GX-A/GF-A series

MAINTENANCE MANUAL

GX- 203A/303A/403A/603A/1003A/1603A
2002A/3002A/4002A/6002A/10002A
6001A/10001A

GF- 123A/203A/303A/403A/603A/1003A/1603A
1202A/2002A/3002A/4002A/6002A/10002A
6001A/10001A

1WTPD4003782

A&D Company, Limited

This manual and Marks

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⚠ This is a hazard alert mark.

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Appendix: GX-A/GF-A Technical Information

1. Introduction

For smooth maintenance, the products must be technically understood, and the required equipment and tools must be prepared. Since the GX-A/GF-A series electronic balance is a precision instrument, proper operation cannot be guaranteed if the maintenance is performed under unsatisfactory conditions.

1.1 Equipment and Tools Required

Description	Purpose
(1) A Phillips screwdriver 3 mm	For disassembling and reassembling
(2) A Torx wrench (T20H)	For disassembling and reassembling
(T25H)	For corner load adjustment
(3) An adhesive tape 8 mm	For cleaning the force motor unit
(4) An Allen wrench 4 mm	For securing the magnet support
(5) Round-nose chain pliers A nipper	For disassembling guide of the lever
(6) A square	For the tension flexure adjustment
(7) A soldering iron (25-40 W)	For soldering wires on force motor

(8) Masses

Model	Cylinder type Masses	Slotted type Masses
123 (Only GF-A)	100gx1	50gx2
203	100gx1, 200gx1	100gx2
303	200gx1, 300gx1	100gx3, 200gx1
403	200gx1, 400gx1	100gx4, 200gx2
603	300gx1, 600gx1	200gx3, 300gx2
1003	500gx1,1000gx1	200gx5, 400gx1, 600gx1
1603	500gx1, 600gx1	400gx4, 600gx2

Model	Cylinder type Masses	Slotted type Masses
1202 (Only GF-A)	500gx2,1kg x1	500gx2
2002	1kg x1, 2kg x1	1kg x2
3002	2kg x1, 3kg x1	1kg x3, 2kg x1
4002	2kg x1, 4kg x1	1kg x4, 2kg x1
6002/6001	3kg x1, 6kg x1	2kg x3
10002/10001	4kg x1, 10kg x1	2kg x5, 3kg x2, 4kg x1

(9) Multi-meter (Voltage measurement with 1mV resolution, Resistance measurement for insulation resistance of 20MΩ or more.)

(10) Oscilloscope

(11) AC adapter (Use the AC adapter supplied with the balance)

(12) The balance instruction manual

One set of jig for disassembling or reassembling the Mechanical unit (7PA:GXA-JIG)

(1) A base jig (GXA-1/8)

(2) A spacer for positioning the beam (1) (GXA-2/8)

(3) A bolt for holding the beam (1) (GXA-3/8)

(4) A bord for positioning the beam (1)(GXA-4/8)

(5) A plate for positioning the beam (1)(GXA-5/8)

(6) A jig for positioning the fulcrum flexure (GXA-6/8)

(7) A jig for positioning the force coil bobbin GXA-7/8)

(8) A jig for assembling the beam (2) (GXA-8/8)

(9) Screws

Temperature Controlled Room

A room where the temperature can be maintained at 10 ±2°C and 30 ±2°C for 4 hours or more.

2. Principles of operation

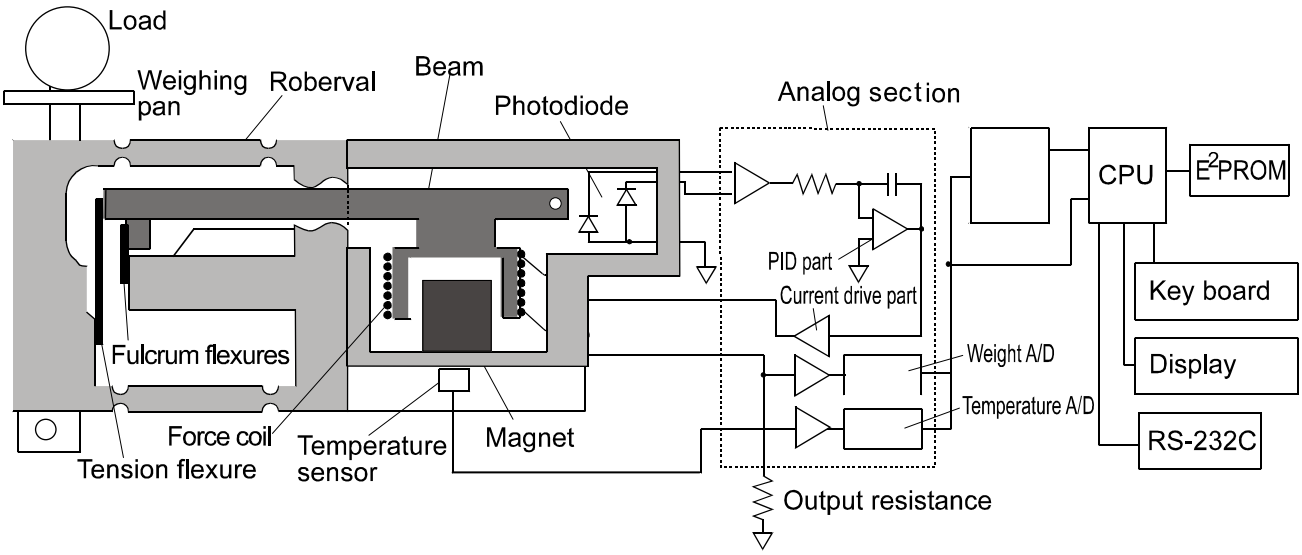
The GX-A/GF-A balances work on the principle of "Force Restoration". Any change in the load on the weighing pan causes a Position Beam Lever to pivot on two Fulcrum Flexures (refer to diagram below). Attached to this beam is a bobbin (wound with fine wire), called the "Force Coil", which floats in a permanent magnet, called the "Force Motor". At the end of the Position Beam Lever there is a small hole which allows light from a Light-Emitting Diode (LED) to pass through to two Photodiodes (light measuring diodes) as it moves up or down. At zero weight, the light detected by the upper Photodiode is equal to that detected by the lower Photodiode. These three diodes make up the Position Detector.

When the Force Coil is pulled up by the leverage exerted from a mass on the weighing pan, the Position Detector detects a change in the position of the Force Coil as the light reaching the upper Photodiode will be greater than that reaching the lower one. The balance then feeds the force coil with more voltage to pull it back until the light measured by the two Photodiodes is equal again. This is accomplished by the Analog section receiving photocurrent from the Photodiodes, converting it to voltage, and boosting it back to the Force Coil. As the voltage increases, so does the magnetic power, pulling the Force Coil back until the Position Detector reads equilibrium.

The current flowing through the Force Coil generates a voltage proportional to the load weight on the pan. This is read back through the Analog section, first being filtered - then the Analog-Digital (A/D) Converter digitalizes this measuring voltage; the resulting value is counted and then fed to the microprocessor (CPU).

Temperature affects the magnet and weight data. So temperature coefficient for weight is measured and saved beforehand. The balance eliminates the temperature effect by using the present temperature measured by the temperature sensor and the coefficient. The output from the temperature sensor is converted digitally and sent to the CPU by the analog module.

The CPU performs mathematical operations in connection with each parameter, such as temperature, linearity coefficient, and calibration data. Also, the user can specify how the calculated information should be displayed by using the keyboard. For example: s/he can have the CPU perform special functions such as conversion into other measuring units, or counting of small parts. Finally, the results are displayed on the Fluorescent Display, or sent through the RS-232C interface.



2.1 Corrective Maintenance Outline

Performance test	To perform the corrective maintenance, defects must be located and their cause determined. The easiest way to locate a defect is to perform an operation check.
Corrective maintenance procedure	Corrective maintenance is described by using a flowchart and a troubleshooting table.
Adjustment details	An adjustment procedure is described for each item.

3. Performance Test

The following test procedures determine whether the balance (GX-A/GF-A series) works properly.
The internal temperature of the balance must be approached to the room (the air) temperature enough, allow half an hour warm-up prior to conducting the performance test.

3.1 Performance Test Procedure

Verify the following points:

External view

1.Adjust the leveling feet to level the balance. Confirm it using the bubble spirit level.
2.The weighing pan should be level. (Check for the correct pan assembly.)
3.Use the breeze break for 0.001g model in GX-A/GF-A series.

Functions

1.Verify that each key functions correctly:
ON/OFF key
CAL key
MODE key
SAMPLE key
PRINT key
RE-ZERO key

2.Verify the following items and operations:
The minus indicator
The decimal point indicator
A stable weighing data can be obtained
The RS-232C communication function

Selection of the weighing units
Identifies each of three TLs.

e.g. when "264.555 TL" is displayed,

k =g display / TL display = 10000.0 / 264.555 = 37.799

3.Verify that the TAEL values are within tolerance:

		Weight	Tolerance
Hong Kong (jewelry)	TN	1 TAEL = 37.4290 g	37.428-37.430 g
Hong Kong (general) Singapore	TG	1 TAEL = 37.7994 g	37.798-37.800 g
Taiwan	TT	1 TAEL = 37.5000 g	37.499-37.501 g

3.2 Test Details

External mass calibration (GF-A series)

After external mass calibration by pressing CAL key, place the specified mass on the pan and read the displayed value. Verify that the difference between the maximum value and the minimum value is within the specifications.

GF-A series

Model	Masses	Specifications
123	100g	±0.001g
203	200g	
303	300g	
403	400g	
603	600g	
1003	1000g	
1603	1600g	±0.002g
1202	1kg	±0.02g
2002	2kg	±0.01 g
3002	3kg	
4002	4kg	
6002	6kg	
10002	10kg	±0.02g
6001	6kg	±0.1 g
10001	10kg	

Internal mass repeatability (GX-A series)

Calibrate using the internal mass.

Perform this three times, verify that the all data be within the specifications.

GX-A series

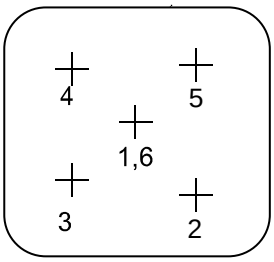
Model	Masses	Specifications
203	200g	±0.010 g
303	300g	
403	400g	
603	600g	
1003	1000g	
1603		
2002	2kg	±0.10g
3002	3kg	±0.15g
4002	4kg	
6002	5kg	
10002		
6001	5kg	±0.5g
10001		

Corner load error

Place the specified mass at the center of the pan (1) and record the displayed value. Then place the mass, at positions 2, 3, 4, 5 then 6. Verify that the difference between the values at the center and at each position (the cross marks 2, 3, 4, and 5 are half the distance from the center of the pan to the corner edge) is within the specifications.

GX-A/GF-A series

Model	Masses	Specifications
123 (Only GF-A)	100g	±0.006g
203		
303	200g	±0.008g
403		±0.007g
603	300g	±0.007g
1003	500g	±0.007g
1603		±0.008g
1202 (Only GF-A)	1kg	±0.06g
2002		
3002	2kg	±0.08g
4002		±0.07g
6002	3kg	±0.07g
10002	4kg	±0.10g
6001	3kg	±0.3g
10001	4kg	



Weighing pan

Repeatability

Place the specified mass at the center of the pan and remove. Record the displayed values with and without load. Repeat the test ten times (one set). Get 10 span data by subtracting the displayed value when no load is applied from the displayed value when load is applied. Obtain the standard deviation from the 10 data and verify that it is within the specifications. If not, perform another two sets of test and obtain the standard deviation for each set. Verify that the two standard deviations are within the specifications.

