

TOPTESTER LTD

TEST REPORT

CUSTOMER: HANDSHAKE FINLAND OY

TEST NAME: MIL-STD-810H, METHOD 516.8, SHOCK

EQUIPMENT UNDER TEST

DEVICE NAME: COMPASS R
VERSION NR: COMPASS R (V.6)
DEVICE ID: 6078

TEST DATE: 28.10.2020

Test id: Shock_Hanshake_201028_01

Report version: 1.0

Persons in charge of the test

Customer: Niko Peltoniemi

Toptester: Pasi Tiuraniemi

Test ordered by: Niko Peltoniemi

Test order date: September 2020

TEST REPORT HISTORY

Version	Date	Change description	Changes made by
1.0	10.11.2020	First version of the report is 1.0. If no changes are necessary, it will be also the final version.	Pasi Tiuraniemi

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1 TEST SUMMARY

Used standard or test method summary

This test was based on MIL-STD-810H standard, Method 516.8 Shock, Procedure I Functional shock with 40 g and 70 g acceleration levels.

Description of equipment under test

Equipment Under Test (EUT):

- Compass R Multifunctional High Power Headlamp, 1 pcs
 - Version: Compass R (v.6)
 - Device ID: SKU: 6078

Test result summary

No external damages caused by the shock tests were found. EUT was functional during and after the test. Thus, the test result is **Pass**.

2 Introduction

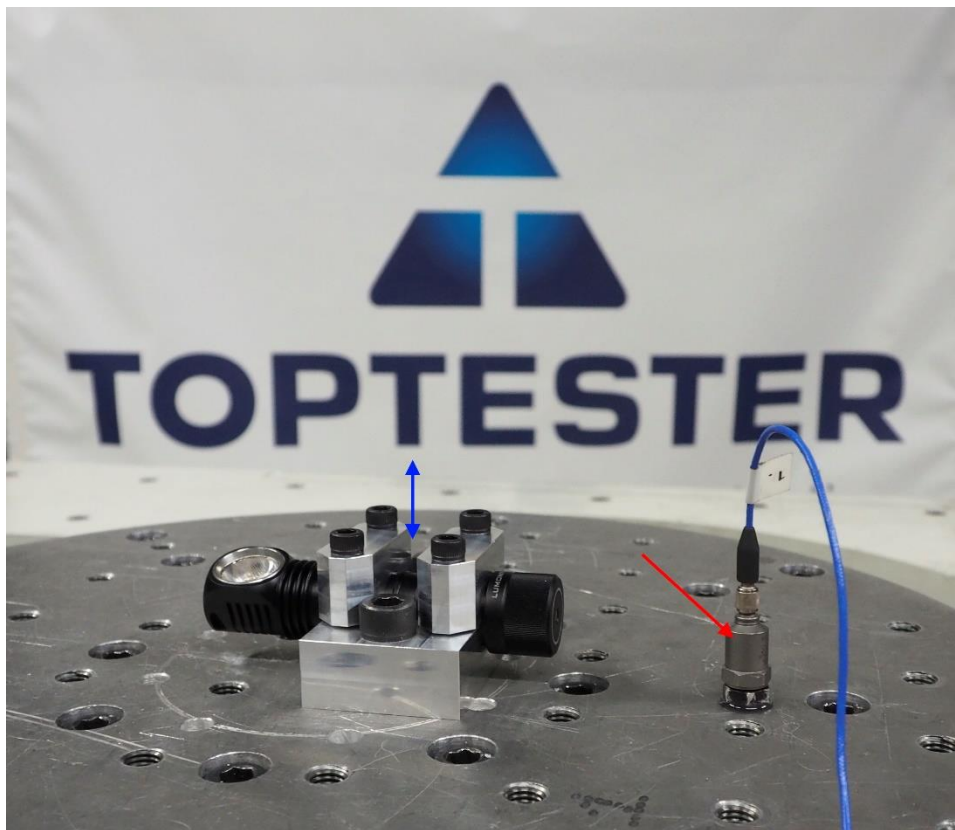
2.1 Background

Test was ordered by Handshake Finland as a part of product testing program.

