

HM-120/200/202/300

HR-202/300

MAINTENANCE MANUAL

PRECISION ELECTRONIC BALANCE



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Parts List

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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 HM/HR 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 disassembly and reassembly
Precision posidrive screwdriver	For securing the motor holder
Adhesive tape 8 mm	For cleaning
Mechanical alignment fixture	For disassembly and reassembly of the force motor section
Precision square	
Wrench 7 mm	For corner load adjustment
Wrench 5.5 mm	For removing the main board
Wrench 8 mm	For replacing the lower case
Allen wrench 1.5 mm	For securing the cam and cam shaft (motor unit)
Round-nose chain pliers	For installing the underhook
Soldering iron (25-40 W)	For soldering
Weights	
HR-202:	Two 20 g, Four 50 g, Two 100 g, One 200 g
HR-300:	Three 100 g, One 200 g
HM-202:	Two 20 g, Four 50 g, Two 100 g, One 200 g
HM-300:	Three 100 g, One 200 g
HM-200:	Four 50 g, Two 100 g, One 200 g
HM-120:	Two 50 g, One 100 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.
Service bench	Should be free of vibration, variations in temperature, dust and drafts.



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 eight hours 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
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. (HM series only)
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,

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

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 (HM series only, 0.1 mg range)

After auto calibration, place the specified mass on the pan and read the displayed value. Repeat this procedure twice. Verify that the difference between the value of each test and the true value is within the specifications.

Model	Mass used	Specifications
HM-202	200 g	± 0.2 mg
HM-300	200 g	± 0.2 mg
HM-200	200 g	± 0.2 mg
HM-120	100 g	± 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. Subtract the displayed value when no load is applied from the displayed value when load is applied. The difference must be within the specifications. If not, repeat the test another twenty times. Verify that the displayed values are within the specifications.

Model	Mass used	Specifications
HR-300	300 g (200 g + 100 g)	0.2 mg (SD)
HM-300	300 g (200 g + 100 g)	0.2 mg (SD)
HM-200	200 g	0.1 mg (SD)
HM-120	100 g	0.1 mg (SD)

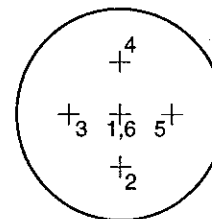
Model	0.1 mg range		0.01 mg range	
	Mass used	Specifications	Mass used	Specifications
HR-202	200 g	0.1 mg (SD)	40 g (20 g \times 2)	0.02 mg (SD)
HM-202	200 g	0.1 mg (SD)	40 g (20 g \times 2)	0.02 mg (SD)

SD=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
HR-300	100 g	± 0.2 mg
HM-300	100 g	± 0.2 mg
HM-200	100 g	± 0.2 mg
HM-120	50 g	± 0.2 mg



Model	0.1 mg range		0.01 mg range	
	Mass used	Specifications	Mass used	Specifications
HR-202	100 g	± 0.2 mg	20 g	± 0.04 mg
HM-202	100 g	± 0.2 mg	20 g	± 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)
HR-202 (0.1 mg)	50 g	50 g	50 g	50 g	± 0.2 mg
HR-202 (0.01 mg)	20 g	20 g	×	×	± 0.03 mg
HR-300	100 g	100 g	100 g	×	± 0.3 mg
HM-202 (0.1 mg)	50 g	50 g	50 g	50 g	± 0.2 mg
HM-202 (0.01 mg)	20 g	20 g	×	×	± 0.03 mg
HM-300	100 g	100 g	100 g	×	± 0.03 mg
HM-200	50 g	50 g	50 g	50 g	± 0.2 mg
HM-120	50 g	50 g	×	×	± 0.2 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
HR-202 (0.1 mg)	50 g	50 g	50 g	50 g	± 0.3 mg
HR-202 (0.01 mg)	20 g	20 g	×	×	± 0.04 mg
HR-300	100 g	100 g	100 g	×	± 0.4 mg
HM-202 (0.1 mg)	50 g	50 g	50 g	50 g	± 0.3 mg
HM-202 (0.01 mg)	20 g	20 g	×	×	± 0.04 mg
HM-300	100 g	100 g	100 g	×	± 0.4 mg
HM-200	50 g	50 g	50 g	50 g	± 0.3 mg
HM-120	50 g	50 g	×	×	± 0.3 mg

Creep characteristics

1. 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.
2. While keeping the mass placed on the pan, wait until the specified creep time has elapsed.
3. Record the displayed value. Remove the mass and wait until the displayed value has stabilized. Record the value.
4. Verify that the changed value in zero and full scale are within the specifications.

Model	Mass used	Creep time	FS change	ZERO change
HR-202	200 g	5 min or more	± 0.3 mg	± 0.4 mg
HR-300	300 g (200 g+100 g)	5 min or more	± 0.4 mg	± 0.5 mg
HM-202	200 g	5 min or more	± 0.3 mg	± 0.4 mg
HM-300	300 g (200 g+100 g)	5 min or more	± 0.4 mg	± 0.5 mg
HM-200	200 g	5 min or more	± 0.3 mg	± 0.4 mg
HM-120	100 g	5 min or more	± 0.2 mg	± 0.3 mg



3. Corrective Maintenance

Perform corrective maintenance for the HM/HR 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 on page 12):

- Type A: Replacing, disassembling, or assembling the force motor section
- 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 section
- 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	Check the voltage (VCC2 5V, VEE1 -10V, VM 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

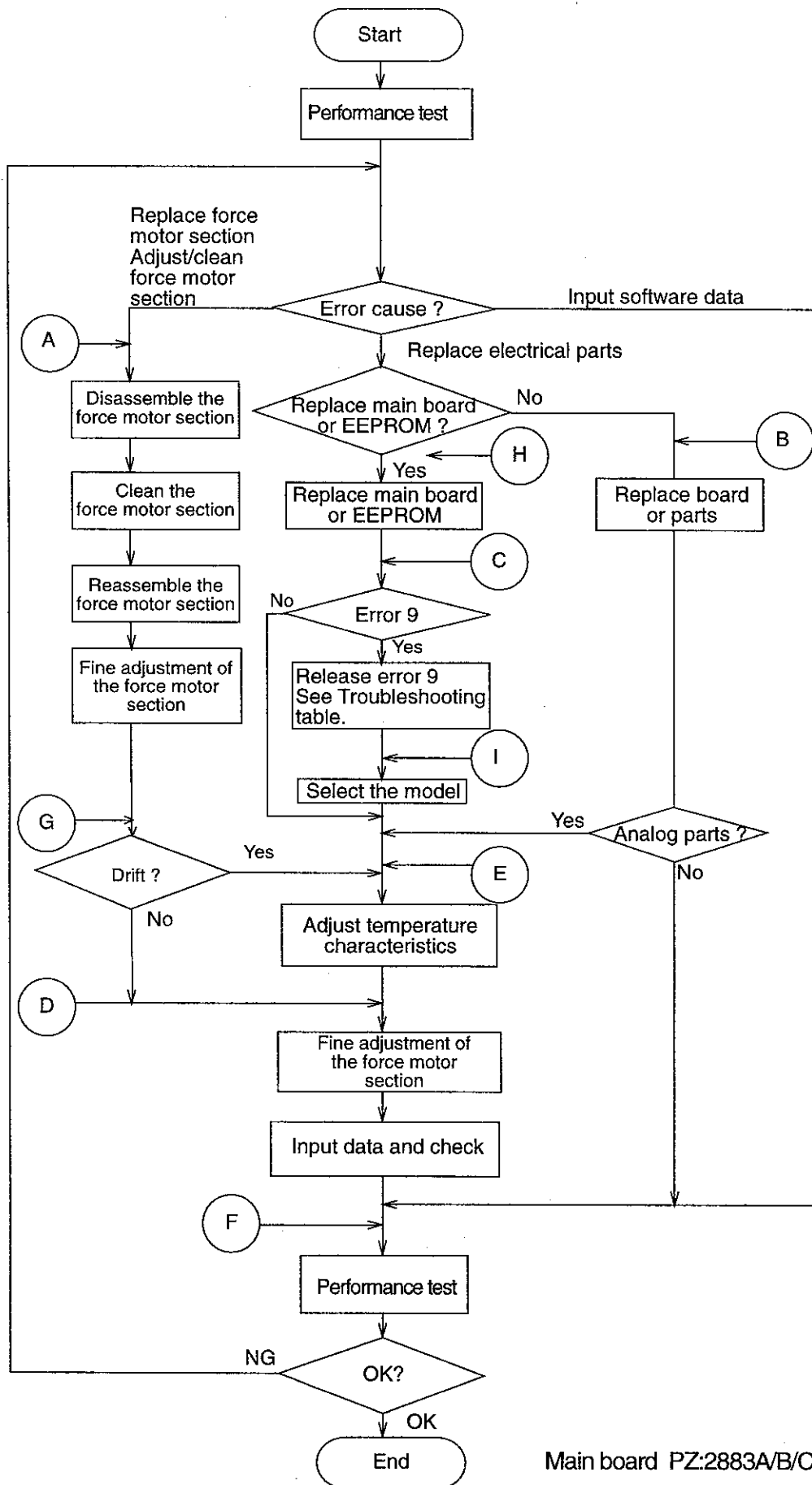
Problem	Location	Check	Solution	Type
No display, but the beam is balanced	Display assembly	Check the display cable and the connections to the main board	Replace the display assembly with a substitute assembly.	F
	Main board assembly	Check the performance using the main board that has not trouble	Replace the main board assembly with a substitute assembly.	H
	Heat seal cable	Check the heat seal cable and that it is connected securely	Connect securely or replace	F
	Display driver IC	Check the display driver IC (U101) is attached properly	Re-solder it	F
		Replace the display driver IC	Replace/Reassemble	F
Unstable display, repeatability error, error 1	Parameter setting	Check if the setting is "cond 0" or "cond 1"	With the MODE Key held down, press the RE-ZERO key to set "cond 3" or "cond 4"	F
	Pan assembly	Check that the pan assembly is correctly assembled and installed	Assemble and install correctly	F
	Foreign matter	Check for foreign matter inside	Remove the foreign matter	F
	Force motor assembly	Check for dust particles in the magnet assembly	Clean and reassemble	A
		Check that the bobbin does not touch the magnet	Reassemble the force motor	A
		Check that the positioning sensor is installed correctly	Install the positioning sensor in the correct position	G
	Internal mass assembly	Check that the mass is in place and does not touch the weighing holder	Adjust the internal mass	F
		Check that the mass and weighing holder are correctly installed	Correct the force motor section attaching position	D
	Temperature A/D	Check that T1 display in check mode is stable	Replace module AMZ45	B
	Weight A/D	Check that D2 display in check mode is stable	Replace module AMZ45 Replace PZ2889, PZ2890, PZ2888	B
	Damage in flexures	Check the upper/lower flexure assemblies, tension flexure and fulcrum flexures	Replace parts and reassemble	A
E, -E display	Calibration	Check calibration	In addition, test repeatability	F
	Damage in flexures	Check D0 value in check mode	Disassemble and reassemble mechanical section	A

Problem	Location	Check	Solution	Type
Creep error	Change in creep with time	Re-enter creep data	→	D
	Damage in flexures	Check the upper/lower flexure assemblies, tension flexure and fulcrum flexures	Replace parts and reassemble Re-enter creep data	A
Cornerload error	Level	Check that the bubble is in center of the level	Level	F
	Insufficient adjustment	Re-adjust corner load	If adjustment does not work, replace the upper/lower flexure assemblies, tension flexure and fulcrum flexures	A
Linearity error	Change in linearity with time	Re-enter linearity data	→	D
	Damage in flexures	Check the upper/lower flexure assemblies, tension flexure and fulcrum flexures	Replace parts and reassemble	A
Span value error after internal CAL (HM series)	CAL SET error	Perform CAL SET which corrects the value for the internal mass	In addition, test linearity	D
	Repeatability error	Test the balance repeatability	Disassemble and check mechanical section	A
		Test the internal mass repeatability	Check the internal mass assembly	D
	Linearity error	Test linearity	Re-enter linearity data, and then perform CAL SET which corrects the value for the internal mass	D
Hysteresis error	Damage in flexures	Check the upper/lower flexure assemblies, tension flexure and fulcrum flexures	Replace parts and reassemble	A
Error 0	Temperature sensor, temperature A/D circuit	Check the value in check mode TI display	Replace and reassemble temperature A/D board	B
			Replace module AMZ45	
Error 3	Bad connection between CPU and EEPROM	Soldering of CPU (U6)	Re-solder and reassemble	F
	Defective EEPROM	EEPROM (U5)	Replace parts and reassemble	H
Error 4	Defective CPU internal RAM	None	Replace and reassemble CPU	F