Model (GX-A /GF-A series)	Offset load(tare)	Masses	Specifications
123 (Only GF-A)		100g	0.001g(standard deviation)
203		200g	
303		300g	
403		400g	
603		600g	
1003		1000g	
1603	600g	1000g	
1202 (Only GF-A)		1kg	0.01g(standard deviation)
2002		2kg	
3002		3kg	
4002		4kg	
6002		6kg	
10002	5kg	5kg	
6001		6kg	0.1g(standard deviation)
10001		10kg	

Linearity / Hysteresis

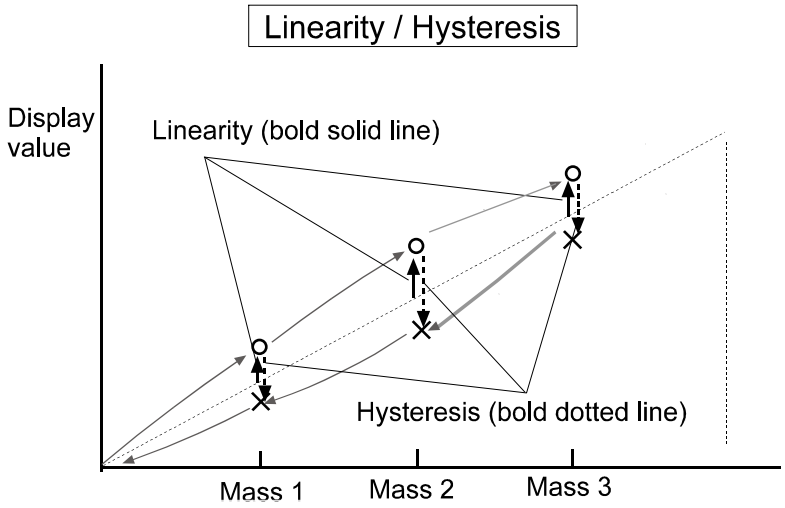
（1） GX-A/GF-A series

Linearity/ Hysteresis

After calibration by using an external weight close to the weighing capacity, place the specified mass one by one on the pan, and check the difference between true value and display value (linearity). After reaching weighing capacity, remove the mass one by one, and check the difference between an increase and decrease (hysteresis).

GX-A/GF-A series

Model	Masses	Linearity	Hysteresis
123 (Only GF-A)	50g×2	±0.002g	±0.002g
203	100g×2		
303	100g×3		
403	100g×4		
603	200g×3		
1003	200g×5	±0.003g	±0.003g
1603	400g×4		±0.004g
1202 (Only GF-A)	500g×2	±0.02g	±0.02g
2002	1kg×2		
3002	1kg×3		
4002	1kg×4		
6002	2kg×3	±0.03g	±0.04g
10002	2kg×5		±0.06g
6001	2kg×3	±0.1g	±0.1g
10001	2kg×5		



4. Corrective Maintenance

Perform corrective maintenance for the GX-A/GF-A series by referring to the maintenance flowchart and the troubleshooting table. The troubleshooting table describes the possible cause and solution to facilitate corrective maintenance.

Perform corrective maintenance according to the error (the letters refer to nodes on the maintenance flow chart):

Type A: Replacing, disassembling, or assembling the force motor unit
Type B: Replacing or adjusting electrical parts
Type C: Initializing the electric board and inputting specific data
Type D: Adjusting the characteristics of the force motor unit
Type E: Inputting temperature data
Type F: Performance test
Type G: Performing drift check
Type H: Replacing the main board

4.1 Troubleshooting Table

The following troubleshooting table describes the possible cause of, and the solution to problems.

Problem	Cause	Check	Solution	Type
No display, beam is not balanced	AC adapter	Is it the correct AC adapter for the power source used?	Replace with the correct AC adapter.	F
		Is the output voltage correct? Measure the output voltage of the AC adapter when it is connected to the balance. The DC output should be at least 11 volts, but no greater than 22 volts.	If the output voltage is not correct, replace the AC adapter.	F
	Power supplies of main board and display board	Is the output of each power supply correct? (Refer to Table-1 of page 15) Check the Vdd, Vgc, Vcc, VLDC.	Check (replace) the main board or display board with substitute items.	H
			Check (replace) the defective power supply part with a substitute item.	F
	Force motor	Check that the connectors are installed correctly(J10A).	Replace the force motor with a substitute item. (Refer to “5. Force Motor Disassembly and Reassembly”)	A
	Main board assembly	Check the performance using the standard main board that works properly.	Replace the main board assembly with a substitute item.	H
	Analog board assembly	Check the performance using the standard analog board that works properly.	Replace the analog board assembly with a substitute item.	E

Problem	Cause	Check	Solution	Type
Unstable weighing data, repeatability error	Force motor, Analog board assembly	Check the operation of weight / temperature offset A/D. (Refer to “6-13 Method of identifying defect location”)	Replace the analog board assembly	E
		Then if it is OK, the cause will be the force motor.	Check the force motor	A
	Pan assembly	Check that the pan assembly is correctly installed	Install the pan assembly correctly.	F
		Check for foreign matter between the pan and dust plate.	Clean the area around the pan assembly and the dust plate.	F
		Check that the dust plate does not touch the pan assembly.	Install the dust plate correctly so that it does not touch the pan.	F
	Damage in flexures	Check the condition of tension and fulcrum flexures and lever.	Replace the parts and reassemble the force motor.	A
	Magnet assembly	Check for dust particles between the magnet and the force coil.	Clean the force motor assembly. (Refer to “5. Force Motor Disassembly and Reassembly”)	A
	Force motor assembly	Check that the flexures are in good conditions and are correctly installed.	Repair the force motor assembly. (Refer to “5. Force Motor Disassembly and Reassembly”)	A
Corner load error	Force motor assembly	Check that the flexures are in good conditions and are correctly installed.	Perform corner load adjustment.	F
			If it does not work well, disassemble and reassemble the balance. (Refer to “5. Force Motor Disassembly and Reassembly”)	A
Hysteresis error	Tension or Fulcrum flexures	Check the condition of tension and fulcrum flexures for distortion.	Replace with substitute items. Disassemble and reassemble the balance. (Refer to “5. Force Motor Disassembly and Reassembly”)	A
Linearity error	Force motor assembly	Follow the linearity check procedure.	Input the linearity data. Refer to page 40.	F
			If it does not work well, disassemble and reassemble the balance. (Refer to “5. Force Motor Disassembly and Reassembly”)	A
After calibrated using the internal mass, the weighing data is not correct (OnlyGX-A)	Force motor assembly	After auto calibration using the internal mass, check the value using the specified mass.	Fine adjustment of the linearity. Refer to page 40~45.	F

Problem	Cause	Check	Solution	Type
Error 0 Temperature data error	Temperature sensor, Analog board assembly, Cables, connectors	Check the operation of weight / temperature offset A/D. (Refer to “6-13, 1 Method of identifying defects in the internal offset mode”)	In the T1 display of check mode menu, check the absolute value and dispersion (Refer to 6-7). If it is NG further, replace and reassemble temperature sensor.	B
		Then if it is NG, the cause will be the analog board assembly.	Replace the analog board.	E
Error 1 Unstable weighing data	Force motor, Analog board assembly	Check the operation of weight / temperature offset A/D. (Refer to “6-13 Method of identifying defect location”) If it is OK, the cause is the force motor.	Check the force motor.	A
		Then if it is NG, the cause will be the analog board assembly.	Replace the analog board assembly.	E
	Pan assembly	Check that the pan assembly is correctly installed.	Install the pan assembly correctly.	F
		Check for foreign matter between the pan and dust plate.	Clean the area around the pan assembly and the dust plate.	F
		Check that the dust plate does not touch the pan assembly.	Install the dust plate correctly so that it does not touch the pan.	F
	Damaged flexures	Check the condition of tension and fulcrum flexures and lever.	Replace the parts and reassemble the force motor unit.	A
	Magnet assembly	Check for dust particles between the magnet and the force coil.	Clean the force motor assembly. (Refer to “5. Force Motor Disassembly and Reassembly”)	A
	Weighing error relating to calibration	Check if Error 1 appears due to underloading (-E) during automatic zero adjustment after the balance is turned on.	Calibrate.	F
Error 3 Defective EEPROM	Defective EEPROM on the Main board	Bad connection between CPU (U1) and EEPROM (U3,U4) Check the soldering around each IC.	Re-solder	F
			Replace the CPU (U1)	F
			Replace the EEPROM (U3,U4)	H
			Note After replacing the CPU or EEPROM, rror 8, rror 9 may be displayed. To correct the error, see the solution for each error described in this table.	—

Problem	Cause	Check	Solution	Type
Error 8 EEPROM error	CPU (U1) and EEPROM (U9) on the main board	The EEPROM version is not correct for the newer CPU version.	Press the PRINT key to change the EEPROM version.	F
Error 9 EEPROM format error	CPU (U1) and EEPROM (U9) on the main board	EEPROM has not been initialized.	While holding down the RE-ZERO and MODE keys, press the PRINT key to initialize the EEPROM.	C
CAL E -CAL E Calibration range error	The mass exceeds the calibration range	Check that the correct mass is used for calibration.	Use the correct mass.	F
	Analog board assembly, coil, zero or span	Check the D0 value.	If the D0 value is not within the specifications, replace parts and reassemble. (When the D0 value is correct, perform calibration in check mode)	A
	Defective pump(Only GX-A)	Check the pump.	Replace the pump or pump control board.	F
	Defective solenoid valve(Only GX-A)	Check the solenoid valve.	Replace the solenoid valve or pump control board.	F
E Overload	Weighing error relating to calibration	Check the D0 value	When the D0 value is correct, perform calibration in check mode, then perform calibration in the weighing mode	F
	Damage in flexures	Check the D0 value	If the D0 value is not within the specifications, replace flexures and reassemble	A
- E Underload	Weighing pan	Check if the correct pan is used and that the pan is installed correctly	Use the correct pan and install it correctly	F
	Weighing error relating to calibration	Check the D0 value	When the D0 value is correct, perform calibration in check mode, then perform calibration in the weighing mode	F
	Damage in flexures	Check the D0 value	If the D0 value is not within the specifications, replace flexures and reassemble	A

Table-1 Specifications of each power-supply voltage on the main board and display board

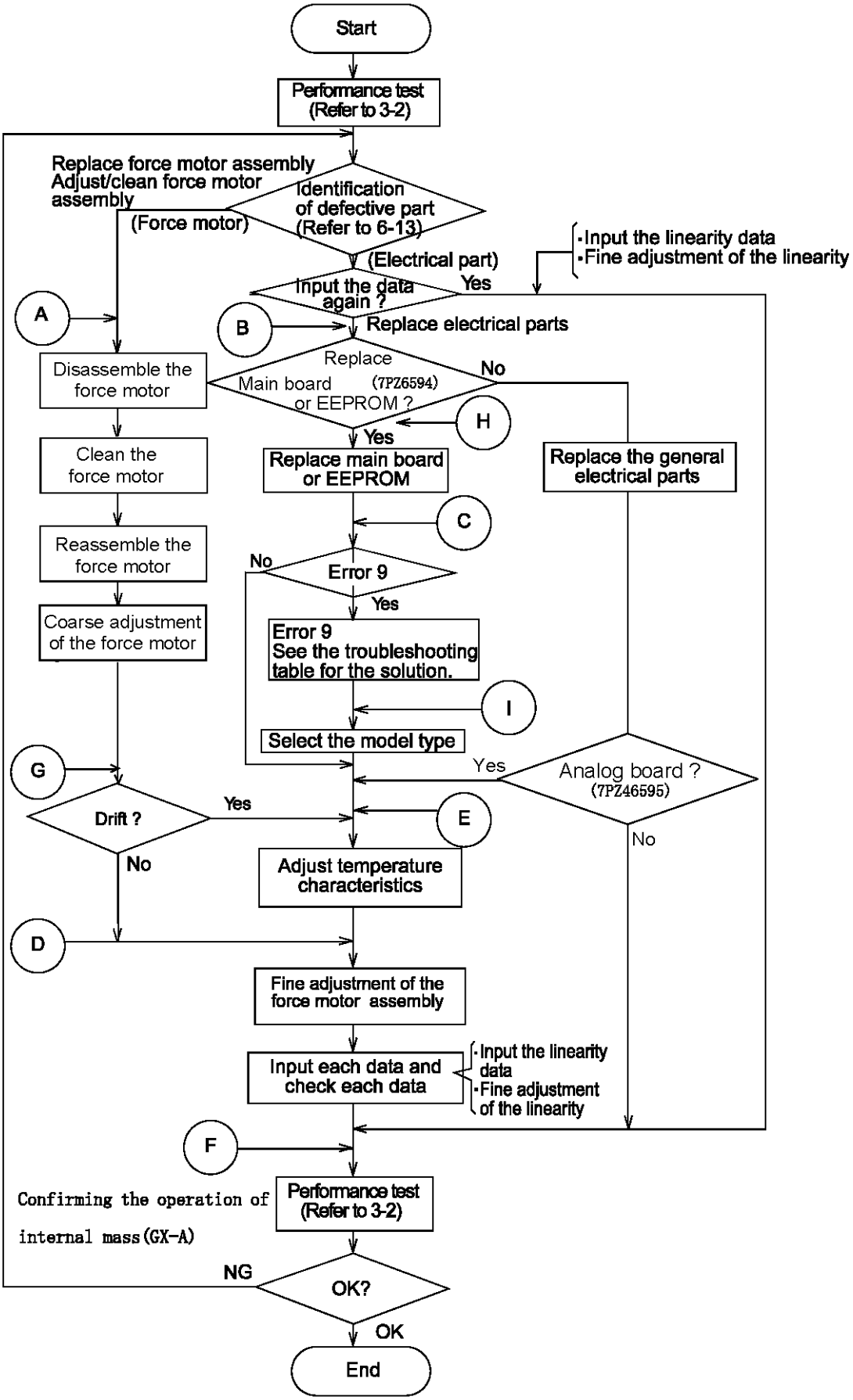
Circuit symbol	Specifications	Check point (Check pad)	Voltage generation element
Vdd	3.1V – 3.5V	Vdd - LG	U6
Vgc	4.7V – 5.3V	Vgc - LG	U7, U8
Vcc	9.5V – 10.5V	Vcc - LG	U8
VLCD*	3.0V – 3.5V	VLCD -GS	U101

