

# GR SERIES

## MAINTENANCE MANUAL

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### PRECISION ELECTRONIC BALANCE

GR-120

GR-200

GR-300

GR-202



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# 1. Introduction

For smooth maintenance, the products must be technically understood, and the required equipment and tools must be prepared. Since the GR 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
Phillips screwdriver 3 mm	For disassembling and reassembling
Precision posidrive screwdriver	For securing the motor holder
Precision flat screwdriver	For adjusting the counter weight
Adhesive tape 8 mm	For cleaning
Mechanical alignment fixture	For disassembling and reassembling the force motor assembly
Wrench 5.5 mm	For adjusting the counter weight and corner load
Allen wrench 3 mm	For securing the force motor assembly
Allen wrench 1.5 mm	For securing the cam and cam shaft (motor unit)
Round-nose chain pliers	For installing the lower case post and the underhook
Soldering iron (25-40 W)	For soldering
Weights	
GR-120:	Two 50 g, One 100 g
GR-200:	Four 50 g, Two 100 g, One 200 g
GR-300:	Three 100 g, One 200 g
GR-202:	Two 20 g, Four 50 g, Two 100 g, One 200 g
AC adapter	Use the AC adapter supplied with the balance.
Multimeter	
Oscilloscope	
Temperature Controlled Room	A room where the temperature can be maintained at $10 \pm 2^{\circ}\text{C}$ and $30 \pm 2^{\circ}\text{C}$ for 8 hours or more.



## 1.2 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 trouble-shooting table.

### Adjustment details

An adjustment procedure is described for each item.



## 2. Performance Test

Allow one hour warm-up prior to conducting the performance test.



### 2.1 Performance Test Procedure

Verify the following points:

#### External view

1. The balance has been leveled. Check using the bubble spirit level.
2. The weighing pan is level. (Check for the correct pan assembly.)

#### Functions

1. Verify that each key functions correctly:

ON/OFF key  
CAL key  
PRINT key  
RE-ZERO key  
RANGE key  
MODE key

2. Verify that the following operate correctly:

The minus indicator  
The decimal point indicator  
That a stable display is obtained.  
The motor functions properly without noise.  
External key inputs  
The interface options  
Selection of the weighing units  
Identifies each of three TLs.  
Evaluates the factor k using a 100-g weight (100.00 g).  
e.g. when "2.64557 TL" is displayed,

$$k = \text{g display} / \text{TL display} = 100.000 / 2.64557 = 37.799$$

3. Verify that the TAEI values are within tolerance :

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



## 2.2 Test Details

### Internal mass repeatability

After auto calibration, place the specified mass on the pan and read the displayed value. Repeat this procedure five times. Verify that the difference between the maximum value and the minimum value is within the specifications.

Model	Mass used	Specifications
GR-120	100 g	$\pm 0.2$ mg
GR-200	200 g	$\pm 0.2$ mg
GR-300	200 g	$\pm 0.2$ mg
GR-202	200 g	$\pm 0.2$ mg

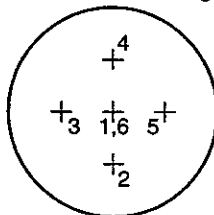
### Repeatability

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). Subtract the displayed value when no load is applied from the displayed value when load is applied. Obtain the standard deviation 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	Mass used	Specifications
GR-120	100 g	0.1 mg (standard deviation)
GR-200	200 g	0.1 mg (standard deviation)
GR-300	300 g	0.2 mg (standard deviation)
GR-202 (0.1 mg range)	200 g	0.1 mg (standard deviation)
(0.01 mg range)	40 g (20 g $\times$ 2)	0.02 mg (standard deviation)

### 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 edge) is within the specifications.



Model	Mass used	Specifications
GR-120	50 g	$\pm 0.2$ mg
GR-200	100 g	$\pm 0.2$ mg
GR-300	100 g	$\pm 0.2$ mg
GR-202 (0.1 mg range)	100 g	$\pm 0.2$ mg
(0.01 mg range)	20 g	$\pm 0.04$ mg

## Linearity

1. After calibration, place mass 1 on the pan and check the value as A.
2. Replace mass 1 with mass 2. Press the RE-ZERO key. Place mass 1 on the pan. Check the value as B.
3. Replace mass 1 with mass 3. Press the RE-ZERO key. Place mass 1 on the pan. Check the value as C.
4. Replace mass 1 with mass 4. Press the RE-ZERO key. Place mass 1 on the pan. Check the value as D.
5. Check the differences, B-A, C-A, and D-A. Verify that all the differences are within the specifications.

Model	Mass 1	Mass 2	Mass 3	Mass 4	Specifications (B-A), (C-A), (D-A)
GR-120	50 g	50 g	×	×	± 0.2 mg
GR-200	50 g	50 g	50 g	50 g	± 0.2 mg
GR-300	100 g	100 g	100 g	×	± 0.3 mg
GR-202 (0.1 mg range)	50 g	50 g	50 g	50 g	± 0.2 mg
GR-202 (0.01 mg range)	20 g	20 g	×	×	± 0.03 mg

## Hysteresis

For hysteresis test, use the mass as shown in the table below.

1. After calibration, confirm zero with nothing on the pan. Place mass 1 on the pan and check the value.
2. Sequentially add mass 2, mass 3 and mass 4. Each time a mass is added, check the value.
3. Sequentially remove mass 4, mass 3, mass 2 and mass 1. Each time a mass is removed, check the value.
4. Check the error of each value obtained in steps 1, 2 and 3. Verify that it is within the specifications.

Model	Mass 1	Mass 2	Mass 3	Mass 4	Specifications
GR-120	50 g	50 g	×	×	± 0.3 mg
GR-200	50 g	50 g	50 g	50 g	± 0.3 mg
GR-300	100 g	100 g	100 g	×	± 0.3 mg
GR-202 (0.1 mg range)	50 g	50 g	50 g	50 g	± 0.3 mg
GR-202 (0.01 mg range)	20 g	20 g	×	×	± 0.04 mg

## Creep characteristics

1. Set the balance to 0.1 mg range of gram weighing mode. Make sure that nothing is placed on the pan. Under the conditions, allow a thirty-minute warm-up.
2. Use the mass shown in the table below. Place and remove the mass as preliminary loading. Record the zero point. Place the mass and wait until the display is stabilized. Then record the displayed value (full scale value).
3. While keeping the mass placed on the pan, wait until the specified creep time has elapsed.
4. Record the displayed value (full scale value). Remove the mass and wait until the displayed value has stabilized. Record the value (zero point value).
5. Verify that the changed value in zero and full scale are within the specifications.

Model	Mass used	Creep time	FS change	ZERO change
GR-120	100 g	3 min or more	$\pm 0.4$ mg	$\pm 0.4$ mg
GR-200	200 g	3 min or more	$\pm 0.5$ mg	$\pm 0.5$ mg
GR-300	300 g	3 min or more	$\pm 0.5$ mg	$\pm 0.5$ mg
GR-202	200 g	3 min or more	$\pm 0.5$ mg	$\pm 0.5$ mg





## 3. Corrective Maintenance

Perform corrective maintenance for the GR series by referring to the maintenance flowchart and the troubleshooting table. The troubleshooting table describes the possible cause and solution to facilitate corrective maintenance. The maintenance flowchart describes what you must do if anything has been replaced or adjusted.

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 assembly
- Type B: Replacing or adjusting electrical parts
- Type C: Initializing a board and inputting specific data
- Type D: Adjusting the characteristics of the force motor assembly
- Type E: Inputting temperature data
- Type F: Performance test
- Type G: Performing drift check




### 3.1 Troubleshooting Table

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

Problem	Location	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 correct? Measure the output of the AC adapter with it connected to the balance (contacts of the power input connector on the power board). The DC output should be at least 12 volts, but no greater than 22 volts.	If the output is not correct, replace the AC adapter.	F
	Fuse	Disconnect the AC adapter and measure the fuse with an ohm meter	Replace with the correct fuse	F
	Main board	Is the output of the power supplies correct? Measure from the GND pin to the +5V pin, and the GND pin to the -10V pin ( $V_M$ 10V)	Replace the main board and display board with substitute items.	H
	Force motor	Check that the connectors are installed correctly	Replace the force motor with a substitute item	A

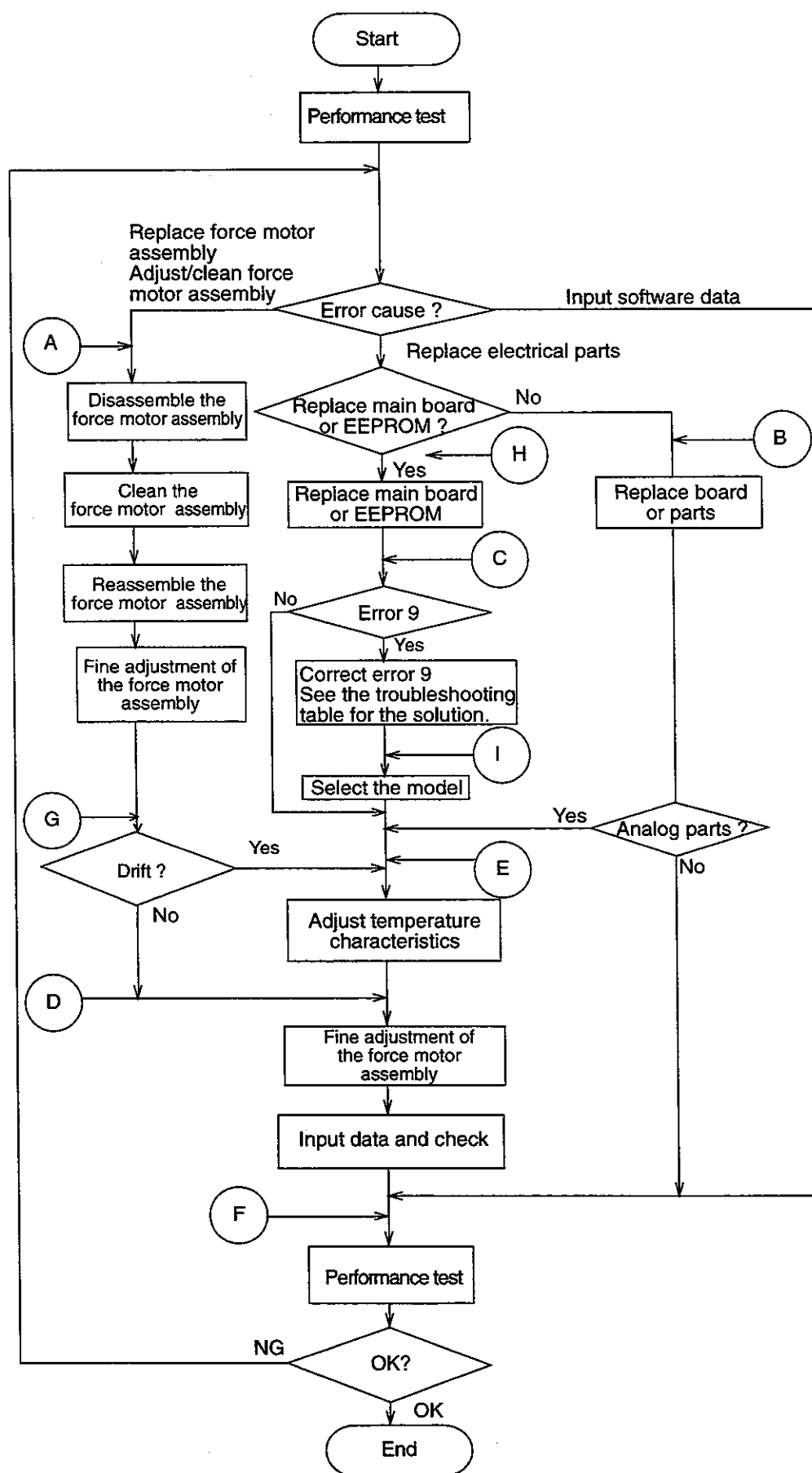
Problem	Location	Check	Solution	Type
No display, but the beam is balanced	Display assembly	Check the display cable and the connections to the main board	Replace the display assembly with a substitute item	F
	Main board assembly	Check the performance using the main board that has no trouble	Replace the main board assembly with a substitute item	H
Unstable display, repeatability error, corner load error	Pan assembly	Check that the pan assembly is correctly assembled and installed	Replace with a substitute item	F
		Check for foreign matter between the pan and breeze break ring	Clean the area around the pan assembly and the breeze break ring	F
		Check that the breeze break ring does not touch the pan assembly	Install the breeze break ring correctly so that it does not touch the pan	F
	Main board	Check the performance using the main board that has no trouble	Replace the main board assembly with a substitute item	H
	Analog board	Check the performance using the analog board that has no trouble	Replace the analog board	B
	Force motor assembly	Check for dust particles between the magnet and the force coil	Clean the force motor assembly or replace with a substitute item	A
		Check the position sensor gap for dust	Clean the position sensor or replace it with a substitute item	G
		Check that the flexures are in good conditions and are correctly installed	Repair the force motor assembly or replace with a substitute item	A
Corner load error	Force motor assembly	Check that the flexures are in good conditions and are correctly installed	Perform corner load adjustment. If it does not work, disassemble and reassemble the balance	A
Hysteresis error	Upper/lower flexure assemblies Tension flexure Fulcrum flexures	Check the position of upper/lower flexure assemblies Check the condition of tension flexure and fulcrum flexures for distortion	Replace with substitute items	A
Linearity error			Using the software, correct linearity. Refer to page 40	

Problem	Location	Check	Solution	Type
Error 0 Temperature error	Temperature sensor, A/D module, cables, connectors	Check the value in check mode TI display	If the value is not within the specifications, replace and reassemble temperature sensor, A/D module	B
Error 1 Unstable data reading	Pan assembly	Check that the pan assembly is correctly assembled and installed	Assemble and install correctly	F
	Temperature sensor, A/D module	Check the value in check mode TI display	If the value is not within the specifications, replace and reassemble temperature sensor, A/D module	B
	Damage in flexures	Check the upper/lower flexure assemblies, tension flexure and fulcrum flexures	Replace parts and reassemble	A
	Magnet assembly	Check for dust particles in the magnet assembly	Clean and reassemble	A
	CAL error	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	Main board	Bad connection between CPU and EEPROM Check the soldering	Re-solder and reassemble	F
			Replace the CPU	F
			Replace the EEPROM	H
			Note After replacing the CPU or EEPROM, Error 8, Error 9 and Error A may be displayed. To correct the error, see the solution for each error described in this table	
Error 4 Internal RAM error	Main board	Defective CPU internal RAM	Replace the CPU	F
Error 5 External RAM error	Main board	Defective external RAM Bad connection between CPU and RAM	Re-solder Replace the RAM	F
Error 6 Resetting error of internal mass position	Pan assembly	Check that the pan assembly is correctly assembled and installed	Assemble and install correctly	F
	Pan	Check that nothing is placed on the pan when the internal mass moves upon power-on or during the display on and off	Make sure that nothing is placed on the pan	F
	Internal mass assembly	Check that the internal mass is in place and that it can be raised or lowered	Check the internal mass	F

Problem	Location	Check	Solution	Type
Error 7 Internal mass error	Defective motor	Remove the motor and check that it rotates	Replace the motor	F
	Cam position	Re-position the cam (Check if the motor is overloaded)	Install the cam in the correct position	F
	Relative position of slit and photointerrupter	Check that the motor rotation stops correctly	Install correctly	F
Error 8 EEPROM error	Main board	Check that the EEPROM version is correct for the CPU	Press the PRINT key to change the EEPROM version	F
Error 9 EEPROM format error	Main board	EEPROM has not been initialized	While holding down the RE-ZERO and MODE keys, press the PRINT key to initialize	C
Error A EEPROM version error	Main board	Check that the EEPROM version is correct for the CPU	While holding down the RE-ZERO and MODE keys, press the PRINT key to initialize	C
CAL E (-) CAL E Calibration error	Check if the weight value exceeds the calibration range	Check that the correct mass is used for calibration	Use the correct mass	F
	A/D module, 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
E Overload	CAL error	Check the D0 value	When the D0 value is correct, perform calibration in check mode, and then perform calibration in weighing mode	F
	Stopper position Damage in flexures	Check the D0 value	If the D0 value is not within the specifications, adjust the stoppers, replace flexures and reassemble	A
-E Underload	Weighing pan	Check that the correct pan is used and that the pan is placed correctly	Use the correct pan and install it correctly	F
	CAL error	Check the D0 value	When the D0 value is correct, perform calibration in check mode, and then perform calibration in weighing mode	F
	Stopper position Damage in flexures	Check the D0 value	If the D0 value is not within the specifications, adjust the stoppers, replace flexures and reassemble	A
 Err	Memory data error	Check that output voltage between U5 28 pin and GND is 2.5 V or greater and that the potential difference across R42 is 1 mV or less	If the values are not obtained, replace the Lithium battery and clear memory data	F



## 3.2 Maintenance Flowchart





## 4. Force Motor Disassembly and Reassembly

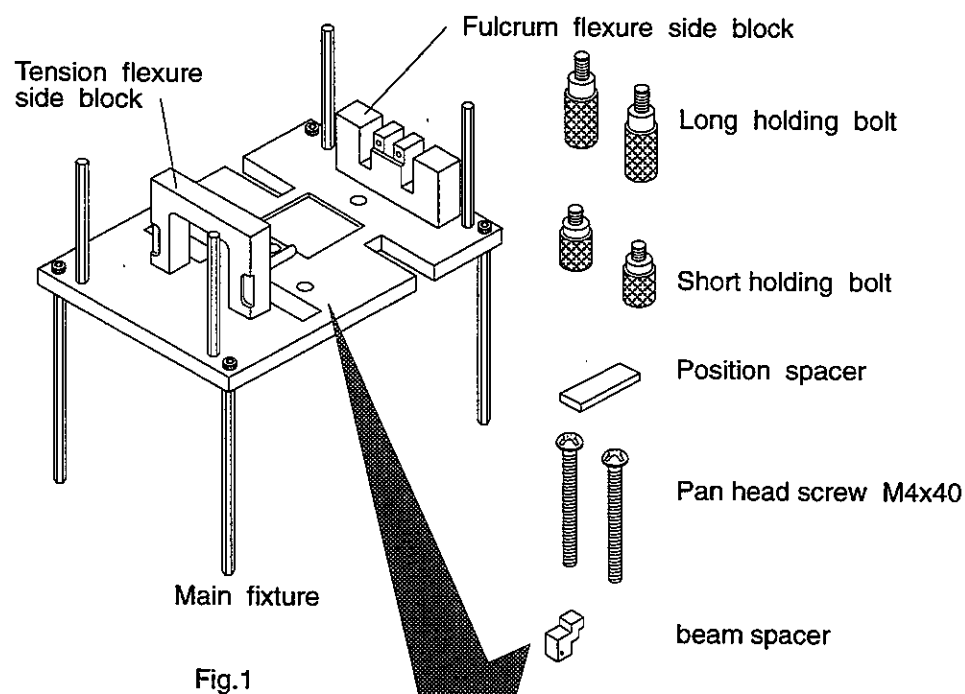
This chapter describes the procedures and notes for the flexure assembly replacement, bobbin cleaning, and adjustment after reassembling the force motor assembly.

Notes: Use a dust free environment for disassembly and reassembly.

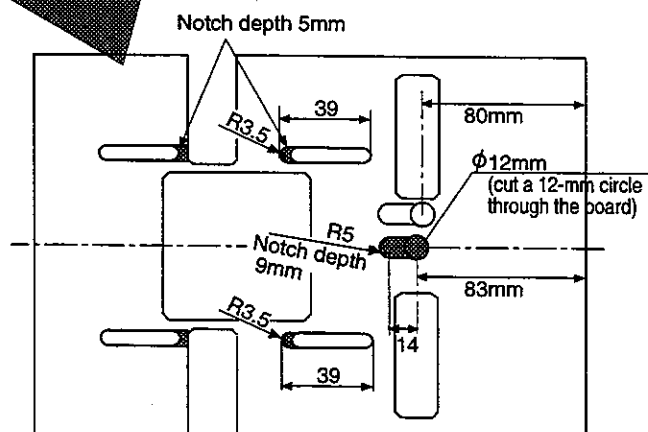
Adjustments are needed after reassembly for linearity, repeatability, creep, hysteresis and corner load error.

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 disassemble the force motor.

Mechanical alignment fixture:



The mechanical alignment fixture is the same as that for HX/HR/HF series. If it was in use, some part of it will interfere with the force motor assembly. So, an additional machining is required to the gray area shown to the right.



Other tools required:

Phillips screwdriver, 3 mm

Allen wrench, 4 mm



## 4.1 Disassembly

### Removing the breeze break

- Step 1. Remove the screws (M3 X 15) securing the display case from the bottom of the balance. Remove the display case.
- Step 2. Remove the four screws securing the rear case.
- Step 3. Remove the three screws securing the main board rear cover.
- Step 4. Open the breeze break door. Take out the weighing pan assembly. Remove the screws (M4 X 30).
- Step 5. Remove the breeze break from the lower case unit.

