TEST REPORT

1. Applicant

Name : EUNHA MACHINERY INDUSTRIAL Co., Ltd.

Address : 141 Kwangmyong Industrial complex 201, Haan-dong, Kwangmyong-city Kyonggi-do, Korea

2. Products

Name : Actuator

Model/Type : SA005

Manufacturer : EUNHA MACHINERY INDUSTRIAL Co., Ltd.

3. Test Standard/Method : Specification requested by the applicant

4. Test Results : Refer to the contents

5. Use of Report : Quality control

6. Date of Application : November 14, 2007

7. Date of Issue : December 17, 2007

Tested by

Byung-IL Kang
Reliability Assessment Team

Approved by

Min-Ho Jung
Director, Reliability Assessment Team Leader

Korea Testing Laboratory

● The summary of test results

Test item	Test condition	Result
Vibration test	1. Test condition • Frequency & Amplitude : 10 Hz → 57.55 Hz, 0.15 mm(level-peak) 57.55 Hz → 150 Hz, 2 g • Test duration : Total 90 minutes (30 minutes for each X・Y・Z axis) • The condition in the test : Operation 2. Acceptance criterion • Mechanical failure should be reason for rejection. • The specimen should operate under the condition mentioned in the sub-clause 3.2.	PASS
Mechanical shock test	1. Test specification • Acceleration & normal duration : 30 g, 18 ms • The number of times : Total 18 times (3 times for each ±X・±Y・±Z axis) • The condition in the test : Non-operation 2. Acceptance criterion • Mechanical failure should be reason for rejection. • The specimen should operate under the condition mentioned in the sub-clause 3.2.	PASS

● Contents

1. General description

The tests were performed in accordance with a requirement of the applicant and the test specifications submitted by the applicant.

2. Specimen

2.1 Specification

Product	Model	The rated voltage	Test item	Sample size
Actuator	SA005	AC 220 V	Vibration	1
			Mechanical shock	

2.2 Photo

Figure 1. Specimen

3. Test Specification

3.1 Standard Atmospherical Conditions

3.1.1 Standard atmospherical conditions for tests and measurements

Unless otherwise specified, the tests shall be performed at below conditions.

(1) Temperature : 15 ℃ ~ 35 ℃

(2) Relative humidity : 25 %R.H. ~ 75 %R.H.

(3) Air pressure : 86 kPa ~ 106 kPa

3.1.2 Recovery

Unless otherwise specified, recovery shall be kept during 1 ~ 2 hours under standard atmospherical condition of the sub-clause 3.1.1.

3.2 Function check

3.2.1 Method

- There check that the operation current(4±0.2 mA ~ 20±0.2 mA) normally measure with each 14 seconds rotating the shaft of the specimen under the rated voltage.
- There check that the shaft of the specimen rotate normally with each 14 seconds increasing the counter of the controller(**rafer to the Figure 2**) under the rated voltage.

Figure 2. Controller

3.3 Vibration test

3.3.1 Method

Item	Test condition
Waveform	sine wave
Frequency & Amplitude	10 Hz → 57.55 Hz, 0.15 mm(level-peak)
	57.55 Hz → 150 Hz, 2 g
Sweep rate	15 min./cycle
The number of times	Total 90 minutes(30 minutes for each X·Y·Z axis)
The condition in the test	Operation

3.3.2 Acceptance criterion

- Mechanical failure should be reason for rejection.
- The specimen should operate under the condition mentioned in the sub-clause 3.2.

3.4 Mechanical shock test

3.4.1 Method

Item	Test specification
Waveform	half-sine
Acceleration & normal duration	30 g, 18 ms
The number of times	Total 18 times(3 times for each ±X · ±Y · ±Z axis)
The condition in the test	Non-operation

3.4.2 Acceptance criterion

- Mechanical failure should be reason for rejection.
- The specimen should operate under the condition mentioned in the sub-clause 3.2.

4. Test result

Test was done in conformity with clause 3 and the test results are as follow.

4.1 Vibration test

Test item	Acceptance criterion	Result
Appearance status	• Mechanical failure should be reason for rejection.	PASS
Function check	• The specimen should operate under the condition mentioned in the sub-clause 3.2.	PASS

4.2 Mechanical shock test

Test item	Acceptance criterion	Result
Appearance status	• Mechanical failure should be reason for rejection.	PASS
Function check	• The specimen should operate under the condition mentioned in the sub-clause 3.2.	PASS