2.2 Equipment under test

Equipment Under Test (EUT):

- Compass R Multifunctional High Power Headlamp, 1 pcs
 - Version: Compass R (v.6)
 - Device ID: SKU: 6078



Picture 1. Compass R headlamp on shaker tester

2.3 Goals of the test

The goal of the test was to see if EUT pass or fail the acceptance criteria named in the test standard and test plan.

3 Test method and measurement description

3.1 Test Method

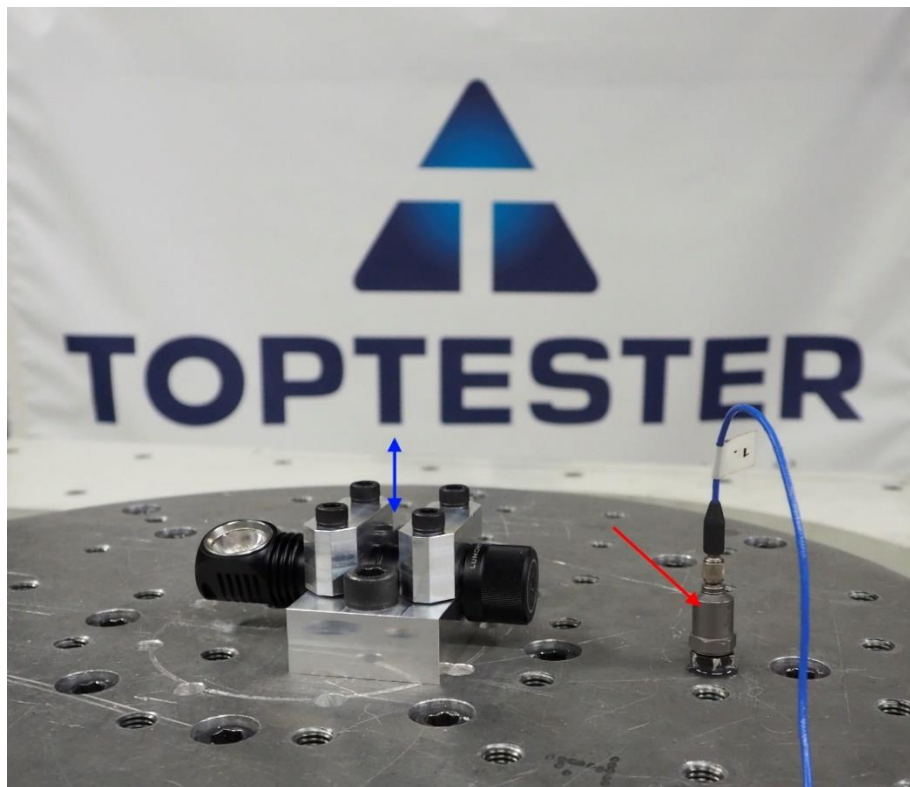
The test was performed according to MIL-STD-810H, Method 516.8 Shock, with following parameters:

Procedure I Functional shock

- Acceleration: 40 g
- Pulse duration: 11 msec
- Pulse shape: Terminal sawtooth
- 100 pcs shocks on each 6 directions (+Z, -Z, +Y, -Y, +X, -X)
- Speed: One pulse / 2 sec
- 3 pcs -9 db, -6db and -3 db preliminary pulse shape adjustment pulses were performed
- Control sensor (red arrow) and Test directions (blue arrow)

Procedure I Functional shock

- Acceleration: 70 g
- Pulse duration: 11 msec
- Pulse shape: Terminal sawtooth
- 100 pcs shocks on each 6 directions (+Z, -Z, +Y, -Y, +X, -X)
- Speed: One pulse / 2 sec
- 3 pcs -9 db, -6db and -3 db preliminary pulse shape adjustment pulses were performed
- Control sensor (red arrow) and Test directions (blue arrow)



Picture 2. Test setup on shaker system

3.2 Analyses

Before, during and after test following analyses were performed

- Visual check
- Inspection to verify the electrical functionality of the device

3.3 Acceptance criteria

After the test, EUT was inspected. Test result could be marked as pass if device could be determined to function normally.

3.4 Test Reliability Control and Measurement

Tira shaker system was controlled with Siemens LMS Scadas mobile vibration controller. Kistler accelerometer was used to control the vibration profile.

Vibration levels were recorded on Siemens Test.Lab program file.

Table 1. Used accelerometer.