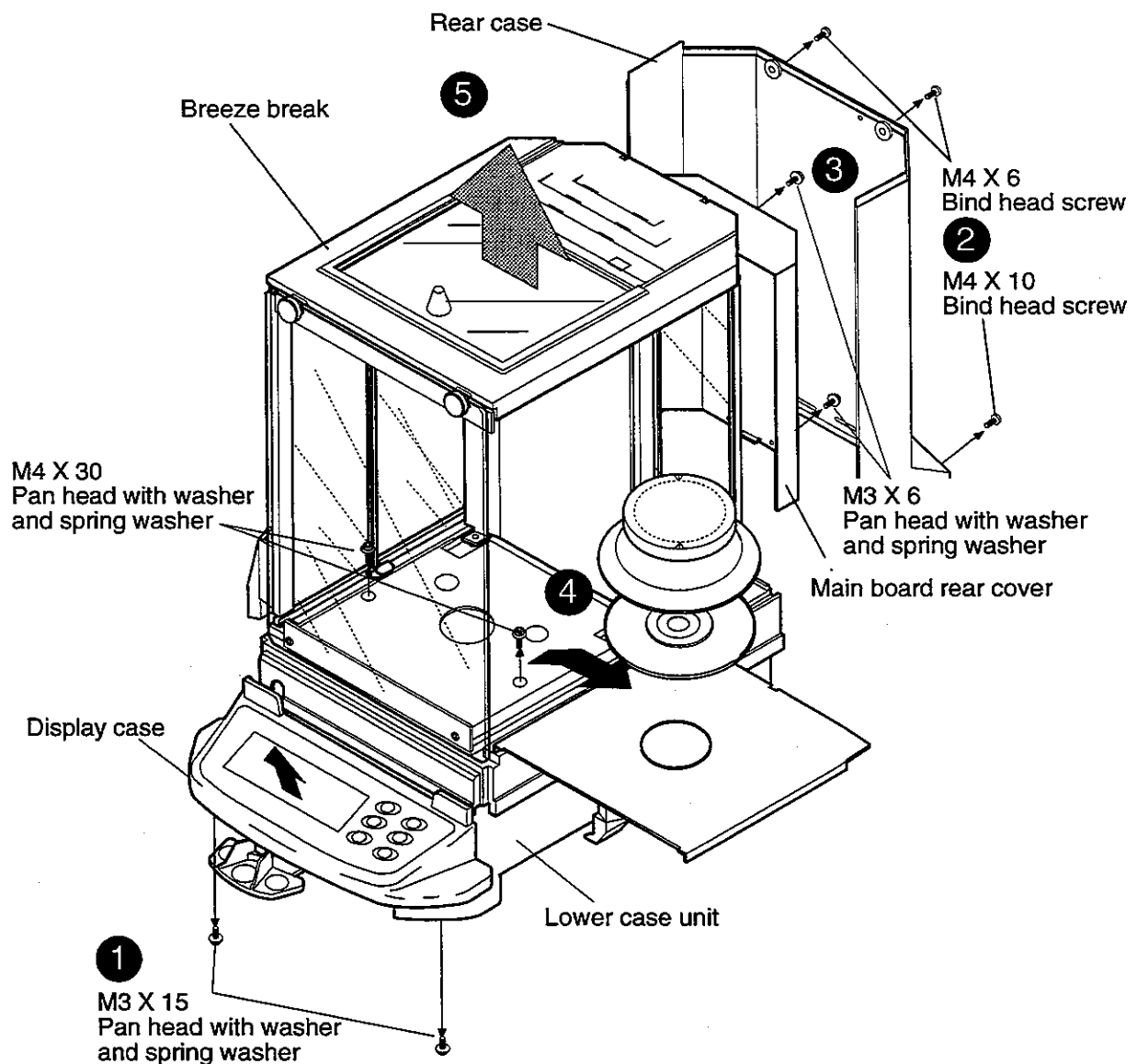


Fig.2

## Removing the force motor

Step 1. Remove the screws (M4 X 6) securing the board support.

Step 2. Disconnect the cables from the main board.

Step 3. Remove the screws (M3 X 6) securing the mechanical case.

Step 4. Remove the screws (M3 X 6) securing the internal mass holder. Remove the internal mass holder and the internal mass.

Step 5. Remove the bolts (M4 X 10) from the lower case unit bottom.

Step 6. Remove the mechanical case.

Step 7. Disconnect the cable from the analog board. Remove the force motor from the lower case.

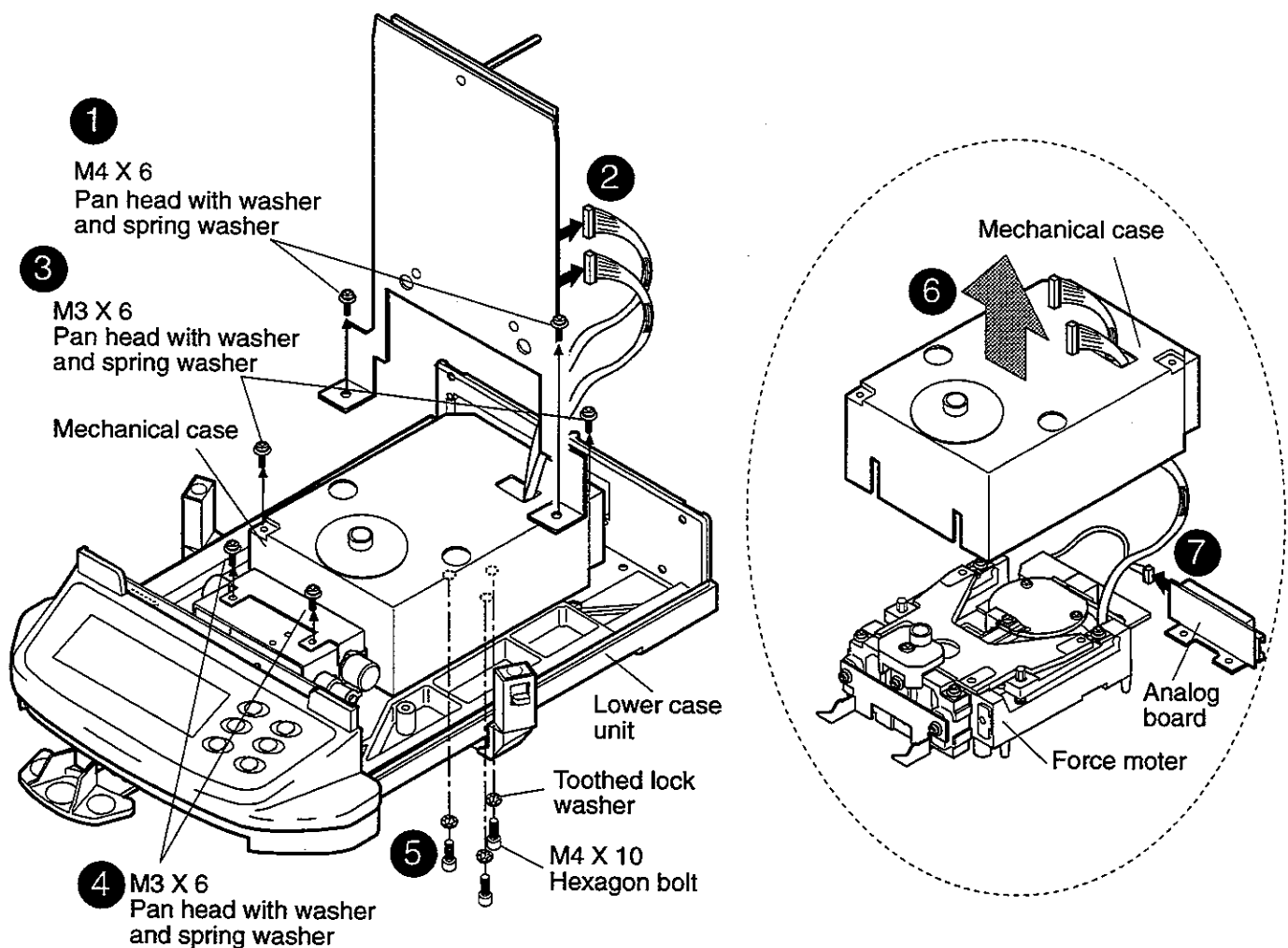
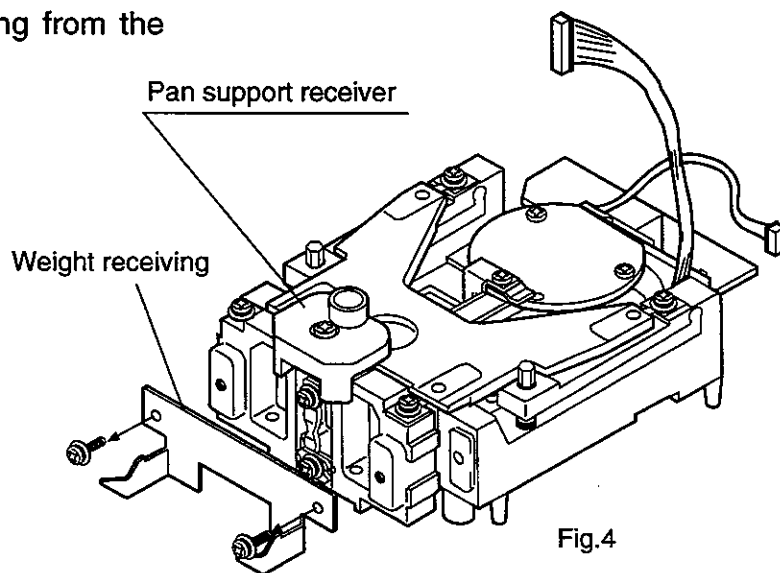


Fig.3



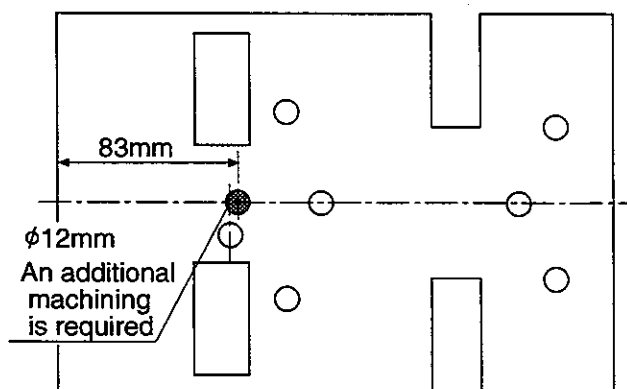
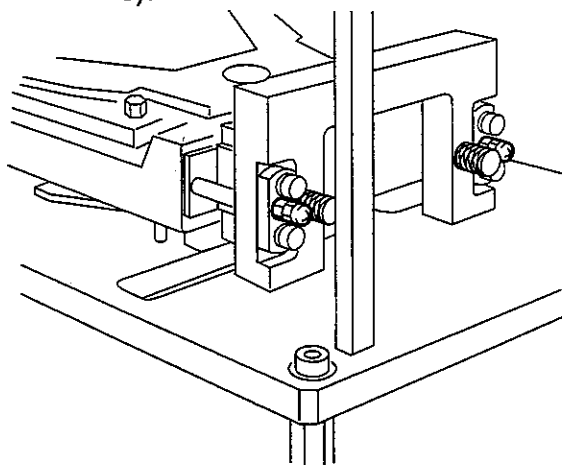
# Force motor disassembly

Step 1. Remove the pan support receiver from the top of the suspension guide .  
Remove the weight receiving from the suspension guide (Fig 4).

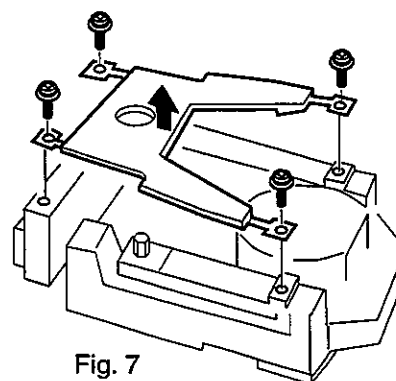


Step 2. Remove the sensor board.

Step 3. Attach the force motor assembly to the alignment fixture (two screws on the front, Fig 5, and four screws on the bottom, Fig 6).



Step 4. Remove the upper flexure assembly. (Fig 7)



- Step 5. Invert the alignment fixture and remove the lower flexure assembly screws (Fig 8).

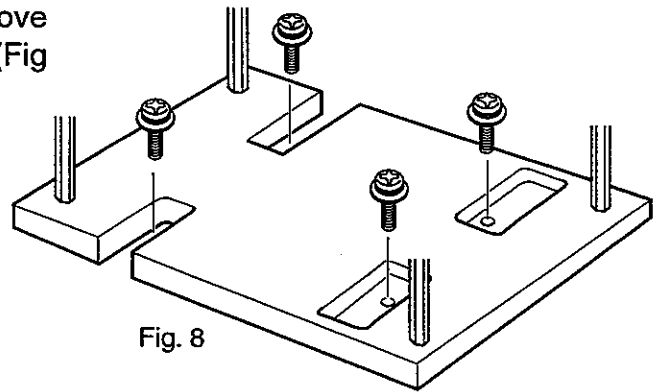


Fig. 8

- Step 6. Remove the lower side screw of tension flexure. Support the beam assembly with your thumb and forefinger (Fig 9) and remove the upper side screw of tension flexure (Fig 10).

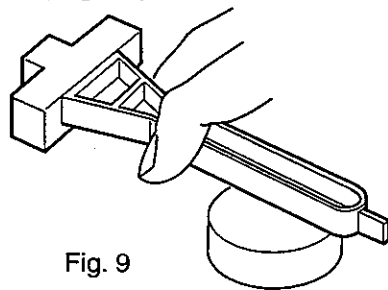


Fig. 9

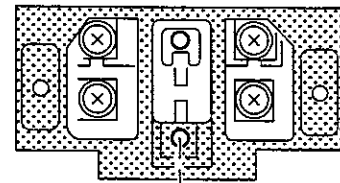


Fig. 10

- Step 7. Remove the force motor from the alignment fixture. Then remove the suspension guide from the force motor (Fig 11).

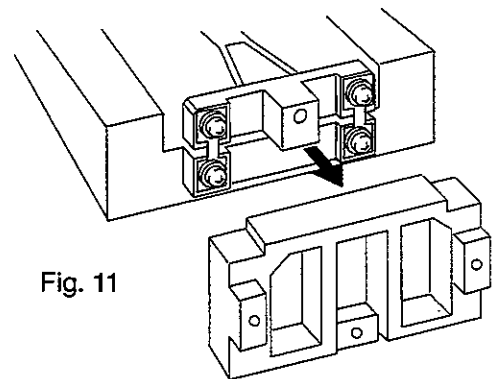


Fig. 11

- Step 8. Attach the force motor to the alignment fixture with four screws on the front and three screws on the bottom (Fig 12).

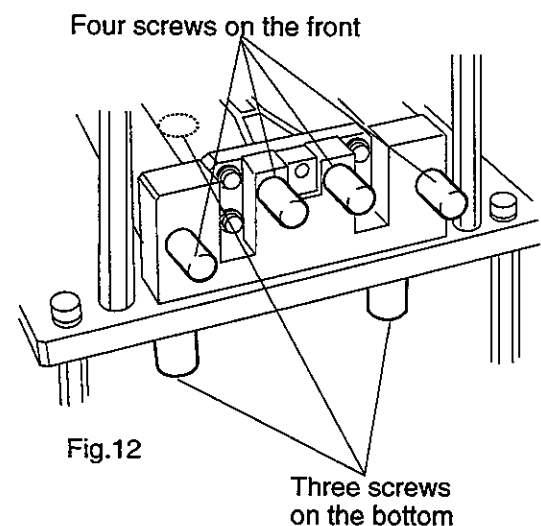


Fig.12

Step 9 Remove the fulcrum flexures (Fig 13).

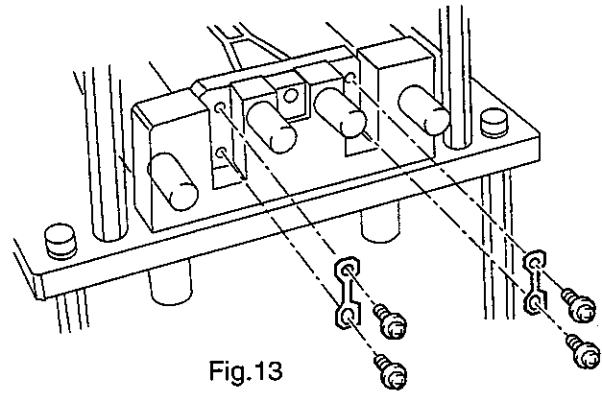


Fig.13

Step 10. Remove the flexible gold wires using a soldering iron from the relay board (Fig 15).

Step 11. Remove the shield plate (Fig 14) and the beam assembly (Fig 15). Use caution when removing the bobbin from the magnet well not to scratch the bobbin surface.

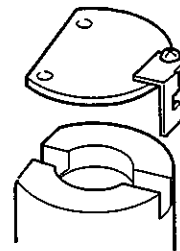


Fig.14

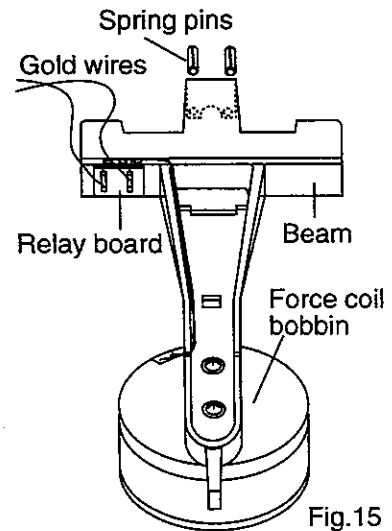


Fig.15

Step 12. Place the tension and fulcrum flexures on a flat surface to check them (a glass door works very well). They should lay flat. Press on each corner, the flexure should not move. Turn the flexure over and repeat this test. If a flexure is not flat, replace it. A bent or twisted flexure can cause corner load error and repeatability problems (Fig 16).

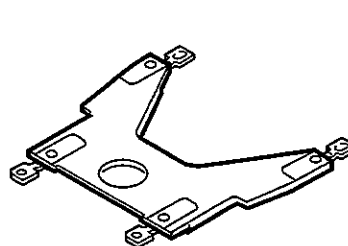


Tension flexure

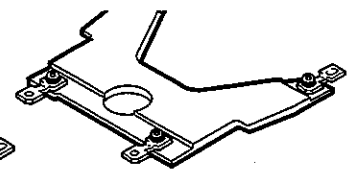


Fulcrum flexure

Step 13. Place the upper flexure assembly on a flat surface with the supporting plate up. Check that the flexures are flat and not twisted. Repeat this procedure with the lower flexure assembly (Fig 16).



Upper flexure assy.



Lower flexure assy.

Fig.16



## 4.2 Cleaning the Magnet Assembly and Bobbin

The magnet assembly and the bobbin will require cleaning if there is a repeatability problem. Any particles of metal, dust or other foreign material can collect around the bobbin. If this material touches the bobbin, it will not move freely. 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 cleaning to remove all 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 a chip of steel will be attracted to the magnet. The screws used in this balance are non-magnetic. Do not substitute screws made of magnetic material.

It is best to avoid smoking while working on the force motor. Ash and smoke particles can stick to the magnet and bobbin.

- Step 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).
- Step 2. Disassemble the force motor far enough to allow removal of the beam assembly.
- Step 3. Clean around the inner and outer surfaces of the magnet well using the adhesive tape.
- Step 4. Clean the inner and outer surfaces of the bobbin using the adhesive tape.
- Step 5. Inspect the magnet well and bobbin using a very strong light. Look for any possible particles stuck to the surfaces. Metal particles may be shiny or dark. Look for anything sticking out from the sides of the magnet.
- Step 6. 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.

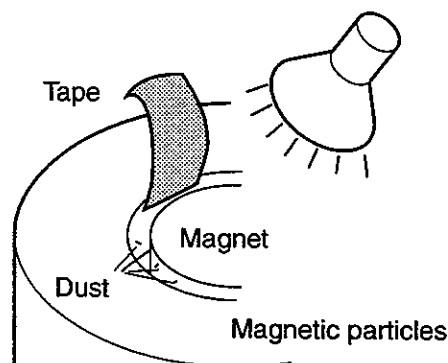


Fig.17



## 4.3 Reassembly

### Force motor reassembly

- Step 1. Adjust the depth to  $39 \text{ mm} \pm 0.05 \text{ mm}$  between upper and lower flexure assy. Loosen the two screws holding the bobbin. Insert the beam, with the bobbin loosely attached, into place. (Fig 18).
- Step 2. Attach the force motor to the alignment fixture (at the fulcrum flexure support) and install the fulcrum flexures (Fig 19, 20, 21 & 22).