Problem	Location	Check	Solution	Type
Error 5	Bad connection between external RAM and CPU	Re-solder CPU (U6) and external RAM (U11)	Solder and reassemble	F
	Defective external RAM	Replace external RAM (U5)	Replace parts and reassemble	F
Error 6	Weighing pan	Check that pan assembly is assembled and installed correctly	Assemble and install correctly	F
	Defective weight A/D	Check coarse performance in check mode D0 display	Replace the force motor	A
			Replace module AMZ45	B
	Internal mass	Check that the internal mass is in place	Check the internal mass	D
	Damage in flexures	Check the upper/lower flexure assemblies, tension flexure and fulcrum flexures	Replace parts and reassemble	A
Error 7	Defective motor	Check motor performance	Replace motor	F
	Model selection	Check the model in check mode	Set to the correct model	I
	Relative position of slit and photointerrupter	Check that slit and photointerrupter are in place	Install correctly	F
	Internal mass position	Check that internal mass is in place	Install correctly	D
Error 8	EEPROM compatibility error due to the CPU replacement	Press the RE-ZERO key to change the EEPROM content	→	D
Error 9	Bad connection between CPU and external RAM	Check CPU (U6) and external RAM (U11)	Solder and reassemble	F
	Main board is not initialized	With the RE-ZERO and MODE keys held down, press the PRINT key. This completes initialization. No more initialization is required	→	C



3.2 Maintenance Flowchart



Main board PZ:2883A/B/C



4. Force Motor Section Disassembly and Reassembly

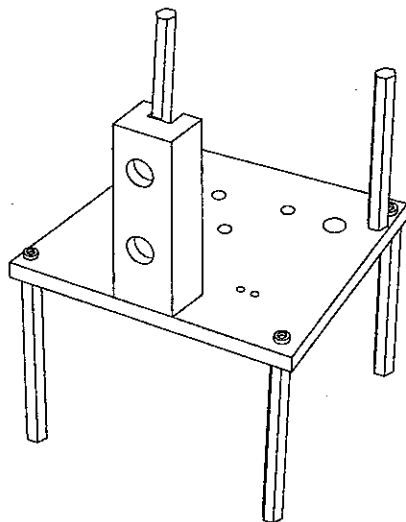
This chapter describes flexures replacement, bobbin cleaning, force motor section alignment, and cautions concerning that procedure.

Note : During disassembly and reassembly, the work site should be dust free.

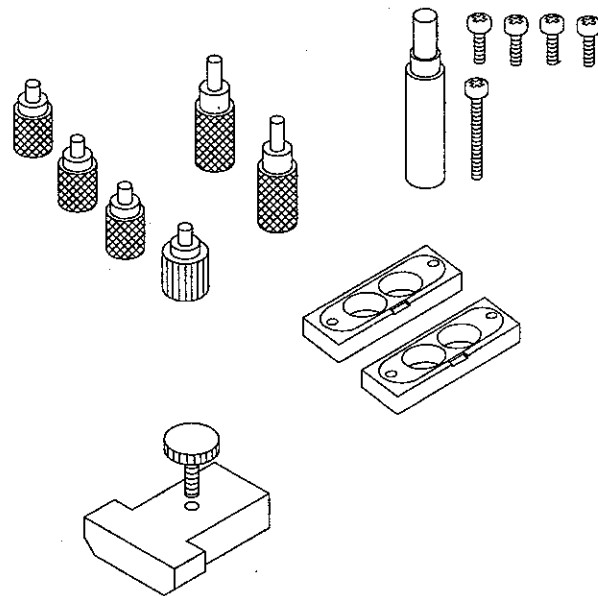
After disassembly and reassembly are completed, adjustment of linearity, hysteresis, creep, center of gravity, stopper, and corner load are required.

(Large amounts of drift may occur depending on the tightening torque and mechanical stress when reassembly is complete. Temperature compensation is required in this case.)

(Mechanical alignment fixture)



(Main fixture)



Holding bolt A	3 pieces
Long holding bolts B	2 pieces
Large holding bolts C	1 piece
M4 × 12 screw	4 pieces
Side fixture	2 piece
Bobbin pole	1 piece
M4 × 30 screw	1 piece
Pan axis block	
Main fixture	
Shock absorber height alignment fixture	

Tool list:

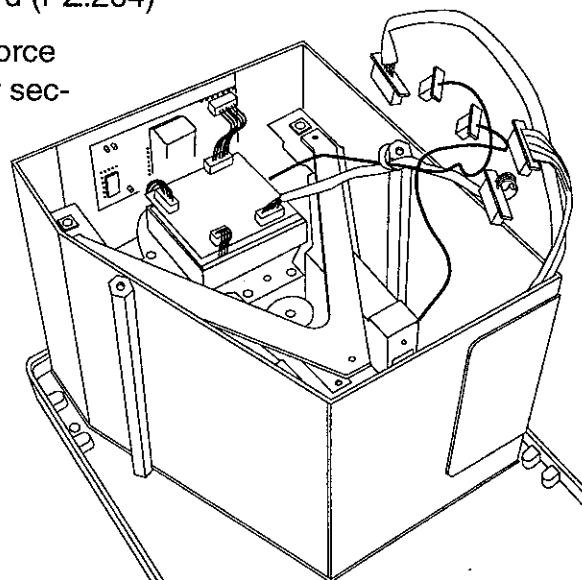
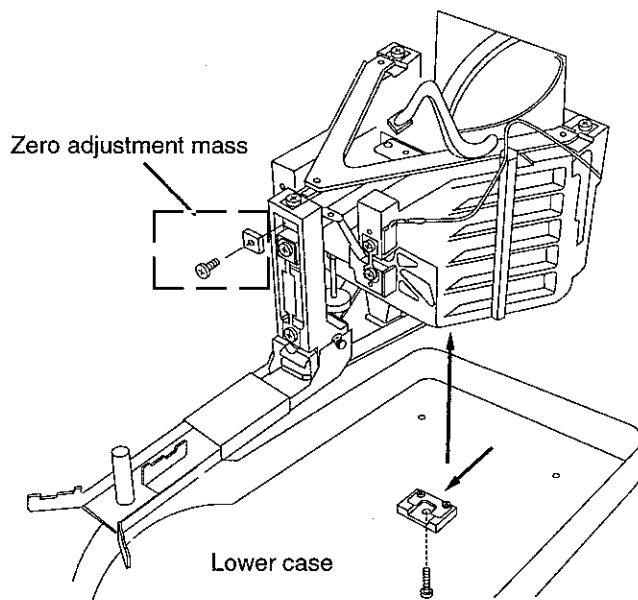
M3 screwdriver
5.5-mm socket wrench
7-mm wrench
Machinists ruler
Precision square
Soldering iron
1.5-mm Allen wrench
Mechanical alignment fixture 7PA:HA-JIG



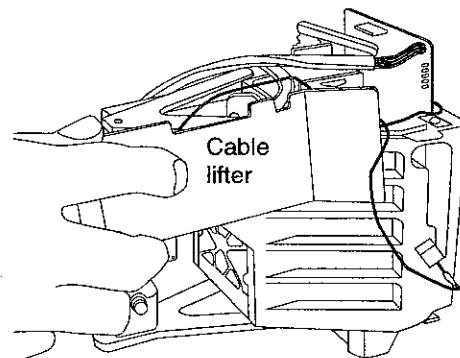
4.1 Disassembly

Step 1. Discount the cables from the main board (PZ:264)

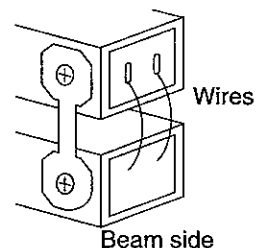
Step 2. Remove the three screws holding the force motor section. Remove the force motor section from the lower case.



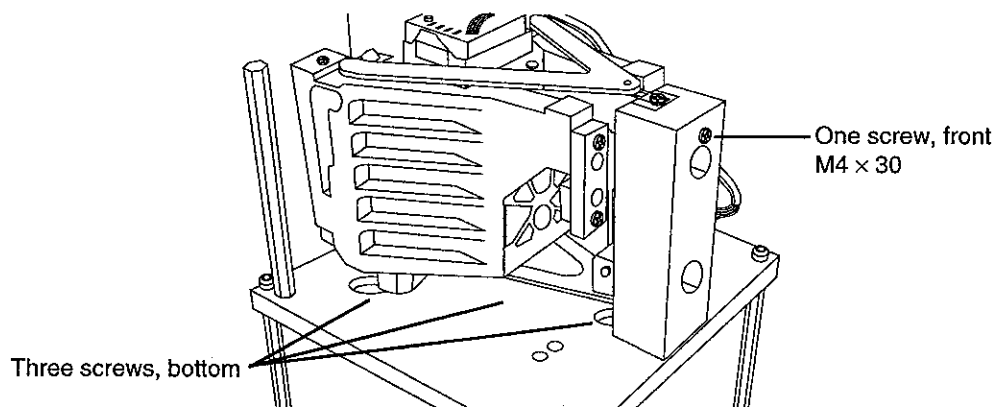
Step 3. Disconnect the cable lifter from the force motor section.



Step 4. Disconnect wires from the beam side using a soldering iron.
Remove the shock absorber.
Remove the zero adjustment mass.



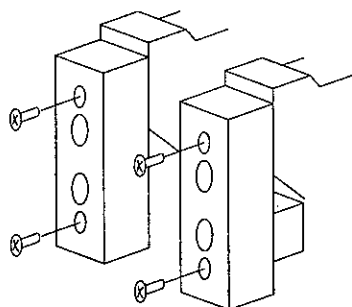
Step 5. Install the force motor section on the main fixture.



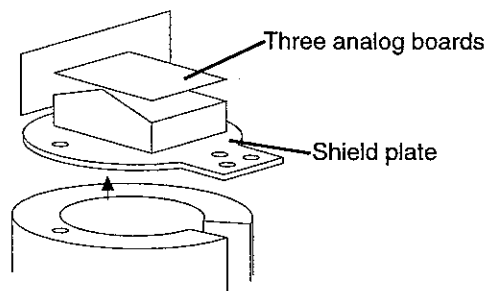
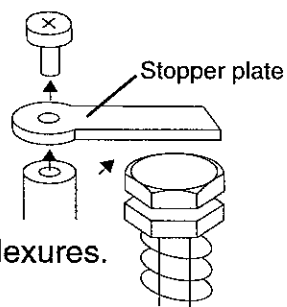
Step 6. Remove the stopper plate.

Step 7. Remove the three analog boards with shield plate.

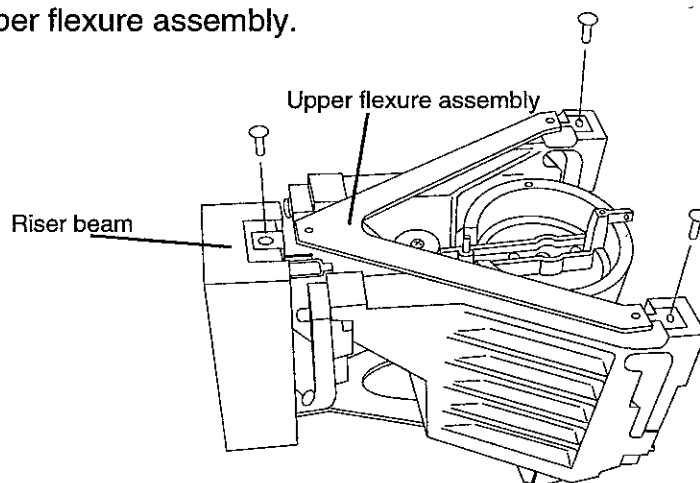
Step 8. Attach the side fixtures on the fulcrum flexures.