Manufacturer	Model	Serial number	Calibration date	Calibration valid until
Kistler	8704B50M1	C129604	24.10.2019	24.4.2021

4 Test and measurement time and resources

Test date 28.1.2020

Test personnel Pasi Tiuraniemi

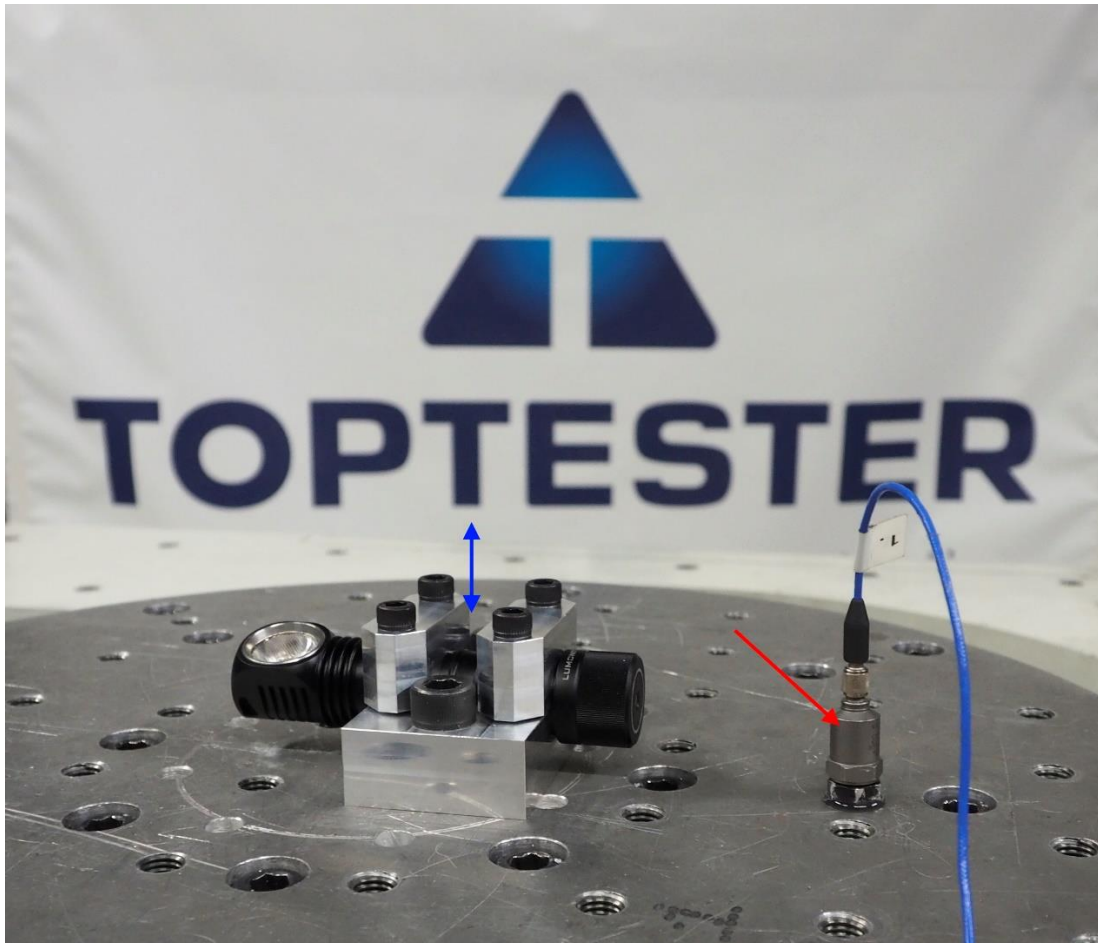
Test sites Toptester, Rovaniemi
Ambient temperature: 22,1 °C
Ambient relative humidity: 53,4 %

Test and measurement equipment:

- Tira shaker system TV59335-3"/RIT-440 TGT MOH 30 XL
- Power supply
- Siemens LMS Scadas Mobile frontend (serial number 22160305), calibration valid until 10.6.2021
- Siemens Simcenter Testlab 18 vibration software
- Kistler accelerometer sensor
- Measurement PC
- VAISALA HMT337 temperature & humidity transmitter (serial number N2050042), calibration valid until 18.2.2022

5 Test results

EUT was inspected before the vibration test and light was adjusted to medium power. EUT was attached to the jig and to the shaker system moving head jig. Two different jigs were used to achieve all the 3 vibration directions.