* PZ6596

Table-2 Specifications of each power-supply voltage on the pump control board (Only FZ)

Circuit symbol	Specifications	Check point (Check pad)	Voltage generation element
Vpu (GX-A)	2.1V – 2.3V	VPU -SG	U901

4.2 Maintenance Flowchart



5. Force Motor Disassembly and Reassembly

This chapter describes the procedures and notes for the flexure assembly replacement, bobbin cleaning, and adjustment after reassembling the force motor.

Notes: The disassembly and reassembly should take place in a dust free environment. Adjustments and confirmations are needed after reassembly for linearity, repeatability, creep, hysteresis and corner load error.

Temperature adjustment is also needed since the balance is affected by tightening torque or stress. If you do not have the proper facilities to do the temperature adjustment, do not attempt to adjust the temperature feature.

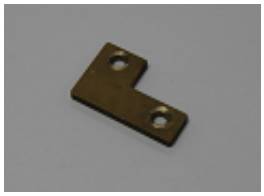
Jig set (7PA:GXA-JIG) for GX-A/GF-A mechanical unit disassembly and reassembly

A base jig
GXA-1/8

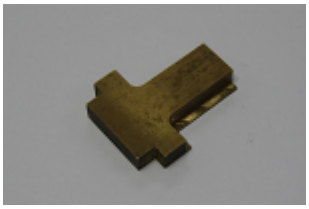
A spacer for positioning the beam(1)
GXA-2/8

A bolt for holding the beam(1)
GXA-3/8

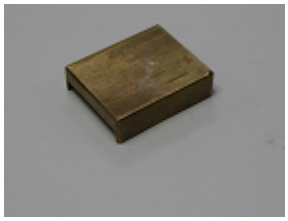
A board for positioning the beam(1)
GXA-4/8



A plate for positioning the beam(1)
GXA-5/8



A jig for positioning the fulcrum flexure(1)
GXA-6/8



A jig for positioning the force coil bobbin
GXA-7/8

A jig for assembling the beam(2)
GXA-8/8

● Other tools required:

A square
M2, M4 screwdriver
M4, M5 torx wrench
M4, M5 allen wrench
5.5mm spanner
A soldering iron

Allen head screw : M5x10 (3pcs)
M4x15 (1pc)

Pan head screw : M3x 80 (1pc)
M4 x 8 (6pcs)
M4 x 10 (2pcs)

5.1 Disassembly

1. Removing the lower case

① Remove the weighing pan.
② Remove the pan support.
③ Remove the lower case (Pan head screw M4x8, WS 4pcs)

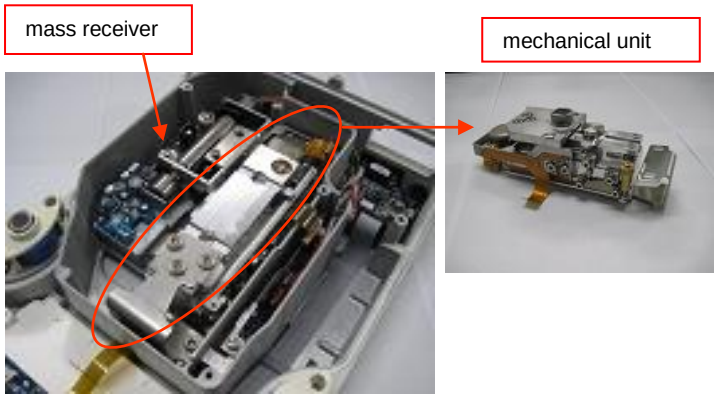
2. Removing the mechanical unit

① Remove the Inner case.

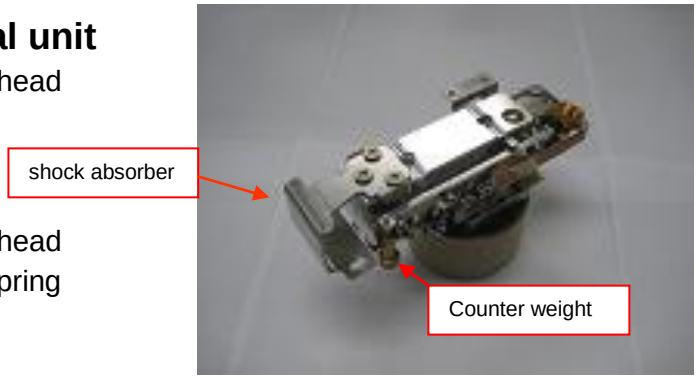
② Disconnect the cable from the A/D board.

③ Remove the mass receiver. (Pan head screw M4x6 with coned disk spring , 2pcs) GX-A series only.

④ Remove the mechanical unit. (Allen head screw M5x10 with coned disk spring , 2pcs)



3. Disassembling the mechanical unit



① Remove the shock absorber. (Short head torx screw M5x8 , 3pcs)

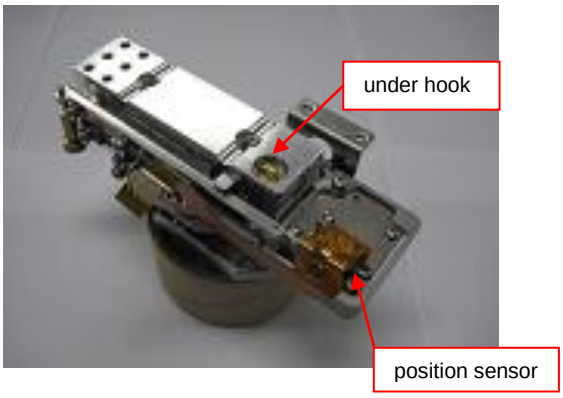
② Remove the Counter weight. (Pan head screw M3x40,1pc and Nut with spring washer M3, 1 pc)

③ Remove the under hook.

④ Remove the position sensor. (Pan head screw M3x6 WS ,2pcs)

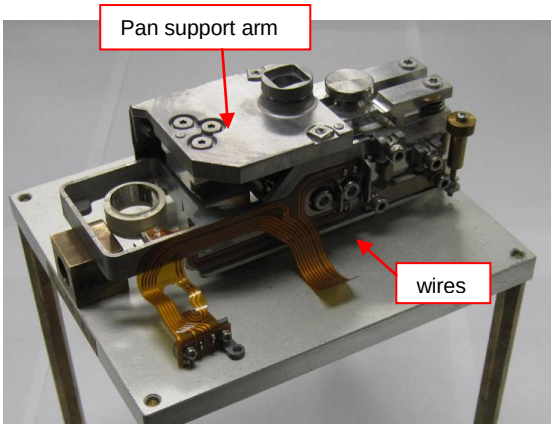
⑤ Remove the magnet unit1(Shield plate) (Shield plate mounting screw, 2pcs).
※Use the pan head screw M3x80 as jig.

⑥ Remove the magnet unit2(Yoke).(Pan head screw M4x8 WS, 2pcs)



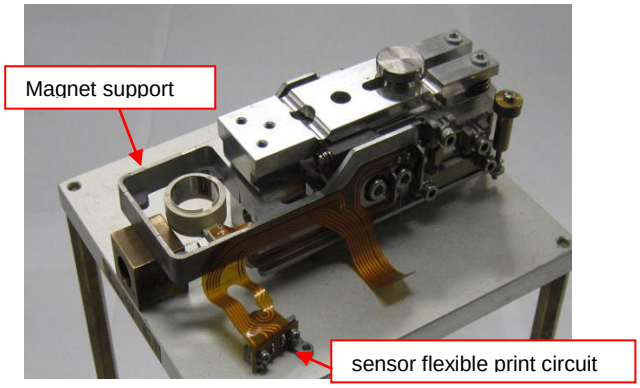
⑦ Secure the roberval on the base jig using the allen head screw M5 x10(3pcs) and the allen head screw M4x15(1pc)

⑧ Remove the Pan support arm. (Short head torx screw M4x10, 3pcs)



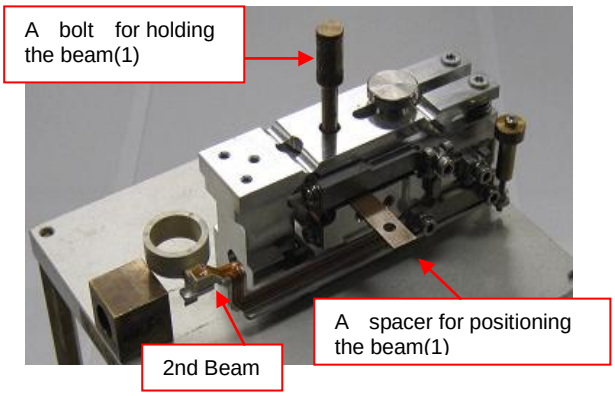
⑨ Remove the wires from the bobbin with a soldering iron.

⑩ Remove the Magnet support with sensor flexible print circuit.(Allen head screw with coned disk spring M5x8, 4pcs)

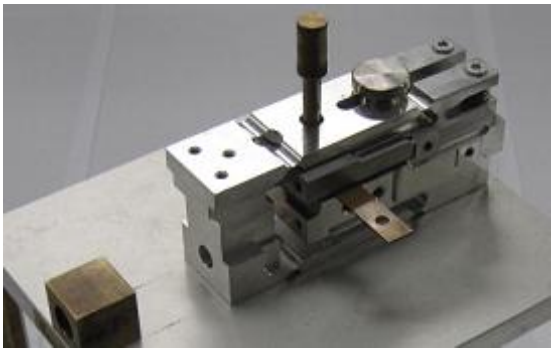


⑪ Insert the" spacer for positioning the Beam (1)" between the 1st beam and the roberval, and secure the 1st beam with the "bolt for holding the beam(1)".

⑫ Remove the 2nd beam. (Allen head screw with coned disk spring M4x8, 2pcs)

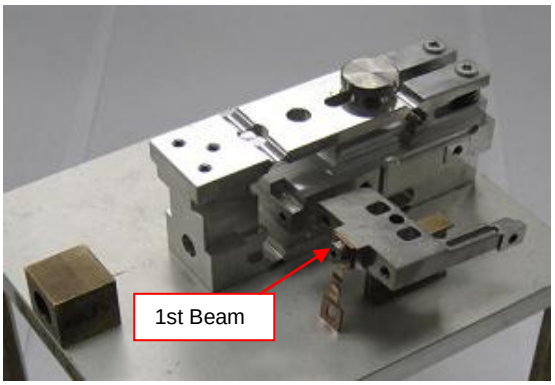


⑬ Remove the Fulcrum flexure.(Pan head screw with washer M4x6, 4pcs)
※In case of 10mg type,
Roberval side: Pan head screw with distance ring and disk washer M4 x10(2pcs).



⑭ Remove the screw for holding the beam from the 1st tension flexure. (Allen head screw with coned disk spring M4x20, 1 pc)

⑮ Remove the 1st Beam.