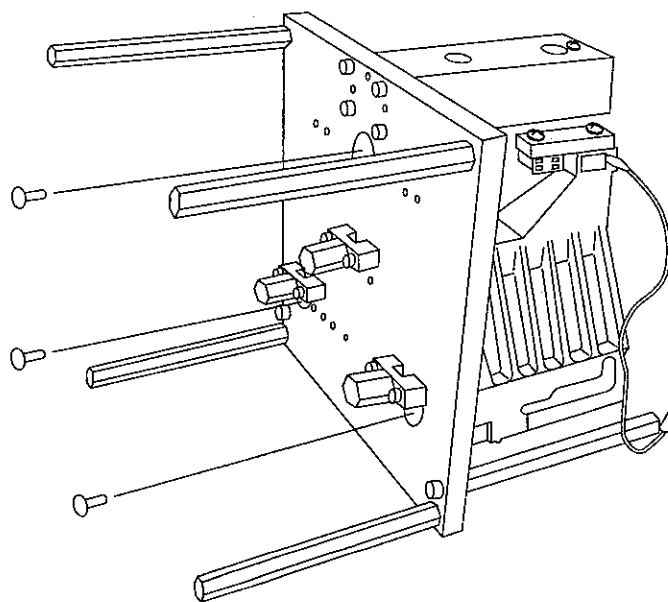
Side fixtures



Step 9. Remove the screws, first from the riser beam, then from the sides to remove the upper flexure assembly.



Step 10. Lay the force motor section on its back. Remove the screws, first from the riser beam, then from the sides to remove the lower flexure assembly.

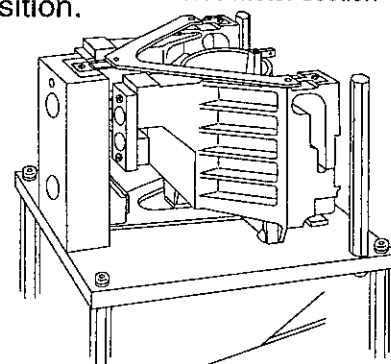
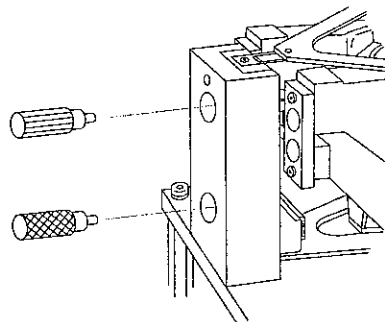


Step 11. Set the force motor section in the upright position.

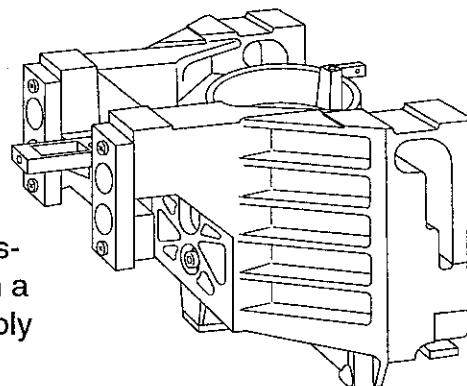
Force motor section

Step 12. Remove the screws securing the force motor section to the alignment fixture to remove the tension flexure.

Step 13. Remove the screws from the fulcrum flexures.



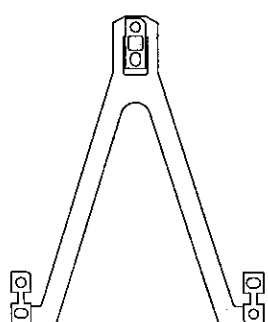
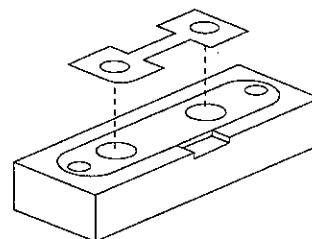
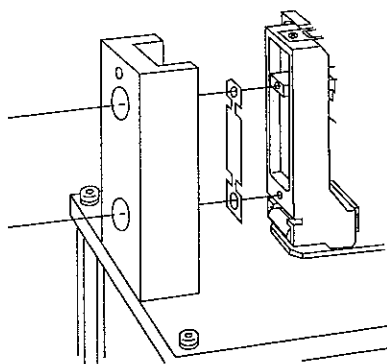
Step 14. Remove the force motor section from the fixture.
Remove the side fixtures from the force motor section.
Remove the riser beam from the fixture.



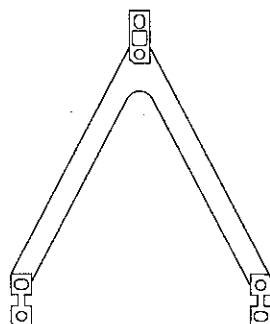
Step 15. Check that the upper and lower flexure assemblies have no distortion by placing on a precise flat surface. If the flexure assembly is distorted, replace it.

Step 16. Remove the beam with the coil attached.

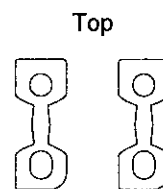
Caution: Do not disassemble the force motor magnet assembly.



Lower flexure assembly



Upper flexure assembly



Fulcrum Flexures



Tension Flexure



4.2 Cleaning the Magnet Assembly and Bobbin

The parts in the force motor section which require cleaning are the bobbin and magnet assembly. Proceed as follows.

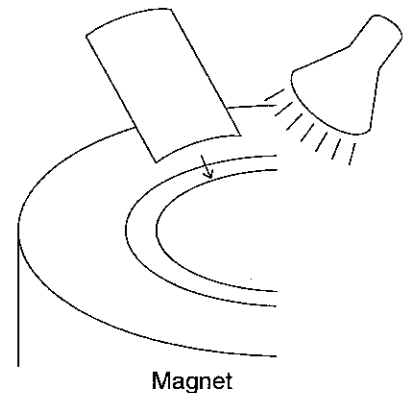
Step 1. Prepare 5-cm adhesive tape.

Note : Metal particles may exist around the magnet. Never use compressed air, and do not smoke at the work site.

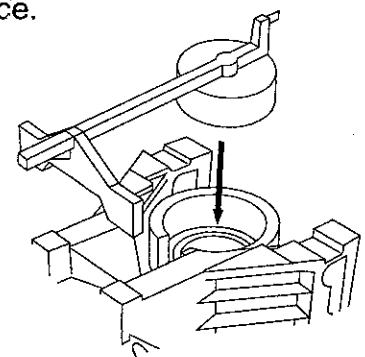
Step 2. Use a bright light to check the magnet assembly. Remove dust and metal particles using the adhesive tape.

Step 3. Using the adhesive tape, clean the wire that is wound on the bobbin.

Step 4. Check that no dust is on the magnet using a bright light.



Step 5. Carefully insert the bobbin into the magnet assembly. Use caution to prevent scratches on the bobbin surface.



Step 6. Assemble the force motor section.

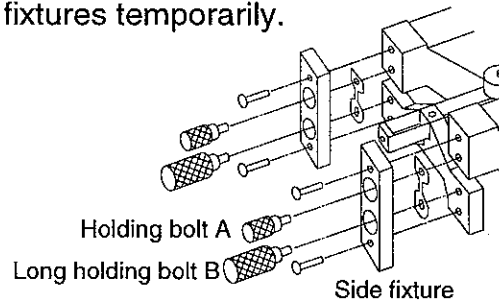


4.3 Reassembly

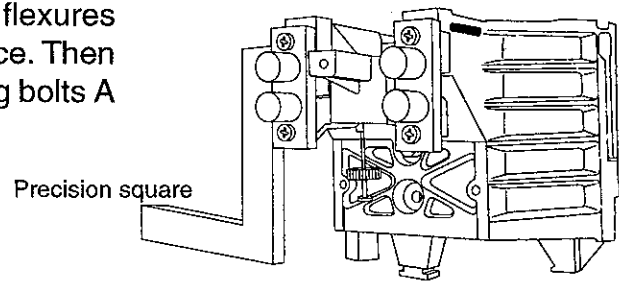
After magnet cleaning has been completed, assemble force the motor section as follows.

- Step 1. Install the fulcrum flexures on the side fixtures temporarily.

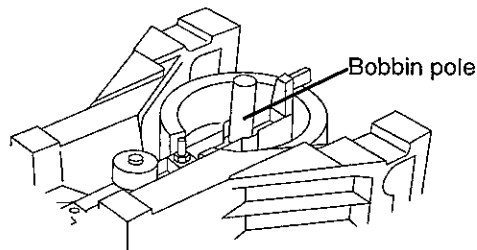
Caution: Check the direction to install the fulcrum flexures.



- Step 2. Check the alignment of the fulcrum flexures using a square on a precise flat surface. Then carefully secure each with the holding bolts A and B.

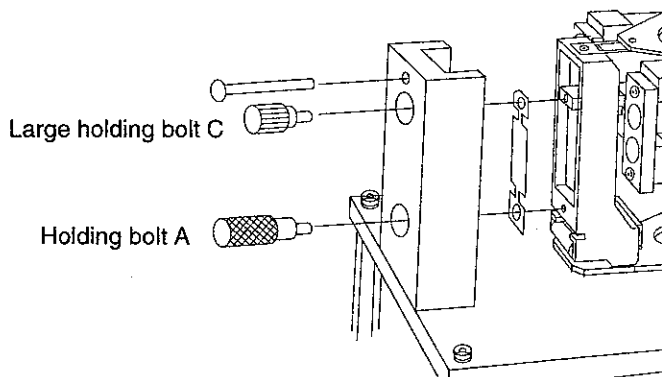


- Step 3. Install the bobbin pole, then fasten the bobbin temporarily.

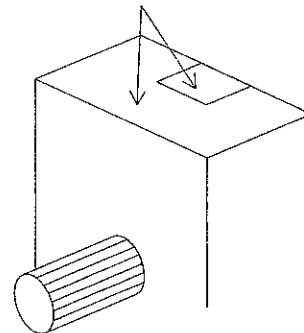


- Step 4. Insert the tension flexure onto the main fixture, then fasten it temporarily.

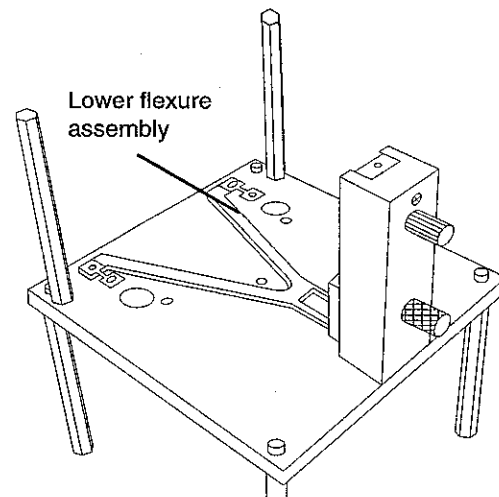
Caution: Check the direction to install the tension flexure.



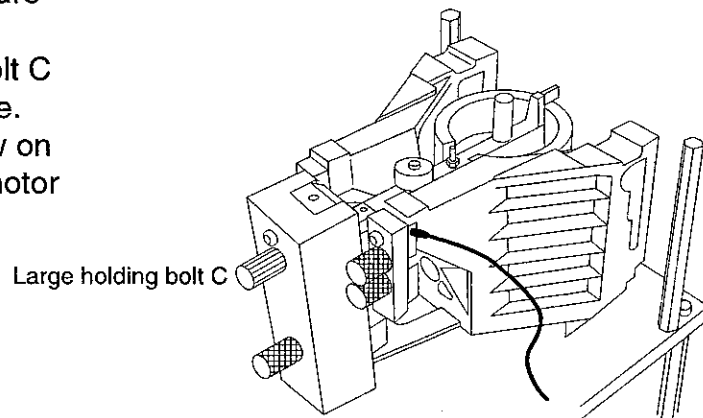
Temporary flush mounting



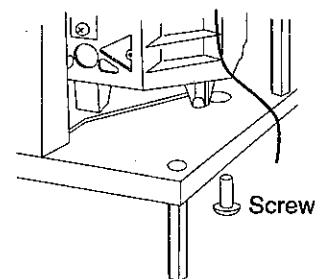
- Step 5. Place the lower flexure assembly on the main fixture.