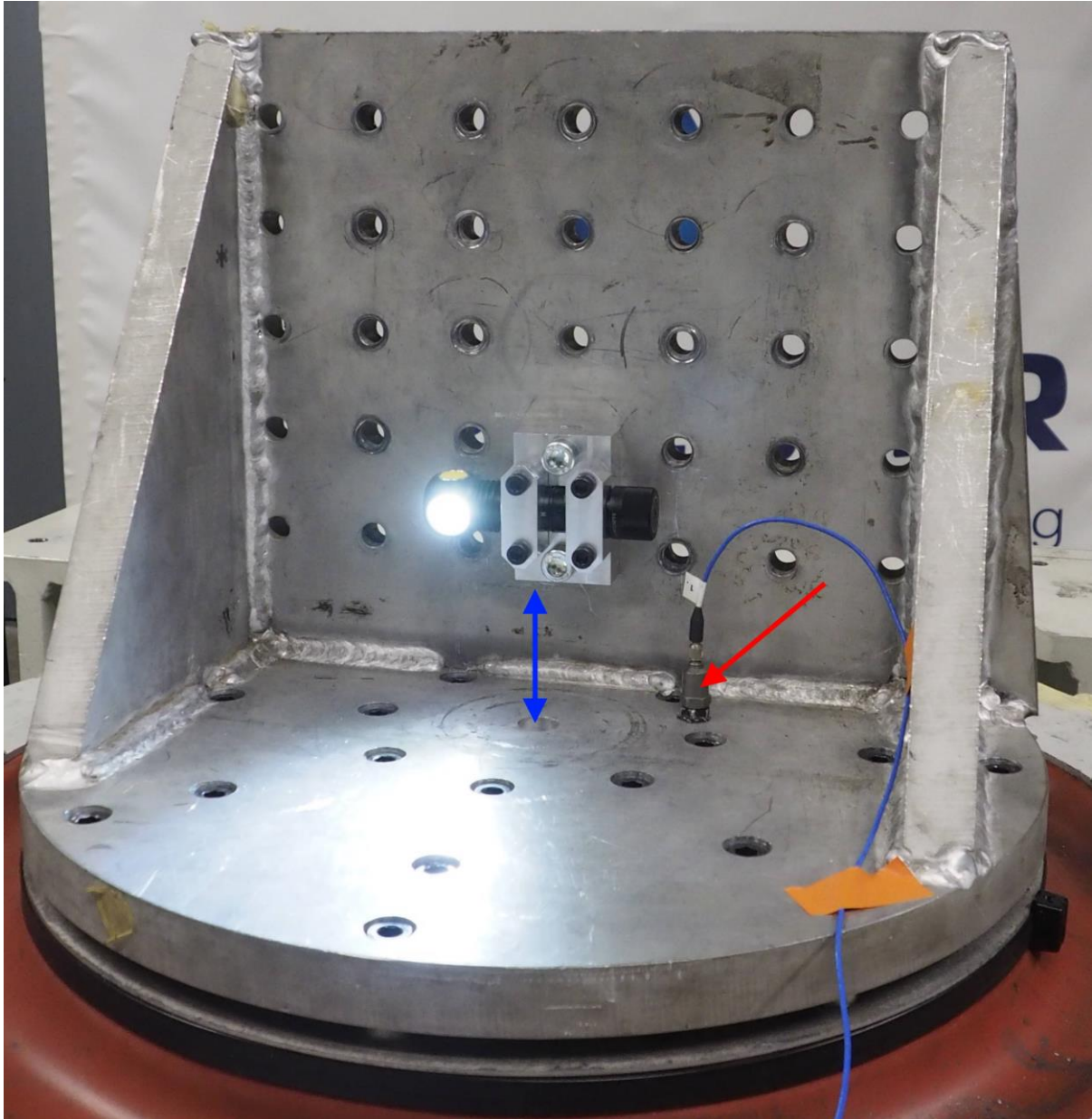


Picture 3. Test setup on +Z direction and – Z direction

The order of the vibration directions was: +Z, -Z, Y, -Y, X and -X

100 pcs of positive 40 g shock pulses were performed to +Z direction, and then 100 pcs of negative 40 g shock pulses were performed to -Z direction. Test set continued with 100 pcs of positive 70 g shock pulses to +Z direction and then 100 pcs of negative 70 g shock pulses to -Z direction.

