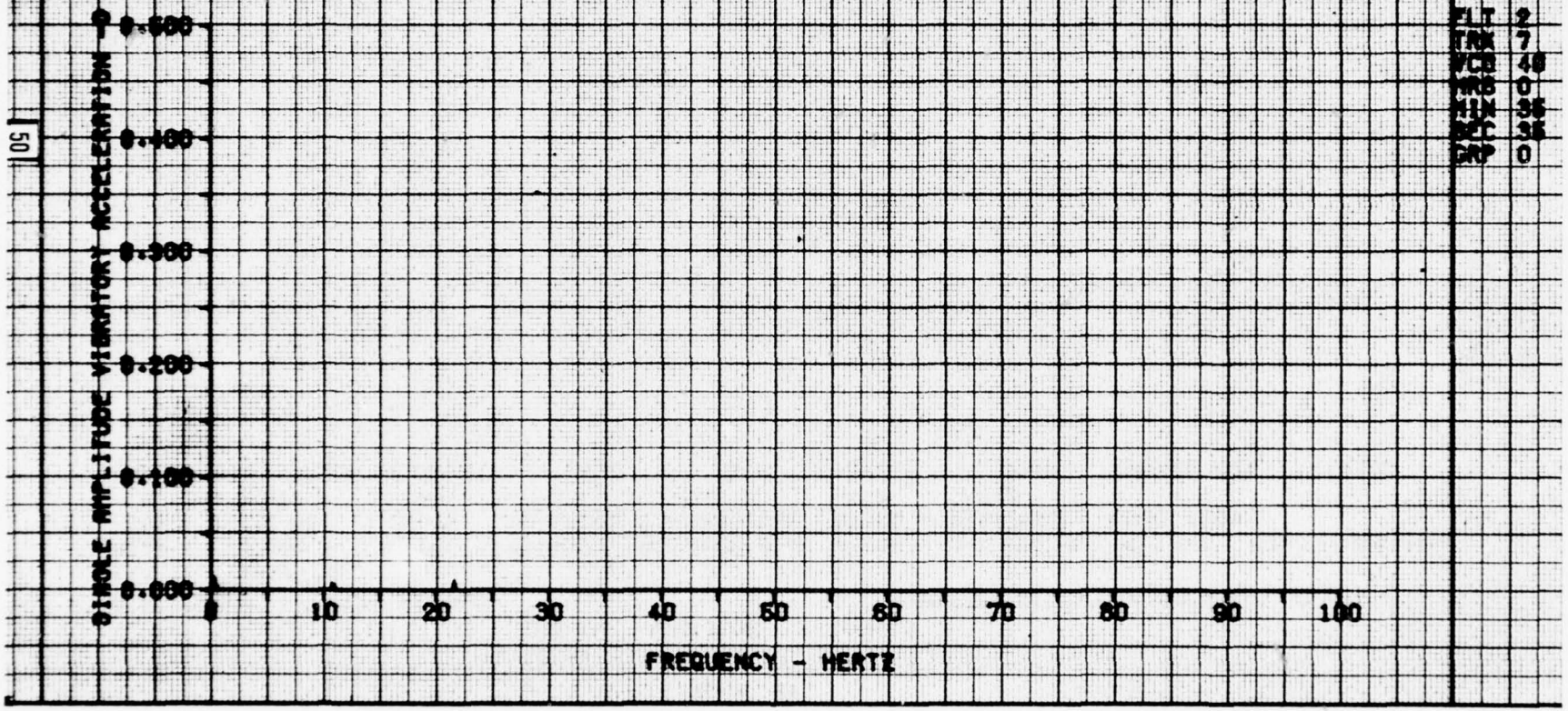
FIGURE 30

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	CYCLIC CONTROL							
AXIS	LONGITUDINAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8580	152.7 FWD	0.0 OHIO	2220	14.0	324.0	ZERO	GROUND RUN	CLEAN



FLT	2
TRK	7
VCB	48
HRS	0
MIN	35
SEC	35
GRP	0

FIGURE 31

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	CYCLIC CONTROL							
AXIS	LATERAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8580	132.7(FWD)	0.0(MID)	2220	14.0	324.0	ZERO	GROUND RUN	CLEAN

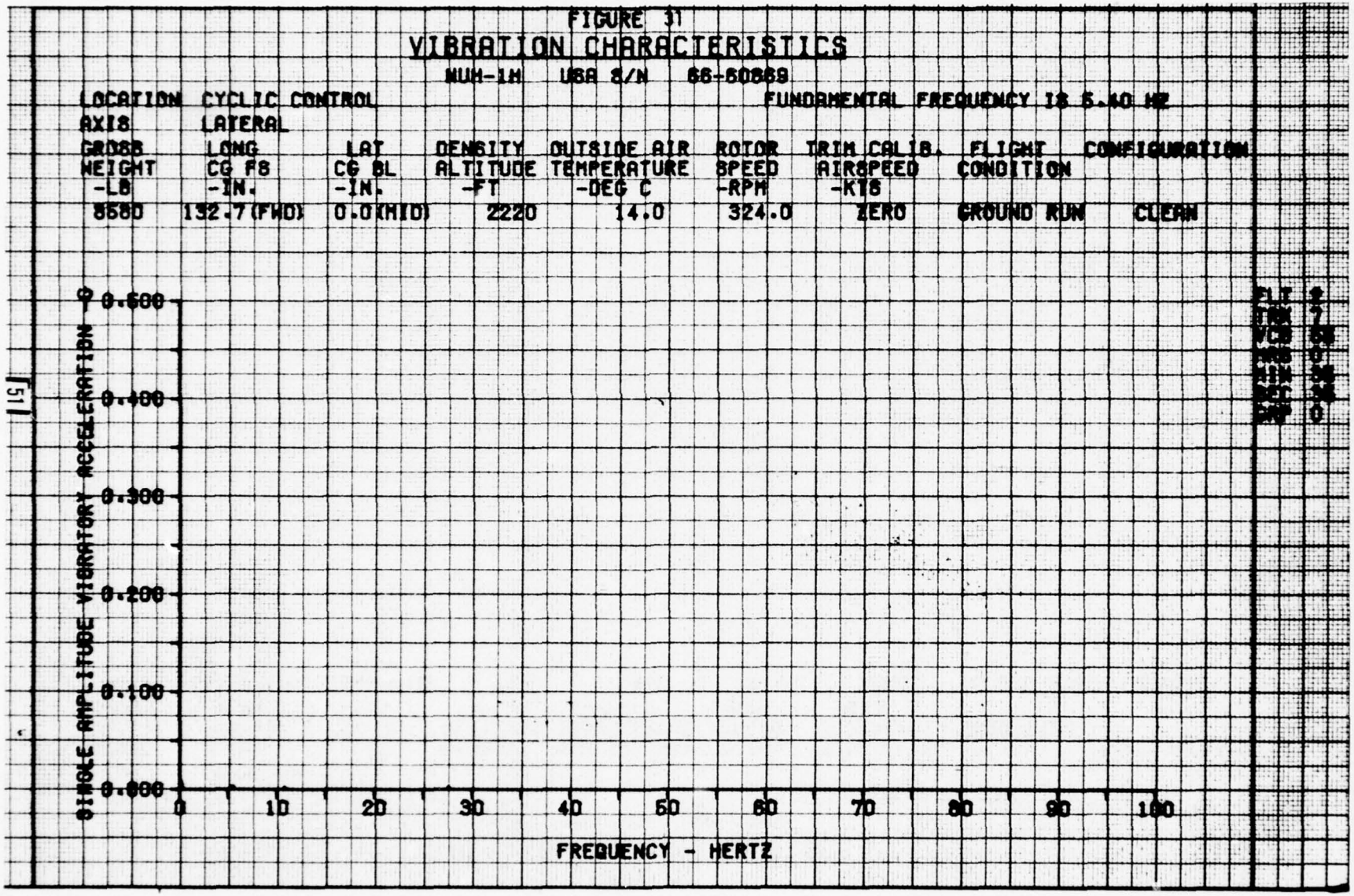


FIGURE 32

VIBRATION CHARACTERISTICS

NUM-1H USA S/N 66-00869

LOCATION FORWARD PALLET FLOOR MOUNT FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8580	1[illegible].7 (FWD)	0.0 (MID)	2220	14.0	324.0	ZERO	GROUND RUN	CLEAN

FLT	2
TRK	7
VCS	78
RUN	0
MIN	36
SEC	35
GRP	0

SINGLE AMPLITUDE VIBRATORY ACCELERATION - g

0.600
0.400
0.300
0.200
0.100
0.000

0 10 20 30 40 50 60 70 80 90 100

FREQUENCY - HERTZ

FIGURE 33

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60889

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION PALLET

AXIS LONGITUDINAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	134.2 (FWD)	0.0 (MID)	2160	14.0	324.0	HOVER	5-FT HOVER	CLEAN

SINGLE AMPLITUDE VIBRATORY ACCELERATION - G

0.600
0.400
0.300
0.200
0.100
0.000

0 10 20 30 40 50 60 70 80 90 100

FREQUENCY - HERTZ

FLT	2
TRQ	4
VCD	79
[illegible]	0
NIN	4
[illegible]	18
DMP	0

FIGURE 34

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60868

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION AXIS	PALLET LATERAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	134.2 (FWD)	0.0 (MID)	2160	14.0	324.0	HOVER	5-FT HOVER	CLEAN

FLT	2
TRK	4
VCD	85
HRS	0
MIN	4
SEC	15
GRP	0

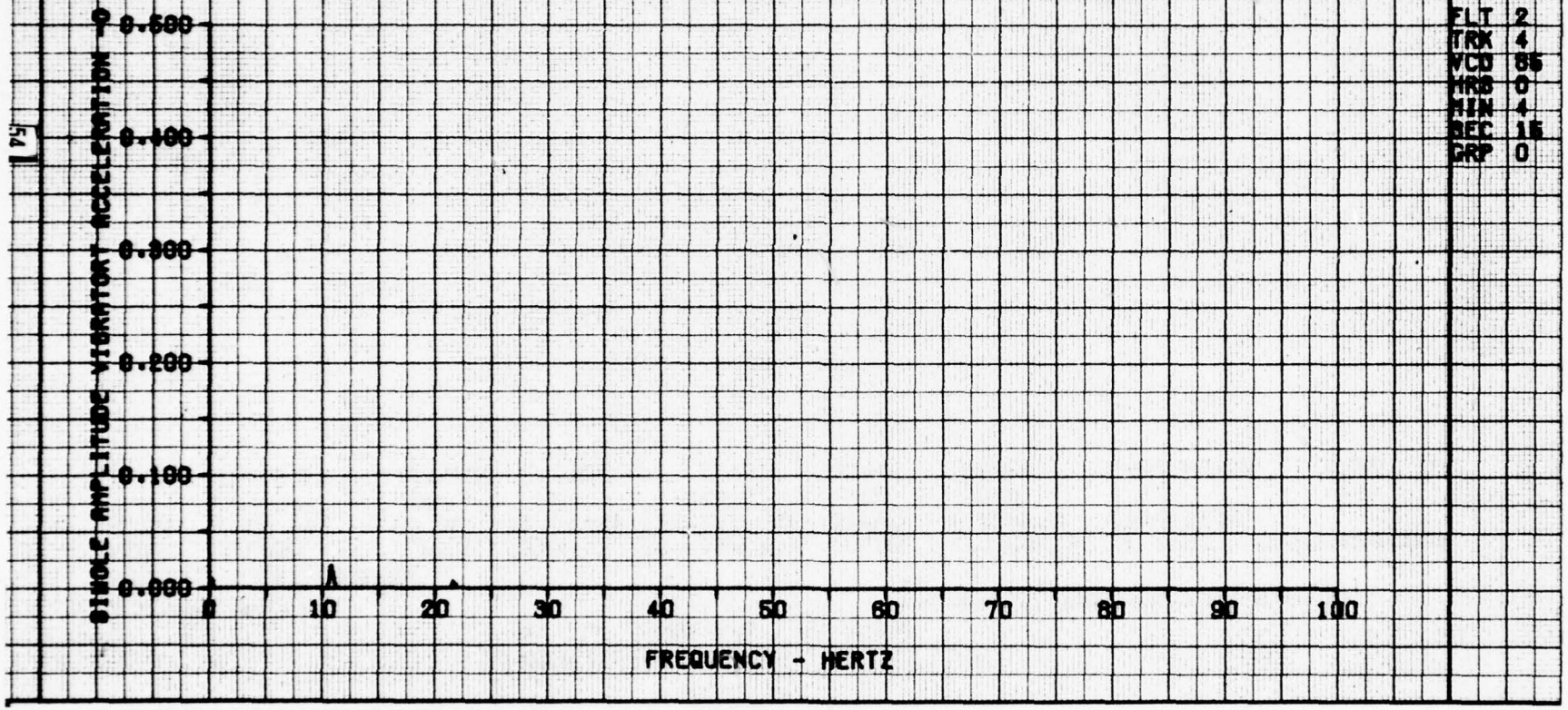


FIGURE 35

VIBRATION CHARACTERISTICS

NUM-1H USA S/N 88-00000

FUNDAMENTAL FREQUENCY 12 5.40 HZ

LOCATION	PALLET							
AXIS	VERTICAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	154.2 (FWD)	0.0 (MID)	2160	14.0	324.0	HOVER	6-FT HOVER	CLEAN

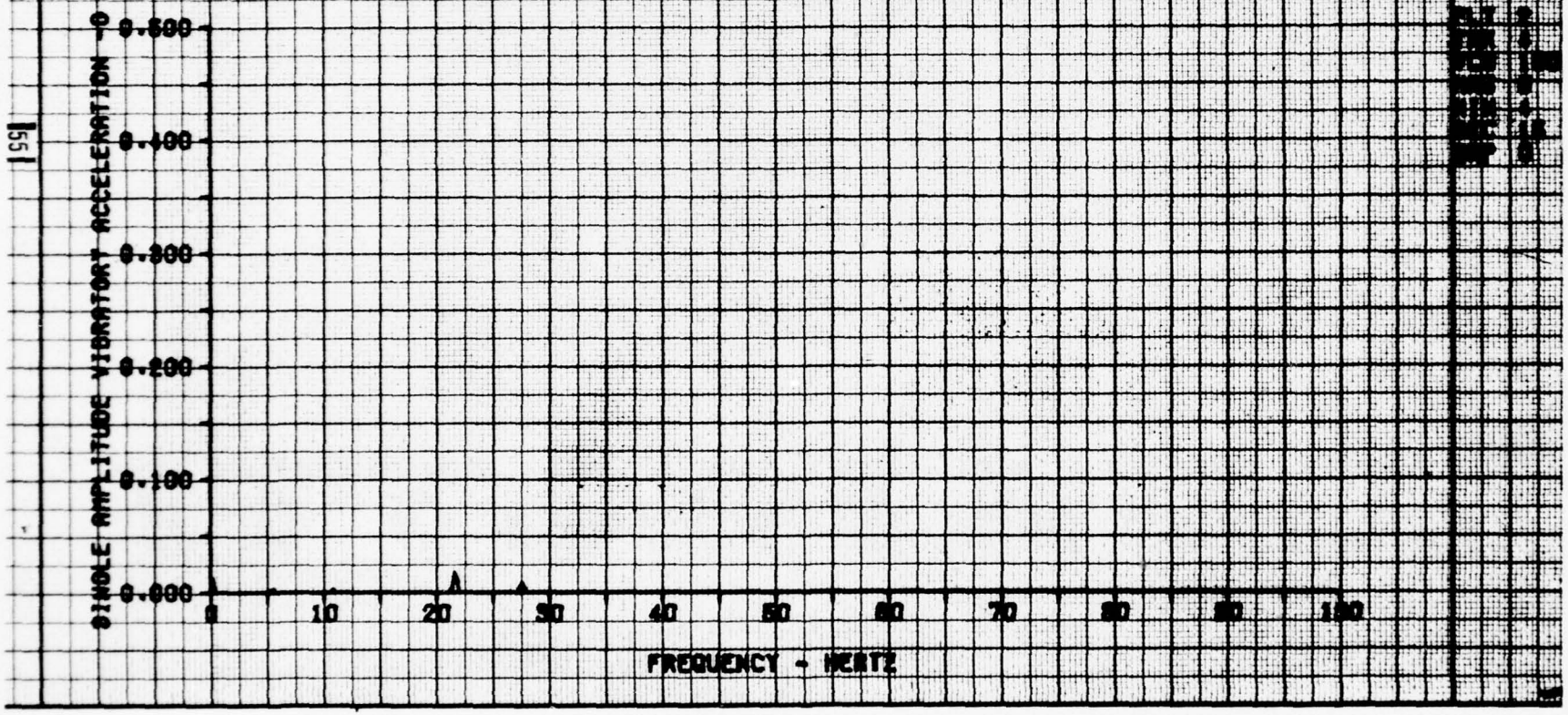


FIGURE 86

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

LOCATION PILOT SEAT — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS LONGITUDINAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	134.2 (FWD)	0.0 (MID)	2160	14.0	324.0	HOVER	5-FT HOVER	CLEAN

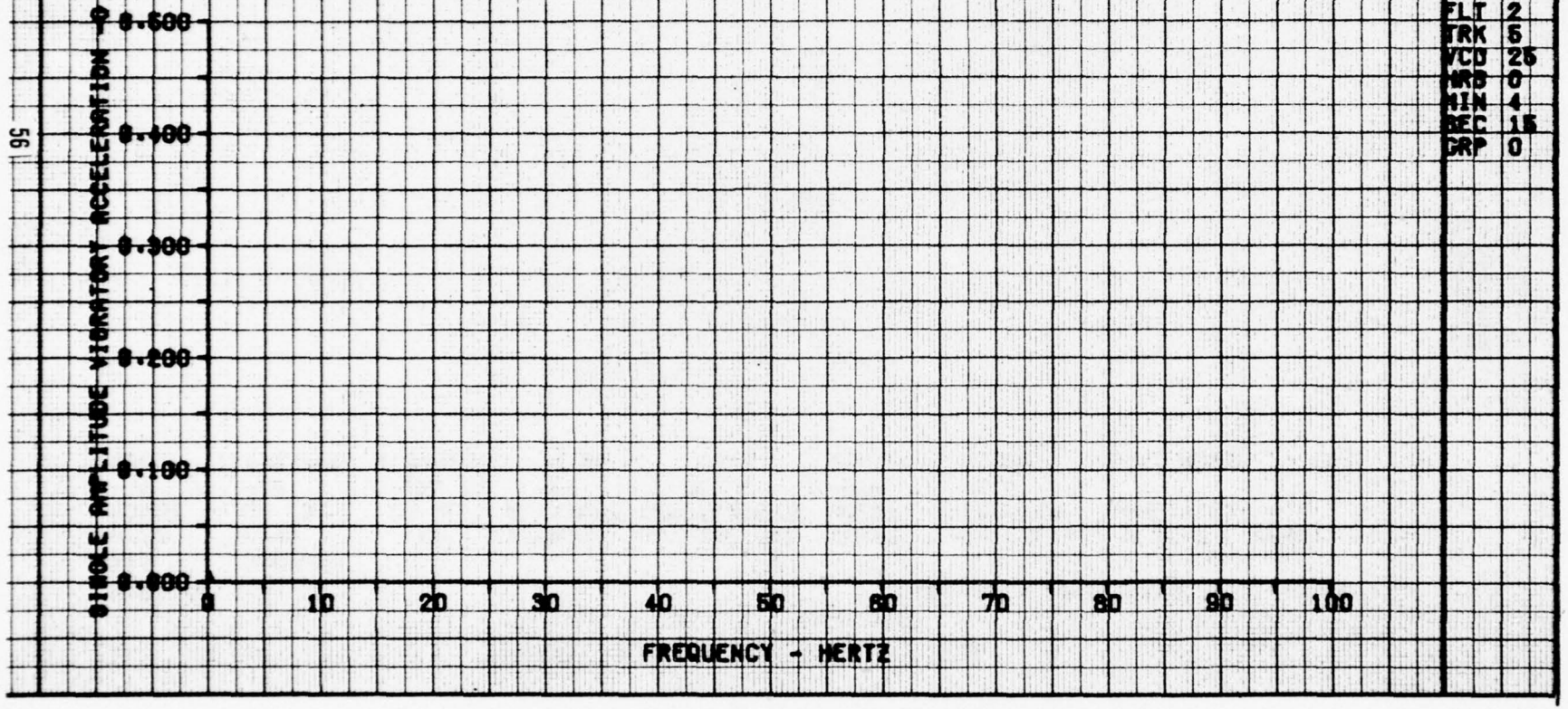


FIGURE 37

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 68-60868

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION PILOT SEAT
AXIS LATERAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	134.2 (FWD)	0.0 (MID)	2160	14.0	324.0	HOVER	6-FT HOVER	CLEAN

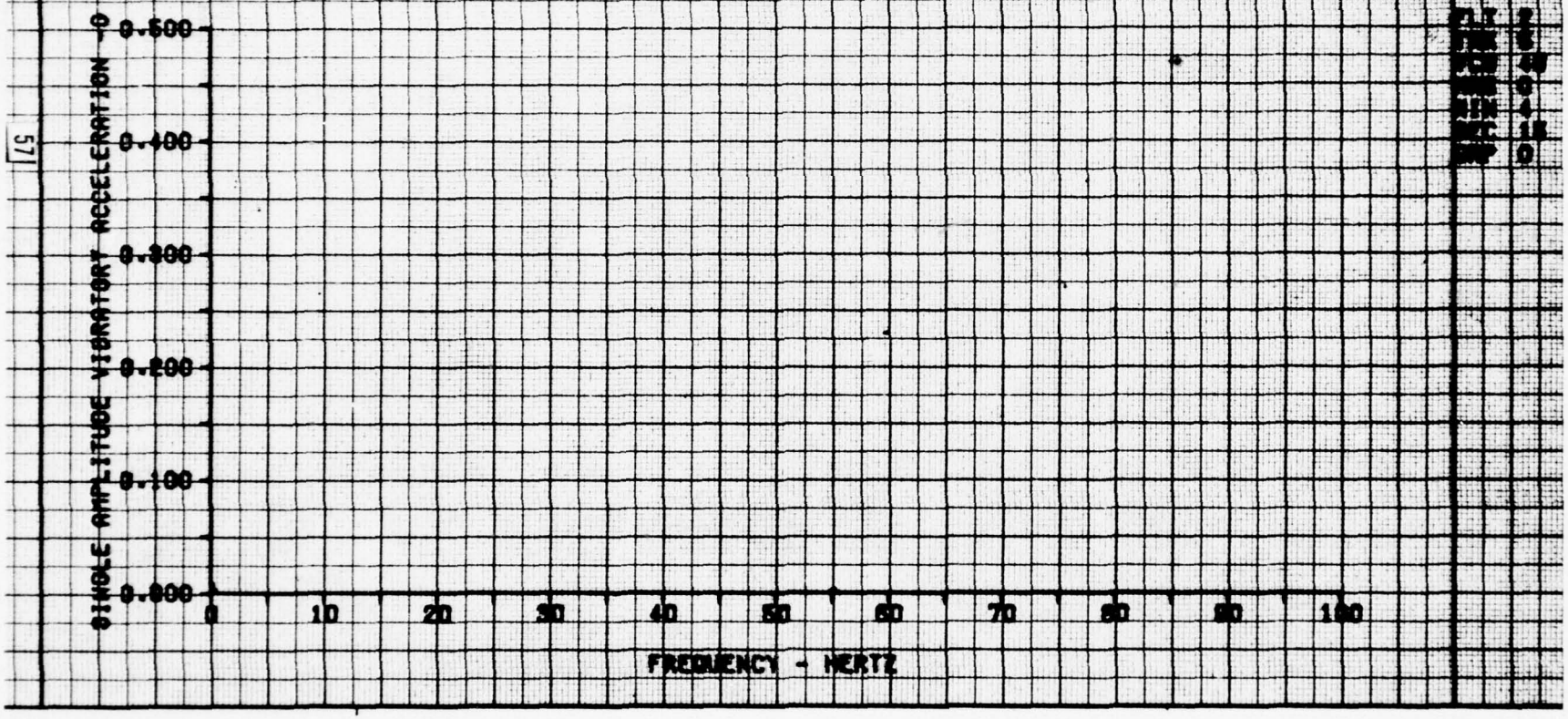


FIGURE 38

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-00869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	PILOT SEAT							
AXIS	VERTICAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8000	134.2 (FWD)	0.0 (MID)	2150	14.0	324.0	HOVER	5-FT HOVER	CLEAN

FLT	2
TRK	5
VCD	55
HRS	0
MIN	4
SEC	18
DRP	0

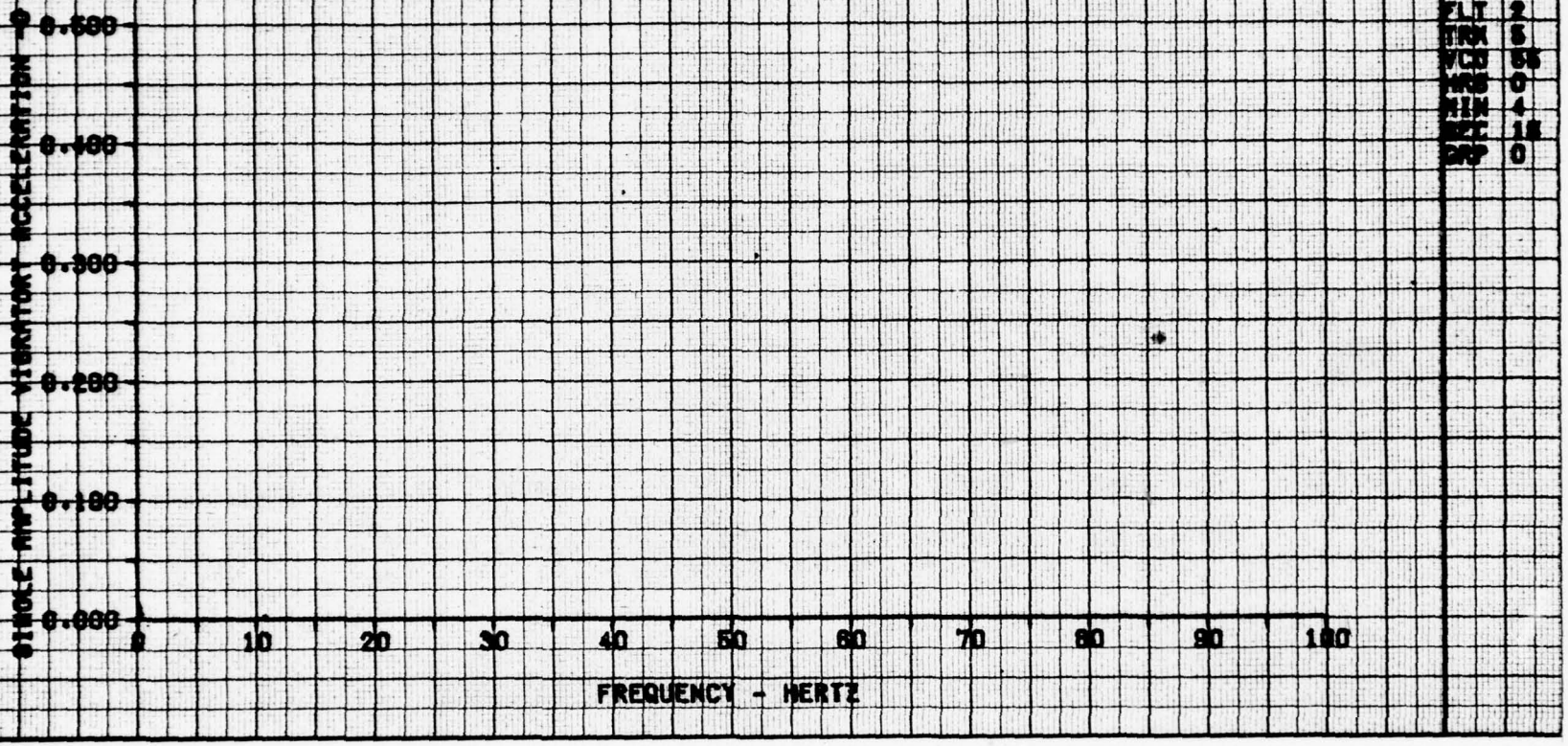


FIGURE 39

VIBRATION CHARACTERISTICS

HUH-1H USA S/N 66-00000

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	TRANSMISSION							
AXIS	LONGITUDINAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	134.2 (FWD)	0.0 (MID)	2180	14.0	324.0	HOVER	6-FT HOVER	CLEAN

SINGLE AMPLITUDE VIBRATORY ACCELERATION - G

0.500
0.400
0.300
0.200
0.100
0.000

0 10 20 30 40 50 60 70 80 90 100

FREQUENCY - HERTZ

FIGURE 40

VIBRATION CHARACTERISTICS

NUH-1M USA S/N 66-60869

LOCATION TRANSMITTION FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS LATERAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8800	134.2(FWD)	0.0(MID)	2160	14.0	324.0	HOVER	5-FT HOVER	CLEAN

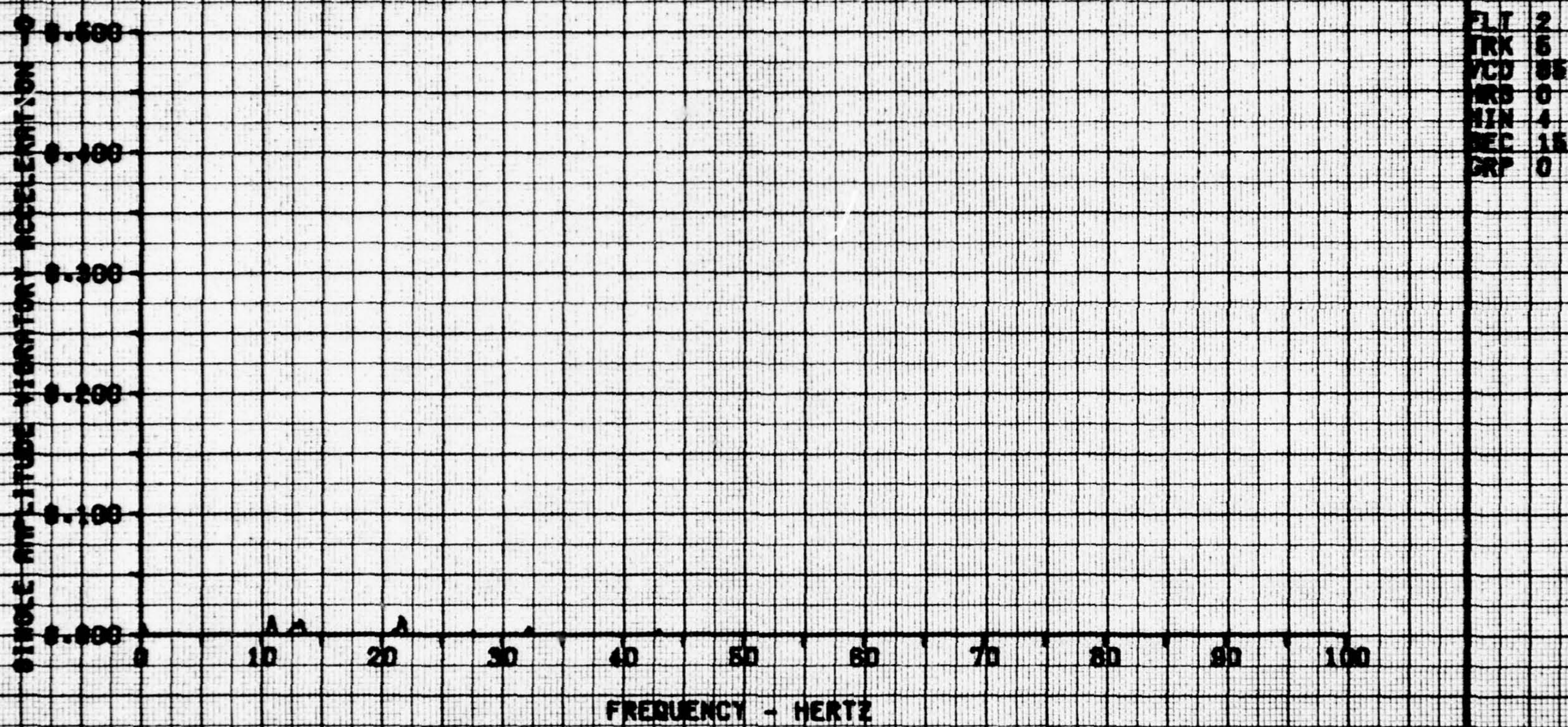


FIGURE 41

VIBRATION CHARACTERISTICS

UH-1H USA S/N 66-16869

LOCATION TRANSMITTION — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	134.2 (FWD)	0.0 (MID)	2160	14.0	324.0	HOVER	6-FT HOVER	CLEAN

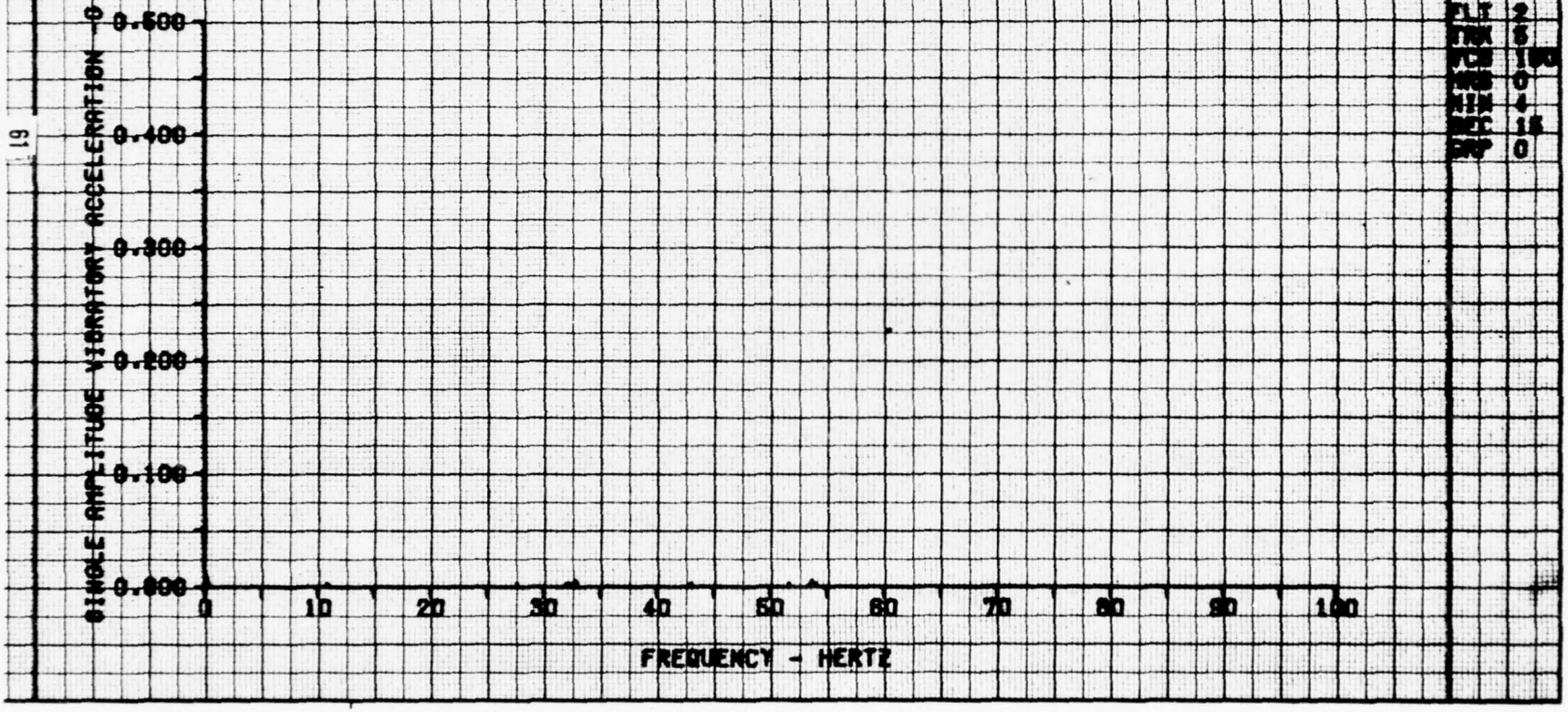


FIGURE 42

VIBRATION CHARACTERISTICS

NUH-1H UBA S/N 66-60869

LOCATION POWER CONVERTER — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS LONGITUDINAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	134.2(FWD)	0.0(MID)	2180	14.0	324.0	HOVER	5-FT HOVER	CLEAN

FLT	2
TRK	6
VCD	25
IRB	C
MIN	4
SEC	15
GRP	0

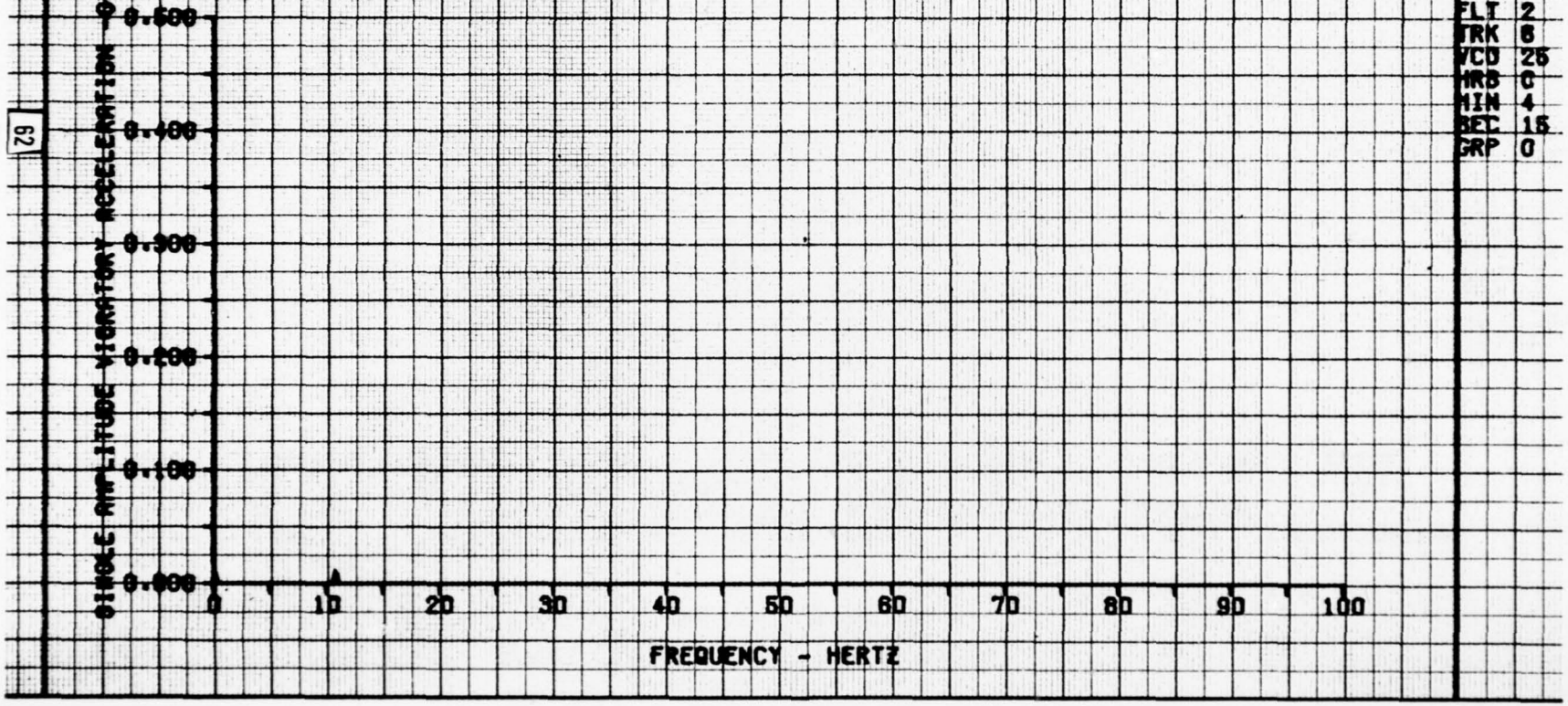


FIGURE 43

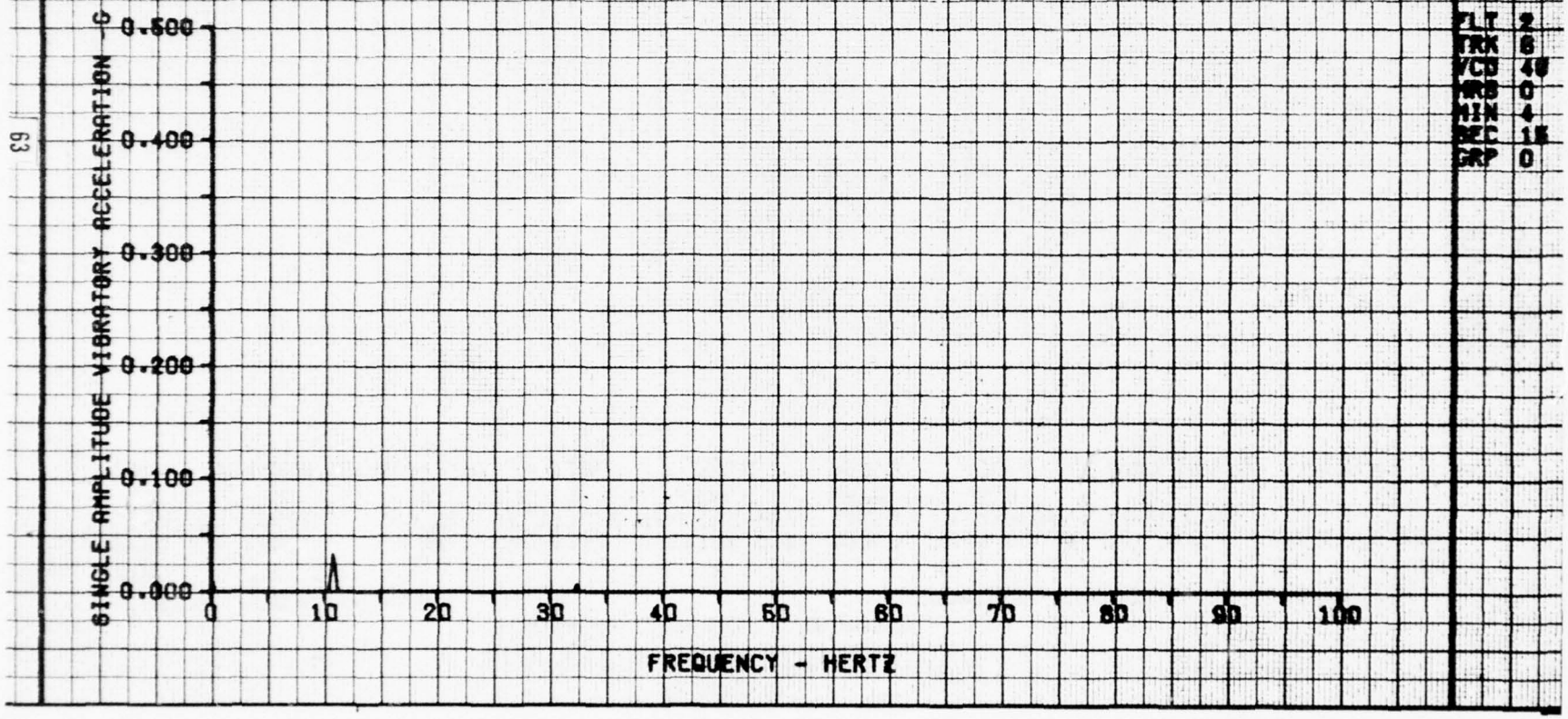
VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-80869

LOCATION POWER CONVERTER — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS LATERAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	134.2 (FWD)	0.0 (MID)	2160	14.0	324.0	HOVER	5-FT HOVER	CLEAN



FLT	2
TRK	6
YCS	48
HRS	0
MIN	4
SEC	15
GRP	0

FIGURE 44

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	POWER CONVERTER							
AXIS	VERTICAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	134.2 (FWD)	0.0 (MID)	2160	14.0	324.0	HOVER	5-FT HOVER	CLEAN

FLT 2
TRK 6
VCO 55
MRS 0
MIN 4
SEC 15
GRP 0

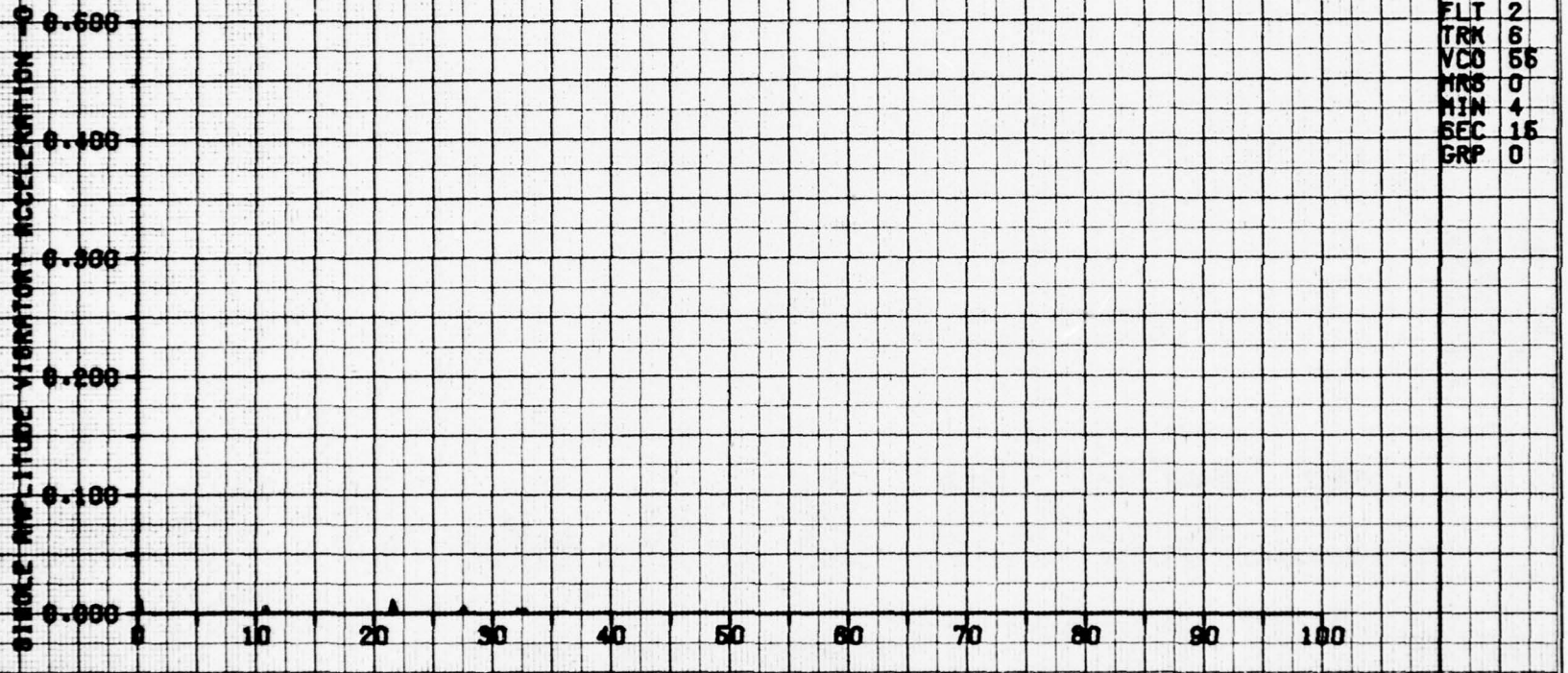


FIGURE 45

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

LOCATION COLLECTIVE CONTROL FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	134.2 (FWD)	0.0 (MID)	2160	14.0	324.0	HOVER	6-FT HOVER	CLEAN

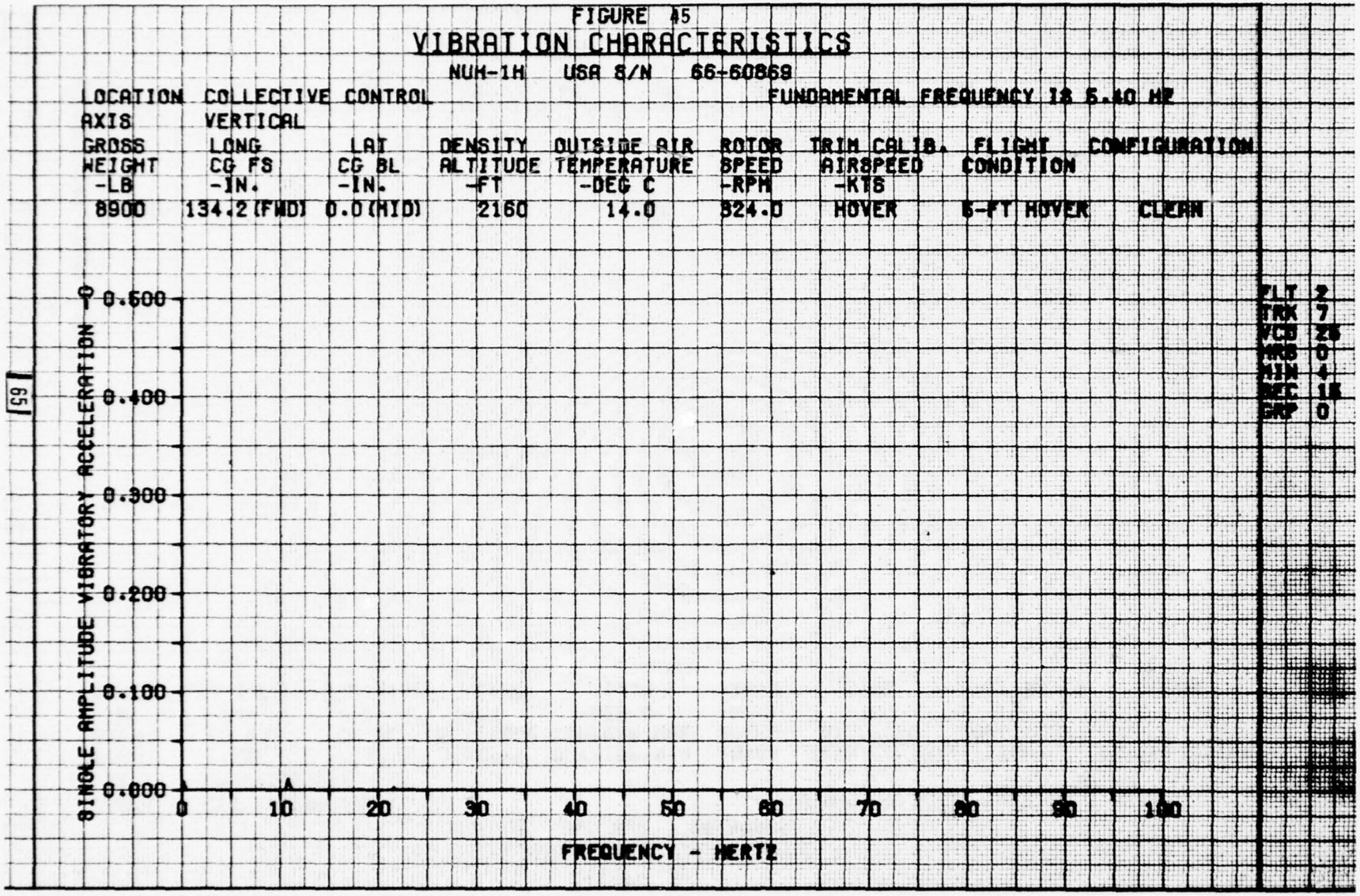


FIGURE 46

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 68-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	CYCLIC CONTROL							
AXIS	LONGITUDINAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8800	134.2 (FWD)	0.0 (MID)	2160	14.0	324.0	HOVER	5-FT HOVER	CLEAN

FLT	2
TRK	7
VCD	40
HRS	0
MIN	4
SEC	15
GRP	0

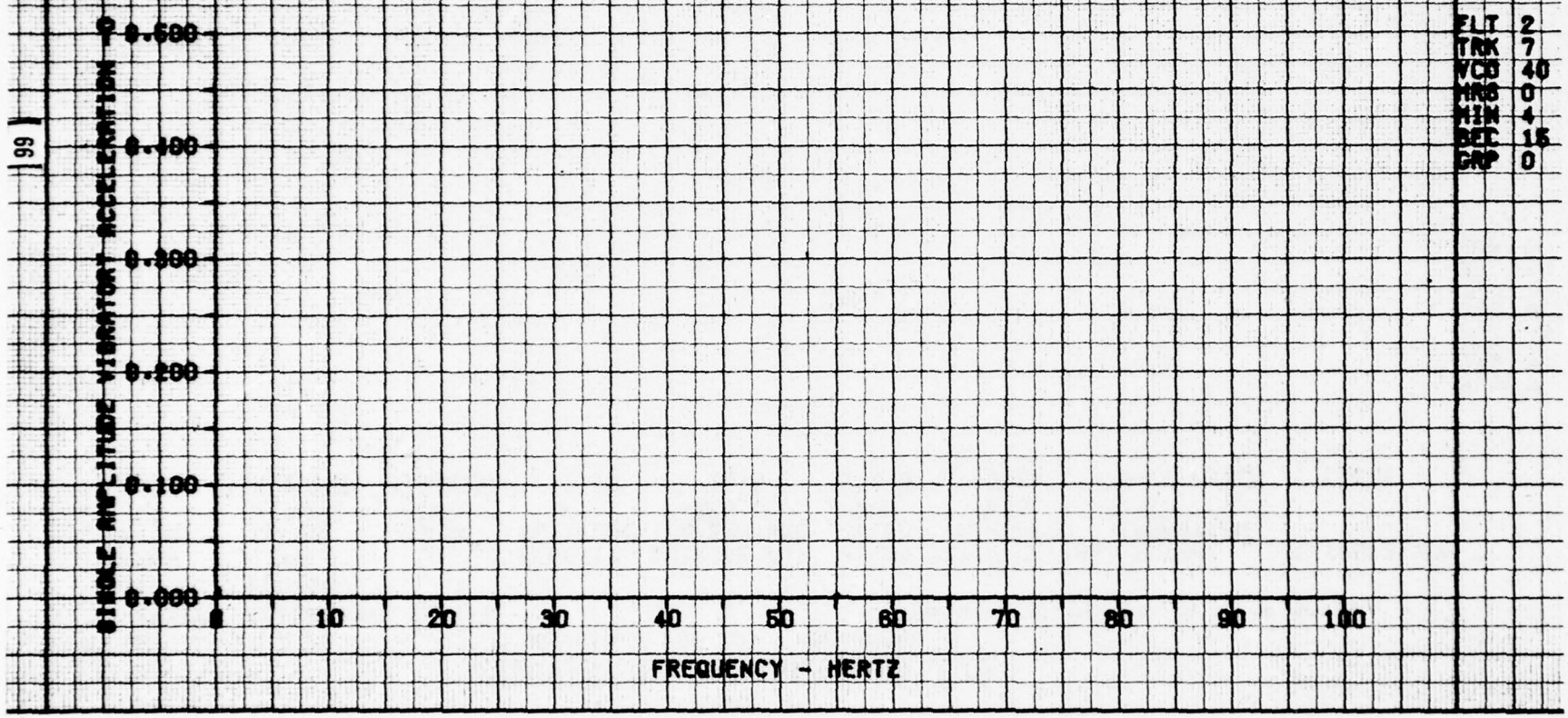


FIGURE 47

VIBRATION CHARACTERISTICS

UH-1H USA S/N 66-16869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	CYCLIC CONTROL							
AXIS	LATERAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	134.2 (FWD)	0.0 (MID)	2160	14.8	324.0	HOVER	6-FT HOVER	CLEAN

FLT	2
TRK	7
VCR	55
FWD	0
AFT	4
REC	16
SKP	0

SINGLE AMPLITUDE VIBRATORY ACCELERATION - g

0.600
0.400
0.300
0.200
0.100
0.000

0 10 20 30 40 50 60 70 80 90 100

FREQUENCY - HERTZ

FIGURE 48

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

LOCATION FORWARD PALLET FLOOR MOUNT — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	134.2 (FWD)	0.0 (MID)	2160	14.0	324.0	HOVER	5-FT HOVER	CLEAN