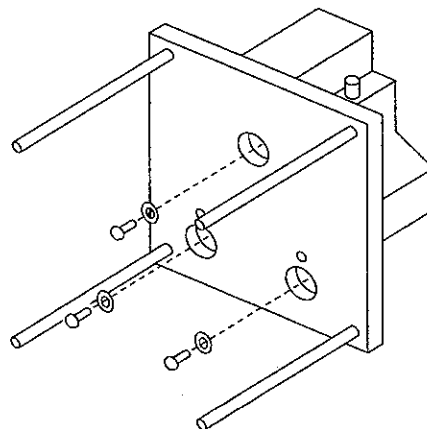
- Step 6. Place the force motor section carefully on the lower flexure assembly. Insert the large holding bolt C through the tension flexure. While tightening the screw on the beam, pull the force motor section to the beam.



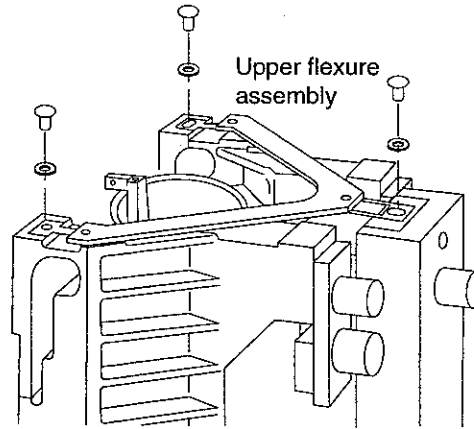
- Step 7. Secure the force motor section to the main fixture from the bottom with three screws.



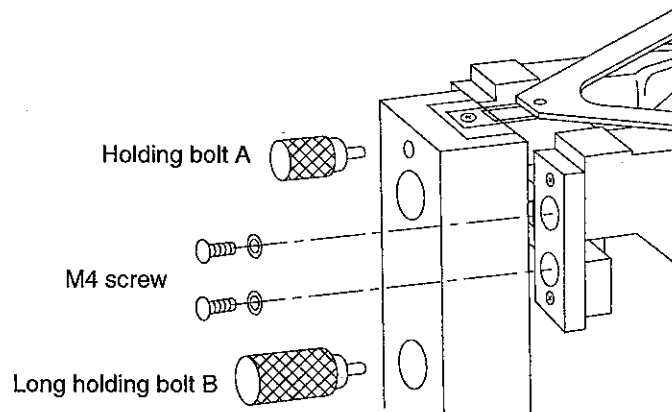
- Step 8. Place the force motor section on its back. Attach the lower flexure assembly.



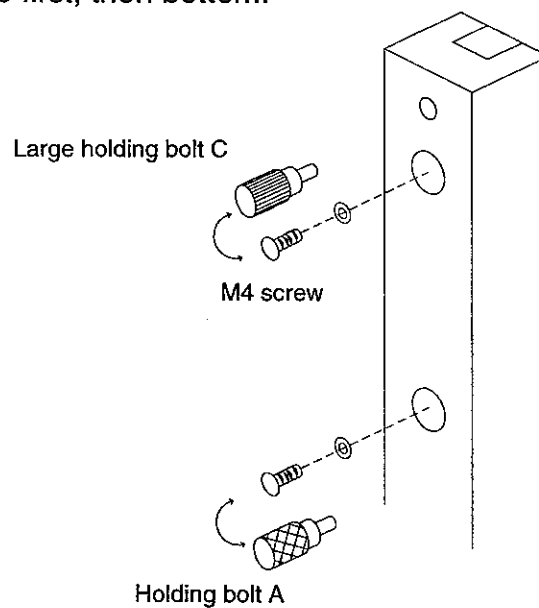
- Step 9. Set the force motor section in the upright position. Secure the upper flexure assembly with three screws.



- Step 10. Replace the holding bolts A and B securing the fulcrum flexures with M4 screws (4-mm Phillips screws), top first, then bottom. The holding bolts A and B should be removed carefully when installing the screws.

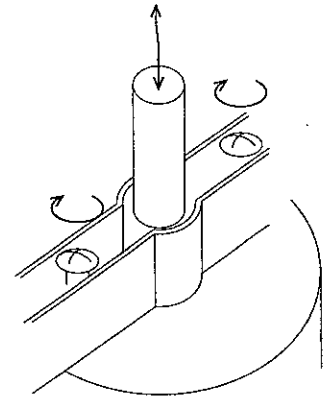


- Step 11. Replace holding bolts C and A securing the tension flexure with M4 screws, top first, then bottom.

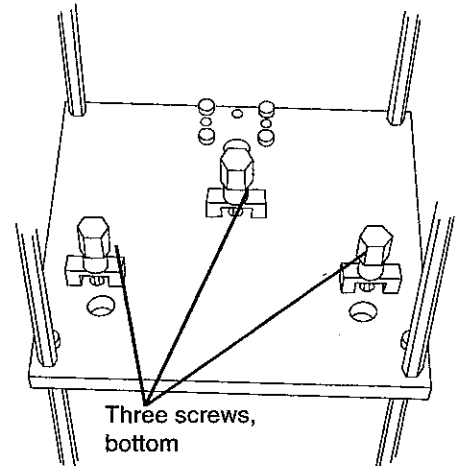


Step 12. Align the center of bobbin using the bobbin pole.

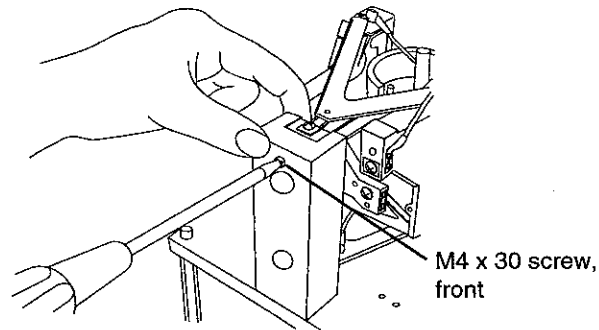
Note : Check that the bobbin pole moves smoothly.



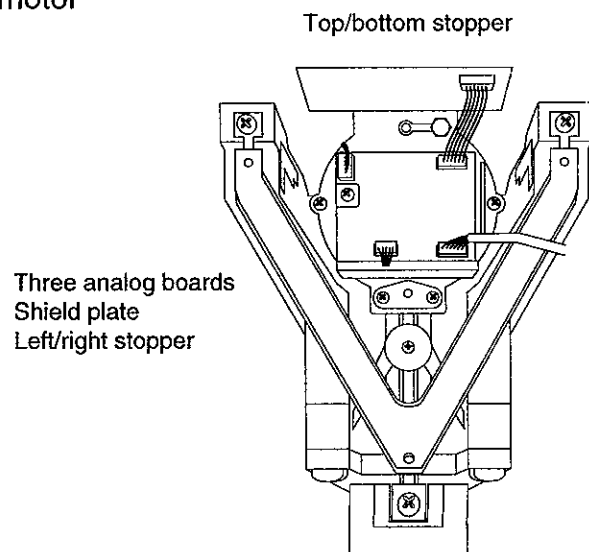
Step 13. Remove the screws securing the force motor section to the main fixture. (Three screws on the bottom.)



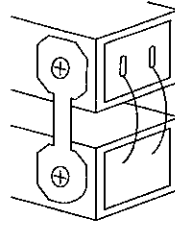
Step 14. Lightly hold the riser beam, and remove the screws.



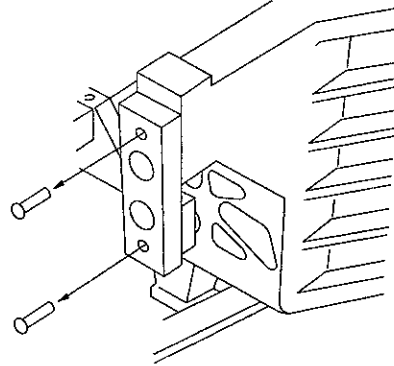
Step 15. Install the three analog boards and shield plate. Remove the force motor section from the main fixture.



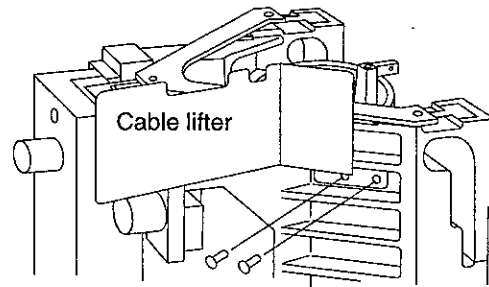
Step 16. Re-solder the wires on the beam side.



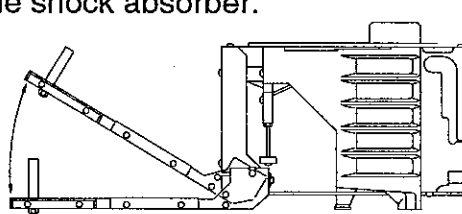
Step 17. Remove the screws securing the fulcrum flexures, bottom first, then top.



Step 18. Install the cable lifter to the force motor section. Fasten the left/right stoppers and top/bottom stoppers temporarily.

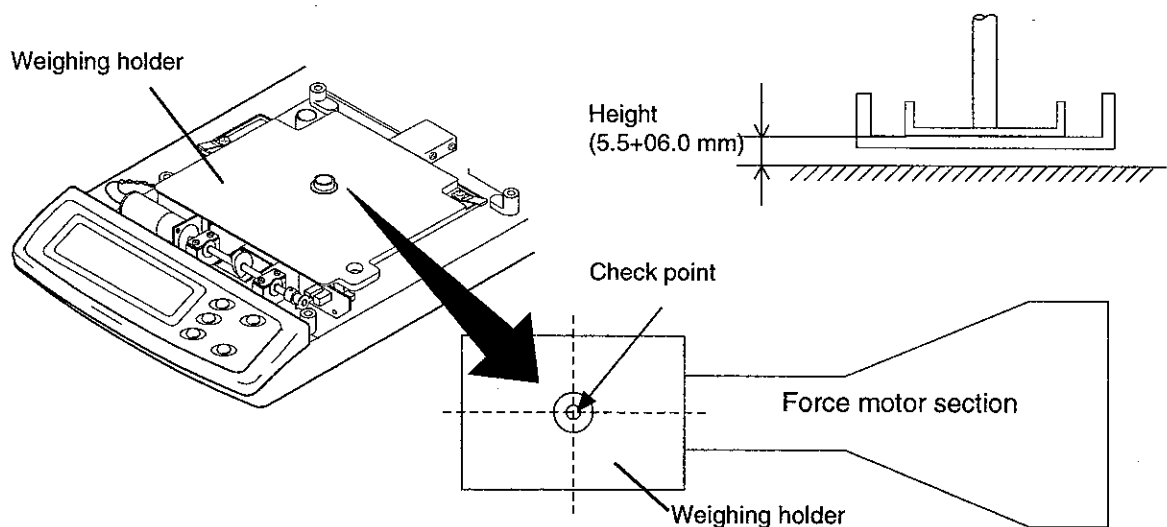


Step 19. Mount the shock absorber.



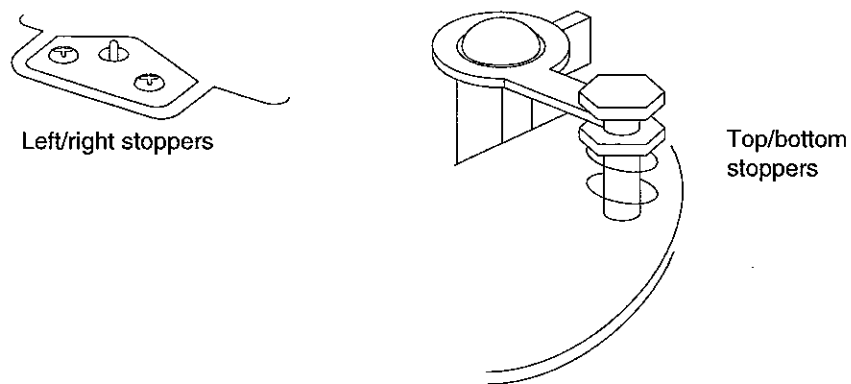
Step 20. Attach the force motor section using the pan axis block.