Figure 3. Initial photo

Figure 4. Final photo

5. Test photos

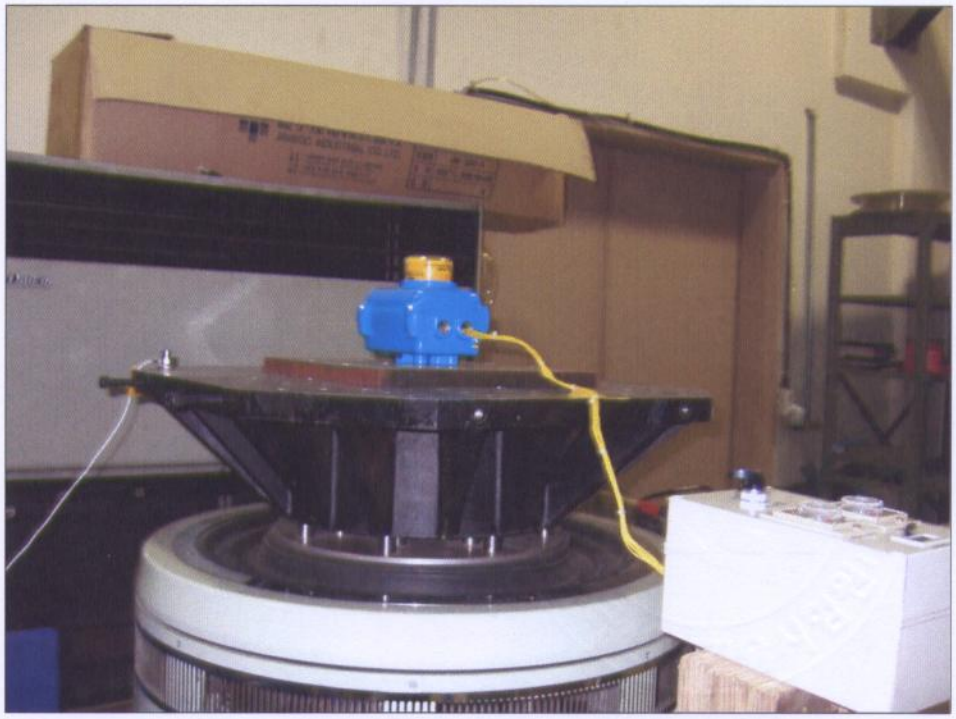

Figure 5. Test photo of Z axis vibration & mechanical shock test