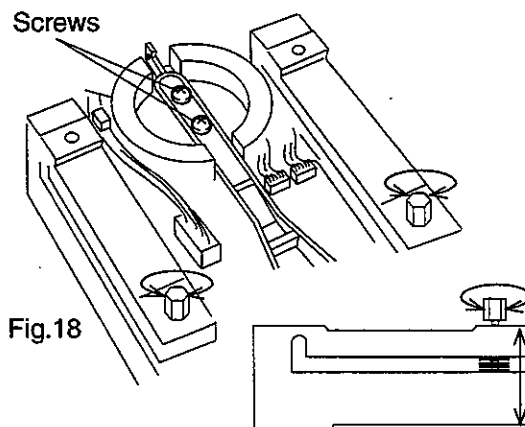


Fig.18

$39\text{mm}\pm0.05\text{mm}$

Four screws on the front

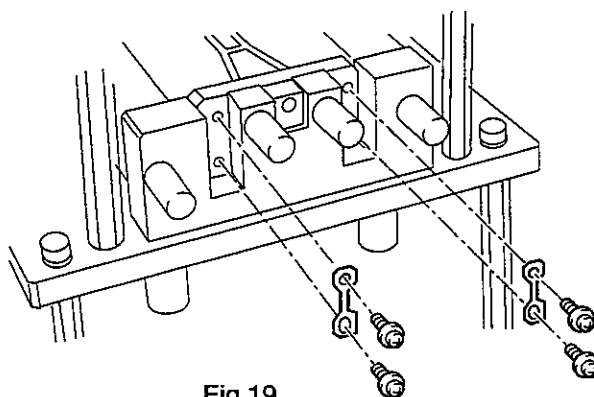


Fig.19

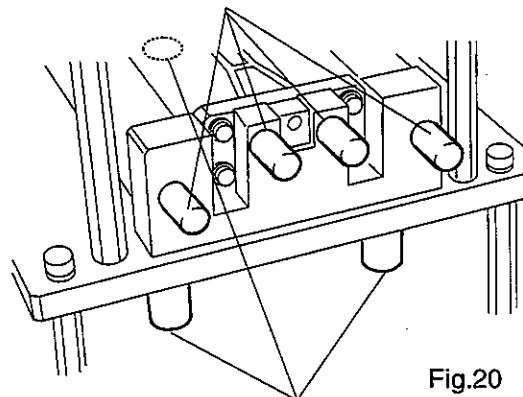


Fig.20

Three screws on the bottom

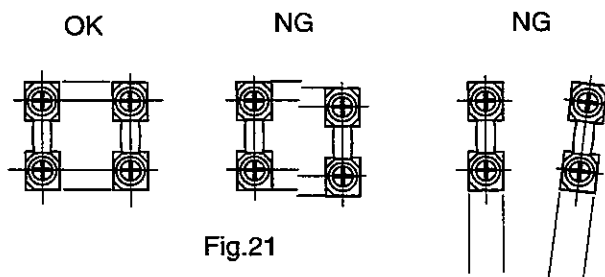


Fig.21

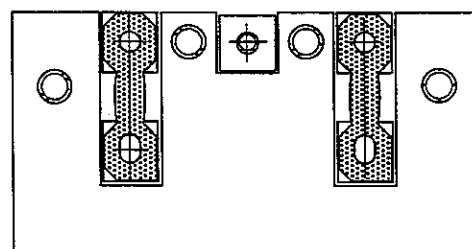


Fig.22

- Step 3. Adjust the bobbin position so that it does not touch the magnet or the sides of the well, then tighten the screws. (Fig 18)
- Step 4. Install the shield plate and the H beam stop (Fig 23).
- Step 5. Solder the flexible gold wires to the analog board (Fig 24). Be careful not to distort, pull tightly or bend the wires.

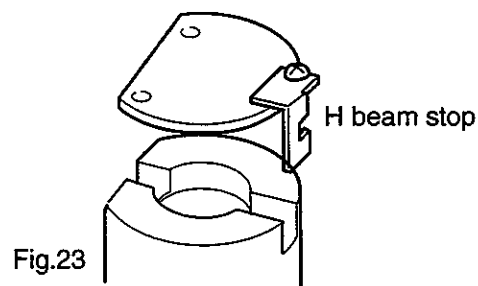


Fig.23

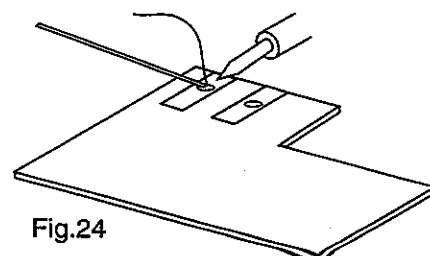
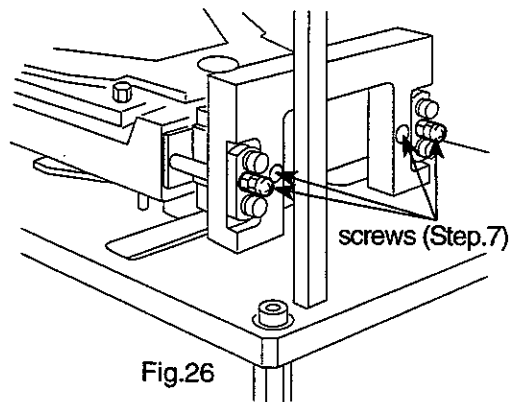
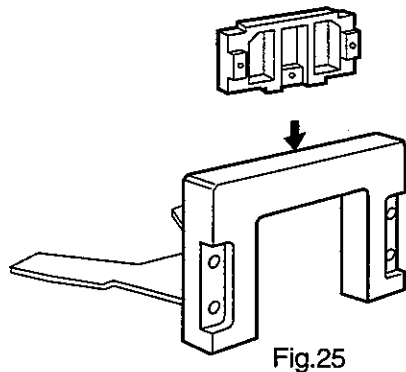
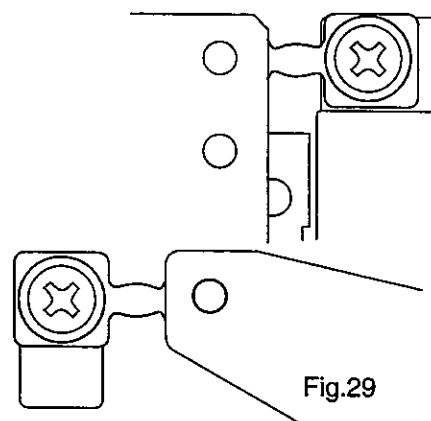
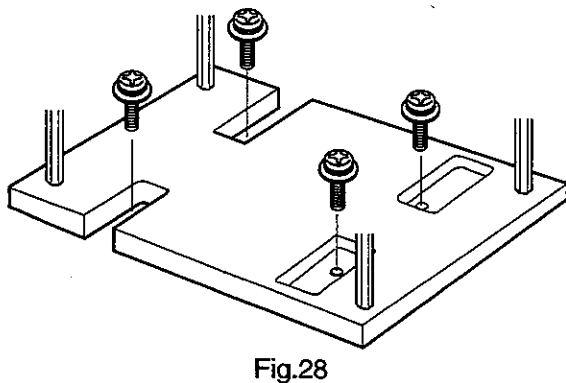
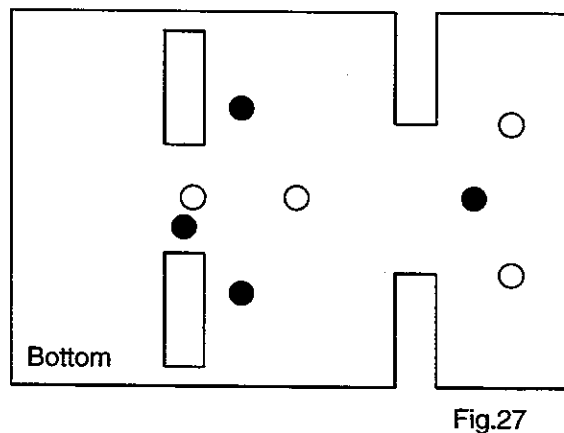


Fig.24

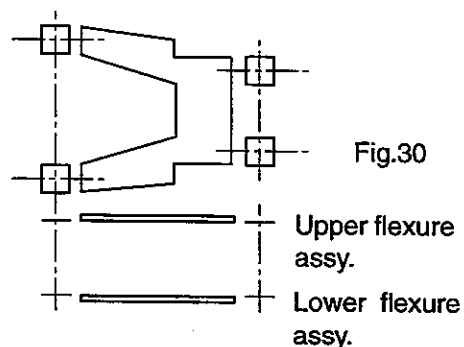
- Step 6. Place the lower flexure assembly and the suspension guide on the alignment fixture. Place the force motor on the alignment fixture using caution not to bend the flexures (Fig 25, 26).



- Step 7. Using two screws, affix the suspension guide to the alignment fixture (Fig 26).
- Step 8. Fasten the force motor using five screws from the underside of the alignment fixture (Fig 27).
- Step 9. Invert the alignment fixture and install the lower flexure assembly screws (Fig 28, 29, 30).



- Step 10. Turn the alignment fixture over again and install the upper flexure assembly (Fig 29, 30).



**Step 11. Install and tighten the tension flexure lightly (Fig 31).**

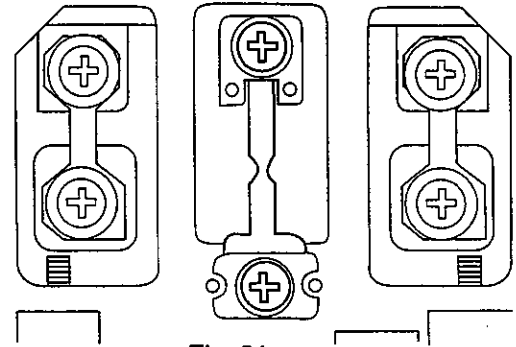


Fig. 31

**Step 12. Insert the spacer under the end of the beam (Fig 33) and tighten the tension flexure.**

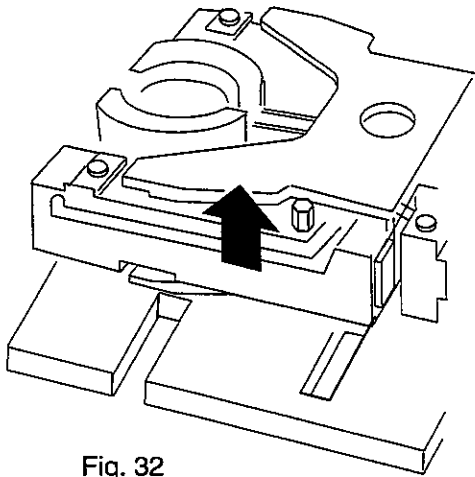


Fig. 32

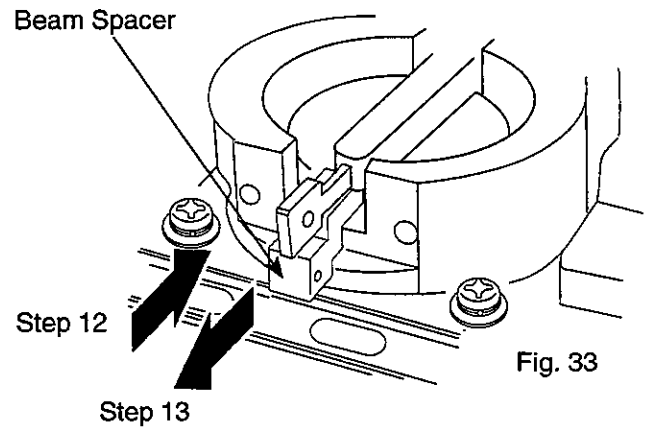


Fig. 33

**Step 13. Remove the force motor from the main fixture (Fig 32). Remove the spacer. (Fig 33). Place the shield plate (Fig 34).**

**Step 14. Remove the force motor assembly from the alignment fixture and install the position sensor (Fig 35).**

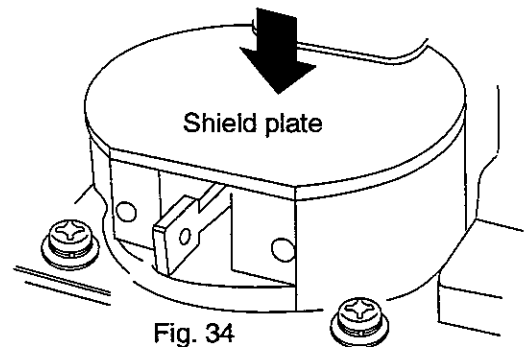


Fig. 34

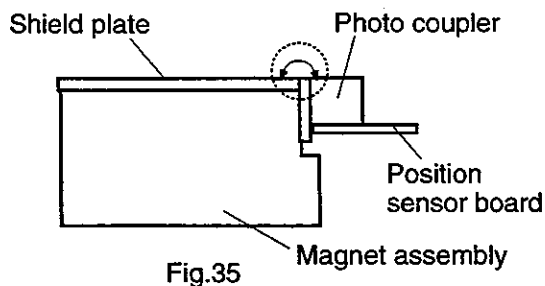


Fig.35

**Note:** The height of the shield plate and photo coupler must be the same.

**Step 15. Install the pan support receiver and weight receiving (Fig 36).**

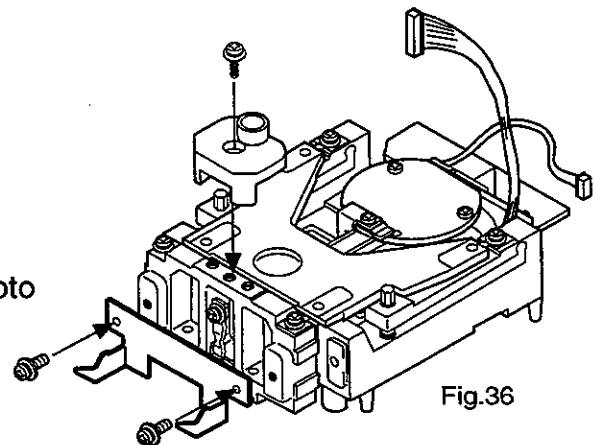


Fig.36

## Attaching the force motor

- Step 1. Insert the bolts (M4 X 10) to the lower case unit bottom to secure the force motor to the lower case unit.
- Step 2. Connect the cable to the analog board.
- Step 3. Place the mechanical case over the force motor and secure it with the screws (M3 X 6).
- Step 4. Secure the board support with the screws (M4 X 6).
- Step 5. Connect the cables to the main board.

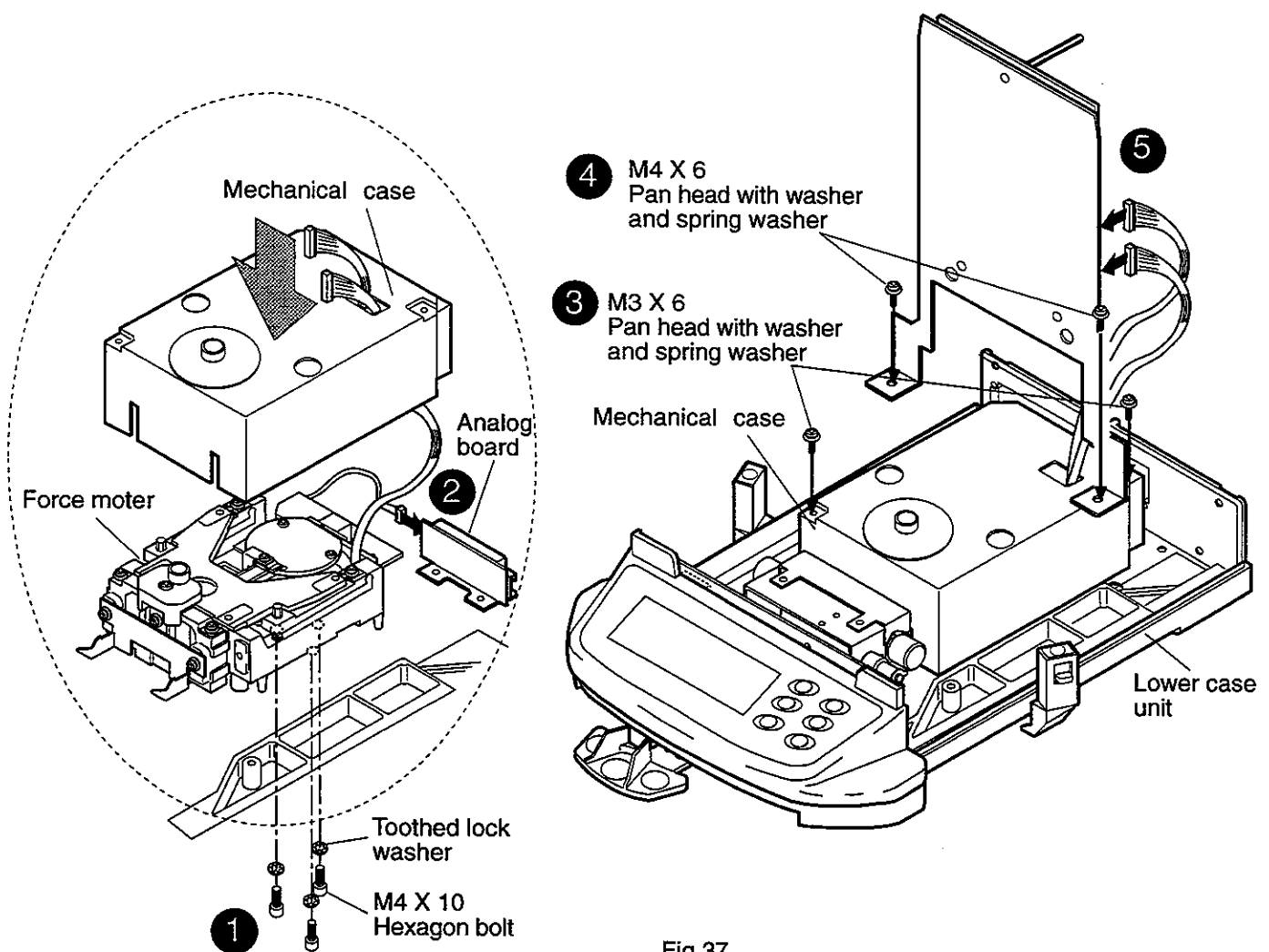
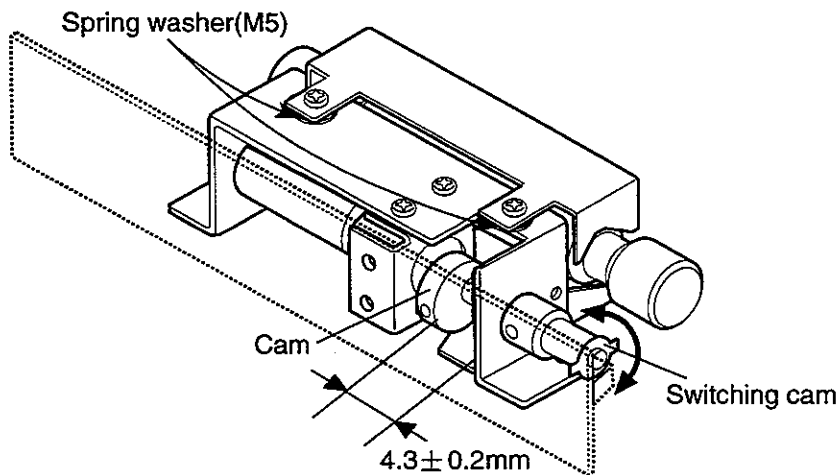


Fig.37

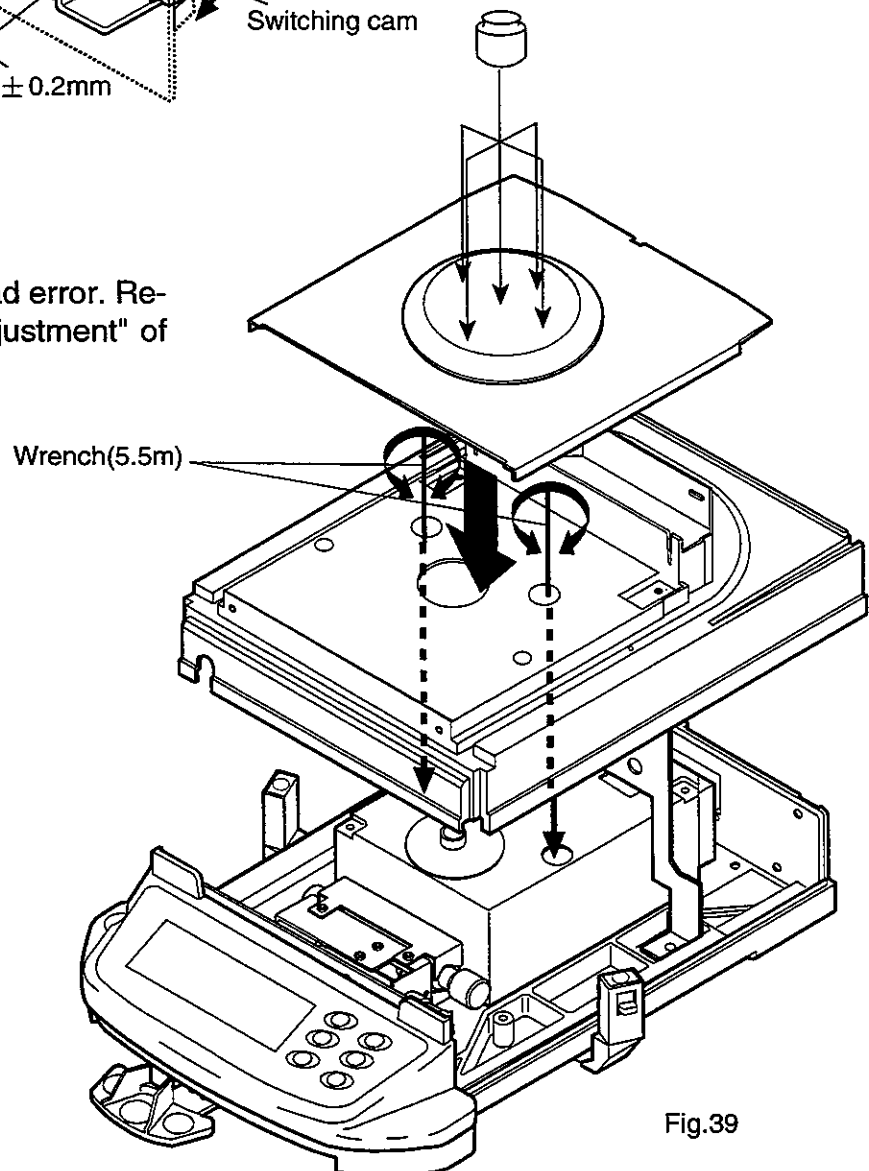


Step 6. Adjust the switching cam so that the mass stops on top or bottom when the ON/OFF key or CAL key is pressed.