Step 21. Adjust the shock absorber height using the shock absorber fixture and attach the force motor section. (Height: 5.5 to 6.0 mm)

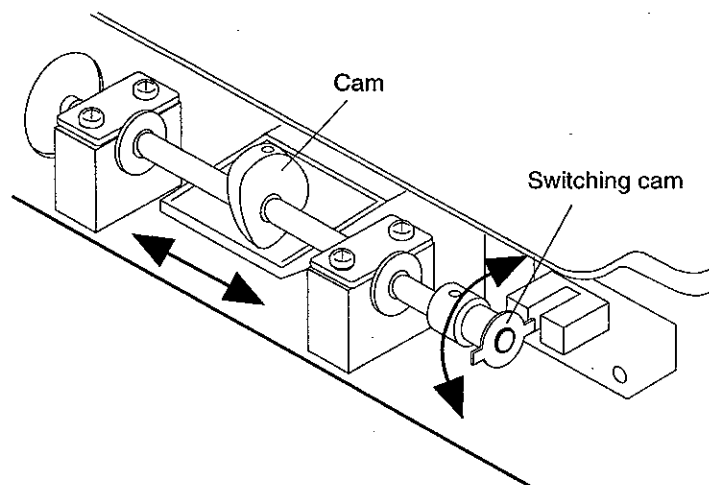


Step 22. Attach the weighing holder in such a way that the weighing pan receptor is placed in the center.

- Step 23. Connect the main board. Turn the power on.
Align the left/right stoppers, and top/bottom stoppers .

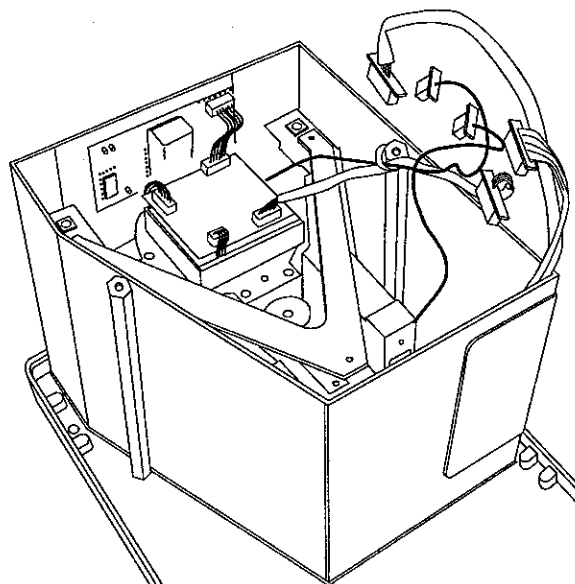


- Step 24. Adjust the switching cam so that the mass stops on top or bottom when the ON/OFF key or CAL key is pressed.



Note: Adjust the cam to the left or right so that there is no play when the mass stops on top.

- Step 25. Install the cables with the clamps. Mount the inner case.

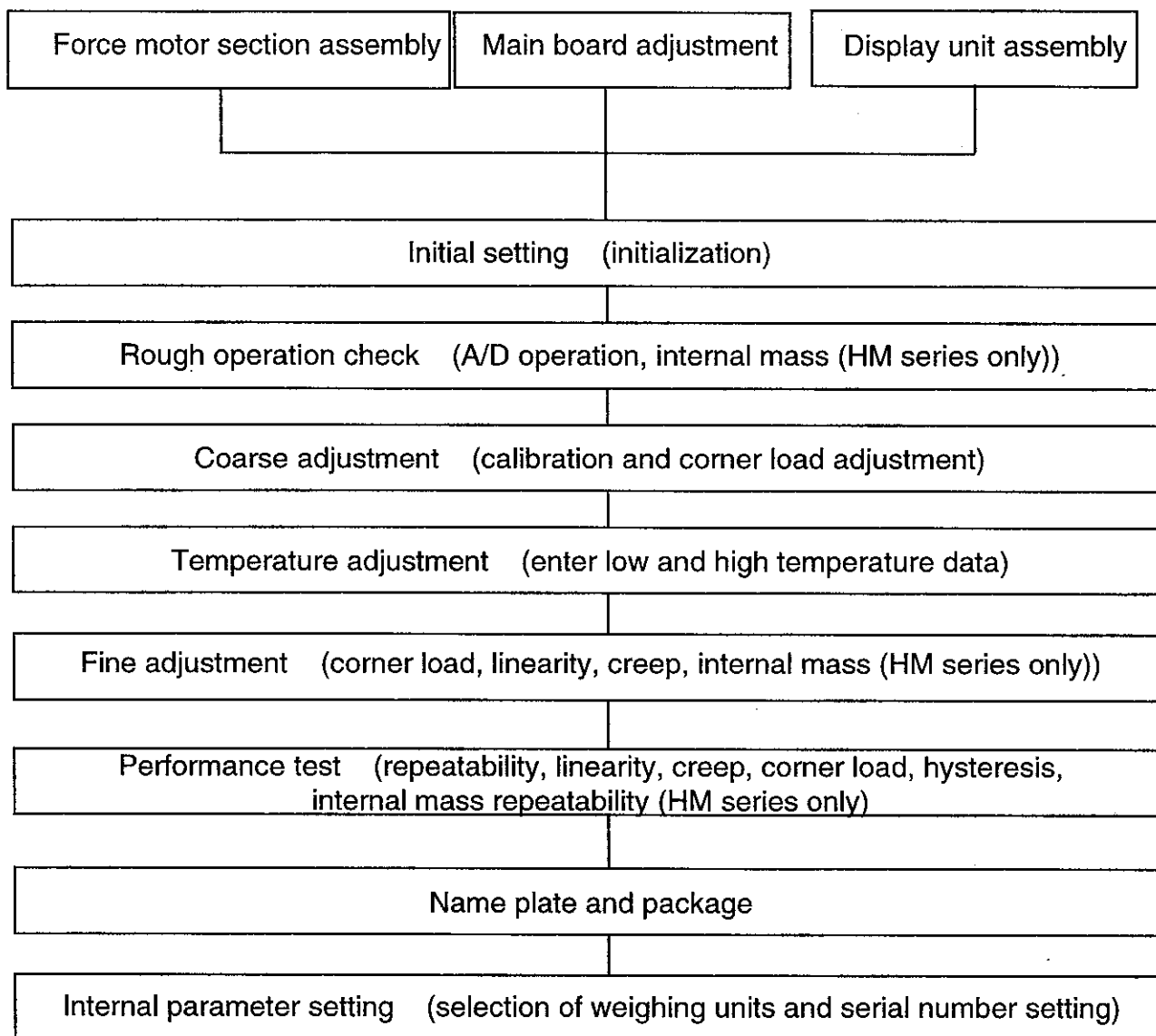




5. Adjustments



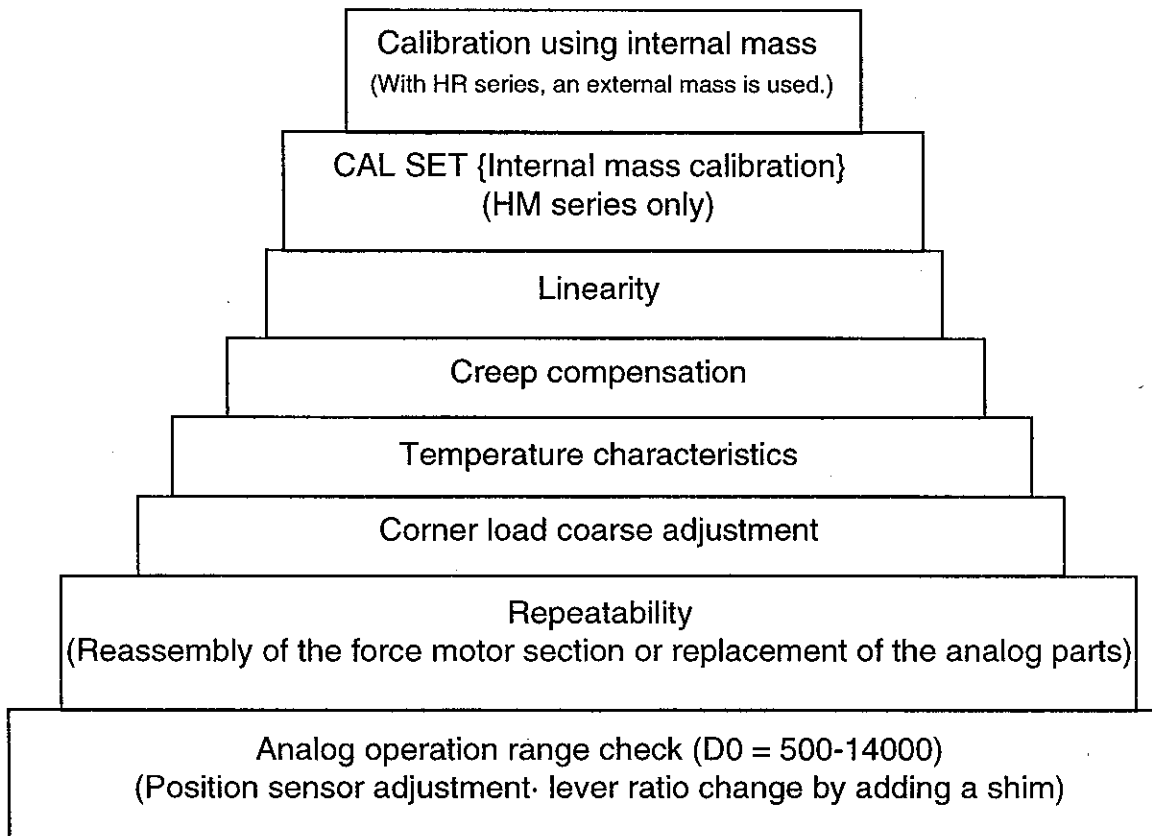
5.1 Adjustment Flow Chart





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 Coarse Operation Check of Boards

PZ:2883A/B/C (Main board, reference board and position sensor board)

Model	PZ number	R606	R409
HR-202/HR-300	PZ:2883A	RL:70R0F	390 K Ω
HM-202/HM-300	PZ:2883B	RL:70R0F	390 K Ω
HM-200/HM-120	PZ:2883C	RL:140R00F	560 K Ω

Main board

Equipment required

- AC adapter (supplied with the balance)
- Voltmeter (with 0.1V reading)

Checking the voltage

1. Connect the AC adapter.
2. Take voltage readings.

VCC2-GND	4.5 V to 5.5 V
VEE1-GND	-9.5 V to -10.5 V
VM-GND	9.0 V to 11.0 V

PZ:2888 (Position sensor board) Common for all models

Equipment required

- AC adapter (supplied with the balance)
- Voltmeter (with 0.01V reading)

Checking the voltage

1. Take a voltage reading across R404 (680 Ω).
0.40 V to 1.70 V

PZ:2884 (Display board) Common for all models

Checking the operation

1. Connect the display board to the balance.
2. Turn the power on.
3. When the balance starts up normally, "<" or "P-FAIL" is displayed.
4. While holding down the RE-ZERO key, press the ON/OFF key. All of the display segments will turn on.



