

# BRINGING SMARTER TECHNOLOGY TO WEIGHING

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Across all industries, the following has always been true about weighing: Without an efficient, easy-to-use and accurate scale, profitability and customer satisfaction are compromised. Reliable product measuring is imperative to managing and monitoring sales and inventory, as well as ensuring compliance with industry regulations.

At A&D Weighing, the quest for the most accurate and reliable scale continues to bring features and benefits to its customers which allow them to better run their businesses. The latest evolution to that commitment to excellence is the Smart Super Hybrid Sensor (SHS).

What does that mean? Simply put:

- **Smart:** Leverages the best features of its predecessors, and combines fast stabilization and high resolution.
- **Super:** It exceeds its predecessors in all aspects of performance and accuracy.
- **Hybrid:** It merges the best aspects of two technologies: To achieve the celebrated results of the SHS, they combined magnetic force restoration and single-point parallelogram load sensing technologies.

## An Evolution in Design: The Advancement of SHS Technology

### SHS

Initially designed as part of the GX/GF series of precision balances, the SHS is a sensor that combines 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.

### Compact SHS

Following the success of that initial design, A&D then developed the Compact Super Hybrid Sensor (C-SHS) for the FZ-i/FX-i series of more affordable precision balances, which featured a miniaturized design through the use of a double lever system.

### Smart SHS

Just recently unveiled, A&D developed the Smart SHS for the GX-A/GF-A series of balances. This latest evolution incorporates the best features of the SHS and C-SHS, and combines fast stabilization and high resolution while reducing the number of parts (to decrease time and cost of repair).

## Smarter All Around: Construction & Features

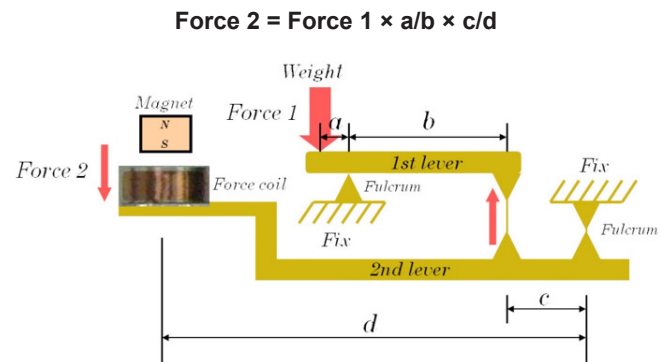
### Corner-load Adjustment is Easier

Corner-load adjustment is possible using adjustment screws and can be reversed as often as necessary. With the GX-A/GF-A series, the adjustment screws can be accessed without taking the sensor out of the balance.



### Wider Range of Readability and Capacity with One Sensor

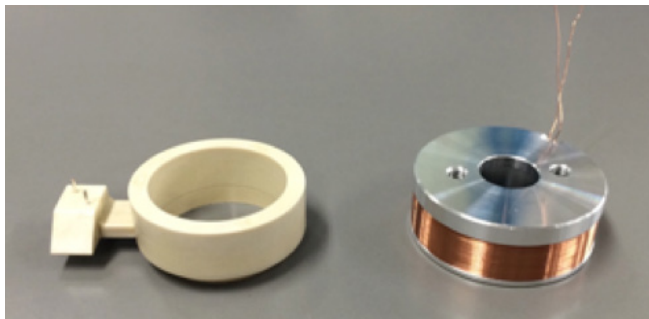
The double-lever system has a higher lever ratio, so it can now achieve a resolution of up to 1/3,000,000 and a capacity of 10 kg for the Smart SHS.



### 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.

In addition, liquid crystal polymer (LCP) is used to mold the force coil, which 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

### 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.

The technology base afforded by Smart SHS has allowed A&D to introduce the Apollo series of balances with a bevy of new benefits.

### Case in Point: The Apollo (GX-A/GF-A) Series of Balances

Enabled by Smart SHS technology, the Apollo series contains three key innovations to provide ideal weighing results – even under the most challenging lab or production settings. These new features include: Impact Shock Detection (ISD), Electronically Controlled Load (ECL) and Flow Rate Display (FRD).

### Electronically Controlled Load (ECL)

The Apollo series features a patent-pending ECL technology that allows the user to perform a diagnostic check and repeatability test without the need of an external test weight. At the touch of a button and in under two minutes, users gain a daily precision verification test with **Dia-Check**. Apollo can also smartly determine a standard deviation and calculate the minimum sample weight with **Quick-MinS**, and allows users and service technicians to ensure operations are USP41 compliant with **Min-S-Alert**.

This feature provides a revolutionary diagnostic tool which ensures critical measurements are compliant with industry standards such as USP 41 and 1251. The ECL feature does this at the single touch of a button and in a manner that is flexible and adaptable to meet the SOP frequency demanded of risky or sensitive materials.

### Impact Shock Detection (ISD)

The patented ISD function on the Apollo series – called **Impact-Alert** – displays the magnitude of impact shocks to the weight sensor at four levels, with audible notification for higher levels of impact which should be avoided. The ISD feature also documents impacts via the **Shock-log** that records time, date, shock level and operator ID, making quality control easier to pinpoint.

The new impact shock detection feature is important when transverse and vertical environment forces are non-predictable. This real-time feedback mechanism prevents equipment damage and helps managers to modify in-line or manual processes alike. ISD provides workers in lab or production environments with the information they need to avoid repetitive impacts.

### Flow Rate Display (FRD)

To avoid irregularity that can arise in traditional filling and dosing applications, the Apollo series features an FRD function. The **FR-Calc** feature calculates and displays the mass or volume flow rates to close the “time-clock disparity” found with traditional PC methods. The series also features an **FR-comparator**, which allows monitoring of flow rate data to ensure it is kept within designated limits. Additionally the tare value can be saved in non-volatile memory so that the remaining amount of the material in the container can be displayed again, even if power is disrupted for any reason during loss-in-weighing measurement.



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