5.2 Assembly

1.Assembling the 2nd Beam unit

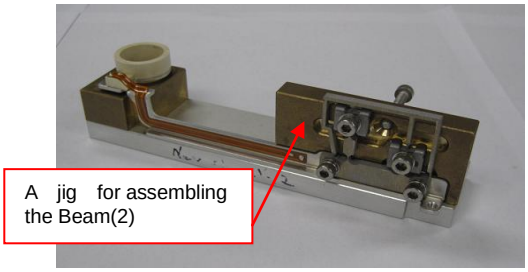
① Secure the 2nd Beam to the jig for assemble the beam(2).

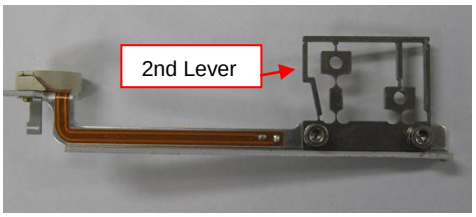
② Secure the 2nd Lever to the 2nd Beam (Allen head screw M4x8 WS,15kgf・cm, 2pcs)

③ Attach the Beam flexible print circuit to the 2nd Beam.

④ Solder the bobbin's wires to the bobbin. The wire must be glued to the Beam flexible print circuit.

⑤ Install the position sensor plate.(Pan head screw /no plated brass)

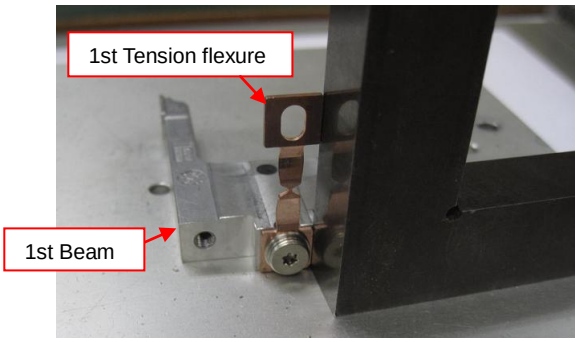




2. Assembling the 1st Beam

① Place the 1st Beam upside-down on the flat board.

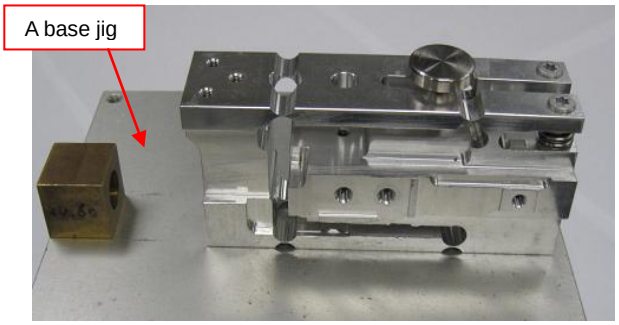
② Install the 1st Tension flexure perpendicularlye (Short head torx screw M4 x 10,15kgf・cm,1pc and Fulcrum flexure folder ,1pc)



3. Assembling the Mechanical unit

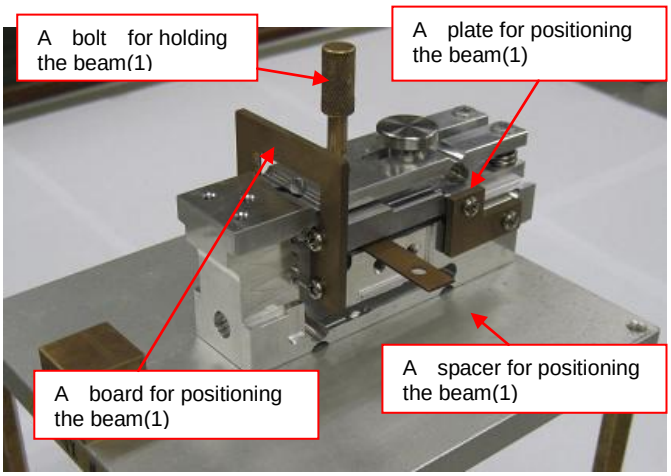
① Secure the Roberval to the base jig using the allen head screw M5x10 (3pcs) and the allen head screw M5x14(1pc).

② Assemble the 1st Beam temporarily using the spacer for positioning the beam (1) and the bolt for holding the beam (1).



③ Fit the frame with the board for positioning the beam (1) and the plate for positioning the beam (1).
Using the pan head screw M4x8(6pcs)
※In case of 10mg type,
Roberval side: Pan head screw
M4 x10(2pcs).

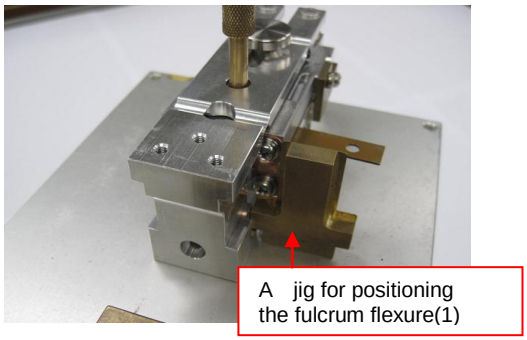
④ Tighten the bolt for holding the beam (1) and he board for positioning the beam (1) and the plate for positioning the beam (1),evenly .

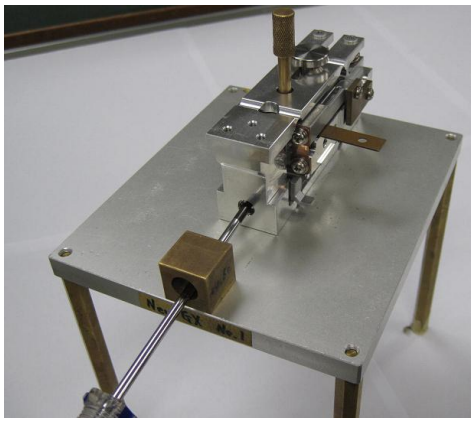


⑤ Remove the bord for positioning the beam (1).

⑥ Install the fulcrum flexures perpendicularlye, using the jig for positioning the fulcrum flexure(1) (Pan head screw with washer M4 x6 , 15kgf・cm, 4pcs)

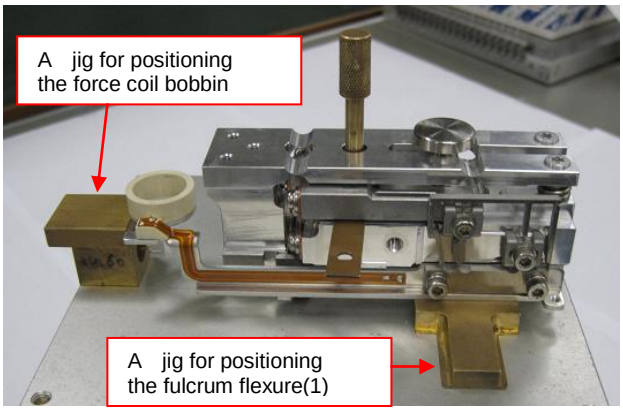
※In case of 10mg type,
Roberval side: Pan head screw with distance ring and disk washer M4 x10 (2pcs).





⑦ Secure the lower side of the tension flexure,using the 1st Tension flexure folder(Allen head screw with coned disk spring M4x20, 25kgf・cm,1pc)

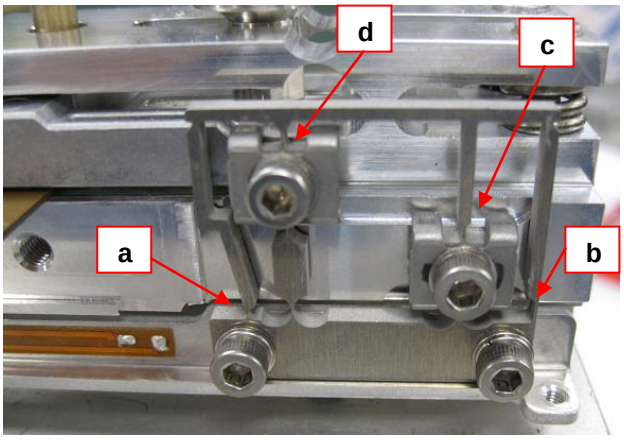
⑧ Place the jig for positioning the force coil bobbin on the base jig, insert the jig for positioning the fulcrum flexure (1) under the beam (2) unit, and secure the 2nd Beam unit using the 2nd tension flexure folder (Allen head screw with coned disk spring M4x8, 15kgf・cm, 2 pcs)

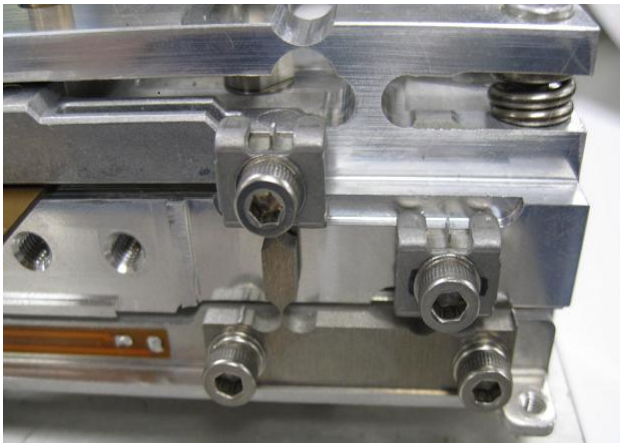


⑨ Cut the reinforcement of the 2nd beam unit.

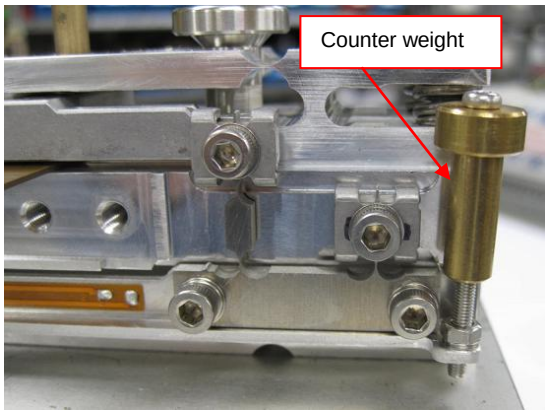
a) Cut a with a nipper.
b) Cut b with a nipper.
c) Cut c with a nipper.
d) Cut d with a nipper.

When nippers don't enter to the inside, cut only the near side. Twist a reinforcement part to the inside by pliers.
And cut a reinforcement part off.
(Hold the force coil and avoid applying force to the thin wall part.)

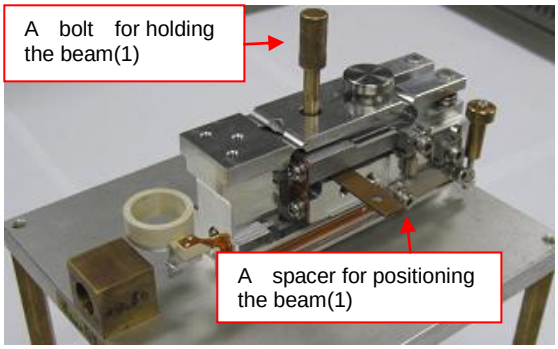




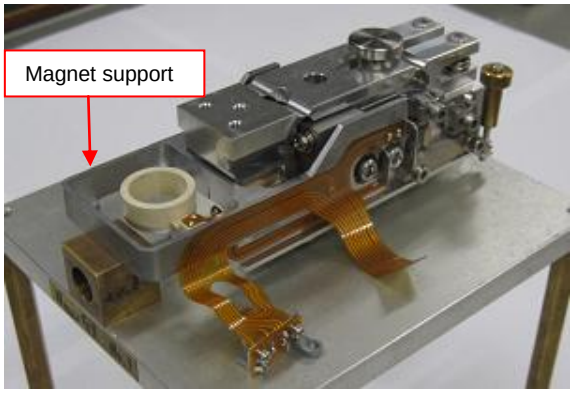
⑩Secure the Counter weight.(Pan head screw M3x40,1pc and Nut with spring washer M3,1pc)



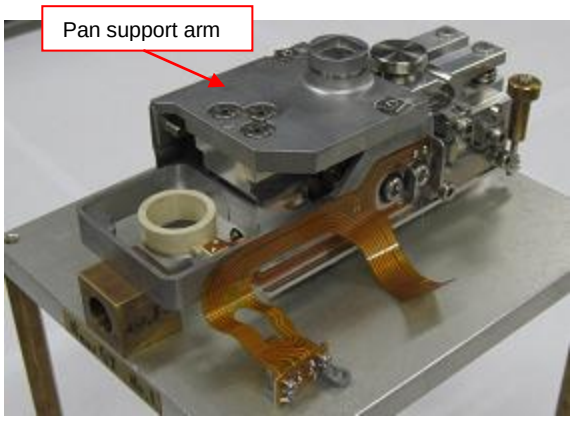
⑪Remove the bolt for holding the beam (1) and the spacer for positioning the beam (1).