5.4 Check Mode

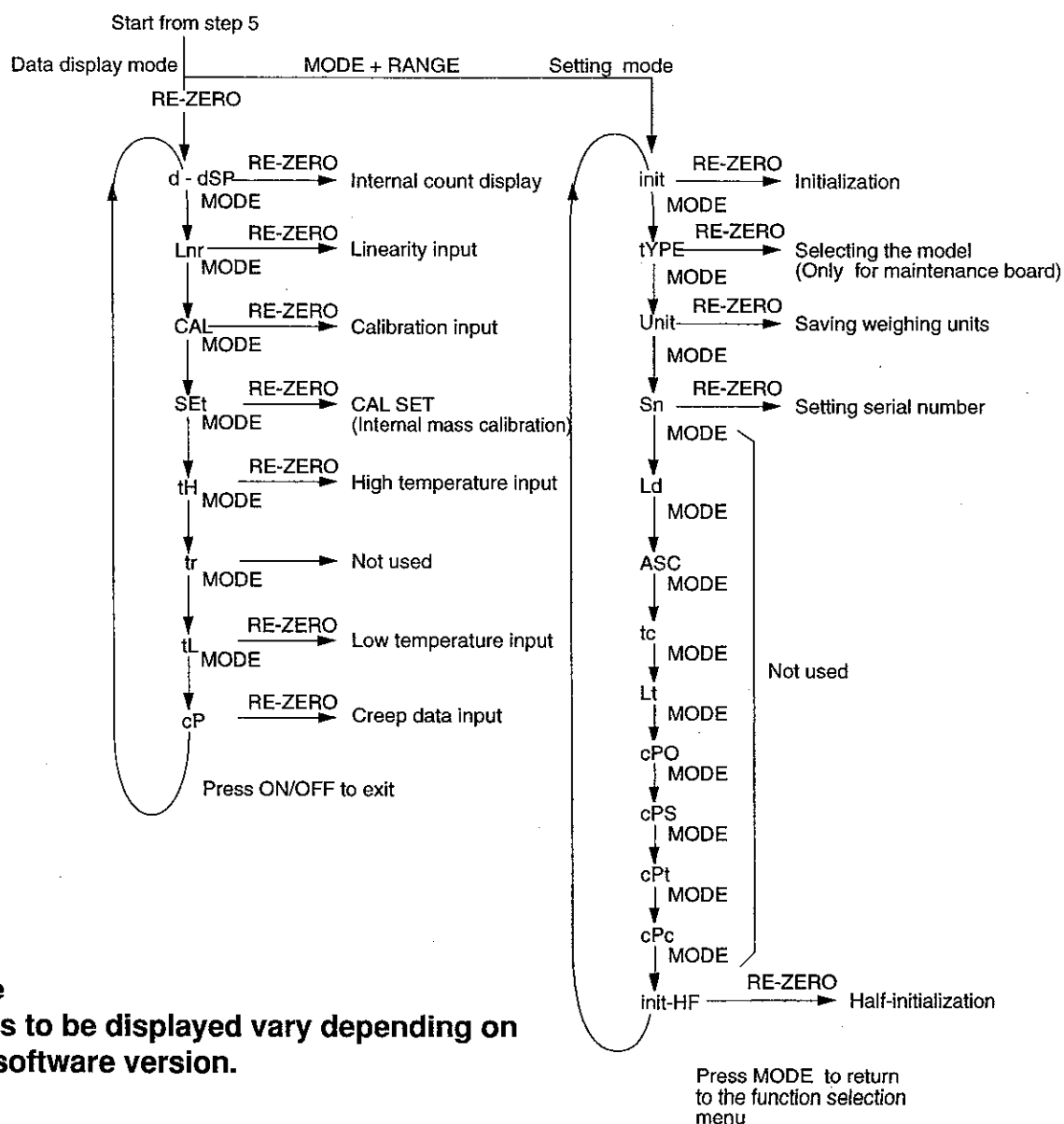
Check mode consists of two modes: Data display mode and setting mode. The data display mode has a function to adjust items such as linearity by entering weight data.

The setting mode initializes, selects weighing units, and sets parameters.

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.
- Step 3. The ROM version will be displayed for about 1 second [P - XXXX].
- Step 4. The balance model will be displayed [Hr - XXX].
- Step 5. All of the display segments will turn on.

2. Check mode menu

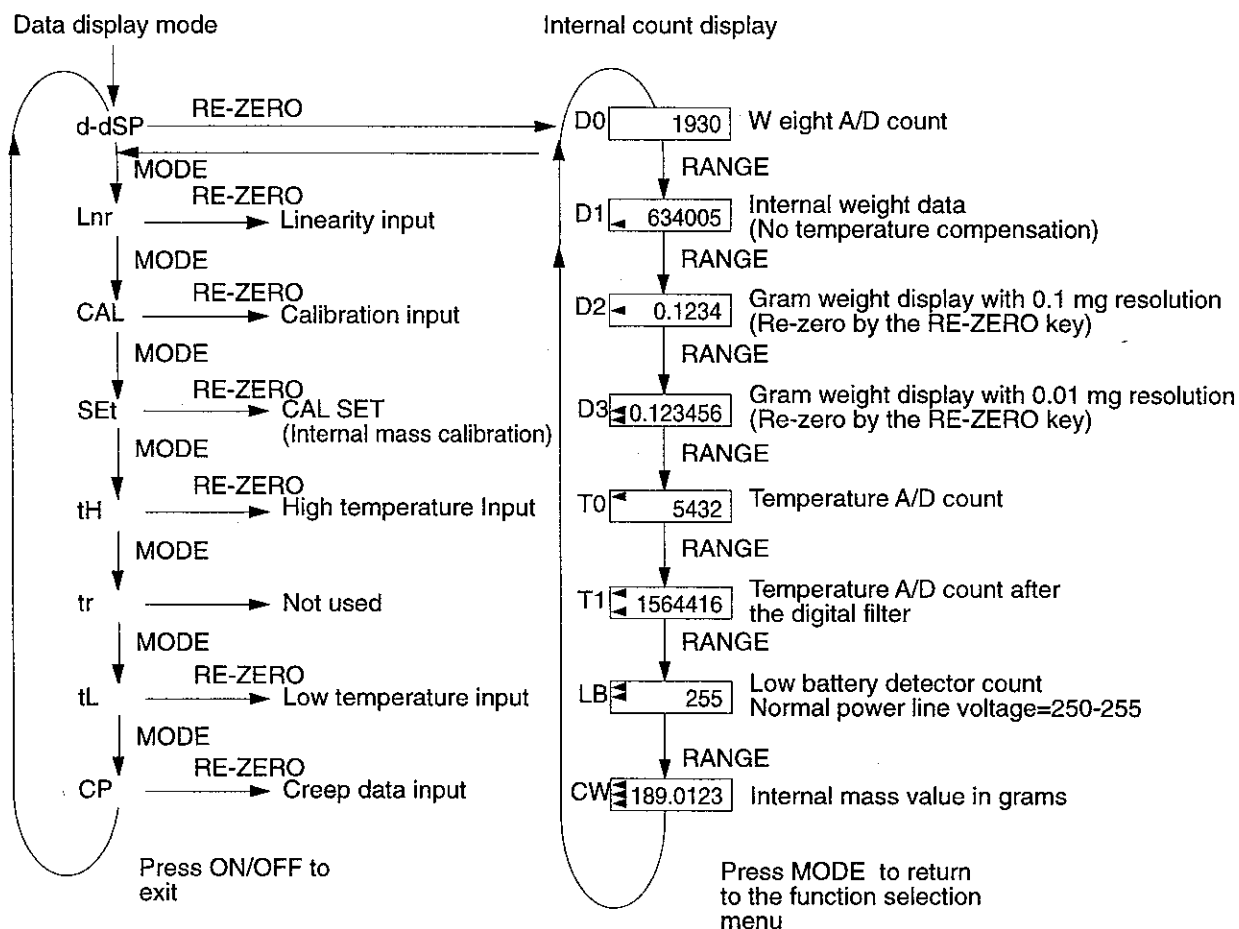




5.5 Check Mode Menus

Internal count display

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





5.6 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 must be re-adjusted.

- Temperature data (reset to the default value), serial number, weighing units
- Linearity data (cleared)
- Internal mass value (set to the default value) (HM series only)
- 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 27 to display setting mode [init].
- Step 2. Press the RE-ZERO key. [init Go] will be displayed.
- Step 3. Press the PRINT key. [init End] will be displayed. Then it will move to the next display.
- Step 4. Follow the same procedure to change the other items. To quit initialization, press the ON/OFF key. The display will be turned OFF.



5.7 Model Selection

Model selection is available for 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 27 to display setting mode [init].
- Step 2. Press the MODE key. [tYPE] will be displayed.
- Step 3. Press the RE-ZERO key. [Hr-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
- If the MODE key is pressed before saving the change, the change will be canceled and the next item will be displayed.
- When the model after change is the same as that before change, the stable indicator illuminates.
- Step 4. Press the PRINT key. [tYPE End] appears. Then, the next item appears.



5.8 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 27 to display data display mode [d-dSP].
- Step 2. Press the RE-ZERO key to display [XXXX]. (weight A/D count display)
- Step 3. Check that the pan assembly is installed properly. Verify that the count is within the range shown in the table below.
- Step 4. Press the RANGE key five times to display [XXXX]. (temperature A/D count display)
- Step 5. Verify that the count at room temperature (15-25°C) is within the range shown in the table below.

Model	D0 (weight A/D)		T1 (temperature A/D)
	zero	span	
HR-202	1400-2000	6300-7700	1200000-1800000 dispersion within MAX-MIN 20 cnt/5 sec
HR-300	900-1500	6300-7700	1200000-1800000 dispersion within MAX-MIN 20 cnt/5 sec
HM-202	1400-2000	6300-7700	1200000-1800000 dispersion within MAX-MIN 20 cnt/5 sec
HM-300	900-1500	6300-7700	1200000-1800000 dispersion within MAX-MIN 20 cnt/5 sec
HM-200	1300-1900	9500-11600	1200000-1800000 dispersion within MAX-MIN 20 cnt/5 sec
HM-120	1300-1900	9500-11600	1200000-1800000 dispersion within MAX-MIN 20 cnt/5 sec

Zero point=value when nothing is on the pan

Span=(D0 value when a 200-g mass is placed on the pan) - (zero point)

2. Motor operation check (HM series only)

- Step 1. In the D0 display (weight A/D count display), press the MODE key twice. [X.XXXX] will be displayed.
- Step 2. Each time the PRINT key is pressed, the motor rotates. 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 five times.

Model	Repeatability specifications
HM-202	MAX-MIN 3 cnt
HM-300	MAX-MIN 3 cnt
HM-200	MAX-MIN 3 cnt
HM-120	MAX-MIN 3 cnt



5.9 Coarse Adjustment

1. Calibration

For HM series, external mass CAL and internal mass CAL are available for selection.

External mass CAL

With nothing placed on the pan, warm up the balance for at least one hour.
Follow the procedure below to calibrate.

- Step 1. See the check mode menu flowchart on page 27 to display data display mode [d-dSP].
- Step 2. Press the MODE key twice. [CAL] is displayed.
- Step 3. ·HR series
Press the RE-ZERO key. [CAL 0] is displayed.
·HM series
Press the RE-ZERO key. [<CAL] is displayed (Resetting the mass position). Then, [CAL in] appears. Within three seconds, press the PRINT key. [CAL 0] appears.
- Step 4. When [CAL 0] is displayed, press the RE-ZERO key. [<CAL 0], then [CAL200] appears.
To change the calibration mass value, press the MODE key when [CAL 0] is displayed. Use the following keys to enter the value.
- MODE key: changes the blinking digit position
 - RE-ZERO key: changes the value of a blinking digit (when digits of the integer part are changed, the decimal values will be reset to zero).
 - PRINT key: saves the change.

The following can be used for external mass calibration.

Model	Mass
HR-300/HM-300	200 g/300 g
HR-202/HM-202/HM-200	200 g/100 g
HM-120	100 g/ 50 g

- Step 9. When [CAL 200] is displayed:
- To perform zero calibration only, press the RE-ZERO key. [CAL End] is displayed to indicate that calibration is complete. Then, the next item is displayed.
 - To perform span calibration, place the calibration mass and press the RE-ZERO key. [<CAL 200], then [CAL End] appears. The calibration is complete. Remove the calibration mass. Then, the next item is displayed.

If [Error 1] appears in step 8 or 9, press the RE-ZERO key to return to [CAL] display and start from step 3 again.

Internal mass CAL (HM series only)

With nothing placed on the pan, warm up the balance for at least one hour.
Follow the procedure below to calibrate.

- Step 1. See the check mode menu flowchart on page 27 to display data display mode [d-dSP].
- Step 2. Press the MODE key twice. [CAL] is displayed.
- Step 3. Press the RE-ZERO key. [<CAL] is displayed (Resetting the mass position). Then the following appear in order, [CAL in], (three seconds), [CAL .], [<CAL.], [CAL.], [<CAL.]. Finally, [CAL End] appears to indicate that calibration is complete. Then, the next item is displayed.

If [Error 1] appears, press the RE-ZERO key to return to [CAL] display and start from step 3 again.

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 27 to display data display mode [d-dSP].
- Step 2. Press the RE-ZERO key to display [XXXX]. (weight A/D count display)
- Step 3. In the D0 display (weight A/D count display), press the RANGE key twice to display [X.XXX] (the D2 display-weight value).
- 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. Verify that the difference between the values in the center and each position is within the specifications.

Model	Mass used	Specifications (D2 display)
HR-202	100 g	±5
HR-300	100 g	±5
HM-202	100 g	±5
HM-300	100 g	±5
HM-200	100 g	±5
HM-120	100 g	±5

3. Counter weight check for tilting

The counter weight is adjusted in the check mode D2 display.