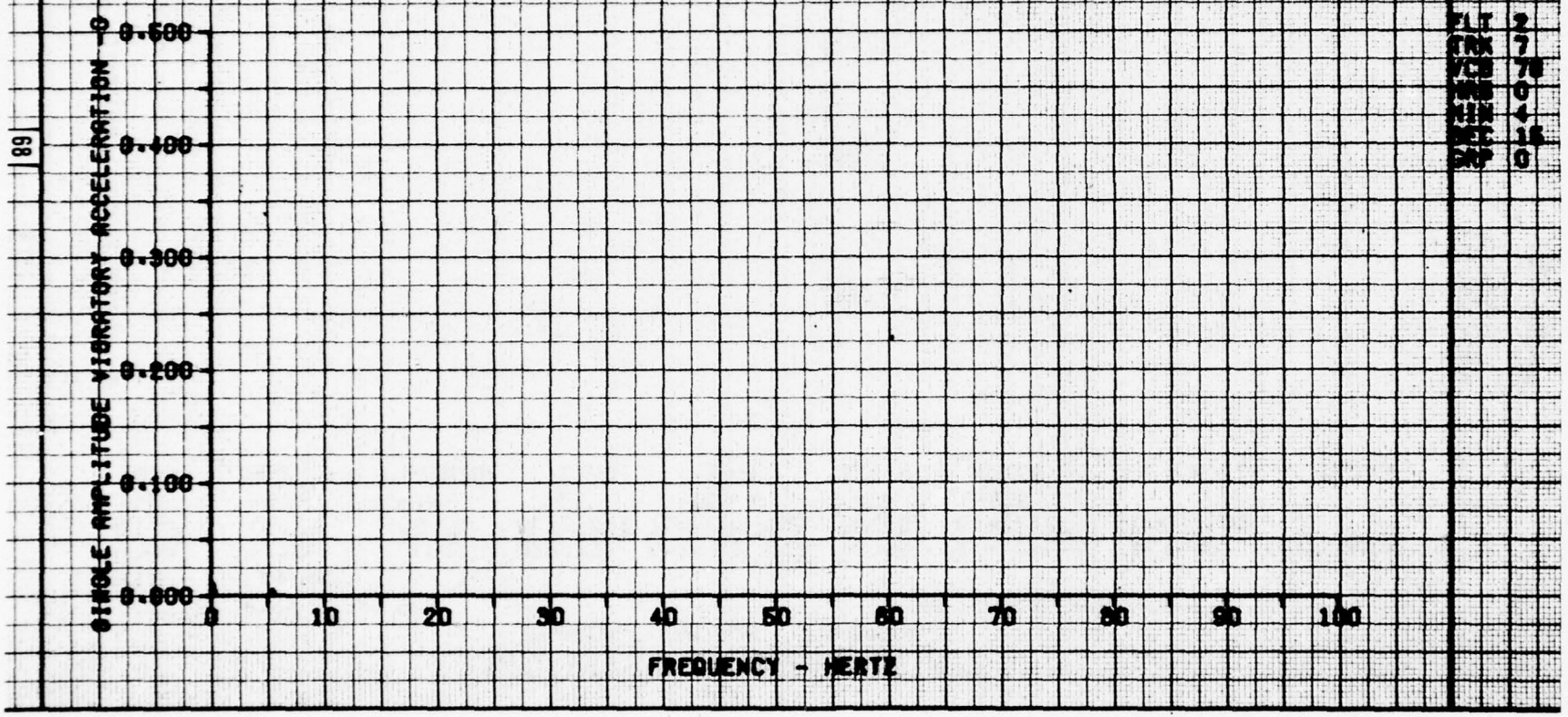


FIGURE 49

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	PALLET							
AXIS	LONGITUDINAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8000	134.2 (FWD)	0.0 (MID)	1500	6.0	324.0	15.0	LEVEL	CLEAN

FLT	3
TRK	4
VCO	70
HRS	7
MIN	54
SEC	56
GRP	0

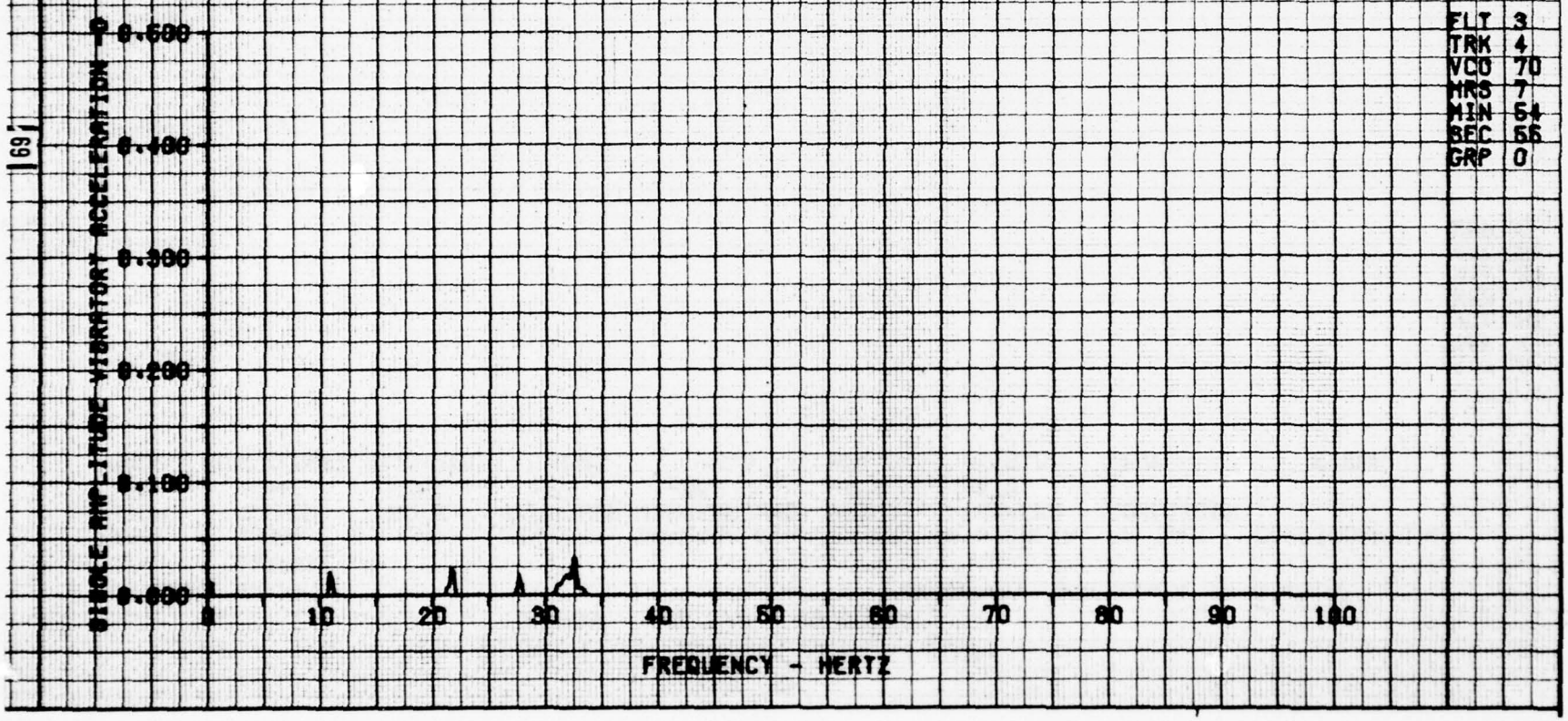


FIGURE 50

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	PALLET							
AXIS	LATERAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	134.2 (FWD)	0.0 (MID)	1500	6.0	324.0	15.0	LEVEL	CLEAN

FLT	3
TRK	4
VCO	85
HRS	7
MIN	54
SEC	55
GRP	0

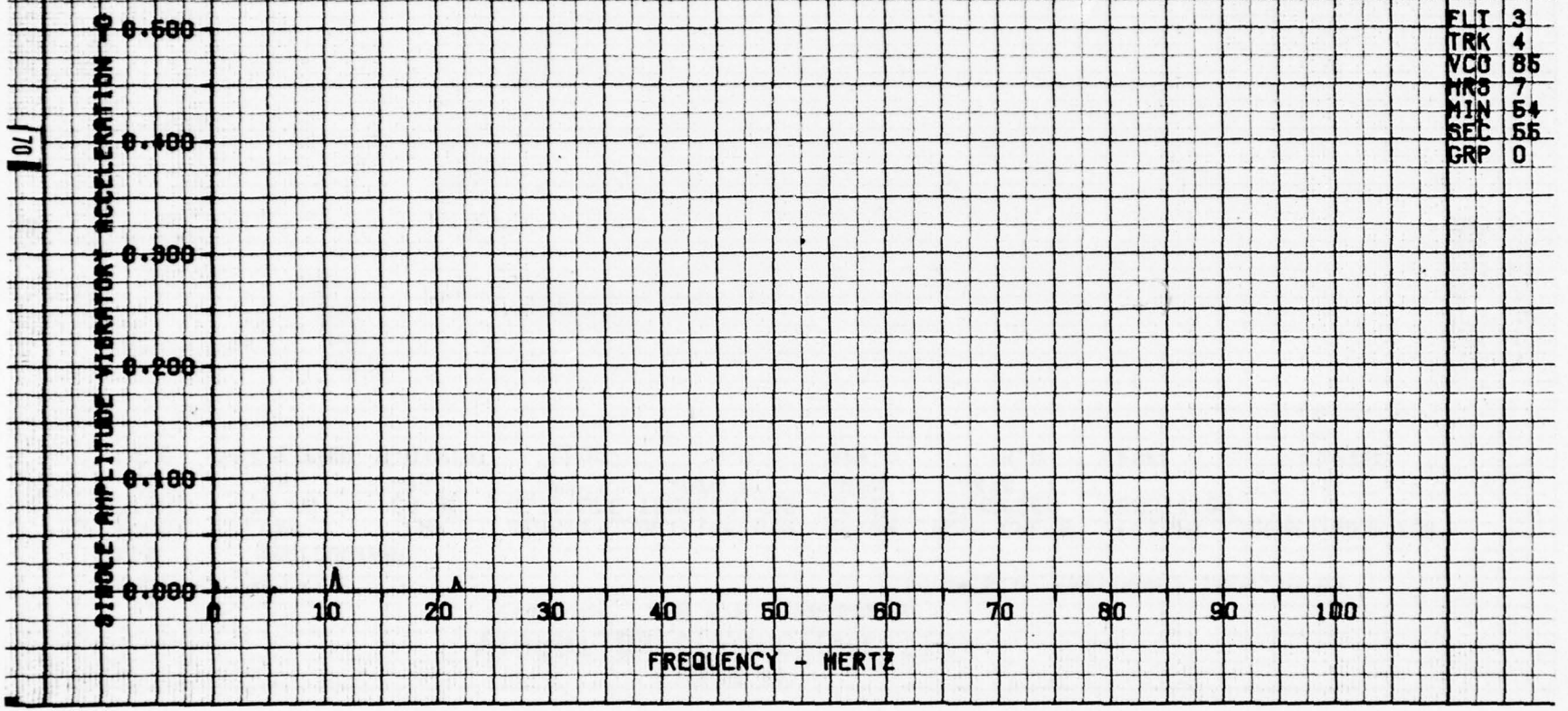


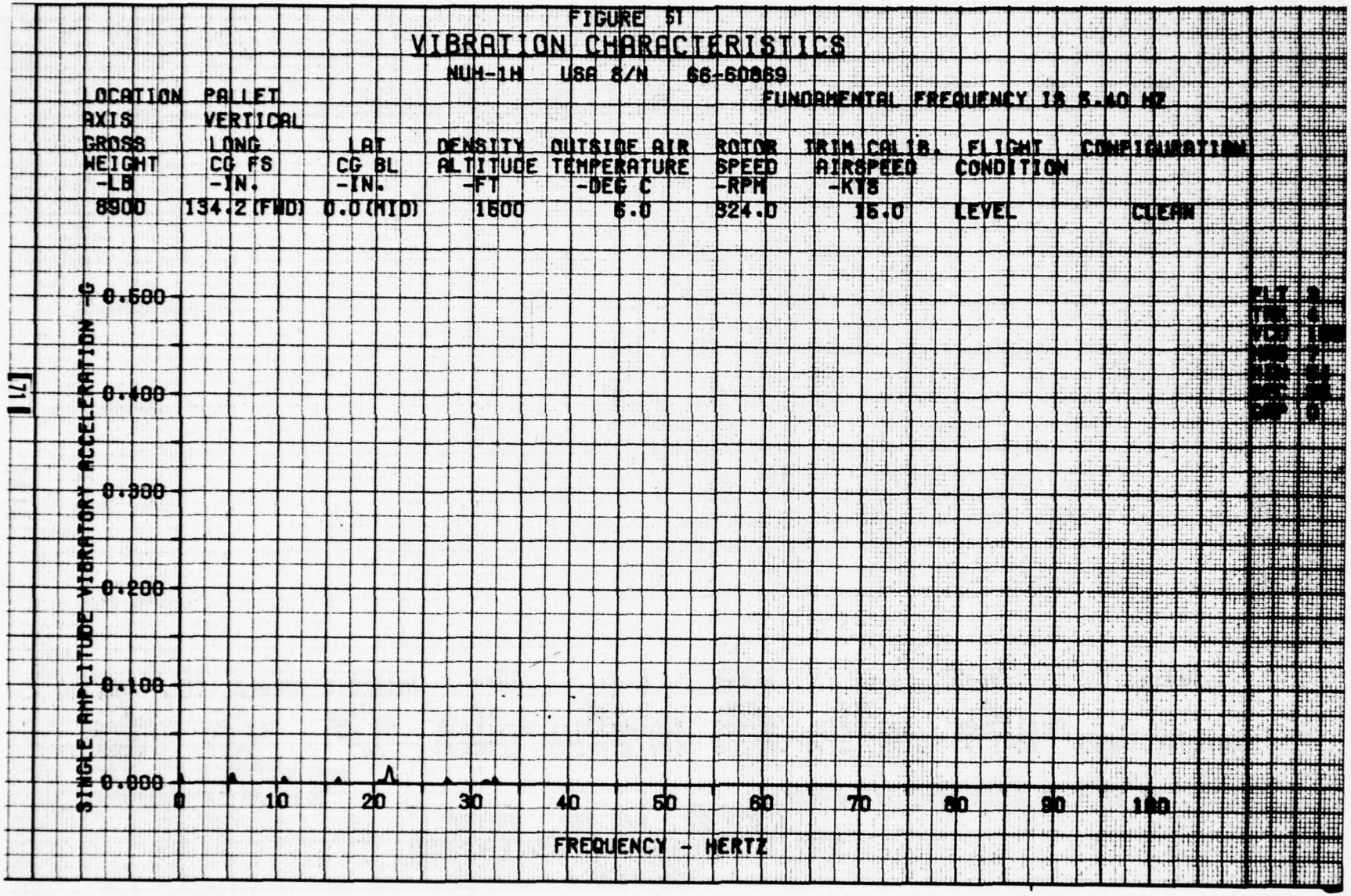
FIGURE 51

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	PALLET							
AXIS	VERTICAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	134.2 (FWD)	0.0 (MID)	1600	6.0	324.0	15.0	LEVEL	CLEAN



[71]

FIGURE 52

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	AXIS	GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
PILOT SEAT	LONGITUDINAL	8500	134.2 (FWD)	0.0 (MID)	1600	6.0	324.0	15.0	LEVEL	CLEAN

FLT	3
TRK	6
VCO	25
HRS	7
MIN	54
SEC	56
GRP	0

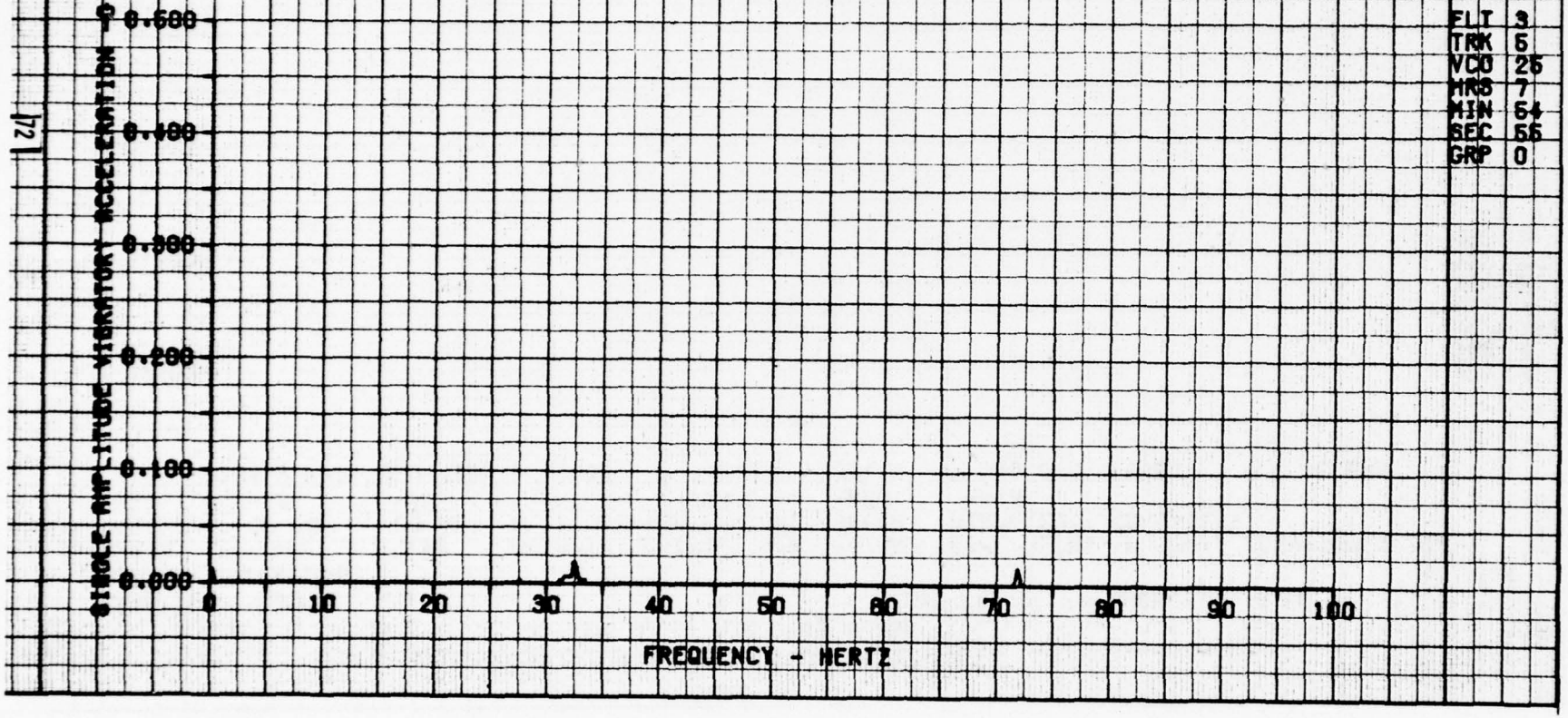


FIGURE 53

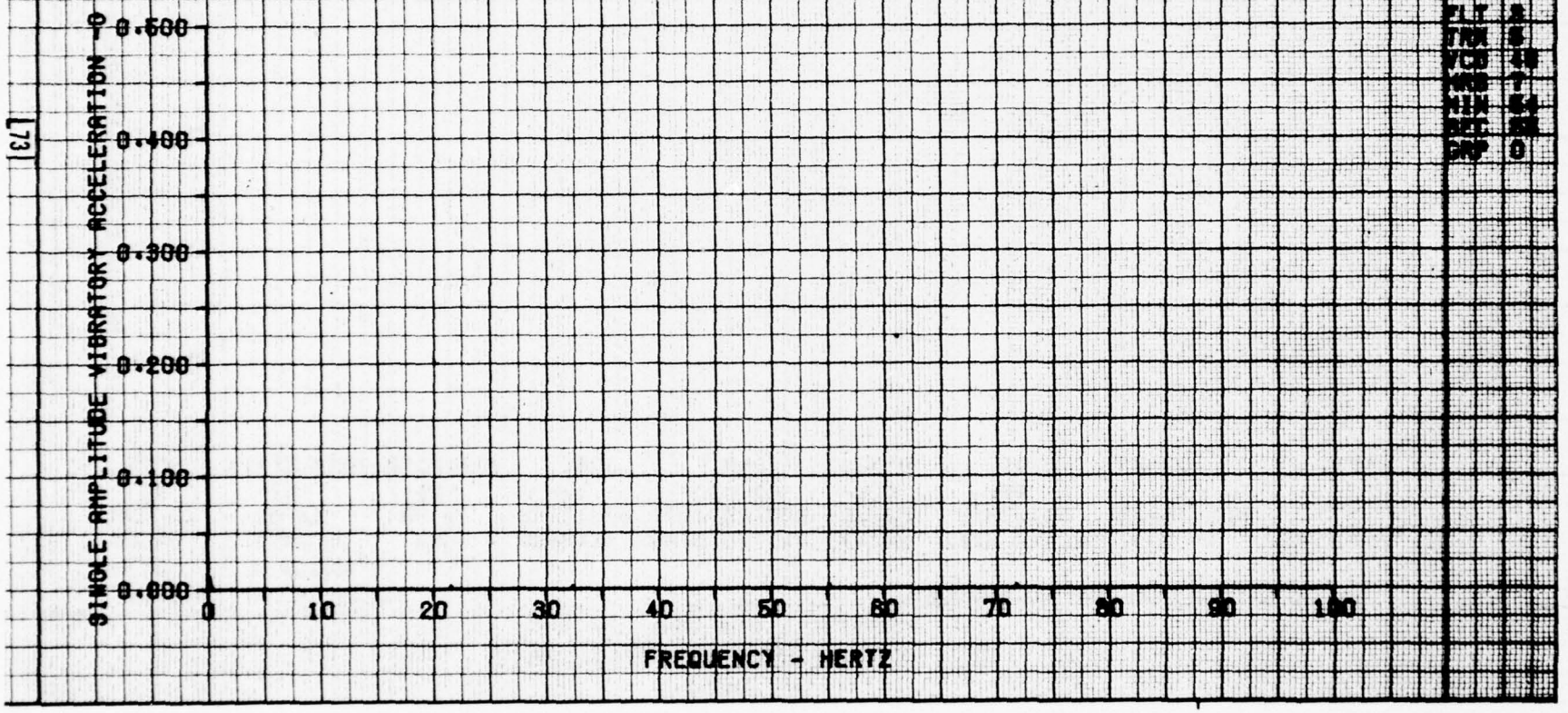
VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

LOCATION PILOT SEAT — FUNDAMENTAL FREQUENCY 18 5.40 HZ

AXIS LATERAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	134.2 (FWD)	0.0 (MID)	1500	6.0	324.0	15.0	LEVEL	CLEAN



[73]

FIGURE 54

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	AXIS	GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
PILOT SEAT	VERTICAL	8500	134.2 (FWD)	0.0 (MID)	1500	8.0	324.0	16.0	LEVEL	CLEAN

FLT	3
TRK	6
VCD	55
HRS	7
MIN	54
SEC	55
GRP	0

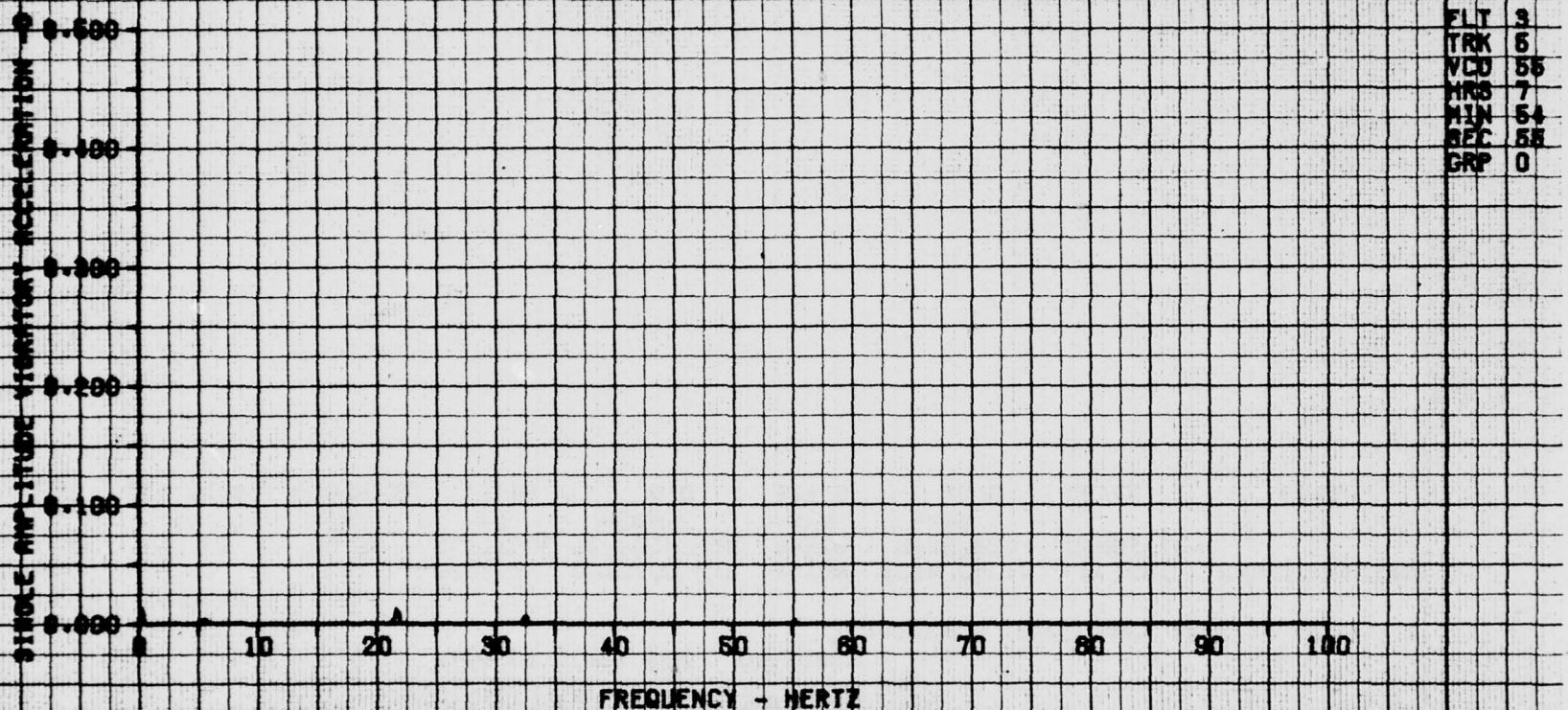


FIGURE 55

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60888

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	TRANSMITTION							
AXIS	LONGITUDINAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	134.2 (FWD)	0.0 (MID)	1500	6.0	324.0	15.0	LEVEL	CLEAN

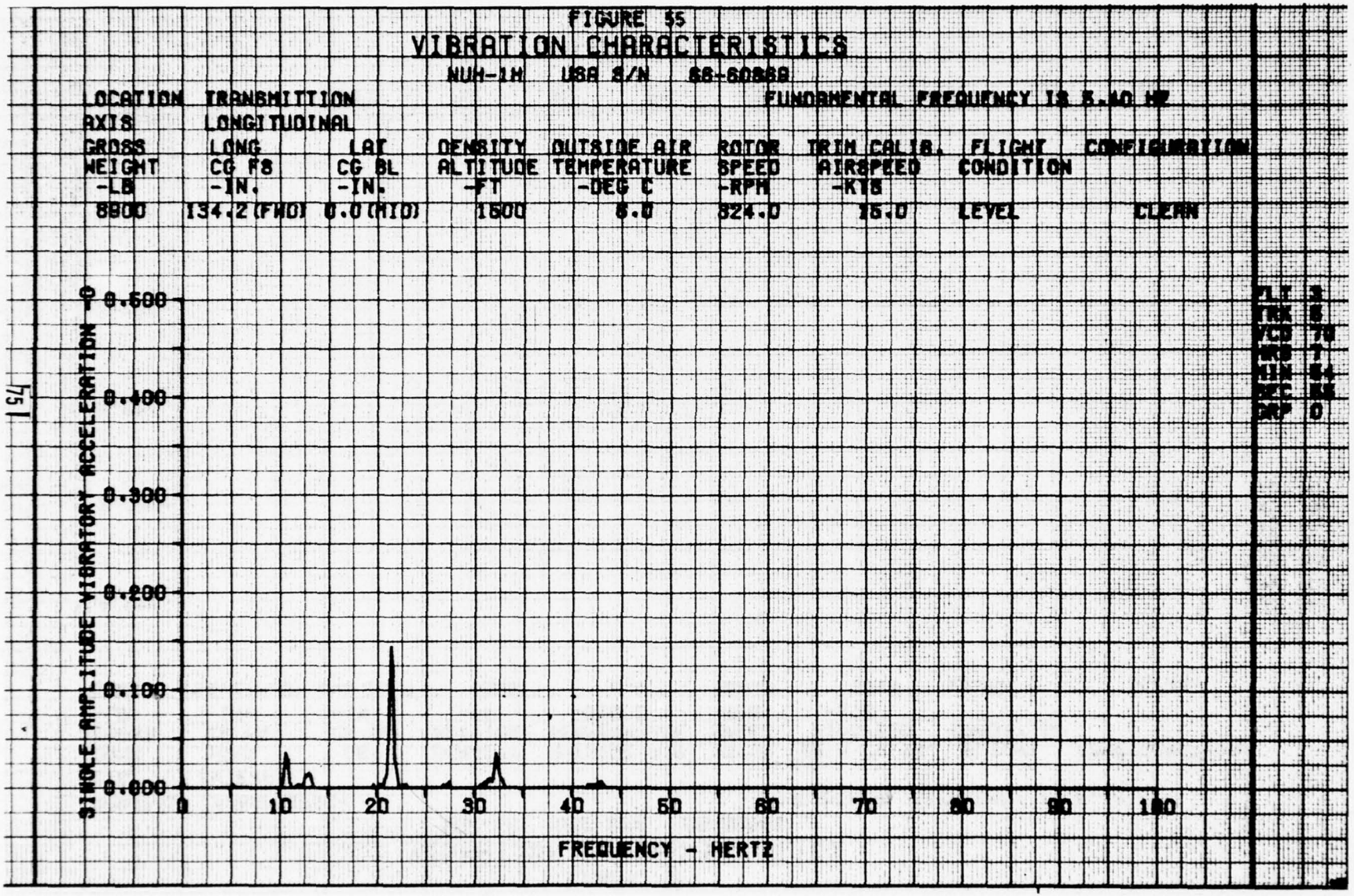


FIGURE 56

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

LOCATION TRANSMITTION — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS LATERAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	194.2(FWD)	0.0(MID)	1500	6.0	324.0	15.0	LEVEL	CLEAN

FLT	3
TRK	5
VCD	85
HRS	7
MIN	54
SEC	55
GRP	0

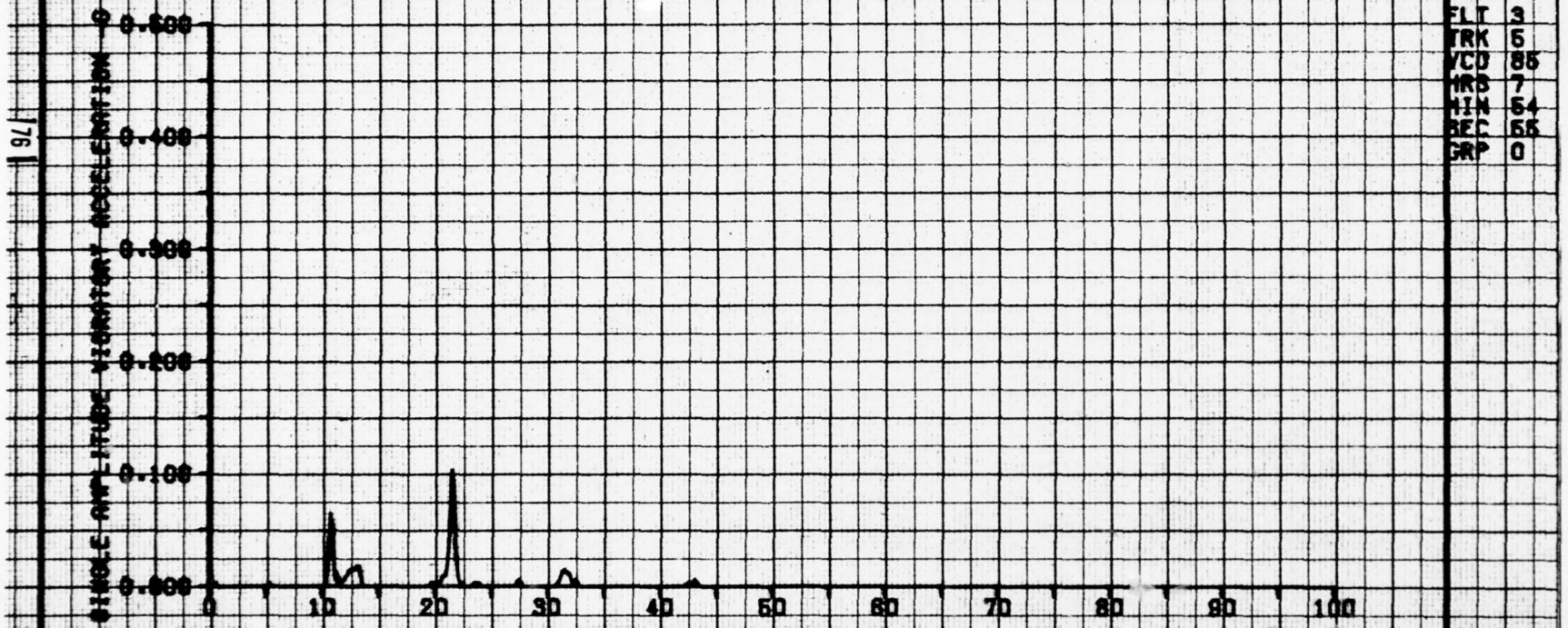


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FIGURE 57

VIBRATION CHARACTERISTICS

NUM-1H USA S/N 66-60869

LOCATION TRANSMITTION FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	134.2 (FWD)	0.0 (MID)	1500	6.0	324.0	15.0	LEVEL	CLEAN

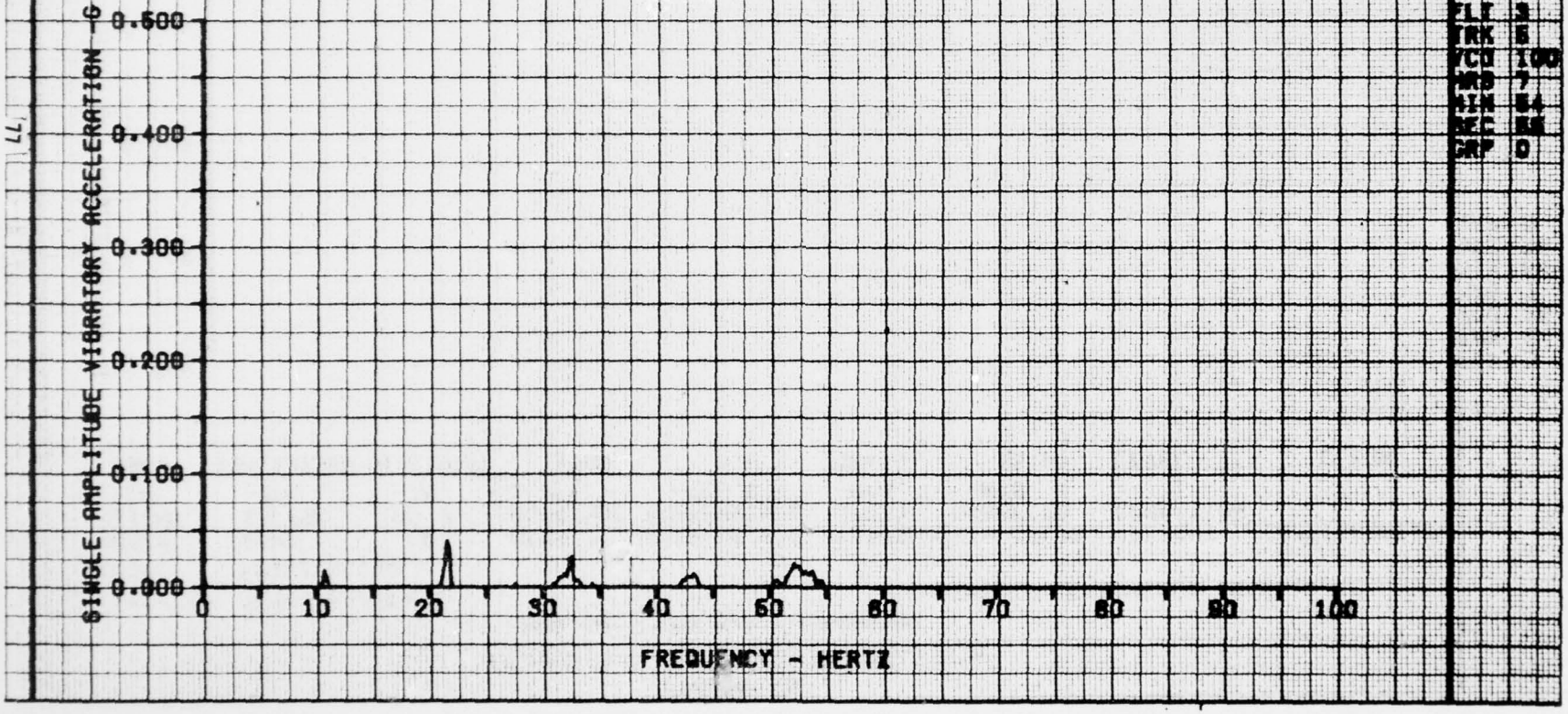


FIGURE 58

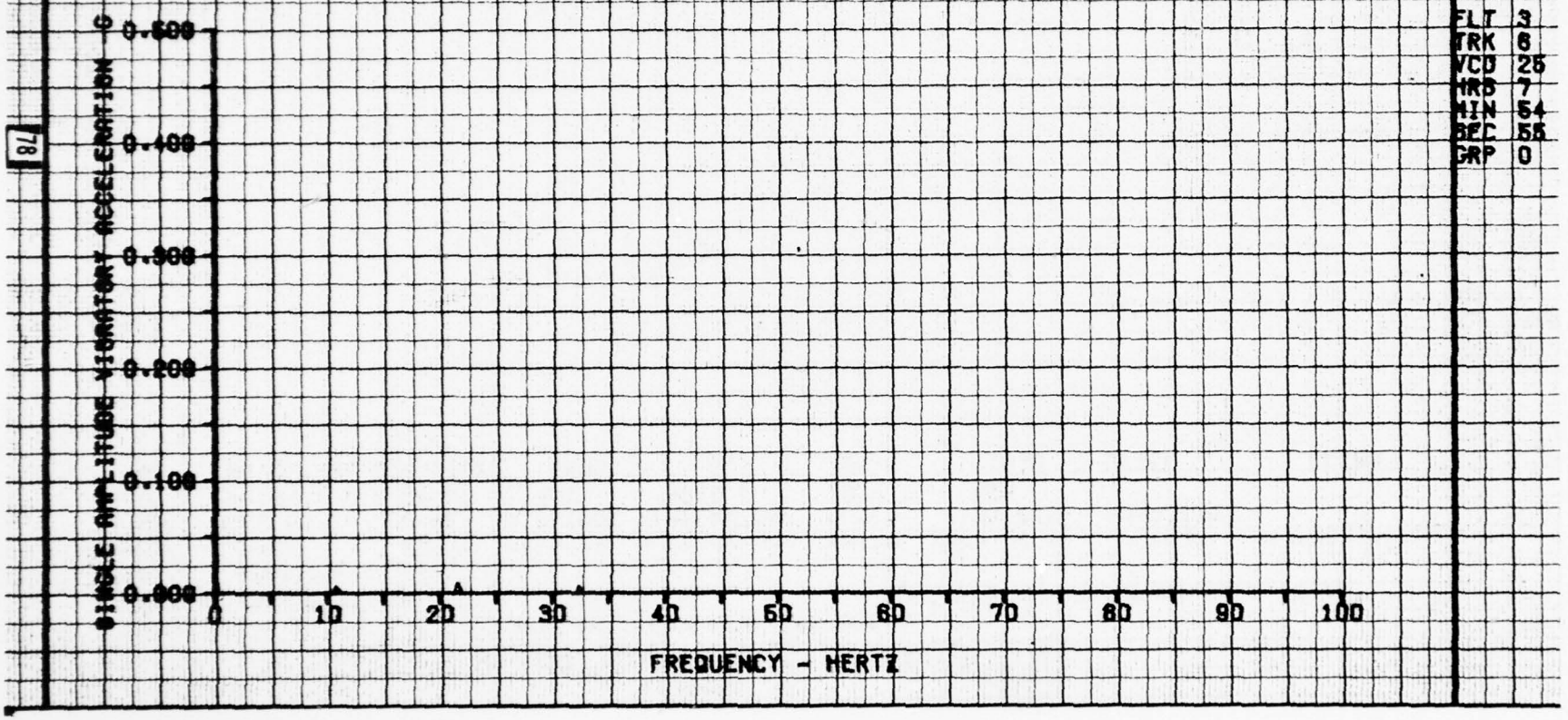
VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

LOCATION POWER CONVERTER — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS LONGITUDINAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
5900	134.2 (FHD)	0.0 (MID)	1600	6.0	324.0	15.0	LEVEL	CLEAN



FLT	3
TRK	6
VCD	25
HRS	7
MIN	54
SEC	55
GRP	0

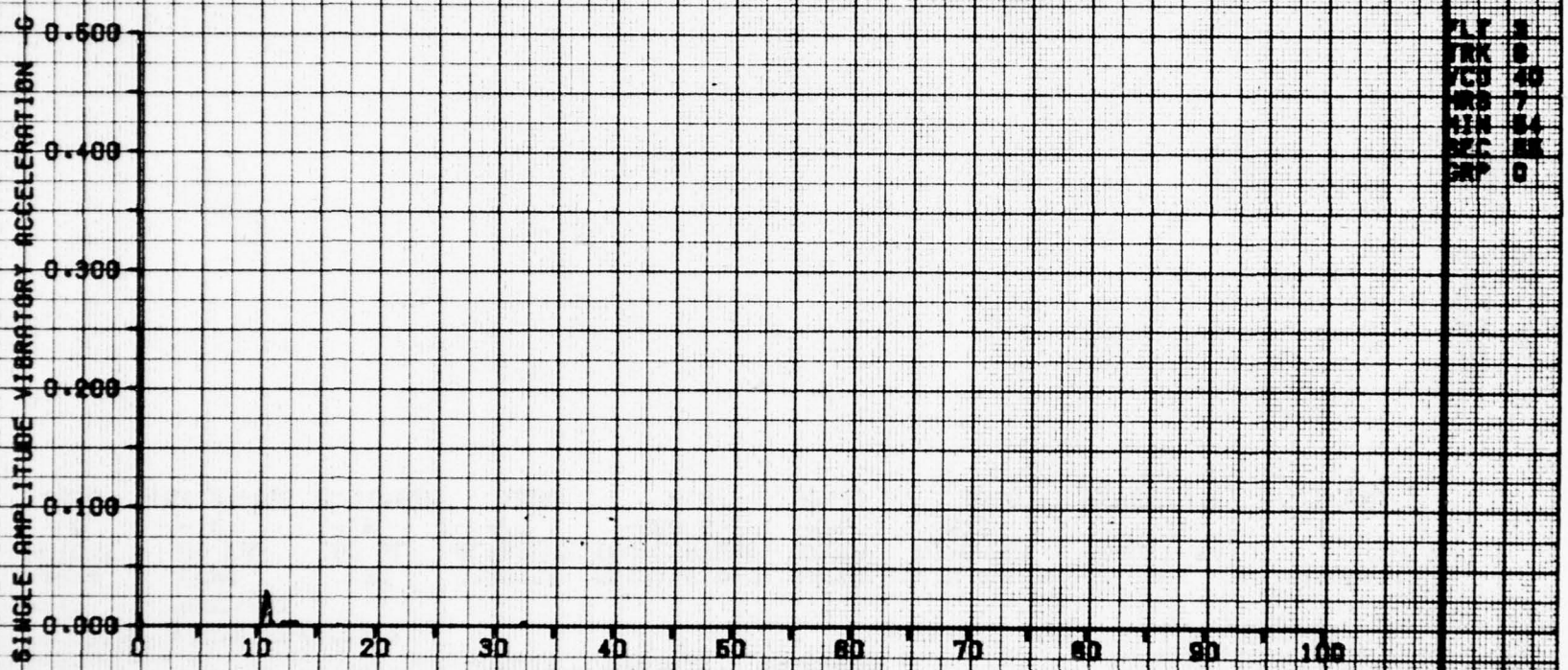
FIGURE 59

VIBRATION CHARACTERISTICS

NUM-1H UBA S/N 66-00000

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	POWER CONVERTER							
AXIS	LATERAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	134.2 (FWD)	0.0 (MID)	1500	6.0	324.0	15.0	LEVEL	CLEAN



FLT	3
TRK	8
VCU	40
HRS	7
MIN	54
SEC	58
SRP	0

FIGURE 60

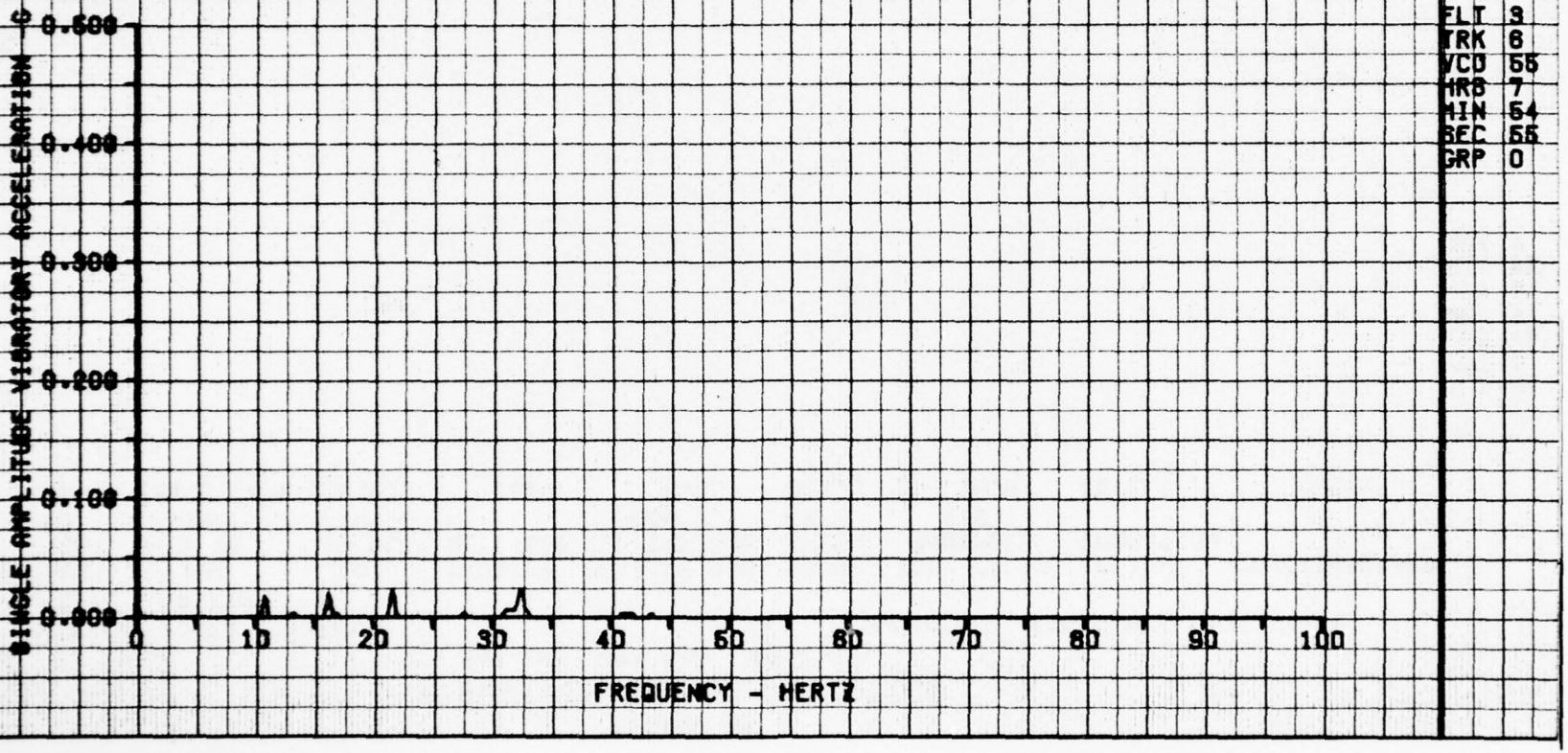
VIBRATION CHARACTERISTICS

NUM-1H UBA S/N 86-60869

LOCATION POWER CONVERTER — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	134.2(FHD)	0.0(MID)	1500	6.0	324.0	16.0	LEVEL	CLEAN



FLT	3
TRK	6
VCD	55
MRB	7
MIN	54
SEC	55
GRP	0

180

FIGURE 61

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

LOCATION COLLECTIVE CONTROL

FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	134.2(FWD)	0.0(MID)	1500	6.0	324.0	16.0	LEVEL	CLEAN

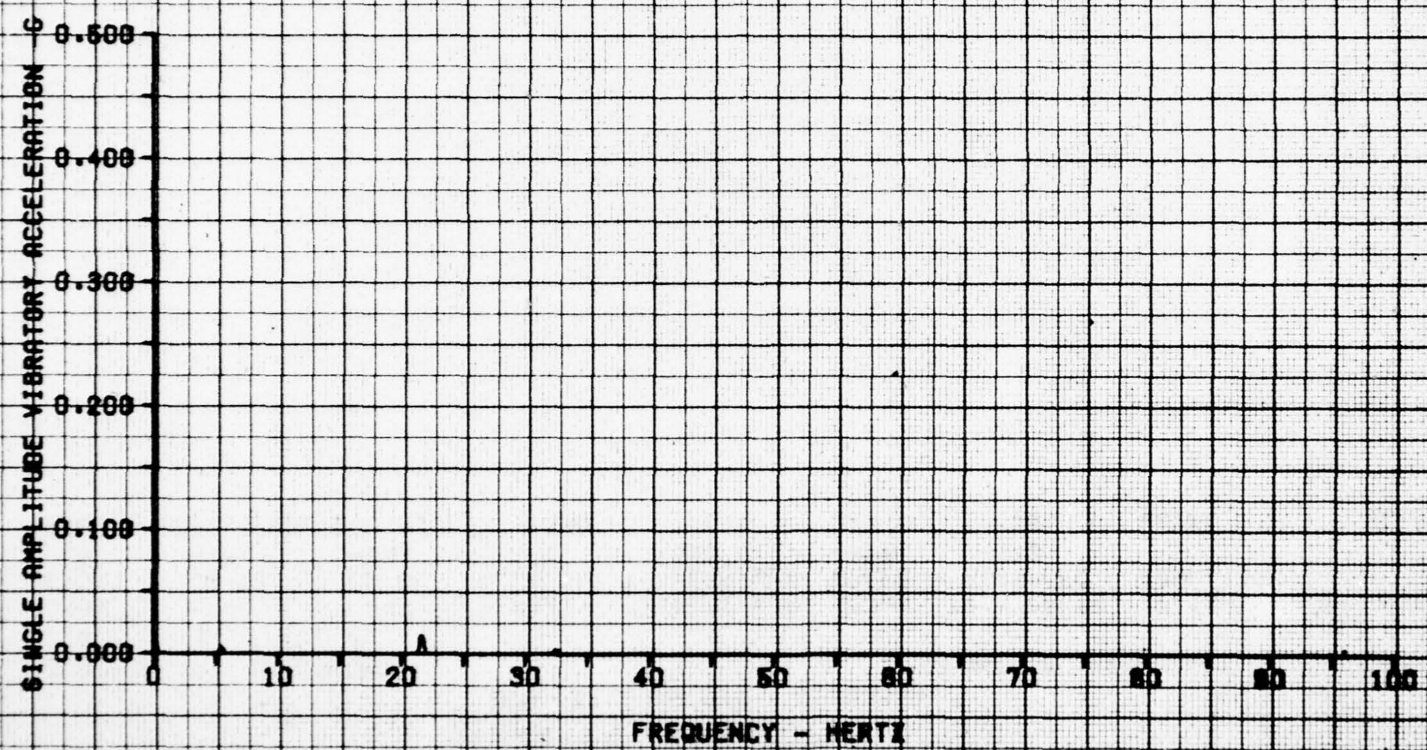


FIGURE 62

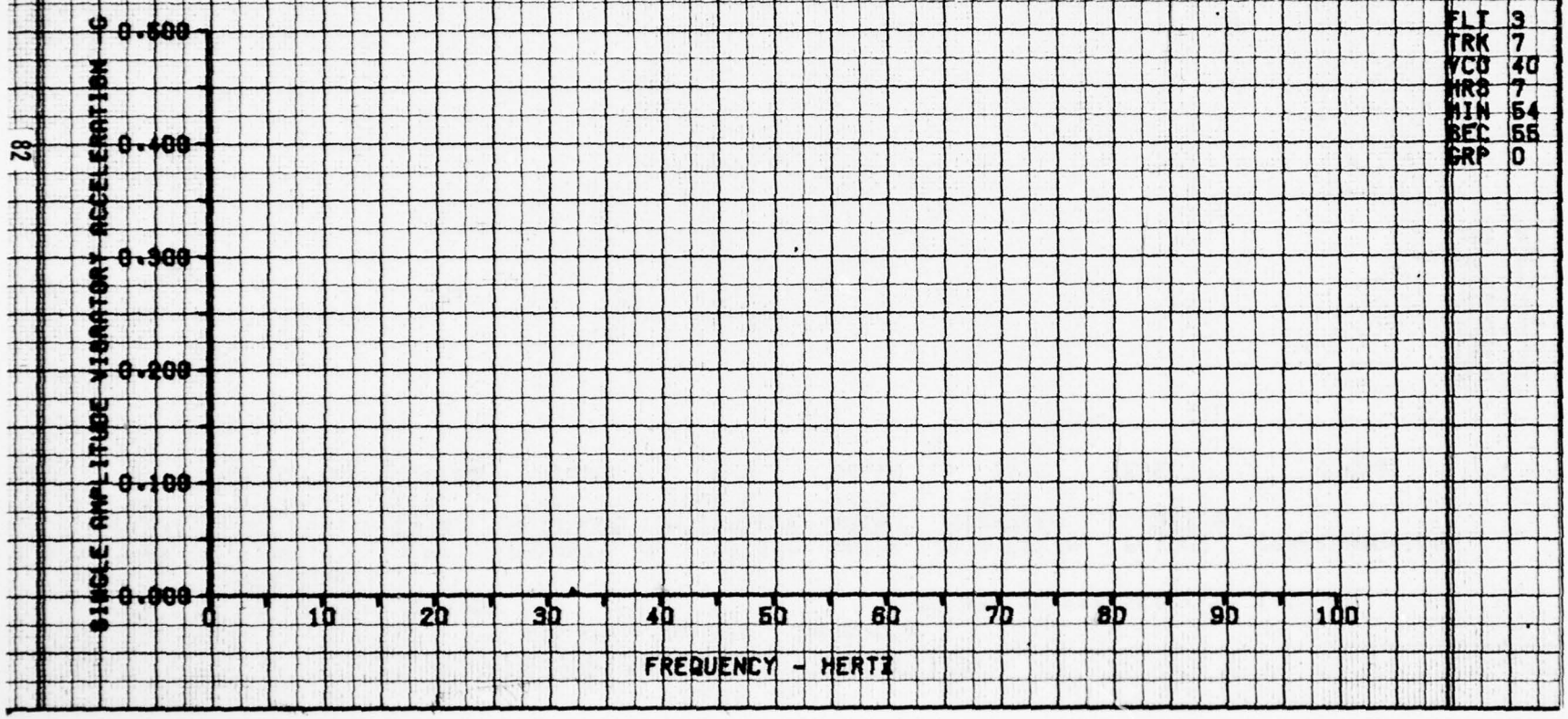
VIBRATION CHARACTERISTICS

NUM-1H USA S/N 66-60868

LOCATION CYCLIC CONTROL — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS LONGITUDINAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8500	134.2 (FWD)	0.0 (MID)	1500	8.0	324.0	16.0	LEVEL	CLEAN



FLT	3
TRK	7
YCO	40
HRS	7
MIN	54
SEC	55
GRP	0

FIGURE 63

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	CYCLIC CONTROL							
AXIS	LATERAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	134.2(FWD)	0.0(MID)	1500	6.0	324.0	15.0	LEVEL	CLEAN