⑫ Secure the Magnet support by pressing it against the base jig and the roberval. (Allen head screw with coned disk spring M5 x8, 60kgf・cm, 4pcs)

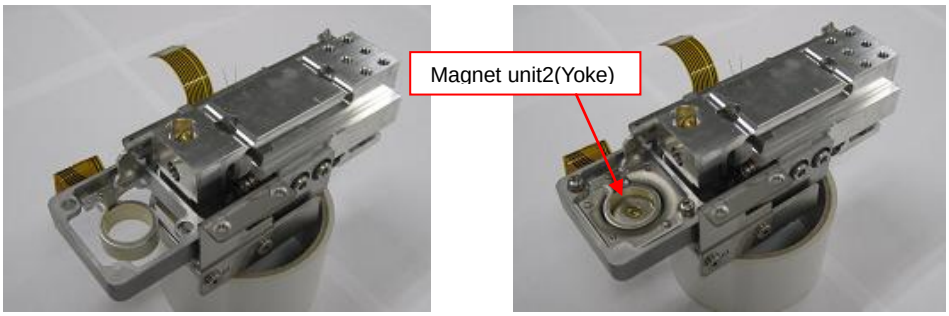


⑬ Secure the pan support arm (Short head torx screw M4x10, 12kgf・cm, 3 pcs)

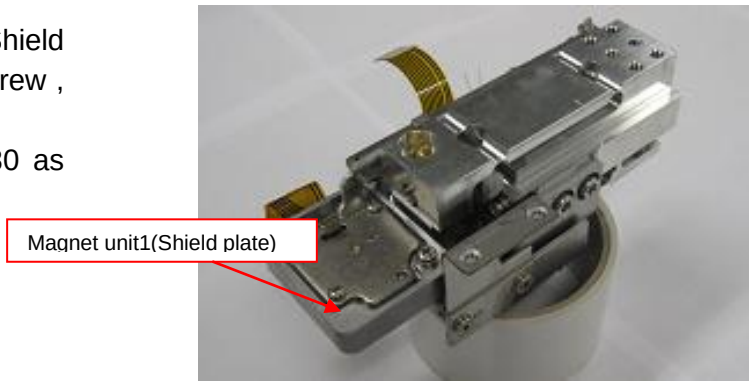


⑭ Remove from the base jig.

⑮ Secure the Magnet unit2(yoke) (Pan head screw M4x8 WS, 12kgf・cm, 2pcs)



⑯ Secure the Magnet unit1(Shield plate) (Shield plate mounting screw , 2pcs).
Use the pan head screw M3x80 as jig.



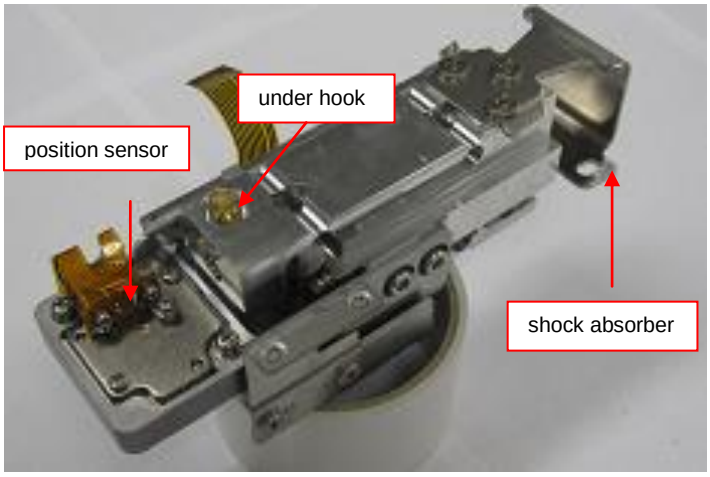
⑰ Secure the position sensor (Pan head screw M3x6 WS, 2 pcs)

⑱ Secure the under hook to the roberval.

⑲ Connect the beam flexible print circuit and the sensor flexible print circuit with two wires.

＊ Make sure that the two soldered wires do not touch the Allen head truss screws that secure the 2nd Lever. (Keep more than 1mm between the screws and the wires.)

⑳ Secure the shock absorber. (Short head torx screw M5x8 60kgf・cm, 3 pcs)



5. Installing the mechanical unit to the upper case

① Check the insulation of the 2nd beam unit (the mechanical unit alone). Measure with a multimeter the resistance between one end of the force coil and the frame. Confirm that the measured value is the same as that of when the electrodes of the multimeter are open. Make the confirmation before connecting the J10 connector. If it is connected, the resistance can become around 2.2MΩ

② Secure the mechanical sensor unit to the upper case(Allen head screw with coned disk spring M5 x10, 2pcs).

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5.3 Cleaning the Magnet Assembly and Bobbin

The magnet assembly and the bobbin will require cleaning if the balance has a repeatability problem. Particles of metal, dust or other foreign material can collect around the bobbin. If such material touches the bobbin, the bobbin will not move correctly. Metal particles are attracted to the magnet and tend to stand straight out. The gap for the bobbin is very narrow, so be very cautious while removing particles.

Note: Do not use compressed air to blow out the magnet well. There may be particles of magnetic material stuck to the bottom of the magnet.
The tools that you use near the magnet should be free of plating and non-magnetic. A flake of plating or metal particles will be attracted to the magnet.
The screws used in this balance are non-magnetic. Do not substitute screws made of magnetic material.

① Prepare a 5 cm-long adhesive tape for cleaning. Use a paper backed or cloth tape (do not use a tape that can be torn easily, such as cellophane tape, it may stick to the magnet and be very difficult to remove).

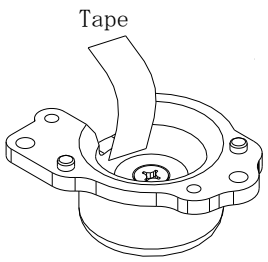
② Clean around the inner and outer surfaces of the magnet well using the adhesive tape.

③ Clean the inner and outer surfaces of the bobbin using the adhesive tape.

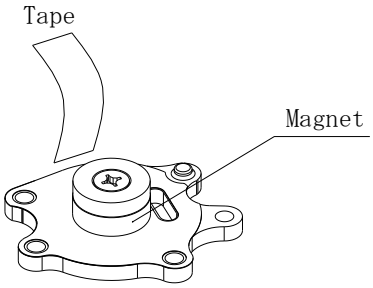
④ Inspect the magnet well and bobbin using a very strong light. Look for any particles stuck to the surfaces. Metal particles may be shiny or dark. Look for anything sticking out from the sides of the magnet.

⑤ Reassemble the force motor and test it for repeatability. Corner load error can often be traced to a repeatability problem.

If there is still a problem, disassemble the force motor and check closely for particles in the magnet gap.



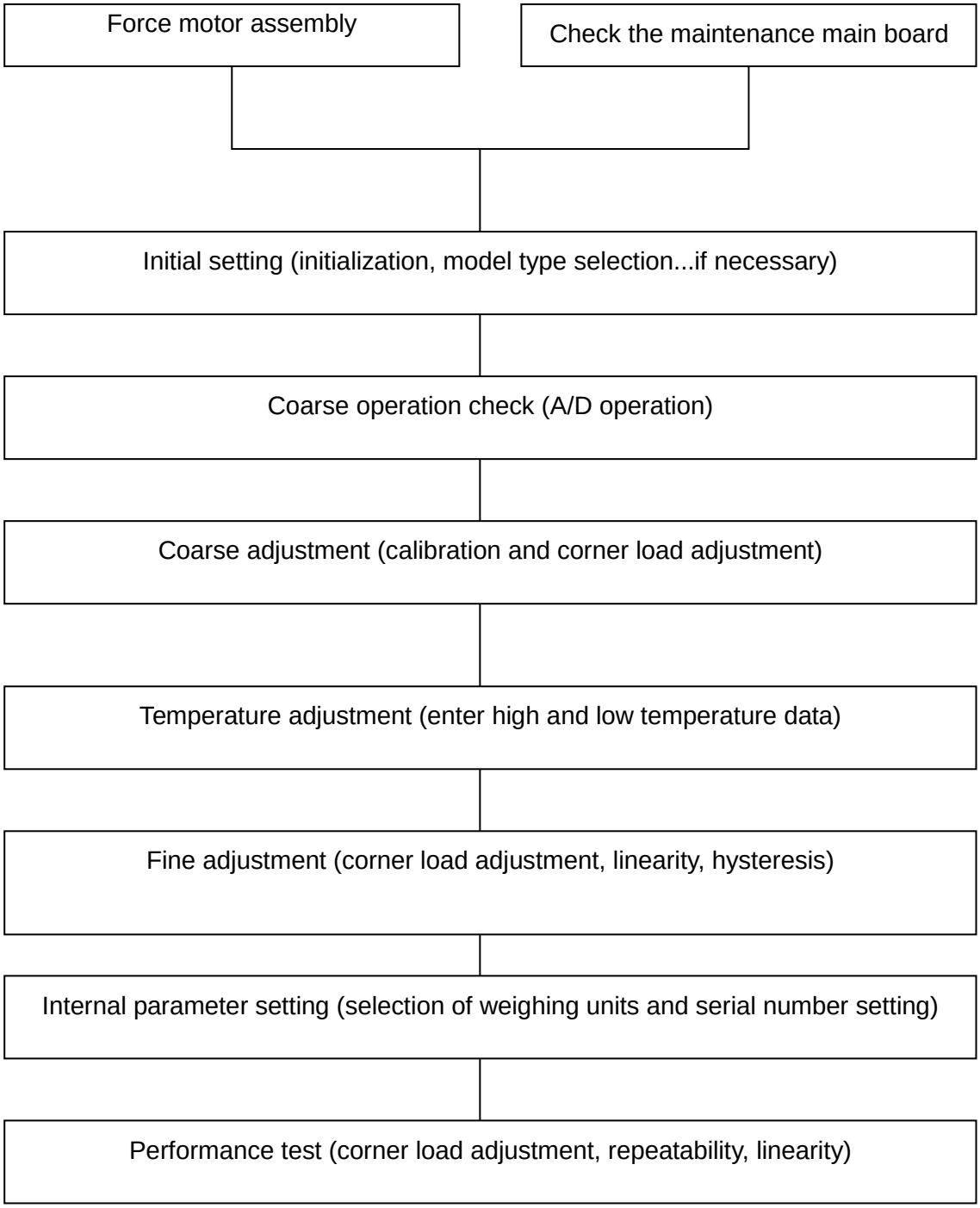
Yoke unit



Shield unit

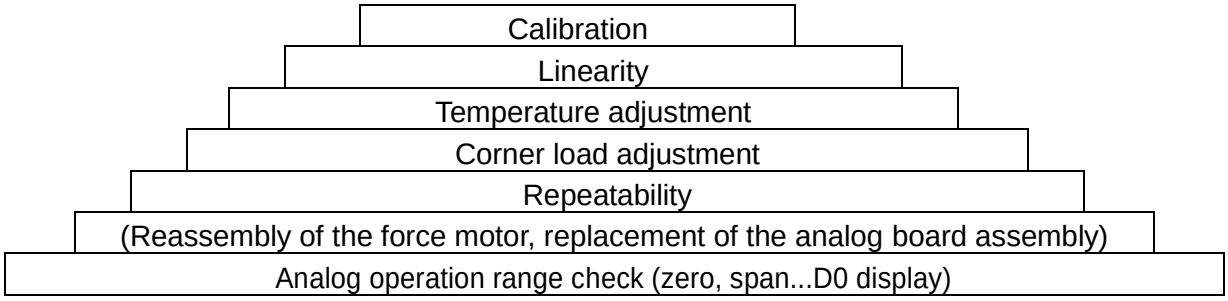
6. Adjustments

6.1 Adjustment Flow Chart



6.2 General Precautions

The data structure is shown below. Functions listed nearer to the bottom are more basic. If the specific data is adjusted, all data listed above the adjusted data must also be adjusted.