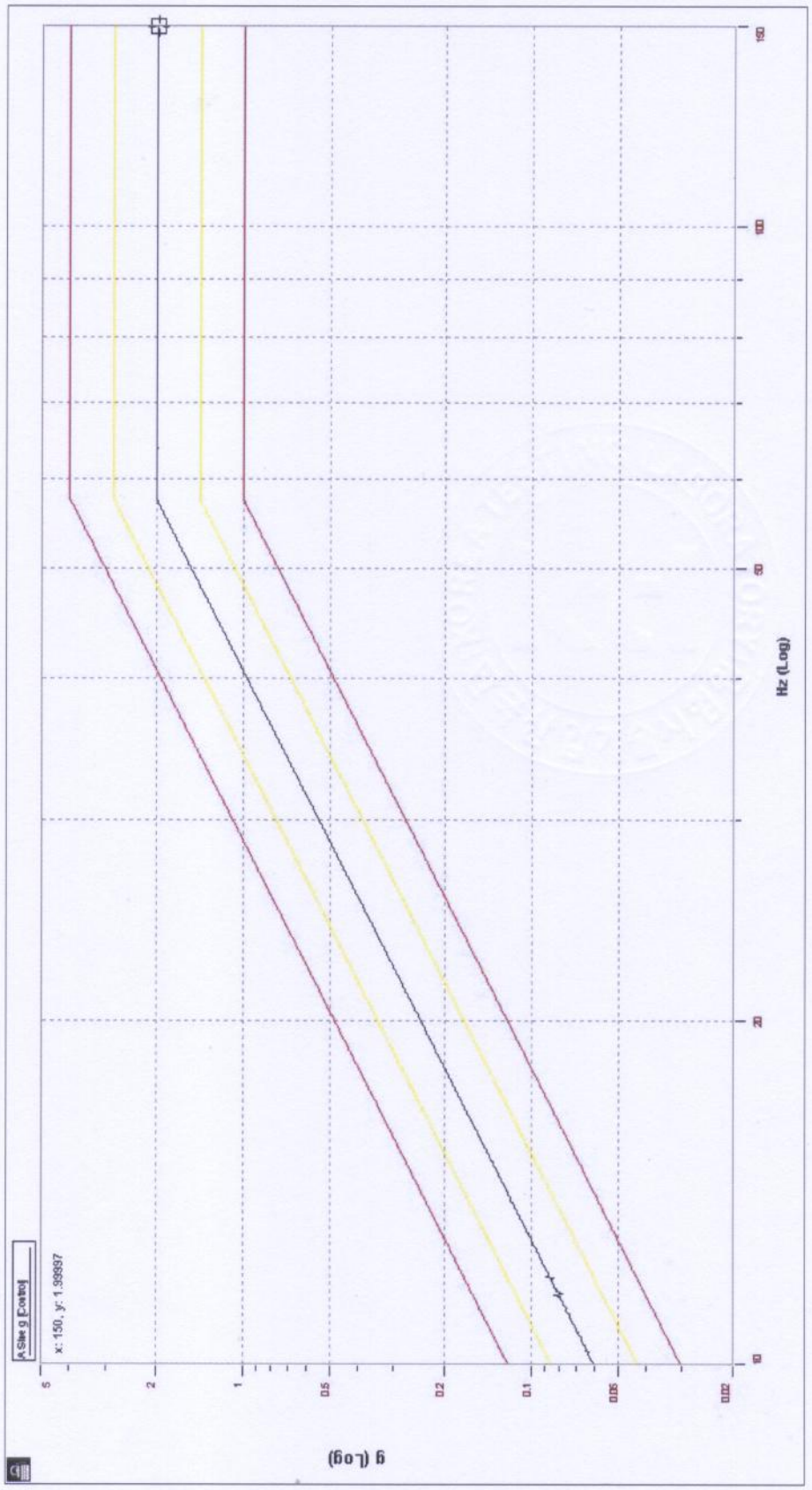

Figure 6. Test graph of Z axis vibration test

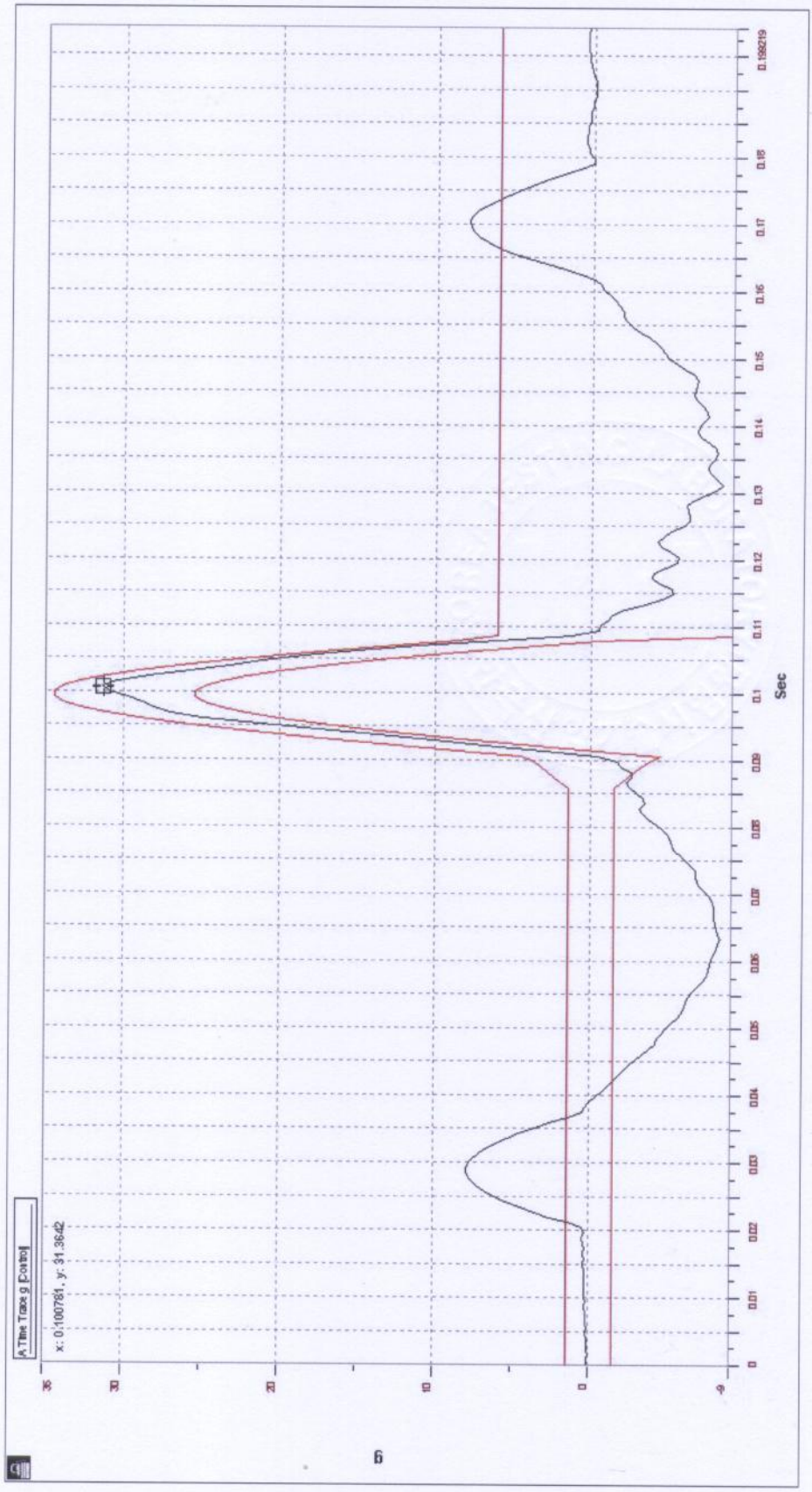

Figure 7. Test graph of +Z axis mechanical shock test

