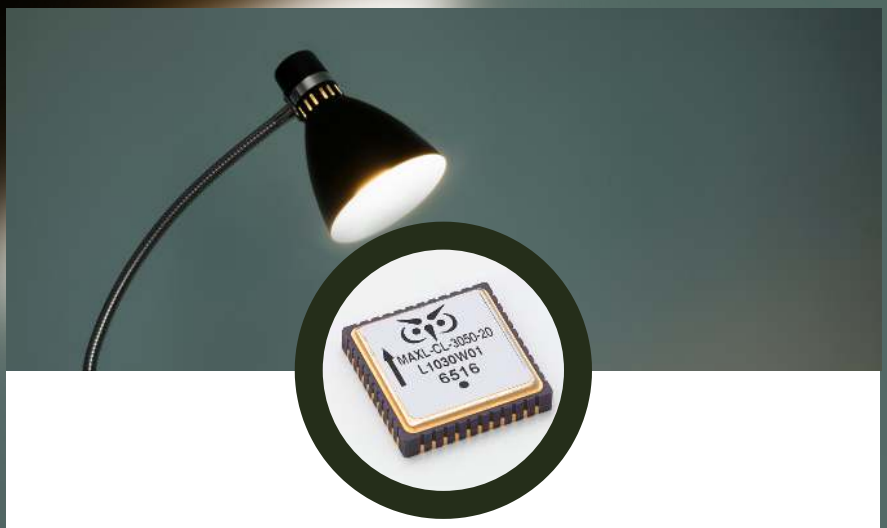


MAXL-CL-3050

50g sensing range Closed Loop MEMS accelerometer in full production

By Physical Logic

July 2021

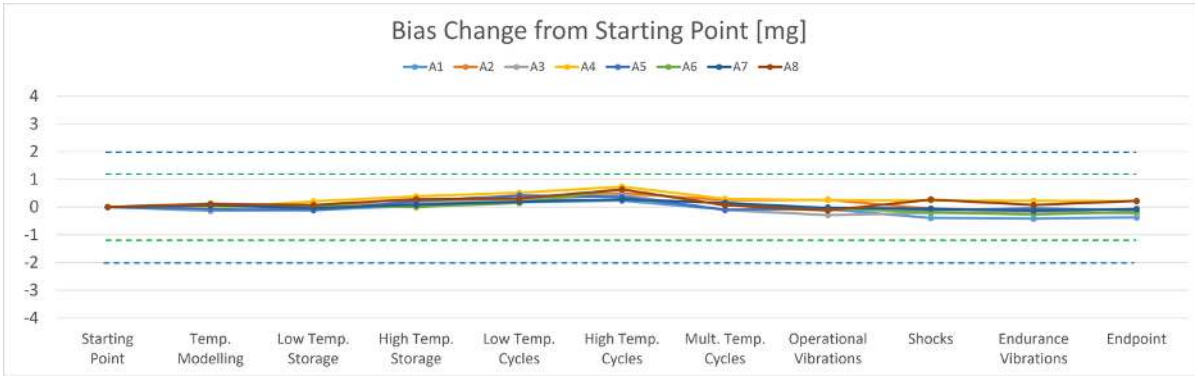
Physical Logic is proud to announce the completion of qualification and production readiness steps of the MAXL-CL-3050, a new 50g sensing range sensor is based on the flagship accelerometer family of sensors, the MAXL-CL-3000. First production batches have been assembled and are currently being distributed to our worldwide valued customers.
As with our currently available 15g and 30g configurations, the performance of MAXL-CL-3050 allows it to compete with traditional mechanical accelerometers in the most demanding navigation related applications.
In addition, a qualification program of MAXL-CL-3070 units has also been performed. We are continuing with production readiness activities, and in parallel preparing first prototypes for first customers.
In this paper, we present some test results of the MAXL-CL-3050 qualification program in which units were exposed to a series of environmental tests over a period of several weeks. Detailed test results are shared with our valued customers.

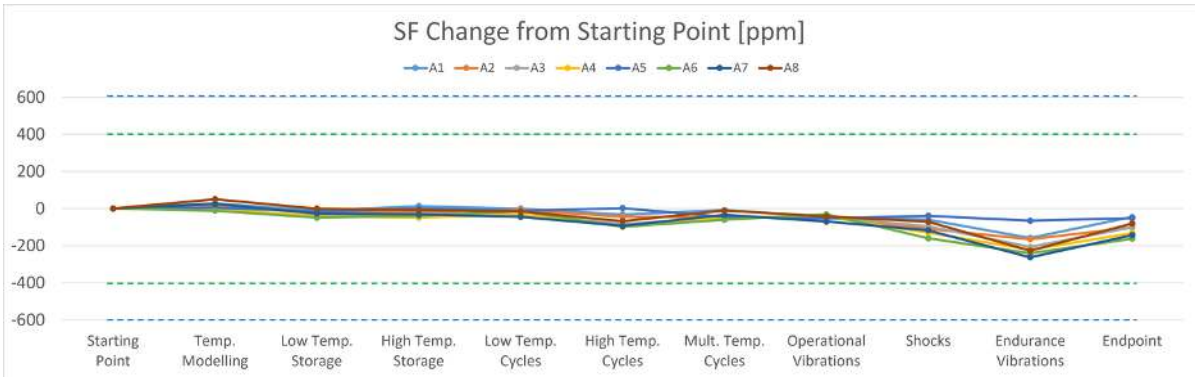
Test Program Overview
The first production units of the MAXL-CL-3050 underwent typical acceptance tests including temperature, vibration, and centrifuge measurements up to 50g. Units that passed the acceptance tests were randomly chosen for the Qualification Test Program (QTP).
The units were then assembled on a special jig designed for interfacing to different environmental exposures such as Temperature Chamber, Vibration Table, etc. In this way, the reproducibility error due to reassembly is avoided.
The program begins with a Temperature Cycle to fit a baseline Temperature model for the Bias, Scale Factor, and Misalignment behavior. Then a comprehensive Temperature Cycle Program is applied including Temperature Storage Cycles (high and low T) and Temperature Operational Cycles (high, low, and multiple T). The next phase entails comprehensive dynamic tests including various Vibration and Shock profiles in multiple directions. In the final step, the units repeat the first Temperature Cycle to compare the temperature behavior to that at beginning of the QTP to test temperature model repeatability.

