

Product Note on Smart Super Hybrid Sensor (Smart SHS)



GX-A/GF-A series – Smart SHS loaded balances

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1. Introduction

A&D has developed a new weighing sensor called Smart Super Hybrid Sensor (Smart SHS).

In the past, we developed a weighing sensor called the Super Hybrid Sensor (SHS) for the GX/GF series—predecessor to the newly-developed GX-A/GF-A series of multi-functional precision balances. The SHS is a sensor that combines the technology of the electromagnetic force restoration method and a spring-material Roberval structure used for load cells using strain gauges. The SHS takes advantage of both the high resolution of electromagnetic force restoration balances and the high stability of strain gauge load cell balances when loading an object on the weighing pan.

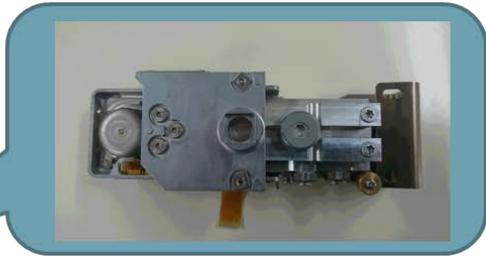
We then went on to develop the weighing sensor we called the Compact Super Hybrid Sensor (C-SHS) for the FZ-i/FX-i series of more affordable precision balances. We managed to miniaturize the design by using a double lever system to reduce costs while not compromising on performance.

And now, we developed the Smart SHS for the GX-A/GF-A series. The Smart SHS inherits the best features of the SHS and C-SHS, and combines fast stabilization and high resolution while reducing the number of parts as well as the time and cost of repair.

2. Smart SHS Construction & Features

1) **Corner-load adjustment has become easier**

Corner-load adjustment is possible using adjustment screws and can be reversed as often as necessary. With the original SHS for the GX/GF series, adjustment requires scraping the Roberval, which is irreversible as well as troublesome.

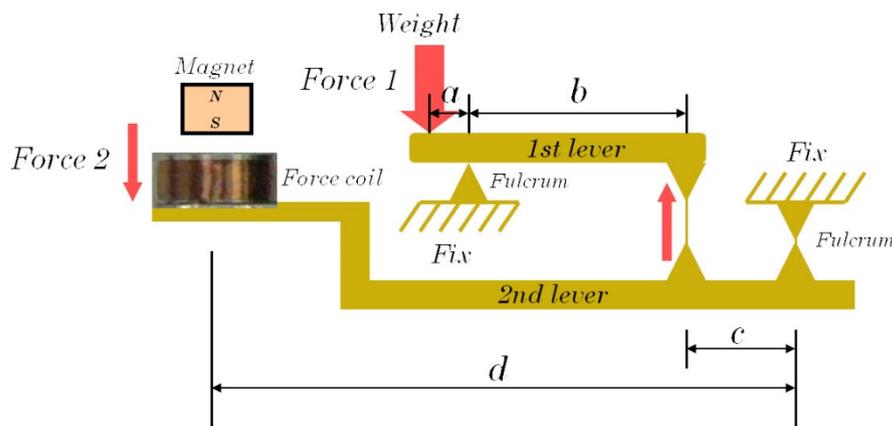


With the GX-A/GF-A series, the adjustment screws can be accessed without taking the sensor out of the balance.

2) Wider range of readability and capacity with one sensor

The double-lever system has a higher lever ratio. We improved the double-lever system employed by the C-SHS so that it can now achieve a resolution of up to 1/3,000,000 and a capacity of **10 kg** for the Smart SHS.

$$\text{Force 2} = \text{Force 1} \times a/b \times c/d$$



3) Increased display stability.

The force motor uses two small magnets to provide a stronger magnetic force. When combined with the double lever system, balancing requires a much weaker electronic current. Consequently, the force coil generates less heat and the display stability is increased.

Further, liquid crystal polymer (LCP) is used to mold the force coil*. This provides greater protection against moisture and reduces the adverse effects of humidity change

on the stability of measurement.



Left: Smart SHS's coil molded with LCP

Right: SHS's coil

* A&D patent

4) Reduced cost of repair and maintenance

The number of components is smaller than that of the C-SHS, meaning that repair/maintenance will cost less.

To find out more, please contact your local A&D representatives or visit our website at <http://www.aandd.jp/>