

# **GHI Systems Rotary Vibration Machine Manual**

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## **I. INTRODUCTION**

The GHI Systems Rotary Vibration Machine (RVM-1) is intended to provide sine and random rotational vibration to a product. The mechanical system is comprised of an electrodynamic actuator, rotational table and stinger interface. The system includes a computer based system for control of vibration input to the table. The basic controller includes two channels which can be configured individually, the average of the two channels or the extremal, which is the highest of the two. Refer to the VL-144 manual for more information on the vibration controller.

The primary test which this machine is designed for is transportation simulation and its effects on hard disk drive bearings. The drive is mounted on the rotational table such that the platters hub is centered on the table. The table is driven with a predetermined spectrum that simulates the transportation environment.

Other rotary vibration applications can be met by the RVM-I.

## **II. SETUP**

The following describes the assembly and setup of the RVM-1 to ready it for operation using the VL-144 Labworks Vibration Controller.

### ***A. Machine Placement***

Place the RVM-1 on a flat stable surface that is not prone to vibration or movement. On slick surfaces, the table may be prone to “crawling” due to the constant movement of the actuator. Steps should be taken to avoid the possibility of the machine moving toward the edge of the table top and falling off.

**Note:**

*The RVM-1 must be placed on a sturdy surface, a flimsy structure will distort the rotational responses during tests.*

**B. Actuator Mounting**

Before unpacking the actuator, loosen the screws on the bottom of the baseplate that attach the trunnion closest to the edge of the baseplate. The Actuator is shipped in its original packaging. Remove it from the steel trunnion, retain the screws and washers and use them to mount it to the trunnions on the RVM-1. Making sure the lettering on the washers faces the actuator, position the actuator with the power connector facing up and adjust to horizontal position but do not tighten the screws yet. Remove the two screws on the clamping blocks on the actuator nose and rotary table, attach the fiberglass stinger, check for square and level of the stinger and actuator then tighten the screws. Tighten screws on the trunnions and bottom of base plate.

**C. Controller Connections**

The model VL-144 vibration controller is furnished as a turnkey system. Unpack all components and place on a stable surface. Make sure airflow will not be obstructed to the rear fans of the PA-138 power amplifier. With all components' power off, connect the large grey amplifier cable to the top of the actuator. Attach the BNC cable to the AC input position on the amplifier and to the Amp Drive position on the back of the PC. Attach the base to the accelerometer and glue it to the end of the stinger clamp away from the actuator. Attach its cable and the other end to the Channel 1 BNC on the back of the PC. Make all necessary PC connections including the power. For a complete description of the VL-144, its components and diagrams, see its manual.

### III. OPERATION

With the PA-138 amplifiers' gain knob in the reset position, turn all components' power on. Go to the Run Random Test screen, load the desired profile and turn the gain knob to about 11 o'clock. Click on Run Random Test. You are now ready to run a profile. See the VL-144 Manual for a complete description of setup and control functions.

### IV MACHINE COMPONENTS DESCRIPTION

#### **A. Base Plate**

The baseplate is a solid, 1.00" thick aluminum plate, onto which the various components of the system are attached. A large hole is cut in the base plate under the rotary table to allow access from the bottom of the machine, to the bearing adjustment nut and locking mechanism.

#### **B. Rotary Table**

The rotary table is composed of a table top and bearing shaft, the outside cylinder/outer bearing support, bearings and tension nut, locking mechanism and stinger clamp.

#### **C. Stinger**

The fiberglass stinger is the interface between the actuator and the rotary table. It is held in place by clamps on both the table and actuator ends.

#### **D. Actuator**

The Actuator drives the table via the stinger interface. The nose piece attached to the head of the actuator includes the stinger clamp.

## V CONTROLLER

### A. Vibration Control System

The GHI Systems RVM-1 is supplied with the Labworks VL-144 Sine and Random controller. Refer to its users manual for a full and complete description of operation.

## VI MAINTENANCE

### A. Table/Bearings

Detach the stinger from the table and rotate the table weekly 25 times to keep the bearings lubricated and to avoid brinelling due to single spot actuation.

### B. Actuator

Refer to the Labworks Actuator Manual for maintenance schedules.

### C. Stinger

Stingers will degrade due to use. Replacement periods will be directly related to the duration and intensity of use. Signs of wear include reduced control ability, white stress marks at the flex points or cracks. Replace the stinger if any of these occur.

## VII WARNINGS & SAFETY ISSUES

### A. Safety Issues

Safety issues concerning the RVM-1 are minimal, however care should be taken around the actuator, stinger clamps and items mounted to the table. While typical displacements and accelerations of the table under control are minimal, the potential exists for displacements and accelerations which could, under certain circumstances result in minor injury. Keep all body parts clear of the actuator, stinger, stinger clamps and items mounted to the table.

## VIII PERFORMANCE SPECIFICATIONS

### A. *System Specifications*

The following are the Standard Equipment Technical Specifications, subject to change at any time.

Drive application:	1" to 5 1/4"
Base plate:	20"x 16"
Base and table weight:	62 lbs (28kg)
Rotary table:	8" (20cm)
Rotary table holes:	M6 on 45 degree radials, 1 inch spacing
Rotary table bearing:	High Load Needle bearings
Actuator:	75 lbs peak sine force, 50 lbs random force electrodynamic
Testing wt, drive & fixture:	5 lbs or 2.3kg
Axis location:	Inside or outside of drive.
Drive operation mode:	Operating or non-operating.
Frequency Ranges Random:	6 Hz to 2KHz or 2 Hz to 500Hz
Sine:	2 Hz to 5K Hz

## IX TECHNICAL SUPPORT

A. **Warranty**

GHI Systems RVM-1 machines are protected under a three month limited warranty. See GHI Systems Terms and Conditions.

B. **GHI Systems Customer Service**

GHI Systems Customer Support and Technical Service personnel are available during normal business hours (8:30 AM to 5 PM, PST), and may be reached at (310) 548-6544 voice, ghi@ghisys.com email, and (310) 548-5749 FAX. Customer support is provided free of charge for one year after date of purchase.

C. **Training**

GHI Systems provides on-site training at competitive rates. Please contact GHI Systems Sales for your requirements.