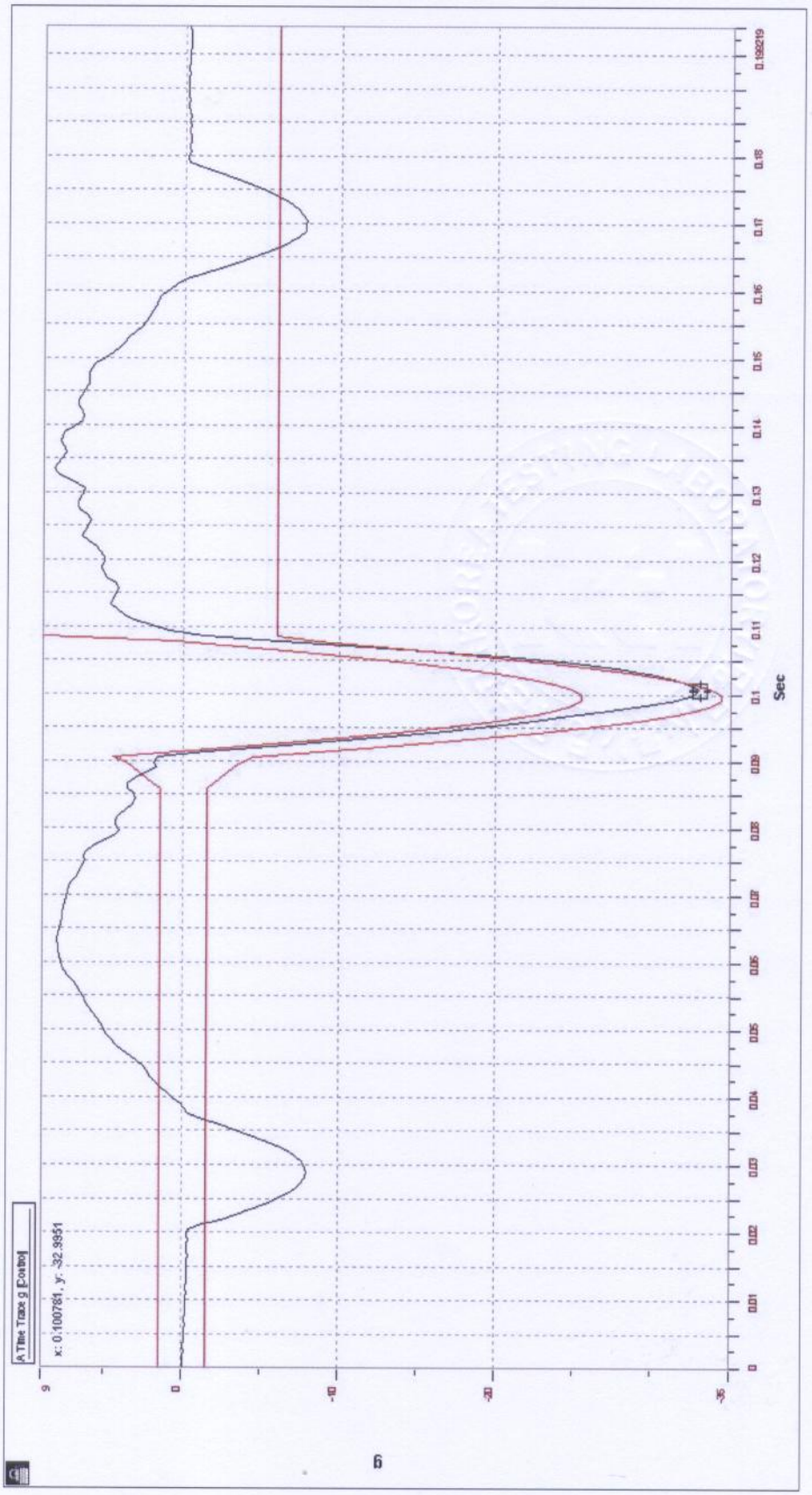

Figure 8. Test graph of -Z axis mechanical shock test

Figure 9. Test photo of X axis vibration & mechanical shock test

