A&D Apollo SERIES GX-A | GF-A
Precision Balances

Taking Weighing Precision and Protection to New Heights

A&D Weighing

Advanced Technologies Providing Innovative Solutions

Smart SHS Technology

A&D's Smart-Super Hybrid Sensor (SHS) technology is the foundation of the innovative solutions found in the A&D Apollo Series. The Smart sensor improvements stem from better design, construction, and materials, resulting in better performance and turbo stabilization times of 1 second. This increases productivity for all weighing work-flows in both labs and production environments. Smart-SHS also gives higher maintainability with a reduced number of parts while still offering maintenance accessibility, unlike other Mono-type systems which only increase cost of ownership. A&D's easy eccentricity adjustment and hybrid design are two prime examples of this high maintainability. We execute for the highest performance, and keep our customer's bottom-line in mind.

Remarkable cost and time savings at the touch of a button.

Innovative Technology

Smart Reasoning

Beneficial Outcomes

ECL

Auto Precision Assessment

Dia-Check

Standard deviation

QuickMin-S

Min-S Alert blinks

Electronically Controlled Load (ECL) Innovation

The operator simply holds the mode key to first perform a self diagnostic check and proceed to ECL where internally a repeatability test is performed without use of an external weight. This critically checks the stability of analog-to-digital conversion before applying a controlled load inside the balance (between 0.3% to 3% of the weighing capacity). It does this by altering the equilibrium state of the weigh sensor and takes 10 repeated measurements. The entire process takes only 1.5 minutes versus traditional repeatability procedures which can take up to 10 minutes, ultimately giving greater convenience and time savings to customers.

The ECL technology provides valuable information which **Auto Precision Assessment** (APA) smartly processes into meaningful, beneficial outcomes such as *Dia-Check*, *Standard Deviation*, *Quick Min-S*, and *Min-S-Alert*.

Dia-Check quickly gives users peace of mind to proceed with daily weighing routines, providing a critical pass or fail indication. A powerful, dynamic tool to diagnose, and verify balance performance.

ECL steps it up a notch by producing the most valuable information, the **Standard Deviation** (SD), allowing users to quickly assess the balance performance under any given environment. This is helpful to include in daily SOP checks.

SD also can determine the minimum sample weight with a feature called **QuickMin-S**. QuickMin-S helps to overcome challenges with handling small weights, accessibility to in-line systems, and in tough environmental conditions

ECL goes one step further allowing users to set the minimum sample weight limit and provides a real time alert with **Min-S-Alert**. Users always feel secure knowing they are in compliance of USP 41 and does not limit how often a minimum sample weight can be determined. This gives more flexibility to follow recommendations of USP 1251. What is so remarkable is this can be performed at the touch of a button, within minutes, in challenging conditions, without the need of an external calibration weight.

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Factory Tough–Laboratory Precise

Impact Shock Detection (ISD) Innovation

Often balances can be damaged or errors can occur due to sharp impacts from automated machine loading or operators dropping material onto the pan. The A&D Apollo series educates, prevents and documents such scenarios. ISD visually indicates the magnitudes of impact shocks that a weigh sensor receives at four different levels. It audibly beeps once at Level 3 and twice at Level 4 delivered through the feature of **Impact-Alert.**

This patented technology provides real-time feedback mechanisms that prevent the sensor from being damaged and can ultimately train and influence operator behaviors. ISD smartly strives for operators to have better weighing techniques, while also helping to program or modify loading in-line automated processes. Impact-Alert ensures the investment of the balance is protected, helps to extend the life of balance, reduce repair and replacement cost and ensure productivity can be maintained by reducing downtime.

Real-time feedback prevents the sensor from being damaged.

No Impact Shock	Level 1	Level 2	Level 3	Level 4
SHOCK 52 g	SHOCK 63 g	SHOCK 74 g	SHOCK 85 g	SHOCK 86 g

ISD takes protection one step higher with **Shock-log** that documents the date, time, and shock level. This enables managers and quality officers to pinpoint the exact moment a critical shock occurred to quickly assess and fix critical failure to get operations back online.