- \* Verify that the cam is  $4.3 \pm 0.2$  mm from the motor frame inner side as shown below.
- \* Raise and lower the mass. Verify that the mass touches nothing.



Step 7. Release the corner load error. Refer to "Corner load adjustment" of "Fine adjustment".



# Attaching the breeze break

- Step 1. Place the breeze break on the lower case unit.
- Step 2. Open the breeze break door. Fasten the two screws (M4 X 30) to secure the breeze break to the lower case unit. Install the weighing pan assembly.
- Step 3. Secure the main board rear cover to the breeze break using the three screws.
- Step 4. Secure the rear case to the breeze break using the four screws.
- Step 5. Secure the display case to the lower case unit using the screws (M3 X 15).
- Step 6. Check the balance zero and span repeatability. If the specified repeatability is obtained, perform adjustment.

Note) If the balance fails the repeatability test, there may be particles stuck to the magnet, or the force coil bobbin may be touching the edge of the magnet well. Also the corner load adjustment could be off far enough to make it difficult to position the weight in the same place. Do the coarse corner load adjustment and then check the repeatability again.

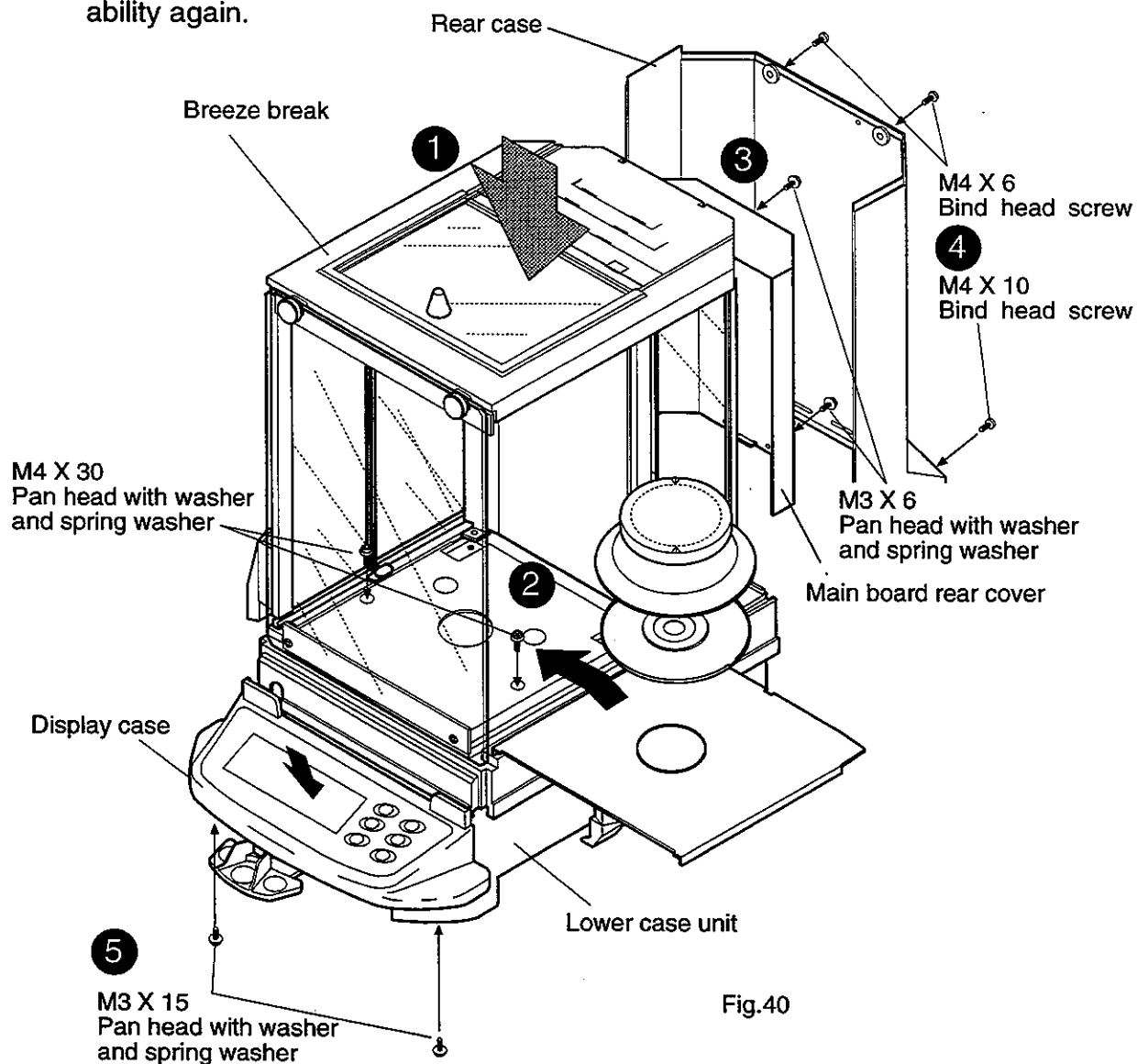


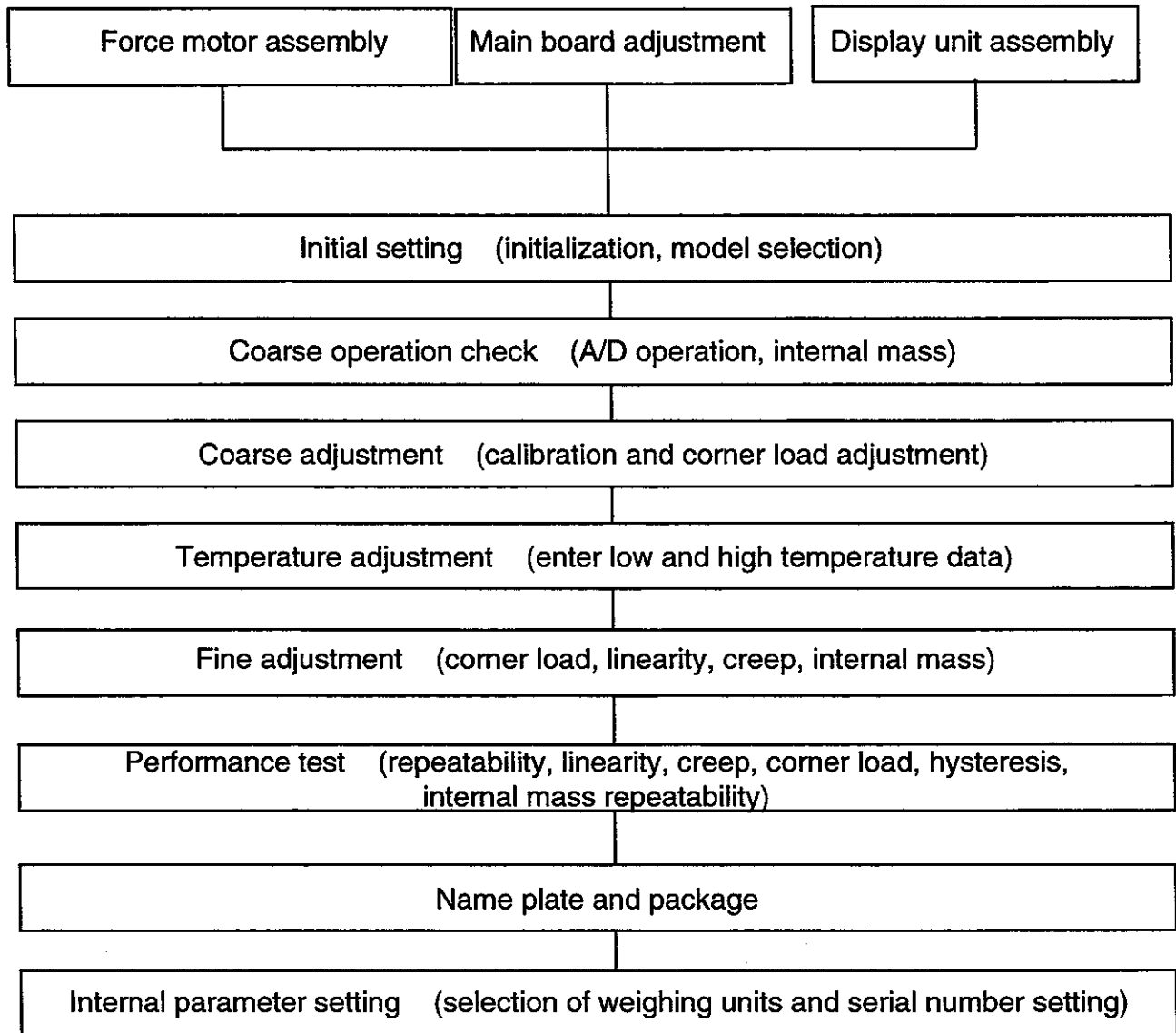
Fig.40



## 5. Adjustments



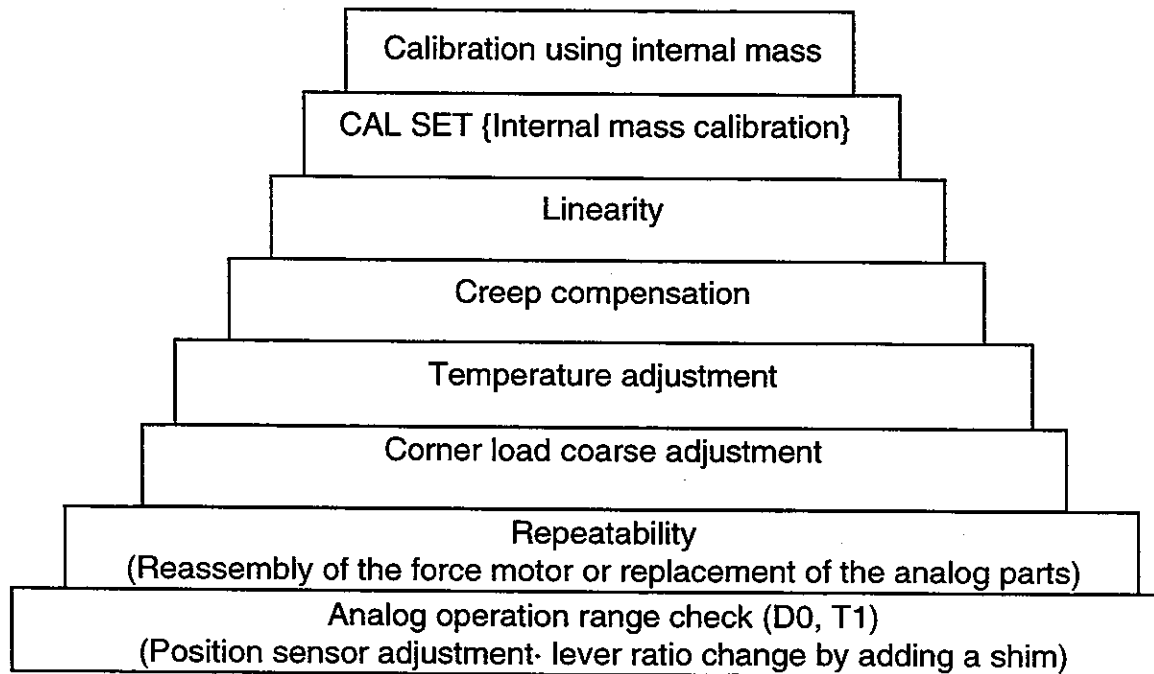
### 5.1 Adjustment Flow Chart





## 5.2 General Precautions

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





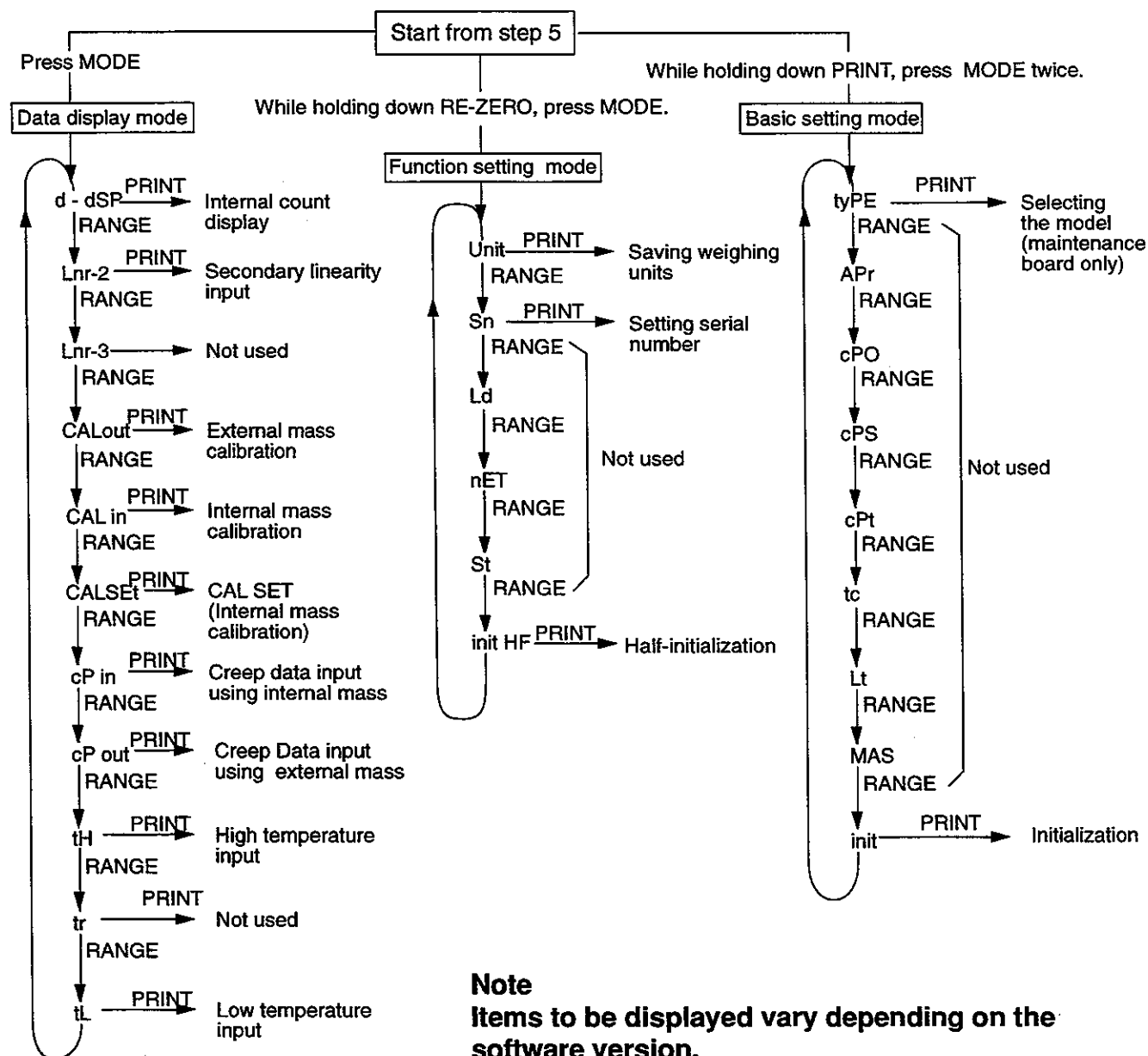
## 5.3 Check Mode

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

### 1. Entering the check mode

- Step 1. Verify that the display is OFF
- Step 2. Press and hold the RE-ZERO and MODE keys and press the ON/OFF key. Release the MODE and ON/OFF keys while still holding the RE-ZERO key. Immediately press the MODE key twice. Perform this procedure within 2 seconds.
- Step 3. The ROM version will be displayed for about 1 second [ P - X.XX ].
- Step 4. The balance model will be displayed [ Gr - XXX ].
- Step 5. All of the display segments will turn on.

### 2. Check mode menu

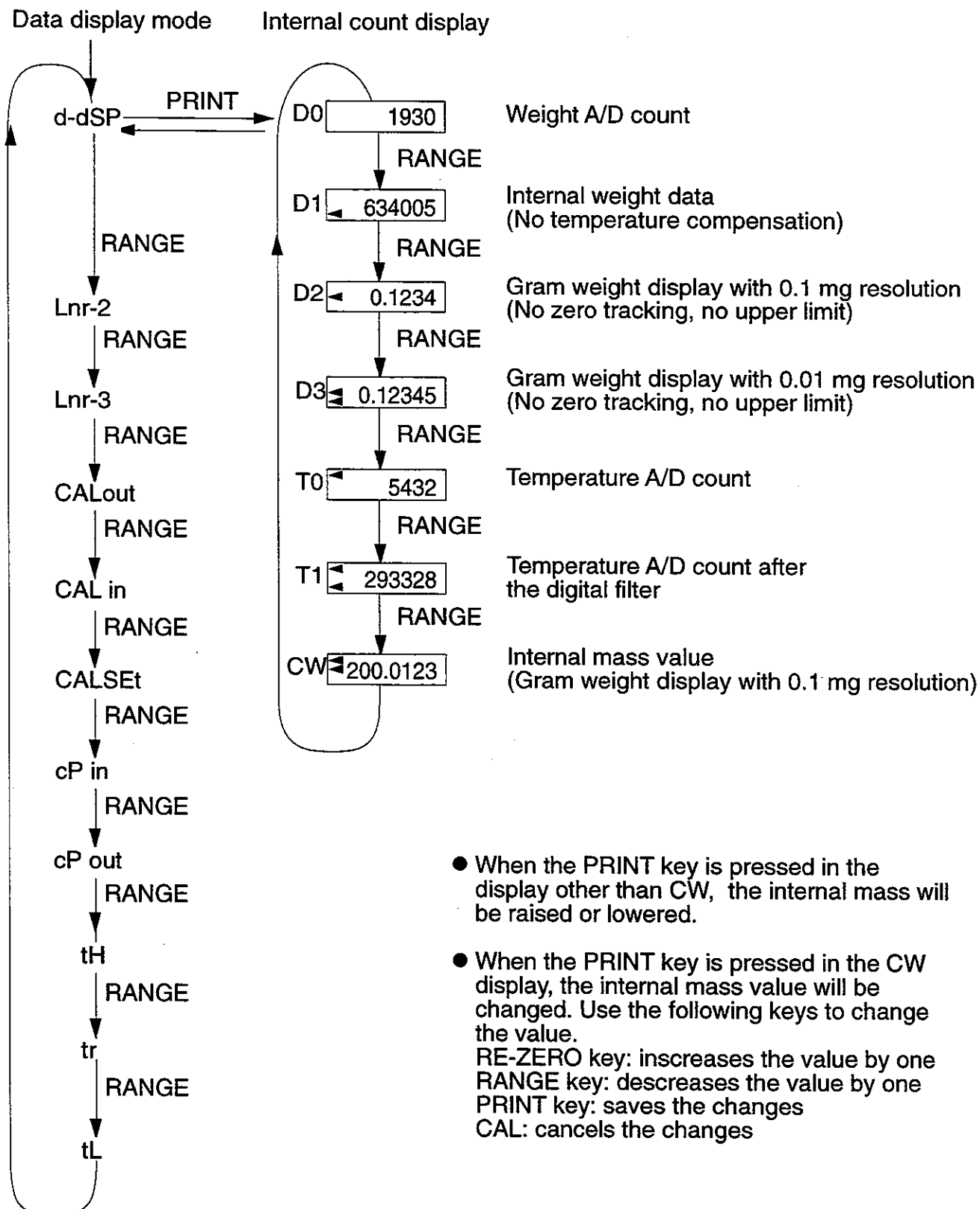




## 5.4 Check Mode Menus

### Internal count display

While in the [d-dSP] display, press the PRINT key to display internal count.  
Use the RANGE key to go to the next data.



- When the PRINT key is pressed in the display other than CW, the internal mass will be raised or lowered.
- When the PRINT key is pressed in the CW display, the internal mass value will be changed. Use the following keys to change the value.  
RE-ZERO key: increases the value by one  
RANGE key: decreases the value by one  
PRINT key: saves the changes  
CAL: cancels the changes



## 5.5 Initialization

**<CAUTION>** · Do not use this procedure if you do not have a temperature controlled room. Use this procedure only if the main board does not work correctly.

This operation initializes the following data. The balance model will be set automatically. Temperature characteristics must be re-adjusted.

- The balance model
- Temperature data (reset to the default value)
- Linearity data (cleared), creep data, serial number, weighing units
- Internal mass value (set to the default value)
- Internal parameter settings (reset to the manufacturer's settings)

### 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 28 to display basic setting mode [tyPE].
- Step 2. Press the RANGE key eight times. [ init ] 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.



## 5.6 Model Selection

Model selection is available for the maintenance board only.

### Model selection procedure

Follow the procedure below to select the balance model.

- Step 1. See the check mode menu flowchart on page 28 to display basic setting mode [tyPE].
- Step 2. Press the PRINT key. [ Gr-202 ] (the currently set model) will be displayed. Use the following keys to select the model.
- RE-ZERO key: changes the model.
  - PRINT key: saves the change.
  - CAL key: cancels the change.
- When the model after change is the same as that before change, the stabilization indicator illuminates.
- Step 3. Press the PRINT key. [ End ] appears. Then, the next item appears.





## 5.7 Coarse Operation Check & Adjustment

### 1. A/D count check

The A/D count is checked in the check mode.

Follow the procedure below to verify the A/D values for D0 and T1.

- Step 1. See the check mode menu flowchart on page 28 to display data display mode [d-dSP].
- Step 2. Press the PRINT key to display [ XXXX]. (D0 display)
- 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.
- Step 4. Place a 200g mass on the pan. Read the count with load. Subtract the count without load from the count with load to obtain the span value. Verify that the span value is within the range shown in the table below.
- Step 5. Press the RANGE key five times to display [ XXXXXX]. (T1 display)
- Step 6. Verify that the count at room temperature (15-25°C) is within the range shown in the table below.