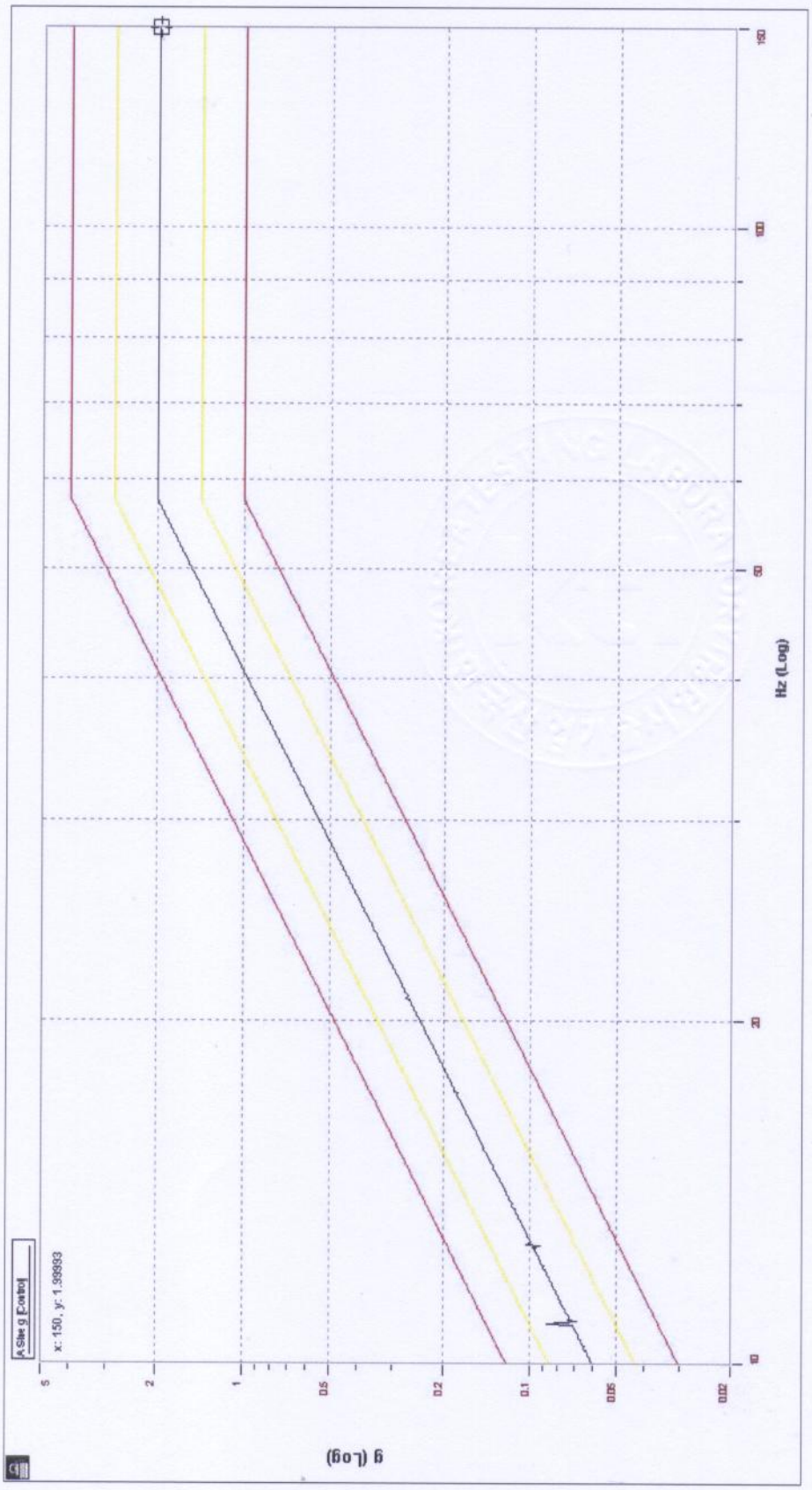

Figure 10. Test graph of X axis vibration test

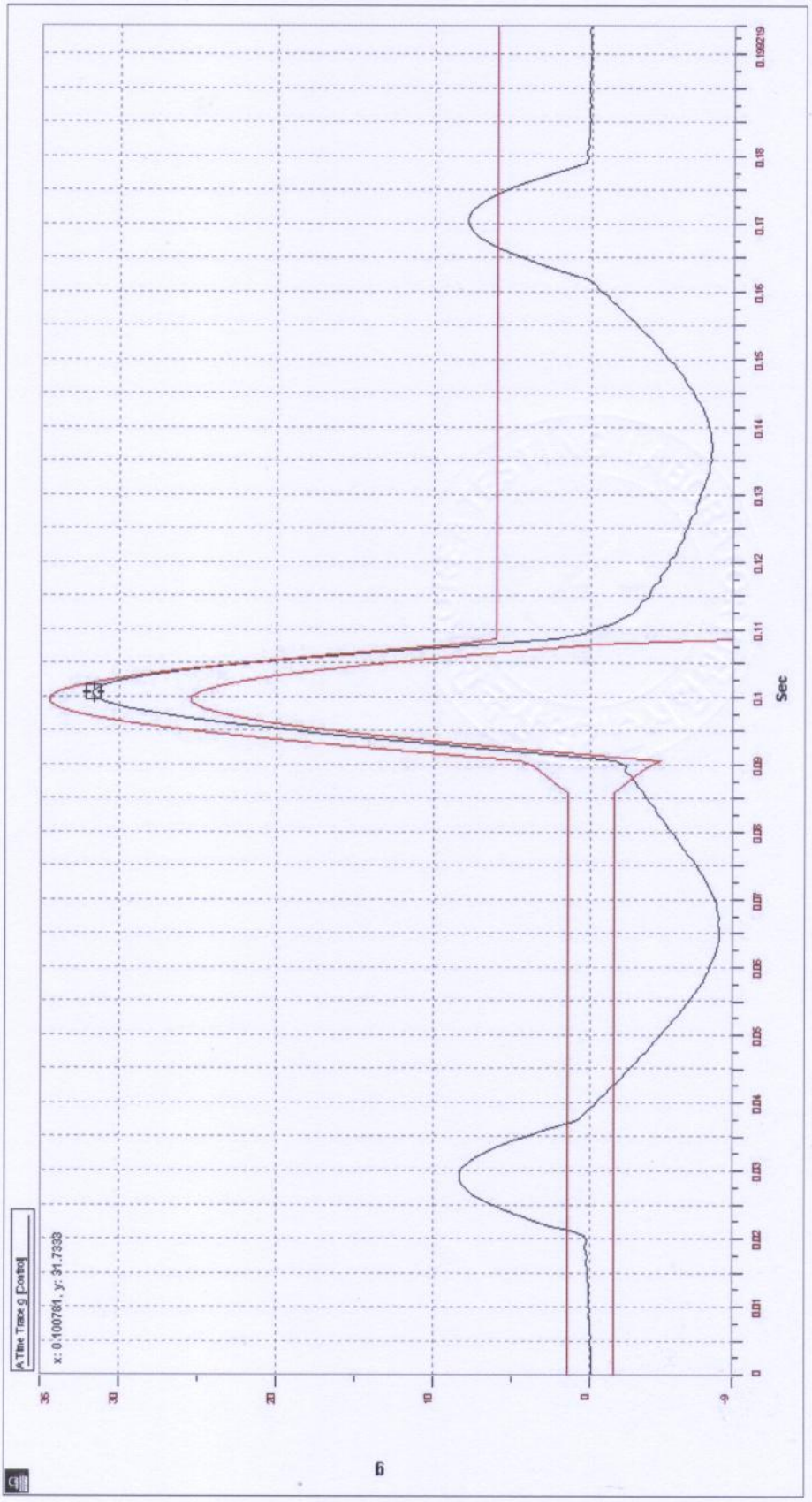

Figure 11. Test graph of +X axis mechanical shock test