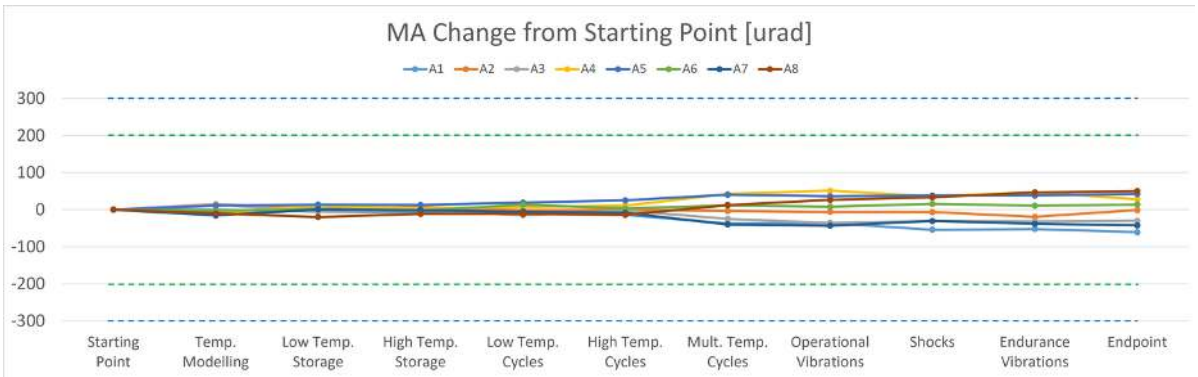
Repeatability Over Environments

Each test is analyzed as an individual test as well as continual monitoring of Bias, Scale Factor (SF), and Misalignment (MA) between environmental exposures to track parameter changes throughout the QTP. (See graphs below) Among all the units, the average maximum Bias Change was 0.5 mg, the average maximum SF Change was 194 ppm, and the average maximum MA Change was 40 µrad.

In the plots, the dashed green lines represent specifications of MAXL-CL-3050-20 grade, while dashed blue lines represent specification limits of MAXL-CL-3050-15.

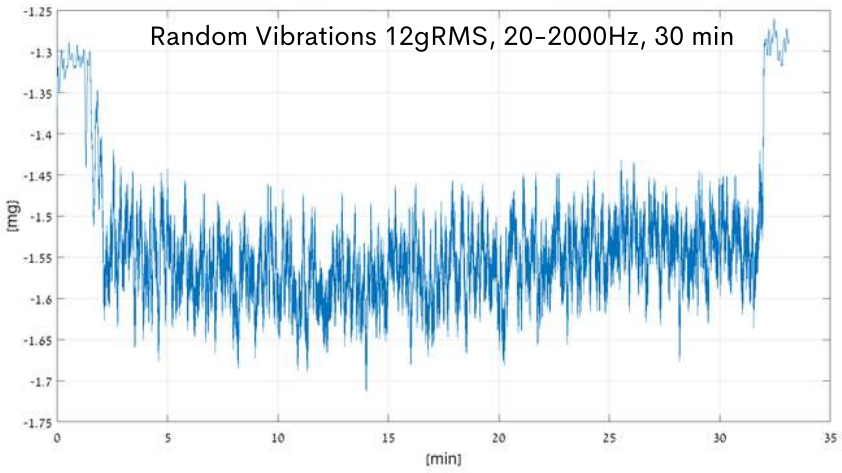






Operational Vibrations

As a sample of the individual tests, random vibrations (20Hz – 2000Hz, 12 gRMS) are applied while the sensors are recorded. Among all the units, the average Vibration Induced Bias is 18 µg and the average Vibration Rectification Error is 2 µg/g^2. This graph shows the typical response to the vibrations applied in the direction of the accelerometer effective axis.



Summary

All the MAXL-CL-3050 units demonstrated excellent performance over environmental exposures verifying the long-term accuracy of the parameters including temperature model repeatability. This product is currently available in grades up to MAXL-CL-3050-20 (1 year repeatability of 1.2 mg); however, after gathering more statistical data, it will be offered as well with 1 year repeatability of 0.5mg (-30 grade).

More information on product specifications can be found in the datasheet which can be downloaded from our website: www.physical-logic.com

Stay updated with our soon to be published
MAXL-CL-3070 product launch.