Shock-log pinpoints the exact moment a critical shock occurred to quickly assess and fix critical failure to get operations back online

Overload Protection

The weight sensor is well protected against vertical and transverse static overloading. It won't break due to malfunction of the weighing system's actuator and the resulting excess "E" load. Additionally there are two leaf springs that support the weighing pan of the A&D Apollo series also mitigate impact shocks significantly. A&D once again takes protection to heart ensuring the A&D Apollo series is the same A&D strong, A&D tough you've come to know in labs and factories alike**.**

Leaf Springs

Keeping Your Devices in Sync for Better Accuracy & Precision

Flow Rate Display (FRD) Innovation

Many operators use a stopwatch or PC to determine a flow rate. FRD helps to streamline and improve both by offering a synced solution that improves accuracy and precision in filling or dosing applications. For example, the internal clocks of external devices are never in complete sync with precision balances. Therefore there is a time-clock disparity that is most noticeable when measuring and recording flow rates of pumps, feeders and other devices at short intervals[1]. Therefore command speed and refresh rate will cause the PC to intermittently produce irregular values or spikes even if the actual flow rate is constant.

The A&D Apollo series through an **FR-Cal** function calculates, displays, & outputs (WinCT-FRD) the mass flow rate, or the volume flow rate by entering the density of the material. Up to 10 densities can be saved to the device. Both the display refresh rate and interval (set between 1 second and 1 hour) are regulated by the same internal clock of the balance, making measurements free from the irregularity that rise from time clock disparity problem.

Time disparity of two different internal clocks
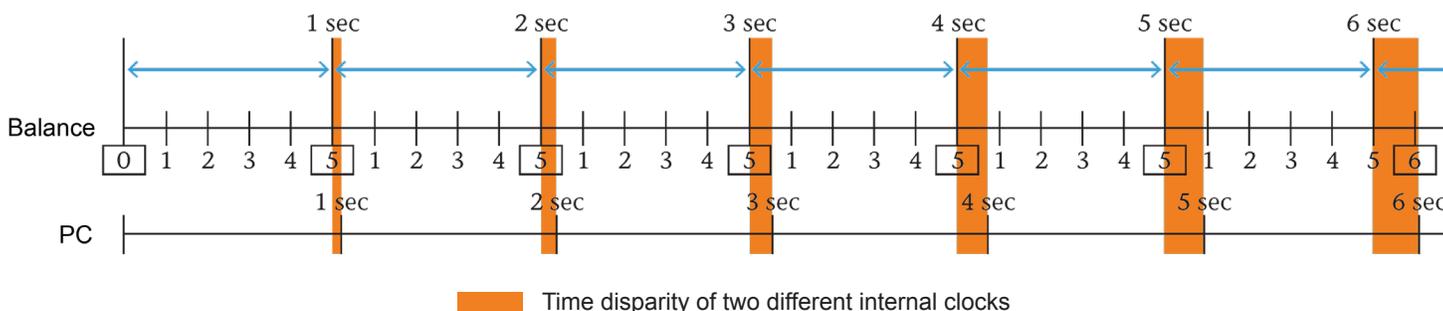
Now what is smart about FRD technology is that we can use a comparator function of **FR-Compare** to provide a feedback mechanism to the user if the flow rate is going too fast or too slow or indicate if flow rate is kept within the designated limits.

Lastly, if the worst happened with a power outage during the "loss-in-weight" measurement, the tare value is stored in our non-volatile memory. The remaining amount in the container can be displayed again and the application can continue through our **FR-Secure.**[2] This avoids loss of sensitive materials and lost time.

Conventional method

FRD
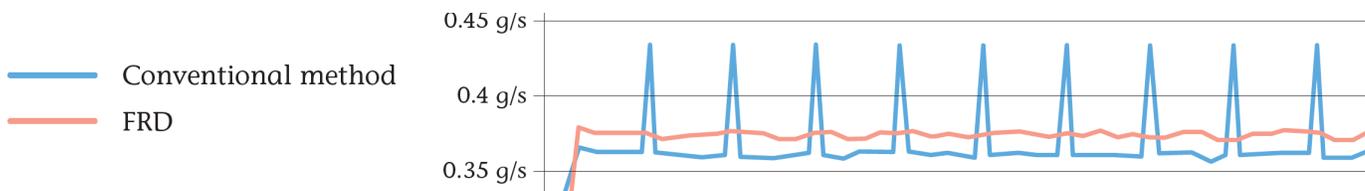
Flow rate measurement using FRD as opposed to the conventional method

*1 Flow rate is determined from the weight variation that occurs during a given interval.
*2 When function is activated, the power-on/rezero/tare is toggled off.