#### Case 1

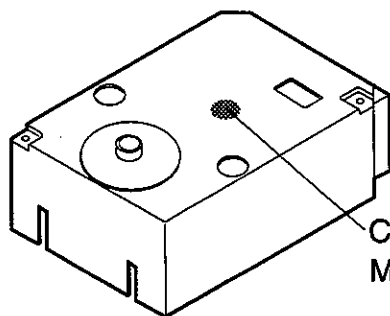
Table for software version 1.25 or later. There is the "Color sheel" on the mechanical case or the "Hollow mark" on the magnet unit.

Model	D0 (weight A/D)		T1 (temperature A/D)	Magnet unit part name
	zero	span		
GR-120	1100 - 2600	6000 - 7660	1200000 - 1800000 dispersion within MAX-MIN 20 cnt/5 sec	7PB:GR-300-1
GR-200				
GR-300				
GR-202				

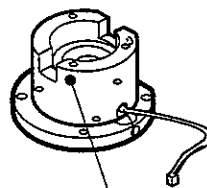
#### Case 2

Table for software version 1.10 or earlier. There are not the "color sheel" or "Hollow mark"

Model	D0 (weight A/D)		T1 (temperature A/D)
	zero	span	
GR-120	1400 - 2300	8000 - 10000	1200000 - 1800000 dispersion within MAX-MIN 20 cnt/5 sec
GR-200			
GR-202			



Color sheel ø8 mm  
Mechanical case (152)



Hollow mark ø3 mm  
Magnet unit (327)

## 2. Motor operation check

- Step 1. In the D0 display (weight A/D count display), press the RANGE key twice.  
[ X.XXXX] will be displayed. (D2 display)
- Step 2. Each time the PRINT key is pressed, the motor rotates and [ mo ] is displayed.  
Verify the following:
- Applying and releasing the internal mass is performed smoothly.
  - No strange noises are generated during the internal mass applying and releasing operation.
- Step 3. In the D2 display, check the internal mass repeatability.

Model	Repeatability specifications
GR-120	±0.3 mg
GR-200	±0.3 mg
GR-300	±0.3 mg
GR-202	±0.3 mg



## 5.8 Coarse Adjustment

### 1. Calibration

#### Internal mass CAL

With nothing placed on the pan, warm up the balance for at least one hour.  
Calibration is performed in the check mode CAL in display.  
Follow the procedure below to calibrate.

- Step 1. See the check mode menu flowchart on page 28 to display data display mode [d-dSP].
- Step 2. Press the RANGE key four times. [ CAL in ] is displayed.
- Step 3. Press the PRINT key. The motor starts and resets the internal mass position.
- Step 4. The display changes in turn as follows:  
[ CAL. ] → [ <CAL . ] → [ CAL . ] → [ <CAL . ] → [ End ]
- Step 17. The operation is complete. Proceed to the next step.

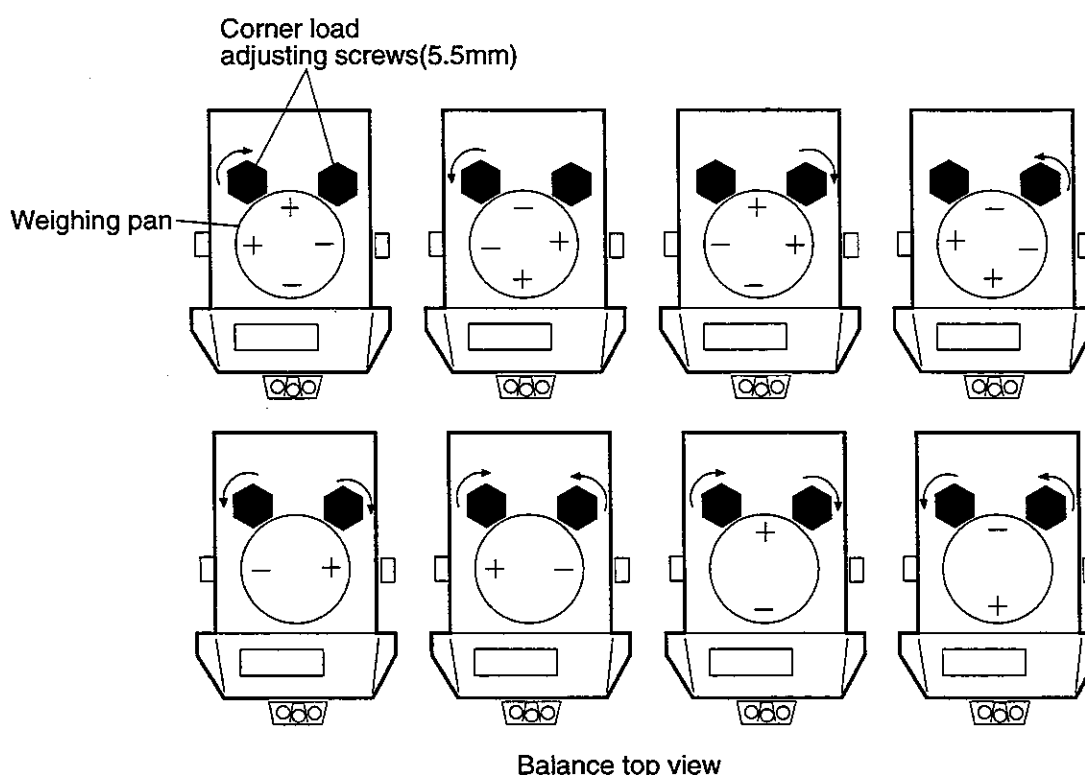
## 2. Corner load adjustment

Corner load is adjusted in the check mode D2 display.

Follow the procedure below to adjust corner load.

- Step 1. See the check mode menu flowchart on page 28 to display data display mode [d-dSP].
- Step 2. Press the PRINT key to display [ XXXX]. (D0 display-weight A/D count display)
- Step 3. In the D0 display (weight A/D count display), press the RANGE key twice to display [ X.XXXX] (D2 display- gram weight display with 0.1 mg resolution).
- 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 specifications. (If the display on the pan is as shown in the illustration below, turn the corner load adjusting screws as indicated by the arrows.)

Model	Mass used	Specifications (D2 display)
GR-120	100 g	$\pm 0.5$ mg
GR-200	100 g	$\pm 0.5$ mg
GR-300	100 g	$\pm 0.5$ mg
GR-202	100 g	$\pm 0.5$ mg

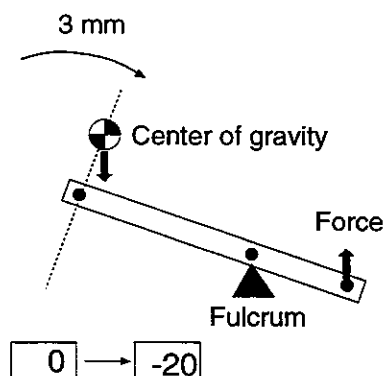


### 3. Counter weight check for tilting

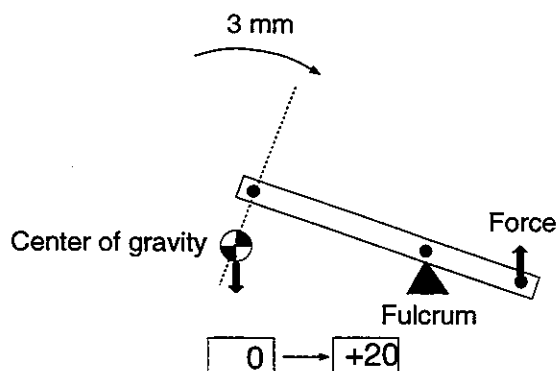
The counter weight is adjusted in the check mode D2 display.  
Perform steps 1-3 on the previous page to be in the D2 display.  
Follow the procedure below to adjust the counter weight.

- Step 1. Press the RE-ZERO key to display zero.
- Step 2. Verify that nothing is placed on the pan. Raise the front of the balance by placing a 3mm block under the front foot. Read the change in the zero point.
- Step 3. Adjust the counter weight position.
- Step 4. Repeat the procedure until the change is within the specifications shown below.

Model	Specifications (D2 display)
GR-120	$\pm 0.5$ mg
GR-200	$\pm 0.5$ mg
GR-300	$\pm 0.5$ mg
GR-202	$\pm 0.5$ mg



Adjust the trimming weight lower to make the center of gravity coincide with the force.



Adjust the trimming weight higher to make the center of gravity coincide with the force.



## 5.9 Temperature Adjustment

A room or chamber that can be set to 10°C and 30°C is required for this adjustment. The balance must stabilize at each temperature (about 8 hours) before the data is taken.

Enter high temperature data, then low temperature data. Then, enter high temperature data again, and check the zero point and the span drift amount.

### 1. Entering the temperature data

- Step 1. See the check mode menu flowchart on page 28 to display data display mode [d-dSP].
- Step 2. Press the RANGE key eight times. [ tH ] appears. Press the RANGE key two more times. Then [ tL ] appears. Enter 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 mass position. After adjustment [ tH 0 ]/[ tL 0 ] is displayed.
- Step 4. With nothing placed on the weighing pan, press the PRINT key. The mass indicator illuminates. To cancel the operation, press the CAL key.
- Step 5. After stabilization, [ tH F ]/[ tL F ] is displayed.
- Step 6. Place a 200g mass on the pan and press the PRINT key. The mass indicator illuminates.  
(If the RANGE key is pressed without placing a mass on the pan, load will be applied using the internal mass.)
- Step 7. After stabilization, [ End ] is displayed.
- Step 8. Remove the mass and proceed to the next step.

## 2. Temperature check

- Step 1. Enter the low temperature data, and select D2 display of the check mode.
- Step 2. Press the RE-ZERO key to display zero. Note the zero point reading. Place a 200g mass on the pan and note the span reading. Remove the mass. (Instead of the 200g mass, the internal mass can be used. Press the PRINT key to raise or lower the internal mass.)
- Step 3. Set the temperature to 30°C. Leave the balance under the temperature for at least 8 hours. (Leave the balance with D2 display.)
- Step 4. Note the zero point reading.
- Step 5. Press the RE-ZERO key to display zero.
- Step 6. Place a 200g mass on the pan and note the span reading. (Instead of the 200g mass, the internal mass can be used. Press the PRINT key to raise or lower the internal mass.)
- Step 7. Verify that the changes in the zero point and span are within the specifications.

Model	Zero point (D2 display)	Span (D2 display)
GR-120	±50d	±35d/200 g
GR-200	±50d	±35d/200 g
GR-300	±50d	±35d/200 g
GR-202	±50d	±35d/200 g



## 5.10 Fine Adjustment

### 1. Entering creep data

Creep data is entered in the check mode cP in display. Follow the procedure below to enter creep data.

#### Entering creep data for GR-120, GR-200, GR-202

- Step 1. See the check mode menu flowchart on page 28 to display data display mode [d-dSP].
- Step 2. Press the RANGE key six times. [ cP in ] is displayed.
- Step 3. Press the PRINT key. The motor starts and adjusts the mass position.
- Step 4. The display changes in turn as follows:  
[ cP ] → [ <cP . ] → [ cP . ] → [ <cP . ] → [ cP..... ] → [ <cP . ] → [ cP . ] → [ <cP . ] → [ End ]
- Step 5. The operation is complete. Proceed to the next step.

#### Entering creep data for GR-300

- Step 1. See the check mode menu flowchart on page 28 to display data display mode [d-dSP].
- Step 2. Press the RANGE key seven times. [ cP out ] is displayed.
- Step 3. Press the PRINT key. The motor starts and adjusts the mass position.
- Step 4. Confirm the pan that nothing is placed. Press the PRINT key. [ <cP 0 ] → [ cP F ]
- Step 5. Place 300g mass on the pan. Press the PRINT key.  
[ cP F ] → [ cP..... ] → ( after 2.5 minutes ) → [ <cP F ] → [ <cP 0 ]
- Step 6. Remove the mass from the pan before the "0" is blinking for one minute.  
[ <cP 0 ] → [ cP 0 ]
- Step 7. Press the PRINT key. [ <cP 0 ] → [ End ]
- Step 8. The operation is complete. Proceed to the next step.

### 2. Corner load adjustment (0.1 mg range)

Corner load is fine-adjusted in the check mode D2 display.

- Step 1. See the check mode menu flowchart on page 28 to display data display mode [d-dSP].
- Step 2. Press the PRINT key to display [ XXXX ]. (D0 display-weight A/D count display)
- Step 3. In the D0 display (weight A/D count display), press the RANGE key twice. [X.XXXX] is displayed. (D2 display- gram weight display with 0.1 mg resolution)

- 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 at each position is within the specifications.

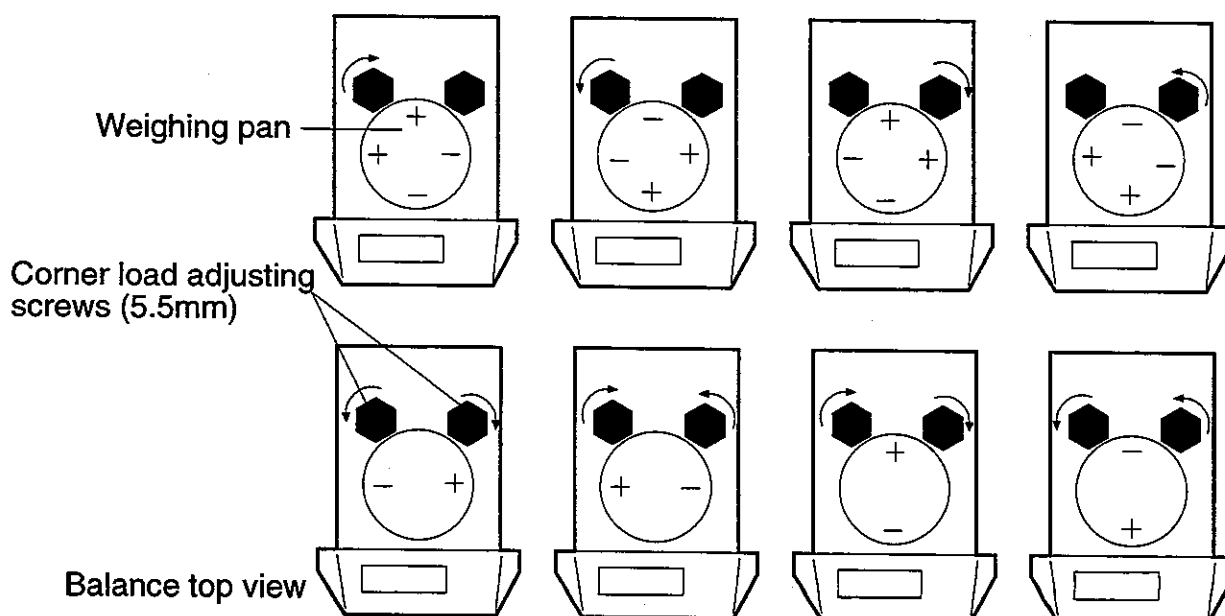
Model	Mass used	Specifications (D2 display)
GR-120	50 g	$\pm 0.2$ mg
GR-200	100 g	$\pm 0.2$ mg
GR-300	100 g	$\pm 0.2$ mg
GR-202	100 g	$\pm 0.2$ mg

### 3. Small range corner load adjustment (GR-202 only)

The GR-202 requires 0.01 mg range corner load adjustment. Perform the fine corner load adjustment in the check mode D3 display.

- Step 1. See the check mode menu flowchart on page 28 to display data display mode [d-dSP].
- Step 2. Press the PRINT key to display [ XXXX]. (D0 display-weight A/D count display)
- Step 3. In the D0 display (weight A/D count display), press the RANGE key three times. [ X.XXXXX] is displayed. (D3 display-gram weight display with 0.01 mg resolution)
- Step 4. In the D3 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 specifications. (If the display on the pan is as shown in the illustration below, turn the corner load adjusting screws as indicated by the arrows.)

Model	Mass used	Specifications (D3 display)
GR-202	20 g	$\pm 0.04$ mg





## 4. Linearity adjustment

Before adjusting linearity, warm up the balance for at least one hour. Apply a preliminary load by placing and removing a load with the same weight value as the full scale value. Perform this three times.

Follow the procedure below to enter linearity.

- Step 1. See the check mode menu flowchart on page 28 to display data display mode [d-dSP].
- Step 2. Press the RANGE key. [ Lnr-2 ] is displayed.
- Step 3. Press the PRINT key. The motor starts and adjusts the mass position. After adjustment, [ Lnr 0 ] is displayed. (Press the CAL key to cancel the operation.)
- 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 on the weighing pan and press the PRINT key.
- Step 7. After stabilization, [Lnr2 ] is displayed. (Press the CAL key to cancel the operation.)
- Step 8. Place mass A with mass B and press the PRINT key.
- Step 9. After stabilization, [Lnr3 ] is displayed. (Press the CAL key to cancel the operation.)
- Step 10. Place mass A and mass B on the weighing pan and press the PRINT key.
- Step 11. After stabilization, [ End ] is displayed.
- Step 12. The operation is complete. Remove mass A and mass B from the pan.

Model	Mass A	Mass B
GR-120	50 g	100 g
GR-200	100 g	100 g
GR-300	100 g	200 g
GR-202	100 g	100 g

## 5. CAL SET (Internal mass value correction)

Perform CAL SET as follows:

External mass calibration using the calibration mass (the instrumental error has been checked up to 0.1 mg) shown in the table below → The internal mass value correction → Internal mass calibration → In D2 display, use the calibration mass to check the error (the difference between the weight value and the mass value)

Before performing CAL SET, warm up the balance for at least one hour. Apply a preliminary load by placing and removing a load with the same weight value as the full scale value. Perform this three times.

Follow the procedure below to perform CAL SET.

- Step 1. See the check mode menu flowchart on page 28 to display data display mode [d-dSP].
- Step 2. Press the RANGE key three times. [ CALout ] is displayed.
- Step 3. Press the PRINT key. The motor starts and resets the internal mass position.
- Step 4. [ CAL 0 ] is displayed. To change the calibration mass value, press the RANGE key and change the value as necessary using the following keys.  
RANGE key: changes the blinking digit position.  
RE-ZERO key : changes the value of the blinking digit.  
PRINT key: saves the changes.
- Step 5. With nothing placed on the pan, press the PRINT key. [ <CAL 0 ] is displayed.
- Step 6. After stabilization, [ 200 ] (For the GR-120, [ 100 ]) is displayed.
- Step 7. Place the calibration mass specified in step 4 on the pan.

Model	Calibration mass
GR-120	100 g
GR-200	200 g
GR-300	200 g
GR-202	200 g

- Step 8. After stabilization, [ End ] is displayed.
- Step 9. Remove the mass.
- Step 10. In the check mode [ d-dSP] display, press the RANG E key five times. [CALSEt] is displayed.
- Step 11. Press the PRINT key. The motor starts and resets the internal mass position.
- Step 12. The display changes in turn as follows:  
[ CC ] → [ <CC . ] → [ CC . ] → [ <CC . ] → [ End ]
- Step 13. The operation is complete. Proceed to the next step.

- Step 14. In the check mode [ d-dSP] display, press the RANGE key four times. [ CAL in ] is displayed.
- Step 15. Press the PRINT key. The motor starts and resets the internal mass position.
- Step 16. The display changes in turn as follows:  
[ CAL. ] → [ <CAL . ] → [ CAL . ] → [ <CAL . ] → [ End ]
- Step 17. The operation is complete. Remove the mass. Proceed to the next step.
- Step 18. In the check mode [ d-dSP] display, press the PRINT key. [ XXXX] is displayed. (D0 display-weight A/D count display)
- Step 19. Press the RANGE key twice. [ X.XXXX] is displayed. (D2 display-gram weight display with 0.1 mg resolution)
- Step 20. Place the calibration mass used in step 7. Verify that the error (the difference between the weight value and the mass value) is within the specifications.

Model	Calibration mass	Specifications (D2 display)
GR-120	100 g	±0.2 mg
GR-200	200 g	±0.2 mg
GR-300	200 g	±0.2 mg
GR-202	200 g	±0.2 mg

## 6. Internal mass value correction

If the error in step 20 above is not within the specifications, correct the internal mass value digitally. After correcting the value digitally, perform steps 14 to 20 described above.

- Step 1. In the check mode [ d-dSP] display, press the PRINT key. [ XXXX] is displayed. (D0 display-weight A/D count display)
- Step 2. Press the RANGE key six times. [ XXX.XXXX] is displayed. (CW display· internal mass value)
- Step 3. To change the internal mass value, press the PRINT key and change the value as necessary using the following keys.  
 RE-ZERO key: increases the value.  
 RANGE key : decreases the value.  
 PRINT key: saves the changes.  
 CAL key: cancels the changes.
- Step 4. Press the PRINT key. [ <END ] is displayed. Then, the balance returns to the CW display.



## 5.11 Parameter Settings

### 1. Unit setting

The weighing units are saved in the check mode. Follow the procedure below to save the units

- Step 1. See the check mode menu flowchart on page 28 to display function setting mode [Unit].
- Step 2. Press the PRINT key. [ Unit g ] is displayed.
- Step 3. Save the units as necessary using the following keys.
- RE-ZERO key: selects the displayed unit.
  - RANGE key : switches the unit to be displayed.
  - PRINT key: saves the selected unit.
  - CAL key: cancels the operation.
- Step 4. When all necessary units are saved, press the PRINT key.
- Step 5. [ End ] is displayed to indicate that the operation is complete.