6.3 Check Mode

Check mode consists of three modes: Data adjustment mode, function setting mode and basic setting mode.

1. Entering the check mode

GX- 203A/303A/403A/603A/1003A/1603A
2002A/3002A/4002A/6002A/10002A
6001A/10001A

GF- 123A/203A/303A/403A/603A/1003A/1603A
1202A/2002A/3002A/4002A/6002A/10002A
6001A/10001A

Step 1. Verify that the display is OFF.

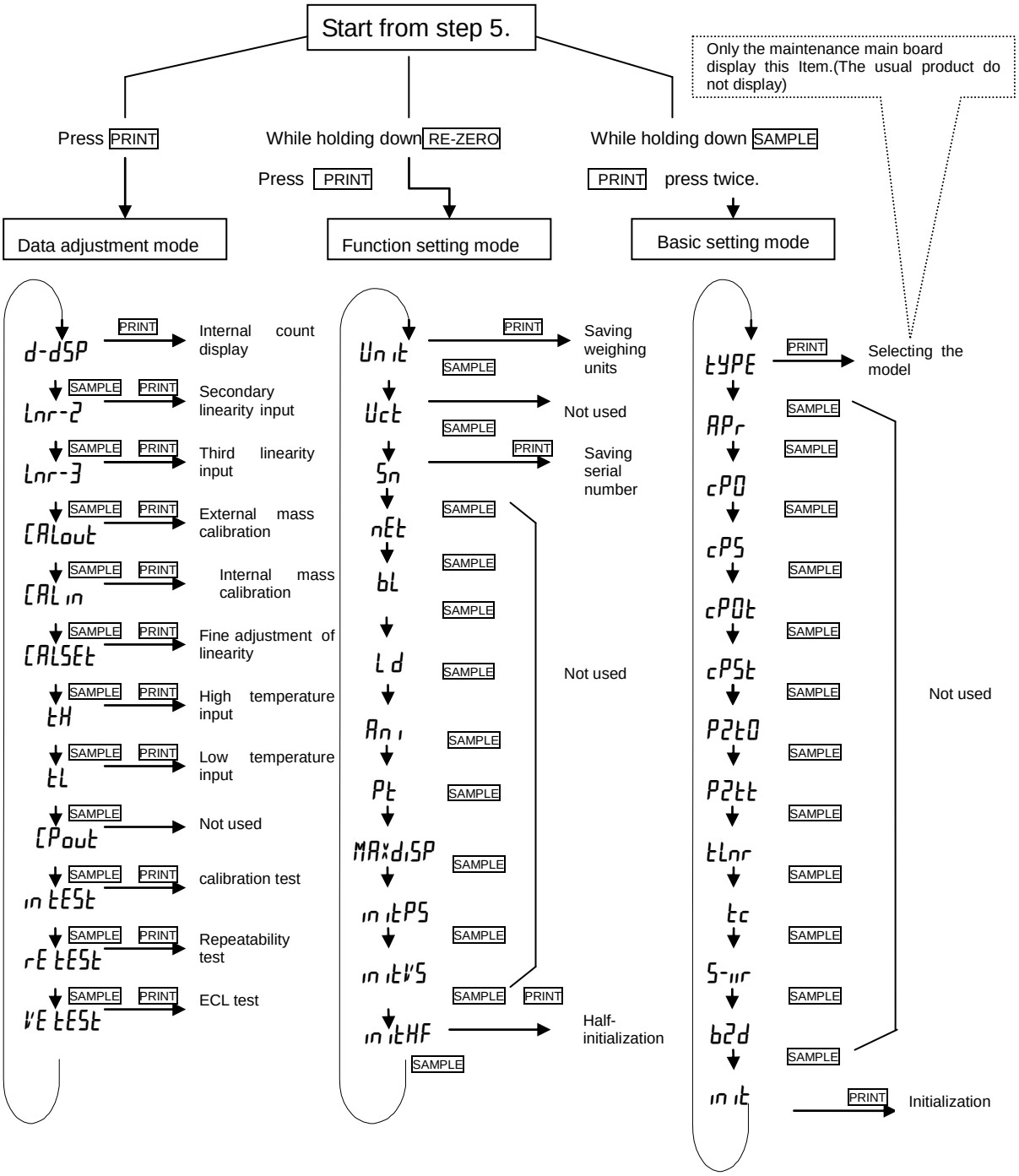
Step 2. Press and hold the RE-ZERO and PRINT keys and press the ON/OFF key. Release the PRINT and ON/OFF keys while still holding the RE-ZERO key. Immediately press the PRINT key twice. Perform this procedure within 2 seconds.

Step 3. The software version will be displayed for about 1 second P- X.XX.

Step 4. The balance model type will be displayed GX203A. (The model type displayed depends on each actual model.)

Step 5. All of the display segments will turn on.

2. Check mode menu



Note: In the above content, the way of displaying may differ depending on the software version.

6.4 Check Mode Menus

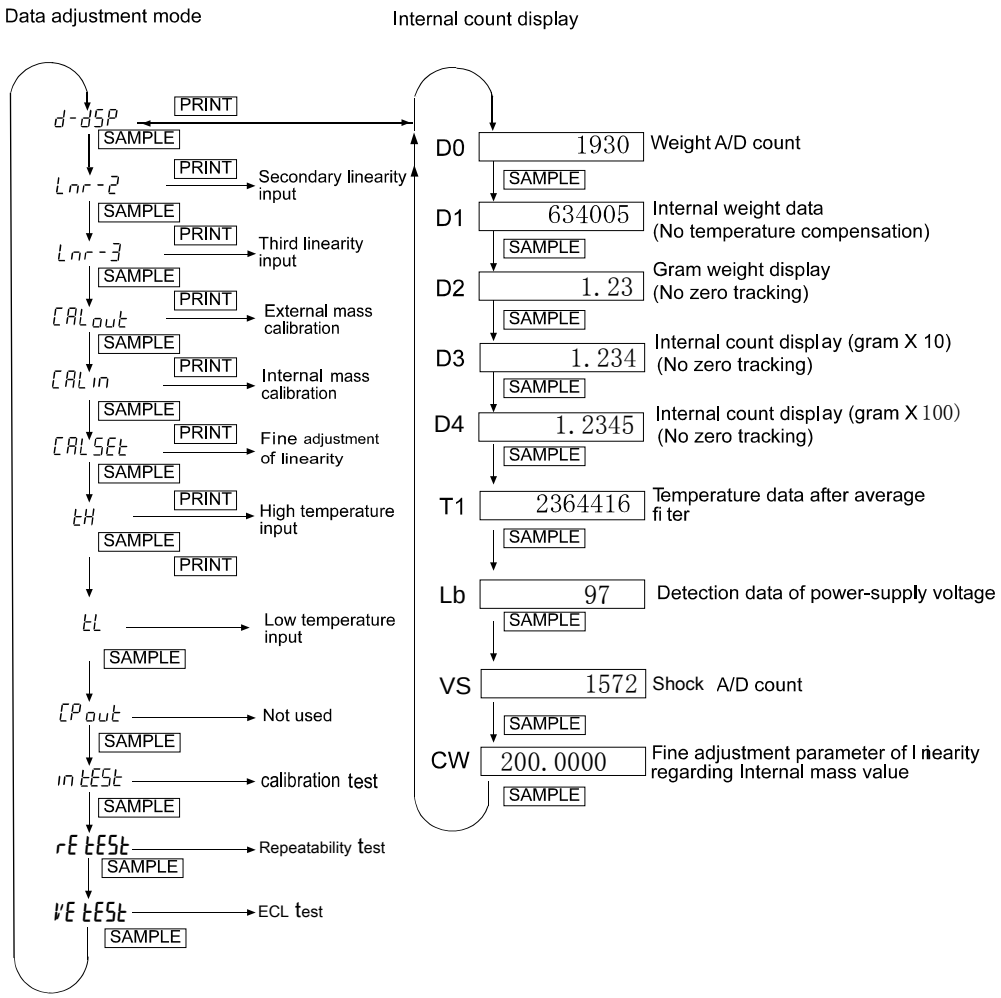
1. Internal count display

GX- 203A/303A/403A/603A/1003A/1603A
2002A/3002A/4002A/6002A/10002A
6001A/10001A

GF- 123A/203A/303A/403A/603A/1003A/1603A
1202A/2002A/3002A/4002A/6002A/10002A
6001A/10001A

While in the d-dSP display, press the PRINT key to display the internal count.

Use the SAMPLE key to go to the next data.



・Digital offset
While in the D0, D1 display, while holding down the RE-ZERO key and MODE key, the balance enters the digital offset input mode.

(In this input mode, the load sensor is disconnected internally. And certain electric signals are input in A to D converter. Refer to “6-13 Method of identifying defect location”)

6.5 Initialization

<CAUTION> · **Do not proceed with this initialization if you cannot prepare a temperature-controlled room. (It is necessary to adjust temperature data after this initialization)**

Note that the following data is initialized by this operation.

- Temperature compensation data for each unit (Then some fixed data is input compulsorily)
- Linearity compensation data (The data is cleared), serial number, weighing units
- Internal parameter settings (Certain values are input compulsorily)

Initialization procedure

Follow the procedure below to completely initialize the data stored in the non-volatile memory.

Step 1. See the check mode menu flowchart on page 29 to display basic setting mode [tYPE] or [APr].

Step 2. Press the [SAMPLE] key several times. [in it] will be displayed.

Step 3. Press the [PRINT] key. [ALL No] will be displayed. To cancel the operation, press the [CAL] or [PRINT] key. The next item will be displayed.

Step 4. Press the [RE-ZERO] key. [ALL Go] will be displayed. To cancel the operation, press the [CAL] key. The next item will be displayed

Step 5. Press the [PRINT] key. [< ALL Go], then [End] will be displayed. The next item will be displayed. Change the other items as necessary.

Step 6. To quit the operation, press the [ON/OFF] key. The display will be turned OFF.

6.6 Model type Selection (Only for maintenance electric board)

Model type selection is available for the maintenance board only.

Model selection procedure

Follow the procedure below to select the balance model type.

Step 1. Verify the following item of the 7PZ-6594B/C (Main board for the maintenance).

☐ Verify the type of the board

・For each type (B/C), verify that the jumper setting is correct. (Refer to the Technical information “3. Circuit Diagram” and “4. Part Layout”)

☐ For the main board unit, verify if it is adjusted completely

・Connect the AC adapter to the main board unit. If Error 9 is displayed, the main board is not adjusted yet and it should be adjusted for a maintenance board.

Step 2. See the check mode menu flowchart on page 29 to display basic setting mode tYPE .

Step 3. Press the PRINT key. Confirm the type on the display as follows.

Type of board	Model type which can be set	Type displayed initially
7PZ-6594B	GX-203A/303A/403A/603A/1003A/1603A GF-123A/203A/303A/403A/603A/1003A/1603A	GX-1603A
7PZ-6594C	GX-2002A/3002A/4002A/6002A/10002A -6001A/10001A GF-1202A/2002A/3002A/4002A/6002A/10002A -6001A/10001A	GX-10002A

Use the following keys to select the model type

RE-ZERO key: changes the model type. (Change the model type according to the kinds of PZ)

PRINT key: saves the final model type.

CAL key: cancels the data.

When the model after change is the same as that before change, the stabilization indicator illuminates.

Step 4. Press the PRINT key. End appears. Then, the next item appears.

6.7 Coarse Operation Check & Adjustment

1. A/D count check

The A/D count can be checked in the check mode.

Follow the procedure below to verify the A/D values for weight data (D0) and temperature data (T1).

Step 1. Display the data adjustment mode d-dSP after getting into check mode shown on page 28,29.

Step 2. Press the PRINT key to display XXXX . (D0 data, weight A/D count)

Step 3. Check that the pan assembly is installed properly. Verify that the count without load (zero point) is within the range shown in the table below.

Note: If the zero point is not within the specification, adjust it by jumpers (JP2, JP3 on the main board).

Opening JP2 makes Zero point +2500(D0) and opening JP3 makes Zero point +2500(D0).

Step 4. Place the mass in the table below on the pan. Read the count with load (full). Subtract the count without load from the count with load to obtain the span value. Verify that the span value and full value are within the range shown in the table below.