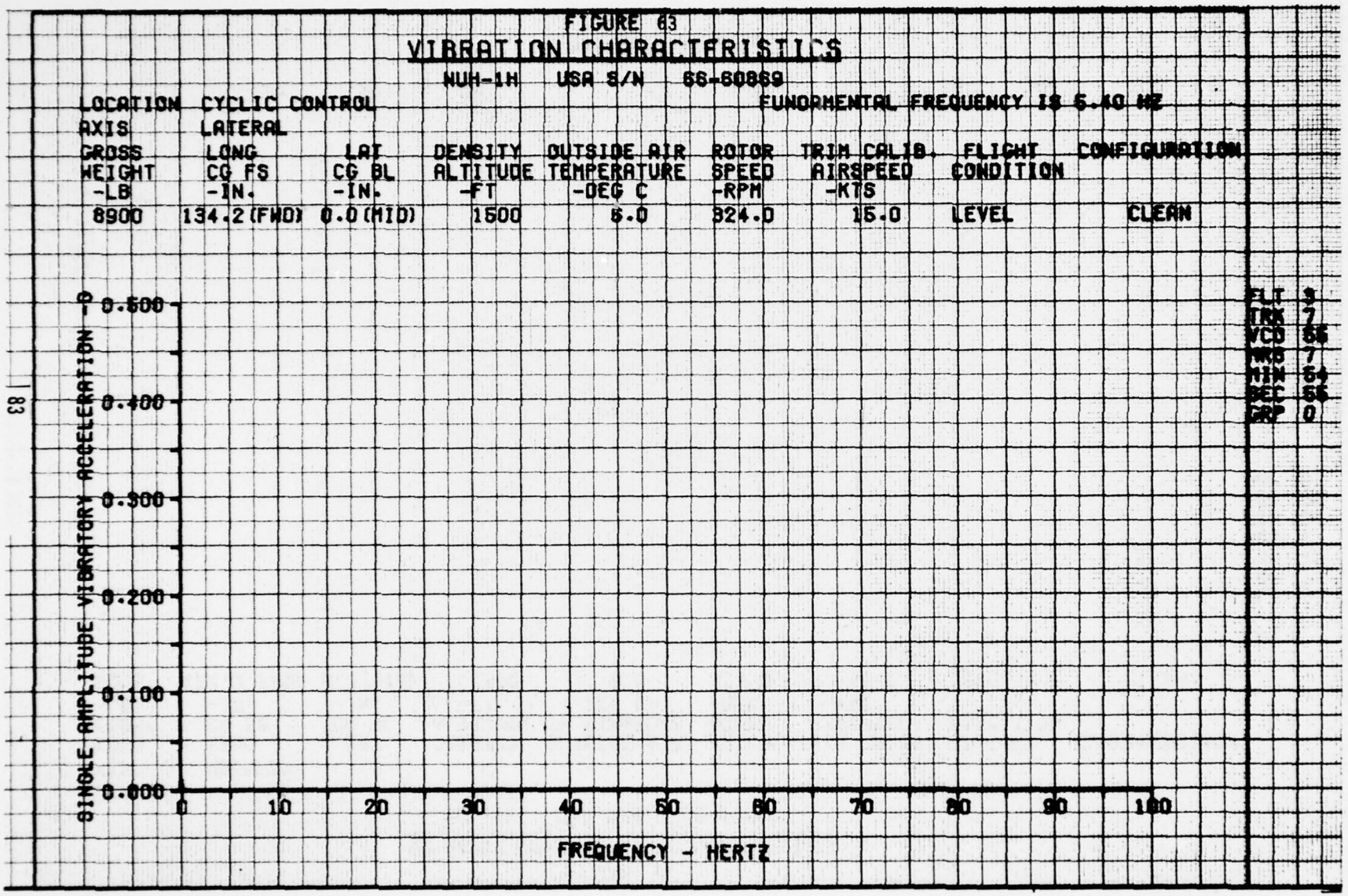


FIGURE 64

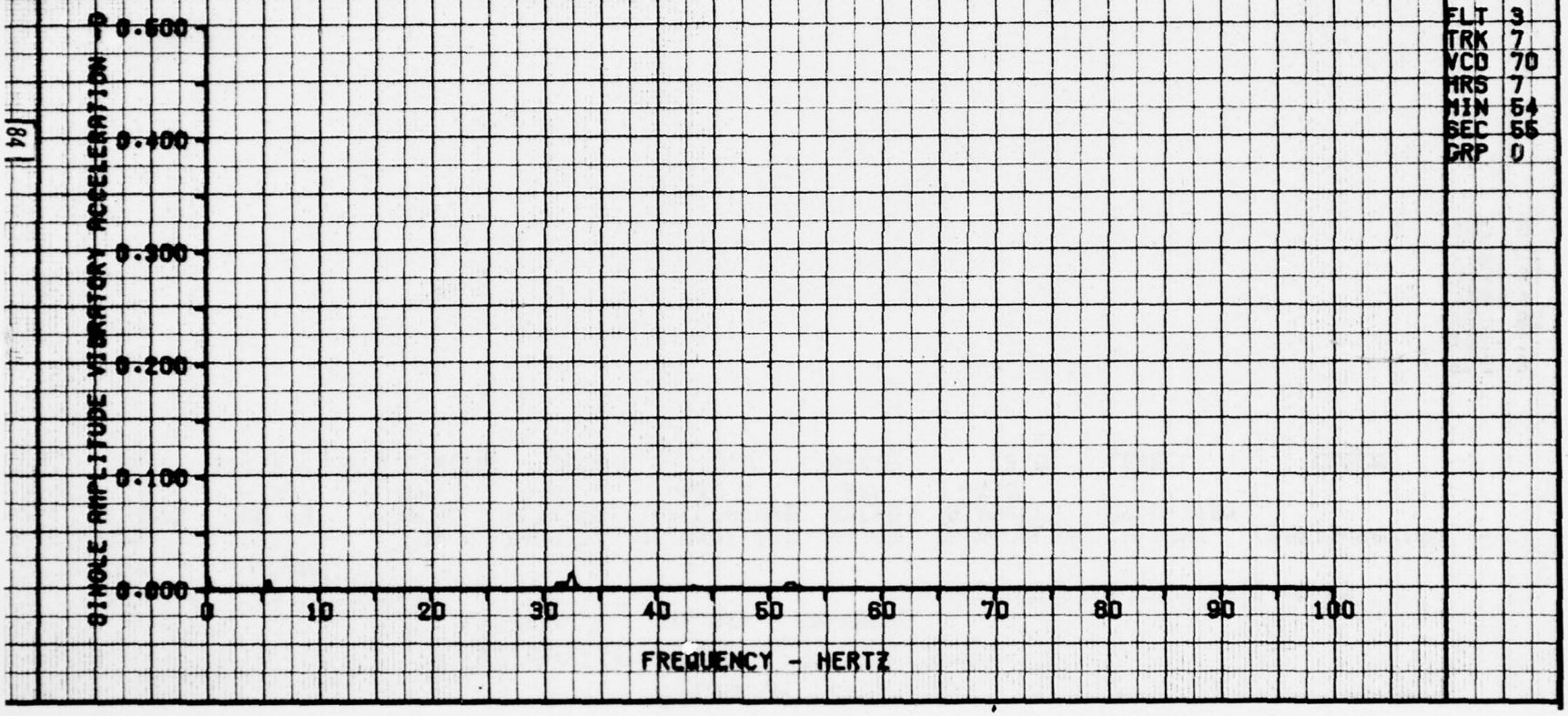
VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

LOCATION FORWARD PALLET FLOOR MOUNT — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	194.2 (FWD)	0.0 (MID)	1500	6.0	324.0	15.0	LEVEL	CLEAN



FLT 3
TRK 7
VCD 70
HRS 7
MIN 54
SEC 56
GRP 0

FIGURE 65

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	AXIS	GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
PALLET	LONGITUDINAL	9160	135.2 (FWD)	0.0 (MID)	1620	4.0	324.0	10.0	NAP OF EARTH	CLEAN

FLT	8
TRK	4
VCD	70
MNS	0
MIN	27
SEC	18
GRP	0

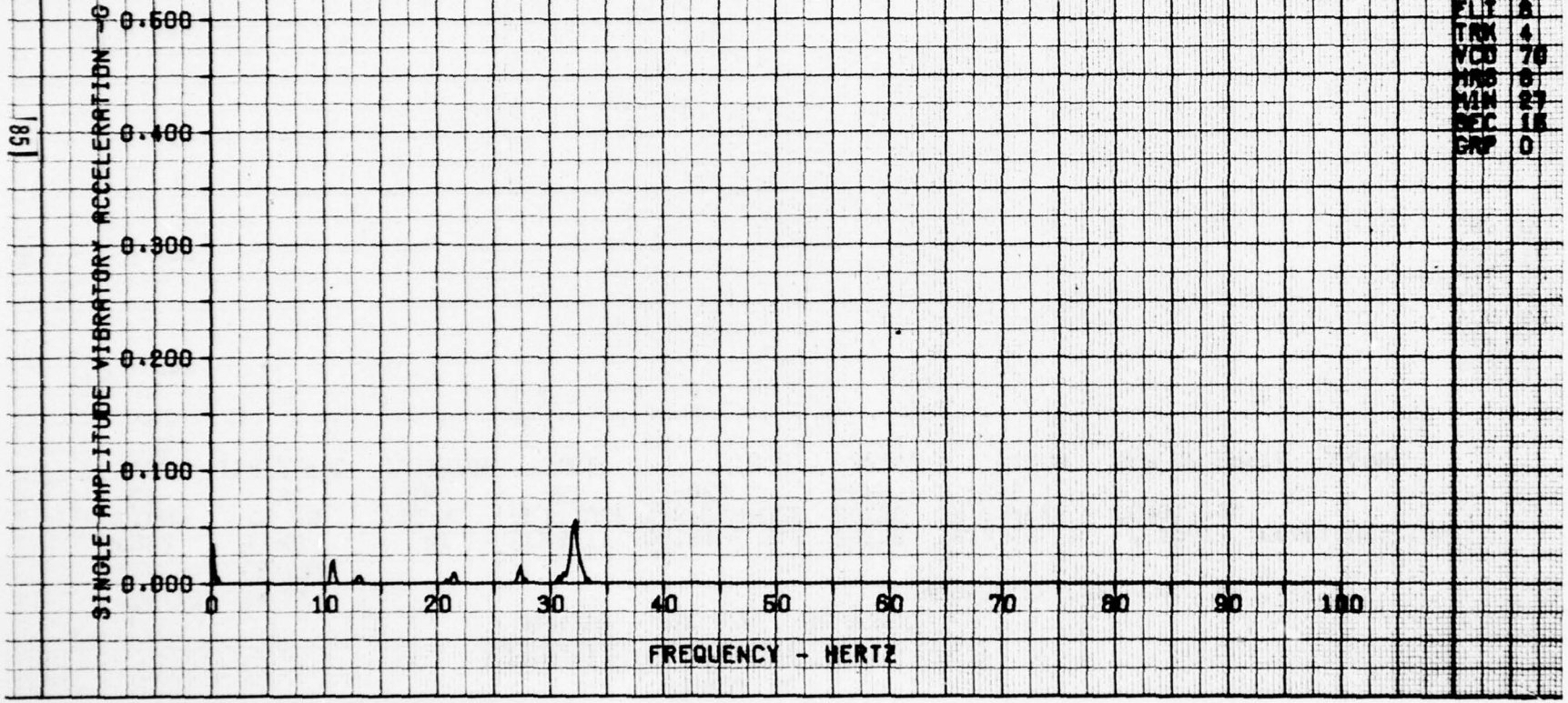


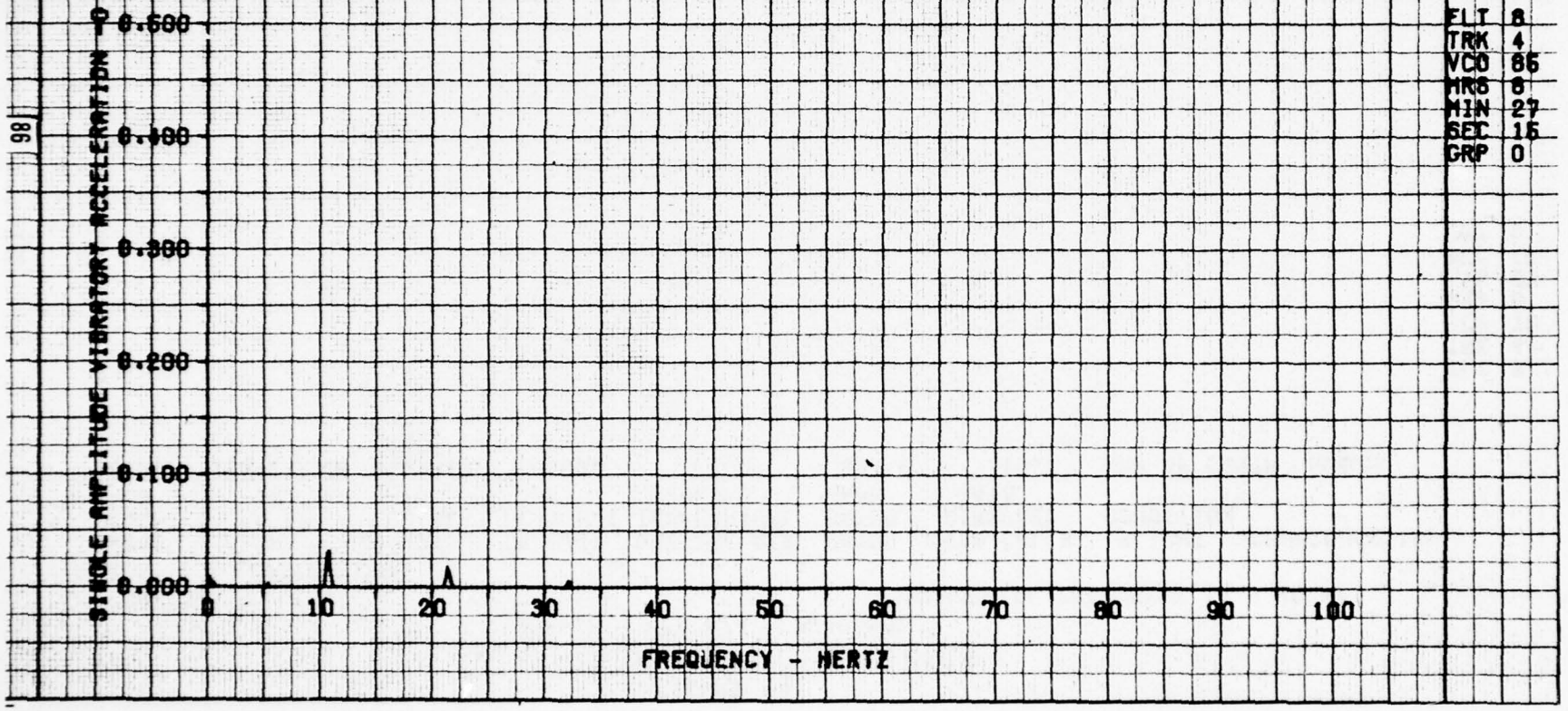
FIGURE 66

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	PALLET							
AXIS	LATERAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
9180	135.2 (FWD)	0.0 (MID)	1620	4.0	324.0	10.0	NAP OF EARTH	CLEAN



FLT	8
TRK	4
VCO	85
HRS	8
MIN	27
SEC	15
GRP	0

FIGURE 67

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

LOCATION PALLET

AXIS VERTICAL

FUNDAMENTAL FREQUENCY IS 5.40 HZ

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
9160	135.2 (FWD)	0.0 (MID)	1520	4.0	324.0	10.0	NAP OF EARTH	CLEAN

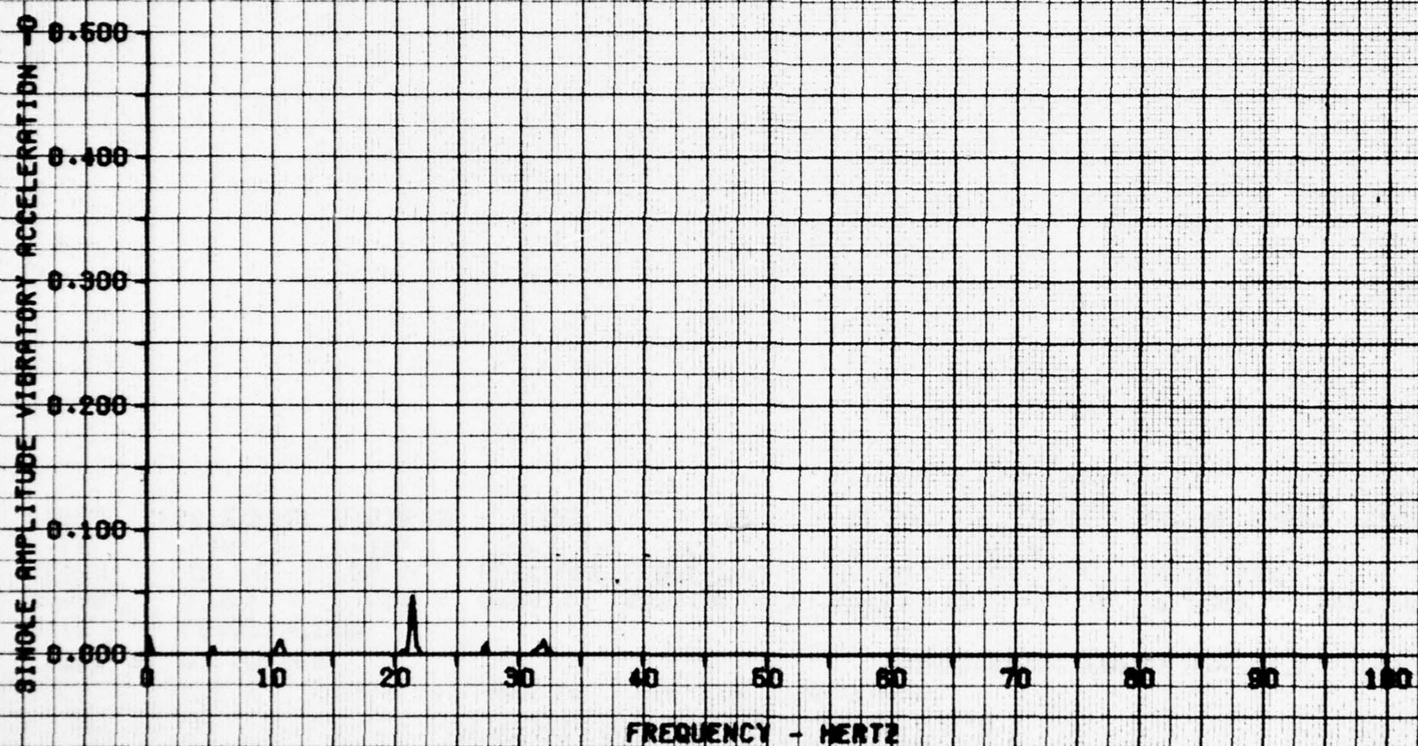


FIGURE 68

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

LOCATION PILOT SEAT — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS LONGITUDINAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
9160	135.2(FWD)	0.0(MID)	1520	4.0	324.0	10.0	NAP OF EARTH	CLEAN

FLT	8
TRK	5
VCO	25
HRS	8
MIN	27
SEC	15
GRP	0

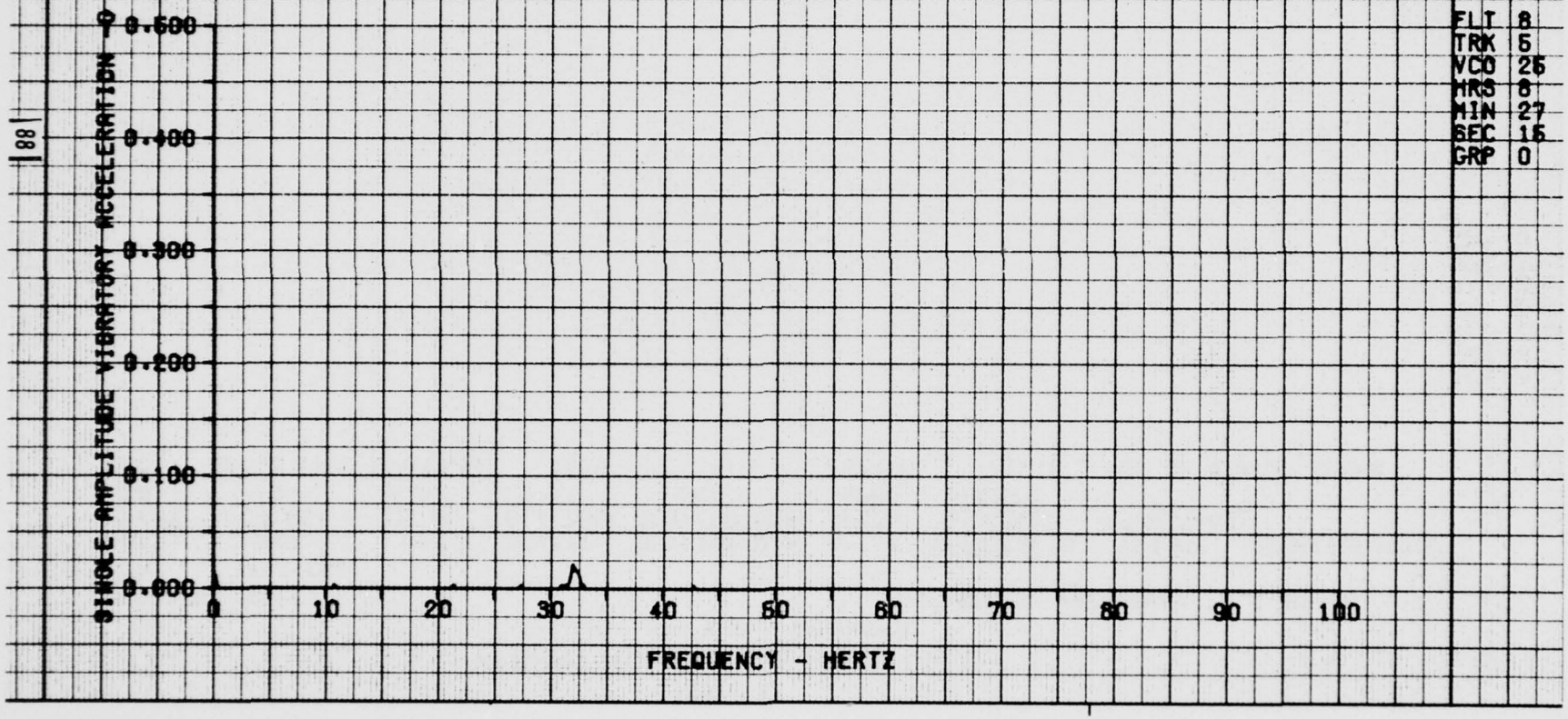


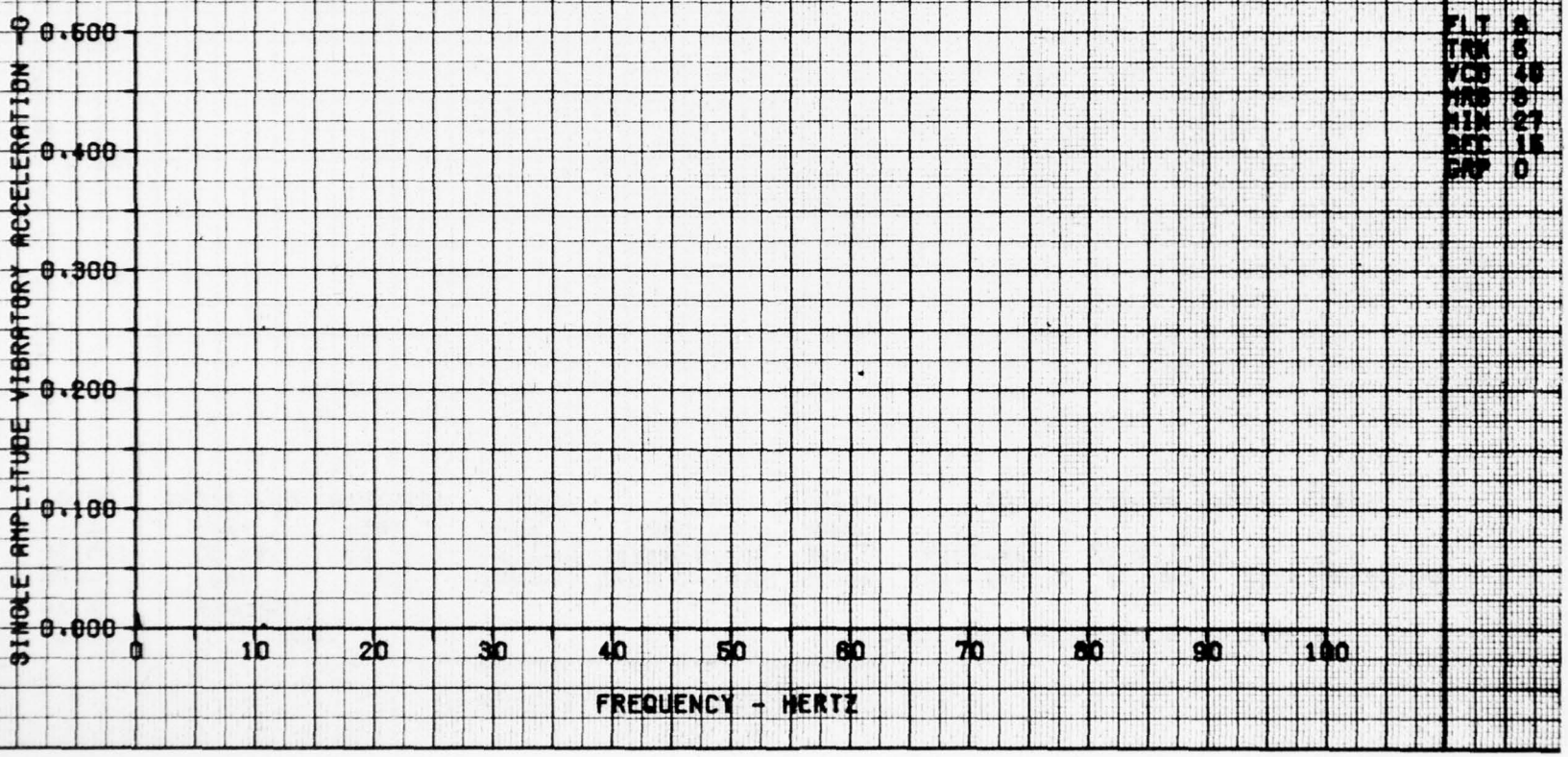
FIGURE 69

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	AXIS	GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
PILOT SEAT	LATERAL	9160	135.2 (FWD)	0.0 (MID)	1620	4.0	324.0	10.0	NAP OF EARTH	CLEAN



FLT	8
TRN	6
VCD	48
MNS	8
MIN	27
SEC	15
CNF	0

FIGURE 70

VIBRATION CHARACTERISTICS

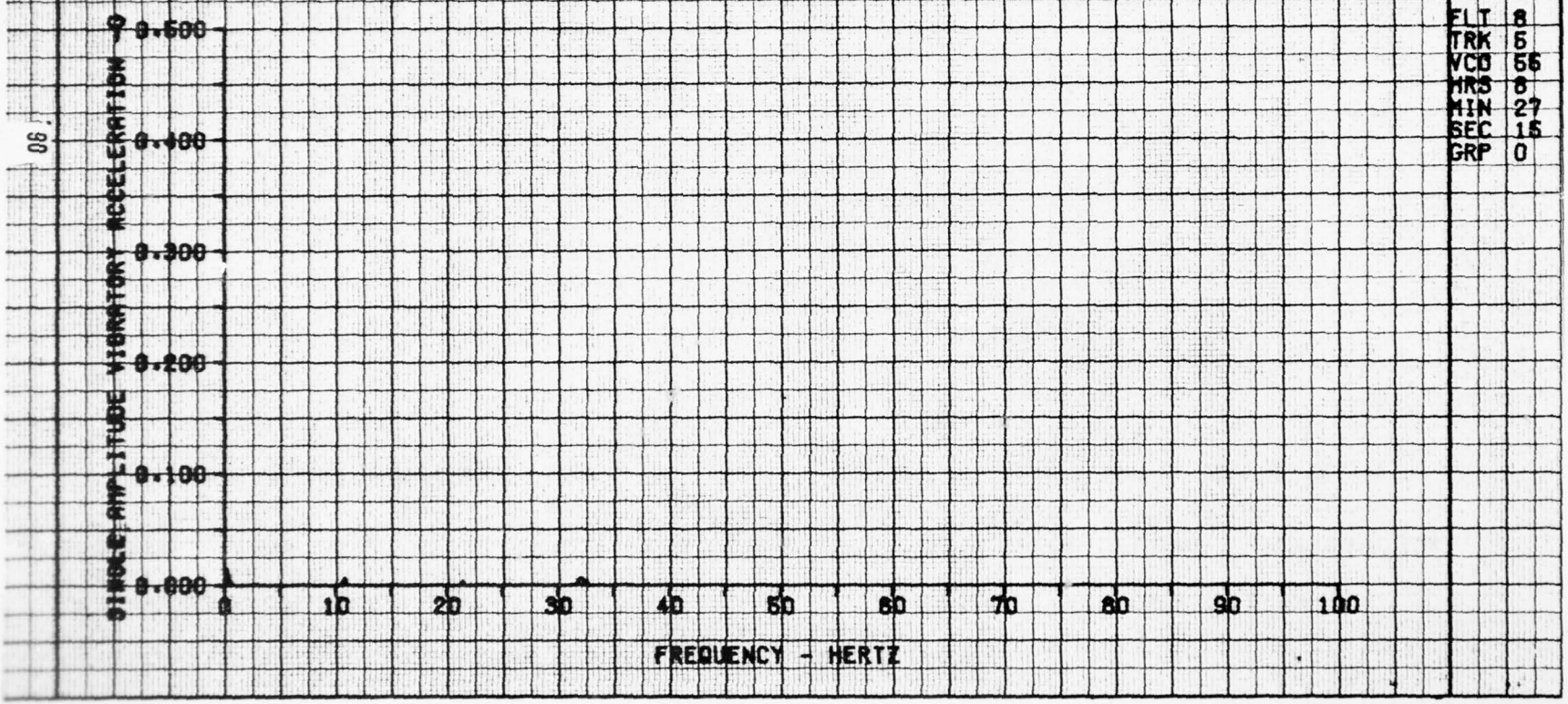
NUH-1H USA S/N 66-60869

LOCATION PILOT SEAT — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
9180	135.2 (FWD)	0.0 (MID)	1620	4.0	324.0	10.0	NAP OF EARTH	CLEAN

FLT	8
TRK	5
VCD	56
HRS	8
MIN	27
SEC	15
GRP	0



06.90

AD-A047 971 ARMY AVIATION ENGINEERING FLIGHT ACTIVITY EDWARDS AF--ETC F/G 1/3
AIRWORTHINESS EVALUATION NUH-1H HELICOPTER WITH GLOBAL POSITION--ETC(U)
MAY 77 C L THOMAS, T P BENSON

UNCLASSIFIED USAAEFA-76-13 NL

2 OF 2
ADA047971

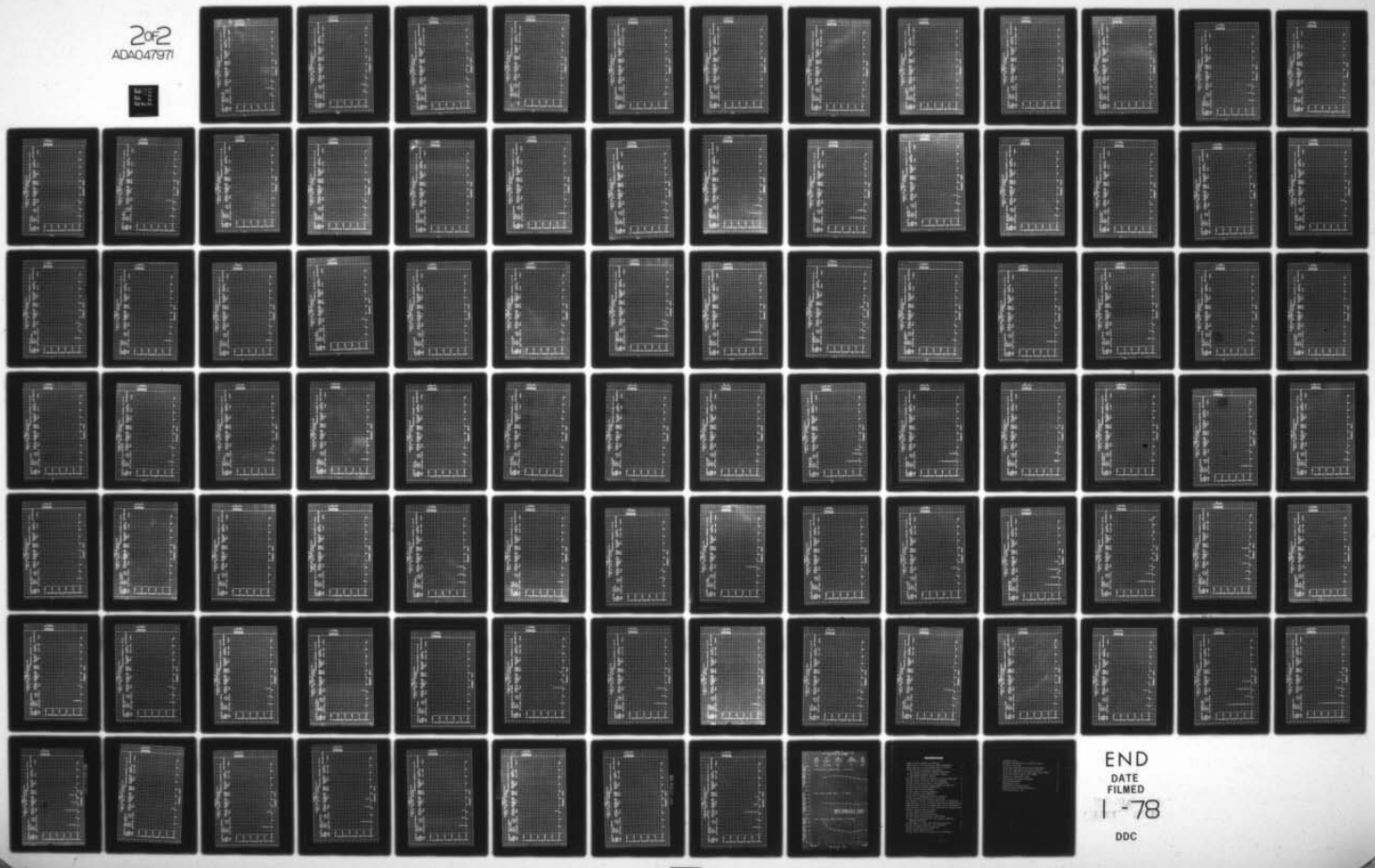


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FIGURE 71

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	TRANSMITTION							
AXIS	LONGITUDINAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
9160	135.2(FWD)	0.0(MID)	1620	4.0	324.0	10.0	MAP OF EARTH	CLEAN

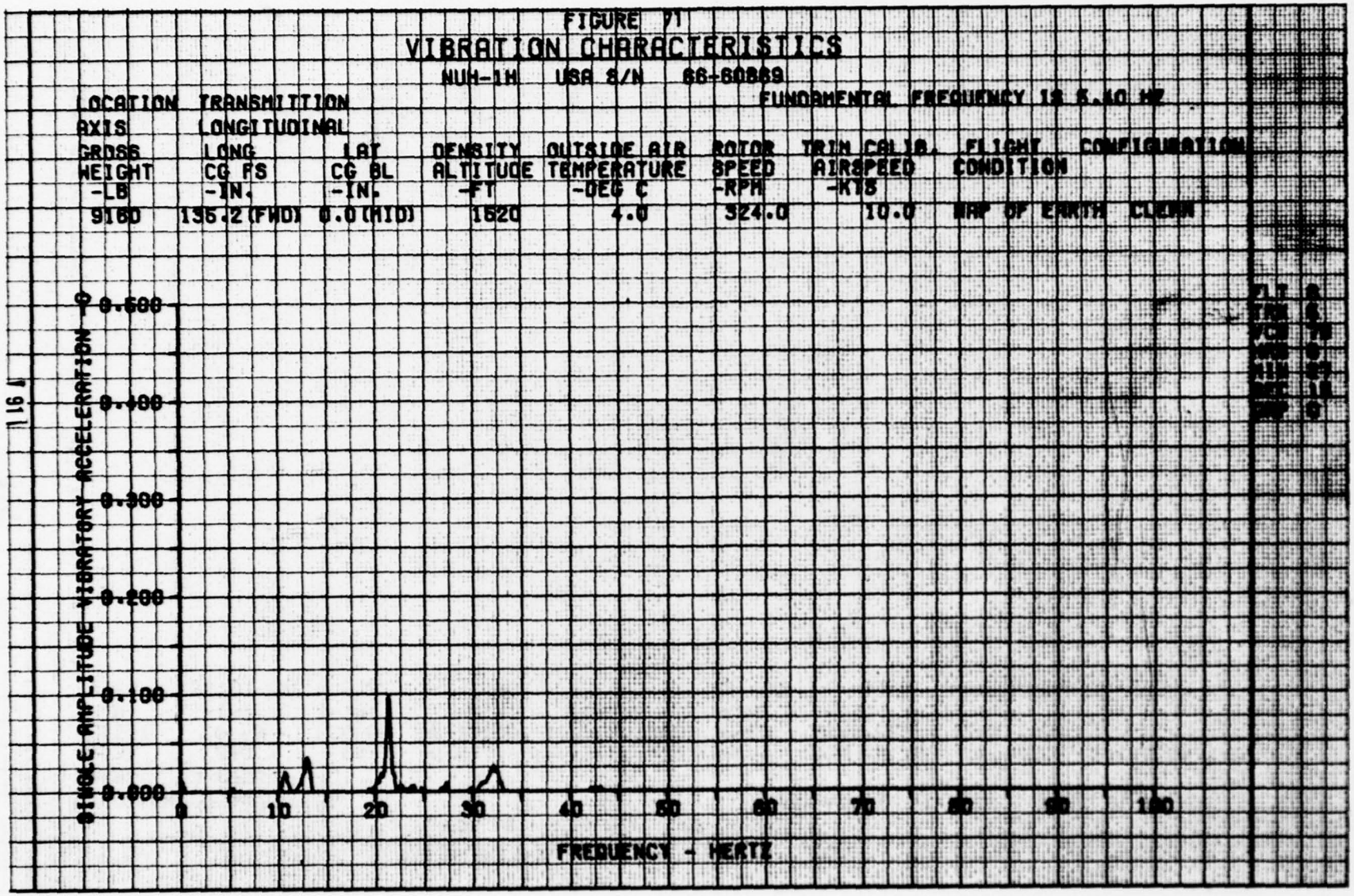

FIGURE 72

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	TRANSMITTION							
AXIS	LATERAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
9160	135.2 (FWD)	0.0 (MID)	1620	4.0	324.0	10.0	MAP OF EARTH	CLEAN

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SINGLE AMPLITUDE VIBRATORY ACCELERATION - G

0.500
0.400
0.300
0.200
0.100
0.000

0 10 20 30 40 50 60 70 80 90 100

FREQUENCY - HERTZ

FLT 8
TRK 5
VCB 86
MCB 0
MIN 27
SEC 16
GRP 0

FIGURE 73

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60889

LOCATION TRANSMITTION — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
9160	135.2 (FWD)	0.0 (MID)	1620	4.0	324.0	10.0	MAP OF EARTH	CLEAN

FLT	8
TRK	5
VCD	150
MRB	0
MIN	27
SEC	15
GRP	0

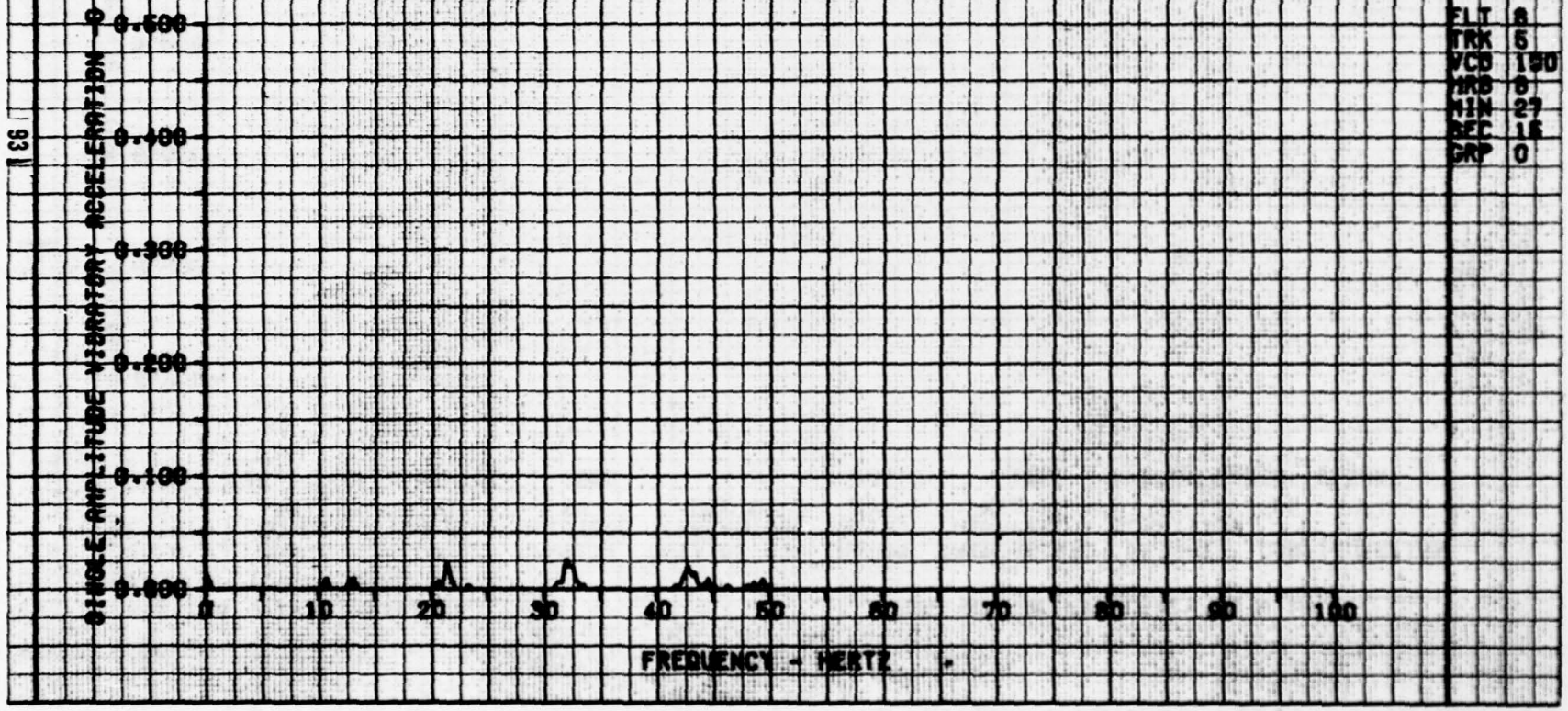


FIGURE 74

VIBRATION CHARACTERISTICS

NUH-1M USA S/N 66-00069

FUNDAMENTAL FREQUENCY IS 5.10 HZ

[illegible] POWER CONVERTER

[illegible] LONGITUDINAL

[illegible]	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
9100	135.2(FWD)	0.0(MID)	1520	4.0	324.0	10.0	NAP OF EARTH	CLEAN

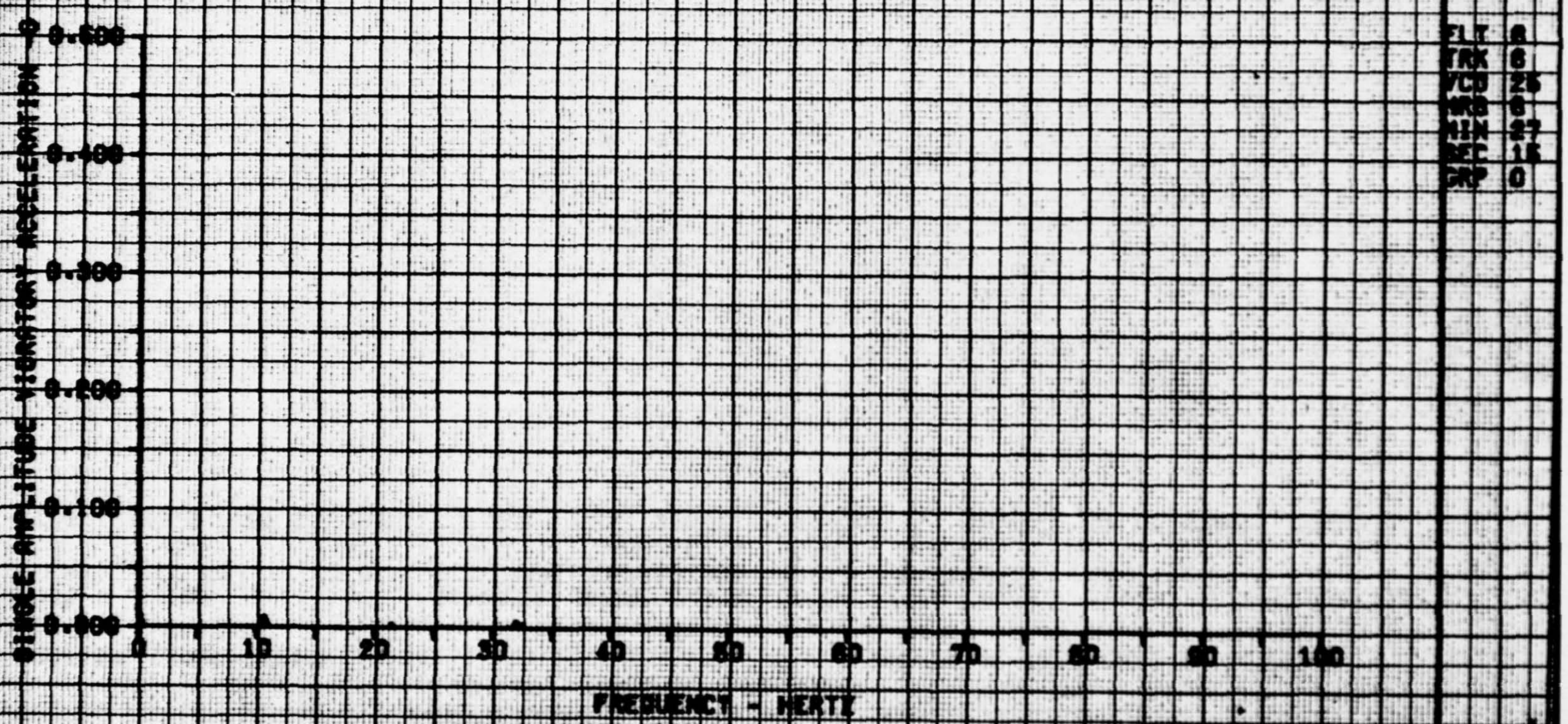


FIGURE 75

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	POWER CONVERTER							
AXIS	LATERAL							
GROSS WEIGHT -LB	LONG. CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
9160	135.2 (FWD)	0.0 (MID)	1620	4.0	324.0	10.6	NAP OF EARTH	CLEAN

SINGLE AMPLITUDE VIBRATORY ACCELERATION - G

0.500
0.400
0.300
0.200
0.100
0.000

0 10 20 30 40 50 60 70 80 90 100

FREQUENCY - HERTZ

FLT	8
TRK	6
VCR	40
HRS	8
MIN	27
SEC	15
GRP	0

FIGURE 76

VIBRATION CHARACTERISTICS

NUM-1H USA S/N 66-00009

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	POWER CONVERTER								
AXIS	VERTICAL								
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
9160	135.2(FWD)	0.0(MID)	1820	4.0	324.0	10.0	MRP OF EARTH	CLEAN

SINGLE AMPLITUDE VIBRATORY ACCELERATION

0.500
0.400
0.300
0.200
0.100
0.000

0 10 20 30 40 50 60 70 80 90 100

FREQUENCY - HERTZ

FLT	8
TRK	6
VCD	55
MRB	8
MIN	27
REC	16
GRP	0

FIGURE 77

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-00000

FUNDAMENTAL FREQUENCY 1R 5.40 HZ

LOCATION	COLLECTIVE CONTROL							
AXIS	VERTICAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
9100	156.2 (FWD)	0.0 (MID)	1620	4.0	324.0	10.0	RNP OF EARTH	CLEAN

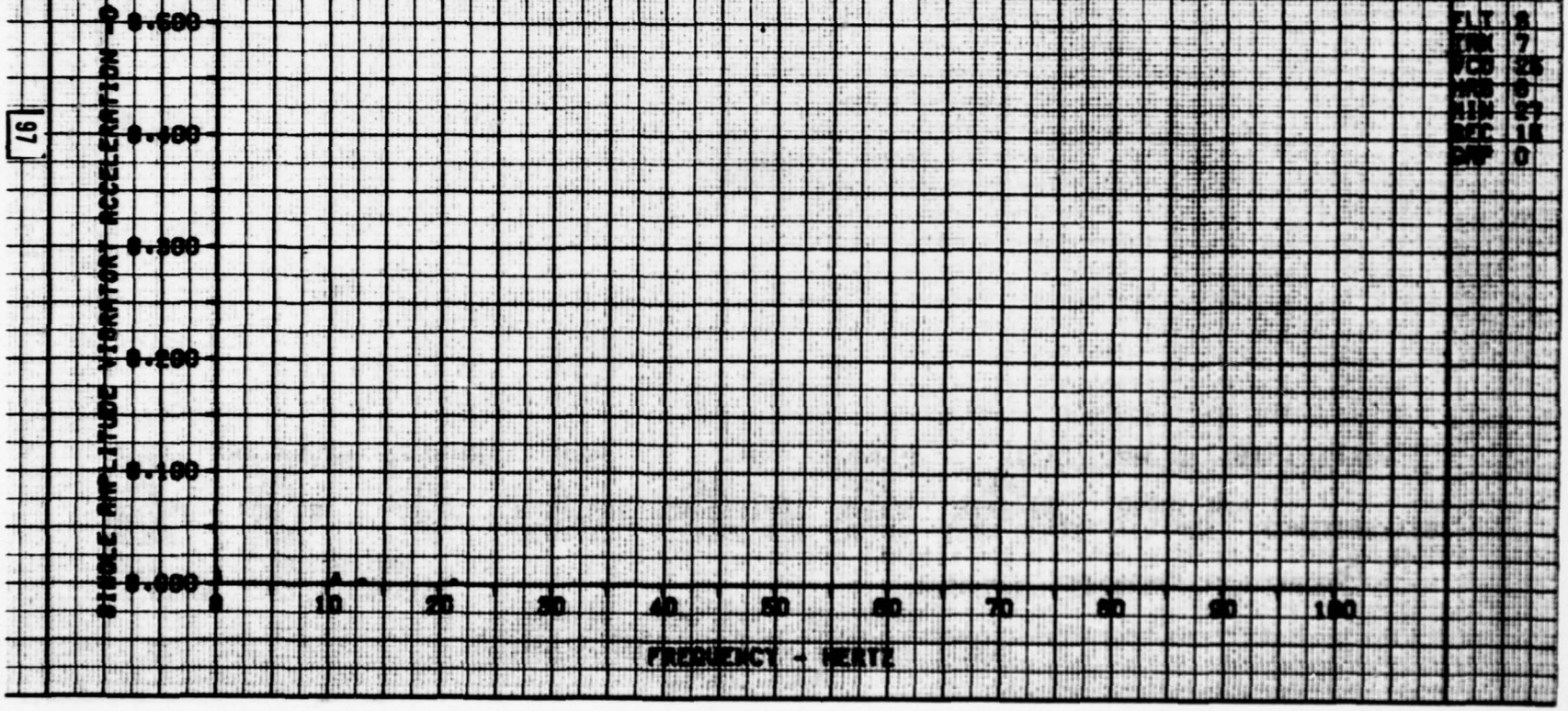


FIGURE 78

VIBRATION CHARACTERISTICS

AH-1H USE S/N 66-00000

FUNDAMENTAL FREQUENCY 1R 5.40 HZ

LOCATION	CYCLIC CONTROL LONGITUDINAL								
AXIS	LONG	LAT	DENSITY	OUTSIDE AIR	ROTOR	TRIM CALIB.	FLIGHT CONFIGURATION		
GROSS WEIGHT -LB	CG FS -IN.	CG BL -IN.	ALTITUDE -FT	TEMPERATURE -DEG C	SPEED -RPM	AIRSPEED -KTS	CONDITION		
9100	135.2 (FWD)	0.0 (MID)	1820	4.0	324.0	10.0	NAP OF EARTH	CLEAN	

FLT	8
TRK	7
VCR	48
HRS	0
MIN	27
SEC	15
GRP	0

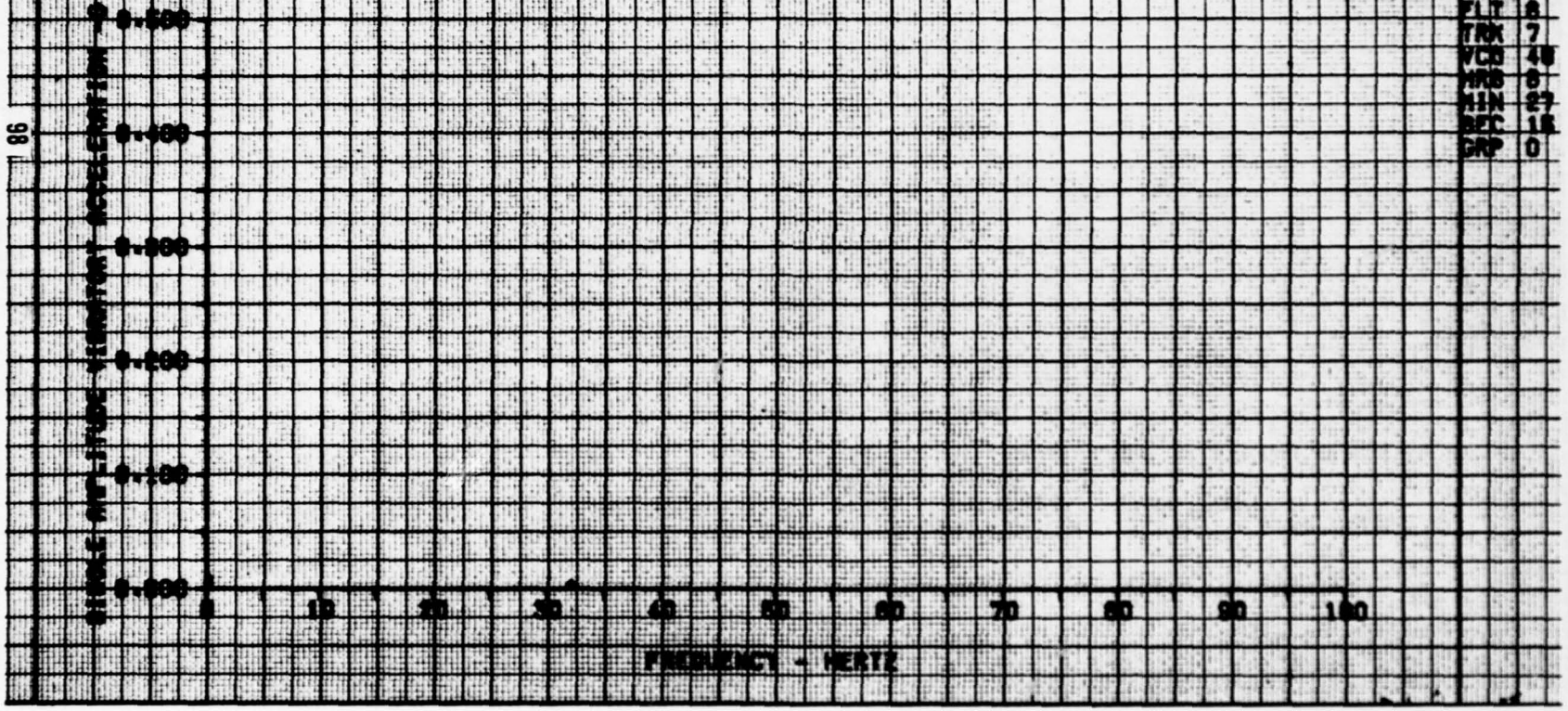


FIGURE 79

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-00000

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	CYCLIC CONTROL							
AXIS	LATERAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CAL IB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
9180	135.2 (FWD)	0.0 (MID)	1620	4.0	324.0	10.0	MAP OF EARTH	CLEAN

FLT 8
TRK 7
VCR 55
MRB 0
MIN 27
SEC 16
DRP 0

SINGLE AMPLITUDE VIBRATORY ACCELERATION - g

0.600
0.400
0.300
0.200
0.100
0.000

0 10 20 30 40 50 60 70 80 90 100

FREQUENCY - HERTZ

FIGURE 80

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-00068

LOCATION	FORWARD PALLET FLOOR MOUNT							FUNDAMENTAL FREQUENCY 19 5.40 HZ
AXIS	VERTICAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
9160	156.2 (FWD)	0.0 (MID)	1620	4.8	324.0	10.0	RMP OF EARTH	CLEAN