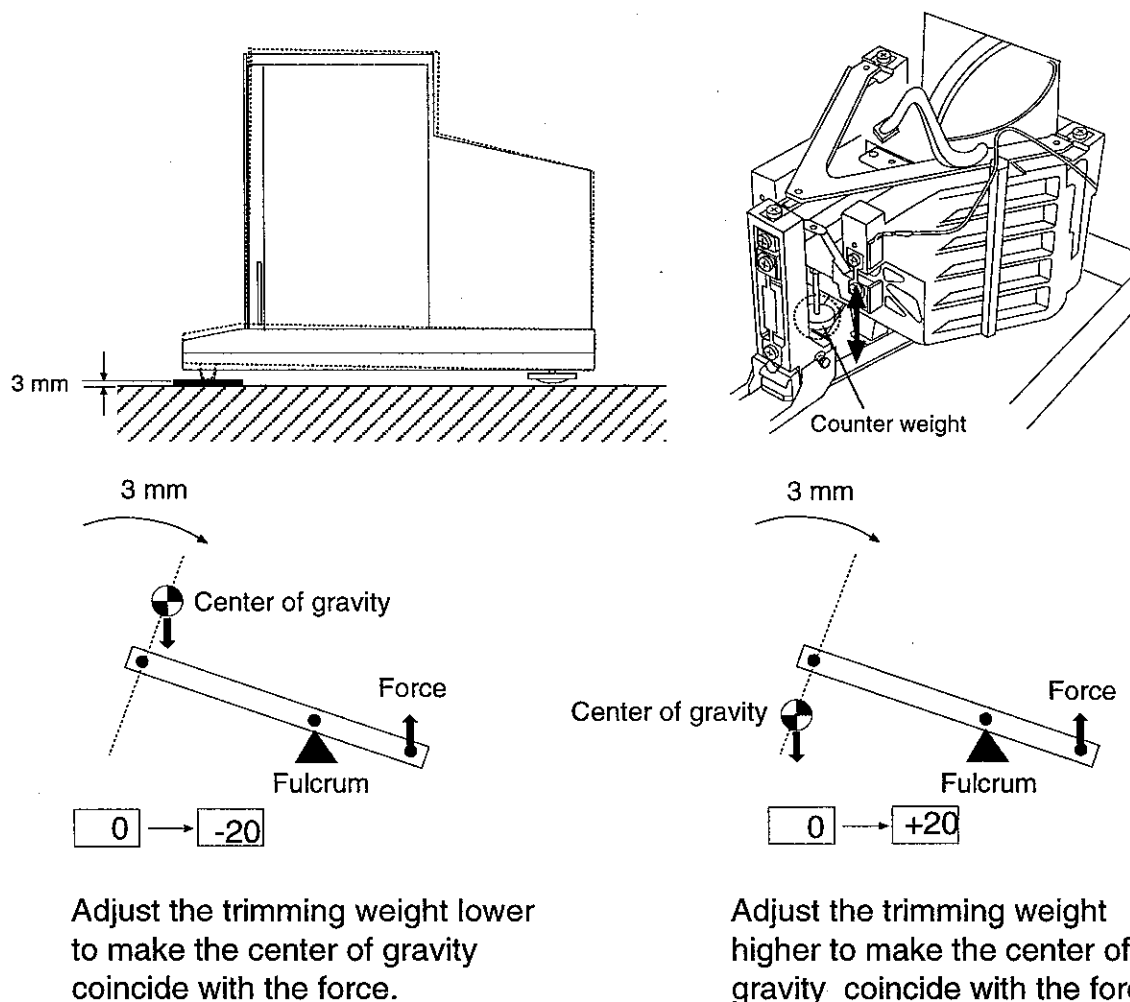
Perform step 1-7 above to be in the D2 display.

Follow the procedure below to adjust the counter weight.

Step 1. Press the RE-ZERO key to display zero.

Step 2. 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 on the beam assembly in the direction shown below.



Step 4. Repeat steps 1-2 until the change is within the specifications shown below.

Model	Specifications (D2 display)
HR-202	±5
HR-300	±5
HM-202	±5
HM-300	±5
HM-200	±5
HM-120	±5



5.10 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 27 to display data display mode [d-dSP].
- Step 2. Press the MODE key 4 times. [tH] appears. Press the MODE key two more times. Then [tL] appears. Enter high temperature data in the tH display, low temperature data in the tL display.
- Step 3. Press the RE-ZERO key. The motor starts and adjusts the mass position. (Not available for HR series since they do not have an internal mass.) After adjustment [tH 0] / [tL 0] is displayed.
- Step 4. With nothing placed on the weighing pan, press the RE-ZERO key.
- Step 5. After stabilization, [tH F] / [tL F] is displayed.
- Step 6. Place a 200g mass on the pan and press the RE-ZERO key. The mass indicator illuminates.
(HM series: Press the PRINT key to apply load 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.
- 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. (For HM series, an internal mass can be used. Press the PRINT key to lower the 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)	
		External mass	Internal mass
HR-202	$\pm 50d$ ($d=0.1$ mg)	$\pm 35d$ ($d=0.1$ mg)	—
HR-300	$\pm 50d$ ($d=0.1$ mg)	$\pm 35d$ ($d=0.1$ mg)	—
HM-202	$\pm 50d$ ($d=0.1$ mg)	$\pm 35d$ ($d=0.1$ mg)	$\pm 35d$ ($d=0.1$ mg)
HM-300	$\pm 50d$ ($d=0.1$ mg)	$\pm 35d$ ($d=0.1$ mg)	$\pm 35d$ ($d=0.1$ mg)
HM-200	$\pm 50d$ ($d=0.1$ mg)	$\pm 35d$ ($d=0.1$ mg)	$\pm 35d$ ($d=0.1$ mg)
HM-120	$\pm 50d$ ($d=0.1$ mg)	$\pm 35d$ ($d=0.1$ mg)	$\pm 35d$ ($d=0.1$ mg)



5.11 Fine Adjustment

1. Entering creep data

HM-200/120 (using an internal mass)

Follow the procedure below to enter creep data.

- Step 1. See the check mode menu flowchart on page 27 to display data display mode [d-dSP].
- Step 2. Press the MODE key seven times. [cP] is displayed.
- Step 3. Press the RE-ZERO key. [<cP] is displayed. (Resetting the mass position)
- Step 4. The display changes in turn as follows:
[cP .] → [<cP .] → [cP .] → [<cP .] → [cP....] → [<cP .] →
[<cP .] → [<cP .] → [cP End]
- Step 5. The operation is complete. Proceed to the next step.

Note: If [Error 1] or [Error 2] is displayed, press the RE-ZERO key to return to [cP] display and start from step 3.

HM-202/300, HR-202/300 (using an external mass)

Follow the procedure below to enter creep data.

- Step 1. See the check mode menu flowchart on page 27 to display data display mode [d-dSP].
- Step 2. Press the MODE key seven times. [cP] is displayed.
- Step 3. Press the RE-ZERO key. [<cP] is displayed. (Resetting the mass position)
- Step 4. [cP 0] appears. (Apply a preliminary load using a 300g mass.)
Verify that nothing is placed on the pan, and press the RE-ZERO key.
- Step 5. [<cP 0], then [cP 300] is displayed.
- Step 6. Place a 300g mass on the pan and press the RE-ZERO key. The display changes in turn as follows: [<cP 300] → [cP....] → [<cP 300]
- Step 7. When zero starts blinking in [cP 0], remove the mass. Zero stops blinking and illuminates.
- Step 8. Press the RE-ZERO key. [<cP 0], then [cP End] is displayed. The operation is complete. Proceed to the next step.

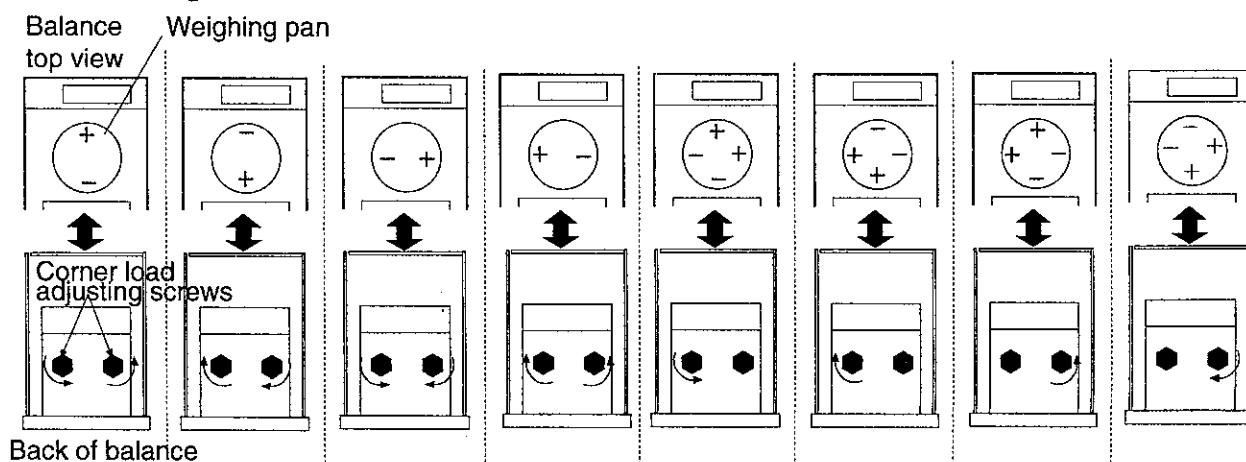
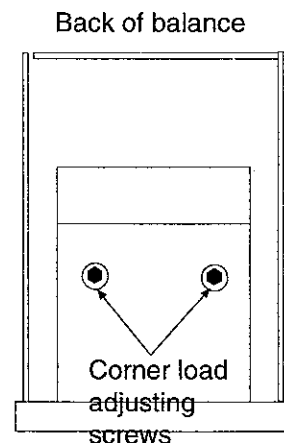
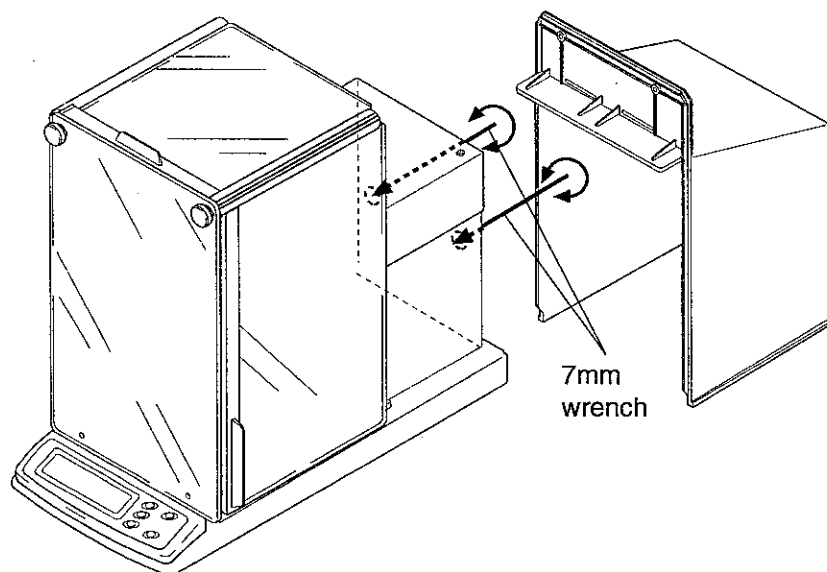
NOTE: If [Error 1] or [Error 2] is displayed, press the RE-ZERO key to return to [cP] display and start from step 3.