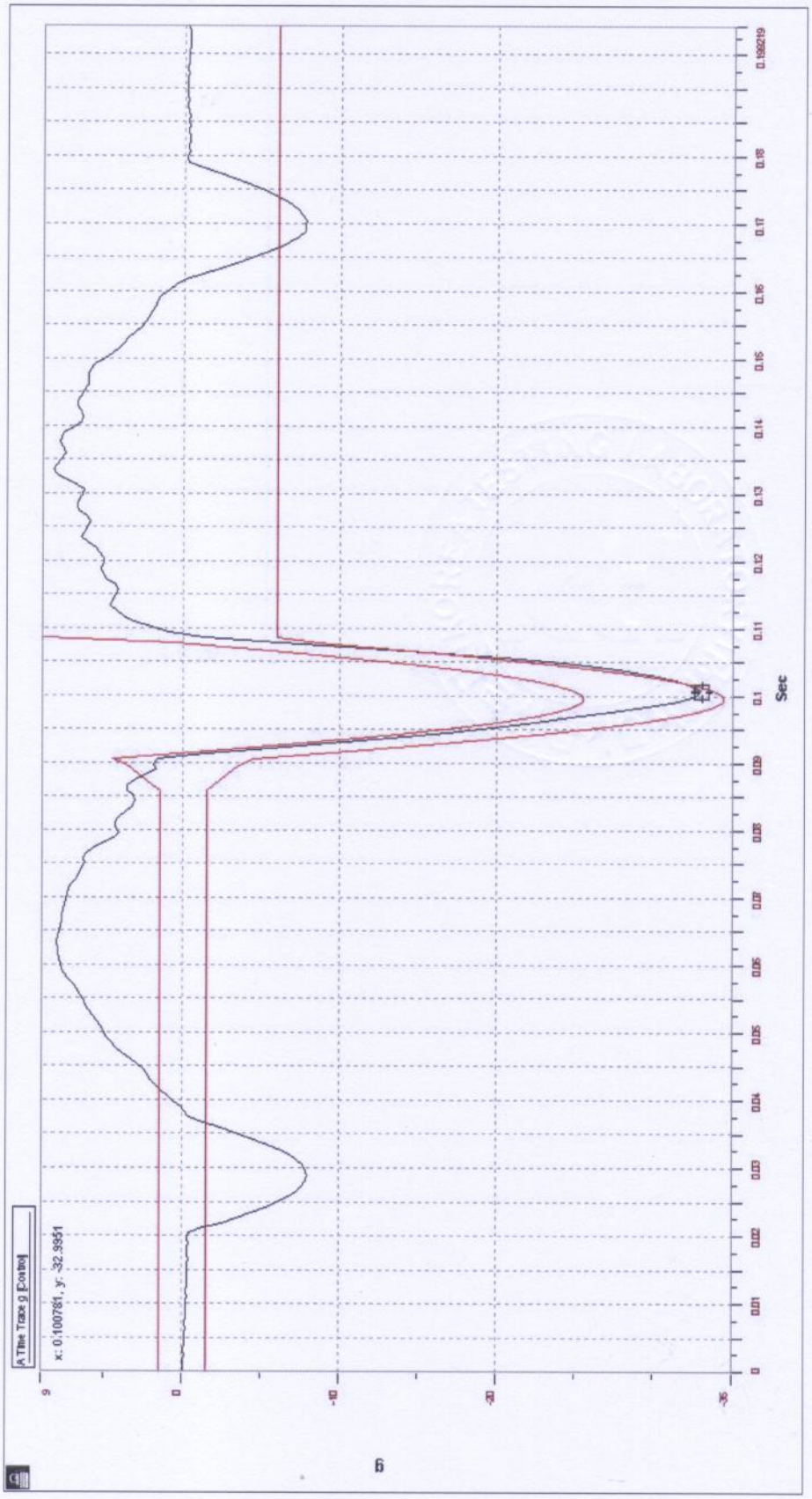

Figure 12. Test graph of -X axis mechanical shock test

Figure 13. Test photo of Y axis vibration & mechanical shock test

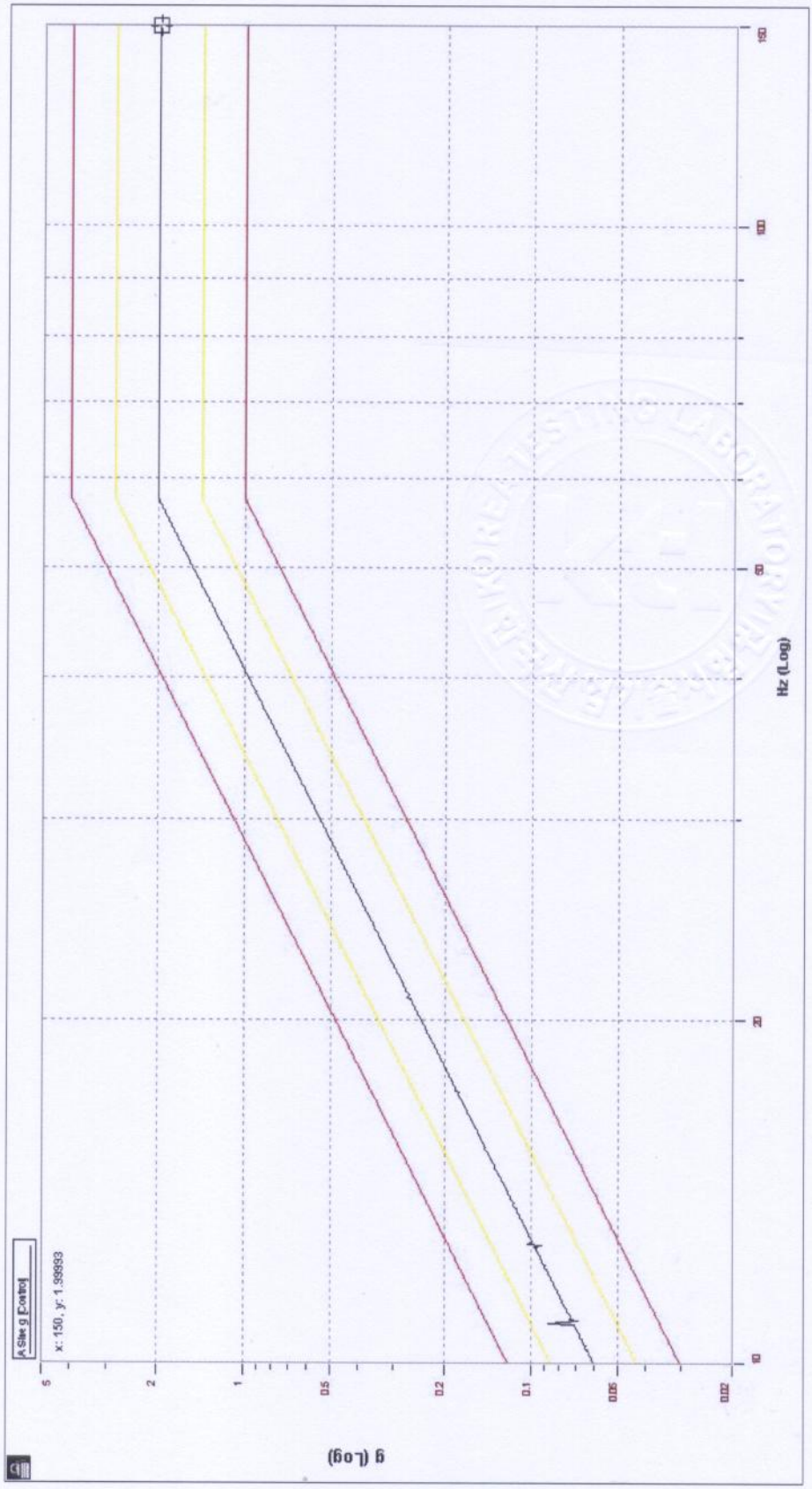