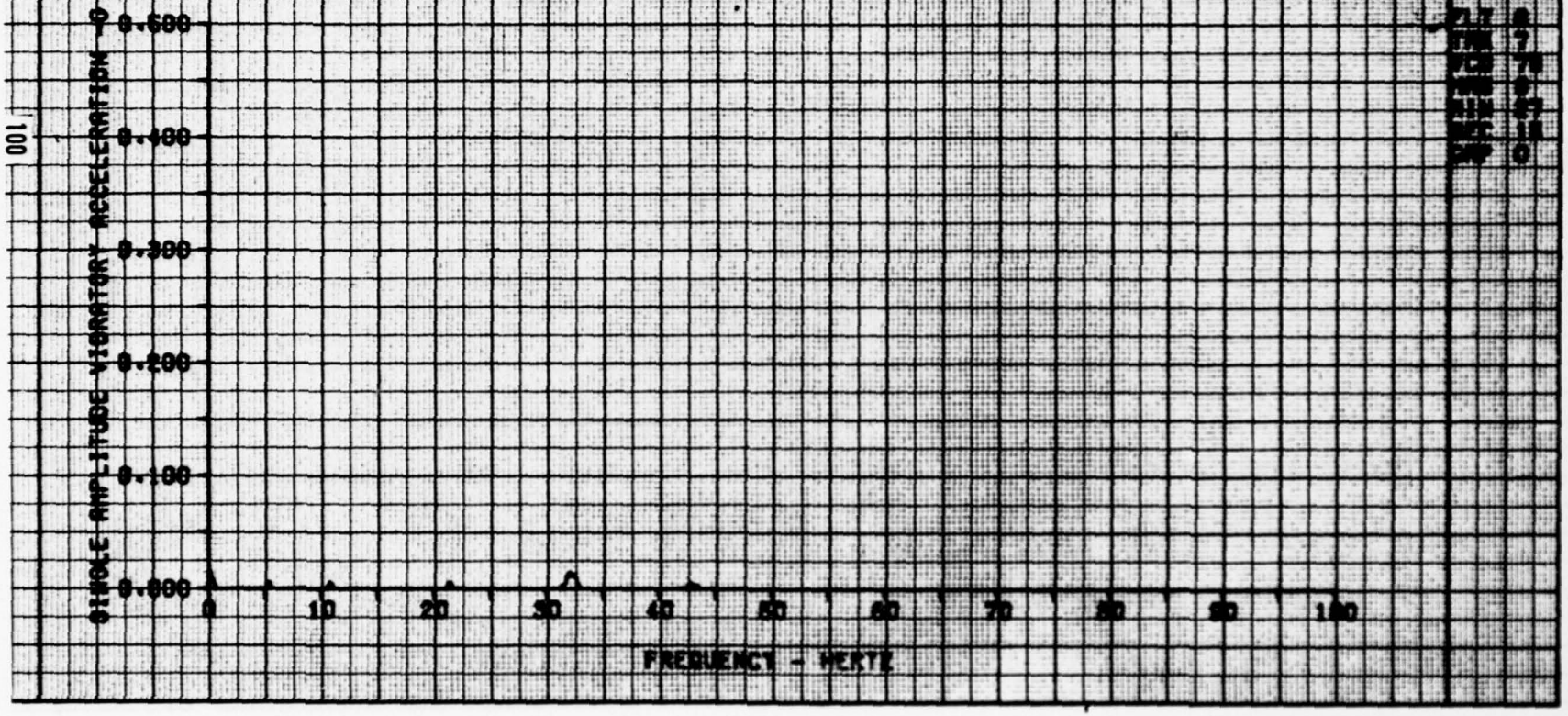


FIGURE 81

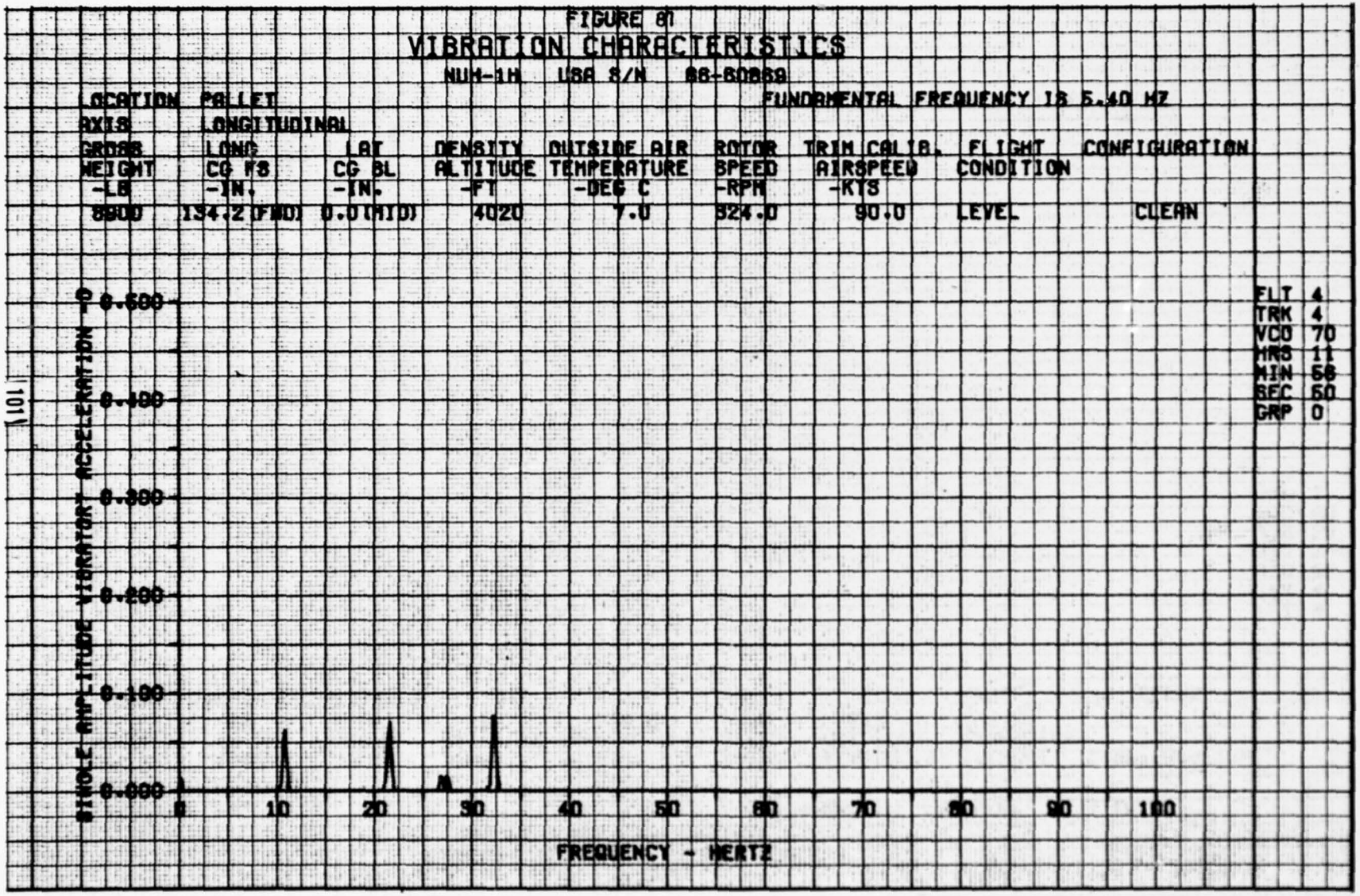
VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-80869

LOCATION PALLET — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS LONGITUDINAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	194.2 (FWD)	0.0 (MID)	4020	7.0	324.0	90.0	LEVEL	CLEAN



FLT	4
TRK	4
VCO	70
HRS	11
MIN	56
SEC	50
GRP	0

FIGURE 82

VIBRATION CHARACTERISTICS

NUM-1H USA S/N 86-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION AXIS	PALLET LATERAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8500	134.2 (FWD)	0.0 (RTD)	4020	7.0	524.0	80.0	LEVEL	CLEAN

FLT	4
TRK	4
YOU	85
HRS	11
MIN	58
SEC	50
GRP	0

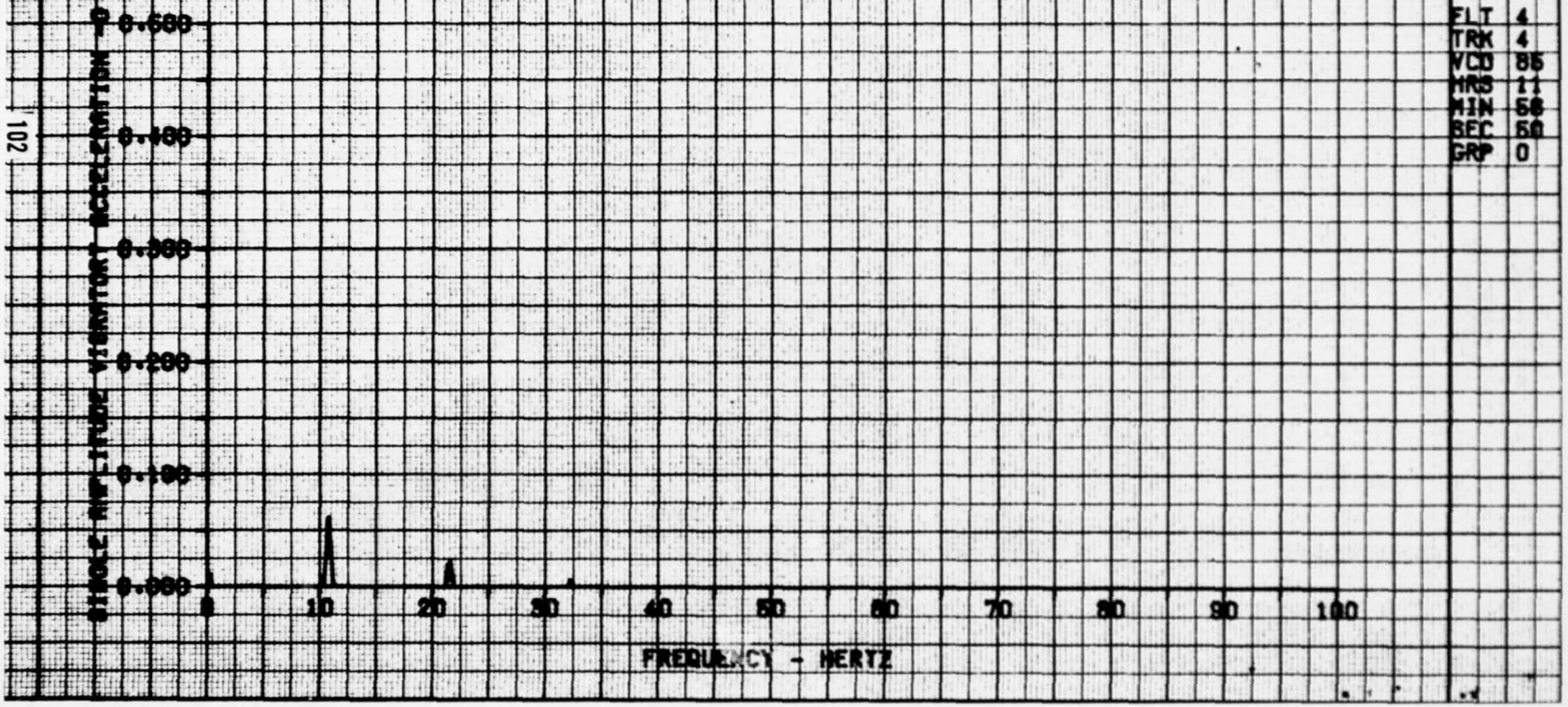


FIGURE #3

VIBRATION CHARACTERISTICS

NUM-1H USA S/N 88-60889

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION PALLET
AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	134.2 (FWD)	0.0 (MID)	4020	7.0	324.0	90.0	LEVEL	CLEAN

FLT	4
TRK	4
VCR	108
MRB	11
MIN	56
REC	50
GRP	0

SINGLE AMPLITUDE VIBRATORY ACCELERATION - G

0.500
0.400
0.300
0.200
0.100
0.000

0 10 20 30 40 50 60 70 80 90 100

FREQUENCY - HERTZ

103

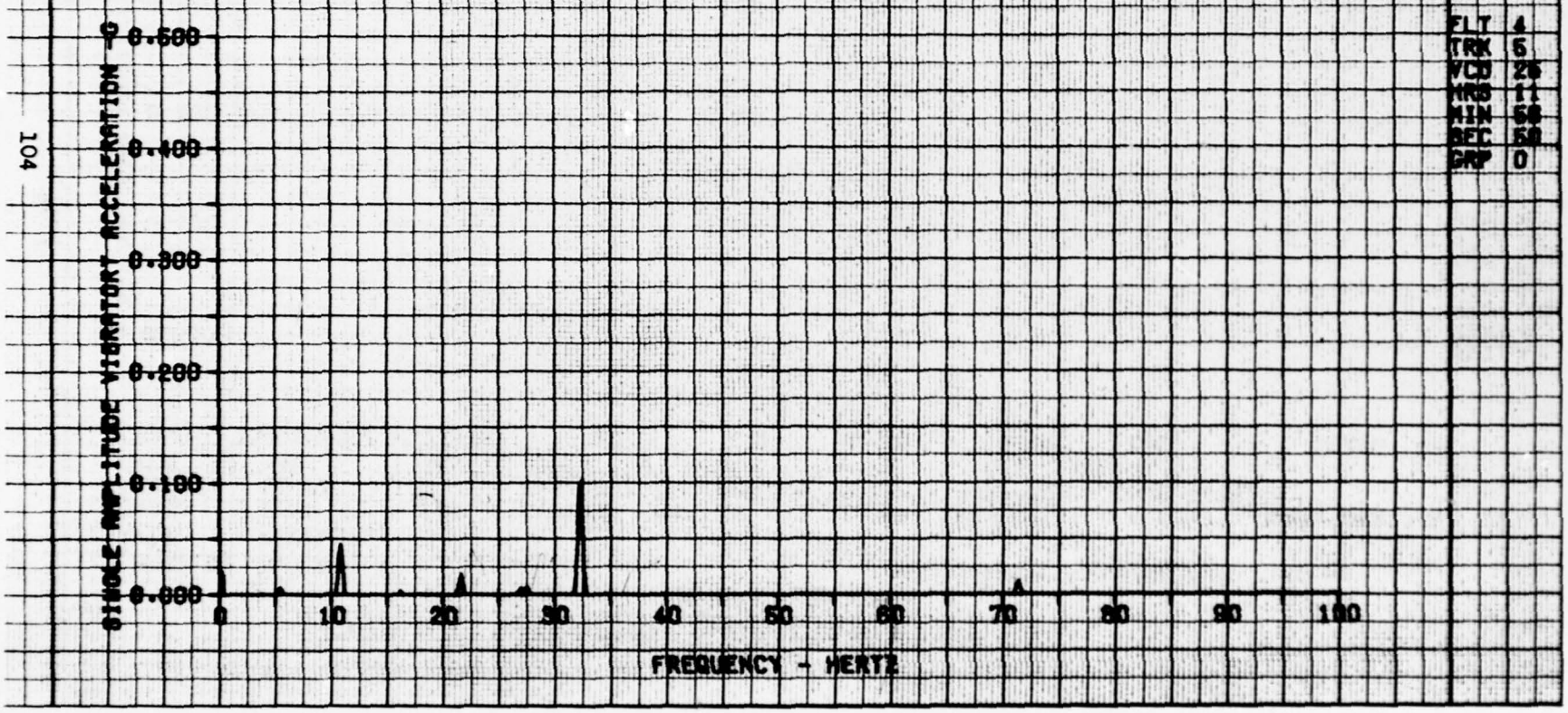
FIGURE 84

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-80869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	PILOT SEAT							
AXIS	LONGITUDINAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	134.2(FWD)	0.0(MID)	4020	7.0	324.0	90.0	LEVEL	CLEAN



FLT	4
TRK	5
VCR	25
MO	11
MIN	58
SEC	58
GRP	0

FIGURE 65

VIBRATION CHARACTERISTICS

UH-1N USA S/N 86-00809

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	AXIS ERROR	LONG	LAT	DENSITY	OUTSIDE AIR	ROTOR	TRIM CALIB.	FLIGHT	CONFIGURATION
PILOT SEAT	LATERAL								
WEIGHT -LB		CG FS -IN.	CG BL -IN.	ALTITUDE -FT	TEMPERATURE -DEG C	SPEED -RPM	AIRSPEED -KTS	CONDITION	
8500		134.2 (FWD)	0.0 (MID)	4020	7.0	324.0	90.0	LEVEL	CLEAN

FLT	4
TRK	5
VCD	40
HRS	11
MIN	58
SEC	50
GRP	0

SINGLE AMPLITUDE VIBRATORY ACCELERATION

0.600
0.400
0.300
0.200
0.100
0.000

0 10 20 30 40 50 60 70 80 90 100

FREQUENCY - HERTZ

FIGURE 86

VIBRATION CHARACTERISTICS

UH-1H USA S/N 66-00000

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	PILOT SEAT VERTICAL								
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRUE AIRSPEED -KTS	CALIB. CONDITION	FLIGHT CONFIGURATION	
9500	194.2 (FWD)	0.0 (MID)	4020	7.0	324.0	90.0	LEVEL	CLEAN	

FLT	4
TRK	6
VCD	55
VRB	11
MIN	58
SEC	58
GRP	0

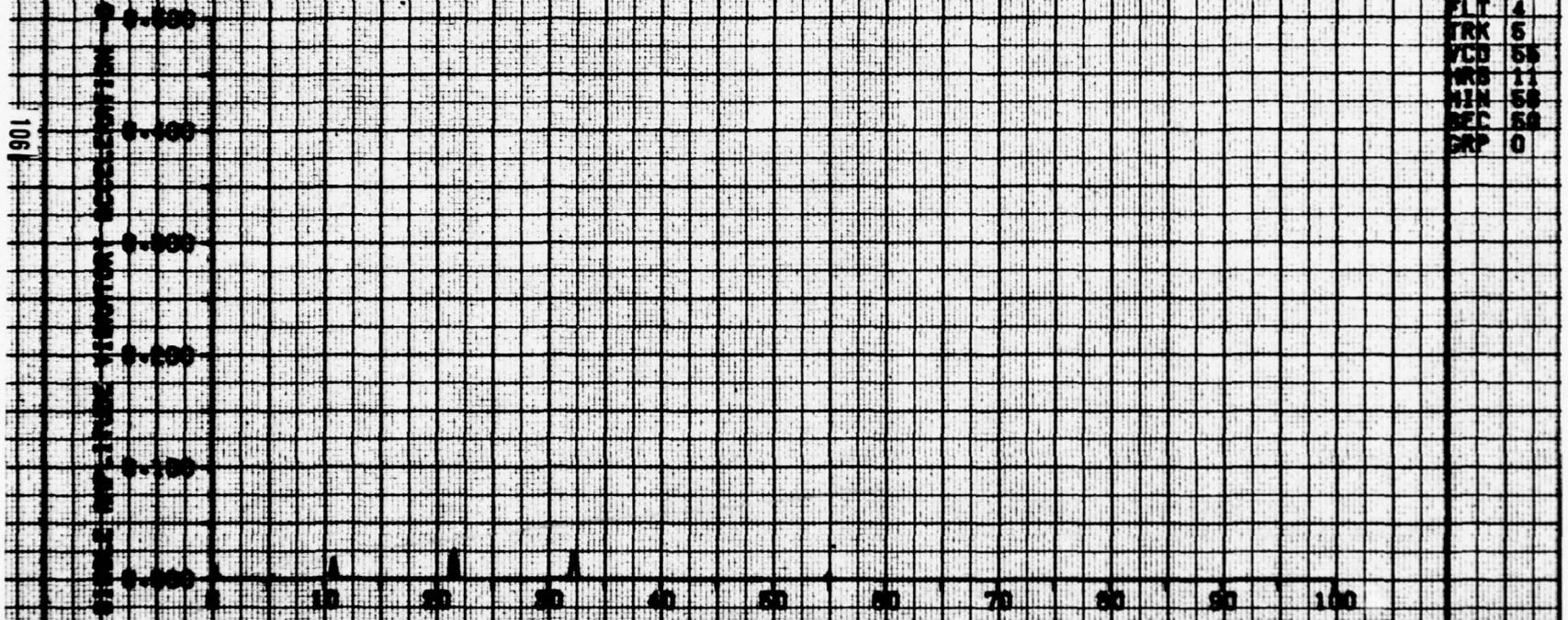


FIGURE 87

VIBRATION CHARACTERISTICS

NUM-1H USA S/N 66-60669

LOCATION POWER CONVERTER — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS LONGITUDINAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	134.2 (FWD)	0.0 (MID)	4020	7.0	324.0	80.0	LEVEL	CLEAN

SINGLE AMPLITUDE VIBRATORY ACCELERATION — g

0.500
0.400
0.300
0.200
0.100
0.000

0 10 20 30 40 50 60 70 80 90 100

FREQUENCY - HERTZ

FLT	4
TRK	6
YCD	25
HRS	11
MIN	56
SEC	50
GRP	0

1071

FIGURE 88

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60059

LOCATION POWER CONVERTER — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS LATERAL

MODEL WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
9500	134.2(FWD)	0.0(MID)	4020	7.0	324.0	90.0	LEVEL	CLEAN

FLT	4
TRK	6
VCD	40
HRS	11
MIN	56
SEC	50
GRP	0

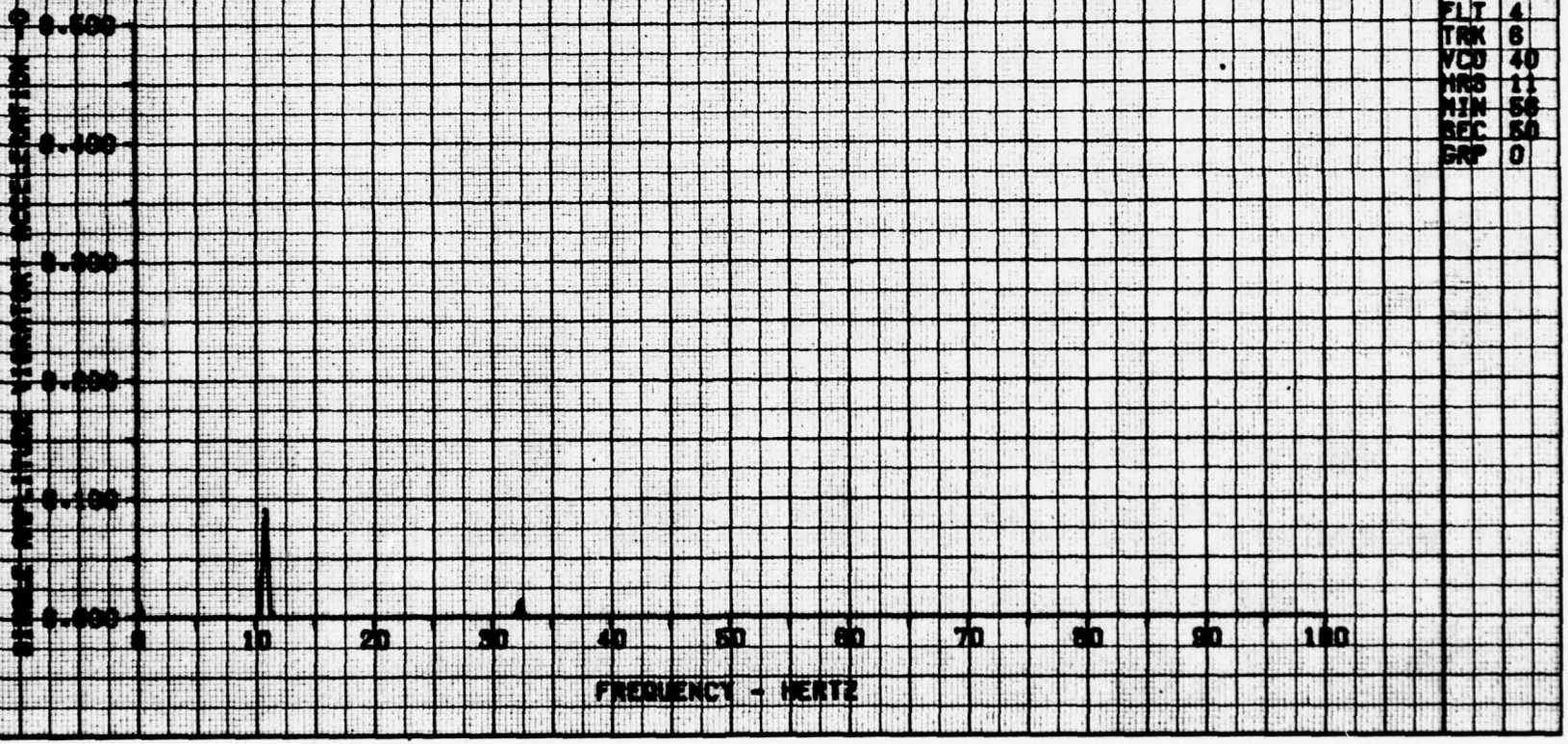


FIGURE 89

VIBRATION CHARACTERISTICS

HUH-1H USN S/N 66-00868

LOCATION POWER CONVERTER — FUNDAMENTAL FREQUENCY IS 3.40 MP

AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	134.2(FWD)	0.0(MID)	4020	7.0	324.0	80.0	LEVEL	CLEAN

FLT	4
TRK	6
VCD	55
HRS	11
MIN	58
SEC	58
DRP	0

SINGLE AMPLITUDE VIBRATORY ACCELERATION - g

0.500
0.400
0.300
0.200
0.100
0.000

0 10 20 30 40 50 60 70 80 90 100

FREQUENCY - HERTZ

FIGURE [illegible]

VIBRATION CHARACTERISTICS

UH-1H USA S/N [illegible]

LOCATION TRANSMISSION

AXIS LONGITUDINAL

FUNDAMENTAL FREQUENCY IS 5.40 HZ

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
[illegible]	134.2(FWD)	0.0(MID)	4020	7.0	324.0	80.0	LEVEL	CLEAN

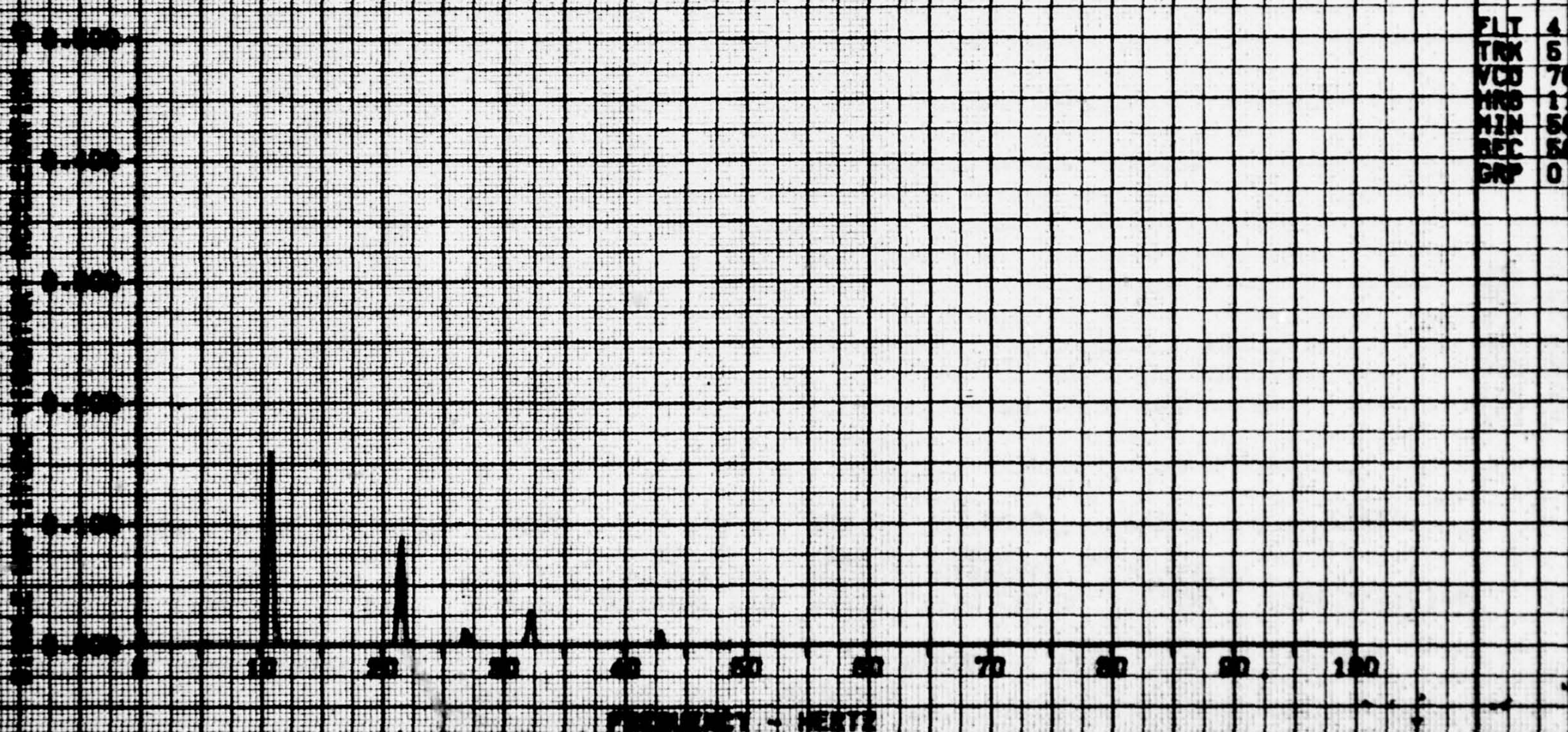


FIGURE 91

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-00868

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION TRANSMITTION
AXIS LATERAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	134.2 (FWD)	0.0 (MID)	4020	7.8	324.0	90.0	LEVEL	CLEAN

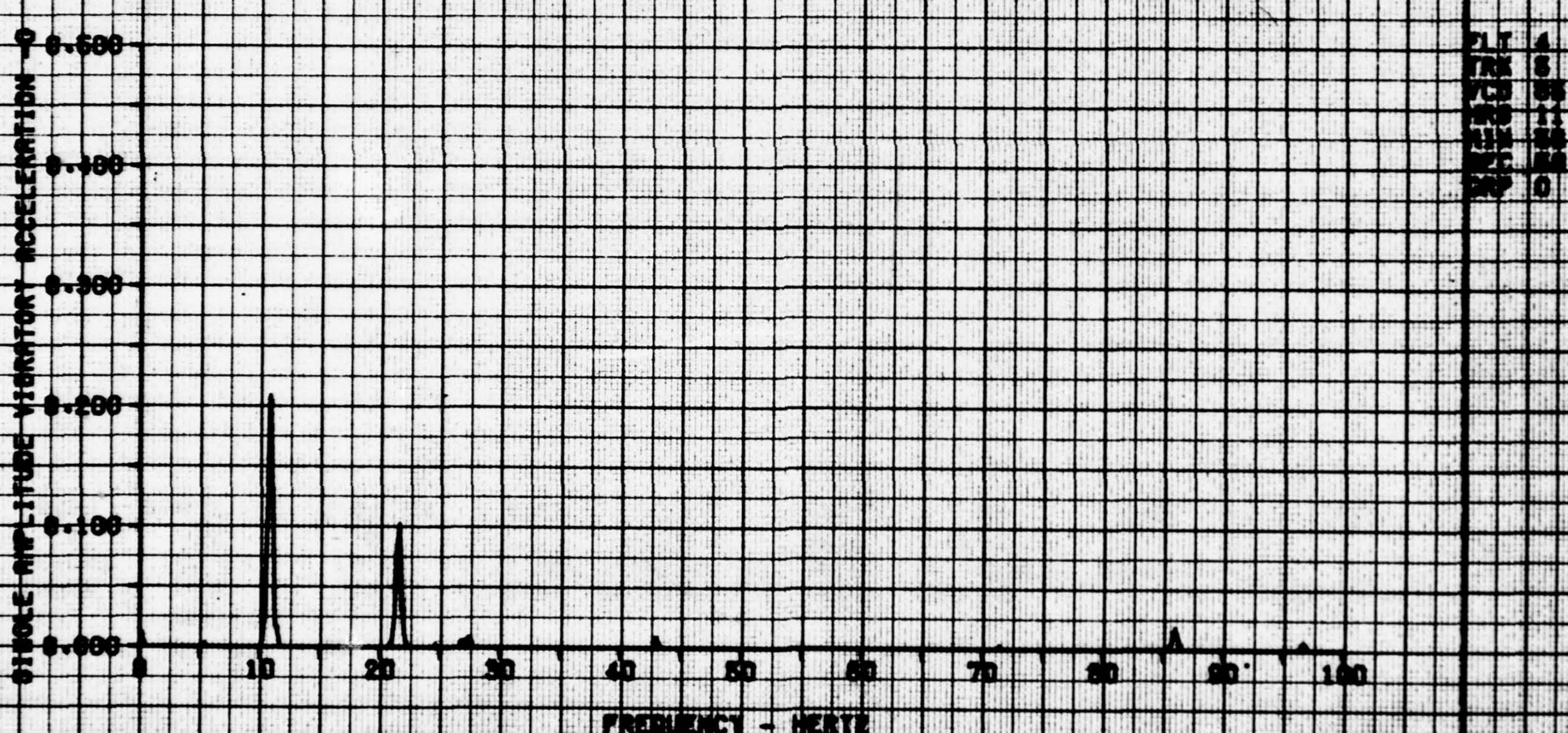


FIGURE 92

VIBRATION CHARACTERISTICS

NUH-1H USA S/N [illegible]

LOCATION TRANSMISSION

FUNDAMENTAL FREQUENCY IS [illegible] HZ

AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	134.2 (FWD)	0.0 (MID)	4020	7.0	324.0	90.0	LEVEL	CLEAN

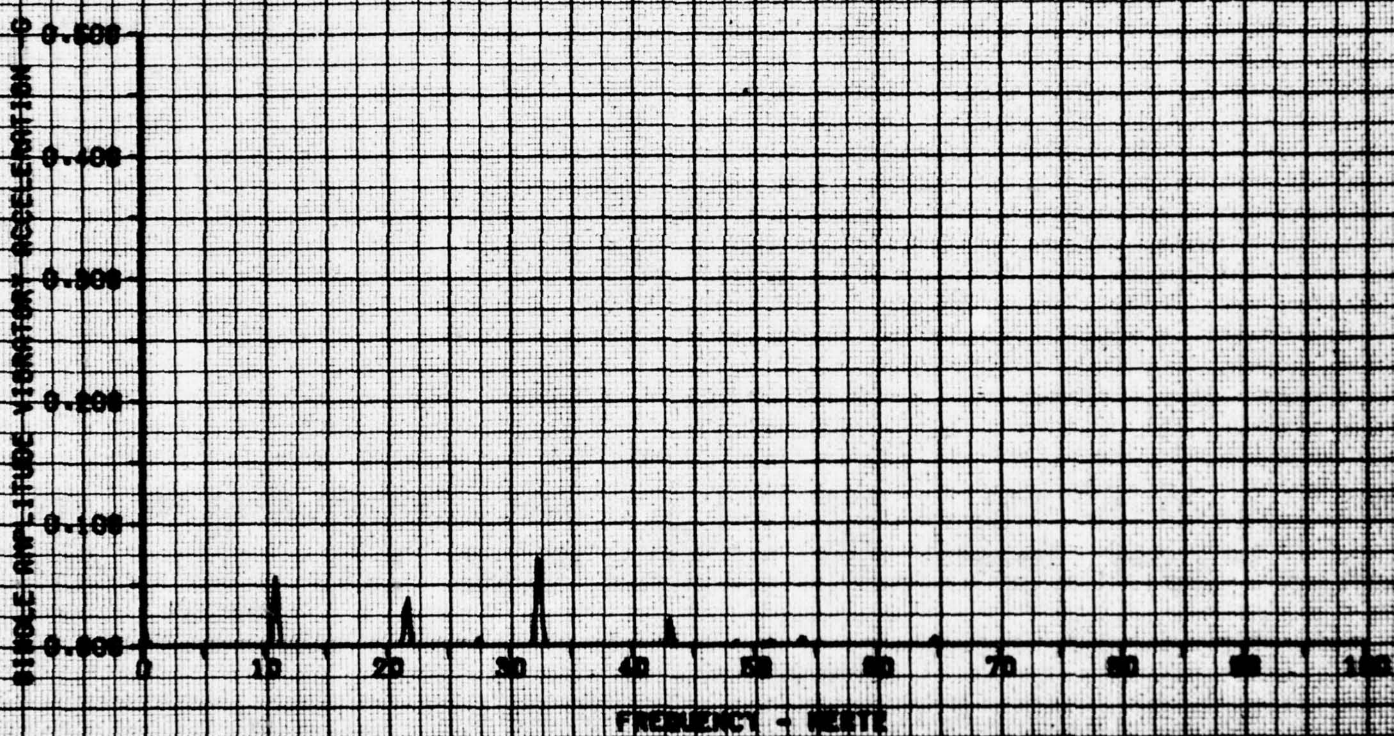


FIGURE 93

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-00969

LOCATION COLLECTIVE CONTROL — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8800	134.2(FWD)	0.0(MID)	4020	7.0	324.0	80.0	LEVEL	CLEAN

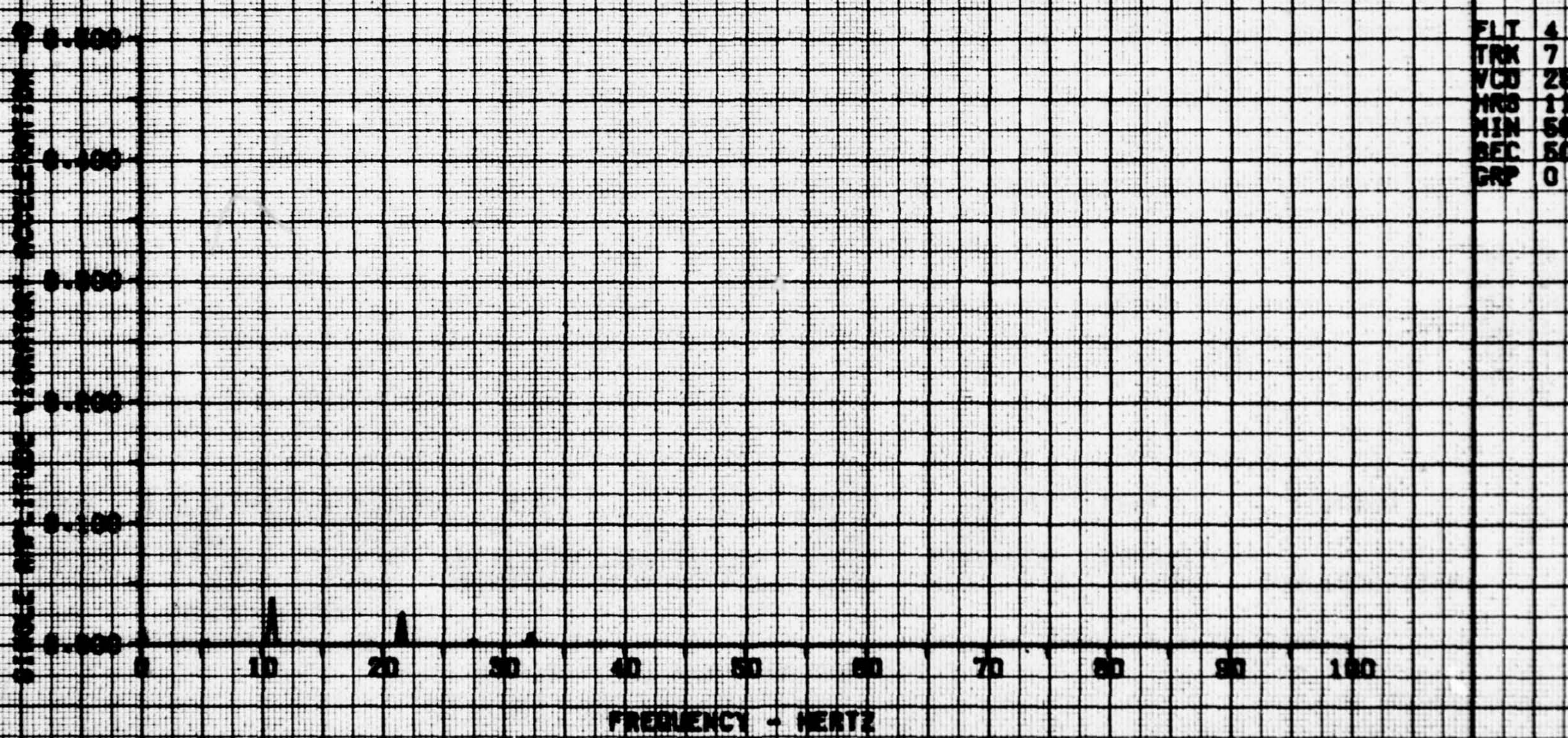


FIGURE 94

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	CYCLIC CONTROL							
AXIS	LONGITUDINAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	134.2 (FWD)	0.0 (MID)	4020	7.8	324.0	80.0	LEVEL	CLEAN

FLT	4
TRK	7
VCD	40
HRS	11
MIN	58
SEC	58
GRP	0

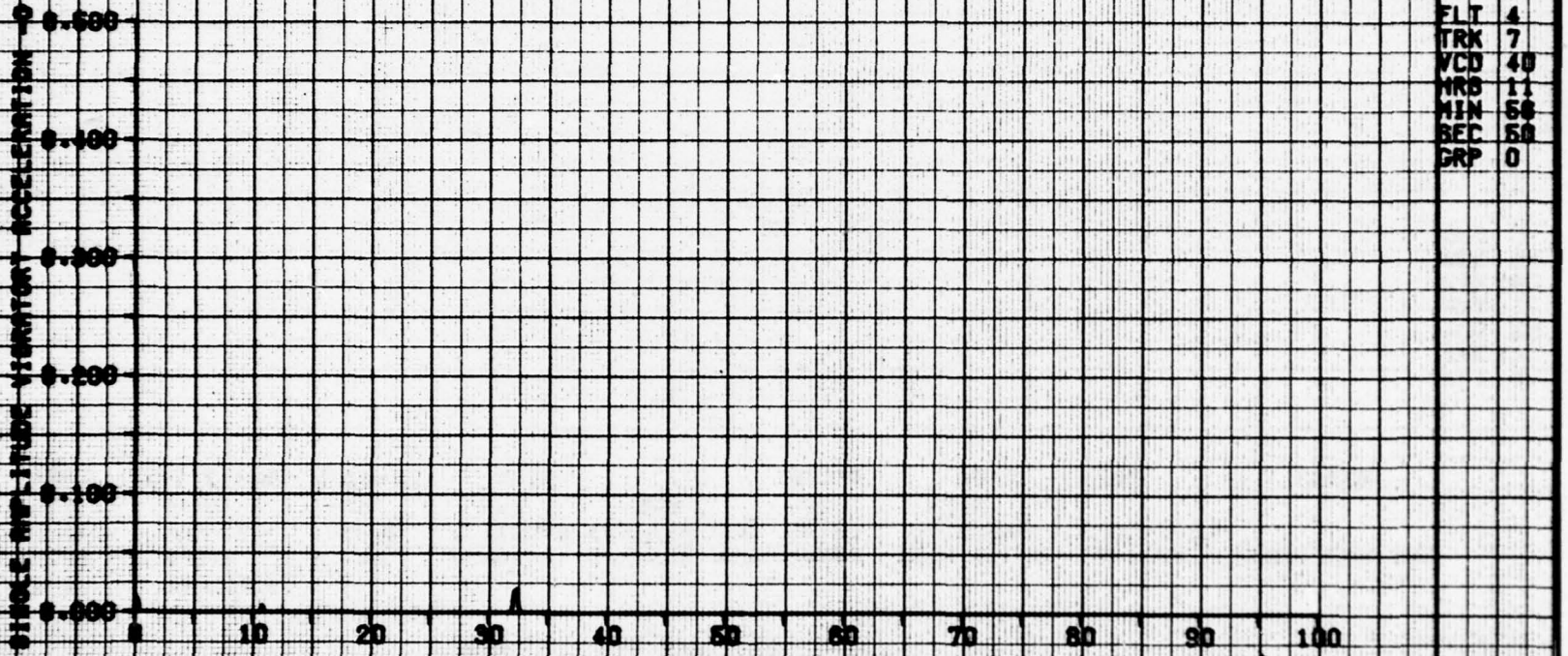


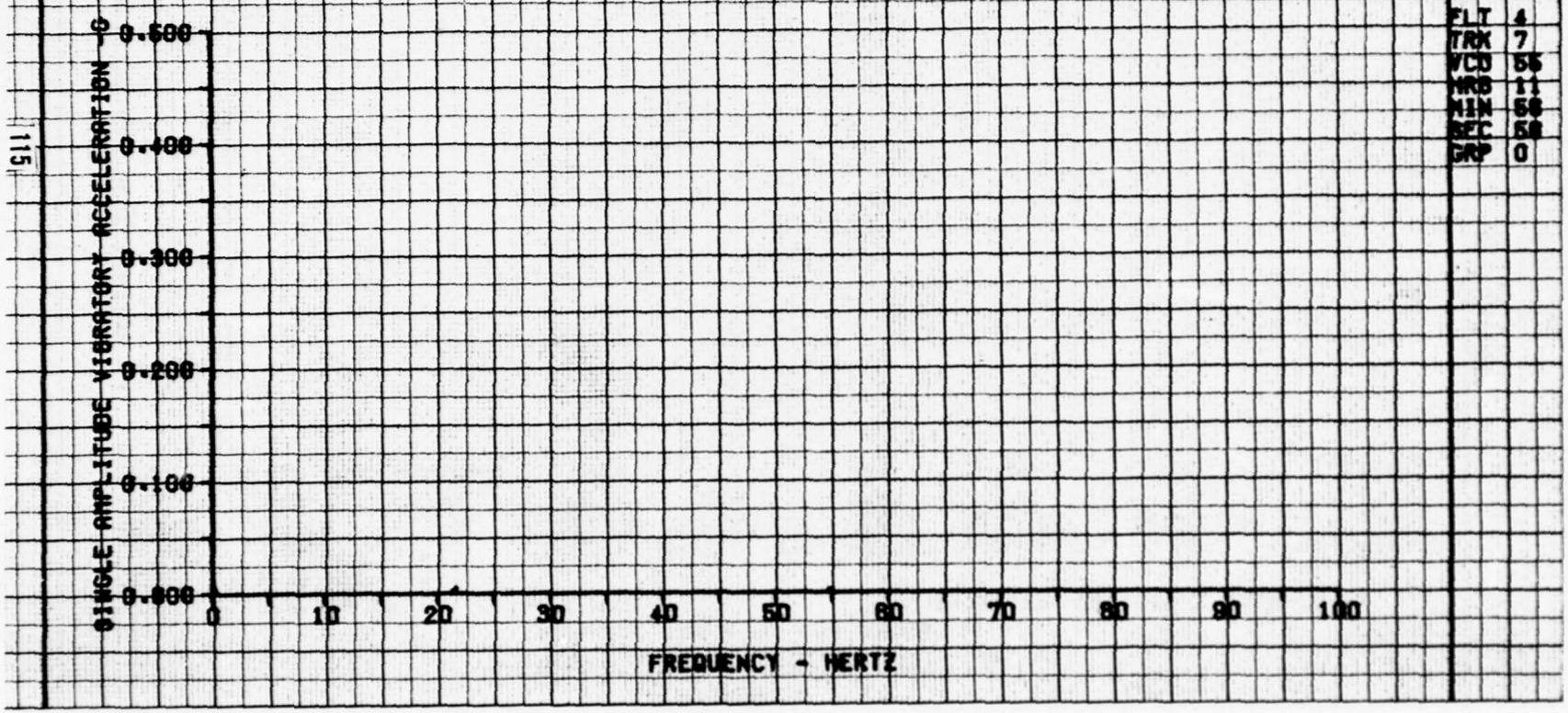
FIGURE 95

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60868

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	CYCLIC CONTROL							
AXIS	LATERAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	194.2 (FWD)	0.0 (MID)	4020	7.0	324.0	90.0	LEVEL	CLEAN



FLT	4
TRK	7
VCD	55
HRS	11
MIN	58
SEC	58
GRP	0

FIGURE 96

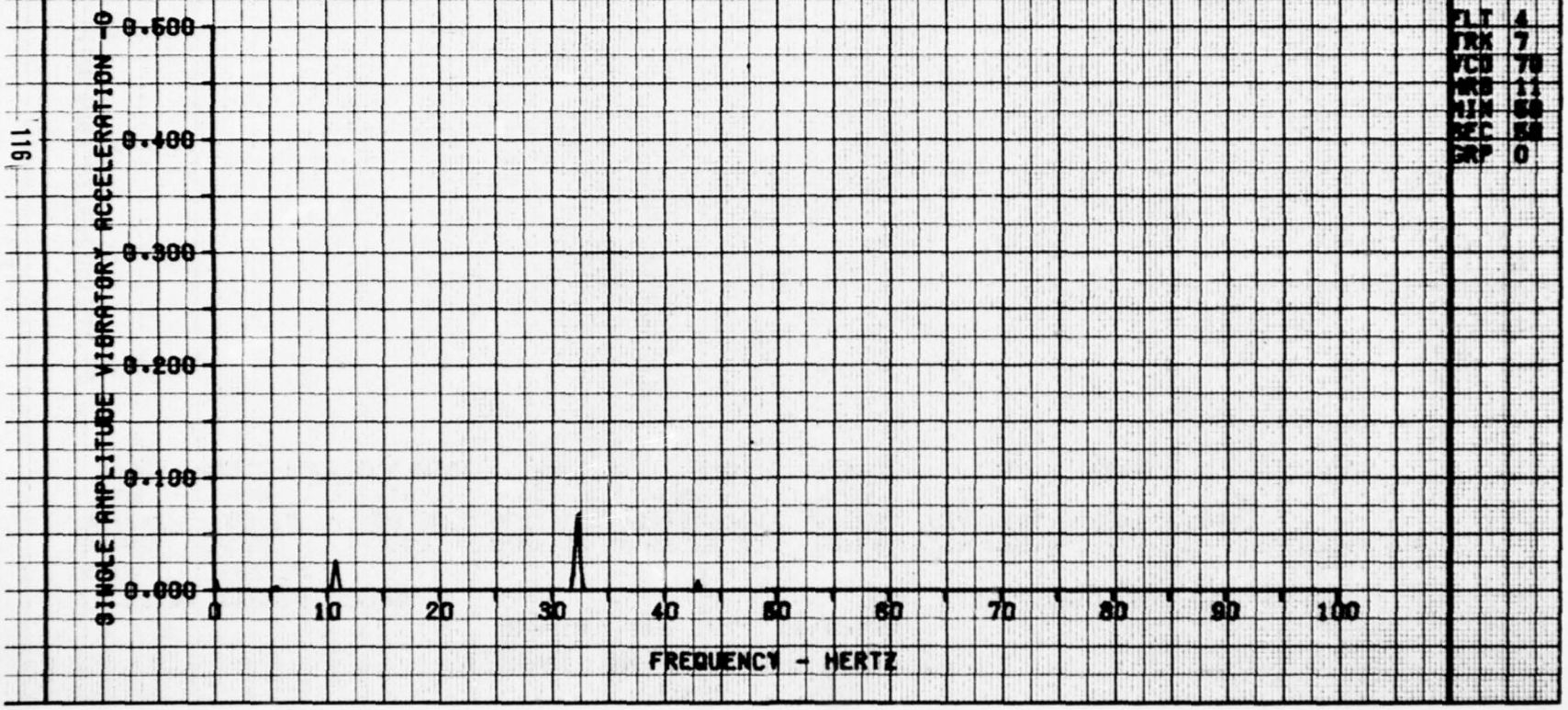
VIBRATION CHARACTERISTICS

NUH-1H USA S/N 68-60869

LOCATION FORWARD PALLET FLOOR MOUNT FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8900	134.2 (FWD)	0.0 (MID)	4020	7.0	324.0	90.0	LEVEL	CLEAN



FLT	4
TRK	7
YCD	78
WKB	11
MIN	58
SEC	58
SRP	0

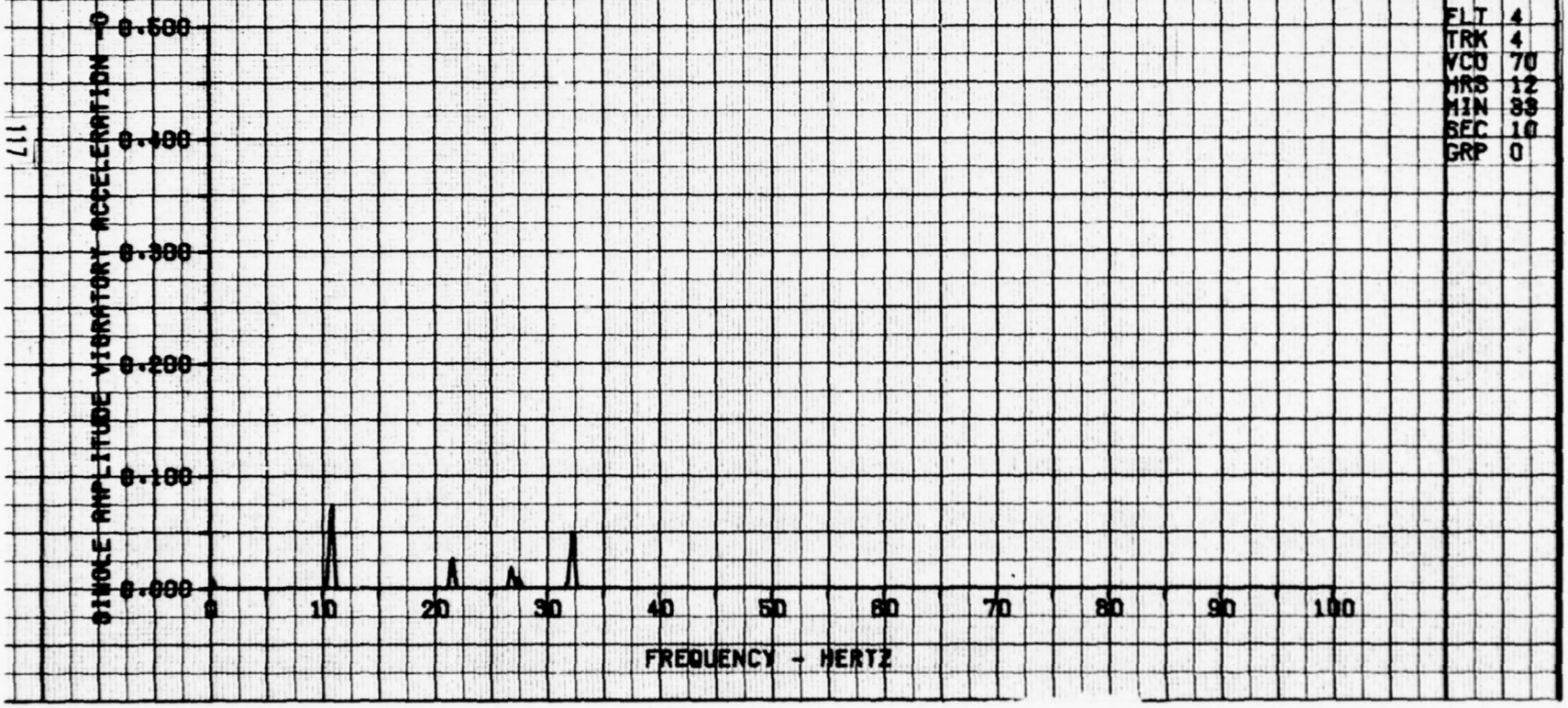
FIGURE 97

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	AXIS	GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
PALET	LONGITUDINAL	8550	132.7(FWD)	0.0(MID)	3040	11.0	324.0	110.0	LEVEL	CLEAN



FLT	4
TRK	4
VCO	70
HRS	12
MIN	33
SEC	10
GRP	0

FIGURE 98

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	AXIS	GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
PALLET	LATERAL	8680	152.7 (FWD)	0.0 (MID)	3040	11.0	324.0	110.0	LEVEL	CLEAN

FLT	4
TRK	4
VCO	85
HRS	12
MIN	38
SEC	10
GRP	0

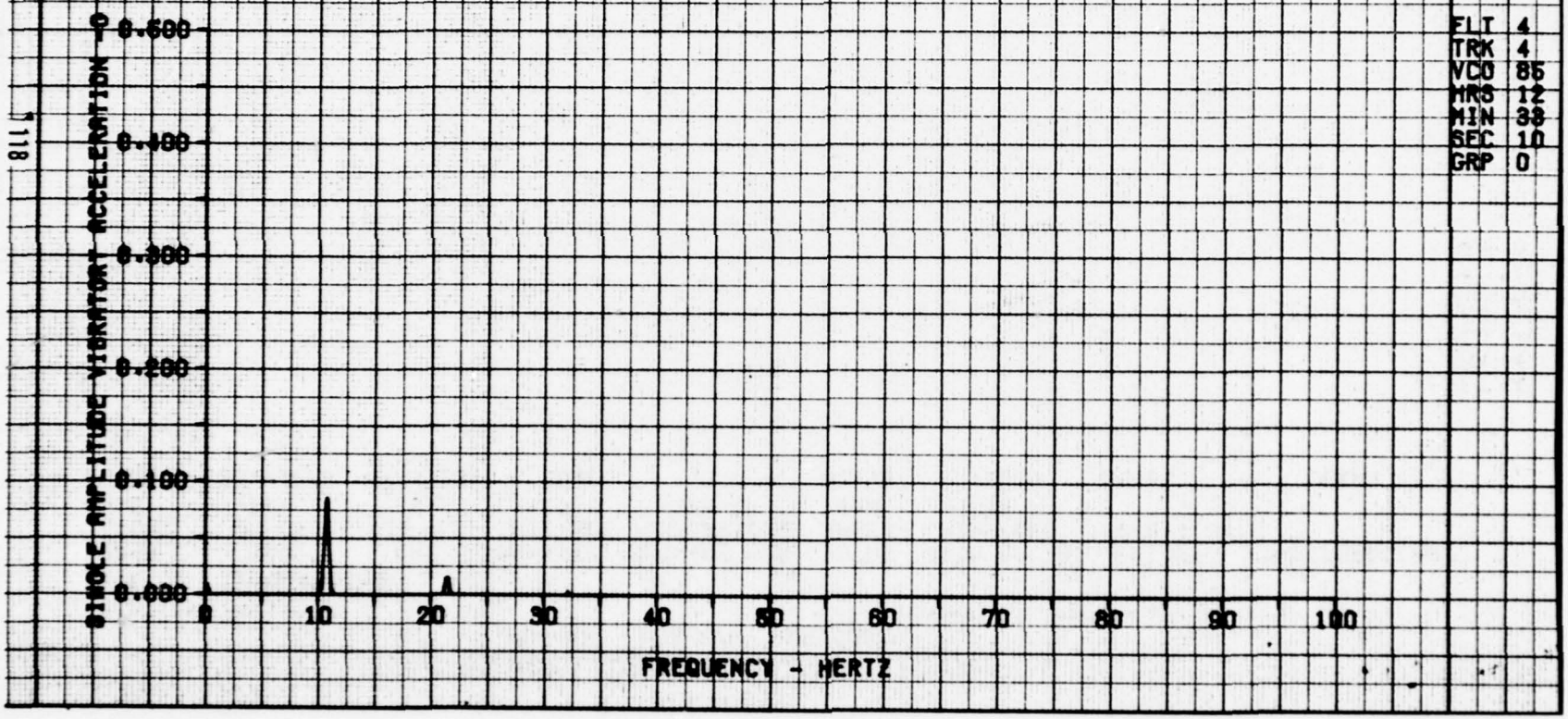


FIGURE 99

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 68-16369

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	PALLET
AXIS	VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8580	132.7 (FWD)	0.0 (MID)	3040	11.0	324.0	110.0	LEVEL	CLEAN