### 2. Serial number setting

Follow the procedure below to set the serial number

- Step 1. See the check mode menu flowchart on page 28 to display function setting mode [Unit].
- Step 2. Press the RANGE key. [ Sn ] is displayed.
- Step 3. Press the PRINT key. The display starts to blink.
- Step 4. Change the value as necessary using the following keys.
- RE-ZERO key: changes the value of the blinking digit.
  - RANGE 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 complete.



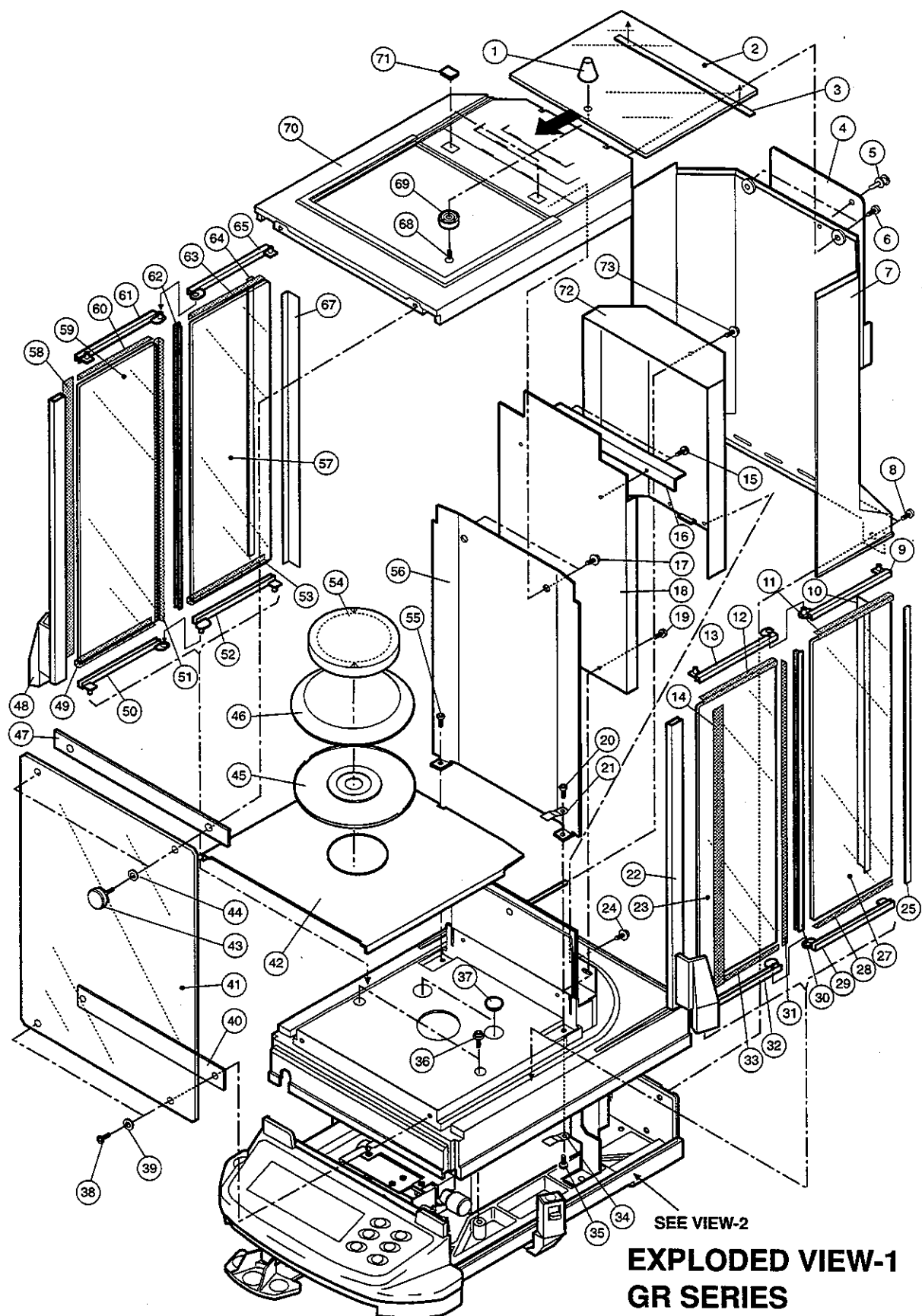
## 5.12 Half-initialization

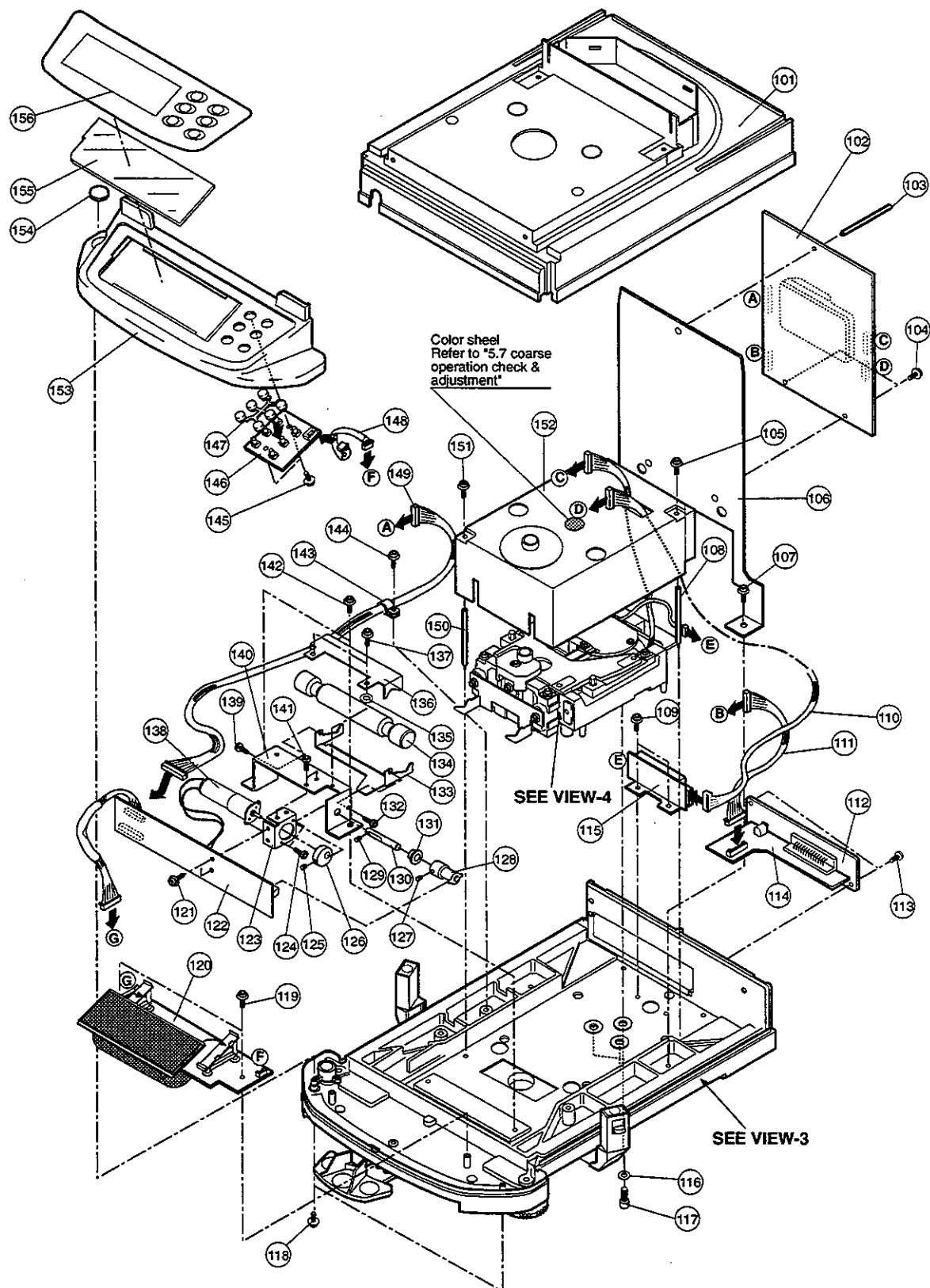
Half-initialization changes all the user settings to the default values. Follow the procedure below.

- Step 1. See the check mode menu flowchart on page 28 to display function setting mode [Unit].
- Step 2. Press the RANGE key five times. [ init HF ] is displayed.
- Step 3. Press the PRINT key. [ HF no ] is displayed. (To cancel the operation, press the CAL key. To proceed to the next item, press the 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 operation is complete.

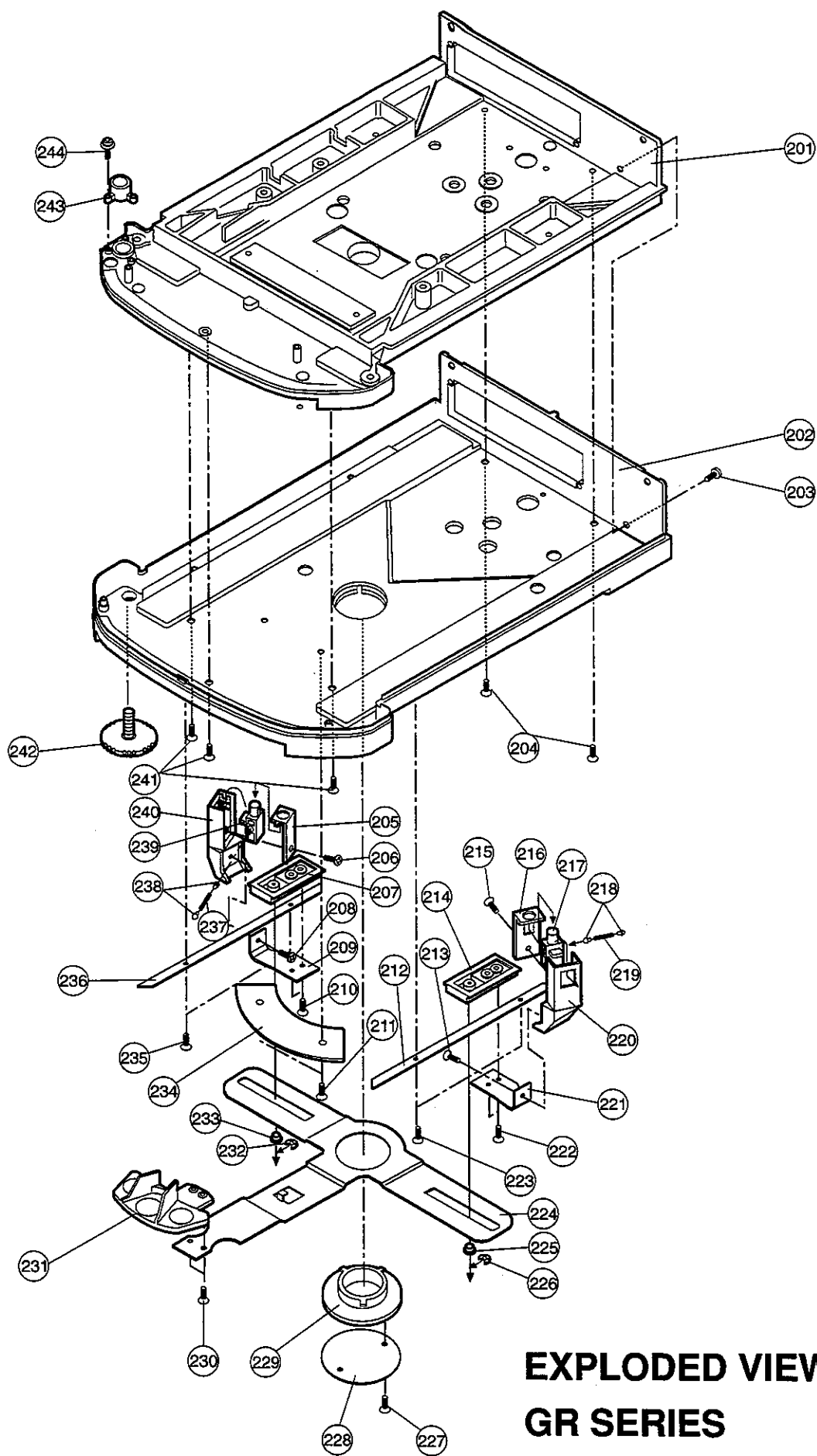


## 6. Exploded Views and Parts List

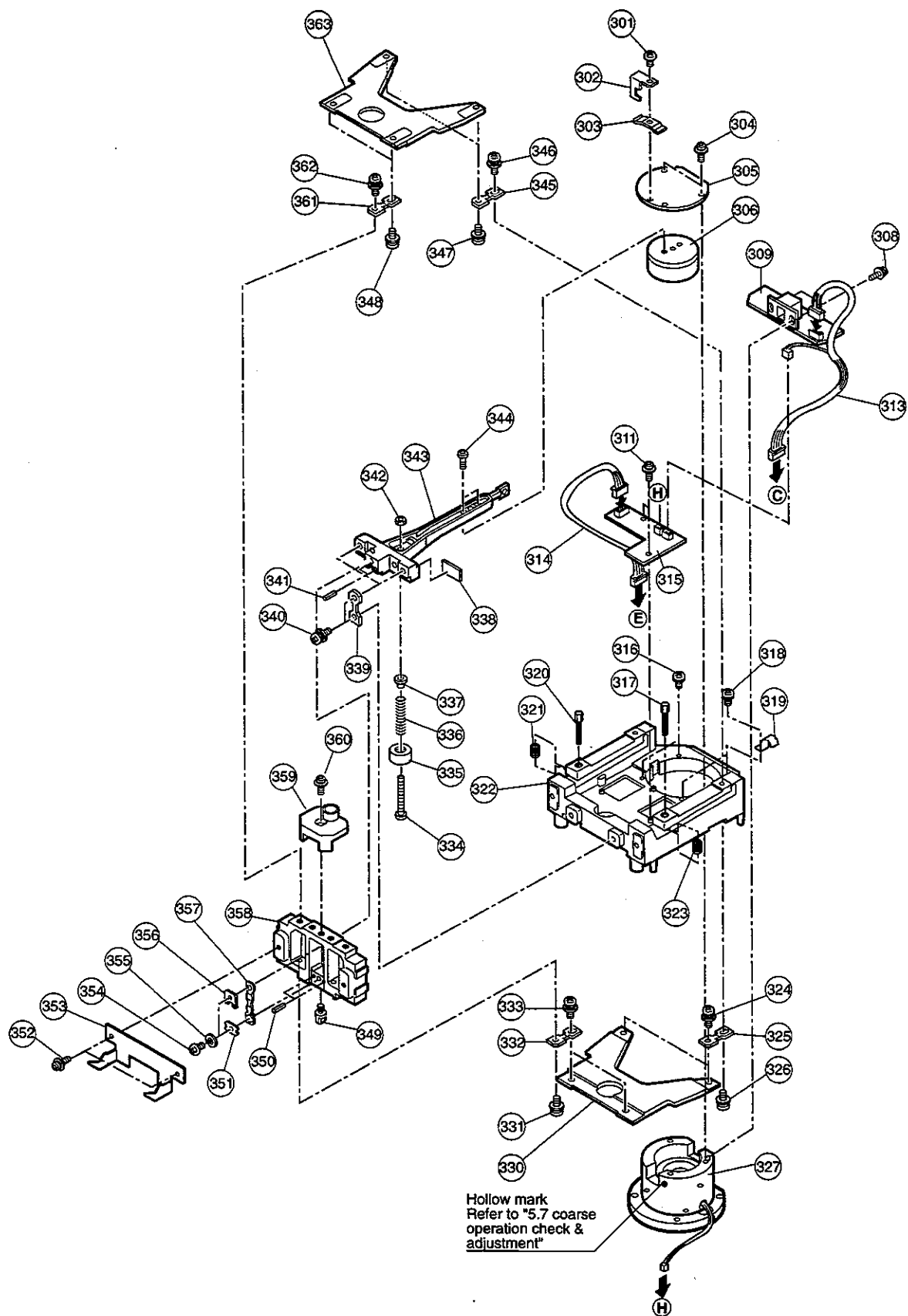




## EXPLODED VIEW-2 GR SERIES







## EXPLODED VIEW-4 GR SERIES

## GR series PARTS LIST VIEW-1 1/2

Symbol	Part No.	Part Name	Q'ty
1	07:B48174	Top knob	1
2	19:4005653	Top glass	1
3	06:4005641-1	Glass space sheet(upper)	1
4	07:4004876	Instruction step card	1
5	10:2W-65-02	Plastic rivet(black)	1
6		Binding head screw (M4X6)	2
7	07:1000058	Rear case	1
8		Binding head screw (M4X10)	2
9	07:4005619A	Glass frame(1)	1
10	06:4005671	Glass seal	1
11		Both-faced adhesive tape (5mm)	1
12		Both-faced adhesive tape (5mm)	1
13	07:4005620A	Glass frame(2)	1
14		Both-faced adhesive tape (10mm)	1
15		Pan head screw with spring washer (M3X4)	2
16	04:4005633	L Angle	1
17		Pan head screw with spring and plain washer (M4X8)	2
18	04:3002355	Main board case(front)	1
19		Pan head screw with spring washer (M3X4)	2
20		Binding head screw (M4X6)	1
21	04:4004874	Conductive plate	1
22	07:3002358-1	Side knob(right)	1
23	19:4005652	Side glass	1
24		Pan head screw with spring and large plain washer (M3X6)	2
25	06:4005641-2	Glass space sheet(lower)	1
27	19:4005652	Side glass	1
28		Both-faced adhesive tape (5mm)	1
29	07:4005620A	Glass frame(2)	1
30	07:4005621	Glass pillar	1
31		Both-faced adhesive tape (5mm)	1
32	07:4005619A	Glass frame(1)	1
33		Both-faced adhesive tape (5mm)	1
34	04:4001814	Earth plate	1
35		Binding head screw (M4X6)	1
36		Pan head screw with spring and plain washer (M4X30)	2
37	06:4005618	Upper case cap	2
38		Flat head screw (M3X10)	2
39	QA:AC310	Nylon washer	2
40	07:4005615	Glass spacer(lower)	1
41	19:4005651	Front glass	1
42	04:3002351	Breeze break attachment	1

## GR series PARTS LIST VIEW-1 2/2

43	07:C42754A	Glass presser screw	2
44	QA:AC310	Nylon washer	2
45	04:4005631	Protective dust plate	1
46	04:4005632A	Breeze break ring	1
47	07:4005614	Glass spacer(upper)	1
48	07:3002358-2	Side knob(left)	1
49		Both-faced adhesive tape (5mm)	1
50	07:4005620A	Glass frame(2)	1
51		Both-faced adhesive tape (5mm)	1
52	07:4005619A	Glass frame(1)	1
53		Both-faced adhesive tape (5mm)	1
54	7PB:HR200-4	Weighing pan unit	1
55		Binding head screw (M4X6)	1
56	04:3002352	Breeze break frame	1
57	19:4005652	Side glass	1
58		Both-faced adhesive tape (10mm)	1
59	19:4005652	Side glass	1
60		Both-faced adhesive tape (5mm)	1
61	07:4005619A	Glass frame(1)	1
62	07:4005621	Glass pillar	1
63		Both-faced adhesive tape (5mm)	1
64	06:4005641-2	Glass space sheet(lower)	1
65	07:4005620A	Glass frame(2)	1
67	06:4005671	Glass seal	1
68		Flat head tapping screw (M3X12)	1
69	07:B48175	Knob base	1
70	07:1000060A	Upper rail	1
71	07:4005829	Cap(white)	2
72	04:3002354	Main board case(rear)	1

## GR series PARTS LIST VIEW-2 1/2

Symbol	Part No.	Part Name	Q'ty
101	07:1000057	Upper case	1
102	7PZ:3184A	Main board assembly	1
103	05:4001815A	Spacer	1
104		Pan head screw with spring and plain washer (M3X6)	2
105		Pan head screw with spring and plain washer (M3X6)	1
106	04:3002353	Board suport	1
107		Pan head screw with spring and plain washer (M3X6)	2
108	05:4005659	Mechanical pole	1
109		Pan head screw with spring and plain washer (M3X6)	2
110	KO:1642-020	Analog board cable	1
111	KO:1130-10W010	Power supply board cable	1
112	02:3002360	Power supply panel	1
113		Binding head screw (M3X10)	2
114	7PZ:3185	Power supply board assembly	1
115	7PZ:3191A	Analog board assembly	1
116		Cup washer (M4)	3
117		Allen head bolt (M4X10)	3
118		Pan head screw with spring and plain washer (M3X15)	2
119		Pan head screw with spring and plain washer (M3X6)	2
120	7PZ:3187	Display board assembly	1
121		Pan head screw with spring and large plain washer (M3X6)	2
122	7PZ:3186	Motor board assembly	1
123	04:4004898A	Motor holder	1
124		Pan head screw (M1.4X4)	2
125		Countiuous thread stud (M3X3)	1
126	07:4001795	Cam	1
127		Countiuous thread stud (M3X3)	1
128	09:B48190	Switching cam	1
129		Countiuous thread stud (M3X3)	1
130	05:4004900	Cam shaft	1
131	10:80F-0503	Flange bush	1
132		Pan head screw with spring washer (M3X6)	1
133	04:4004896	Seesaw	1
134	05:4004899	Weight	1
135		Washer (M4)	1
136	04:4004897	Weight holder	1
137		Pan head screw with spring and plain washer (M3X6)	2
138	10:A35234	Gear motor	1
139		Pan head screw with spring washer (M3X6)	1
140	04:4004895	Motor frame	1
141		Pan head screw with spring washer (M3X6)	2