Figure 14. Test graph of Y axis vibration test

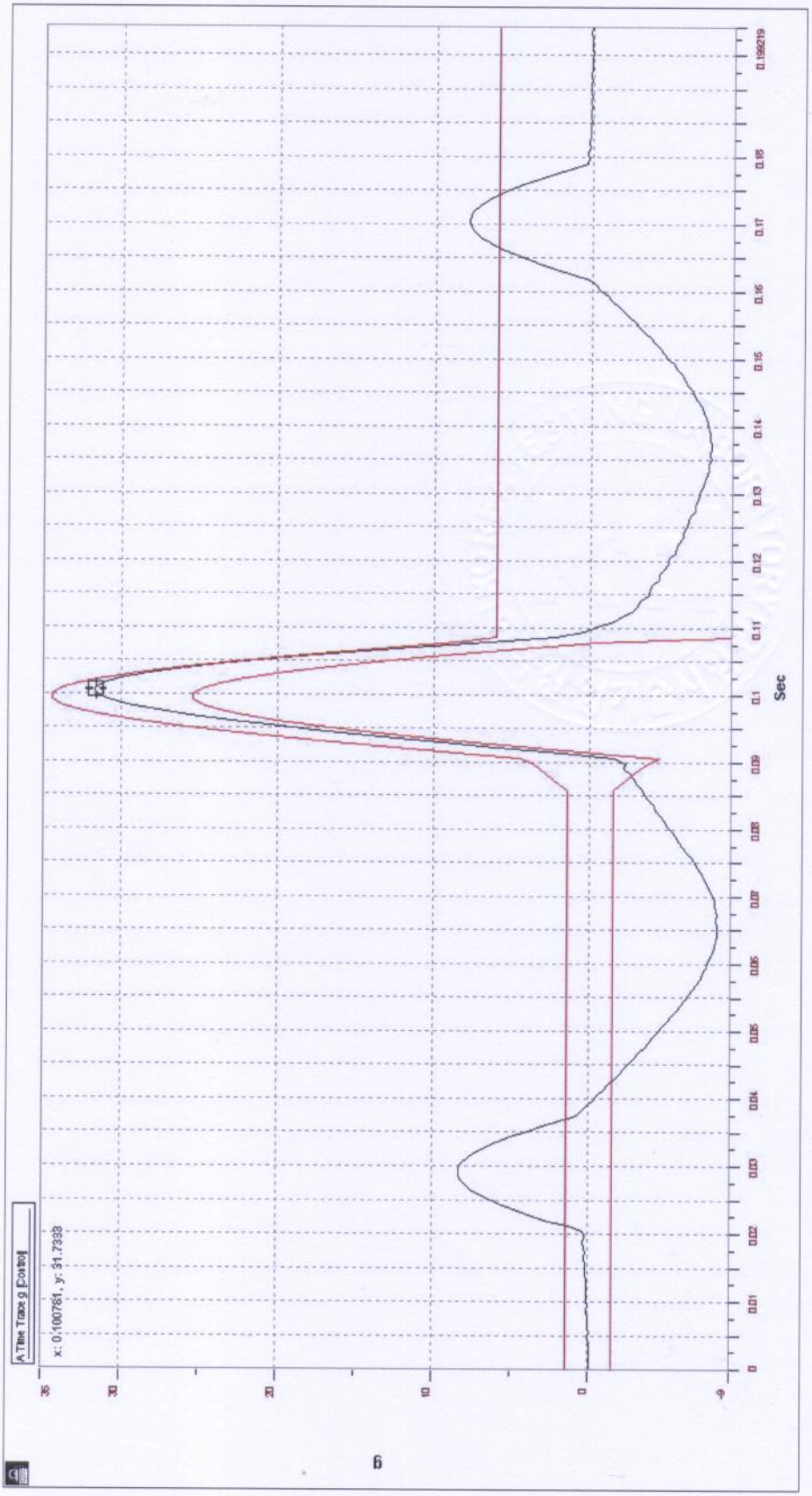

Figure 15. Test graph of +Y axis mechanical shock test