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Protecting and Adhering to Good Data Management, Documentation and Compliance Practices

Quick Min-S
From the standard deviation obtained using ECL described earlier, the A&D Apollo series also calculates and indicates the minimum weight at the installation location[3] in accordance with the United States Pharmacopeia (USP) standard.

Min-S Alert
To ensure that the measured sample quantity meets the minimum weight requirement, the A&D Apollo series can display an alert until the sample quantity reaches the value entered as the minimum weight.

Password-Protect
Use of the balance can be password-protected for authorized individuals (up to 11 including one administrator)—the administrator can perform all operations including calibration while other users can make measurements only. Moreover, upon receiving a command to disable its keys, the balance becomes operable only by sending commands from an external device such as a PC.

Automatic Self-Calibration (ASC)
The GX-A can be set to calibrate itself automatically using its internal weight either (1) in response to change in ambient temperature (approx. 10 °C) to prevent error due to sensitivity drift, (2) at a set interval time, or (3) at predetermined (up to three) times of the day. Internal calibration can also be performed any time with one key press.

GLP/GMP/GCP/ISO Compliant Output
For documentation requirements, the A&D Apollo series can output its manufacturer, model, serial number, ID number, date + time, space for signature for calibration report, calibration test report, and title & end blocks for a series of weighing results.

Universal Flexi Coms (UFC)
UFC lets you edit serial data output/printout format. With this function, label printing is also made possible by connecting the balance to a commercially-available printer[4], and enabling the arbitrary character strings output.

Statistical Calculation Function (SCF)
The A&D Apollo series can display and output statistical calculation data including number of data, sum, maximum, minimum, range (maximum-minimum), average, standard deviation, and coefficient of variation to facilitate the analysis of measurements.

Gross/Net/Tare Output
On receiving a command or with key operation, the A&D Apollo series outputs the gross, net, and tare values to an external device such as a printer, PC or PLC.

*3 The effects of the ambient environmental conditions on repeatability is taken into account, unlike the values shown in catalogs as "ideal" or "typical".
*4 Printers can be programmed to print from string sent via RS232C. Cross cables may be required based on the external device.

DISCOVER PRECISION

Advanced and Practical Features

RS-232C and USB Interfaces Standard

For the USB interface, you can toggle between the Quick USB mode (plug-and-play with weighing data output to a PC only) and the Virtual COM mode (for bi-directional communication) with internal settings. A USB cable is provided as standard.

Security Slot

An off-the-shelf (such as Kensington) anti-theft lock can be used to prevent the balance from being lost.

Bright Bubble
Large, easy-to-see spirit level with LED Illumination

The illumination blinks for 5 seconds after the display is turned on to indicate that the balance level needs to be checked.
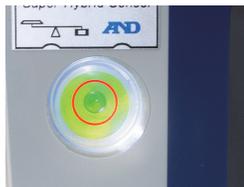
Stainless Steel Pan & Dustplate

Easy to clean

Die cast Aluminum Housing

Top & Bottom to increases stabilization.

Large Reverse Backlit LCD Display

The contrast of black and white provides excellent visibility even in poorly-lit areas and also prevents eye fatigue.

Easy 6 key controls

Easy unit toggle

One-touch Cal

Easy resolution toggle

FlyThumbwheel **Anti-slip Feet**

The leveling feet can be adjusted up or down smoothly using large thumbwheels.