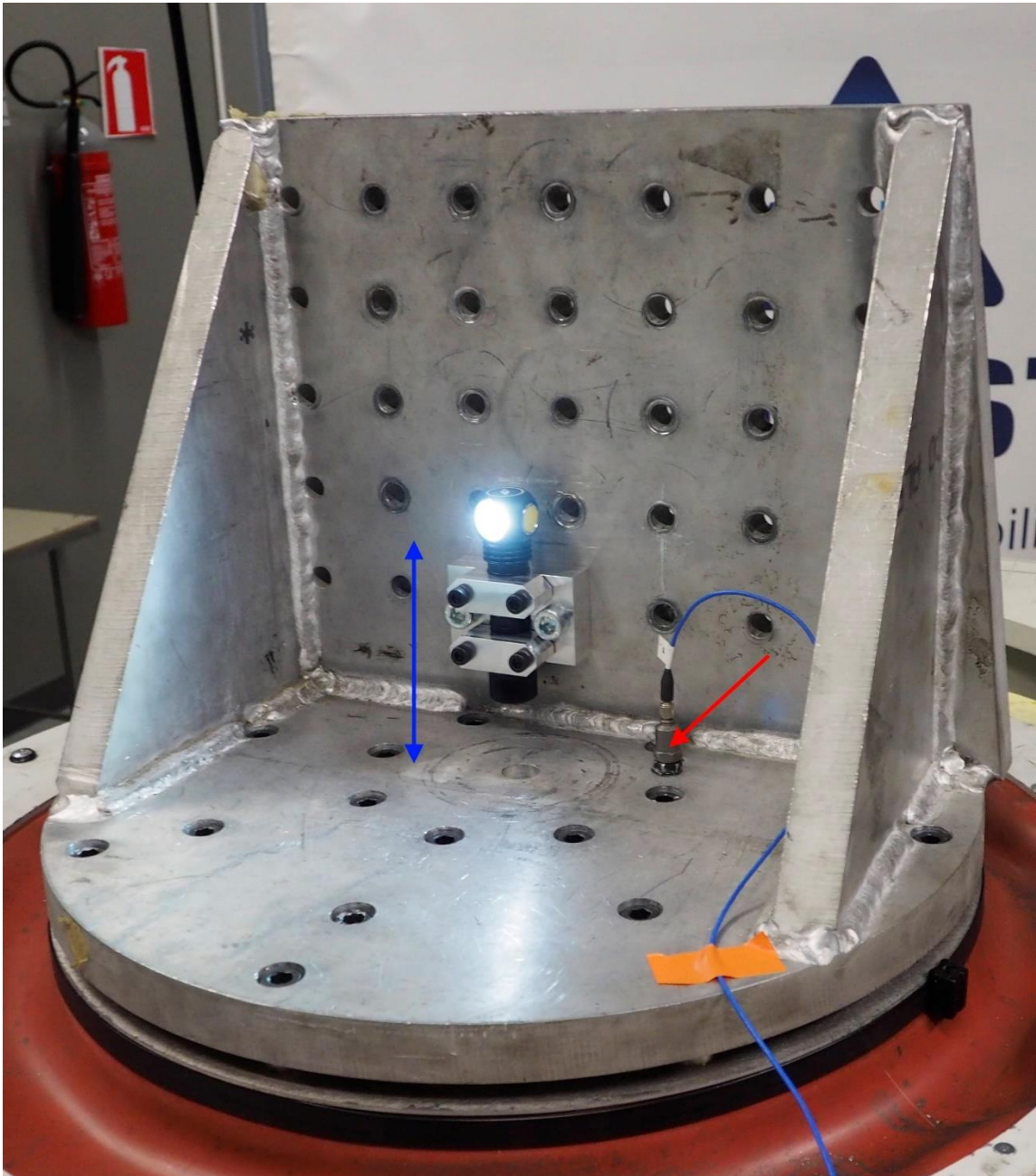
After the test to Z direction, angled shaker jig was installed to shaker system. EUT jig was then installed for the test to Y direction. Control Sensor (red arrow) was glued on angled jig. Blue arrow points out the movement to Y direction.