FLT	4
TRK	4
VCD	100
HRS	12
MIN	33
SEC	10
GRP	0

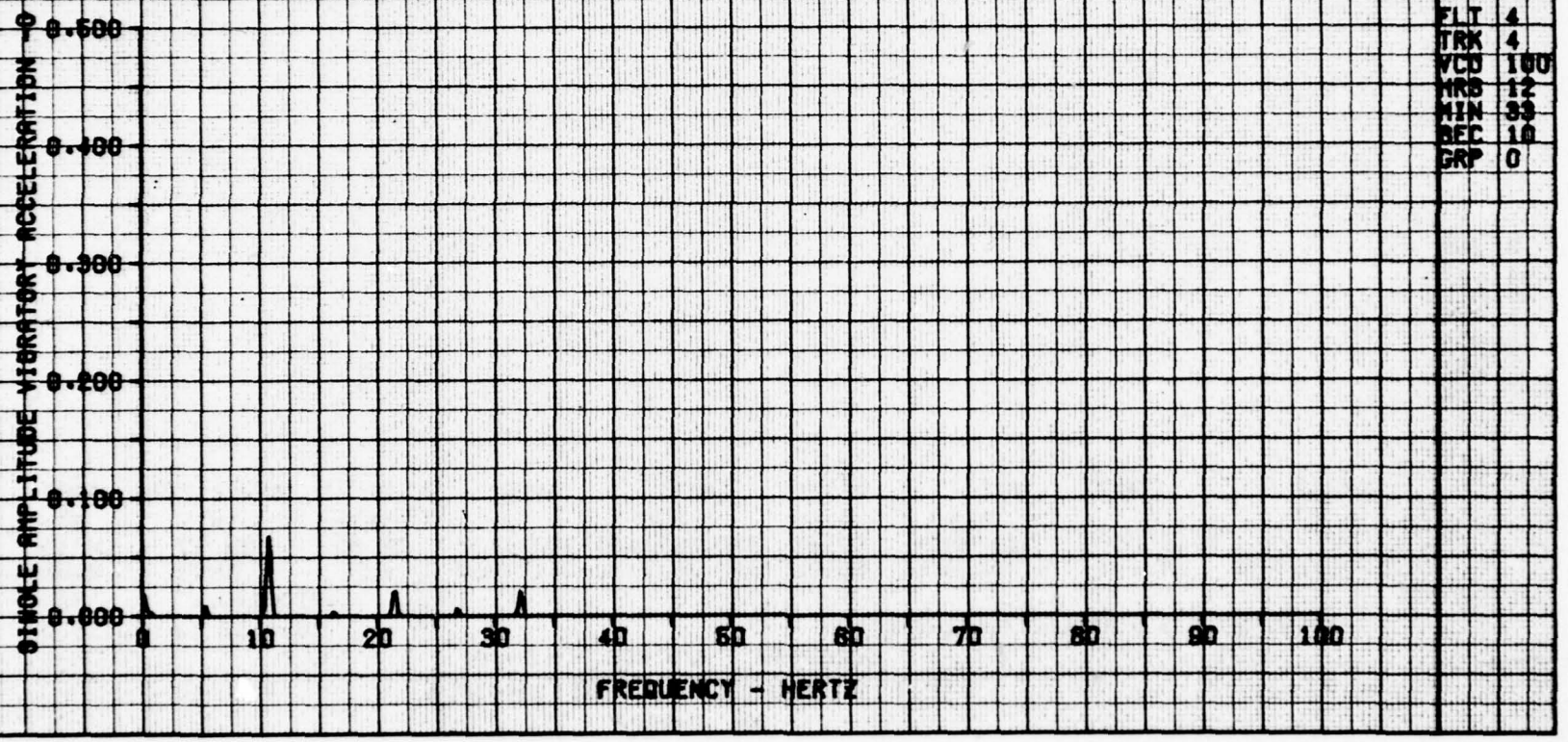


FIGURE 100

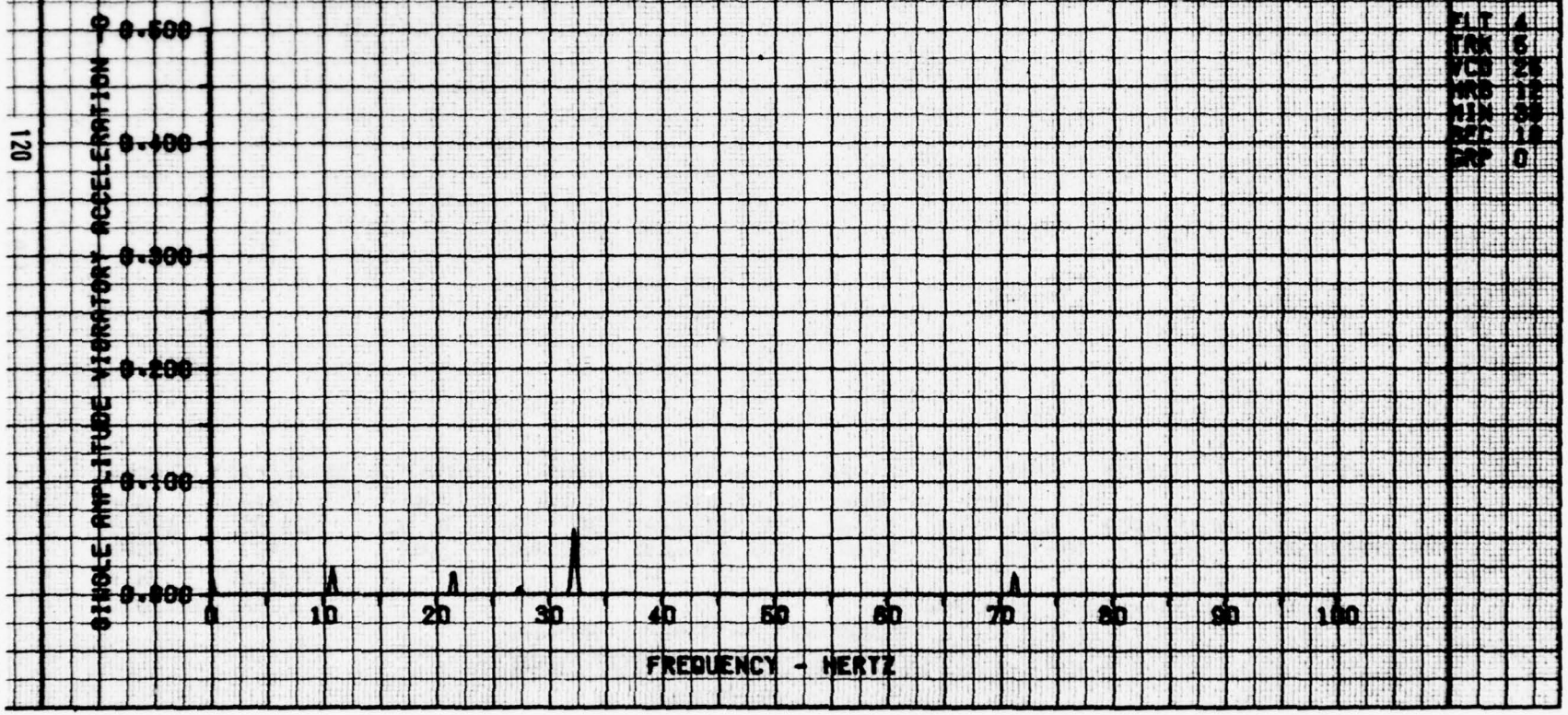
VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60868

LOCATION PILOT SEAT — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS LONGITUDINAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8580	132.7(FWD)	0.0(MID)	3040	11.0	324.0	110.0	LEVEL	CLEAN



FLT	4
TRK	6
VCR	25
HRS	1
MIN	30
SEC	10
SRP	0

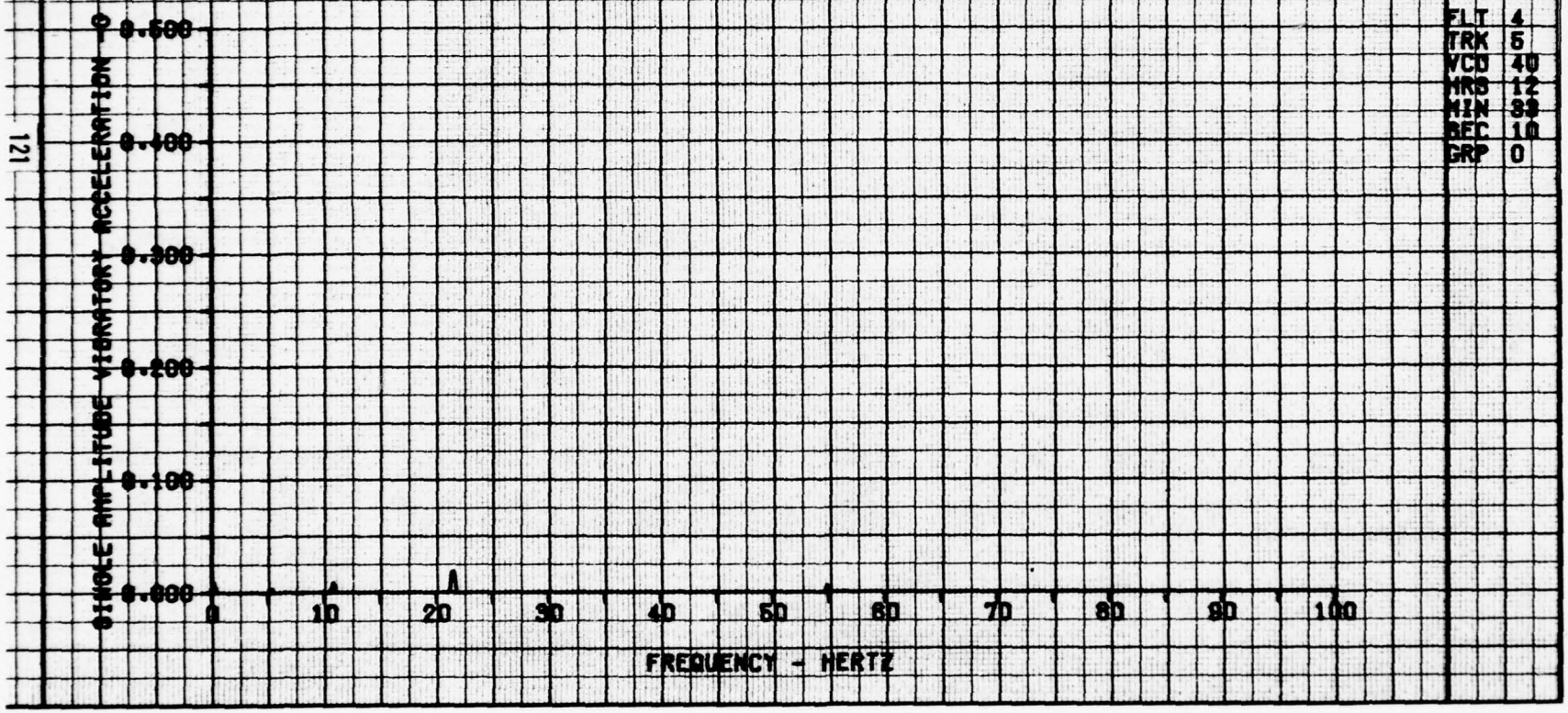
FIGURE 101

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-00869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	PILOT SEAT								
AXIS	LATERAL								
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION	
8580	192.7(FWD)	0.0(MID)	3040	11.0	324.0	110.0	LEVEL	CLEAN	



FLT	4
TRK	5
YCD	40
HRS	12
MIN	33
SEC	10
GRP	0

FIGURE 10E

VIBRATION CHARACTERISTICS

HUM-1H USA S/N 66-

FUNDAMENTAL FREQUENCY 18 5.40 HZ

LOCATION	PILOT SEAT								
AXIS	VERTICAL								
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION	
[illegible]	132.7(FWD)	0.0(RIO)	9040	11.0	324.0	110.0	LEVEL	CLEAN	

FLT	4
TRK	5
VCD	55
HRS	12
MIN	33
SEC	10
GRP	0

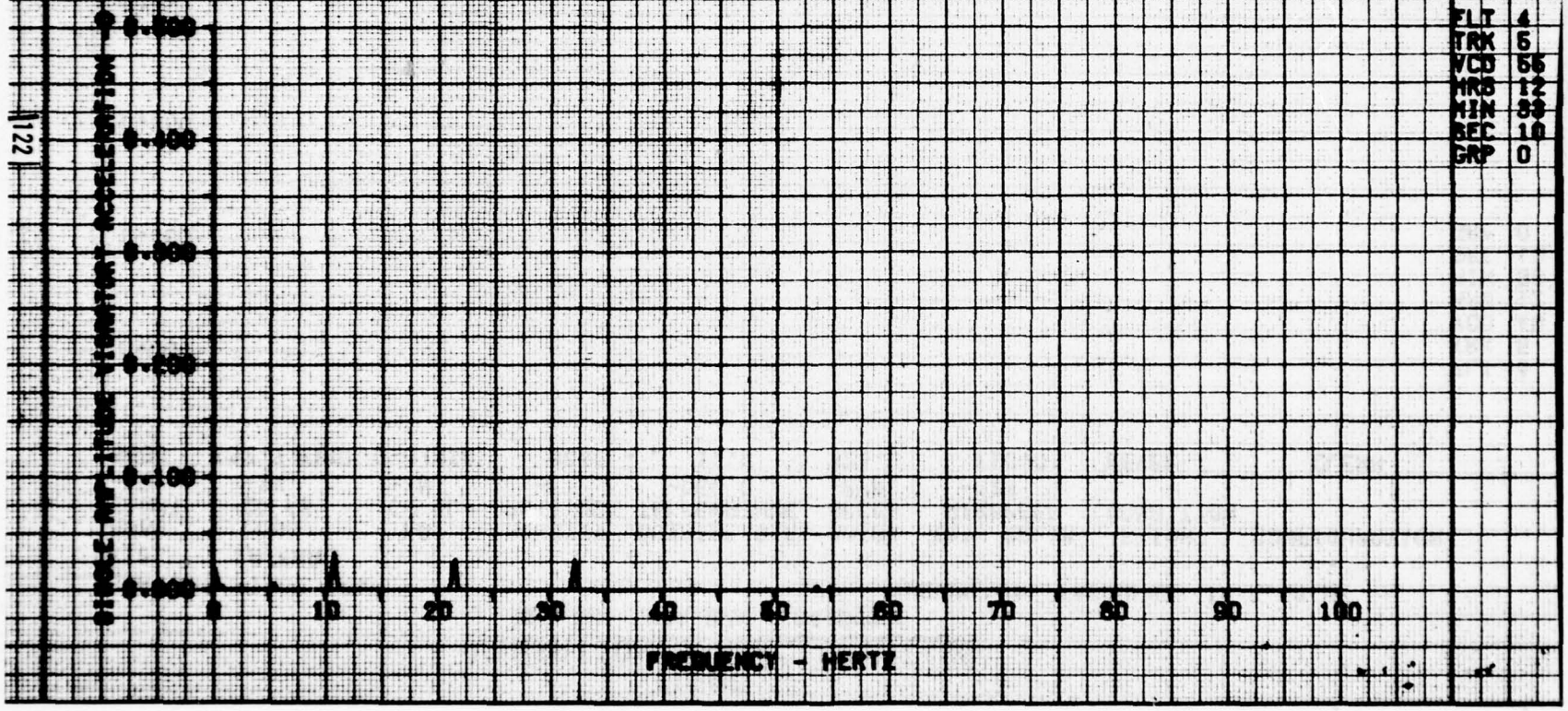


FIGURE 103

VIBRATION CHARACTERISTICS

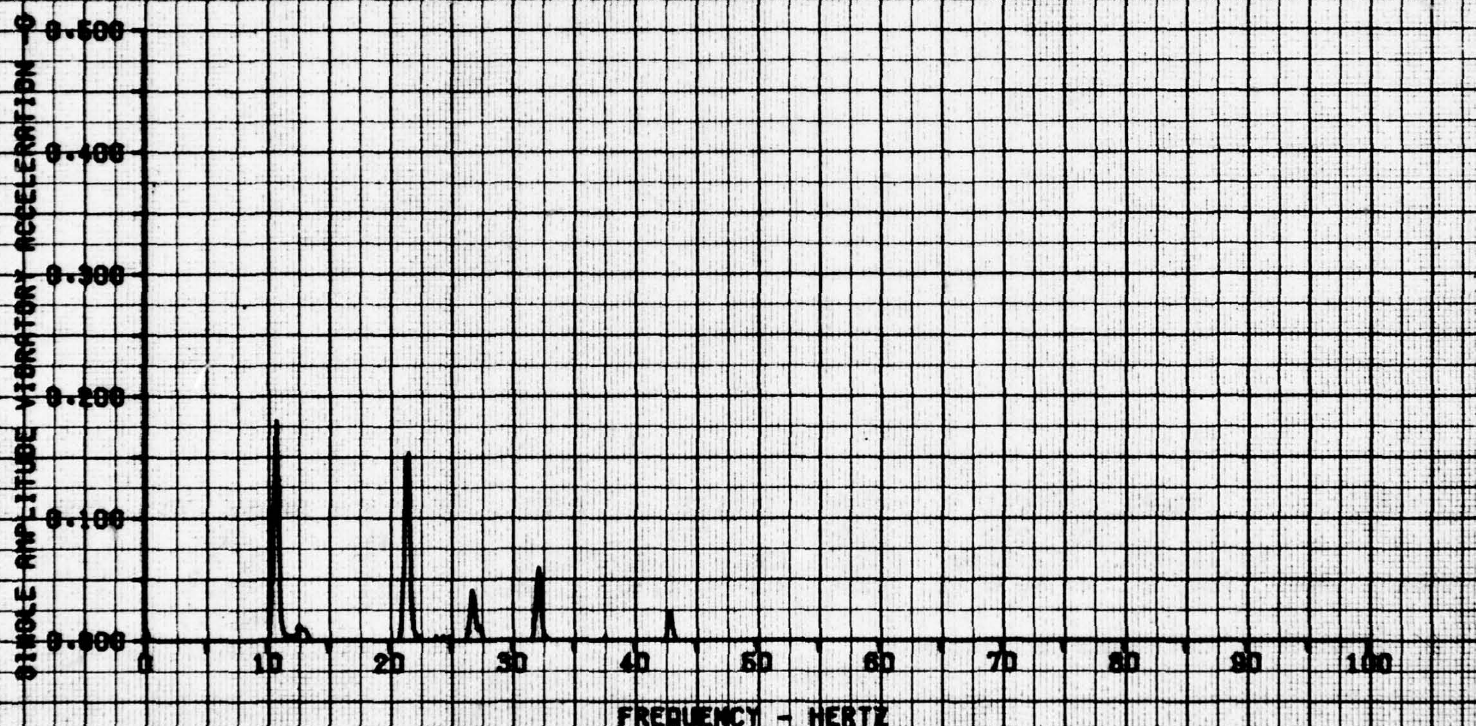
NUH-1H USA S/N 68-60869

LOCATION TRANSMISSION

AXIS LONGITUDINAL

FUNDAMENTAL FREQUENCY IS 5.40 HZ

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8580	132.7(FWD)	0.0(MID)	3040	11.0	324.0	110.0	LEVEL	CLEAN



FLT 4
TRK 5
VCD 70
HRS 12
MIN 38
SEC 18
GRP 0

FIGURE 104

VIBRATION CHARACTERISTICS

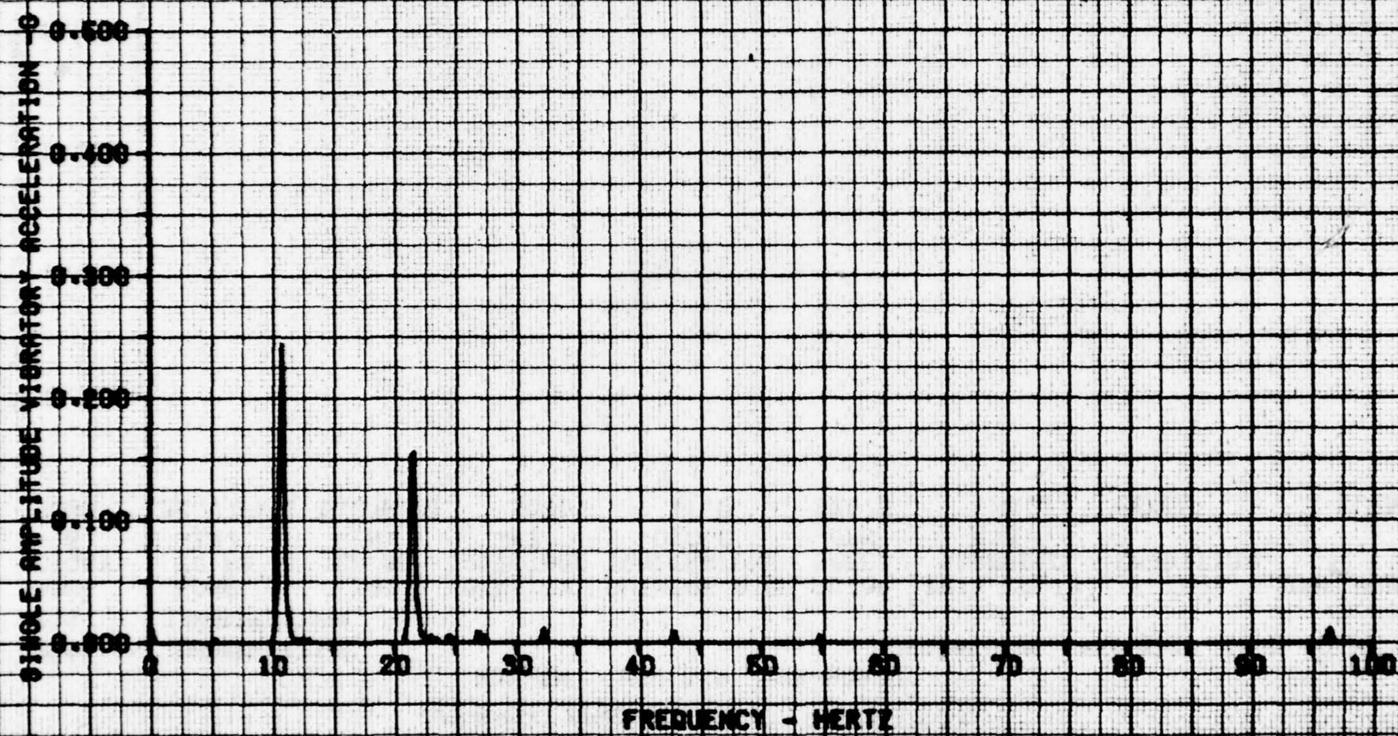
NUH-1H USA S/N 66-60869

LOCATION TRANSMITTION

FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS LATERAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8580	132.7(FWD)	0.0(MID)	3040	11.0	324.0	110.0	LEVEL	CLEAN



FLT 4
TRK 5
VCD 08
HRS 12
MIN 30
SEC 11
GRP 0

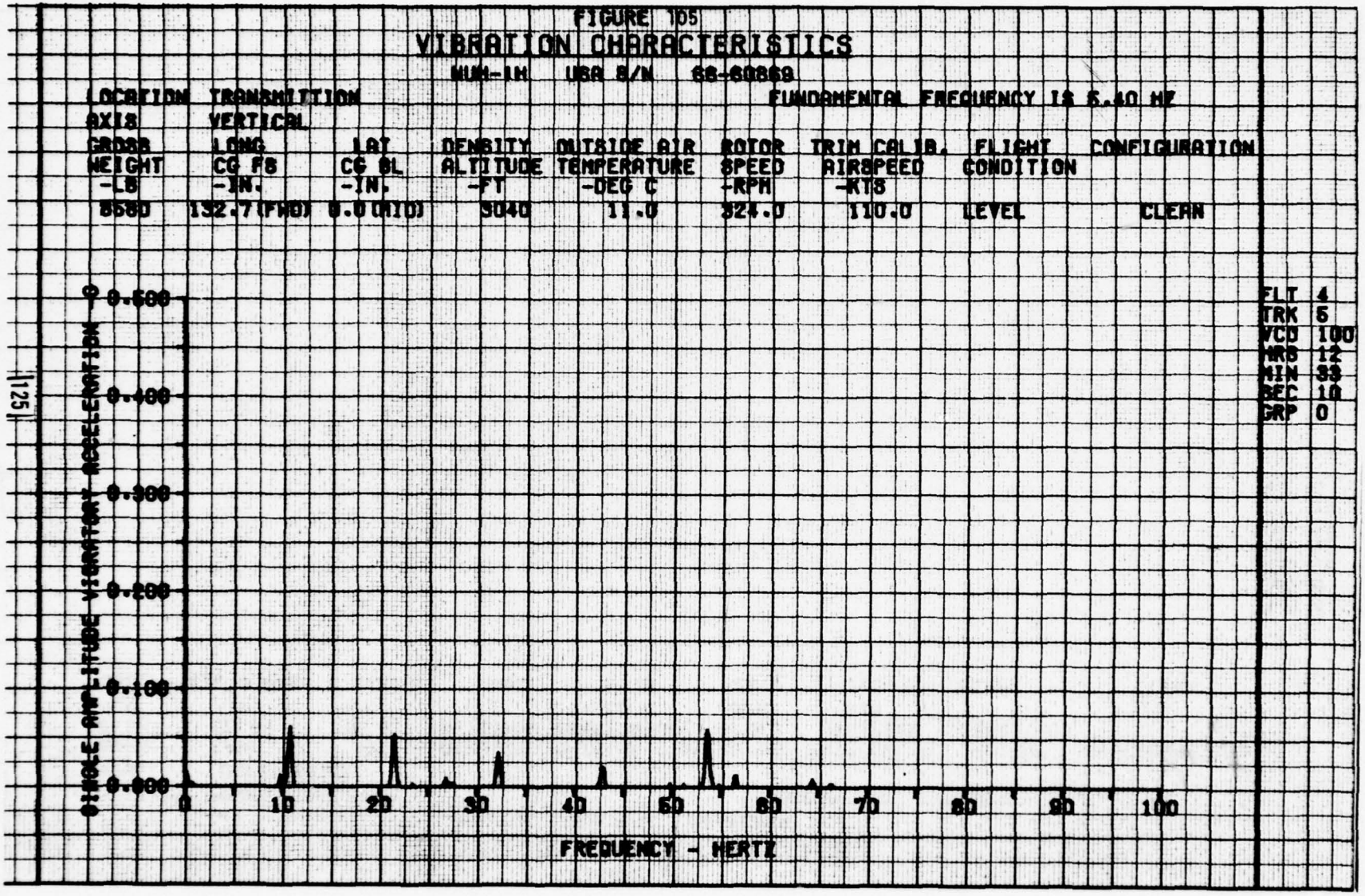
FIGURE 105

VIBRATION CHARACTERISTICS

MUH-1H USA S/N 68-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	TRANSMITTION							
AXIS	VERTICAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8580	132.7 (FWD)	0.0 (MID)	3040	11.0	324.0	110.0	LEVEL	CLEAN



FLT	4
TRK	5
VCD	100
HRS	12
MIN	33
SEC	10
GRP	0

FIGURE 106

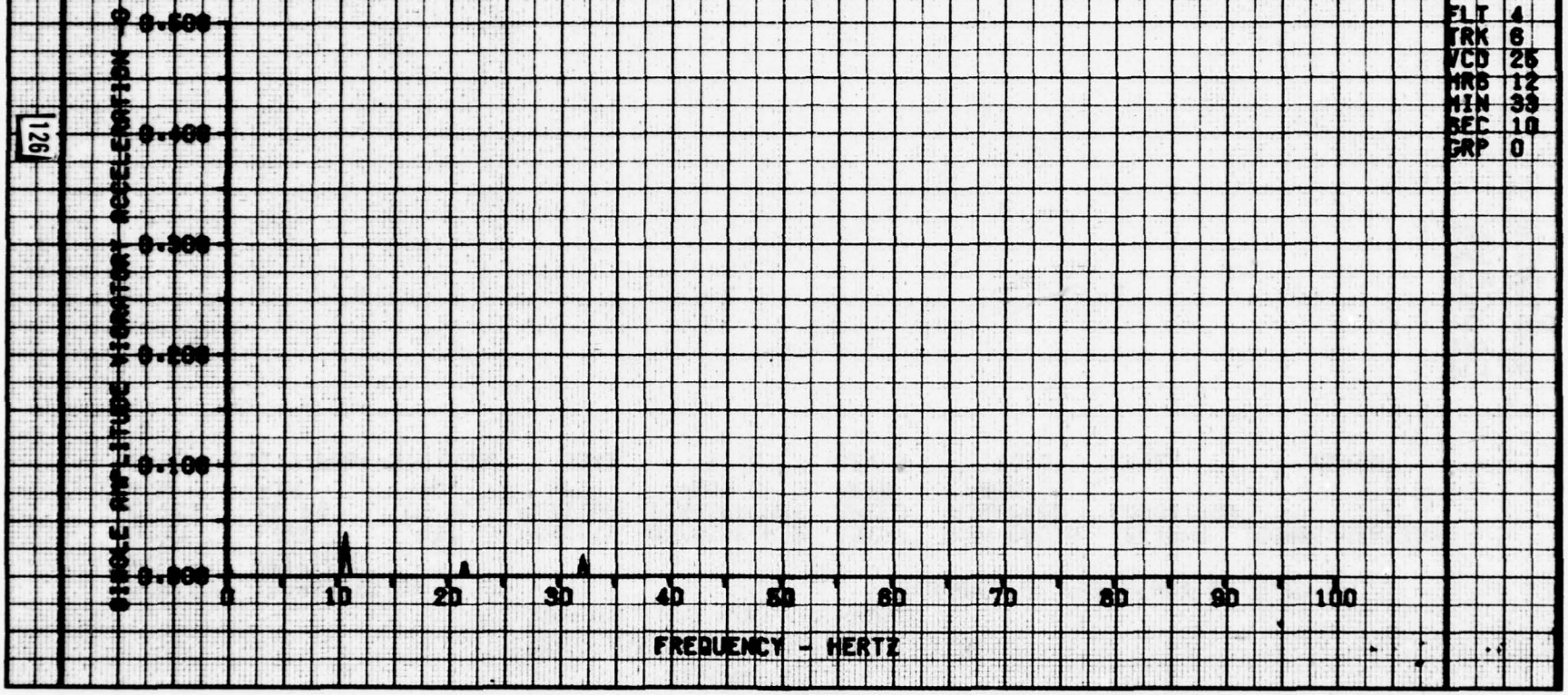
VIBRATION CHARACTERISTICS

NUH-1H UBA S/N 66-60869

LOCATION POWER CONVERTER — FUNDAMENTAL FREQUENCY IS 6.40 HZ

AXIS LONGITUDINAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8580	192.7(FWD)	0.0(MID)	9040	11.0	324.0	110.0	LEVEL	CLEAN



FLT	4
TRK	6
VCD	25
HRS	12
MIN	33
SEC	10
GRP	0

FIGURE 107

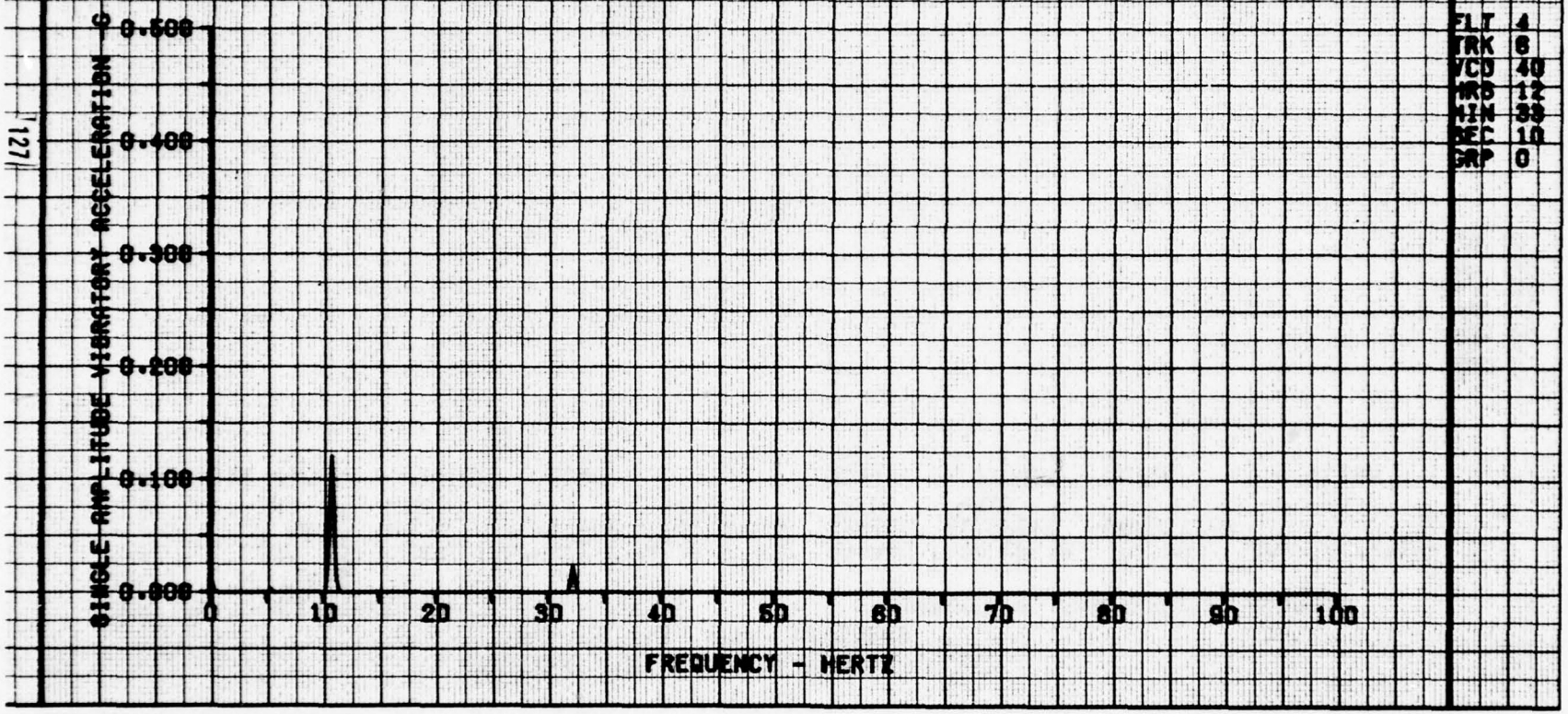
VIBRATION CHARACTERISTICS

NUM-1M UBA S/N 66-80869

LOCATION POWER CONVERTER FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS LATERAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8580	132.7(FWD)	0.0(MID)	3040	11.0	324.0	110.0	LEVEL	CLEAN



FLT	4
TRK	6
VCD	40
MRB	12
MIN	33
REC	10
GRP	0

FIGURE 108

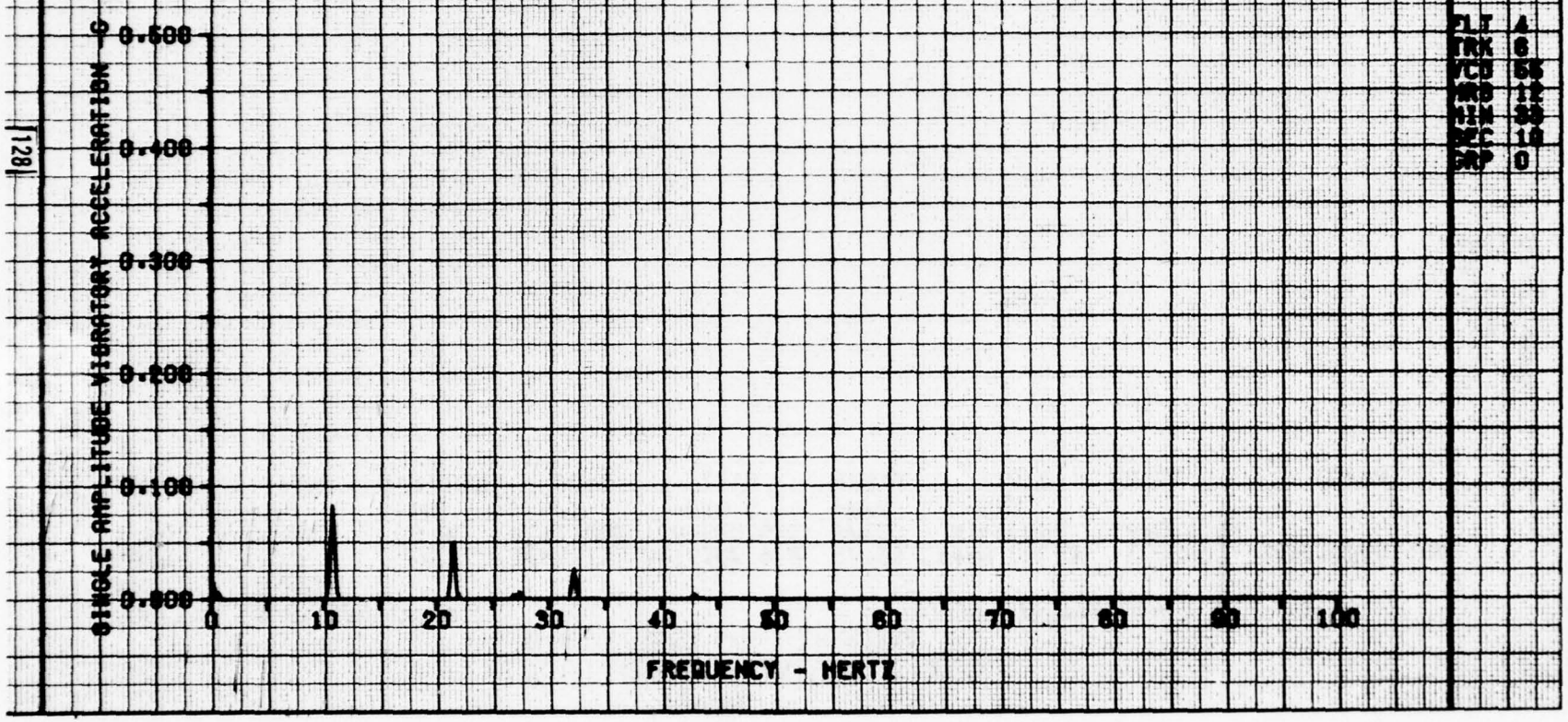
VIBRATION CHARACTERISTICS

MUH-1H USA S/N 66-60869

LOCATION POWER CONVERTER — FUNDAMENTAL FREQUENCY IS 6.40 HZ

AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8580	132.7(FWD)	0.0(MID)	3040	11.0	324.0	110.0	LEVEL	CLEAN



FLT	4
TRK	6
VCD	55
MRD	11
MIN	30
SEC	10
SRP	0

FIGURE 109

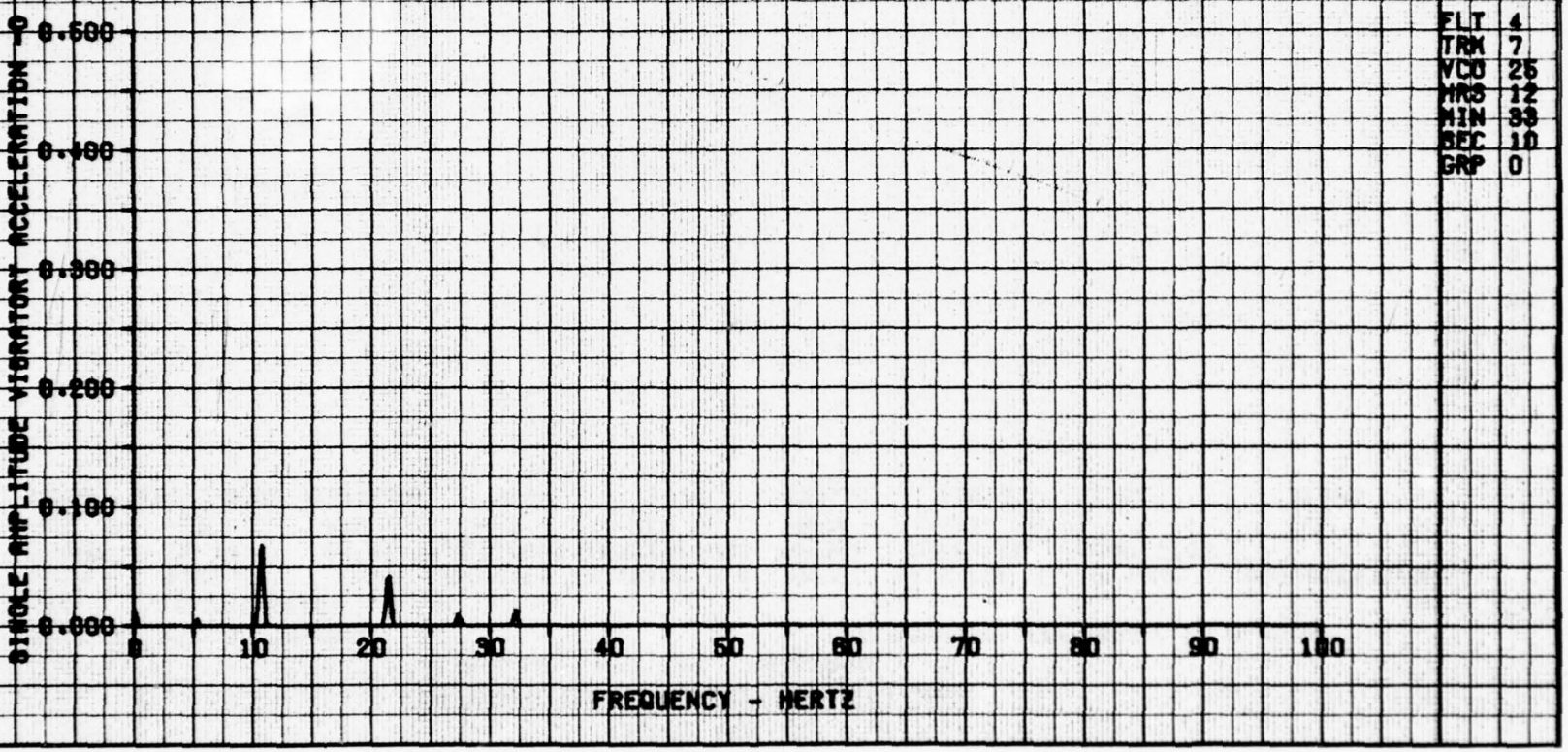
VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

LOCATION COLLECTIVE CONTROL — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8680	132.7 (FWD)	0.0 (MID)	3040	11.0	324.0	110.0	LEVEL	CLEAN



FLT	4
TRK	7
YOO	25
HRS	12
MIN	33
SEC	10
GRP	0

FIGURE 110

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

LOCATION CYCLIC CONTROL — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS LONGITUDINAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8680	132.7(FWD)	0.0(MID)	3040	11.0	324.0	110.0	LEVEL	CLEAN

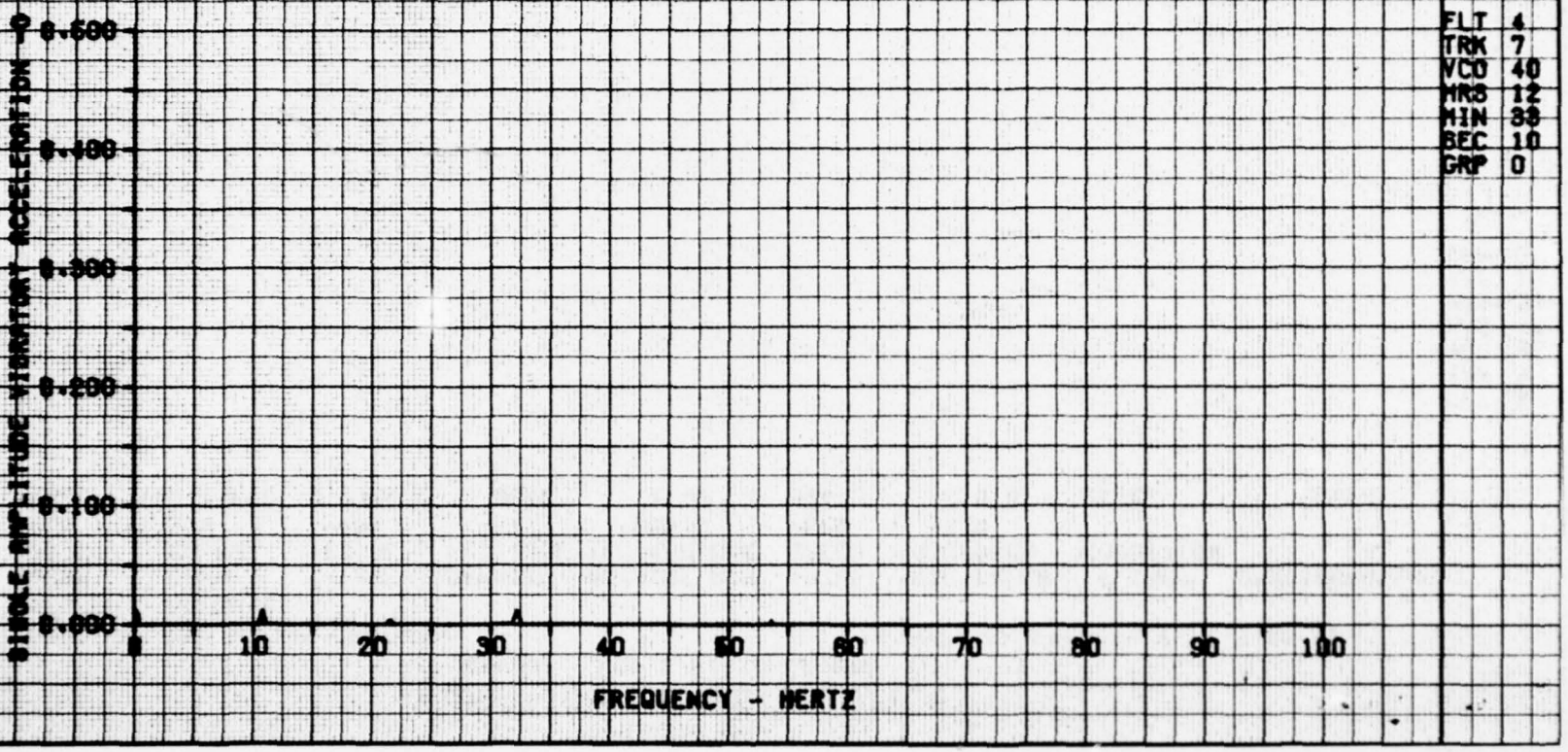


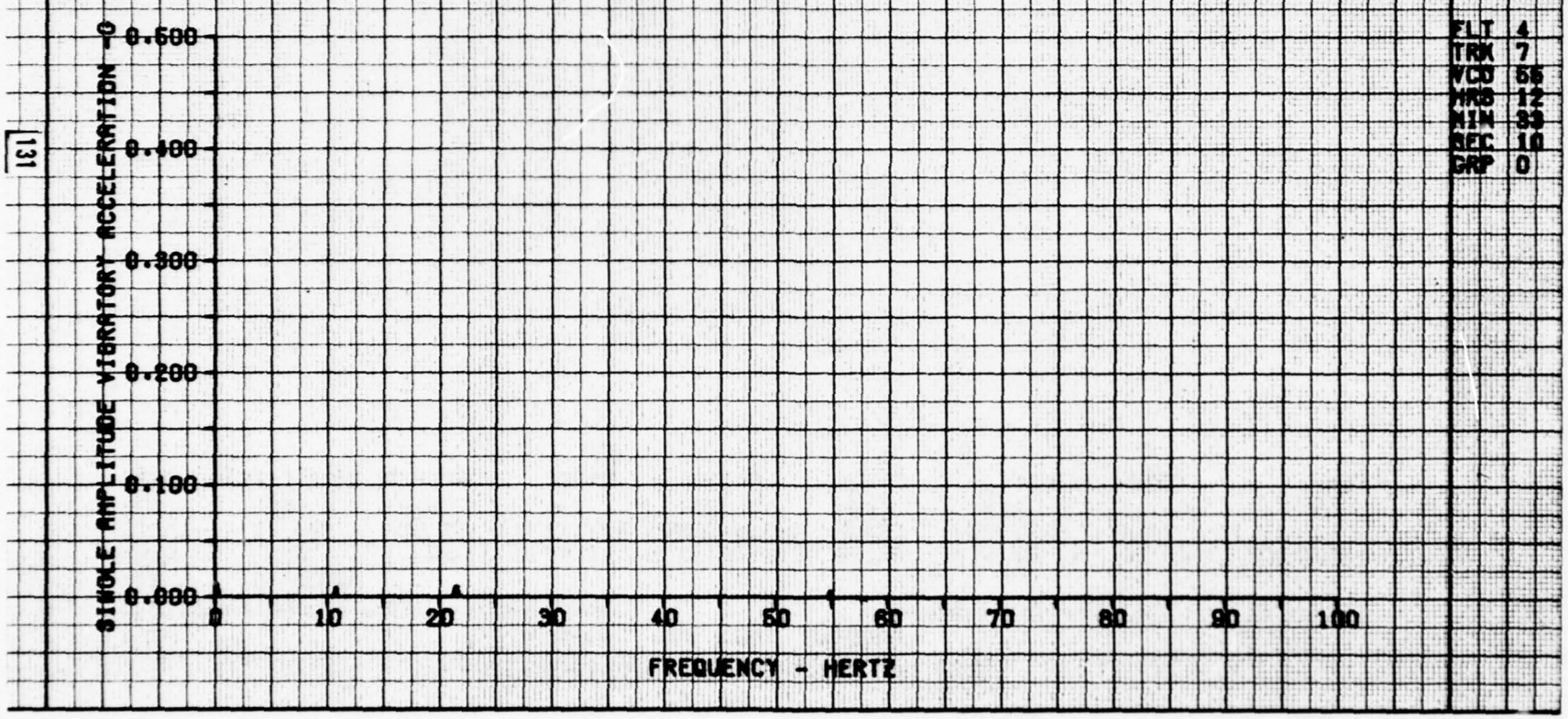
FIGURE 111

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	CYCLIC CONTROL								
AXIS	LATERAL								
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION	
8580	132.7 (FWD)	0.0 (MID)	3040	11.0	324.0	110.0	LEVEL	CLEAN	



FLT	4
TRK	7
YCD	56
MRB	12
MIN	33
SEC	10
GRP	0

FIGURE 112

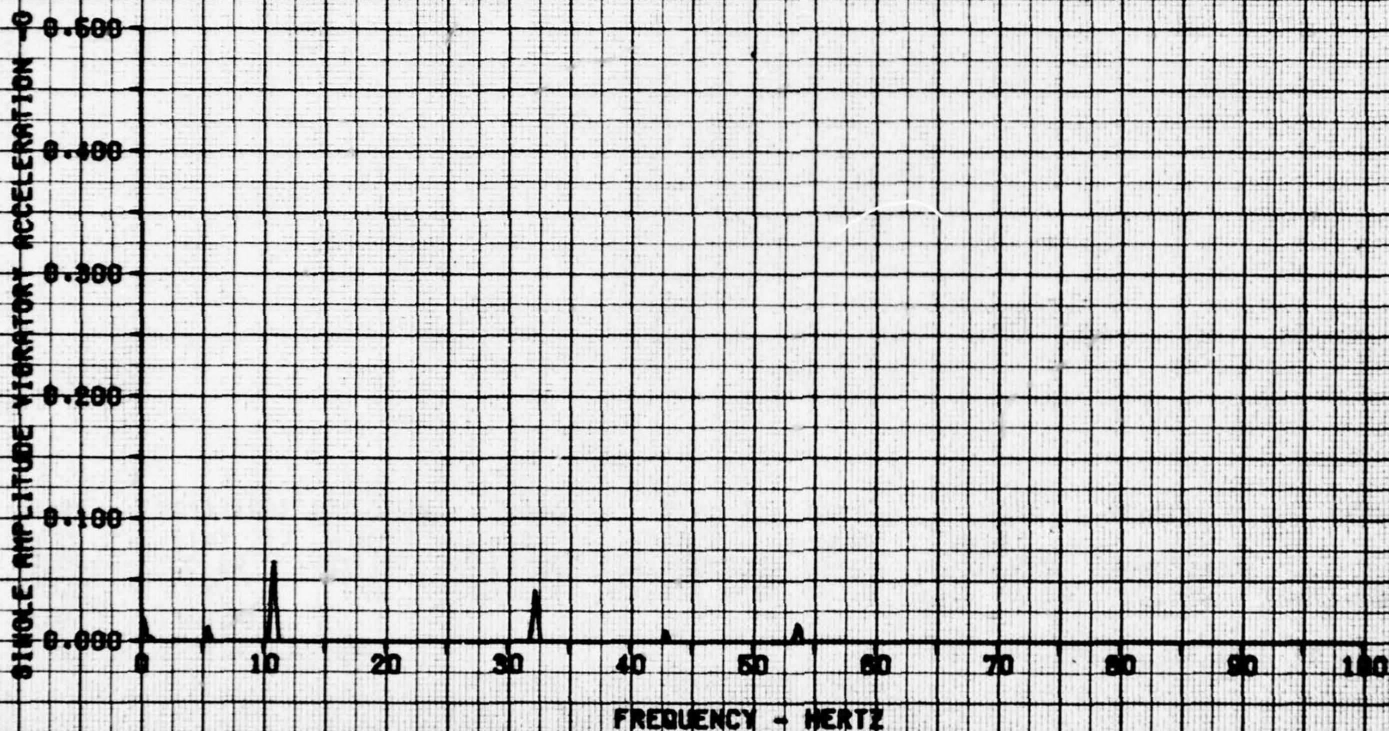
VIBRATION CHARACTERISTICS

NUH-1M USA S/N 66-60869

LOCATION FORWARD PALLET FLOOR MOUNT FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8580	132.7(FWD)	0.0(MID)	3040	11.0	324.0	110.0	LEVEL	CLEAN



FLT 4
TRK 7
VCD 78
HRS 12
MIN [illegible]
SEC 18
GRP 0

FIGURE 113

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	PALLET								
AXIS	LONGITUDINAL								
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8780	153.7 (FWD)	0.0 (MID)	4100	8.0	324.0	80.0	CLIMB	CLEAN

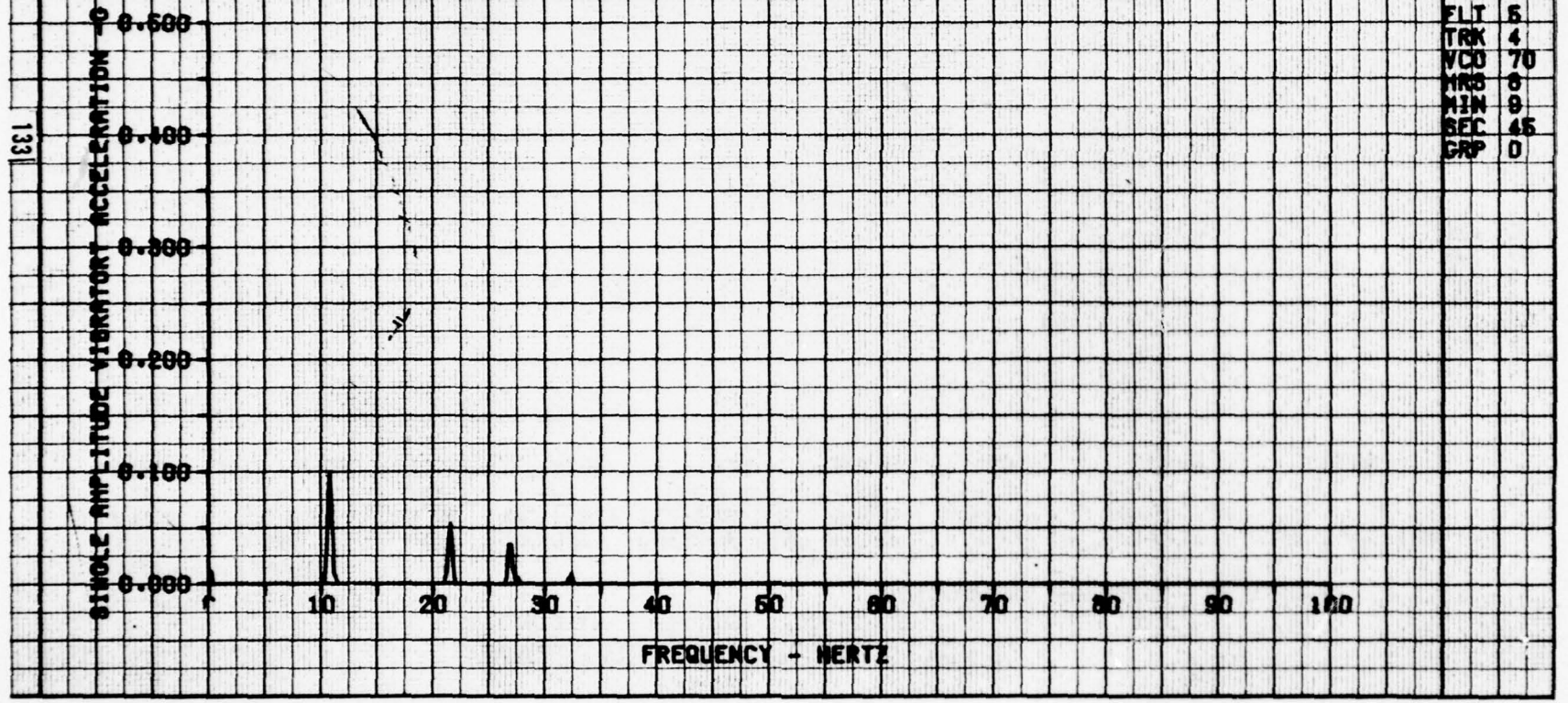


FIGURE 114

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	PALLET									
AXIS	LATERAL									
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION		
8780	193.7(FWD)	0.0(MID)	4100	6.0	324.0	80.0	CLIMB	CLEAN		