In the D0 data mode (Weight A/D count), press the SAMPLE key twice to display X.XX (D2 data). Verify that the dispersion is within the specifications as below when the mass is placed on the pan.

Model	Masses	Zeropoint (D0)	Full (D0)	Span (D0)	Dispersion (D2)
GX-203A/303A/403A 603A/1003A/1603A GF-123A203A/303A 403A/603A/1003A 1603A	1600g	1100~4000	9000	3700～5000	MAX-MIN: 0.002g/5seconds
GX-2002A/3002A/4002A 6002A/10002A 6001A/10001A GF-1202A/2002A/3002A 4002A/6002A/10002A 6001A/10001A	10kg	1100~4000	~9000	3000～4200	MAX-MIN: 0.02g/5seconds MAX-MIN: 0.1g/5seconds

Step 5. In the D2 data mode, press the SAMPLE key three times to display XXXXXX . (T1 data)

Step 6. Verify that the count at room temperature (15-25°C) is within the range shown in the table below.

Absolute value (T1 data)	Dispersion (T1 data)
2400000-2800000	MAX-MIN: 40 counts/5 seconds

6.8 Coarse Adjustment

1. Calibration

With nothing placed on the pan, warm up the balance for at least half an hour. Calibration is performed in the check mode [CALout] display. Follow the procedure below to calibrate.

Step 1. Display the data adjustment mode [d-dSP] after getting into check mode shown on page 28,29.

Step 2. Press the SAMPLE key three times. [CALout] is displayed.

Step 3. Press the PRINT key.

Step 4. [CAL 0] is displayed. Check the standard mass for calibration in table below.

Model (GX-A/GF-A series)	Standard masses
123 (Only GF-A)	100g
203/303	200g
403	400g
603	500g
1202 (Only GF-A)	1kg
1003A/1603A	1kg
2002A/3002A	2kg
4002A	4kg
6002A	5g
10002A	10kg
6001A	5g
10001A	10g

Step 5. With nothing placed on the pan, press the PRINT key. [< CAL 0] is displayed.

Step 6. After it stabilized, [200] is displayed. (Example of the GX203A)

Step 7. Place the calibration mass specified in step 4 on the pan. Press the PRINT key. [< 200] is displayed. (Example of the GX203A)

Step 8. After it stabilized, [End] is displayed.

Step 9. Remove the mass.

2. Corner load adjustment

Corner load is adjusted in the check mode D2 display.

Coarse adjustment

Step 1. Display the data adjustment mode [d-dSP] after getting into check mode shown on page 28,29.

Step 2. Press the PRINT key to display [XXXX] . (D0 data-weight A/D count)

Step 3. In the D0 data mode (weight A/D count), press the SAMPLE key twice to display [X.XXX] . (D2 data as gram weight display).

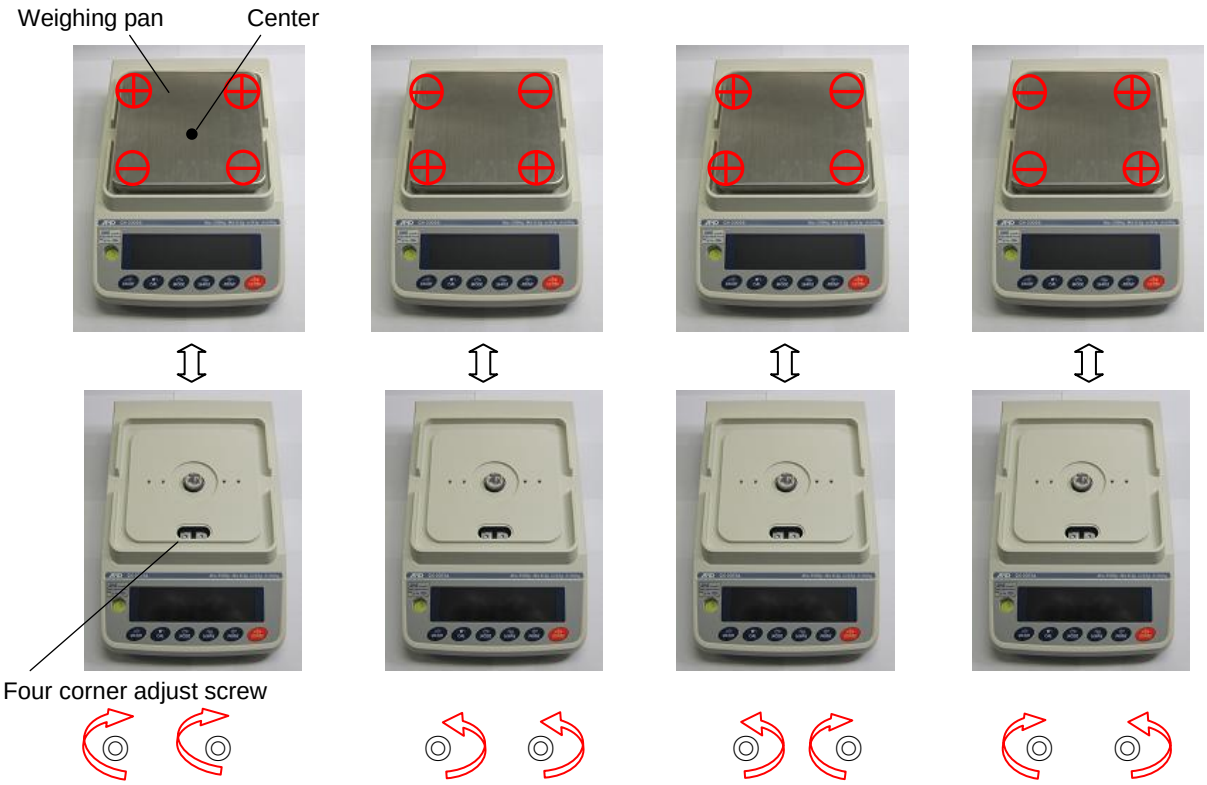
Step 4. In the D2 display, place an external mass on the center of the pan and at four positions half the distance from the center of the pan to the edge. Adjust the corner load adjusting screws so that the difference between the values in the center and each position will be within the specification. (If a condition in the illustration below occurs, turn the corner load adjusting screws as indicated by the arrows.)

Step 5. When adjusting the corner load, a drift of the zero point may be generated. After adjusting, load the mass listed in table below on the front, back, left and right of the weighing pan, and work again after the drift of the center zero point is confirmed to be within ±3 digits.

Model (GX-A/GF-A series)	Masses	Specifications	Drift value of Zero point
123 (Only GF-A)	100g	±0.006g	±0.003g
203			
303	200g	±0.008g	
403		±0.007g	
603	300g	±0.007g	
1003	500g	±0.007g	
1603		±0.008g	
1202 (Only GF-A)	1kg	±0.06g	±0.03g
2002			
3002	2kg	±0.08g	
4002		±0.07g	
6002	3kg	±0.07g	
10002	4kg	±0.10g	
6001	3kg	±0.3g	±0.3g
10001	4kg		

If the corner load error at the front of the weighing pan is plus counts, turn the four corner adjust screws counterclockwise.

If the corner load error at the front of the weighing pan is minus counts, turn the four corner adjust screws clockwise.



3. Hysteresis check

Apply a preliminary load by placing and removing a load with the same weight value as the full scale value. Perform this pre-load three times.

Note: The corner load error has a bad effect on the linearity adjustment or linearity and hysteresis check.

In the D2 data mode, place the specified check mass in the table below one by one on the pan. After reaching the weighing capacity, remove each mass one by one, and check that the difference between increasing points and decreasing points are within the specifications (hysteresis).

Model (GX-A/GF-A series)	Masses	Hysteresis (D2 mode)
123 (Only GF-A)	50g x 2	±0.002g
203	100g x 2	
303	100g x 3	
403	100g x 4	
603	200g x3	
1003	200g x5	±0.003g
1603	400g x4	±0.004g
1202 (Only GF-A)	500g x2	±0.02g
2002	1kg x 2	
3002	1kg x 3	
4002	1kg x 4	
6002	2kg x 3	±0.03g
10002	2kg x 5	±0.04g
6001	2kg x 3	±0.1g
10001	2kg x 5	

6.9 Temperature Adjustment

A room or chamber that can be set at 10°C and 30°C is required for this adjustment.
The balance must stabilize at each temperature for more than 4 hours before the data is taken.
Input high temperature data initially, then input low temperature data. Finally go back to high temperature state, and check the zero drift and the span drift.
Use the same mass when inputting data for both high temperature and low temperature.

1. Inputting the temperature data

Step 1. Display the data adjustment mode [d-dSP] after getting into check mode shown on page 28,29.

Step 2. Press the SAMPLE key six times. [tH] appears. Press the SAMPLE key two more times. Then [tL] appears. Input high temperature data in the tH display, low temperature data in the tL display.

Step 3. In the [tH] or [tL] display, press the PRINT key. The motor starts and adjusts the internal mass position correctly. Then [tH 0] or [tL 0] is displayed respectively.

Step 4. With nothing placed on the weighing pan, press the PRINT key as zero point data. To cancel the operation, press the CAL key.

Step 5. After it stabilized, [tH F] or [tL F] is displayed respectively.

Step 6. Place the mass in table below on the weighing pan and press the PRINT key.

Model (GX-A/GF-A series)	Masses
1603 series (0.001g type)	400g
10002 series (0.01g type)	2kg
10001 series (0.1g type)	2kg

Step 7. After it stabilized, [End] is displayed.

2. Temperature adjustment check

Step 1. After inputting the low temperature data, keep the temperature.

Step 2. Press the RE-ZERO key to show zero. Note the zero point reading. Place a mass in table below on the pan and note the span reading. The span data is calculated after subtracting the zero point reading from the full point reading. Remove the mass.

Step 3. Set the temperature to 30°C again. Leave the balance at that temperature for at least 4 hours. (Leave the balance with D2 data mode.)

Step 4. Note the zero point reading.

Step 5. Press the RE-ZERO key to display zero.

Step 6. Place a mass in table below on the pan and note the span reading. The span data is calculated after subtracting the zero point reading from the full point reading. Remove the mass.

Step 7. Verify that the changes in the zero point and span are within the specifications.

Model (GX-A/GF-A series)	Masses	Data mode	Zero	Span
1603 series (0.001g type)	400g	D2	±0.050g /20℃	±0.016g /20℃
10002 series (0.01g type)	2kg	D2	±0.50g /20℃	±0.08g /20℃
10001 series (0.1g type)	2kg	D2	±1.0g /20℃	±0.1g /20℃

6.10 Fine Adjustment

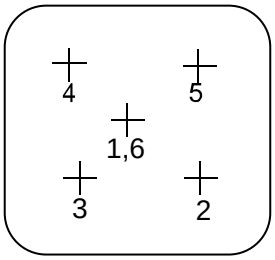
1. Corner load adjustment

In the D2 data mode, place an external mass on the center of the pan and at four positions half the distance from the center of the pan to the corner edge shown in a figure below. Verify that the difference between the values at the center and at each position is within the specifications.

About the adjustment method, refer to the “2.Corner load adjustment” of “6.8 Coarse Adjustment” .

When adjusting the corner load error by turning the four corner adjust screws, zero point drift may be generated. After turning the four corner adjust screws, load the mass listed in table below on the front, back, left and right of the weighing pan, and work after the drift of the center zero point is confirmed to be within the ±2 digits.

Model (GX-A/GF-A series)	Masses	Specifications	Drift value of Zero point
123 (Only GF-A)	100g	±0.006g	±0.002mg
203			
303	200g	±0.008g	
403		±0.007g	
603	300g	±0.007g	
1003	500g	±0.007g	
1603		±0.008g	
1202 (Only GF-A)	1kg	±0.06g	±0.02mg
2002			
3002	2kg	±0.08g	
4002		±0.07g	
6002	3kg	±0.07g	
10002	4kg	±0.10g	
6001	3kg	±0.3g	
10001	4kg		



2. Linearity adjustment (Lnr-2, 3) / Linearity and Hysteresis check

First, warm up the balance at room temperature for at least 1 hour before carrying out the adjustment.

Apply a preliminary load by placing and removing a load with the same weight value as the full scale value. Perform this pre-load three times. Follow the procedure below to input linearity data.

Note: The corner load error has a bad effect on the linearity adjustment or linearity and hysteresis check.

Step 1. Display the data adjustment mode [d-dSP] after getting into check mode shown on page 28,29.