Picture 4. Test setup on +Y direction and -Y direction

100 pcs of positive 40 g shock pulses were performed to +Y direction, and then 100 pcs of negative 40 g shock pulses were performed to -Y direction. Test set continued with 100 pcs of positive 70 g shock pulses to +Y direction and then 100 pcs of negative 70 g shock pulses to -Y direction.

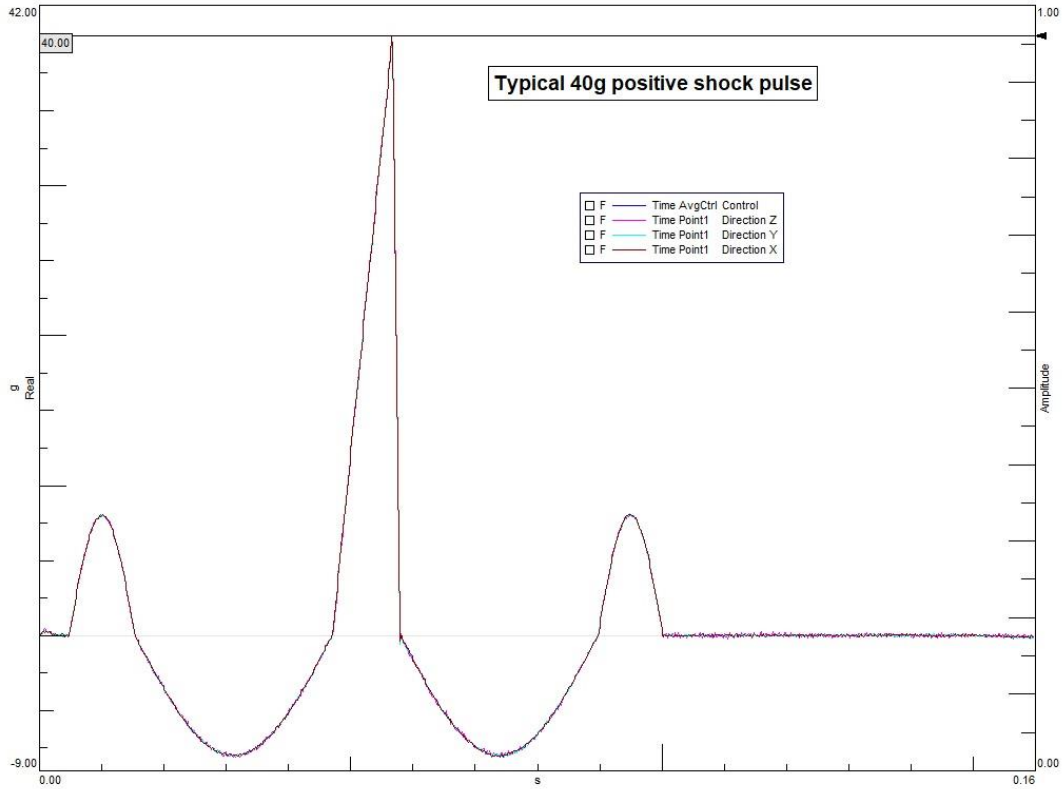
After Y direction test, EUT jig was then installed for the tests to X direction. Blue arrow points out.