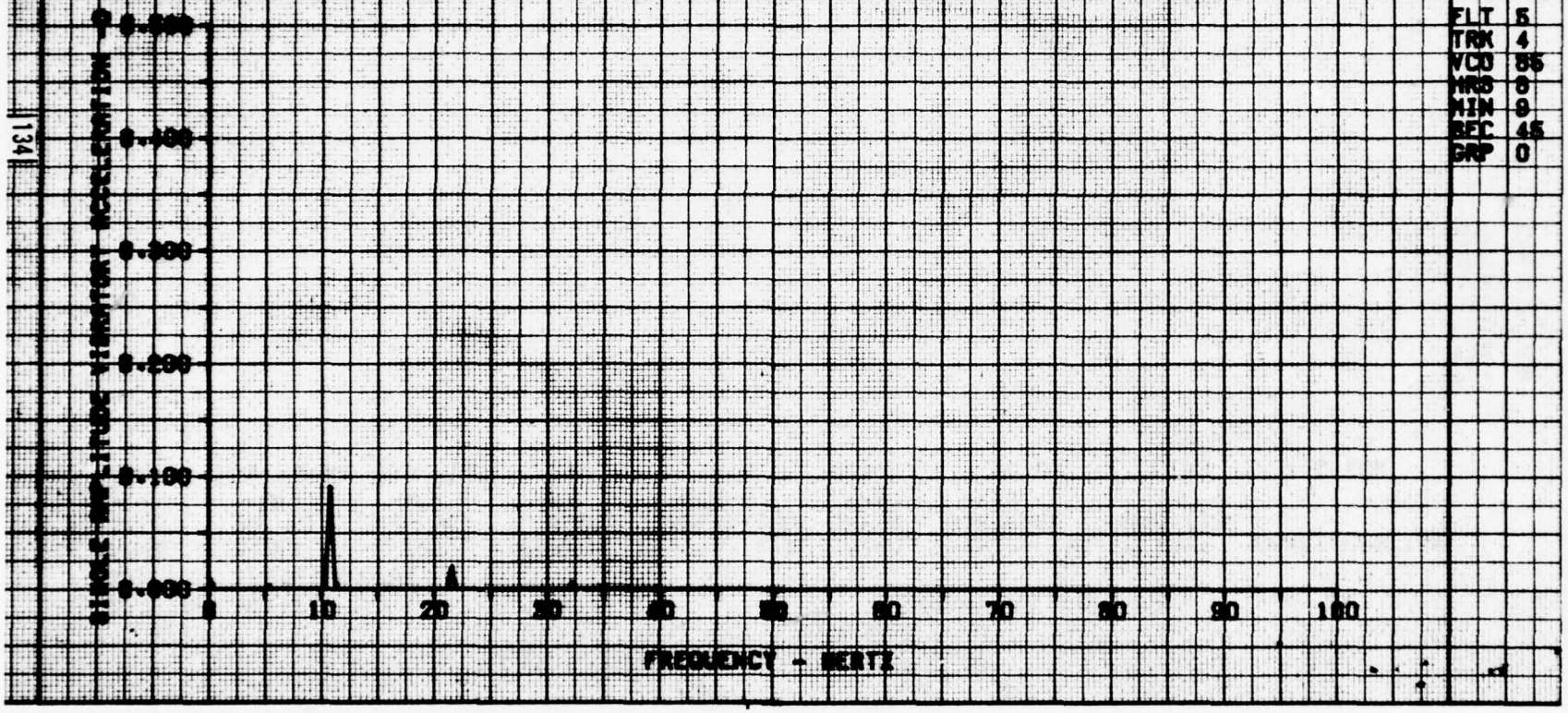


FIGURE 115

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-00869

LOCATION PILOT
AXIS VERTICAL
FUNDAMENTAL FREQUENCY IS 5.40 HZ

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8760	133.7 (FWD)	0.0 (MID)	4100	8.0	324.0	80.0	CLIMB	CLEAN

FLT	5
TRK	5
VCD	55
HRS	0
MIN	9
SEC	45
GRP	0

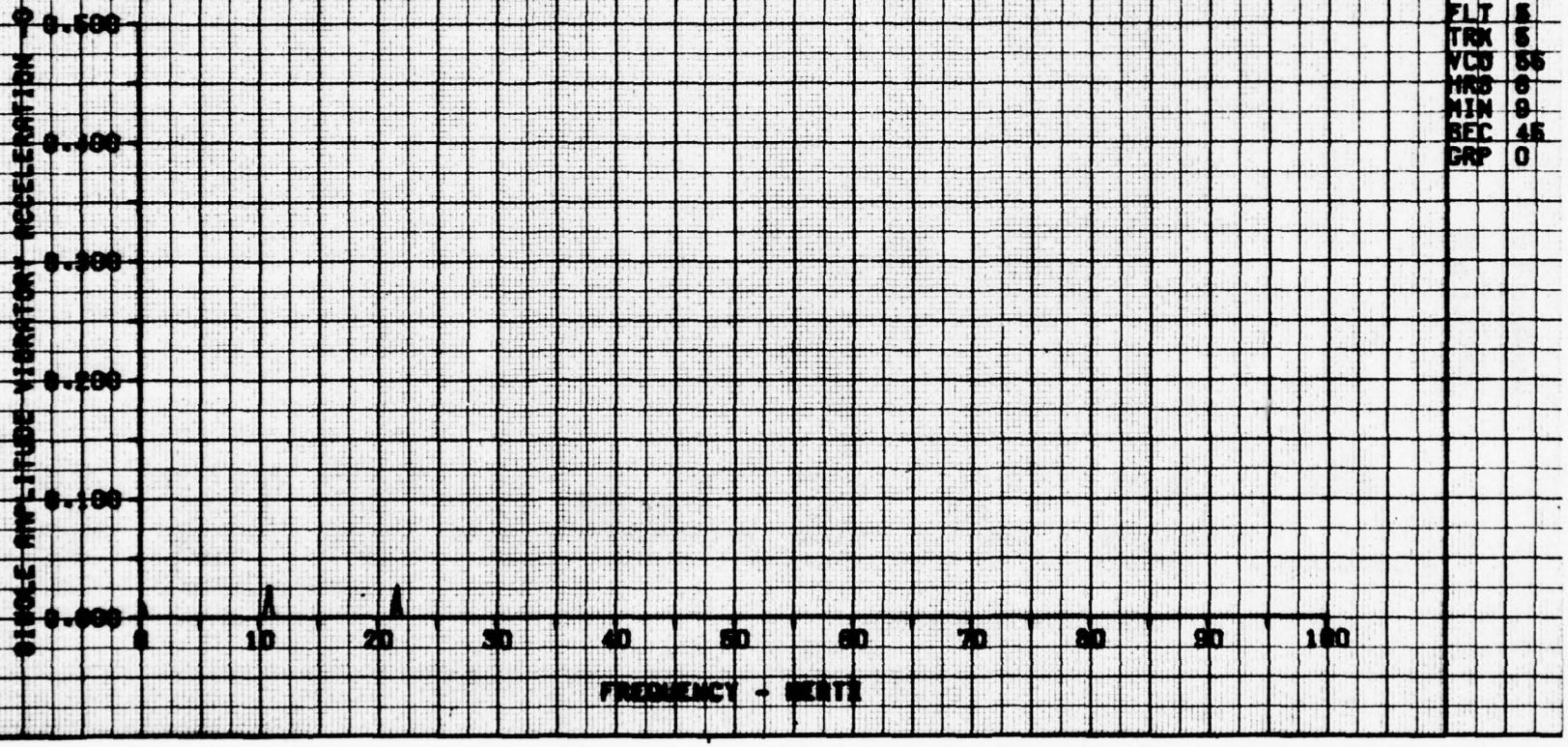


FIGURE 116

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

LOCATION PILOT SEAT — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS LONGITUDINAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8780	133.7(FWD)	0.0(MID)	4100	8.0	324.0	80.0	CLIMB	CLEAN

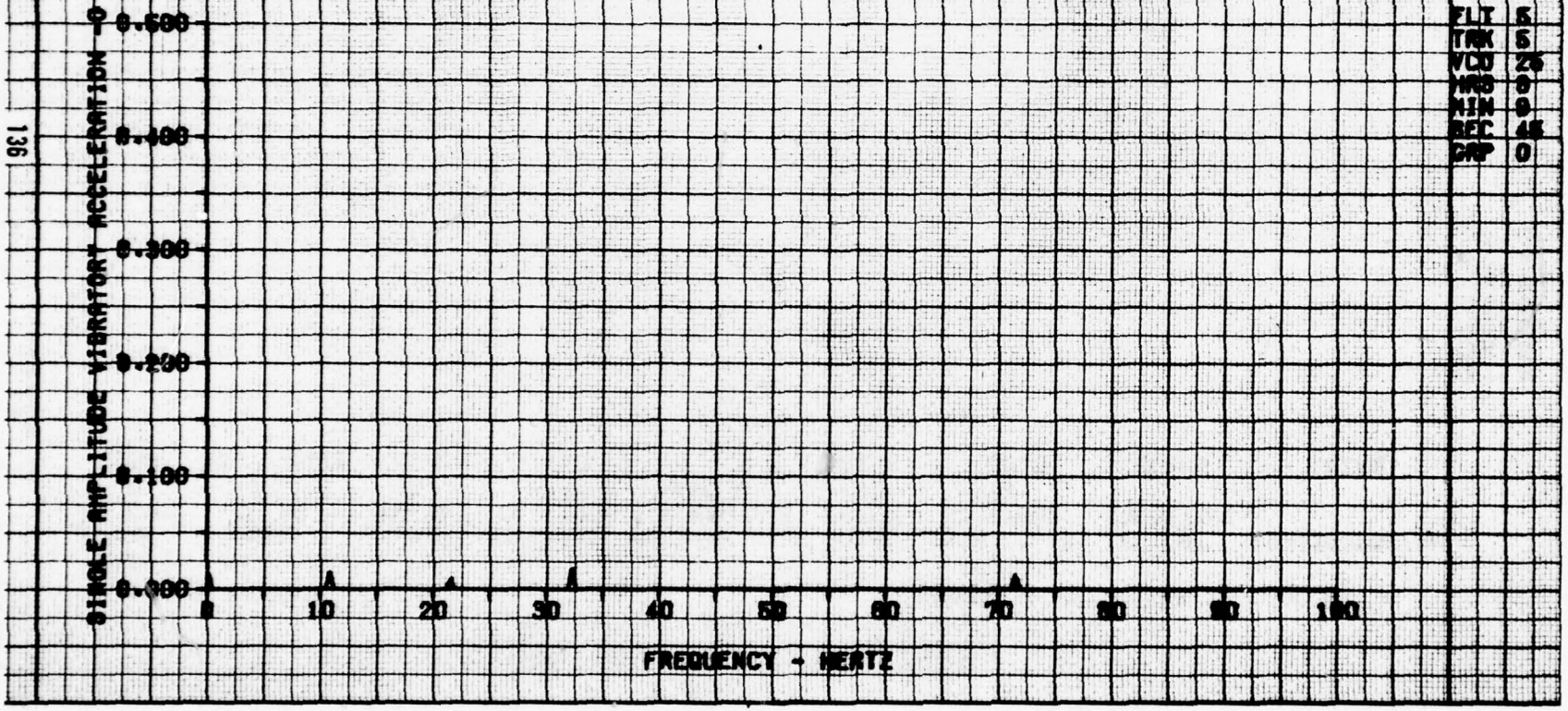


FIGURE 117

VIBRATION CHARACTERISTICS

MUH-1H USA S/N 66-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	PILOT SEAT								
AXIS	LATERAL								
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION	
8780	133.7 (FWD)	0.0 (MID)	4100	8.0	324.0	80.0	CLIMB	CLEAN	

FLT	6
TRK	6
VCD	40
HRS	8
MIN	9
SEC	45
GRP	0

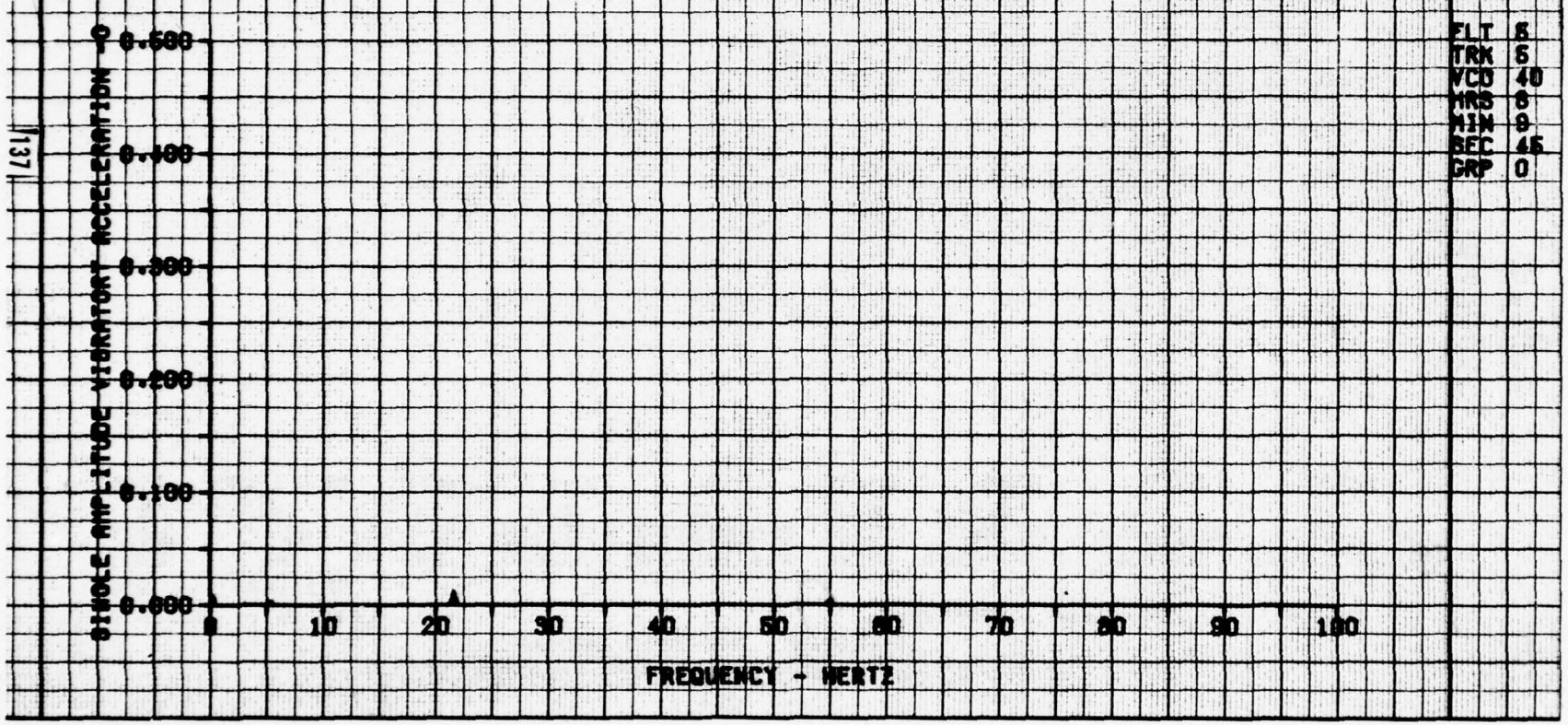


FIGURE 118

VIBRATION CHARACTERISTICS

NUM-1H USA S/N 86-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	AXIS	GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
PILOT SEAT	VERTICAL	8700	135.7 (FWD)	0.0 (MID)	4100	8.0	524.0	80.0	CLIMB	CLEAN

FLT 5
TRK 4
VCD 100
HRS 0
MIN 0
SEC 45
GRP 0

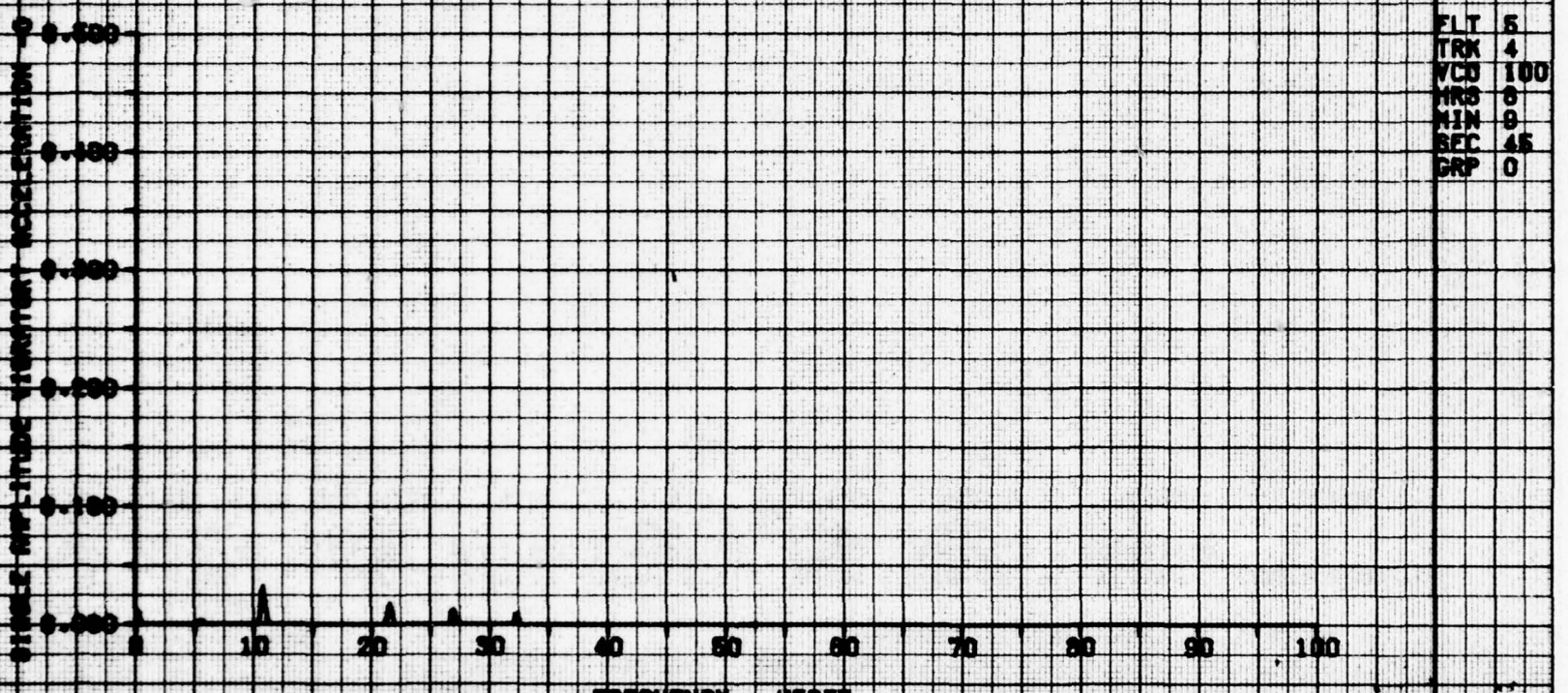


FIGURE 119

VIBRATION CHARACTERISTICS

NUM-1H USA S/N 88-00068

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	TRANSMITTION								
AXIS	LONGITUDINAL								
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION	
8700	133.7 (FWD)	0.0 (MID)	4100	8.0	324.0	80.0	CLIMB	CLEAN	

SINGLE AMPLITUDE VIBRATORY ACCELERATION - G

0.600
0.400
0.300
0.200
0.100
0.000

0 10 20 30 40 50 60 70 80 90 100

FREQUENCY - HERTZ

FLT	X
TRN	5
YCB	76
HRS	0
MIN	0
SEC	45
DRP	0

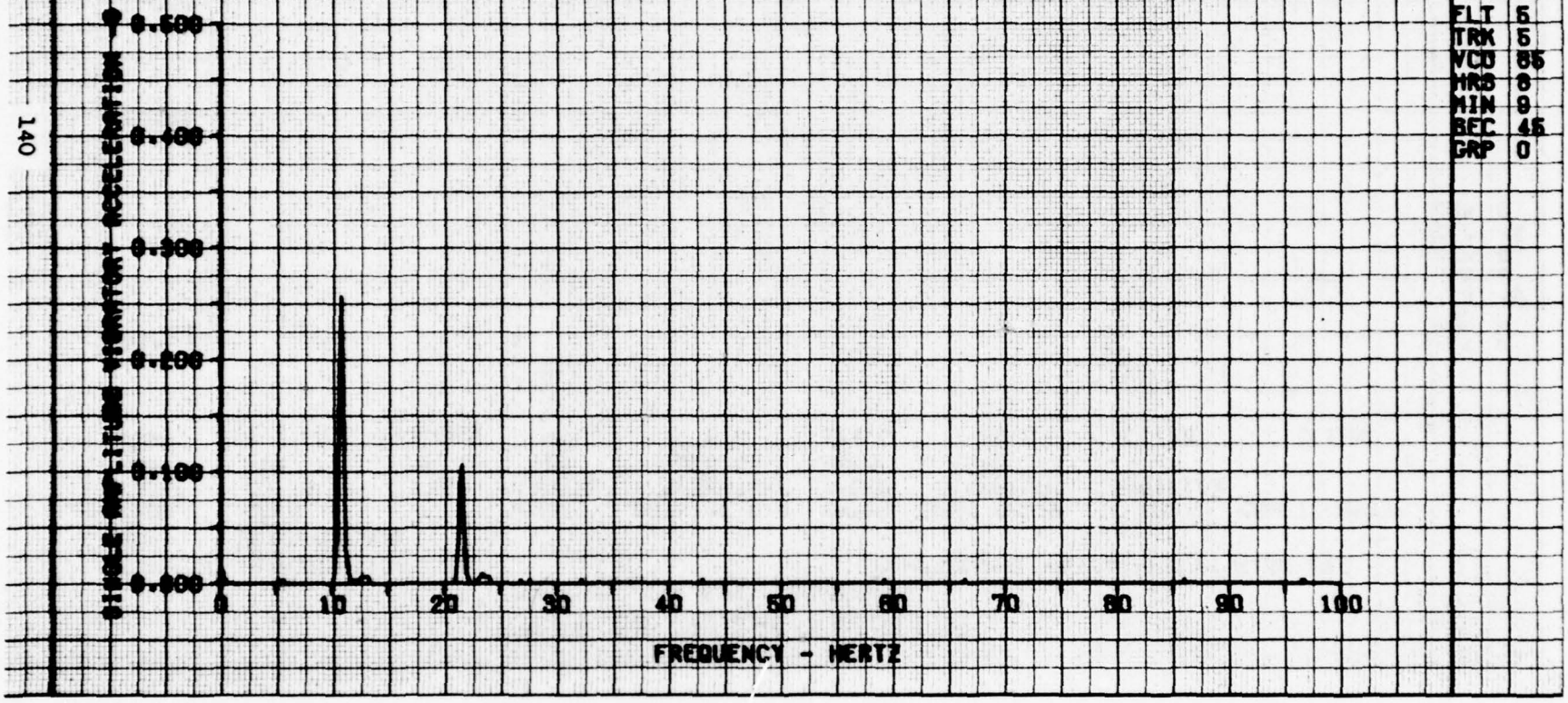
FIGURE 120

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-80869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	TRANSMITTION								
AXIS	LATERAL								
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION	
8780	193.7(FWD)	0.0(MID)	4100	8.0	324.0	80.0	CLIMB	CLEAN	



FLT	5
TRK	5
VCO	85
HRS	8
MIN	9
SEC	45
GRP	0

FIGURE 121

VIBRATION CHARACTERISTICS

NUM-1H USA S/N 66-60868

FUNDAMENTAL FREQUENCY IS 5.10 HZ

LOCATION	TRANSMITTION									
AXIS	VERTICAL									
GROSS WEIGHT -LB	LONG CG FS -IN.		LAT CG BL -IN.		DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8700	193.7	(FWD)	0.0	(MID)	4100	8.0	524.0	80.0	CLIMB	CLEAN

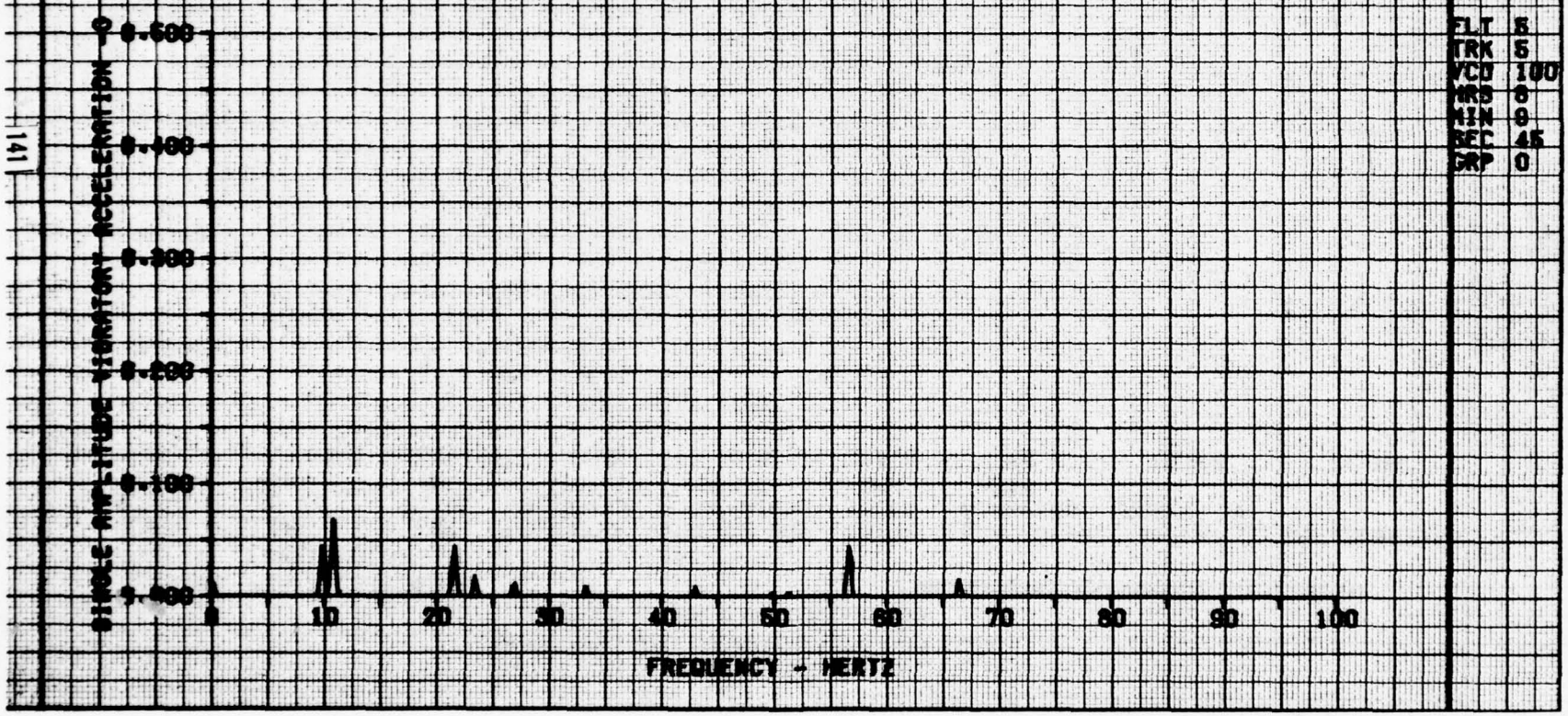


FIGURE 122

VIBRATION CHARACTERISTICS

HUM-1H USA S/N 68-68068

LOCATION POWER CONVERTER — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS LONGITUDINAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8780	133.7(FWD)	0.0(MID)	4100	8.0	324.0	80.0	CLIMB	CLEAN

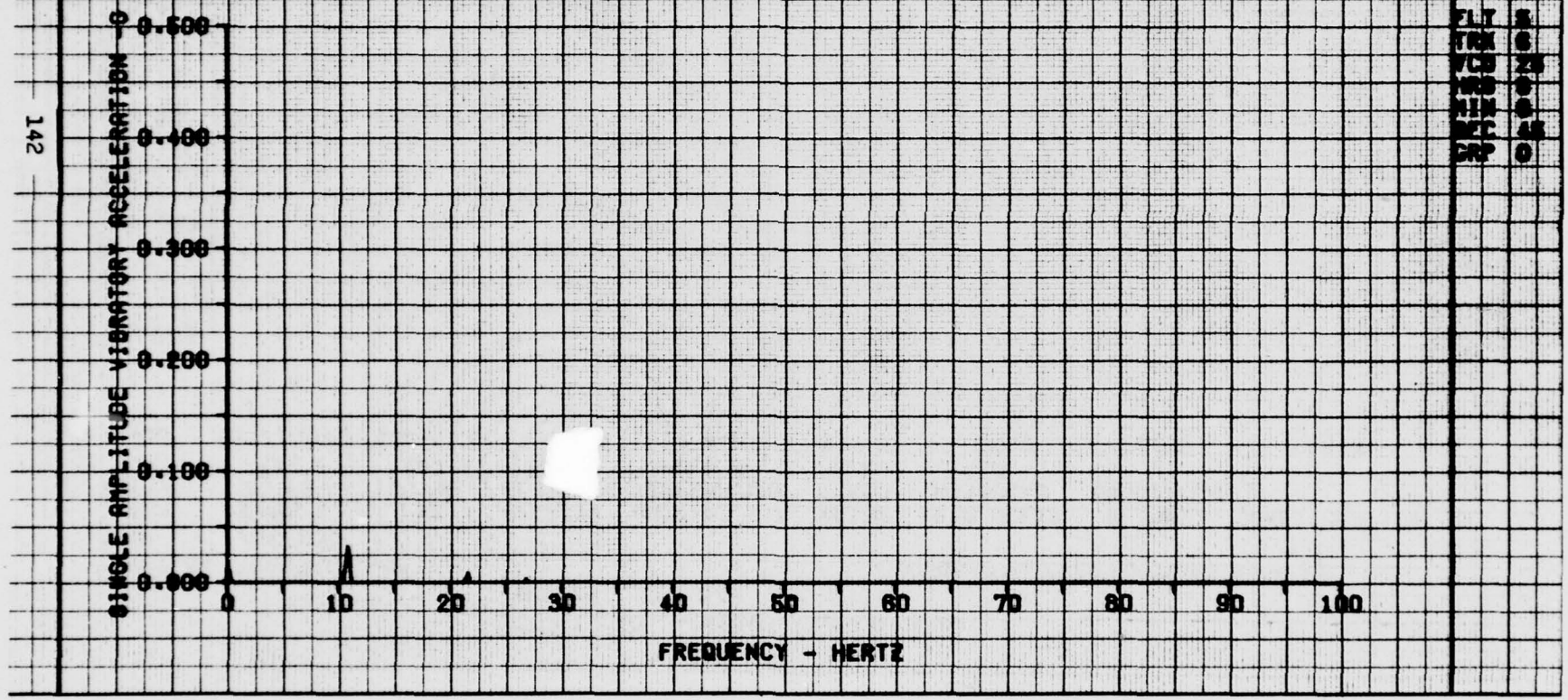


FIGURE 123

VIBRATION CHARACTERISTICS

NUM-1H USA S/N 66-00000

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	POWER CONVERTER
AXIS	LATERAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8760	133.7(FWD)	0.0(MID)	4100	8.0	324.0	60.0	CLIMB	CLEAN

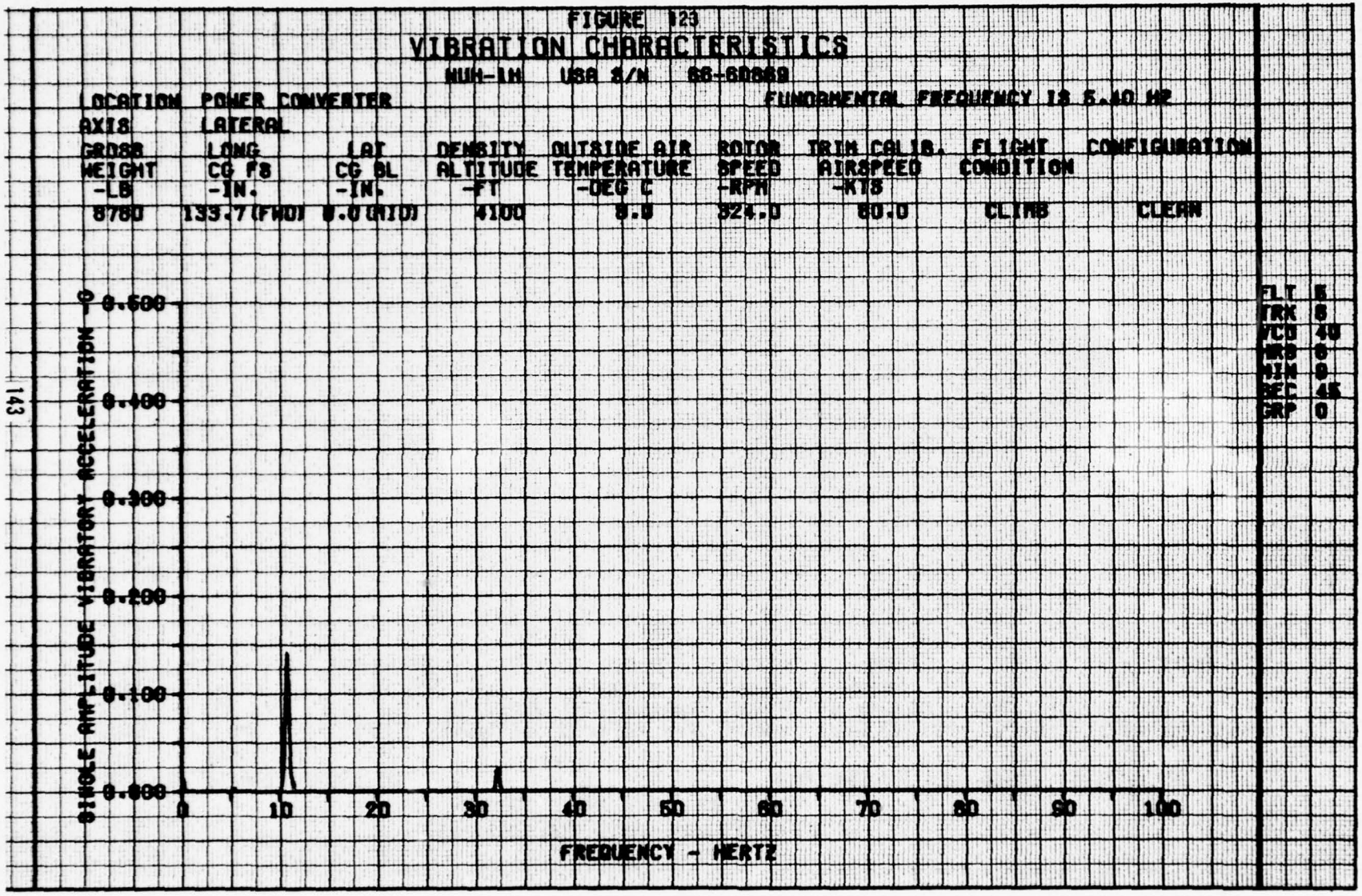


FIGURE 124

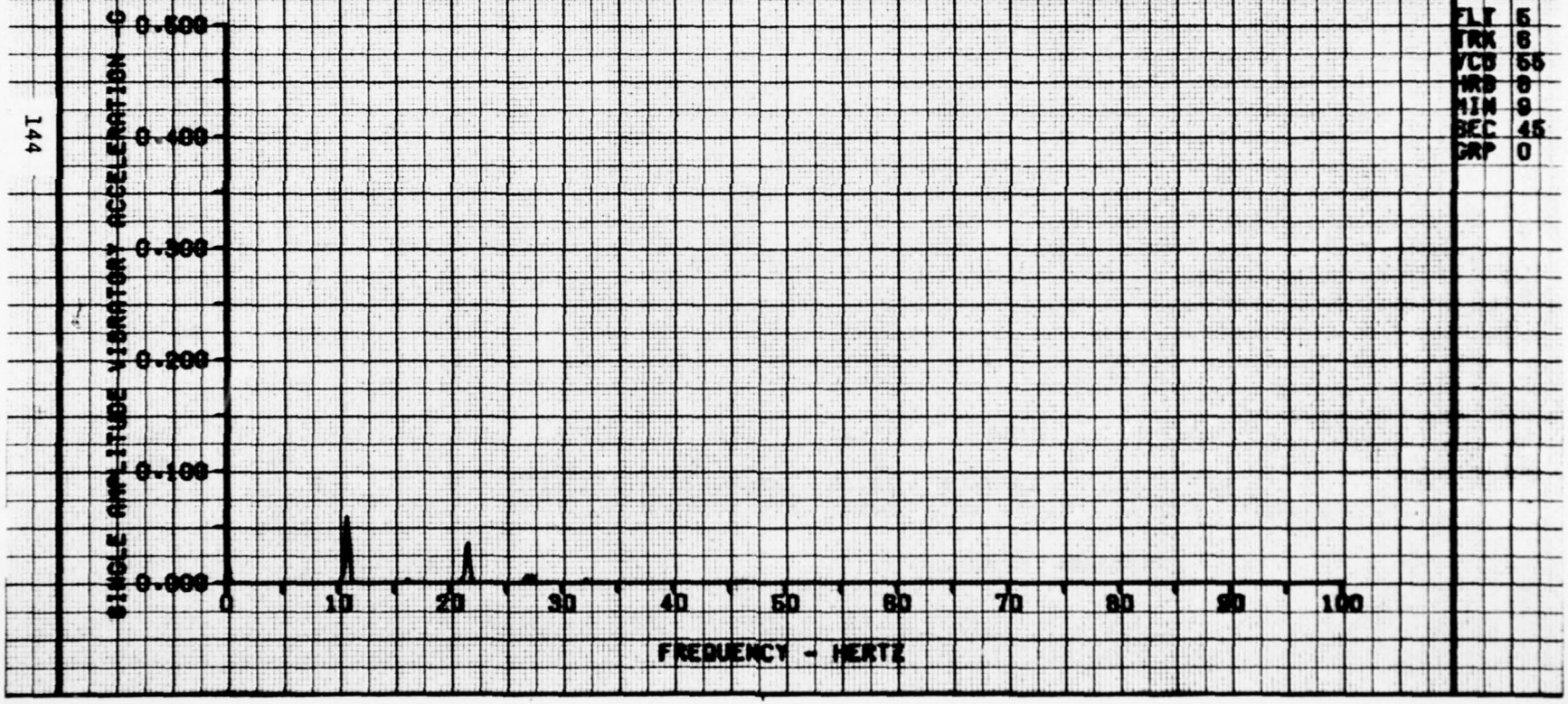
VIBRATION CHARACTERISTICS

MUH-1N UBA S/N 66-60869

LOCATION POWER CONVERTER — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8760	133.7(FWD)	0.0(MID)	4100	8.0	324.0	80.0	CLIMB	CLEAN



FLT	5
TRK	6
YCD	55
HRD	8
MIN	9
SEC	45
GRP	0

FIGURE 125

VIBRATION CHARACTERISTICS

UH-1H UBA S/N 68-16869

LOCATION COLLECTIVE CONTROL — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8780	133.7(FWD)	0.0(MID)	4100	8.0	324.0	80.0	CLIMB	CLEAN

FLT	5
TRK	7
VCD	25
HRS	8
MIN	9
SEC	45
GRP	0

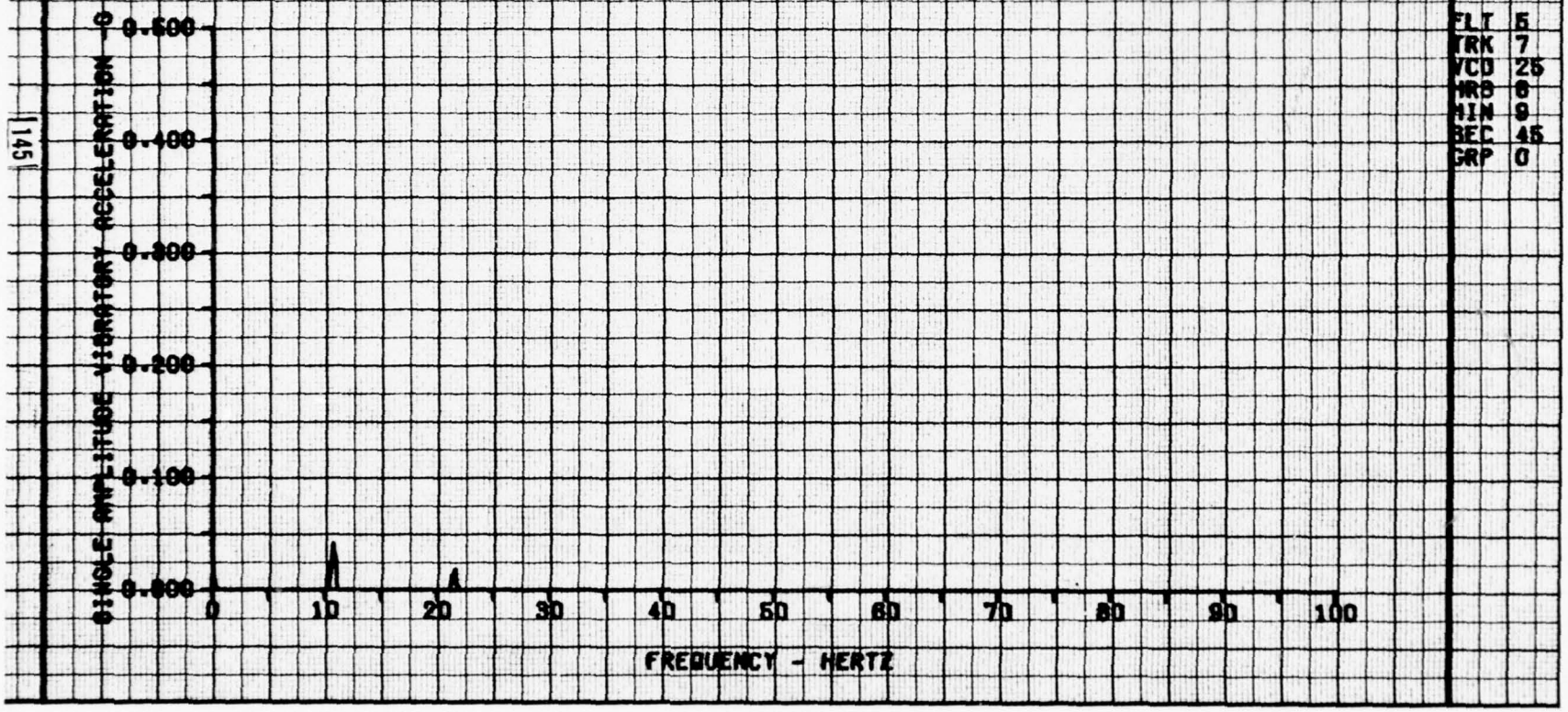


FIGURE 126

VIBRATION CHARACTERISTICS

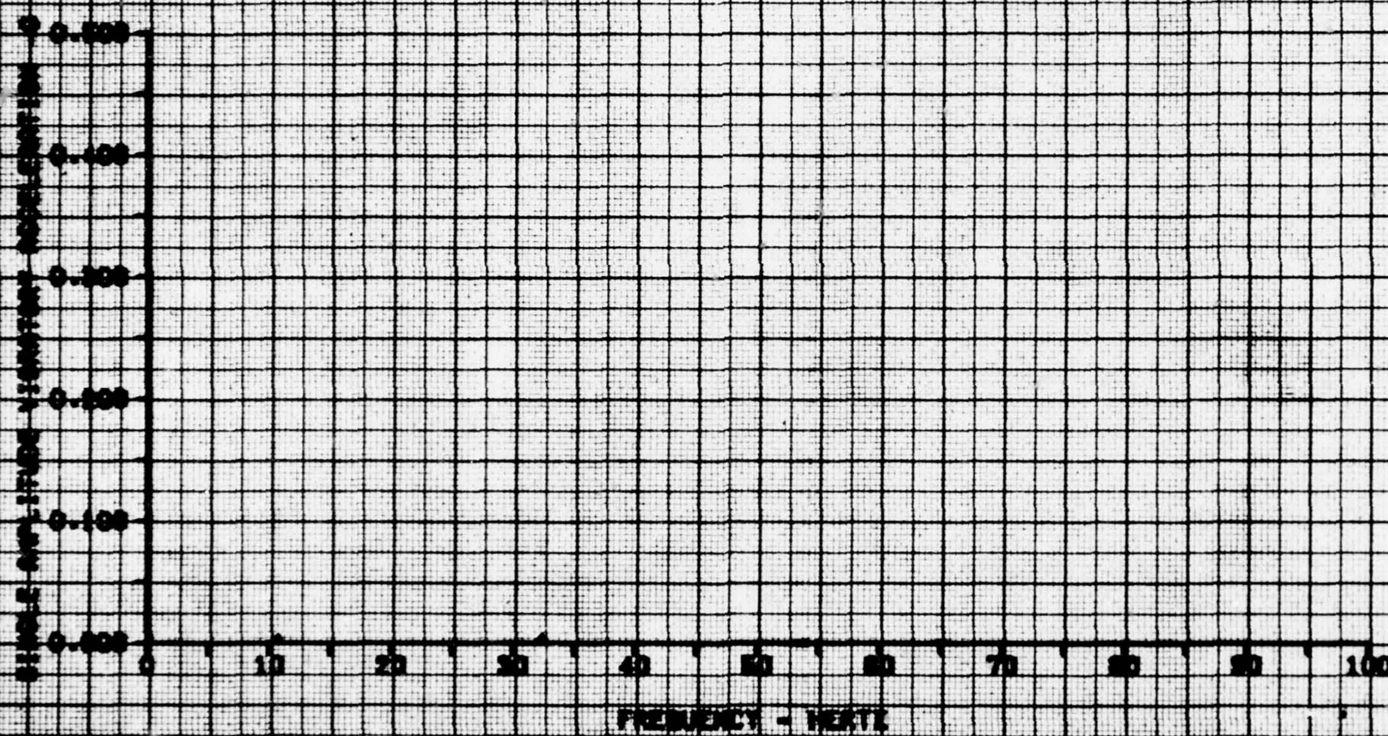
RUN-IN UBA S/N 68-60089

LOCATION CYCLIC CONTROL

AXIS LONGITUDINAL

FUNDAMENTAL FREQUENCY IS 5.40 HZ

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8700	135.7(FWD)	0.0(MID)	5100	5.0	324.0	80.0	CLIMB	CLEAN



FLT 5
TRK 7
VCD 40
HRS 6
MIN 9
SEC 45
DRP 0

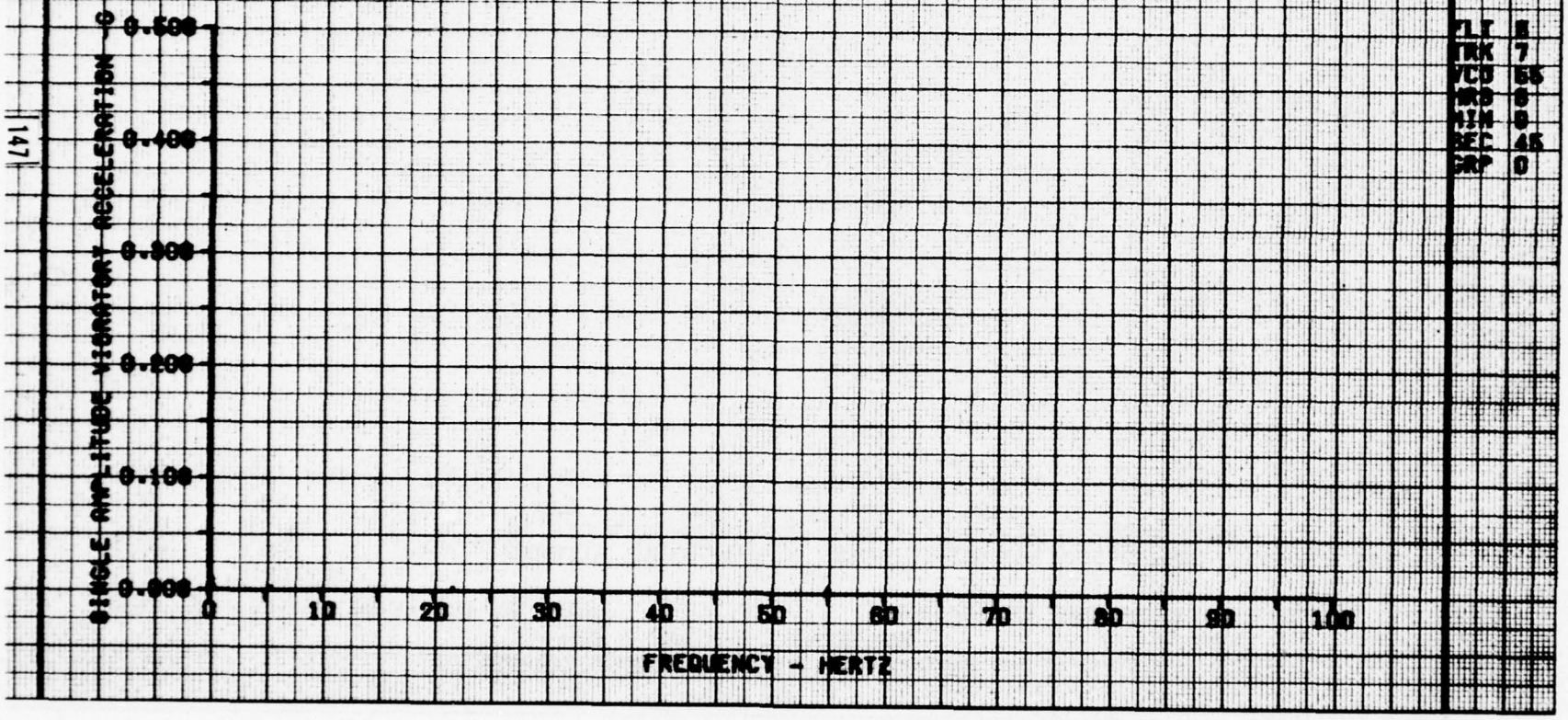
FIGURE 127

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60889

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	CYCLIC CONTROL								
AXIS	LATERAL								
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8780	133.7 (FWD)	0.0 (MID)	4100	8.0	324.0	80.0	CLIMB	CLEAN



FLT	8
TRK	7
VCO	55
MRO	0
TIM	0
REC	45
GRP	0

FIGURE 128

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-00089

LOCATION FORWARD PALLET FLOOR MOUNT — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8780	133.7(FWD)	0.0(MID)	4100	8.0	324.0	80.0	CLIMB	CLEAN

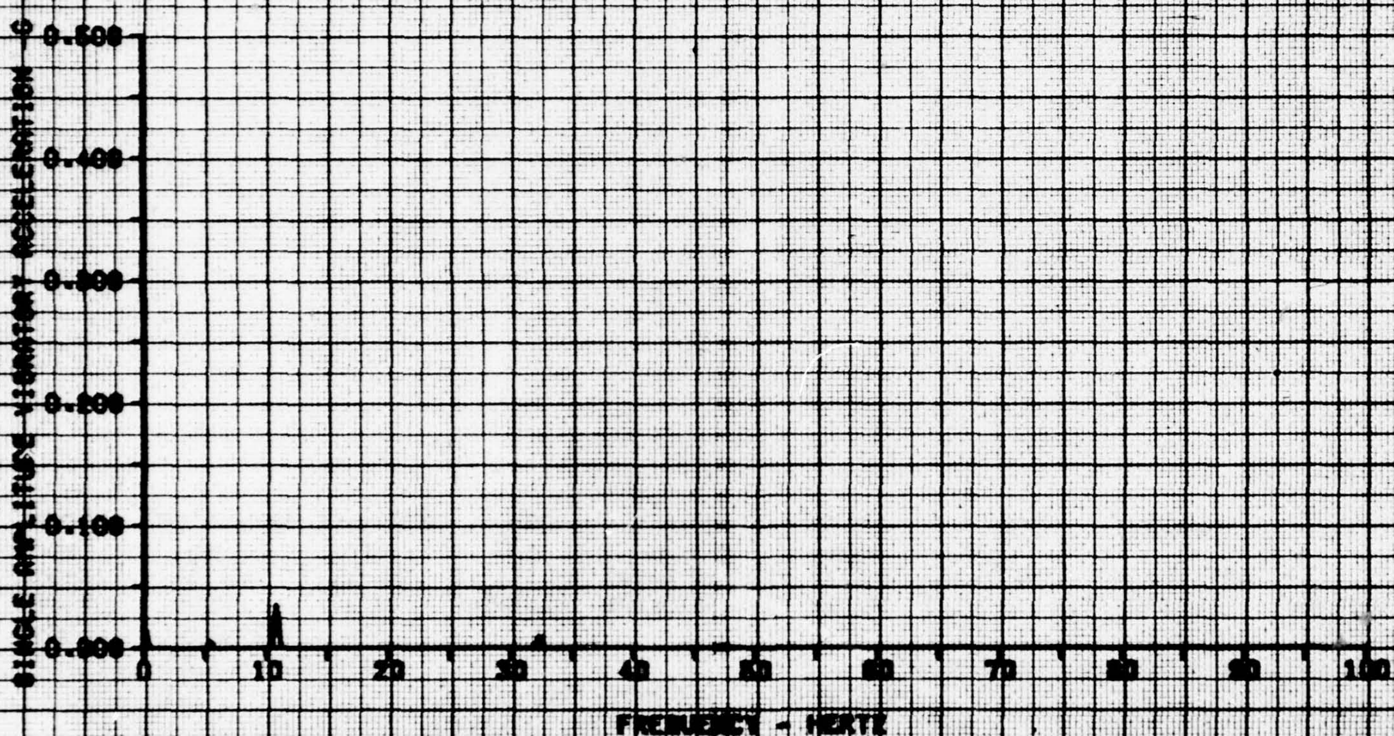


FIGURE 29

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

LOCATION PALLET

FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS LONGITUDINAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONFIGURATION CONDITION	
8540	139.1 (FWD)	0.0 (MID)	4120	8.0	324.0	80.0	RIGHT TURN	CLEAN