## GR series PARTS LIST VIEW-2 2/2

142		Pan head screw with spring and large plain washer (M3X6)	2
143	10:NK-3N	Nylon clamp	1
144		Pan head screw with spring and plain washer (M3X6)	1
145		Pan head screw with spring and plain washer (M3X6)	2
146	7PZ:3188	Switch board assembly	1
147	06:4005628	Rubber keytop	1
148	KO:964-04W005	Cable	1
149	KO:1643-035	Logic board cable	1
150	05:4005659	Mechanical pole	1
151		Pan head screw with spring and plain washer (M3X6)	1
152	03:2000273	Mechanical case	1
153	07:1000059	Display case	1
154	07:4001797A	Leveling vial window	1
155	07:4005625	Filter	1
156	08:3002363-3	Keysheet(GR120)	1
156	08:3002363-2	Keysheet(GR200)	1
156	08:3002363-5	Keysheet(GR300)	1
156	08:3002363-1	Keysheet(GR202)	1

## GR series PARTS LIST VIEW-3

Symbol	Part No.	Part Name	Q'ty
201	03:1000055B	Base	1
202	07:1000056	Lower case	1
203		Binding head screw (M4X6)	1
204		Flat head screw (M4X6)	2
205	07:4005638	Knob cover	1
206		Flat head screw (M3X6)	1
207	07:4005649A	Knob guide	1
208		Flat head screw (M3X6)	1
209	04:4005654-2	Knob plate(left)	1
210		Flat head screw (M3X4)	2
211		Flat head screw (M3X4)	2
212	04:4005964	Side rail	1
213		Flat head screw (M3X6)	1
214	07:4005649A	Knob guide	1
215		Flat head screw (M3X6)	1
216	07:4005638	Knob cover	1
217	07:4005637	Knob switch	1
218	07:4005639	Slide pin	2
219	00:4005655	Slide spring	1
220	07:3002356-1	Under knob(right)	1
221	04:4005654-1	Knob plate(right)	1
222		Flat head screw (M3X4)	2
223		Flat head screw (M3X4)	2
224	04:3002361A	T lever	1
225	07:4005650A	Knob bush	1
226	10:D4	E ring	1
227		Flat head screw (M3X6)	1
228	04:4005657	Underfloor plate	1
229	07:4005644	Lever ring	1
230		Flat head screw (M3X4)	2
231	07:4005682A	Front knob	1
232	10:D4	E ring	1
233	07:4005650A	Knob bush	1
234	07:4005647	Front rail	1
235		Flat head screw (M3X4)	2
236	04:4005964	Side rail	1
237	00:4005655	Slide spring	1
238	07:4005639	Slide pin	2
239	07:4005637	Knob switch	1
240	07:3002356-2	Under knob(left)	1
241		Flat head screw (M4X6)	3
242	06:4005645	Leveling foot	2
243	03:4005673	Leveling vial stand	1
244		Pan head screw with spring and plain washer (M3X15)	3

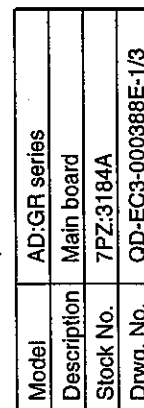
## GR series PARTS LIST VIEW-4 1/2

Symbol	Part No.	Part Name	Q'ty
301		Pan head screw with spring washer (M3X6)	1
302	04:C42509C	Beam stopper	1
303	04:C41679	Beam stopper spring plate	1
304		Pan head screw with spring washer (M3X6)	2
305	04:B47737B	Shield plate	1
306	09:3002362	Bobbin	1
308		Pan head screw with spring and large plain washer (M3X6)	2
309	7PZ:3190A	Position sensor board assembly	1
311		Pan head screw with spring and plain washer (M3X6)	2
313	KO:1644-025	Position sensor cable	1
314	KO:1617A-013	Shield cable	1
315	7PZ:3344	Temperature sensor board assembly	1
316		Pan head screw with spring washer (M4X20)	2
317	05:4005634	Four corners adjustment screw	1
318		Pan head screw with spring washer (M4X20)	2
319	04:C41223A	Cable clumper	1
320	05:4005634	Four corners adjustment screw	1
321	00:4005635	Four corners adjustment spring	1
322	03:2000272A	Main mechanical frame	1
323	00:4005635	Four corners adjustment spring	1
324	09:4005559	Screw and washer assembly	2
325	04:4003343B;C	Flexure	2
326	09:4005559	Screw and washer assembly	2
327	7PB:GR300-1	Magnetic unit	1
330	03:4005675	Flexure beam	1
331	09:4005559	Screw and washer assembly	2
332	04:4003343B;C	Flexure	2
333	09:4005559	Screw and washer assembly	2
334	05:B47110A	Adjust screw for center of gravity	1
335	05:C41000	Trimming weight	1
336	10:C-207	Trimming weight spring	1
337	05:B47111	Spring guide ring	1
338	PZ:2745	Relay board	1
339	04:4004832;C	Fulcrum flexure	2
340	09:4005559	Screw and washer assembly	2
341	10:P1.5X6	Waved spring pin	1
342	06:4005645	Hexagon nut M3	1
343	03:B31291A	Beam	1
344		Pan head screw (M3X8)	1
345	04:4003343B;C	Flexure	2
346	09:4005559	Screw and washer assembly	2

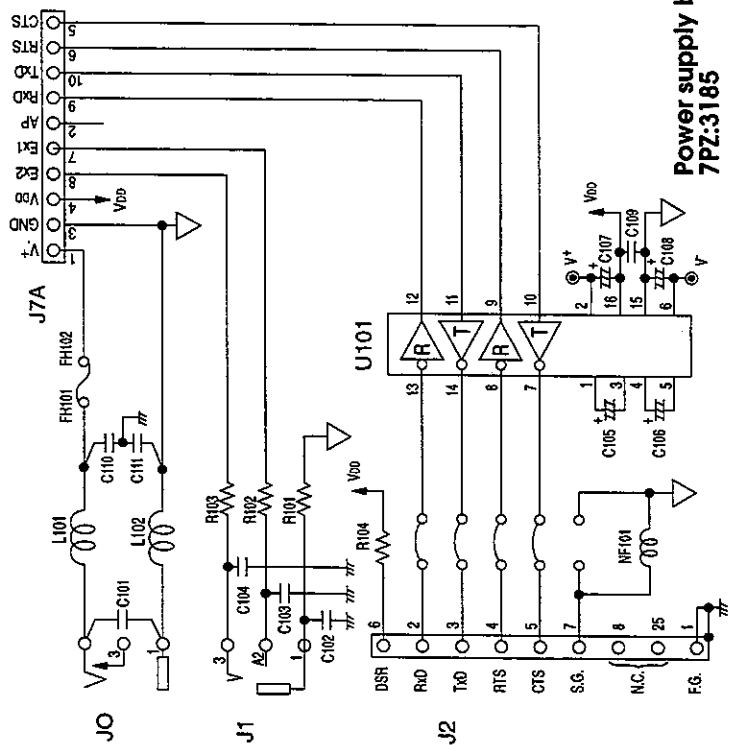
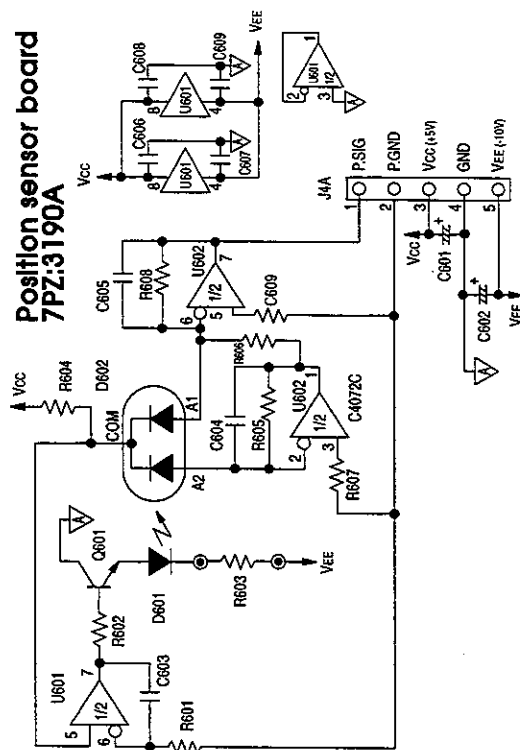
## GR series PARTS LIST VIEW-4 2/2

347	09:4005559	Screw and washer assembly	2
348	09:4005559	Screw and washer assembly	2
349	05:A46919	Underhook	1
350	10:P1.5X6	Waved spring pin	2
351	04:B47108	Tension flexture holder	1
352		Pan head screw with spring and plain washer (M4X6)	2
353	04:4005629	Weight receiving	1
354		Pan head screw (M4X8)	2
355	10:S-NO-1-SUS	Coned disc spring	2
356	04:B47107A	Tension flexture holder	1
357	04:4005699;C	Tension flexture	1
358	03:3002359	Suspension guide	1
359	03:4005674	Pun supporter	1
360		Pan head screw with spring and plain washer (M4X6)	1
361	04:4003343B;C	Flexuture	2
362	09:4005559	Screw and washer assembly	2
363	03:4005675	Flexuture beam	1

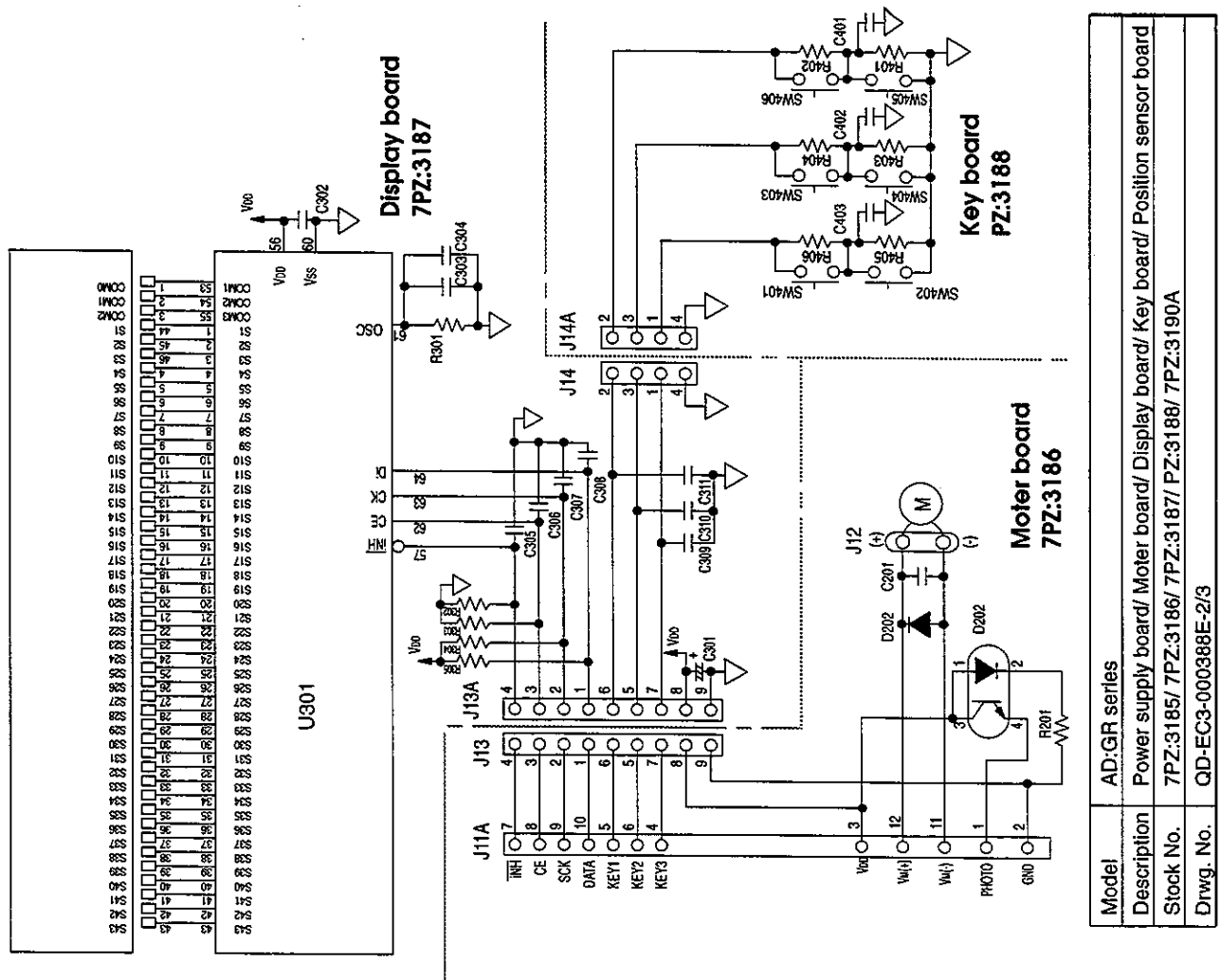




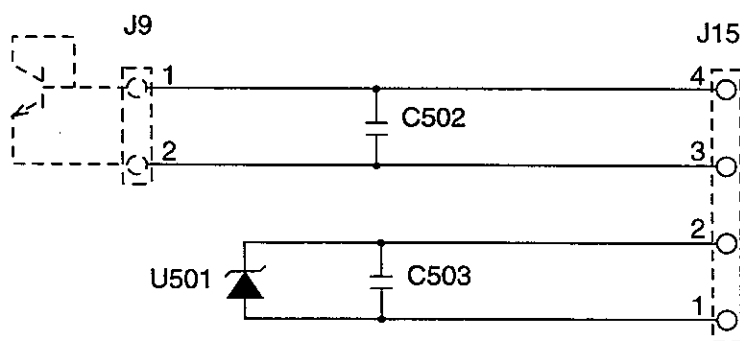
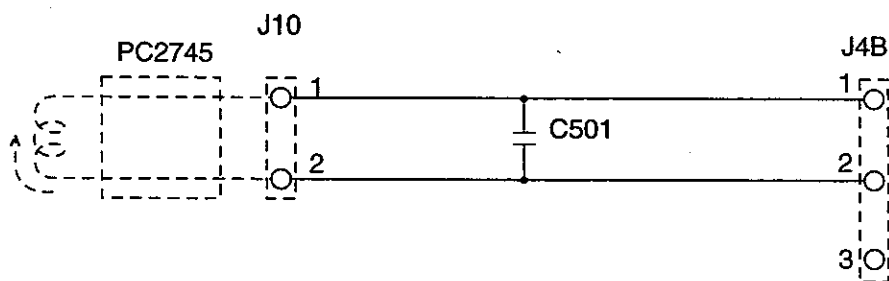
# Position sensor board 7PZ:3190A



# Power supply board 7PZ:3185



Model	AD-GR series
Description	Power supply board/ Motor board/ Display board/ Key board/ Position sensor board
Stock No.	7PZ:3185/ 7PZ:3186/ 7PZ:3187/ 7PZ:3188/ 7PZ:3190A
Drwg. No.	QD-EC3-000388E-2/3



Model	AD:GR series
Description	Relay board
Stock No.	7PZ:3344
Drwg. No.	QD-EC3-000388E-3/3

## 7PZ:3184A PARTS LIST 1/2

Circuit Symbol	Part No.	Part Name	Q'ty
	PC:3184C	Printed Wiring Board	1
B1	EB:CR2032-WT12	Lithium Battery	1
C1,2	CC:0.1U25V	Ceramic Capacitor	2
C3,5,7-9,21,25,26,30-35,37,39,41	CC:FK26Y5V104T	Ceramic Capacitor	17
C4,15	CC:0.01UT	Ceramic Capacitor	2
C6	CC:330P	Ceramic Capacitor	1
C10-14,22,23	CC:330PT	Ceramic Capacitor	7
C16	CT:1V010T	Tantalum Capacitor	1
C27-29,36,38,40	CK:ECA1EM471-T	Chemical Capacitor	6
C42,43	CK:ECA1VM471-T	Chemical Capacitor	2
D1,2	DI:SB10-03A2-T	Diode	2
D3	DI:1SS97	Diode	1
D4	DI:1SS53	Diode	1
J3	J1:7P-S2T2-EF	Pin Header	1
J4	J1:08P-S2T2-EF	Pin Header	1
J7	J1:10P-S2T2-EF	Pin Header	1
J11	J1:12P-S2T2-EF	Pin Header	1
L1,2	LL:LHL08TB471K	Inductor	2
NF1	NF:D-58C	Noise Filter	1
NF2	NF:EXCEMT102BC	Noise Filter	1
NF3	NF:ZBF253D-01	Ferrite Bead	1
Q1	QF:K701	FET	1
R1,2,8-18,45	RC:NAT47KJT	Carbon Resistor	14
R3	RC:NAT1MJT	Carbon Resistor	1
R4	RC:NAT470RJT	Carbon Resistor	1
R5-7,40	RC:NAT4.7KJT	Carbon Resistor	4
R19-21,27,28,30	RC:NAT22KJT	Carbon Resistor	6
R22-26,29,39,41	RC:NAT100KJT	Carbon Resistor	8
R31,34,35	RC:NAT1RJT	Carbon Resistor	3
R32	RM:RNM5.1KFT	Metal Film Resistor	1
R33,36	RM:RNM1KFT	Metal Film Resistor	2
R37	RC:NAT10KJT	Carbon Resistor	1
R42	RC:NAT2.2KJT	Carbon Resistor	1
U1	UC:D78054GC-A51	CPU	1
U2	UC:TC140G02AU12	Gate Array	1
U3	UC:93LC56P	E2PROM	1
U4	UA:S-8054ALR-Z	Comparator	1

## 7PZ:3184A PARTS LIST 2/2

U5	UC:5564APL-15	Static RAM	1
U6	UC:HC573	Latch	1
U7	UC:HC125	Buffer	1
U8,9	UR:IR3M03A	DC/DC Convertor	2
U10	UR:TA78L010AP-T	Regulator	1
U11,12	UR:TA78L005AP-T	Regulator	2
U13	UR:TA79010S	Regulator	1
	MF:AMZ45	Analog Module	1
XT1	XT:C45B12M-K02U	Crystal	1
	07:C43674	Isolation Sheet	1

## 7PZ:3185 PARTS LIST

Circuit Symbol	Part No.	Part Name	Q'ty
	PC:3185C	Printed Wiring Board	1
C101-104,109	CC:FK26Y5V104T	Ceramic Capacitor	5
C105-108	CK:SRA16VB-10	Chemical Capacitor	4
C110,111	CC:0.01U500V	Chemical Capacitor	2
FH101,102	FH:85PN0819	Fuse Holder	2
	FS:EAWK-500MA	Fuse	1
J0	EJ:0470-01-230	Jack	1
J1	JE:HSJ1414-01	Jack	1
J2	JA:17LE-13250	D-sub Connector	1
J7A	JL:10P-S2T2-EF	Pin Header	1
L101,102	LL:LHL06TB470K	Inductor	2
NF101	NF:ZBF253D-01	Ferrite Bead	1
R101	RC:NAT2.2KJT	Carbon Resistor	1
R102,103	RC:NAT820RJT	Carbon Resistor	2
R104	RC:NAT3.3KJT	Carbon Resistor	1
U101	UC:MAX232CPE	RS-232C Driver	1

## 7PZ:3186 PARTS LIST

Circuit Symbol	Part No.	Part Name	Q'ty
	PC:3186C	Printed Wiring Board	1
C201	CC:0.01UT	Ceramic Capacitor	1
D201	DF:TLP852	Phot Interrupter	1
D202	DI:1SS270T	Diode	1
J11A	JL:12P-S2T2-EF	Pin Header	1
J13	KO:1654-009	Cable	1
R201	RC:NAT1.2KJT	Carbon Resistor	1

## 7PZ:3187 PARTS LIST

Circuit Symbol	Part No.	Part Name	Q'ty
	PC:3187C	Printed Wiring Board	1
C301	CT:1V010T	Tantalum Capacitor	1
C302	CC:FK26Y5V104T	Ceramic Capacitor	1
C303,304,309-311	CC:330PT	Ceramic Capacitor	5
C305-308	CC:10PT	Ceramic Capacitor	7
J13A	Jl:09P-S2T2-EF	Pin Header	1
J14	Jl:4P-ST2-EF	Pin Header	1
	ED:DLC-1590	LCD	1
R301	RC:NAT100KJT	Carbon Resistor	1
R302-305	RC:NAT47KJT	Carbon Resistor	4
U301	UC:LC75850E	LCD Driver	1
	KO:1583-46-035	Heat seal	1
	07:4005626-1	LCD Holder	1
	07:4005626-2	LCD Holder	1

## 7PZ:3188 PARTS LIST

Circuit Symbol	Part No.	Part Name	Q'ty
	PC:3188C	Printed Wiring Board	1
C401-403	CC:330PT	Ceramic Capacitor	3
J14A	Jl:4P-S2L2-EF	Pin Header	1
R401,403,405	RC:NAT5.6KJT	Carbon Resistor	3
R402,404,406	RC:NAT10KJT	Carbon Resistor	3
SW401-406	SK:EVQ21307K	Tact Switch	6