Options

GXA-03	**2nd RS-232C interface**[*5]
GXA-04	**Comparator relay output/buzzer/external key input interface**[*5]
	Enables signaling check weighing results (5 steps) by buzzer and/or external comparator (traffic) lights. It also has two jacks for separately-sold foot switches.
GXA-06	**Analog output interface**[*5] 0-1 V, or 0.2-1 V for conversion to 4-20 mA.
GXA-09	**Built-in rechargeable battery (factory-installed/dealer option)** [*5]
	10 hours of charging for 14 hours of operation (the remaining battery level will be indicated on the display). The balance can be used while recharging the battery.
GXA-10	**Large glass breeze break**
GXA-12	**Animal weighing pan** (for models of 320 g capacity or higher)
	Use together with the animal weighing (average & hold) mode.
GXA-13	**Density determination kit** (for the 1 mg models only)
	Makes weighing the sample in air and in water quicker, easier and more precise. The GX-A/GF-A series can then perform a density calculation automatically.
GXA-17	**Large glass breeze break with built-in fanless ionizer** (static eliminator) The fanless ionizer can neutralize even extremely fine powders without disturbance.
GXA-23-PRINT	**External key input interface with the AX-SW137-PRINT foot switch**[*5]
GXA-23-REZERO	**External key input interface with the AX-SW137-REZERO foot switch**[*5]
GXA-23-PLUG	**External key input interface with the AX-T-314A-S plug**[*5]
GXA-24	**USB host interface** (factory-installed/dealer option) [*5]
	Accepts an off-the-shelf USB flash drive to save weighing results in CSV format.
GXA-25	**External fanless ionizer** (static eliminator) [*5]
	Power is supplied from the balance. Activated for a set duration with an IR sensor.
GXA-26	**External IR switch**[*5]
	For touchless operation of print or re-zero (tare).
FXi-08	**Ethernet interface**[*5]

GXA-10 Large Glass Breeze Break

Accessories

AD-1641	Air flow logger
AD-1682	Rechargeable battery unit
AD-1683	Static eliminator[*6]
AD-1684A	Electrostatic field meter
AD-1687	Weighing environment logger
AD-1688	Weighing data logger
AD-1689	Tweezers for calibration weight
AD-1691	Weighing environment analyzer
AD-8127	Compact printer
AD-8526	Serial/Ethernet converter
AD-8920A	Remote display
AD-8922A	Remote controller
AX-GXA-31	Main unit cover (5 pcs)
AX-SW137-PRINT	Foot switch for print
AX-SW137-REZERO	Foot switch for re-zero
AX-USB-9P	Serial/USB converter
AD-8529PC-W	Bluetooth Converter for PC
AD-8529PR-W	Bluetooth Converter for Printer

AD-8127 with AD-8529PR-W

AX-SW137-PRINT   AX-SW137-REZERO

*5 Only one of GXA-03, GXA-04, GXA-06, FXi-08, GXA-09, GXA-23-PRINT/REZERO/PLUG,GXA-24, GXA-25 or GXA-26 can be installed.
*6 9V Power needs to be supplied from an AC adapter.

Specifications

	GF123A	GX203A / GF203A	GX303A / GF303A	GX403A / GF403A	GX603A / GF603A	GX1003A / GF1003A	GX1603A / GF1603A
Capacity	122 g	220 g	320 g	420 g	620 g	1100 g	1620 g
Readability	0.001 g						
Repeatability (std. deviation)	0.001 g					0.002 g (for 1600 g) / 0.001 g (for 1000 g)	
Linearity	±0.002 g					±0.003 g	
Accuracy immediately after internal calibration (for the GX-A series) [i]	± 0.010 g					± 0.010 g (for 1000 g)	
Stabilization Time	Approx. 1 sec (approx 0.8 sec for 5 g)					Approx 1.5 sec (approx 0.8 sec for 5 g)	
Sensitivity drift	±2 ppm / ˚C (10 ˚C to 30 ˚C / 50 ˚F to 86 ˚F, when automatic self-calibration is OFF)						
Calibration — Type	External	GX Internal / GF External					
Calibration — Wt. g.	50 g / 100 g	50 g / 100 g / 200g	50 g / 100 g / 200 g / 300 g	50 g / 100 g (100 g interval) / 400 g	50 g / 100 g (100 g interval) / 600 g	50 g / 100 g (100 g interval) / 1000 g	50 g / 100 g (100 g interval) / 1600 g
Display	Reverse Backlit LCD (Character height: 17.8 mm)						
Display Refresh Rate	5 times / second, 10 times / second or 20 times / second						
Units of Measure [ii]	g (gram), oz (ounces), lb (pound), lb-oz (pound-ounce), ozt (troy ounce), ct (metric carat), mom (momme), dwt (pennyweight), gr (grain), pcs (counting mode), % (percent mode), SG (specific gravity), and a user-programmable unit.						
Counting mode — Min unit mass	0.001 g						
Counting mode — Number of samples	5, 10, 25, 50 or 100 pieces						
Percent mode — Min 100% ref mass	0.100 g						
Percent mode — Min 100% display	0.01%, 0.1% or 1% (depends on the reference mass stored)						
Operating environment	5 ˚C to 40 ˚C / 41 ˚F to 104 ˚F, 85% R.H. or less (no condensation)						
Power supply / consumption	AC adapter / approx. 30 VA						
Communication Interface	RS-232C and USB						
Weighing pan size	128 mm × 128 mm / 5 × 5 in						
Dimensions (W × D × H)	212 (W) × 317 (D) × 93 (H) mm / 8.3 (W) × 12.5 (D) × 3.7 (H) in						
Net weight	Approx. 5 kg / 11 lb						