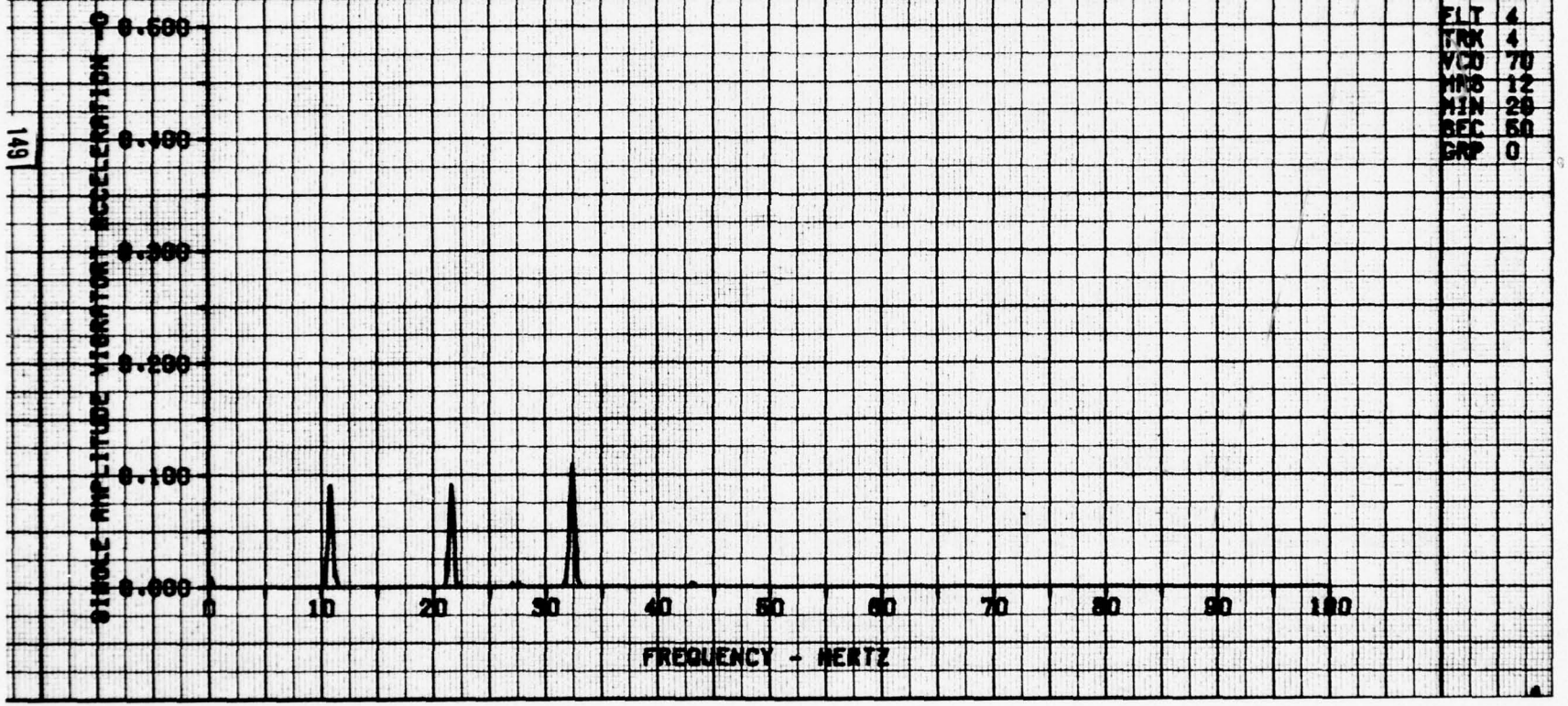


FIGURE 150

VIBRATION CHARACTERISTICS

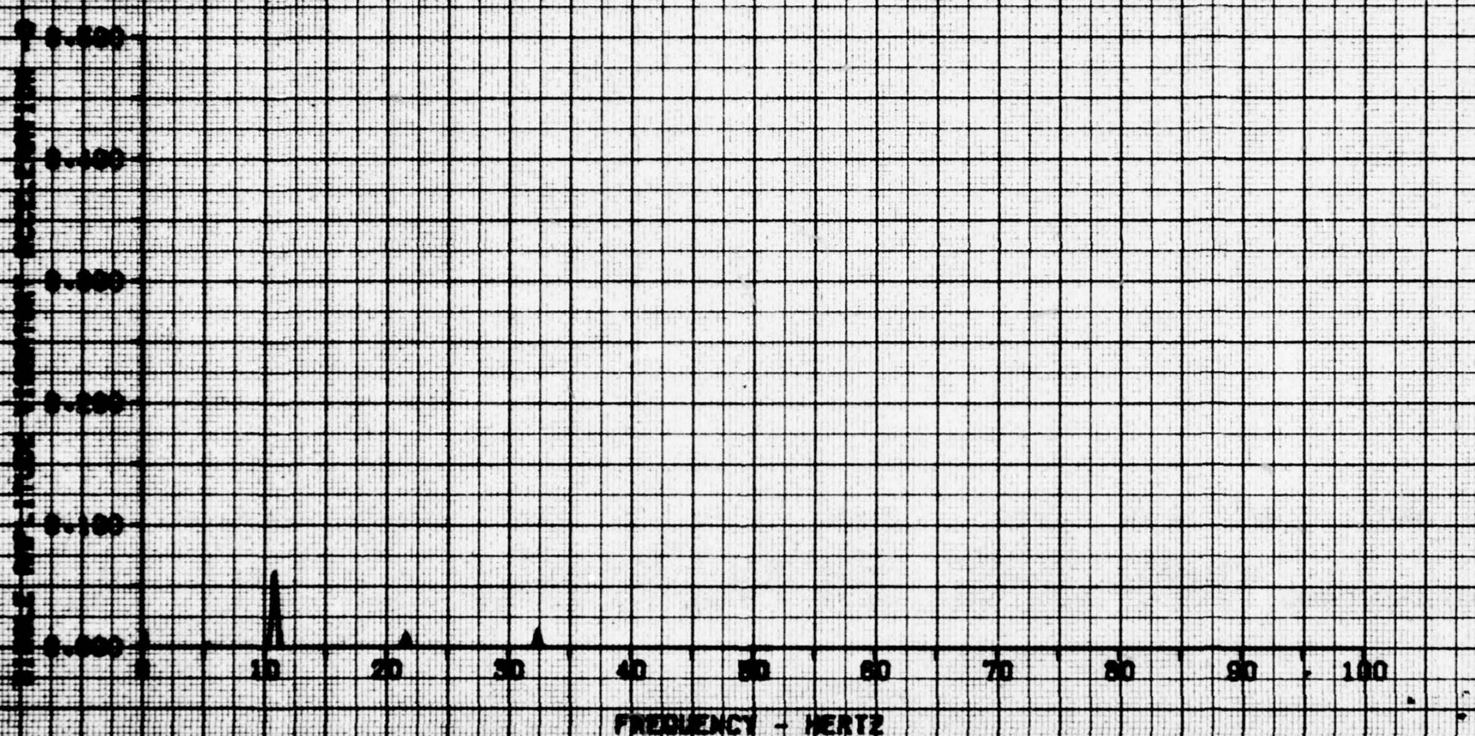
NUH-1H USA S/N 66-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION PALLET

AXIS LATERAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
[illegible]	[illegible].1(FWD)	0.0(MID)	4120	[illegible].0	324.0	80.0	RIGHT TURN	CLEAN



FLT 4
TRK 4
VCD 85
HRS 12
MIN 20
SEC 50
GRP 0

FIGURE 131

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	PALLET							
AXIS	VERTICAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8840	193.1 (FWD)	0.0 (RID)	4120	8.0	324.0	60.0	RIGHT TURN	CLEAN

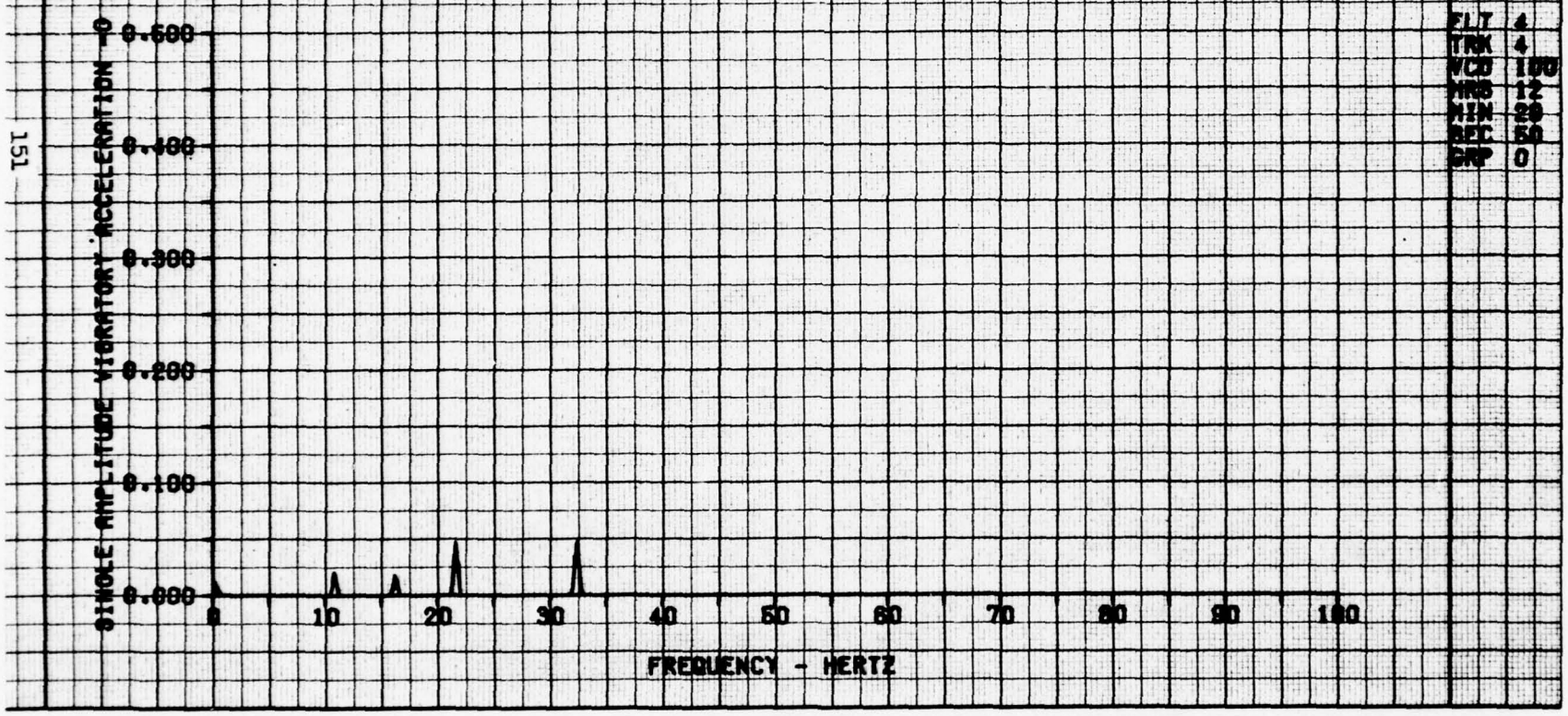


FIGURE 132

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60868

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	PILOT SEAT							
AXIS	LONGITUDINAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8640	133.1 (FWD)	0.0 (RTO)	4120	8.0	324.0	80.0	RIGHT TURN	CLEAN

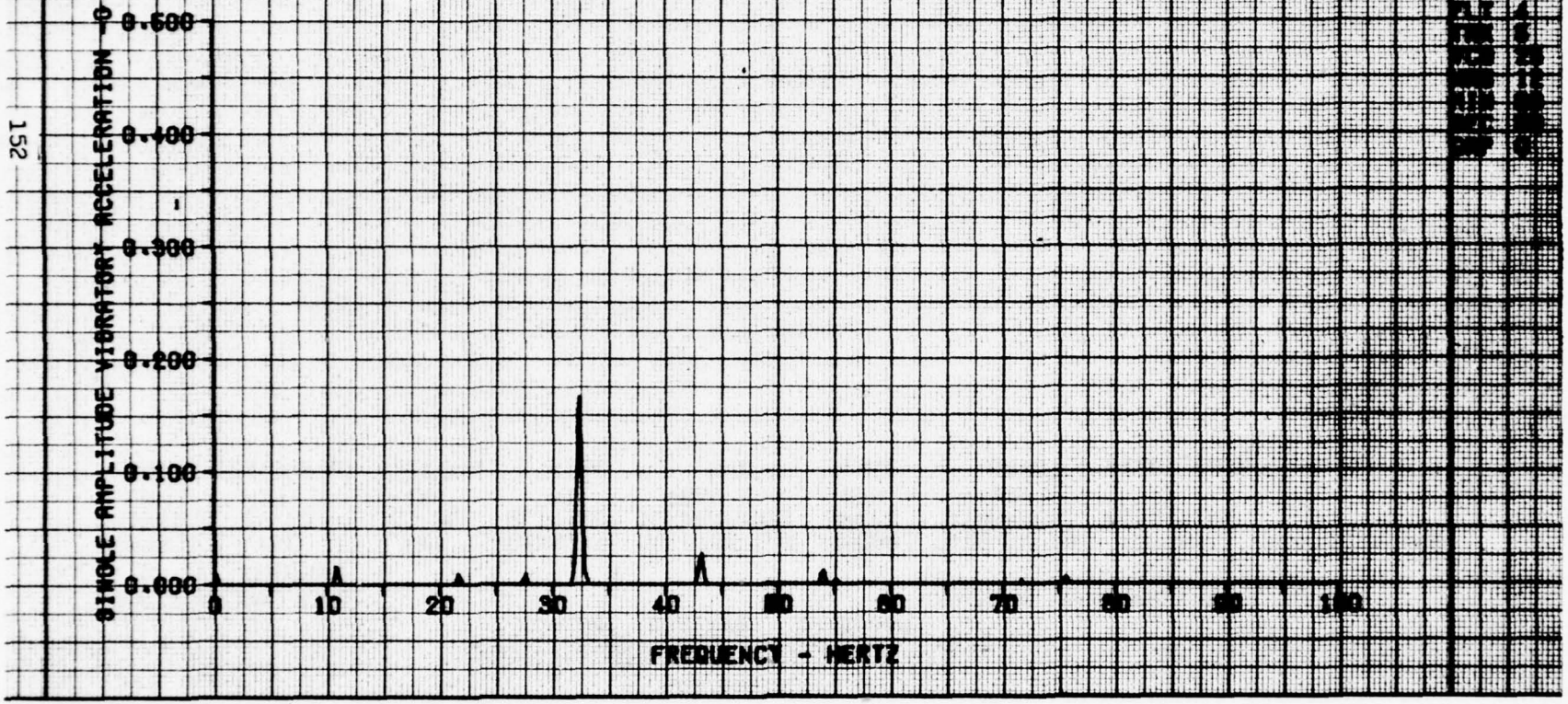


FIGURE 183

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

LOCATION PILOT SEAT — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS LATERAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8840	133.1 (FWD)	0.0 (MID)	4120	8.0	324.0	80.0	RIGHT TURN	CLEAN

FLT	4
TRK	5
VCD	40
HRS	12
MIN	20
SEC	50
GRP	0

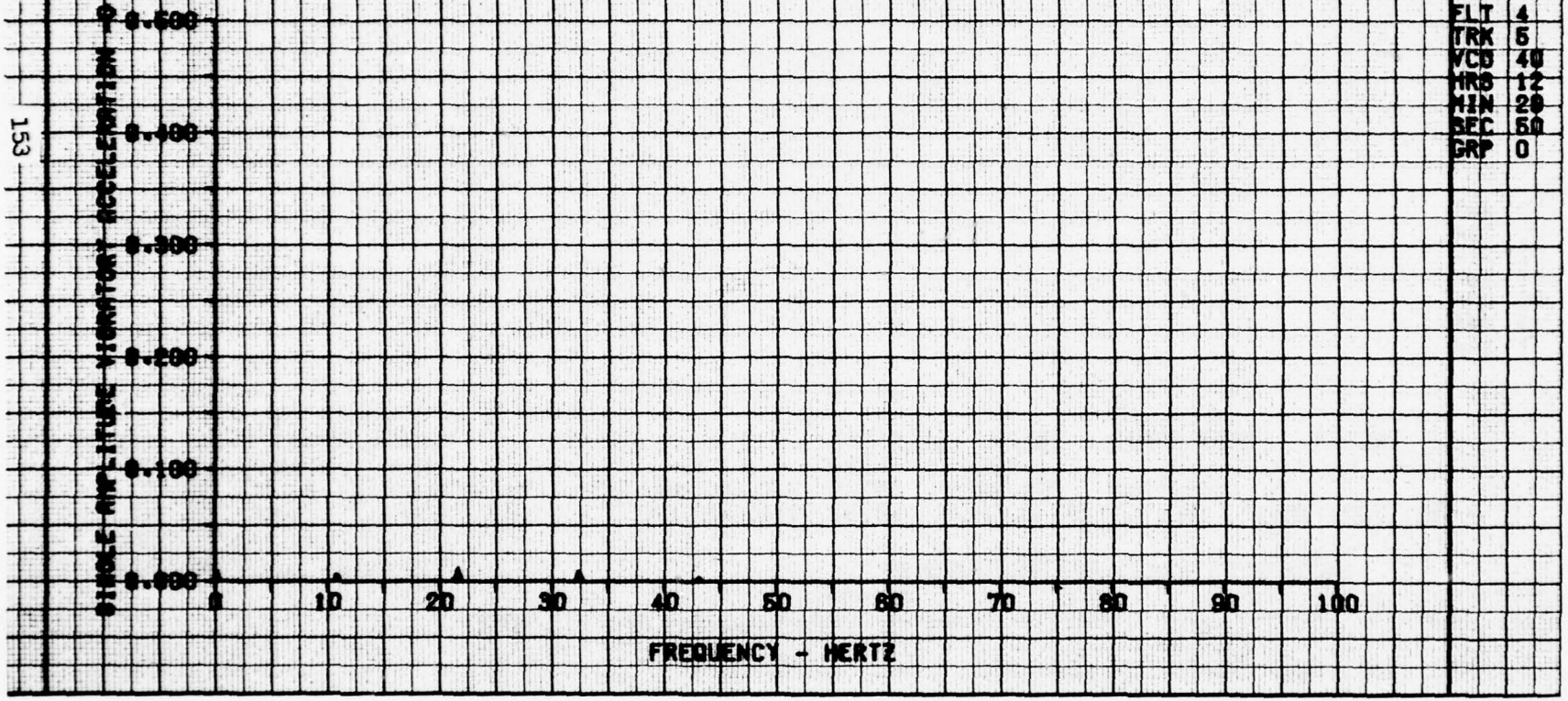


FIGURE 134

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 68-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	PILOT SEAT							
AXIS	VERTICAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8540	133.1 (FWD)	0.0 (MID)	4120	8.0	324.0	80.0	RIGHT TURN	CLEAN

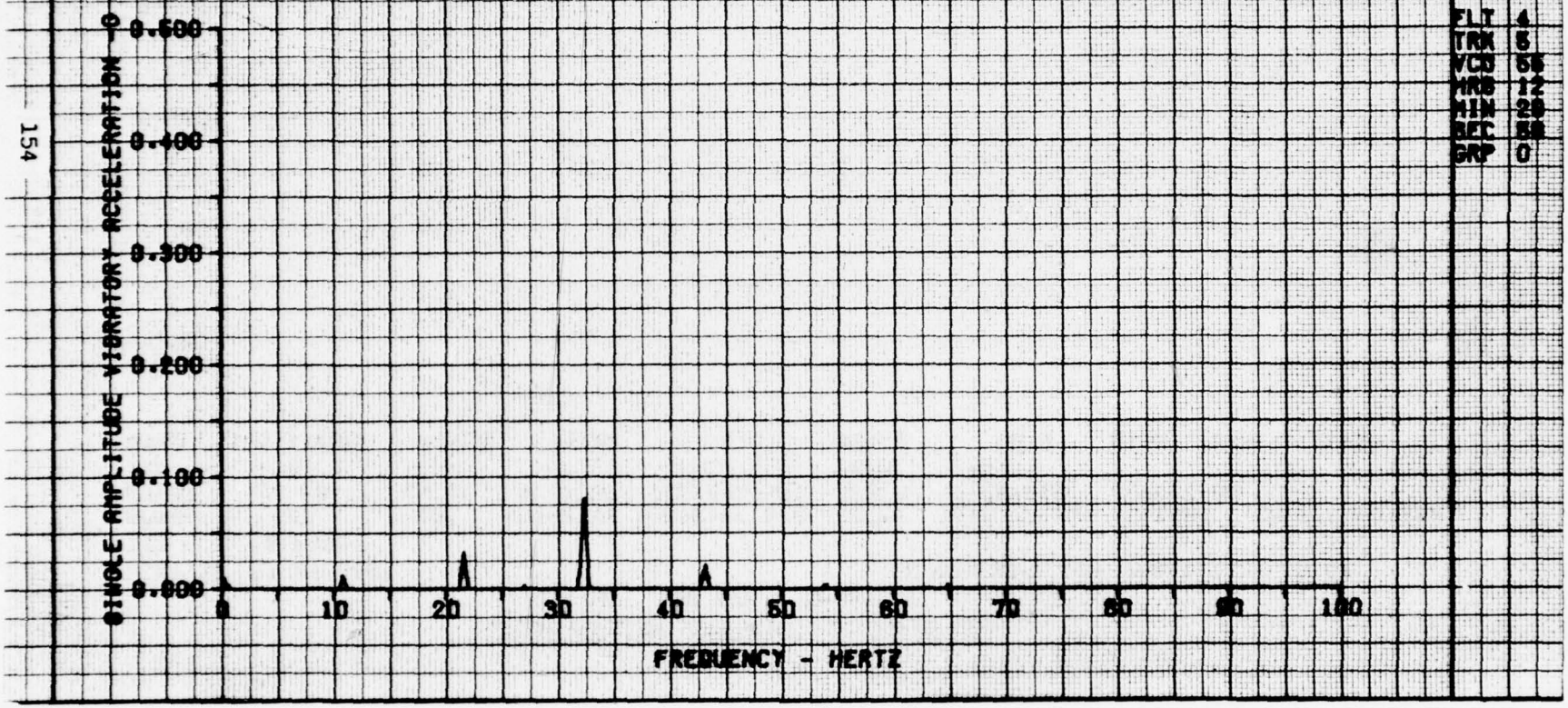


FIGURE 135

VIBRATION CHARACTERISTICS

NUM-1M USA S/N 88-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	TRANSMITTION							
AXIS	LONGITUDINAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8640	133.1 (FWD)	0.0 (MID)	4120	8.0	324.0	60.0	RIGHT TURN	CLEAN

SINGLE AMPLITUDE VIBRATORY ACCELERATION - g

0.600
0.400
0.300
0.200
0.100
0.000

0 10 20 30 40 50 60 70 80 90 100

FREQUENCY - HERTZ

FLT	4
TRK	5
VCD	70
RPS	12
MIN	20
SEC	50
GRP	0

FIGURE 136

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	TRANSMITTION							
AXIS	LATERAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8540	133.1 (FWD)	0.0 (MID)	4120	8.0	324.0	80.0	RIGHT TURN	CLEAN

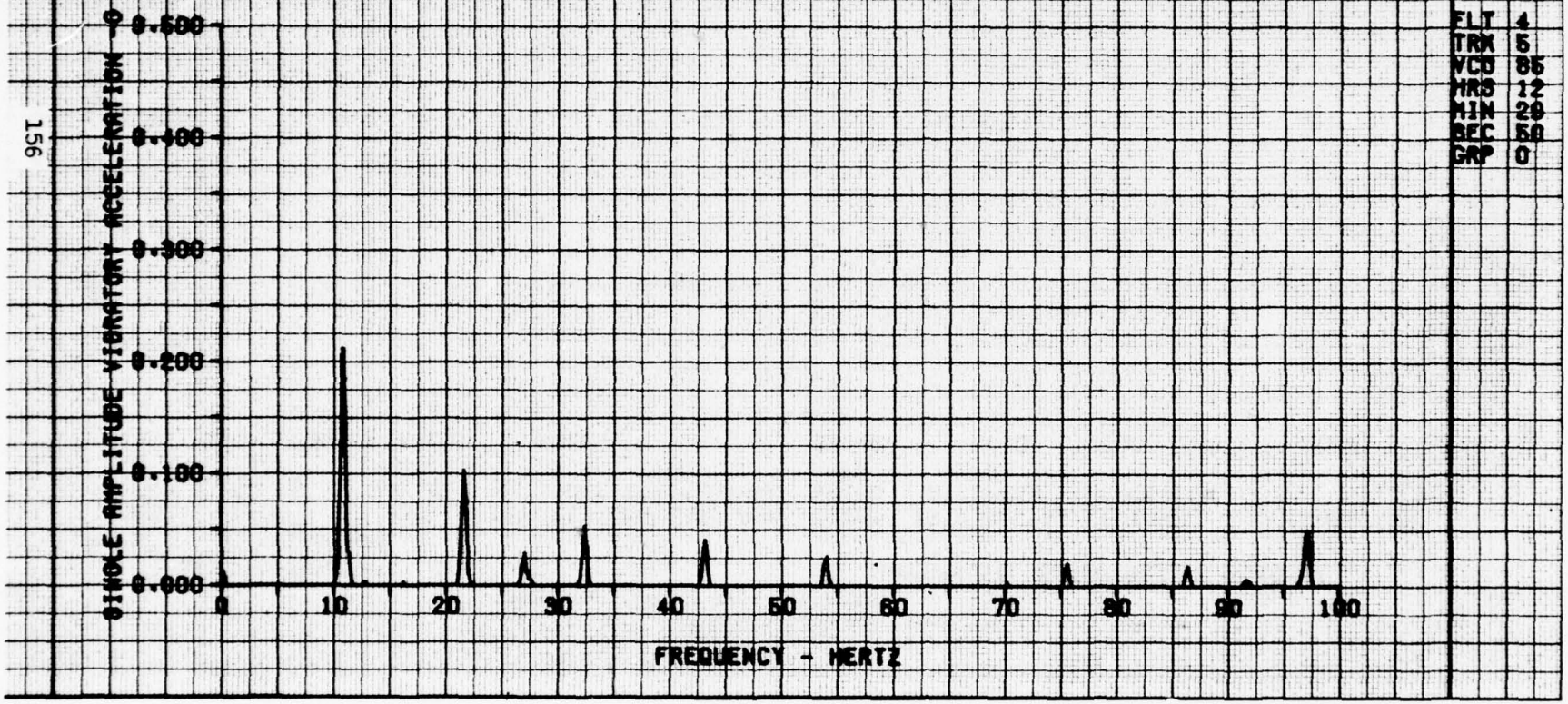


FIGURE 137

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

LOCATION TRANSMITTION FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
9640	153.1 (FWD)	0.0 (MID)	4120	8.0	324.0	80.0	RIGHT TURN	CLEAN

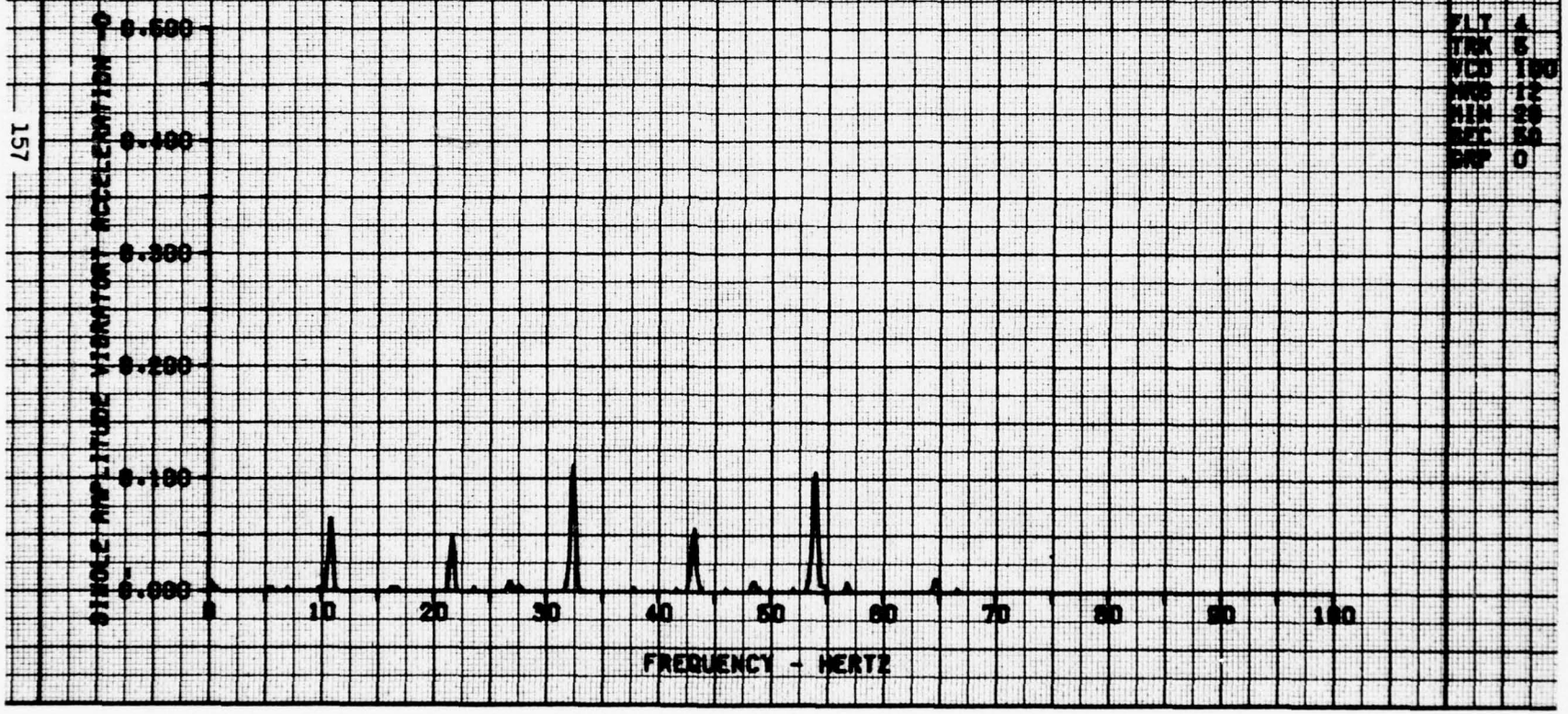


FIGURE 138

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-00969

LOCATION POWER CONVERTER — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS LONGITUDINAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
[illegible]	133.1 ([illegible])	0.0 (MID)	4120	8.8	324.0	80.0	RIGHT TURN	CLEAN

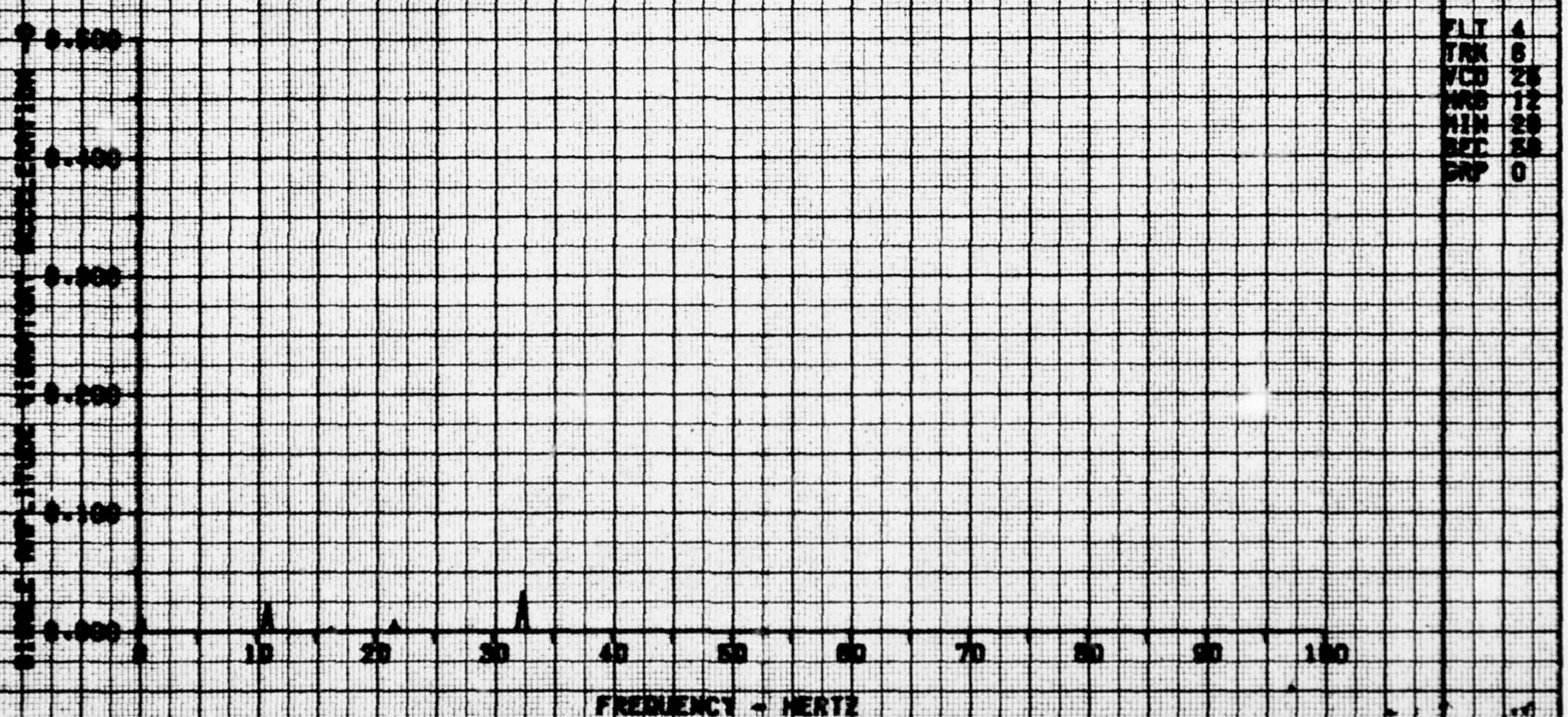


FIGURE 159

VIBRATION CHARACTERISTICS

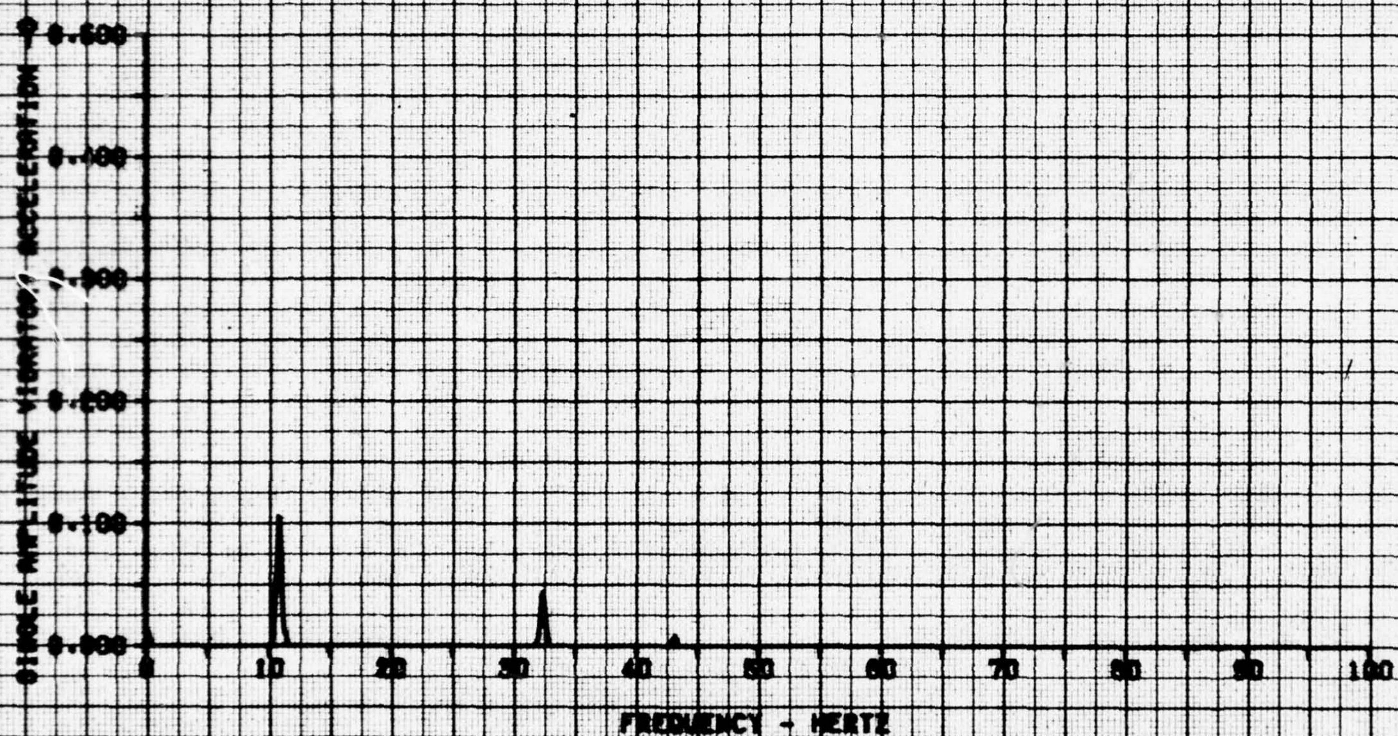
NUH-1M USA S/N 66-60868

LOCATION POWER CONVERTER

FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS LATERAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8840	133.1(FWD)	0.0(MID)	4120	8.0	324.0	80.0	RIGHT TURN	CLEAN



FLT 4
TRK 6
VCD 48
HRS 12
MIN 28
SEC 58
GRP 0

FIGURE 40

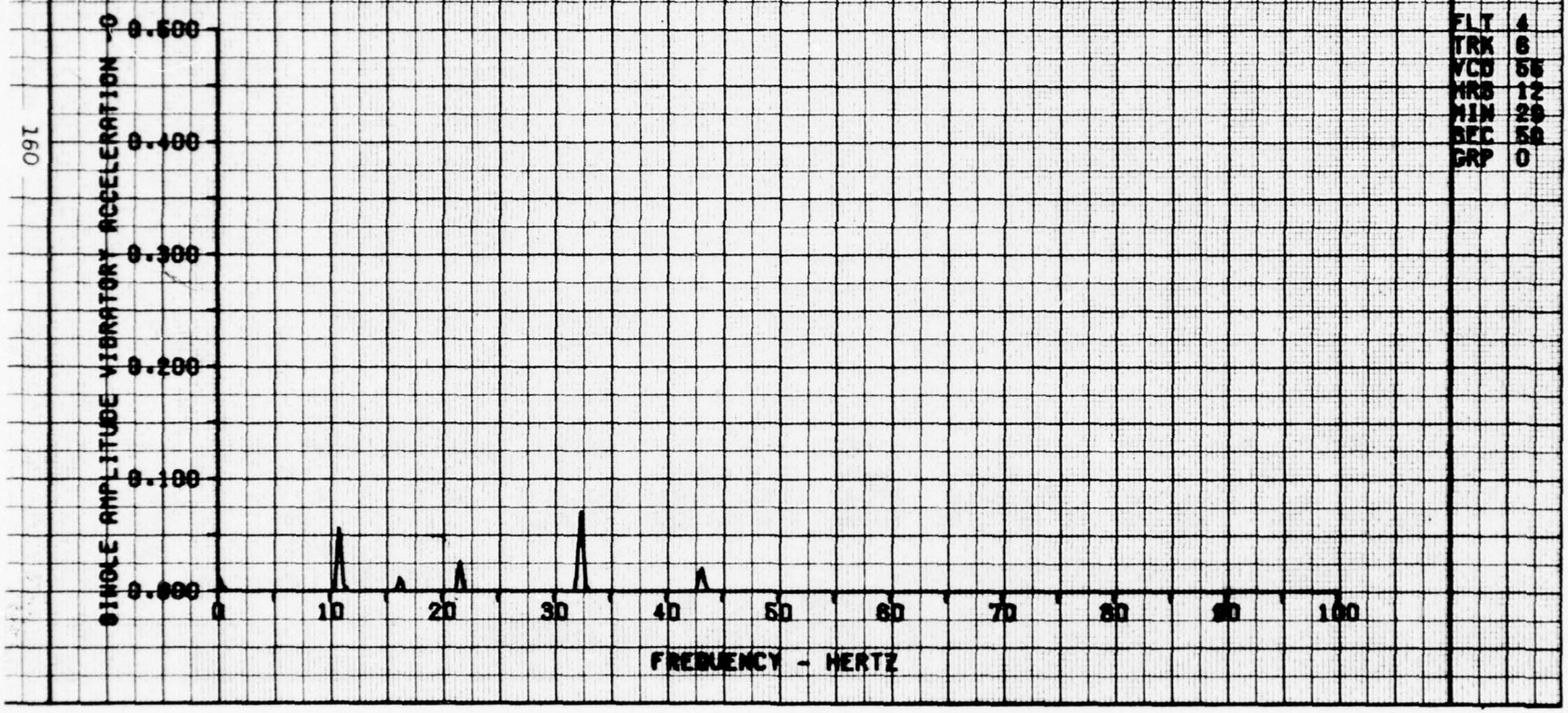
VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

LOCATION POWER CONVERTER — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8840	133.1 (FWD)	0.0 (MID)	4120	8.0	324.0	80.0	RIGHT TURN	CLEAN



FLT	4
TRK	6
VCD	55
HRS	12
MIN	28
SEC	59
GRP	0

FIGURE 141

VIBRATION CHARACTERISTICS

NUH-1M USA S/N 66-00869

LOCATION COLLECTIVE CONTROL

FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8840	133.1 (FWD)	0.0 (MID)	4120	6.0	324.0	80.0	RIGHT TURN	CLEAN

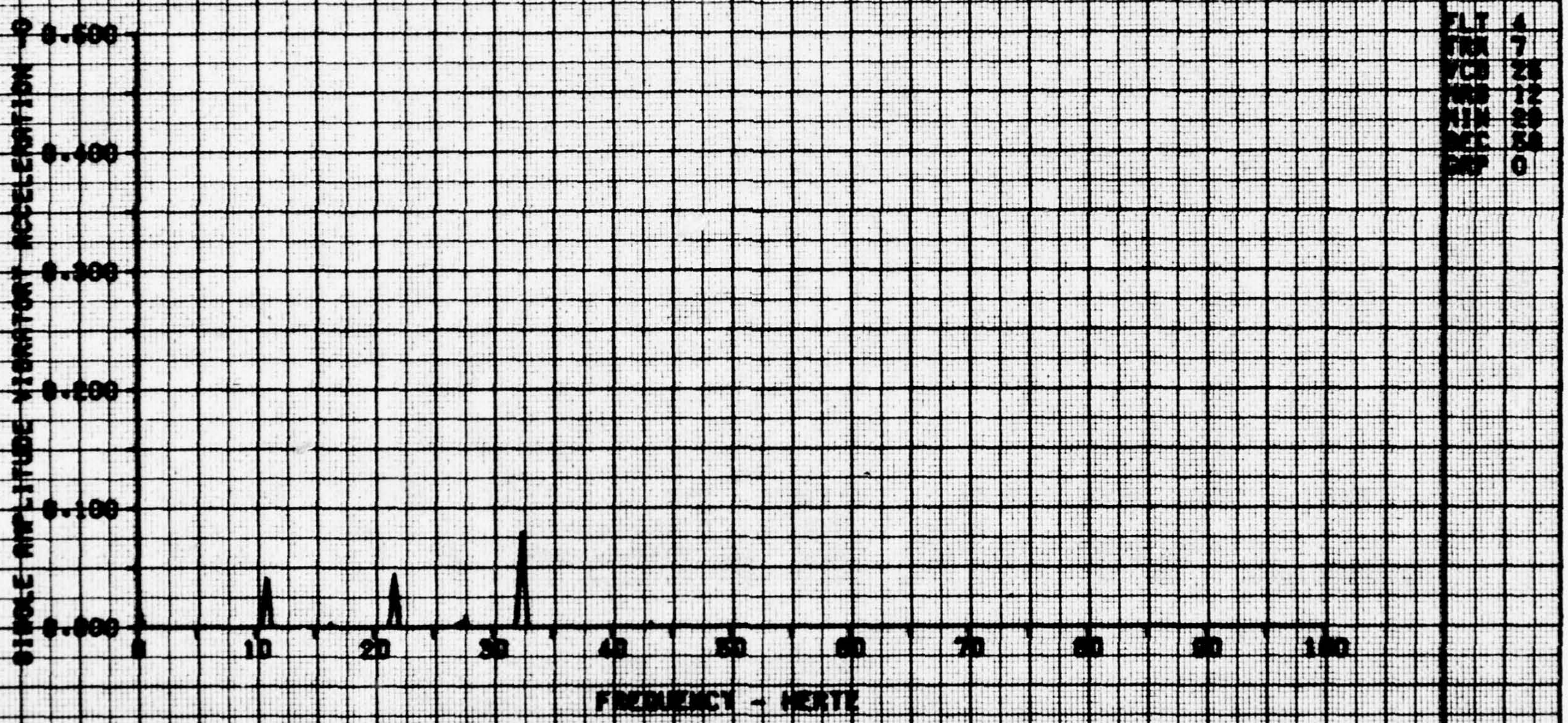


FIGURE 142

VIBRATION CHARACTERISTICS

NUH-1H UBR S/N 68-08869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	CYCLIC CONTROL							
AXIS	LONGITUDINAL							
GROSS WEIGHT -LB	LONG. CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8643	155.1 (FWD)	0.0 (RIO)	4120	6.8	324.0	80.0	RIGHT TURN	CLEAN

FLT	4
TRK	7
VCD	40
MRB	12
MIN	29
SEC	50
GRP	0

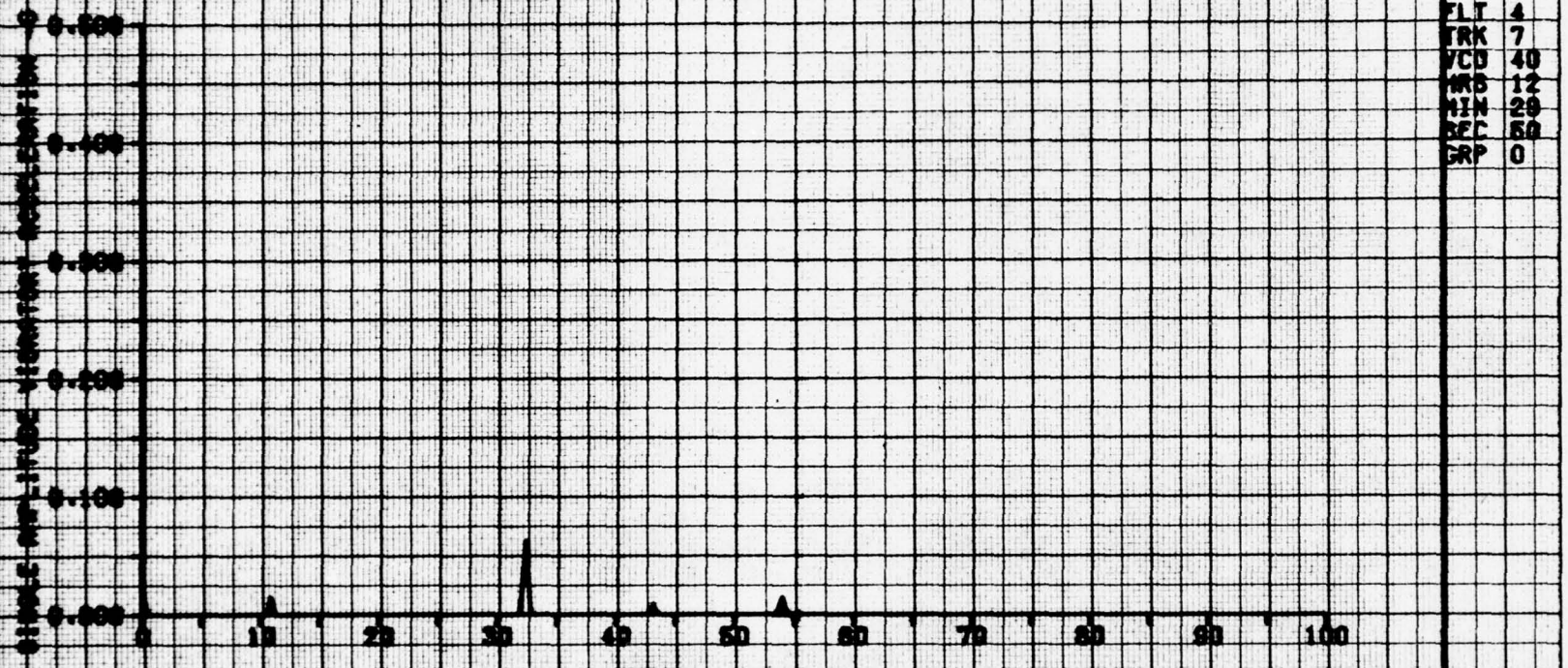


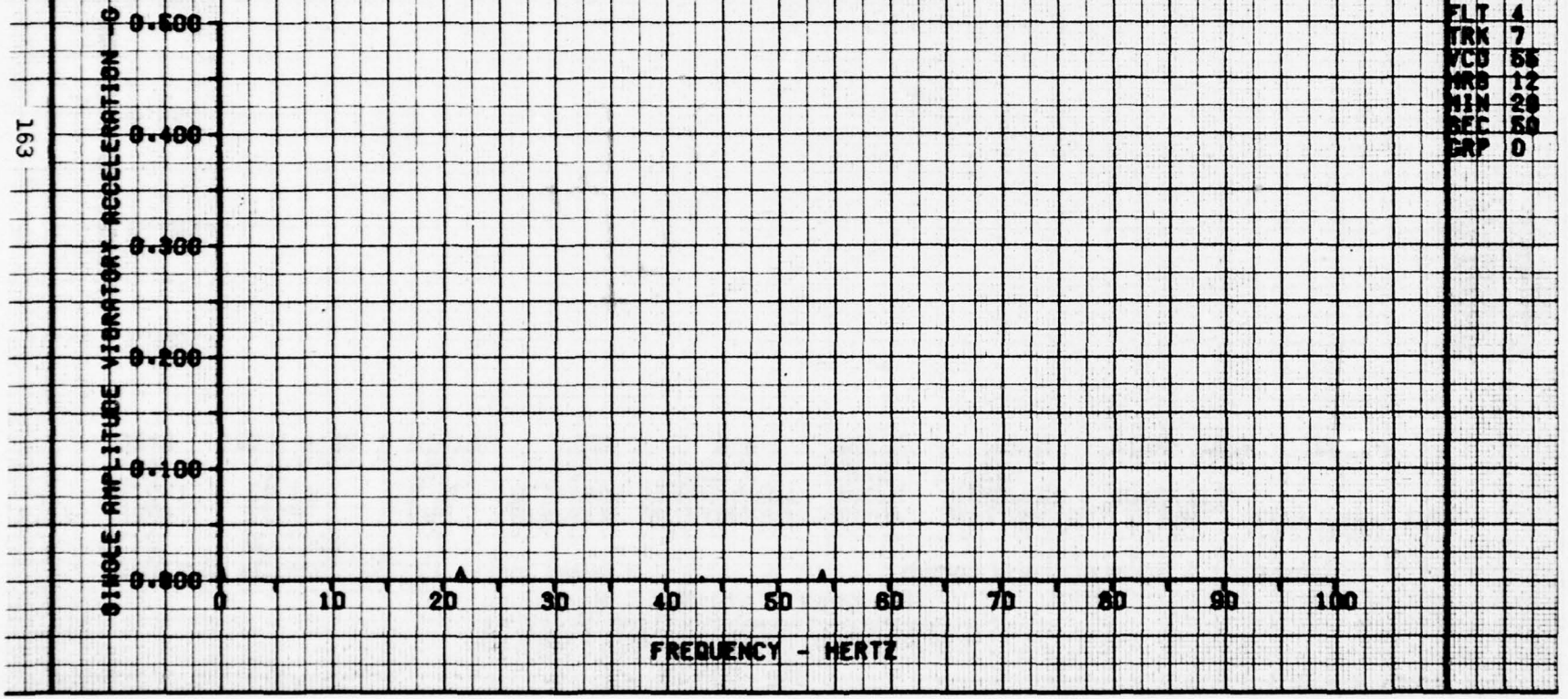
FIGURE 143

VIBRATION CHARACTERISTICS

MUH-1H USA S/N 66-60868

FUNDAMENTAL FREQUENCY IS 6.40 HZ

LOCATION	CYCLIC CONTROL							
AXIS	LATERAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8840	133.1 (FWD)	0.0 (MID)	4120	8.0	324.0	80.0	RIGHT TURN	CLEAN



FLT	4
TRK	7
VCD	55
MRB	12
MIN	28
SEC	50
GRP	0

FIGURE 144

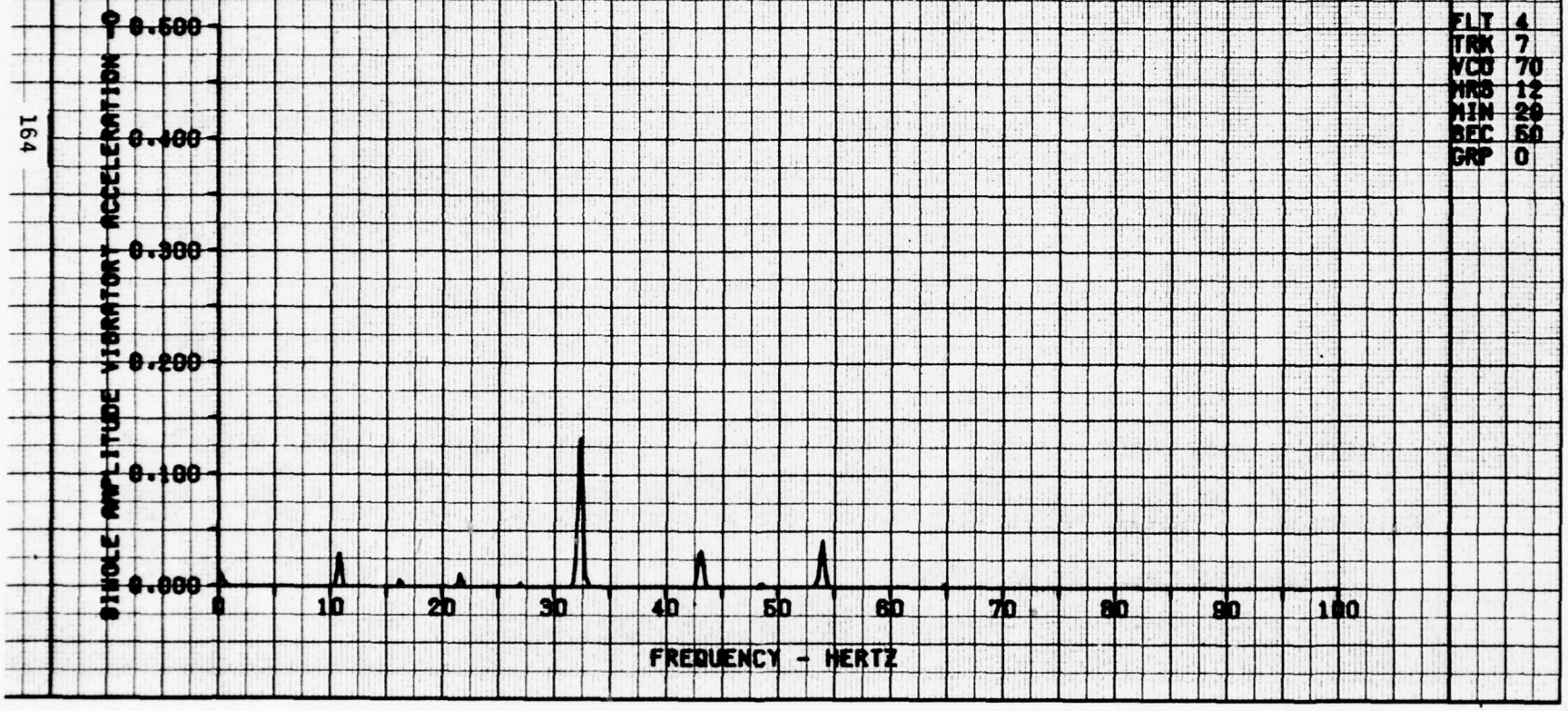
VIBRATION CHARACTERISTICS

UH-1H USA S/N 66-16868

LOCATION FORWARD PALLET FLOOR MOUNT — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
8640	133.1 (FWD)	0.0 (MID)	4120	8.0	324.0	80.0	RIGHT TURN	CLEAN



FLT	4
TRK	7
VCD	70
HRS	12
MIN	20
SEC	50
GRP	0

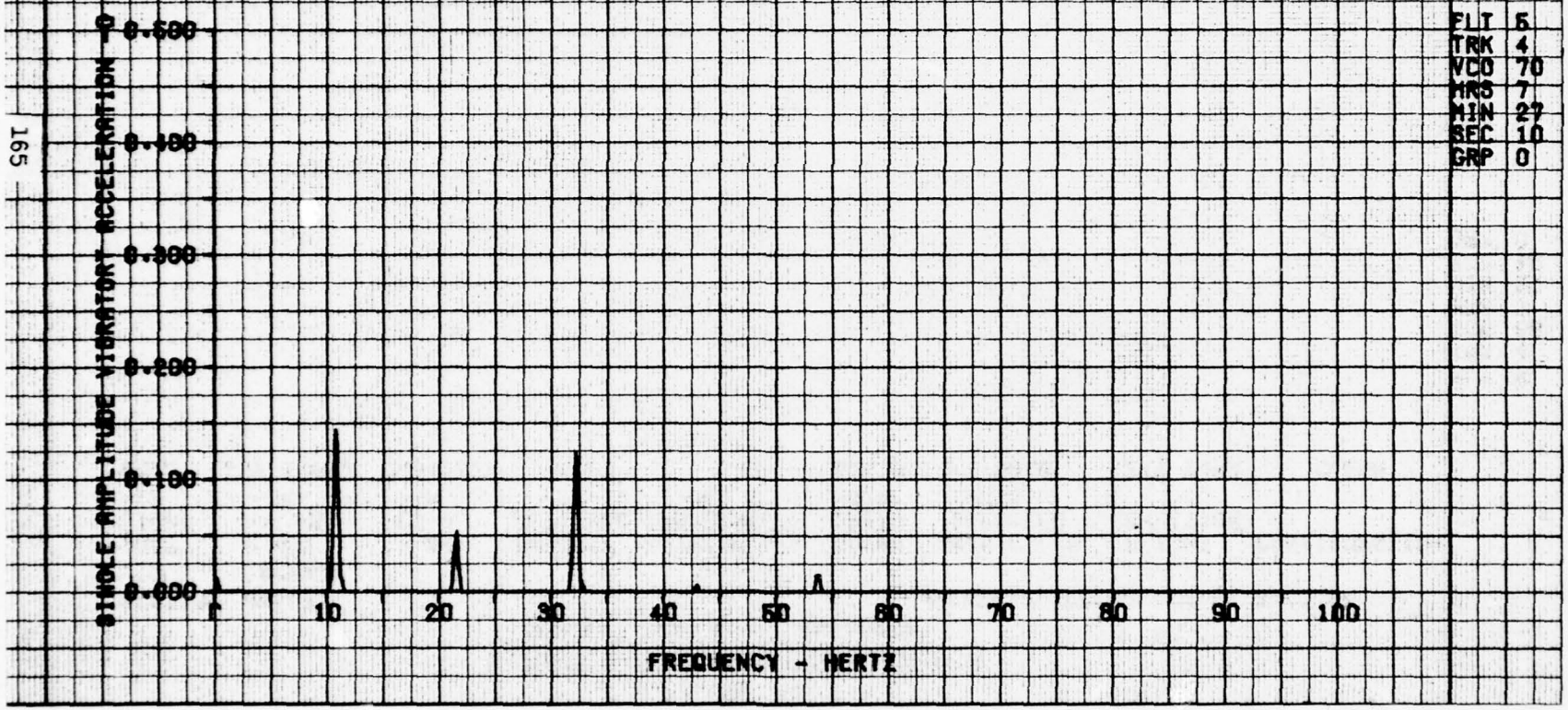
FIGURE 145

VIBRATION CHARACTERISTICS

NUM-1H USA S/N 68-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	AXIS	GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
PALLET	LONGITUDINAL	9240	135.4 (FWD)	0.0 (MID)	4220	9.0	324.0	80.0	LEFT TURN	CLEAN