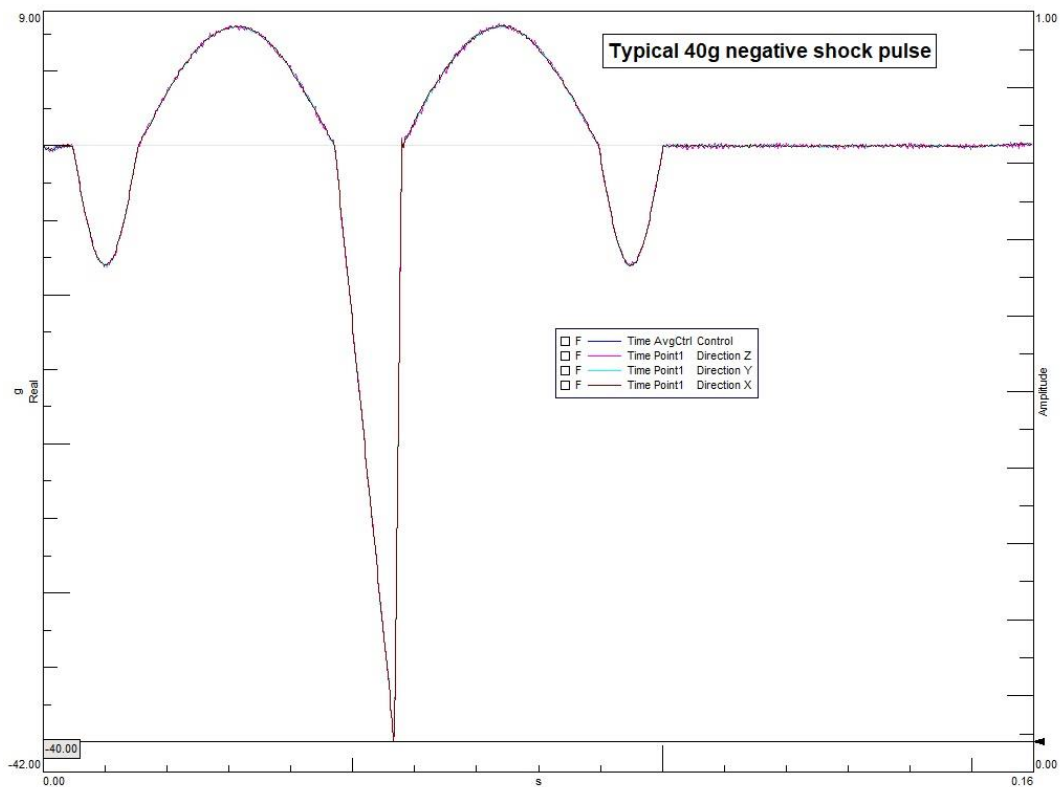
Picture 5. Test setup on +X direction and - X direction

100 pcs of positive 40 g shock pulses were made to +X direction, and then 100 pcs of negative 40 g shock pulses were made to -X direction. Test set continued with 100 pcs of positive 70 g shock pulses to +X direction and then 100 pcs of negative 70 g shock pulses to -X direction.

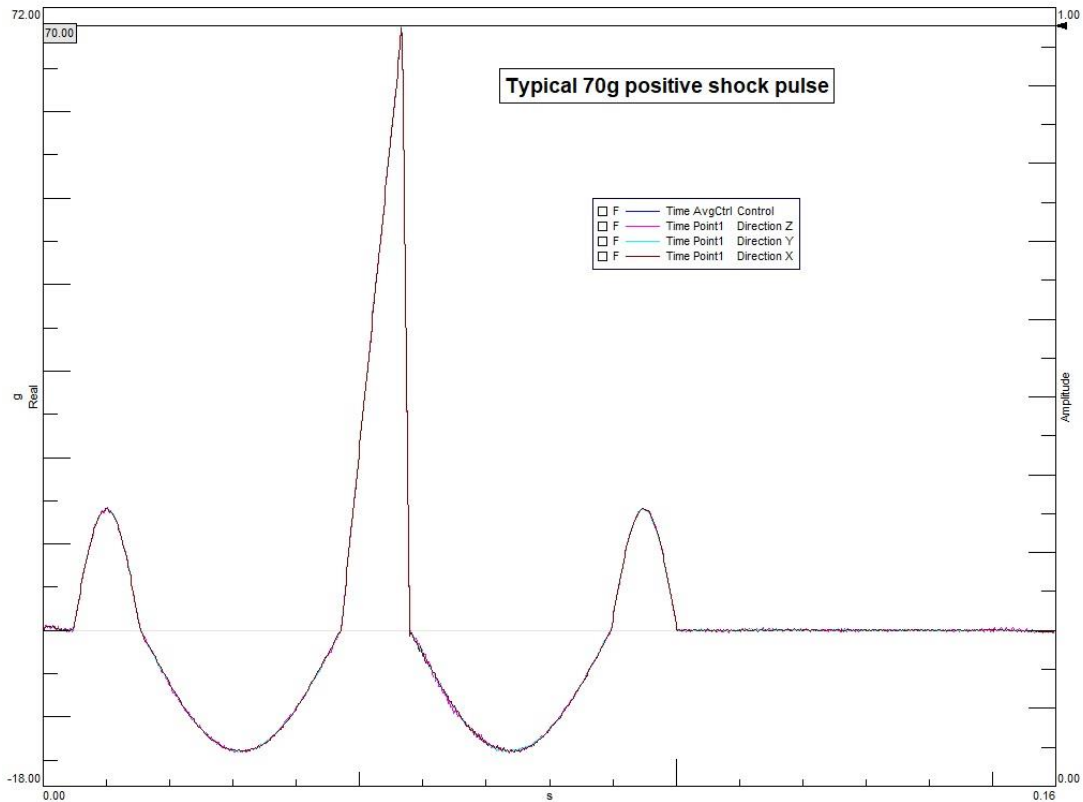
During all shock test pulses, EUT was operational. No visual damages were found.