Step 2. Press the [SAMPLE] key one time. [Lnr-2] is displayed.

・In the case of GX,GF 1603/4002/6002/10002/6001/1001-A 、Press the [SAMPLE] key twice.
→ [Lnr-3] is displayed.

Step 3. Press the [PRINT] key. The motor starts and adjusts the internal mass position correctly. Then [Lnr-0] is displayed. (Press the [CAL] key to cancel this procedure.)

Step 4. With nothing placed on the pan, press the [PRINT] key.

Step 5. After stabilization, [Lnr-1] is displayed (Press the [CAL] key to cancel the operation.)

Step 6. Place mass A shown in the table below on the weighing pan and press the [PRINT] key.

Step 7. After it stabilized, [Lnr-2] is displayed. (Press the [CAL] key to cancel the operation.)

Step 8. Remove mass A, place mass B and press the [PRINT] key.

Step 9. After it stabilized, [Lnr-3] is displayed. (Press the [CAL] key to cancel the operation.)

Step 10. Add mass A (confirm to place mass B and mass A on the weighing pan) and press the [PRINT] key.

・In the case of GX,GF 1603/4002/6002/10002/6001/1001-A ,go to Step 11,otherwise go to Step 15.

Step 11. After it stabilized, [Lnr-4] is displayed. (Press the [CAL] key to cancel the operation.)

Step12. Remove all the mass on the weighing pan, place mass C and press the PRINT key.

Step13. After it stabilized, Lnr-5 is displayed. (Press the CAL key to cancel the operation.)

Step14. Add mass A (confirm to place mass C and mass A on the weighing pan) and press the PRINT key.

Step15. After it stabilized, End is displayed. Remove mass and complete.

Model (GX-A/GF-A series)	Input grade	Masses			Input method and actual load on the pan					
					Lnr0	Lnr1	Lnr2	Lnr3	Lnr4	Lnr5
		A	B	C	No load	A	B	B+A	B+C	B+C+A
123 (Only GF-A)	2	50g	50g	-	0g	50g	50g	100g	-	-
203		100g	100g			100g	100g	200g	-	-
303		100g	200g			100g	200g	300g	-	-
403		200g	200g			200g	200g	400g	-	-
603		300g	300g			300g	300g	600g	-	-
1003		400g	600g			400g	600g	1000g	-	-
1603	3	400g	600g	600g		400g	600g	1000g	1200g	1600g
1202 (Only GF-A)	2	500g	500g	-		500g	500g	1kg	-	-
2002		1kg	1kg			1kg	1kg	2kg	-	-
3002		1kg	2kg			1kg	2kg	3kg	-	-
4002	3	2kg	1kg	1kg		2kg	1kg	3kg	2kg	4kg
6002		2kg	2kg	2kg		2kg	2kg	4kg	4kg	6kg
10002		4kg	3kg	3kg		4kg	3kg	7kg	6kg	10kg
6001	3	2kg	2kg	2kg		2kg	2kg	4kg	4kg	6kg
10001	3	4kg	3kg	3kg		4kg	3kg	7kg	6kg	10kg

Linearity and Hysteresis check

Calibrate by using the calibration mass in table below.

After calibration, in the D2 data mode, place the specified check mass in the table below one by one on the pan, and check that the difference between the true value and the displayed value is within the specifications (linearity). After reaching the weighing capacity, remove each mass one by one, and check that the difference between increasing points and decreasing points are within the specifications (hysteresis).

Model	Calibration masses	Check masses	Linearity (D2 mode)	Hysteresis (D2 mode)
123 (Only GF-A)	100g	50gx2	±0.002g	±0.002g
203	200g	100gx2		
303	300g	100gx3		
403	400g	100gx4		
603	600g	200gx3		
1003	1000g	200gx5	±0.003g	±0.003g
1603	1600g	400gx4		±0.004g
1202 (Only GF-A)	1kg	500gx2	±0.02g	±0.02g
2002	2kg	1kgx2		
3002	3kg	1kgx3		
4002	4kg	1kgx4		
6002	6kg	2kgx3	±0.03g	±0.04g
10002	10kg	2kgx5		±0.06g
6001	6kg	2kgx3	±0.1g	±0.1g
10001	10kg	2kgx5		

3. Internal mass value correction (CAL SEt) (Only GX-A)

The following explains about how the internal mass value is adjusted precisely.
Perform the linearity adjustment before internal mass value correction. In the case of performing the internal mass value correction only, the internal temperature of the balance must be approached to the room (the air) temperature enough.

(1) Preliminary load

Apply a preliminary load by placing a load with the full scale value and remove it. Perform this pre-load three times.

(2) External mass calibration (CAL out)

Step 1. Display the data adjustment mode [d-dSP] after getting into check mode shown on page 28,29.

Step 2. Press the SAMPLE key three times. [CALout] is displayed.

Step 3. Press the PRINT key. The motor starts and adjusts the internal mass position correctly.

Step 4. [CAL 0] is displayed. Check the standard mass for calibration in table below.

Model (GX-A series)	Standard masses
203	200g
303	300g
403	400g
603	600g
1003	1000g
1603	
2002	2kg
3002	3kg
4002	4kg
6002	5kg
10002	
6001	
10001	

To change the calibration mass value, press the SAMPLE key and change the value as necessary using the following keys.
SAMPLE key: changes the blinking digit position.
RE-ZERO key : changes the value of the blinking digit.
PRINT key: saves the data.

Step 5. With nothing placed on the pan, press the PRINT key. [<CAL 0] is displayed.

Step 6. After it stabilized, [200] is displayed. (Example of the GX-203A)

Step 7. Place the calibration mass specified in step 4 on the pan. Press the PRINT key. < 200 is displayed. (Example of the GX-203A)

Step 8. After it stabilized, End is displayed.

Step 9. Remove the mass.

(3) Fine adjustment of internal mass value

Step 1. In the data adjustment mode d-dSP , press the SAMPLE key five times. CALSEt is displayed.

Step 2. Press the PRINT key. The pump starts and adjusts the internal mass position correctly.

Step 3. The display changes in turn as follows:

CAL SEt → <CAL. SEt → <CAL . SEt → <CAL . SEt → <CAL . SEt → End → tH

Step 4. Proceed to the next step.

(4) Internal mass calibration (CAL in)

Step 1. In the data adjustment mode d-dSP , press the SAMPLE key four times. CAL in is displayed.

Step 2. Press the PRINT key. The motor starts and adjusts the internal mass position correctly.

Step 3. The display changes in turn as follows:

CAL → <CAL . → CAL . → <CAL . → End

Step 4. Proceed to the next step.

(5) In D2 data mode, verify the error of the fine adjustment

Step 1. In the data adjustment mode d-dSP , press the PRINT key. XXXX is displayed. (D0 data-weight A/D count)

Step 2. Press the SAMPLE key twice. XXXXX.X is displayed. (D2 data-gram weight display)

Step 3. Place again the calibration mass used in “(2) External mass calibration”. Verify that the error (the difference between the displayed weight value and the mass value) is within the specifications.

If not within the specifications, perform the fine adjustment again (operation of (2), (3)), or perform the digital correction as explained later.

Model (GX-A series)	Standard masses	Specifications
203	200g	±0.010g
303	300g	
403	400g	
603	600g	
1003	1000g	
1603		
2002	2kg	±0.10g
3002	3kg	±0.15g
4002	4kg	
6002	5kg	
10002		
6001	5kg	±0.5g
10001		

(6) Calibrate using the internal mass and verify the fine adjustment error (operation (4)-(5)). Perform this three times, verify that the all data be within the specifications.

4. check the operation of the electronically controlled load

① With D2 MODE, when loaded with electronically controlled load , the value and stability of the span in the table below have to be checked. Confirm that it is within range.

With the key operation (pressing the SAMPLE key while pressing the MODE key), you can load the electronically controlled load .

Also it can be operated in the following command.

FP7:0 electronically controlled load ON

FP7:1 electronically controlled load OFF

※ When the electronically controlled load is ON, the mark lights on the left side of the upper part of the display.

② Electronically controlled load,confirm that the repeatability [standard deviation SD] (10 times or 5 times) of the span at the time of load is within the range of Table below.

Check mode with VE TEST, it is possible to repeat load of electronically controlled load and effectiveness of repeatability calculation.

Model (GX-A series)	D2span	D2 stability	VE TEST Span reproducibility σ
104,204,304	1.5~3.5 g	Within 0.1 mg / 5 seconds	Within 0.1 mg
123,203,303,403,603,1003,1603	3~12 g	Within 0.001mg / 5 seconds	Within 0.001g
1202,2002,3002,4002,6002,10002	15~55 g	Within 0.01mg / 5 seconds	Within 0.01g
6001,10001	15~55 g	Within 0.1mg / 5 seconds	Within 0.1g

6.11 Parameter Settings

1. Serial number setting

Follow the procedure below to set the serial number.

Step 1. Display the function setting mode [Unit], after getting into check mode shown on page 28,29.

Step 2. Press the SAMPLE key twice. [Sn] is displayed.

Step 3. Press the PRINT key. Then the display starts to blink.

Step 4. Using the following keys, input the serial number on the label attached to the each balances.

RE-ZERO key: changes the value of the blinking digit（+）.
MODE key: changes the value of the blinking digit（−）.
SAMPLE key: changes the blinking digit position.
CAL key : cancels the operation

Step 5. When the serial number is set, press the PRINT key.

Step 6. [End] is displayed to indicate that the operation is completed.

6.12 Half-initialization

Half-initialization changes all the user settings(*1) to the default values. Follow the procedure below.

Step 1. Display the function setting mode [Unit], after getting into check mode shown on page 29.

Step 2. Press the [SAMPLE] key several times. [initHF] is displayed.

Step 3. Press the [PRINT] key. [HF No] is displayed. (To cancel the operation, press the [CAL] key or [PRINT] key.)

Step 4. Press the [RE-ZERO] key. [HF Go] is displayed. (To cancel the operation, press the [CAL] key.)

Step 5. Press the [PRINT] key. [<HF Go] and then [End] is displayed. The Half-initialization is completed.

(*1) The user settings

- Function setting
- Value of the external mass for calibration
- Content of data memory function
- Density data of liquid for density measurement
- Password

6.13 Method of identifying defect location (Electrical part or Mechanical part)

In this chapter it explains about how easily you can check the cause of malfunction in the mechanical parts or in the electrical part, without disassembling the balance. It is advantageous if the defect is “unstable data” or “repeatability error”.

1. Method of identifying defects in the internal offset mode

*** If i) is OK, the electrical part is not defective. In this case, it is likely that the cause is in the mechanical part.**

*** If i) is NG, the electrical part is defective. It is necessary to check or replace the electrical part especially analog board.**

i) Operation confirmation for the electrical portion of the weight A/D part by itself

Step 1. Display the data adjustment mode [d-dSP] after getting into check mode shown on page 28,29.

Step 2. Press the [PRINT] key. [XXXX] is displayed. (D0 data mode-weight A/D count)

Step 3. Press and hold [RE-ZERO] key and press [MODE] key. “-1-“ is displayed on the upper left display in offset mode (seven segments). With a same key operation, the mode can be moved to “-2-“, “-3-”. See the example at the bottom of this page.

(1) In the offset 2 (-2-), verify that the data is within 2300-2700.

(2) In the offset 3 (-3-), verify that the data is within 4800-5200

Step 4. Press the [SAMPLE] key. [XXXXXX] is displayed. (D1 display-Internal weight data)

Step 5. Press and hold [RE-ZERO] key and press [MODE] key. “-1-“ is displayed on the upper left display in offset mode (seven segments). With the same key operation, the mode can be moved to “-2-“, “-3-”. See the example at the bottom of this page.

(1) In the offset 3 (-3-), verify that the data is within 25000000-29000000, and the data of dispersion is within 15 counts (MAX-MIN) in 5 seconds.

Offset mode (Weight A/D)

Weight A/D input	Dot segments on the upper left	D0 data	D1 data
Offset 1 only	-1-	Approx.0	Approx.11000
Offset 2 only	-2-	Approx.2500	Approx.13700000
Offset 3 only	-3-	Approx.5000	Approx.27500000
Ordinary state (Connecting to the mechanical part)	No display	Weight A/D count	Internal weight data D1

Example) In the D0 data mode, to display “-2-”.

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