FLT 5
TRK 4
VCO 70
HRS 7
MIN 27
SEC 10
GRP 0

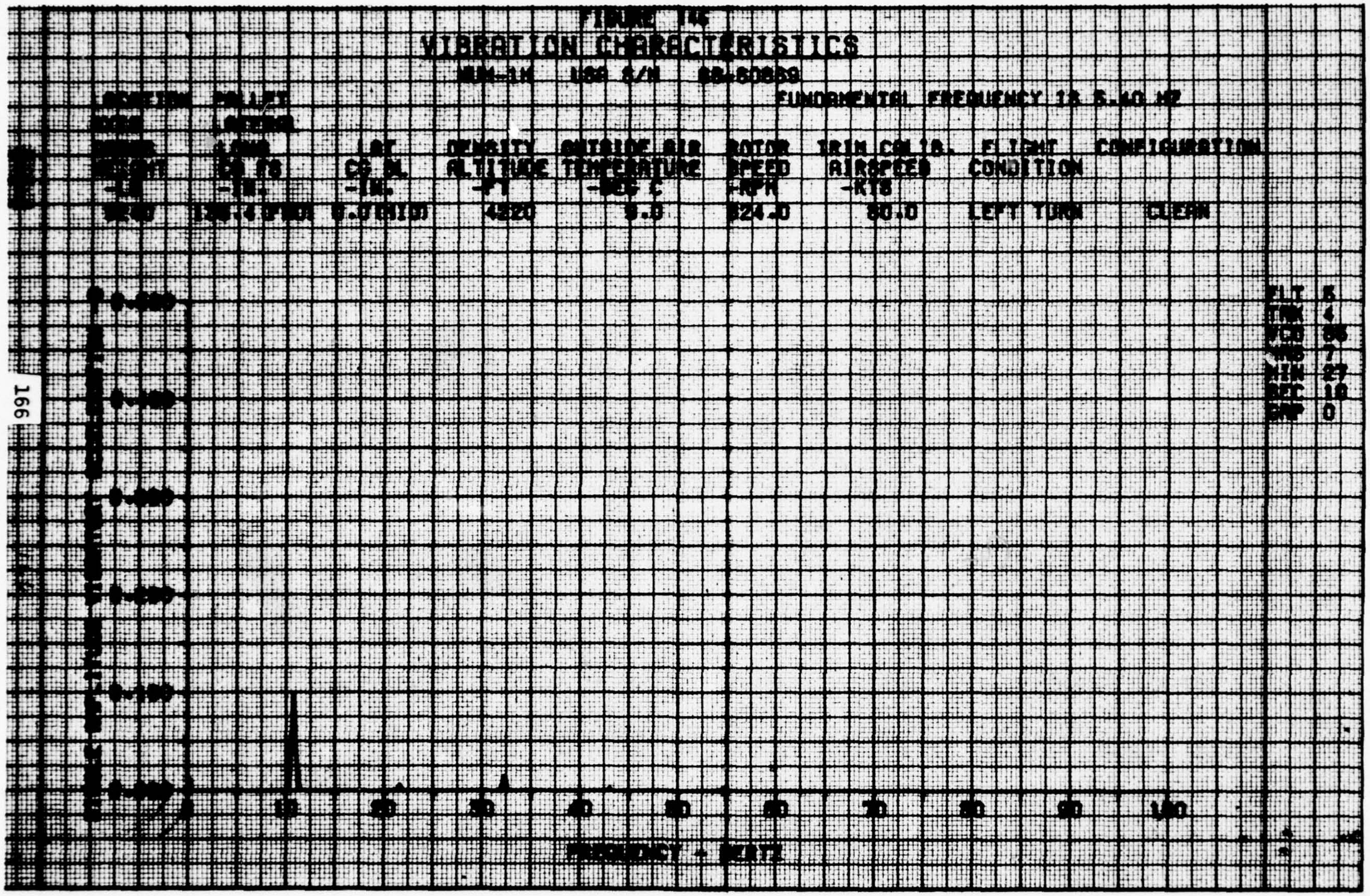

VIBRATION CHARACTERISTICS
FUNDAMENTAL FREQUENCY IS 5.40 HZ
LAT
DENSITY ALTITUDE -FT
OUTSIDE AIR TEMPERATURE -DEG C
ROTOR SPEED -RPM
TRIM CALIB. AIRSPEED -KTS
FLIGHT CONDITION
CONFIGURATION
4220
324.0
80.0
LEFT TURN
CLEAN
10
20
30
40
50
60
70
80
90
100
FREQUENCY - HERTZ

FIGURE 147

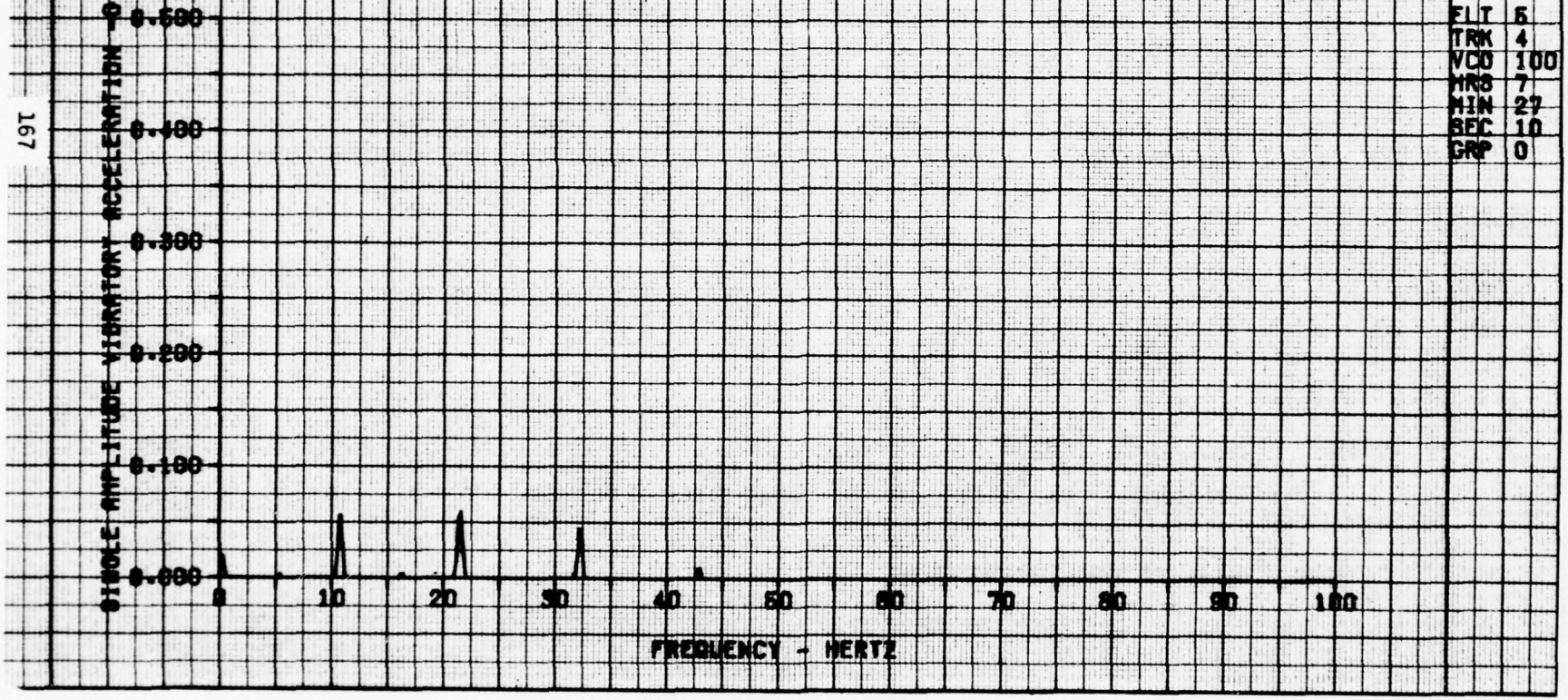
VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-80869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	PALLET							
AXIS	VERTICAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
9240	136.4 (FWD)	0.0 (MID)	4220	9.0	324.0	80.0	LEFT TURN	CLEAN

FLT	5
TRK	4
VCD	100
HRS	7
MIN	27
SEC	10
GRP	0



FIDURE 148

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

LOCATION PILOT SEAT — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS LONGITUDINAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
9240	135.4 (FWD)	0.0 (MID)	4220	9.0	324.0	80.0	LEFT TURN	CLEAN

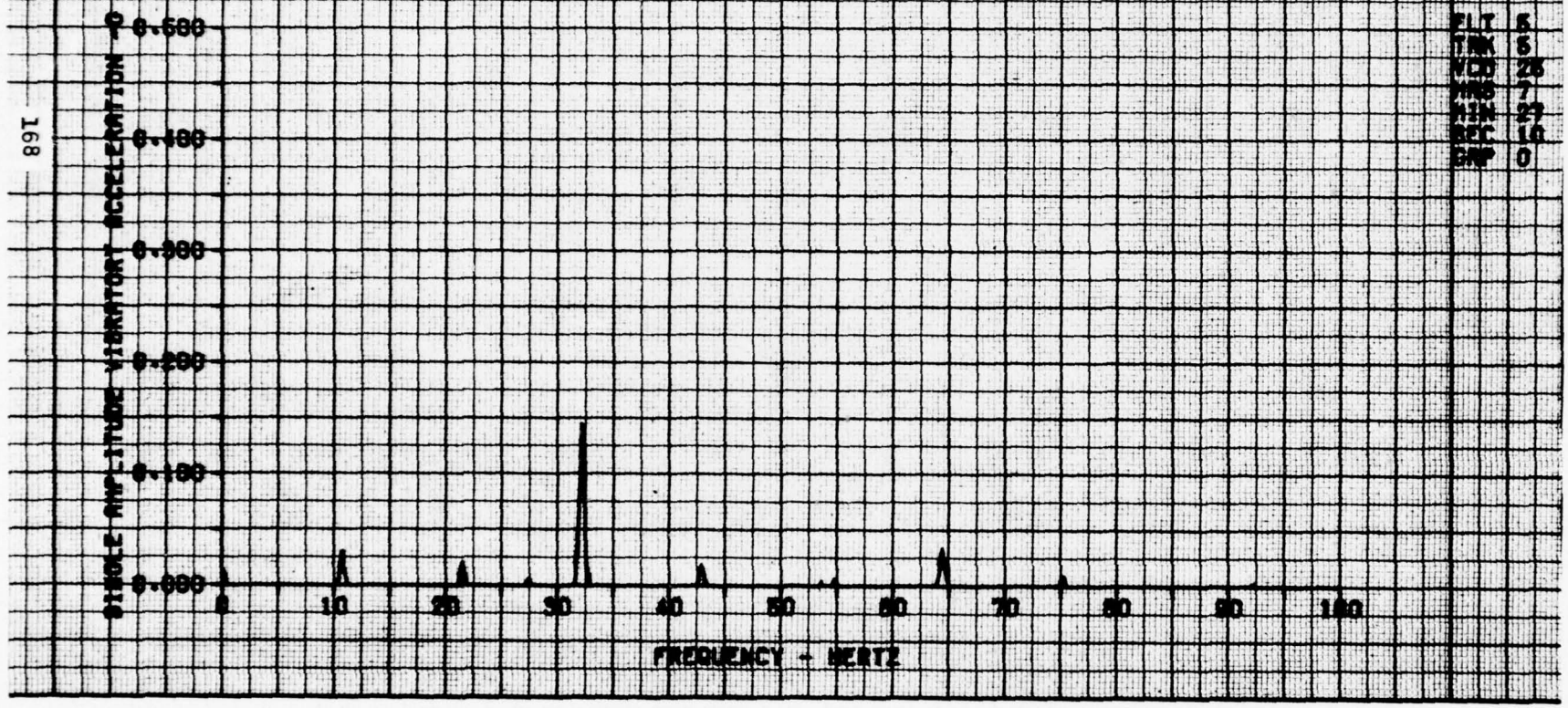


FIGURE 49

VIBRATION CHARACTERISTICS

UH-1H USA S/N 66-00000

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	PILOT SEAT							
AXIS	LATERAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
9240	135.4 (FWD)	0.0 (RID)	4220	0.0	324.0	80.0	LEFT TURN	CLEAN

SINGLE AMPLITUDE VIBRATORY ACCELERATION - g

0.500
0.400
0.300
0.200
0.100
0.000

0 10 20 30 40 50 60 70 80 90 100

FREQUENCY - HERTZ

FLT	5
TRK	5
YCD	40
HRS	7
MIN	27
SEC	10
GRP	0

FIGURE 150

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

LOCATION PILOT SEAT — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
9240	135.4 (FWD)	0.0 (RTD)	4220	8.0	324.0	80.0	LEVEL	CLEAN

FLT	5
TRK	5
VCD	55
HKB	7
MIN	27
REC	18
CRP	0

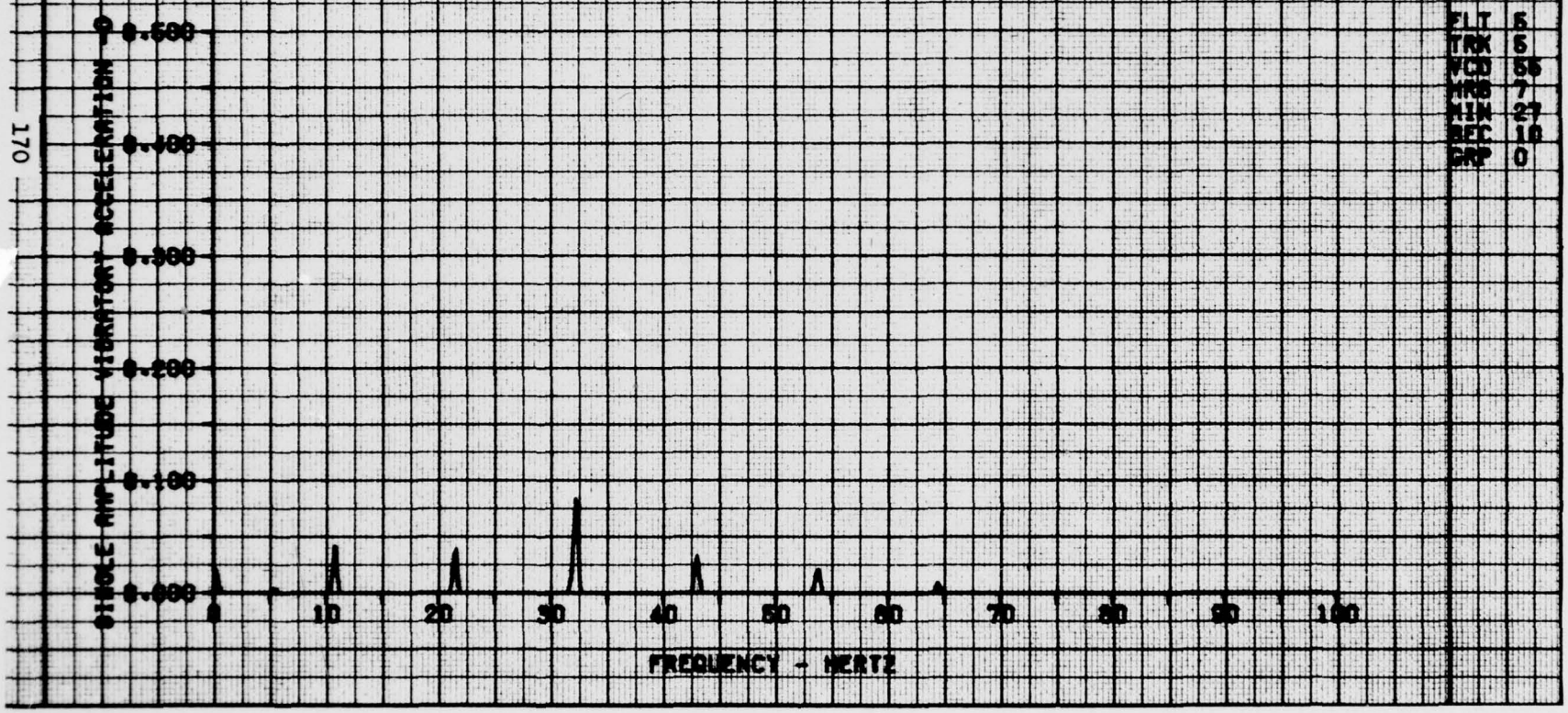


FIGURE 151

VIBRATION CHARACTERISTICS

UH-1H USA S/N 66-60869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	TRANSMITTION							
AXIS	LONGITUDINAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
9240	135.4 (FWD)	0.0 (RID)	4220	9.0	324.0	80.0	LEFT TURN	CLEAN

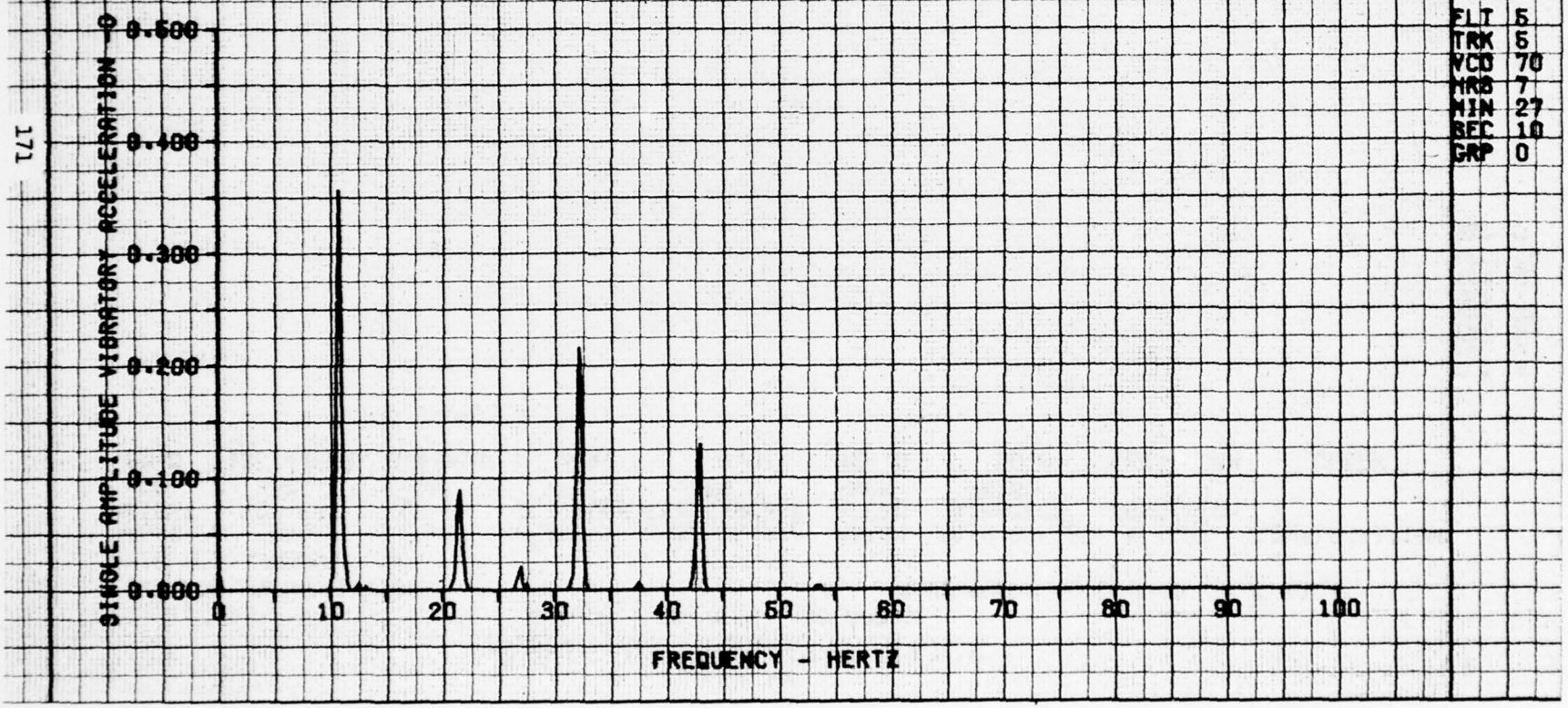


FIGURE 152

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

FUNDAMENTAL FREQUENCY 1R 5.40 HZ

LOCATION AXIS	TRANSMITTION LATERAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
9240	135.4 (FWD)	0.0 (MID)	4220	9.0	324.0	80.0	LEFT TURN	CLEAN

FLT	5
TRK	5
VCO	85
MO	7
MIN	27
SEC	18
GRP	0

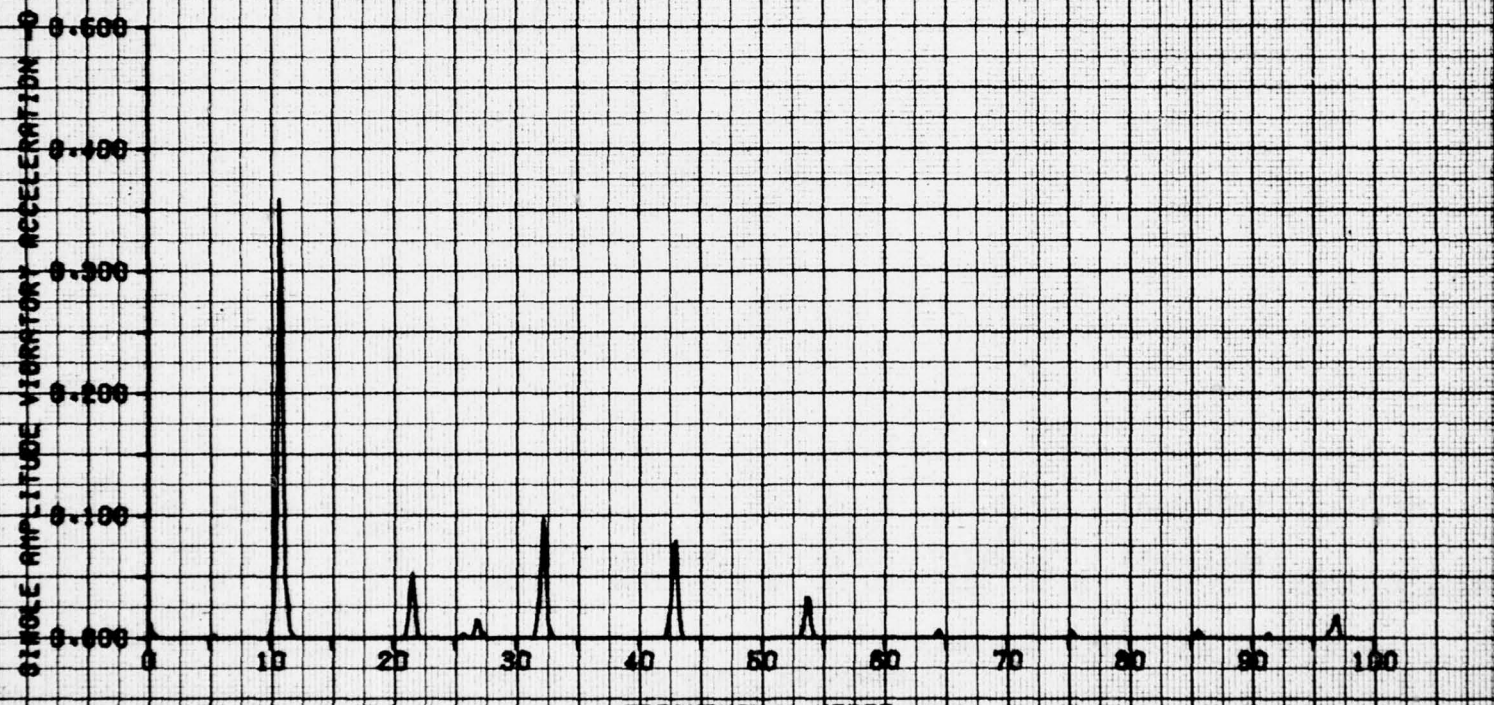


FIGURE 153

VIBRATION CHARACTERISTICS

UH-1H USA S/N 66-16869

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	TRANSMITTION VERTICAL								
AXIS	LONG	LAT	DENSITY	OUTSIDE AIR	ROTOR	TRIM CALIB.	FLIGHT	CONFIGURATION	
GROSS WEIGHT -LB	CG FS -IN.	CG BL -IN.	ALTITUDE -FT	TEMPERATURE -DEG C	SPEED -RPM	AIRSPEED -KTS	CONDITION		
8240	136.4 (FWD)	0.0 (MID)	4220	0.0	324.0	80.0	LEVEL	CLEAN	

FLT 5
TRK 5
VCD 100
HRS 7
MIN 27
SEC 10
GRP 0

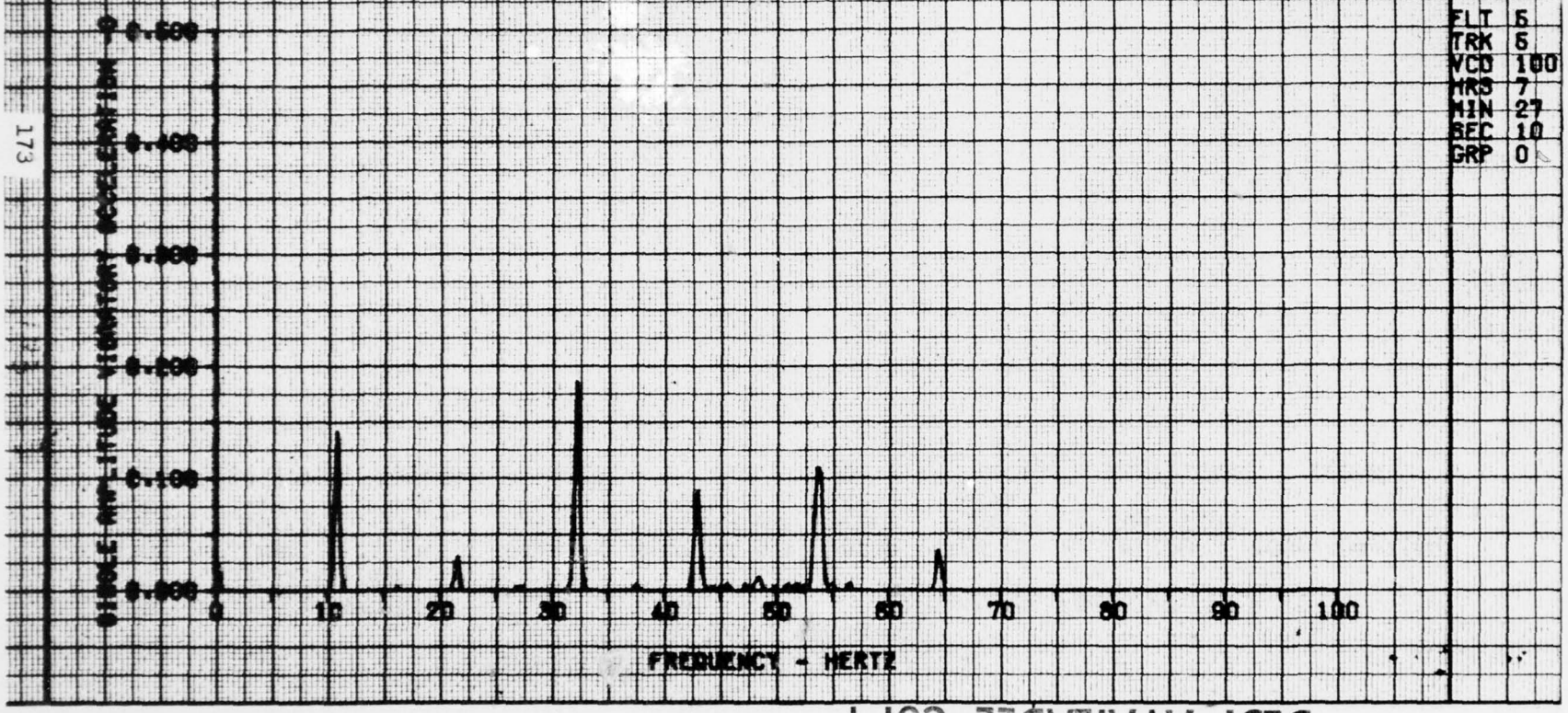


FIGURE 154

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60869

LOCATION POWER CONVERTER — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS LONGITUDINAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
9240	135.4 (FWD)	0.0 (MID)	4220	9.0	324.0	80.0	LEFT TURN	CLEAN

FLT	5
TRK	6
VCB	25
HRS	7
MIN	27
SEC	18
GRP	0

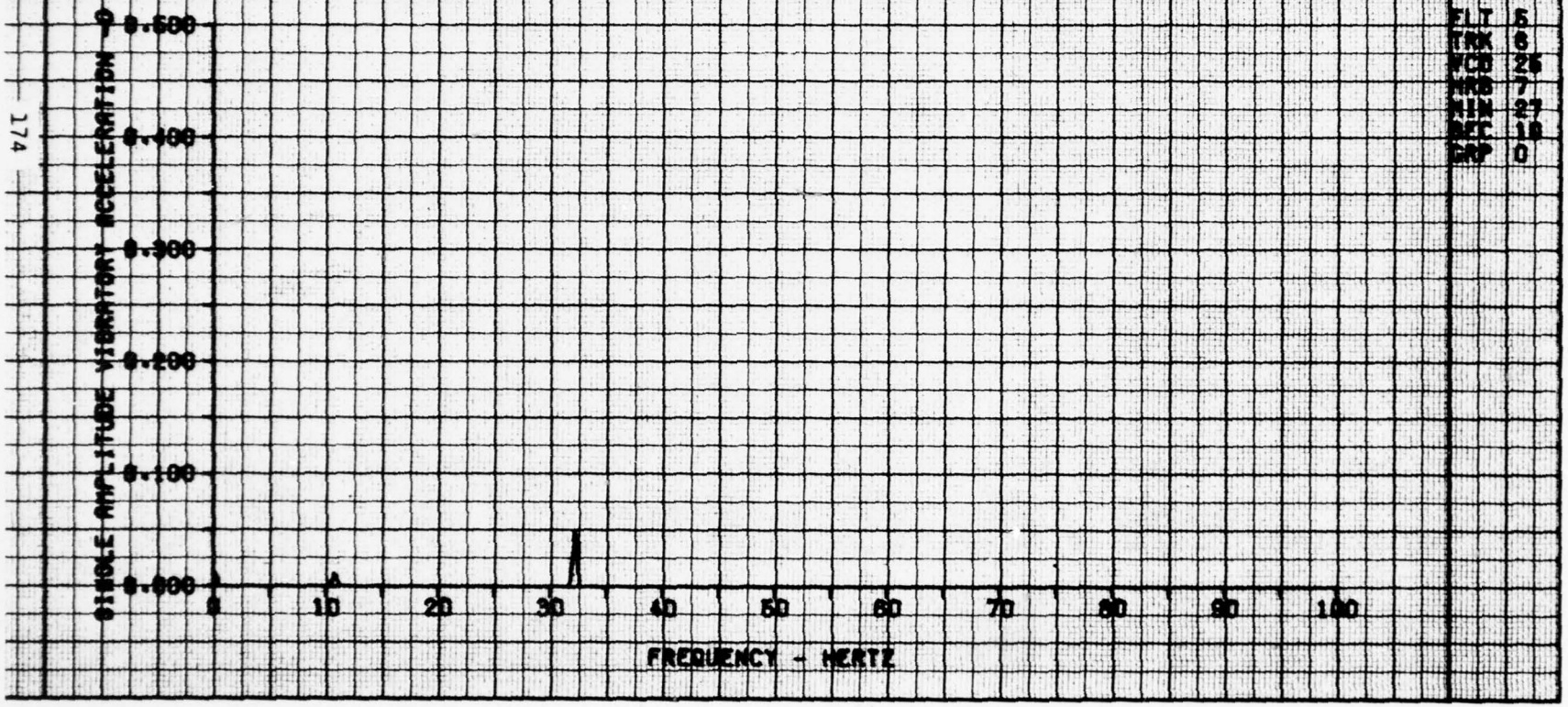


FIGURE 155

VIBRATION CHARACTERISTICS

UH-1H USA S/N 66-16969

LOCATION POWER CONVERTER — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS LATERAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
9240	136.4 (FWD)	0.0 (MID)	4220	9.0	324.0	80.0	LEFT TURN	CLEAN

FLT	5
TRK	6
YCD	48
MSR	7
MIN	27
SEC	18
GRP	0

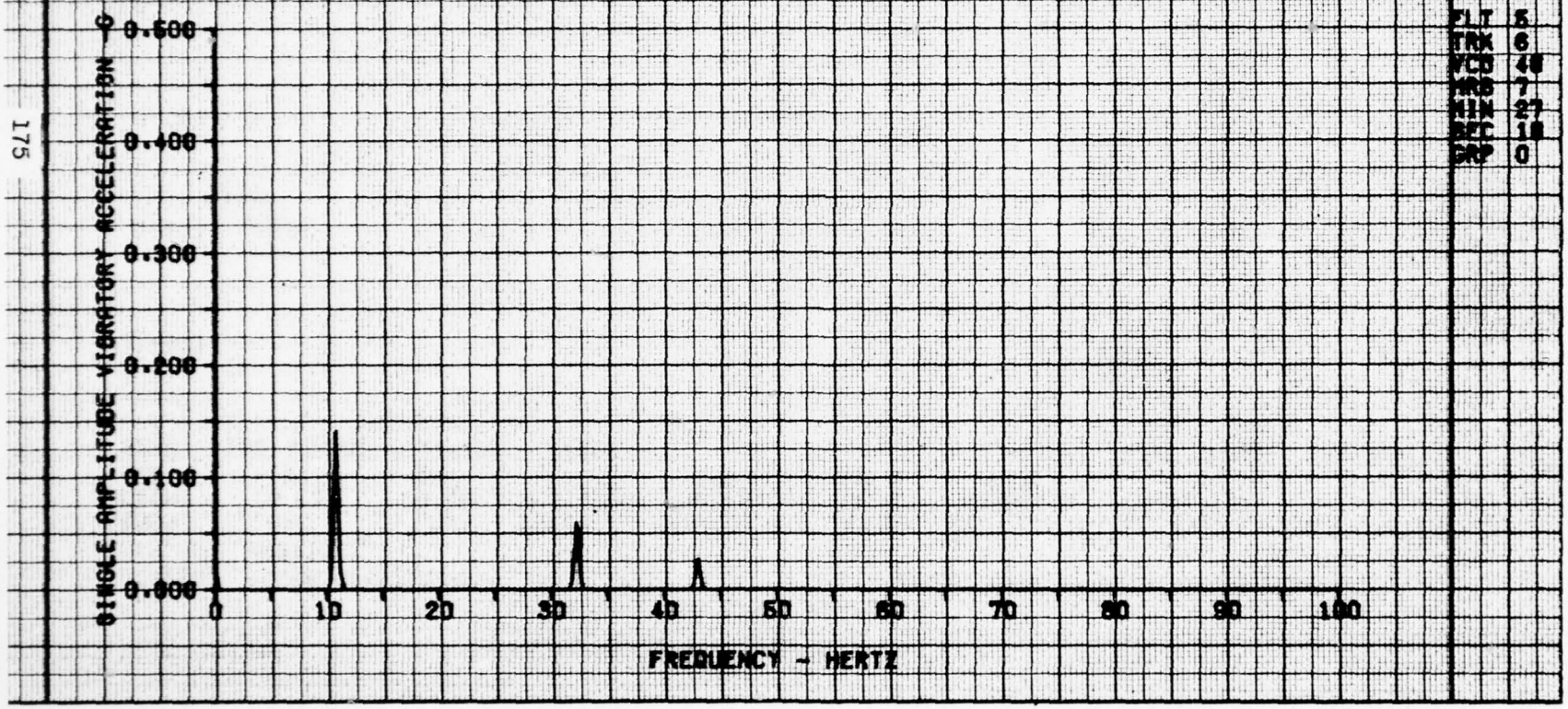


FIGURE 156

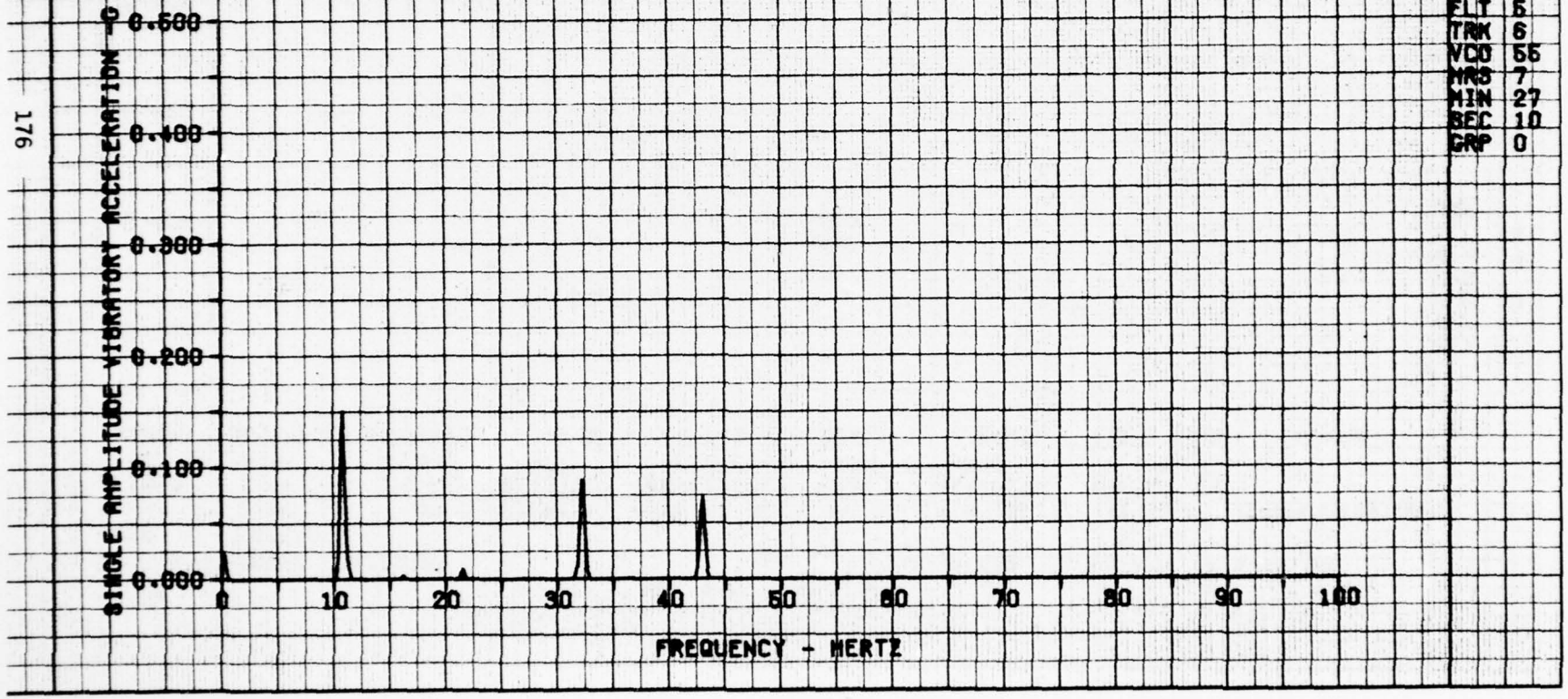
VIBRATION CHARACTERISTICS

NUH-1H USA S/N 66-60859

LOCATION POWER CONVERTER — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
9240	135.4 (FWD)	0.0 (MID)	4220	9.0	324.0	80.0	LEFT TURN	CLEAN



FLT	5
TRK	6
VCO	55
HRS	7
MIN	27
SEC	10
GRP	0

FIGURE 57

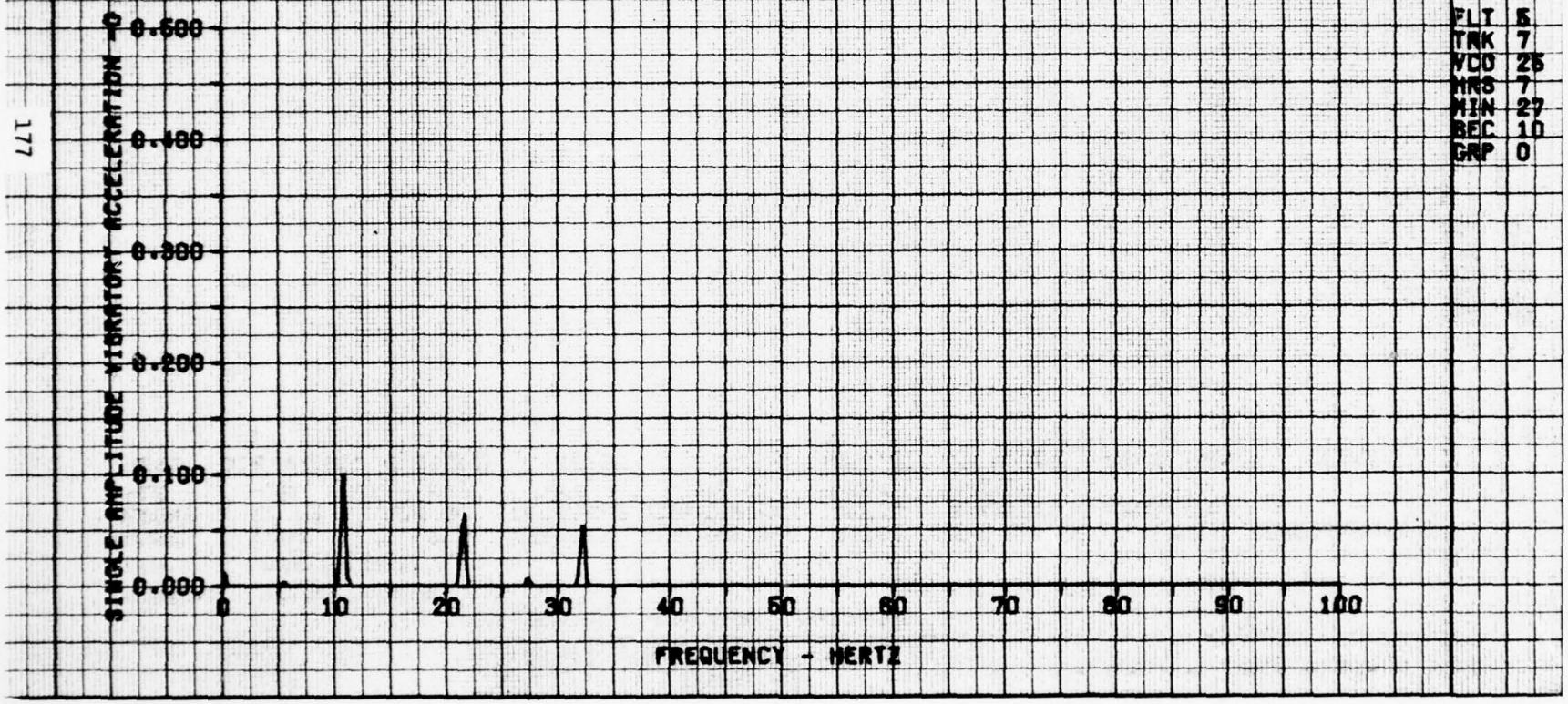
VIBRATION CHARACTERISTICS

NUH-1H USA S/N 86-60869

LOCATION COLLECTIVE CONTROL — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS VERTICAL

GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
9240	135.4 (FWD)	0.0 (MID)	4220	9.0	324.0	80.0	LEFT TURN	CLEAN



FLT	5
TRK	7
VCO	25
HRS	7
MIN	27
SEC	10
GRP	0

FIGURE 124

VIBRATION CHARACTERISTICS

UH-1H (GE S/N 66-00000)

FUNDAMENTAL FREQUENCY 19.5 A/C RPM

LOCATION DATA ERROR	CYCLIC CONTROL LONGITUDINAL								
WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRUE AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
9240	136.4 FWD	0.0 INBD	4220	6.0	324.0	80.0	LEFT TURN	CLEAN

FLT 5
TRK 7
ICD 48
ENG 7
MIN 87
SEC 10
SMP 0

SINGLE AMPLITUDE VIBRATORY ACCELERATION - g

0.500
0.400
0.300
0.200
0.100
0.000

0 10 20 30 40 50 60 70 80 90 100

FREQUENCY - HERTZ

FIGURE 159

VIBRATION CHARACTERISTICS

NUH-1H USA S/N 88-00859

FUNDAMENTAL FREQUENCY IS 5.40 HZ

LOCATION	CYCLIC CONTROL							
AXIS	LATERAL							
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
9240	136.4 (FWD)	0.0 (MID)	4220	9.0	324.0	80.0	LEFT TURN	CLEAN

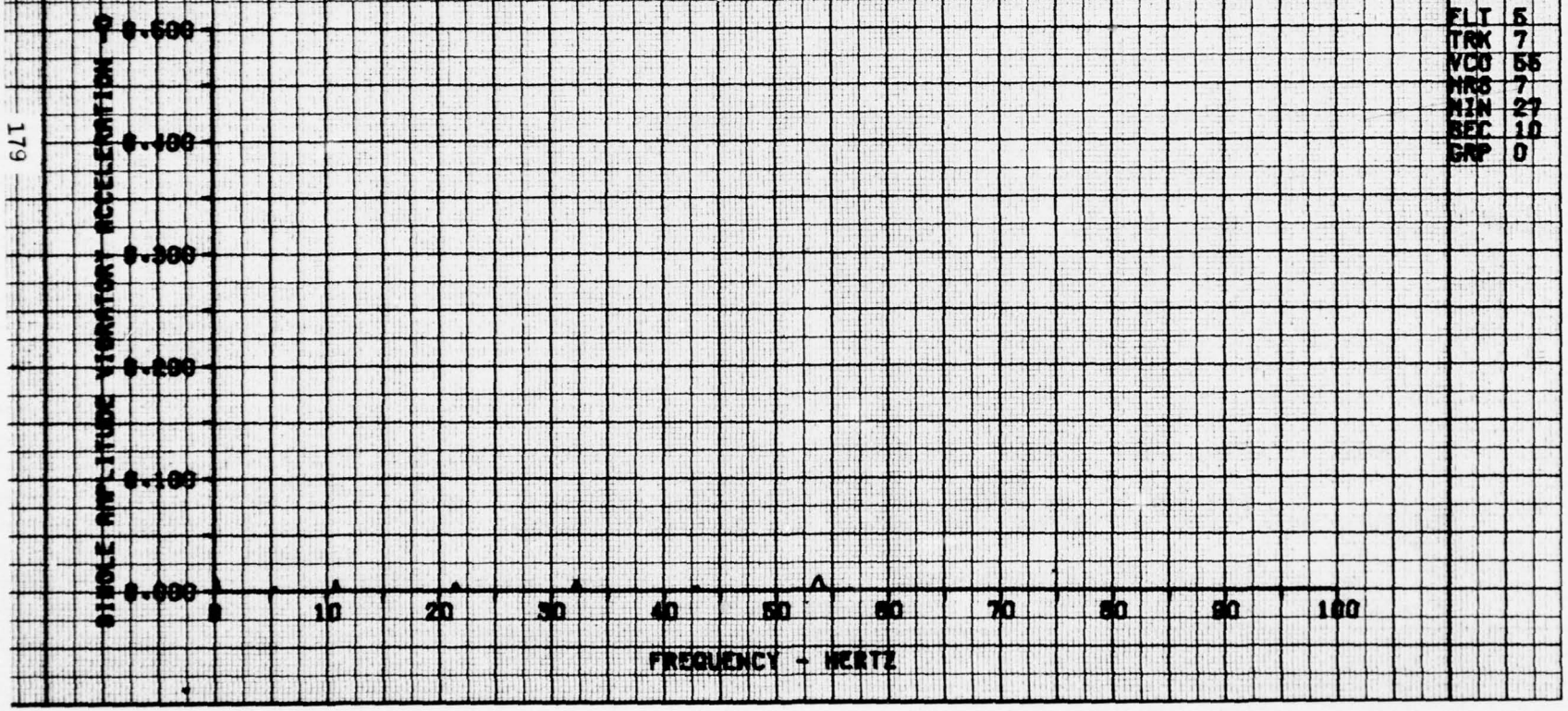


FIGURE 160

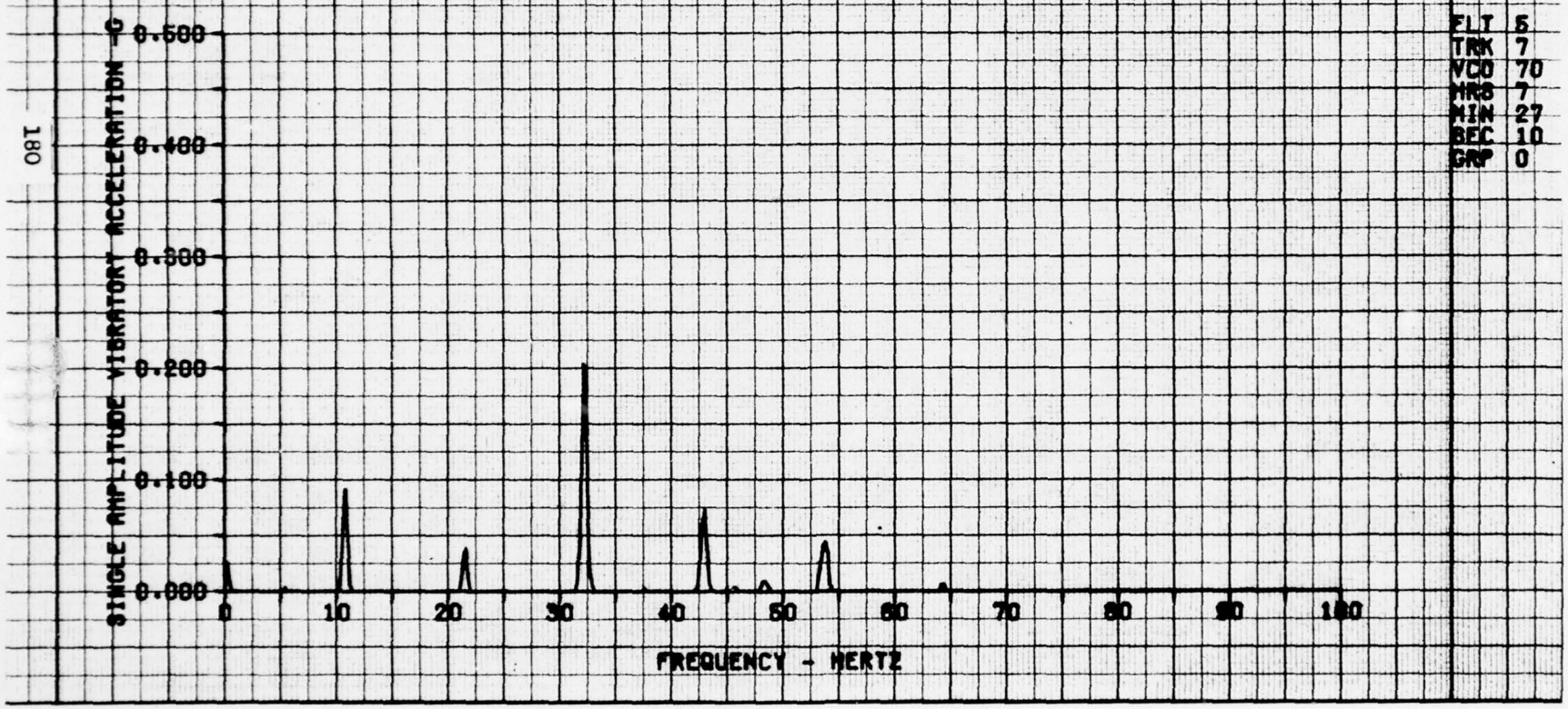
VIBRATION CHARACTERISTICS

NUM-1H USA S/N 66-60869

LOCATION FORWARD PALLET FLOOR MOUNT — FUNDAMENTAL FREQUENCY IS 5.40 HZ

AXIS VERTICAL

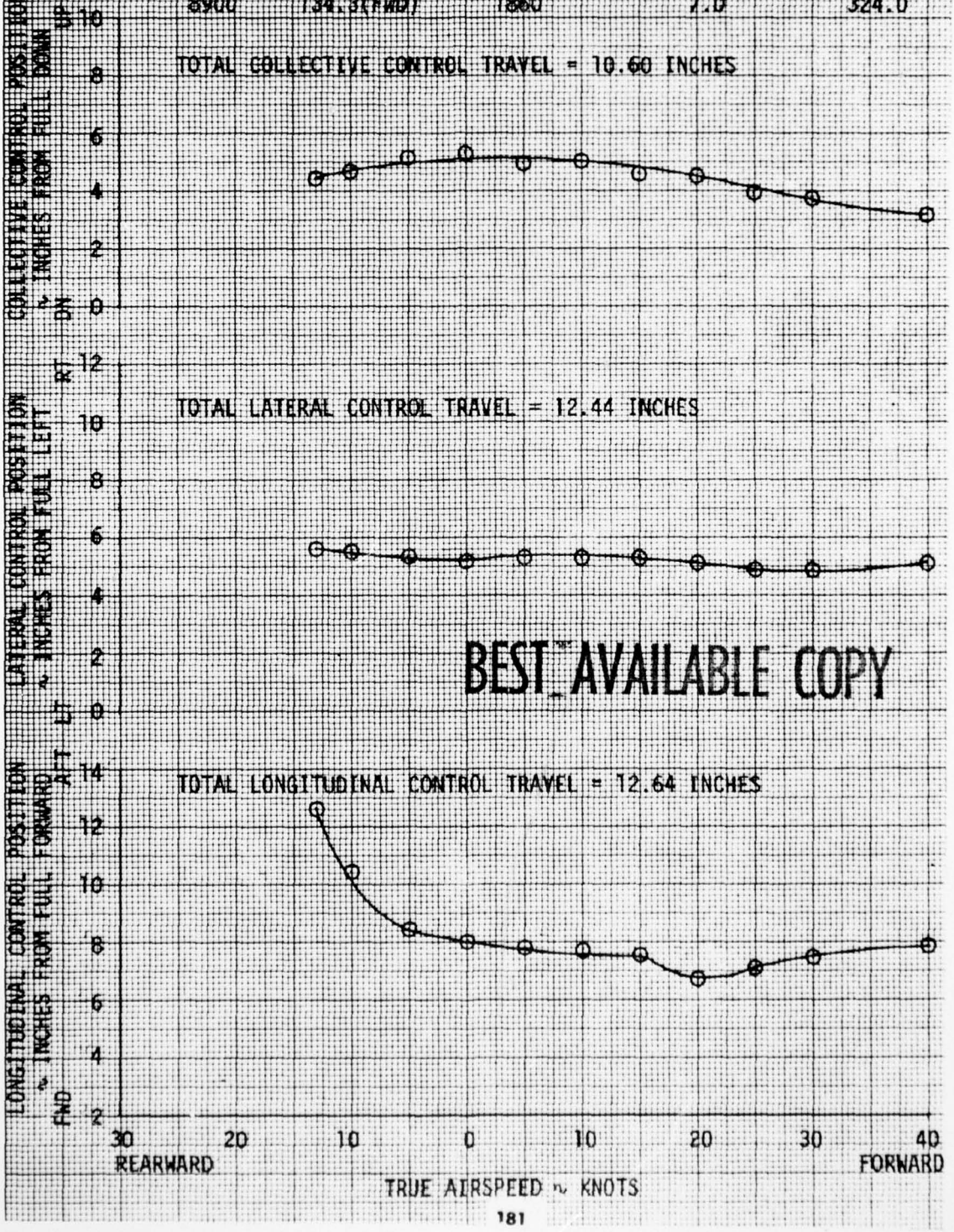
GROSS WEIGHT -LB	LONG CG FS -IN.	LAT CG BL -IN.	DENSITY ALTITUDE -FT	OUTSIDE AIR TEMPERATURE -DEG C	ROTOR SPEED -RPM	TRIM CALIB. AIRSPEED -KTS	FLIGHT CONDITION	CONFIGURATION
9240	135.4 (FWD)	0.0 (MID)	4220	9.0	324.0	80.0	LEFT TURN	CLEAN



FLT	5
TRK	7
VCO	70
HRS	7
MIN	27
SEC	10
GRP	0

FIGURE 161
LOW-SPEED FORWARD AND REARWARD FLIGHT
NUH-1H USA S/N 66-60869

AVG GROSS WEIGHT ~ LB	AVG CG LOCATION ~ IN	AVG DENSITY ALTITUDE ~ FT	AVG AMBIENT TEMPERATURE ~°C	AVG ROTOR SPEED ~ RPM
8900	134.3(FWD)	1860	7.0	324.0



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