Specifications

	GF1202A	GX2002A / GF2002A	GX3002A / GF3002A	GX4002A / GF4002A	GX6002A / GF6002A	GX10002A / GF10002A	GX6001A / GF6001A	GX10001A / GF10001A
Capacity	1220 g	2200 g	3200 g	4200 g	6200 g	10200 g	6200 g	10200 g
Readability	0.01 g						0.1 g	
Repeatability (std. deviation)	0.01 g				0.02 g (for 10000 g) / 0.01 g (for 5000 g)		0.1 g	
Linearity	±0.02 g			±0.03 g			±0.1 g	
Accuracy immediately after internal calibration (for the GX-A series) [i]	± 0.10 g		± 0.15 g		± 0.15 g (for 5000 g)		± 0.5 g (for 5000 g)	
Stabilization Time	Approx. 1 sec (approx 0.8 sec for 50 g)				Approx 1.5 sec (approx 0.8 sec for 50 g)		Approx 1 sec (approx 0.8 sec for 500 g)	
Sensitivity drift	±2 ppm / ˚C (10 ˚C to 30 ˚C / 50 ˚F to 86 ˚F, when automatic self-calibration is OFF)							
Calibration — Type	External	GX Internal / GF External						
Calibration — Wt. g.	500 g / 1000 g	500 g / 1000 g / 2000g	500 g / 1000 g / 2000 g / 3000 g	500 g / 1000 g (1000 g interval) / 4000 g	500 g / 1000 g (1000 g interval) / 6000 g	500 g / 1000 g (1000 g interval) / 10000 g	500 g / 1000 g (1000 g interval) / 6000 g	500 g / 1000 g (1000 g interval) / 10000 g
Display	Reverse Backlit LCD (Character height: 17.8 mm)							
Display Refresh Rate	5 times / second, 10 times / second or 20 times / second							
Units of Measure [ii]	g (gram), oz (ounces), lb (pound), lb-oz (pound-ounce), ozt (troy ounce), ct (metric carat), mom (momme), dwt (pennyweight), gr (grain), pcs (counting mode), % (percent mode), SG (specific gravity), and a user-programmable unit.							
Counting mode — Min unit mass	0.01 g						0.1 g	
Counting mode — Number of samples	5, 10, 25, 50 or 100 pieces							
Percent mode — Min 100% ref mass	1.00 g						10.0 g	
Percent mode — Min 100% display	0.01%, 0.1% or 1% (depends on the reference mass stored)							
Operating environment	5 ˚C to 40 ˚C / 41 ˚F to 104 ˚F, 85% R.H. or less (no condensation)							
Power supply / consumption	AC adapter / approx. 30 VA							
Communication Interface	RS-232C and USB							
Weighing pan size	165 mm × 165 mm / 6.5 × 6.5 in							
Dimensions (W × D × H)	212 (W) × 317 (D) × 93 (H) mm / 8.3 (W) × 12.5 (D) × 3.7 (H) in							
Net weight	Approx. 5 kg / 11 lb							

i Under stable environment (no rapid temperature/humidity change, vibration, draft, magnetism, static, etc). The mass of the internal weight may vary with age.
ii One additional unit from tael (Singapore/HK jewelry/Taiwan/China), tola or Newton can be added upon request.

Standard functions

Super Hybrid Sensor (SHS) · Internal Calibration (GX-A) · External Calibration (GF-A) · Impact Shock Detection · Flow Rate Display · Electronically Controlled Load · Reverse Backlit LCD · Quick USB · RS-232C Interface · Date & Time · GLP Compliant · Ticket Formatting · Auto Power On · Auto Power Off · Software · User Access Control · Optimizing Unit Weights · Percentage Function · Animal Weighing · Statistical Calculation · Comparator Function · Underhook · Memory Function

Optional

LAN-Ethernet Interface · Rechargeable Battery · USB Host Interface

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