## 7PZ:3190A PARTS LIST

Circuit Symbol	Part No.	Part Name	Q'ty
	PC:3190C	Printed Wiring Board	1
C601,602	CT:1V010T	Tantalum Capacitor	2
C603	CC:0.01UT	Ceramic Capacitor	1
C604	CC:10PT	Ceramic Capacitor	1
C605	CC:68PT	Ceramic Capacitor	1
C606-609	CC:FK26Y5V104T	Ceramic Capacitor	4
D601	DL:SLR-935A	Phot Diode	1
D602	DI:MI-33H-2D	Phot Diode	1
FH101,102	FH:85PN0819	Fuse Holder	2
J4A	JL:05P-S2T2-EF	Pin Header	1
Q601	QT:C1815YT	Transistor	1
R601,607	RC:NAT100KJT	Carbon Resistor	2
R602	RC:NAT3.3KJT	Carbon Resistor	1
R603	RC:NAT680RJT	Carbon Resistor	1
R604	RM:RNM240KFT	Metal Film Resistor	1
R605,606	RF:390KRF-FLN	Metal Film Resistor	2
R608	RC:NAT1MJT	Carbon Resistor	1
R609	RC:NAT47KJT	Carbon Resistor	1
U601	UA:C4062C	Operational Amplifier	1
U602	UA:C4072C	Operational Amplifier	1
	03:B48483A	Position Sensor Holder	1
	07:4005642	Bush	1
	07:4005643	Bush	1

## 7PZ:3344 PARTSLIST

Circuit Symbol	Part No.	Part Name	Q'ty
	PC:3344C	Printed Wiring Board	1
C501,502	CC:FK26Y5V104T	Ceramic Capacitor	2
C503	CC:68PT	Ceramic Capacitor	1
J4B	JL:3P-S2T2-EF	Pin Header	1
J9	JL:2P-S2T2-EF	Pin Header	1
J15	JL:4P-ST2-EF	Pin Header	1
U501	UA:LM329AZ	Reference IC	1

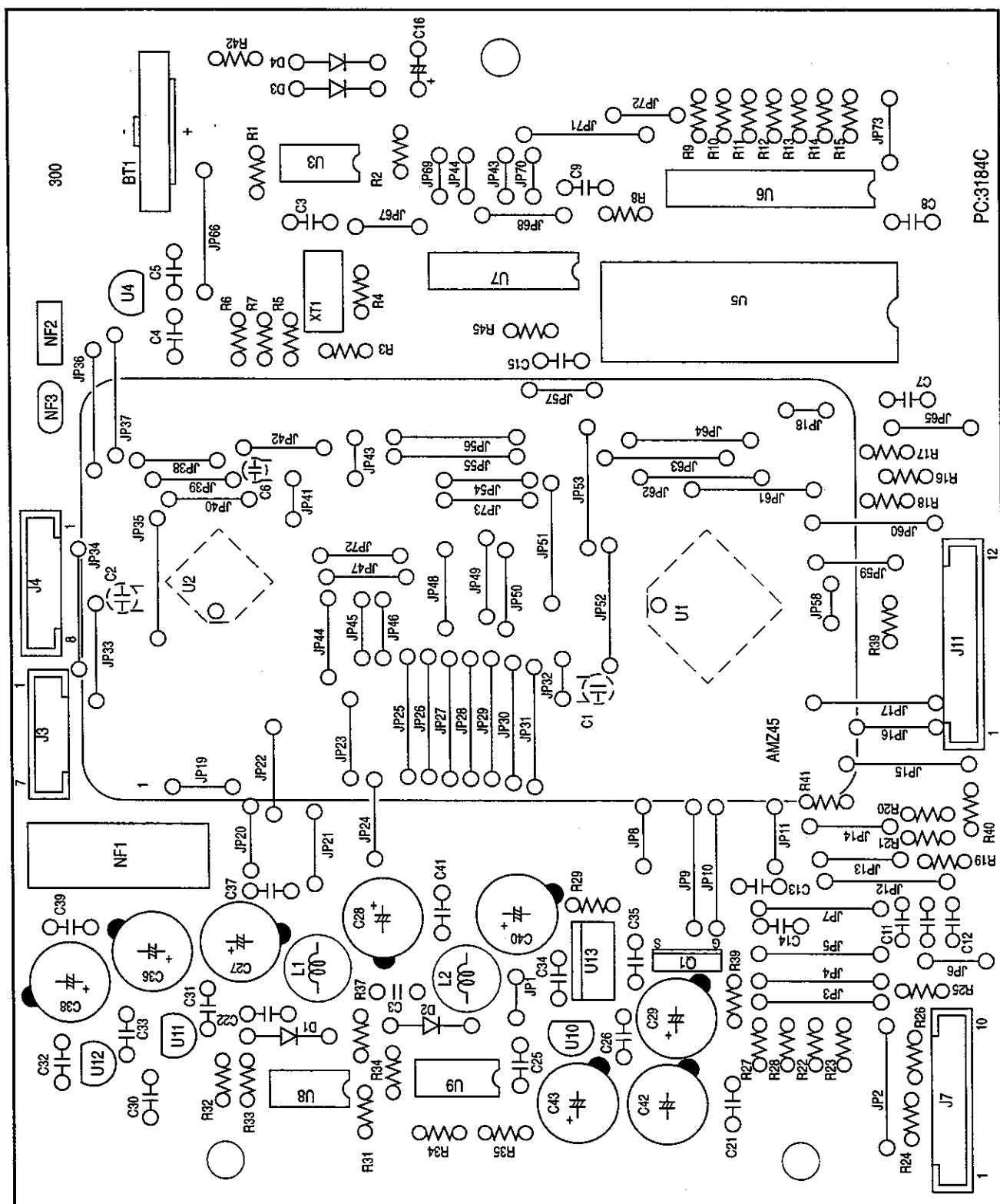
## GR series MAINTENANCE UNITS

Part No.	Part Name	Q'ty
7PB:GR300-1	Magnetic unit	(1)
7PB:GR202-2	Flexure unit	(2)
7PB:GR202-6	Beam unit	(1)
7PB:GR202-7	Trimming weight unit	(1)
7PB:GR202-8	Frame unit	(1)
7PB:HR200-4	Weighing Pan unit	(1)
7PM:GR202-1	Lower case unit	(1)
7PM:GR202-2	Upper case unit	(1)
7PM:GR202-K	Mechanical unit	(1)
7PZ:3184A	Main board assembly	(1)
7PZ:3185	Power supply board assembly	(1)
7PZ:3186	Motor board assembly	(1)
7PZ:3187	Display board assembly	(1)
7PZ:3188	Switch board assembly	(1)
7PZ:3190A	Position sensor board assembly	(1)
7PZ:3191A	Analog board assembly	(1)
7PZ:3344	Temperature sensor board assembly	(1)

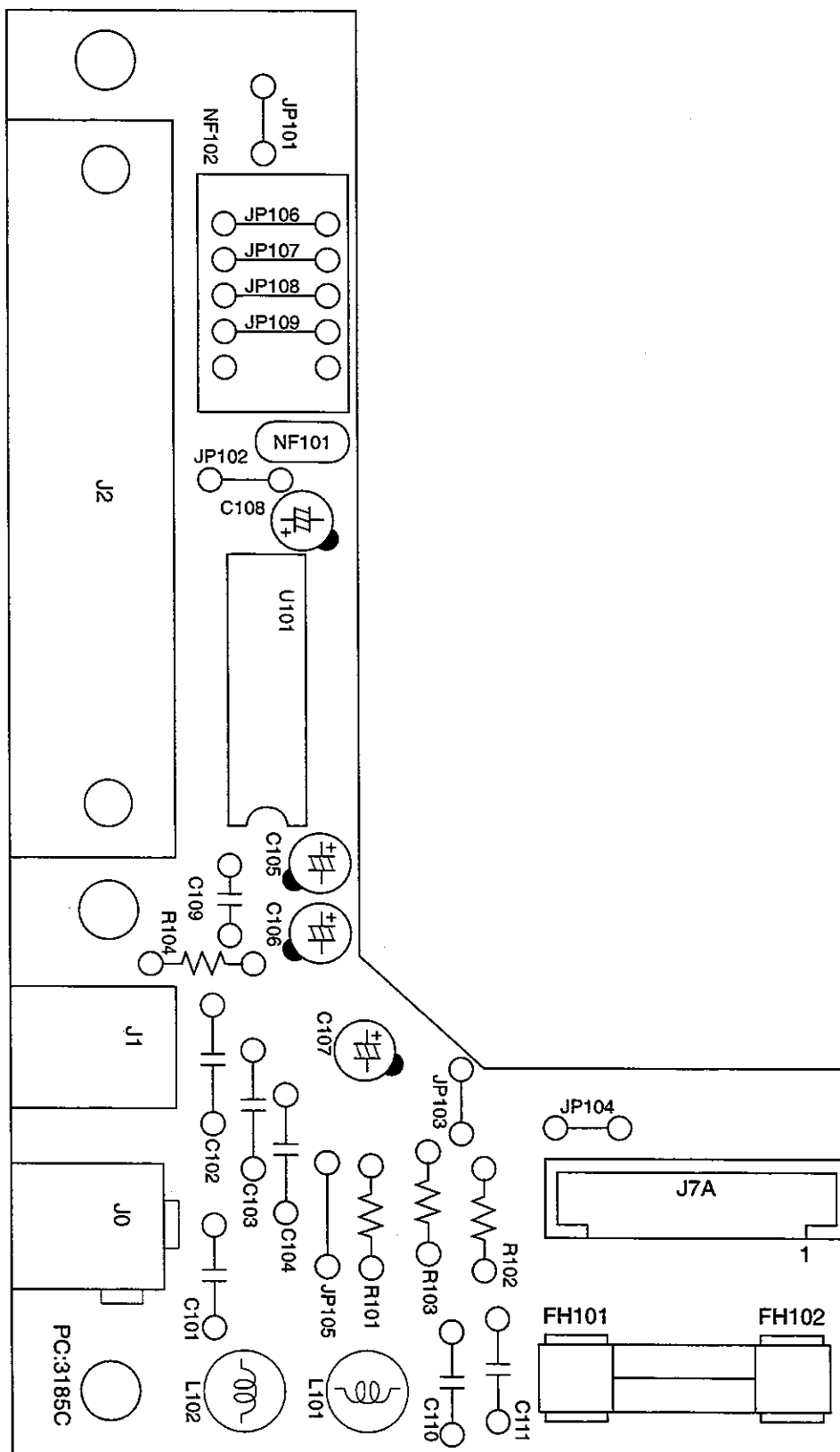




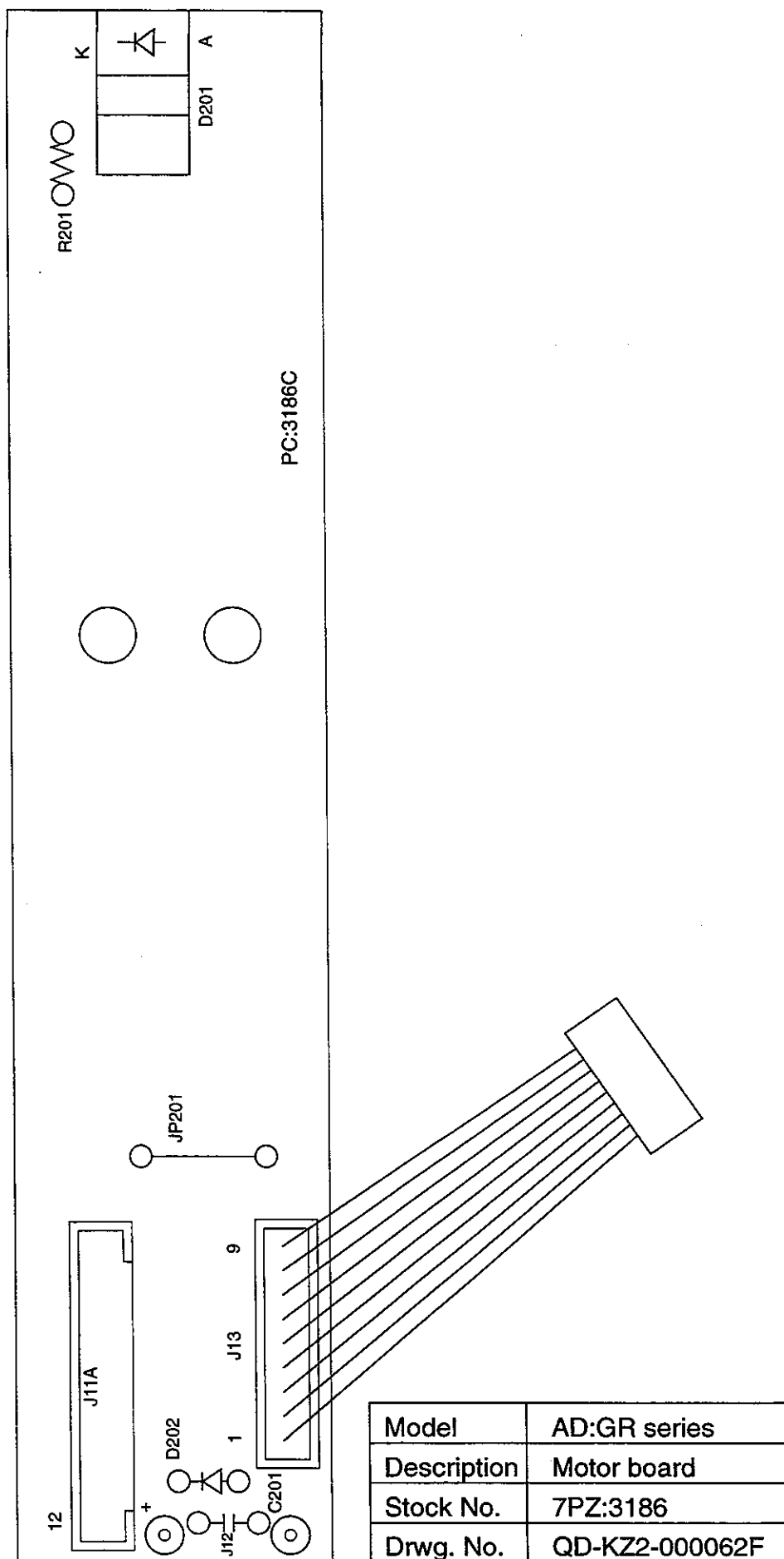
## 8. Parts Layout

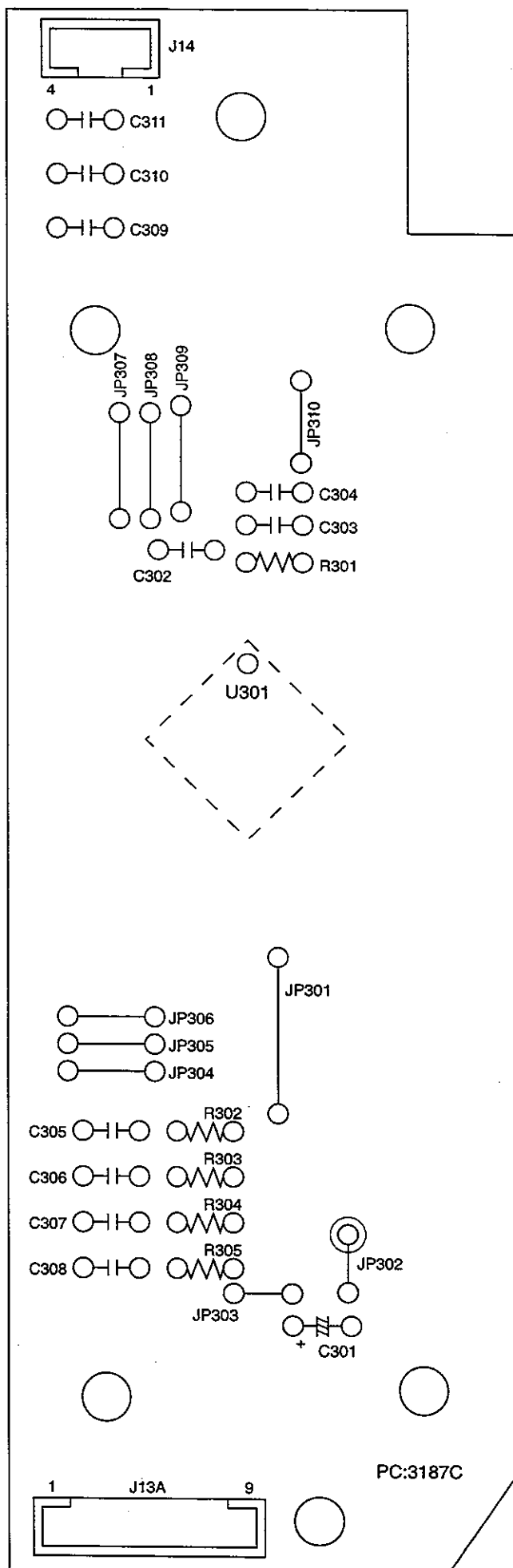


Model	AD:GR series
Description	Main board
Stock No.	7PZ:3184A
Drwg. No.	QD-KZ2-000062F

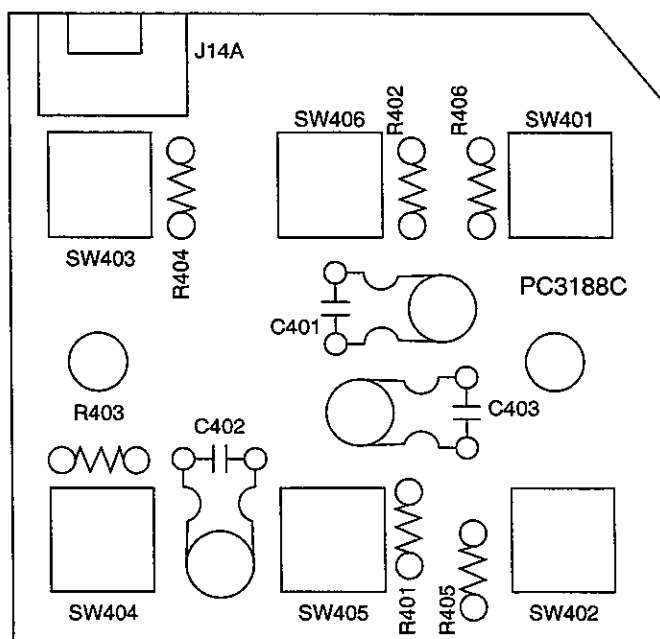


Model	AD:GR series
Description	Power supply board
Stock No.	7PZ:3185
Drwg. No.	QD-KZ2-000062F

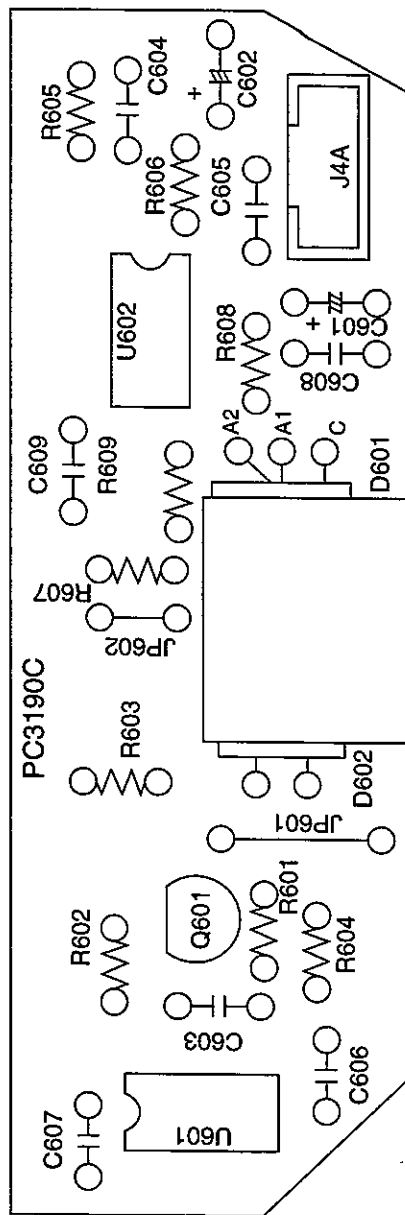




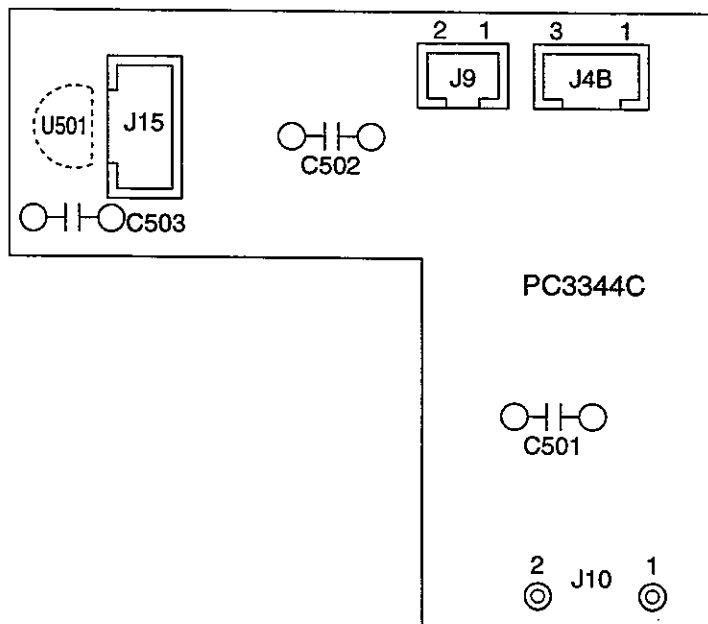
Model	AD:GR series
Description	Display board
Stock No.	7PZ:3187
Drwg. No.	QD-KZ2-000062F



Model	AD:GR series
Description	Key board
Stock No.	7PZ:3188
Drwg. No.	QD-KZ2-000062F



Model	AD:GR series
Description	Position sensor board
Stock No.	7PZ:3190A
Drwg. No.	QD-KZ2-000062F



Model	AD:GR series
Description	Relay board
Stock No.	7PZ:3344
Drwg. No.	QD-KZ2-000062F

## This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.