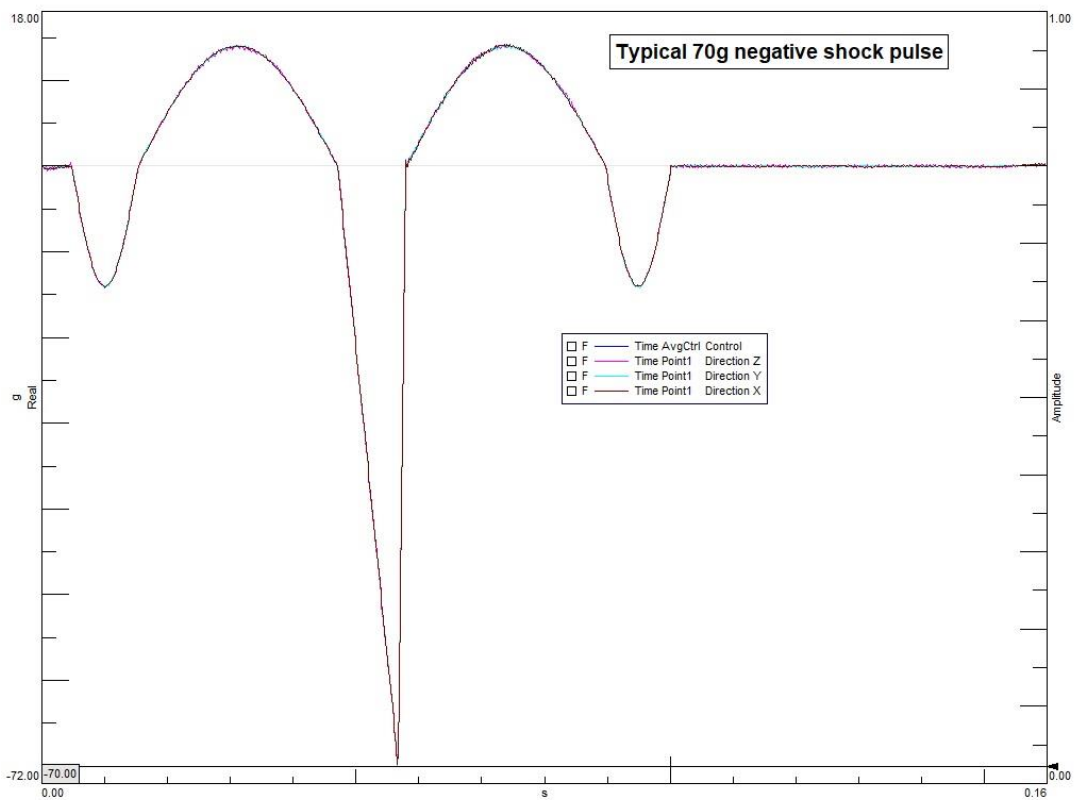
Picture 6. Typical 40g positive shock pulses on Z, Y and X direction



Picture 7. Typical 40g negative shock pulses on Z, Y and X direction



Picture 8. Typical 70g positive shock pulses on Z, Y and X direction



Picture 9. Typical 70g negative shock pulses on Z, Y and X direction

6 Conclusions and recommendations

No external damages caused by the shock test were found. EUT was functional during and after the test. Thus, the test result is **Pass**.

7 Quality



Toptester is an ISO 9001
certified organisation