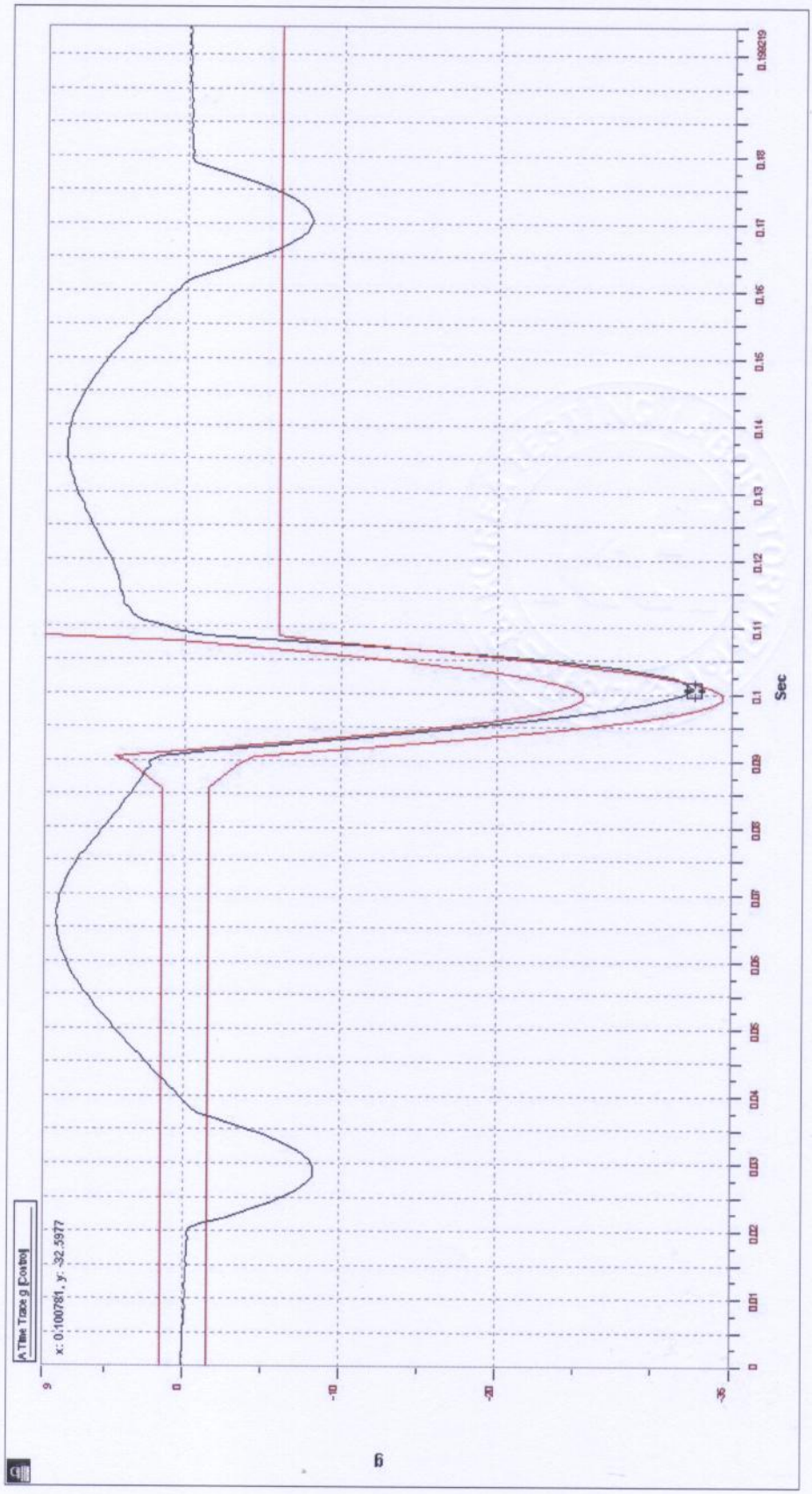

Figure 16. Test graph of -Y axis mechanical shock test

6. Test equipments

List of test equipment

Equipment	Manufacture	Model
Mechanical tester	ets	ETS-3000