2. Corner load adjustment

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

- Step 1. See the check mode menu flowchart on page 27 to display data display mode [d-dSP].
- Step 2. Press the RE-ZERO key to display [XXXX]. (weight A/D count display)
- Step 3. In the D0 display (weight A/D count display), press the MODE key twice. [X.XXX] is displayed. (the D2 display-weight value)
- 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)
HR-202	100 g	± 2
HR-300	100 g	± 2
HM-202	100 g	± 2
HM-300	100 g	± 2
HM-200	100 g	± 2
HM-120	50 g	± 2

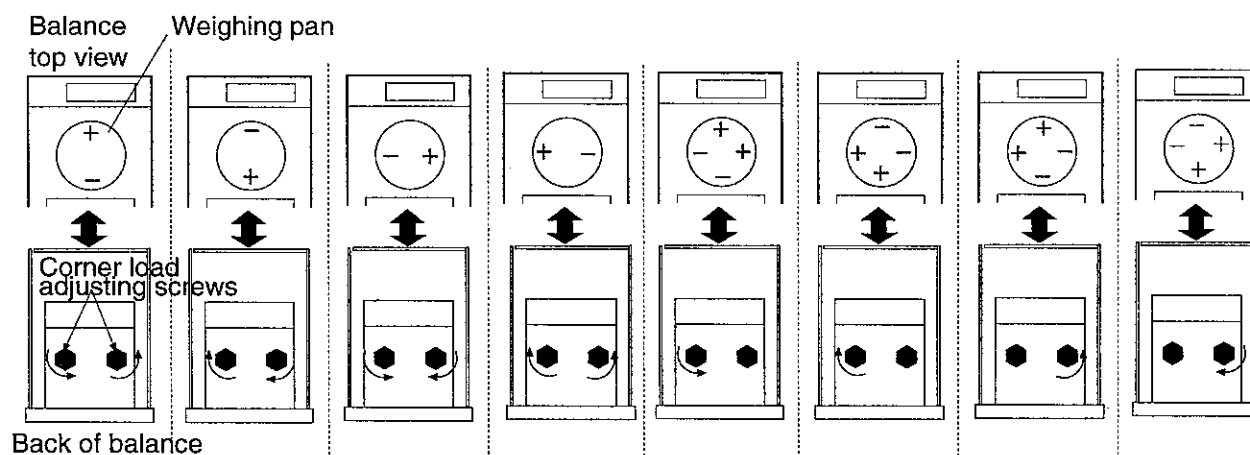


3. Small range corner load adjustment (HR-202/HM-202 only)

The HR-202 and HM-202 require 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 27 to display data display mode [d-dSP].
- Step 2. Press the RE-ZERO key to display [XXXX]. (weight A/D count display)
- Step 3. In the D0 display (weight A/D count display), press the MODE key three times. [X.XXX] is displayed. (the D3 display-weight value)
- 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 at each position is within the specifications.

Model	Mass used	Specifications (D3 display)
HR-202	20 g	± 4
HM-202	20 g	± 4



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 27 to display data display mode [d-dSP].
- Step 2. Press the MODE key. [Lnr] is displayed.
- Step 3. Press the RE-ZERO key. The motor starts and adjusts the mass position. (Not available for HR series since they do not have an internal mass.) After adjustment, [Lnr 0] is displayed.
- Step 4. With nothing placed on the pan, press the RE-ZERO key.
- Step 5. After stabilization, [Lnr 1] is displayed.
- Step 6. Place mass A on the weighing pan and press the RE-ZERO key.
- Step 7. After stabilization, [Lnr 2] is displayed.
- Step 8. Place mass B on the weighing pan and press the RE-ZERO key.
- Step 9. After stabilization, [Lnr 3] is displayed.
- Step 10. Place mass A and mass B on the weighing pan and press the RE-ZERO key.
- Step 11. After stabilization, [Lnr End] is displayed.
- Step 12. The operation is complete. Remove mass A and mass B from the pan.

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

5. CAL SET (Internal mass calibration, HM series only)

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 which corrects the value for the internal mass.

- Step 1. See the check mode menu flowchart on page 27 to display data display mode [d-dSP].
- Step 2. Press the MODE key three times. [SEt] is displayed.
- Step 3. Press the RE-ZERO key. The motor starts and performs internal mass preliminary loading.
- Step 4. [CAL 0] is displayed. To change the calibration mass value, use the MODE key.
- Step 5. With nothing placed on the pan, press the RE-ZERO key. [CAL 0] is displayed.
- Step 6. After stabilization, [CAL 200] ([CAL 100] for HM-120) is displayed.
- Step 7. Place the calibration mass specified in step 4 on the pan.
- Step 8. After stabilization, [CAL End] is displayed.
- Step 9. Remove the mass.
- Step 10. Hereafter, the internal mass will be applied and released automatically.
(Preliminary loading → Zero point reading → Mass raising → Mass lowering)
Note: With software version 1.00, repeat the procedure from step 8 four times.
The averaged value of four operations will be considered the internal mass value.
- Step 11. [SEt End] is displayed to indicate that the operation is complete.



5.12 Parameter Settings

1. Unit setting

The weighing units listed in the modification code table are saved in the check mode. Follow the procedure below to save the units

- Step 1. See the check mode menu flowchart on page 27 to display setting mode [init].
- Step 2. Press the MODE key twice. [Unit] is displayed.
- Step 3. Press the RE-ZERO key. [Unit g] is displayed.
- Step 4. Save the units as necessary using the following keys.
 - RANGE key: saves the unit.
 - RE-ZERO or MODE key : goes to the next unit.
- Step 5. When all necessary units are saved, press the PRINT key.
- Step 6. [Unit 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 27 to display setting mode [init].
- Step 2. Press the MODE key three times. [Sn] is displayed.
- Step 3. Press the RE-ZERO key. [00000000] (The value saved) is displayed.
- Step 4. Change the value as necessary using the following keys.
 - MODE key: changes the blinking digit position.
 - RE-ZERO or MODE key : changes the value of the blinking digit.
- Step 5. When the serial number is set, press the PRINT key.
- Step 6. [Sn End] is displayed to indicate that the operation is complete.

PZ:2883A/B/C PARTS LIST -1/2

MAIN BOARD FOR HR-202/300(PZ:2883A)

MAIN BOARD FOR HM-202/300(PZ:2883B)

MAIN BOARD FOR HM-120/200(PZ:2883C)

CIRCUIT SYMBOL or DRWG. NO.	PARTS NAME	DESCRIPTION	Q'TY
U1,2	UR:IR3M03A	DC/DC CONVERTER	2
U4	UR:TA78DL10S	REGULATOR	1
U5	UC:93LC56P	EEPROM	1
U6		cpu(μ pD78P054)	1
U7	UC:140G02AU12	GATE ARRAY	1
U8	UA:S-8054ALR	VOLTAGE DETECTOR	1
U9	UC:HC125	C-MOS IC	1
U10	UC:HC573	C-MOS IC	1
U11	UC:5564APL-15	S-RAM	1
U12	UR:TA78DL05S	REGULATOR	1
U13	UR:TA79010S	REGULATOR	1
D1,2	DI:SB10-03A2-T	SCHOTTKY DIODE	2
Q1	QF:K701	FET	1
R3,6,7	RC:NAT1RJT	CARBON RESISTOR	3
R4,9	RM:RMN1KFT	METALIZED RESISTOR	2
R5,17,19,20,21	RC:NAT4.7KJT	CARBON RESISTOR	5
R8	RC:NAT10KJT	CARBON RESISTOR	1
R10,33	RC:NAT5.6RJT	CARBON RESISTOR	2
R11,12	RC:NAT820RJT	CARBON RESISTOR	2
R13,14,26,27,28	RC:NAT22KJT	CARBON RESISTOR	5
R15,16,18,29,30,31,35,36	RC:NAT47KJT	CARBON RESISTOR	8
R22	RC:NAT470RJT	CARBON RESISTOR	1
R23	RC:NAT1MJT	CARBON RESISTOR	1
R24	RN:IHR-4-104JA	RESISTOR NETWORK 4-100K	1
R25,37	RC:NAT100KJT	CARBON RESISTOR	2
R32	RN:IHR-8-563JA	RESISTOR NETWORK8-56K	1
R34	RC:NAT2.2KJT	CARBON RESISTOR	1

PZ:2883A/B/C PARTS LIST -2/2

MAIN BOARD FOR HR-202/300(PZ:2883A)

MAIN BOARD FOR HM-202/300(PZ:2883B)

MAIN BOARD FOR HM-120/200(PZ:2883C)

CIRCUIT SYMBOL or DRWG. NO.	PARTS NAME	DESCRIPTION	Q'TY
C1,2	CC:220P1KV	CERAMIC CAPACITOR 220P/1KV	2
C3,4	CK:ECA1VM471-T	ELECTROLYTIC CAPACITOR 470 μ /35V	2
C5,6,10,14~16, 18~21,27,29, 33~38,	CC:FK26Y5V104T	CERAMIC CAPACITOR 0.1 μ /50V	18
C7,11,22,28,30~32,	CC:330PT	CERAMIC CAPACITOR 330P	7
C8,9,12,13,17	CK:ECA1EM471-T	ELECTROLYTIC CAPACITOR 470 μ /25V	5
C24	CC:330P	CERAMIC CAPACITOR 330P	1
C26	CC:0.022 μ T	CERAMIC CAPACITOR 0.022 μ	1
L1,2	LL:LHL06TB470K	COIL 47 μ H	2
L3,5	LL:LHL08TB471K	COIL 470 μ H	2
J1	EJ:0470-01-230	POWER JACK	1
J2	JE:HSJ0916-01	3P JACK	1
J3	J1:3P-S2T2-EF	CONNECTOR	1
J4	J1:2P-S2T2-EF	CONNECTOR	1
J5,5A	J1:7P-S2T2-EF	CONNECTOR	2
J6	J1:05P-S2T2-EF	CONNECTOR	1
J7	JD:SLEM10S-2	CONNECTOR	1
	BKE:AMZ45	ANALOG MODULE	1
	07:C43674	ISOLATION SHEET	1
	FH:85PN0819	FUSE HOLDER	1
	FS:EAWK-500MA	FUSE	1

PZ:2884 PARTS LIST

DISPLAY BOARD FOR HM SERIES,HR-202/300

CIRCUIT SYMBOL or DRWG. NO.	PARTS NAME	DESCRIPTION	Q'TY
U101	UC:LC75850E	LCD DRIVER	1
R101~104	RC:NAT47KJT	CARBON RESISTOR	4
R108	RC:NAT100KJT	CARBON RESISTOR	1
C102	CT:1V010T	TANTALUM CAPACITOR	1
C103	CC:FK26Y5V104T	CERAMIC CAPACITOR 0.1 μ /50V	1
C106~110	CC:330PT	CERAMIC CAPACITOR 330P	5
C111~114	CC:10PT	CERAMIC CAPACITOR 10P	4
J7A	JD:SLEM10S-2	CONNECTOR	1
J9	J1:4P-S2L2-EF	CONNECTOR	1
	07:4001794-1	LCD HOLDER L	1
	07:4001794-2	LCD HOLDER R	1
	KO:1272	HEAT SHEET	1
	ED:E-7355	LCD	1

PZ:2885 PARTS LIST

SWITCH BOARD FOR HM SERIES,HR-202/300

CIRCUIT SYMBOL or DRWG. NO.	PARTS NAME	DESCRIPTION	Q'TY
R201,203,205	RC:NAT10KJT	CARBON RESISTOR	3
R202,204,206	RC:NAT5.6KJT	CARBON RESISTOR	3
C201~203	CC:330PT	CERAMIC CAPACITOR 330P	3
J9A	J1:4P-S2T2-EF	CONNECTOR	1

PZ:2886 PARTS LIST

MOTOR DRIVE BOARD FOR HM SERIES

CIRCUIT SYMBOL or DRWG. NO.	PARTS NAME	DESCRIPTION	Q'TY
D301	DI:ISS270T	DIODE	1
R301	RC:NAT1.2K	CARBON RESISTOR	1
C301	CC:0.01 μ T	CERAMIC CAPACITOR 0.01 μ	1
J6A	KO:974-5-40T	MOTOR DRIVE BOARD CABLE	1
J15	KO:1287-3-13T	PHOTO INTERRUPTER BOARD CABLE	1

PZ:2888/A PARTS LIST

POSITION SENSOR BOARD FOR HM-202/300,HR-202/300(PZ:2888)

POSITION SENSOR BOARD FOR HM-120/200(PZ:2888A)

CIRCUIT SYMBOL or DRWG. NO.		PARTS NAME	DESCRIPTION	Q'TY
U401		UA:C4062C	OP AMP	1
U402		UA:C4072C	OP AMP	1
D401		DL:TLN110	DIODE	1
D402		DI:MI-33H-2D	PHOTO DIODE	1
Q401		QT:C1815YT	TRANSISTOR	1
R401,405		RC:NAT100KJT	CARBON RESISTOR	2
R402		RC:NAT3.3KJT	CARBON RESISTOR	1
R403		RM:RNM240KFT	METALIZED RESISTOR	1
R404		RC:NAT680RJT	CARBON RESISTOR	1
R406,407		RF:390KRF-FLN	FLAT RESISTOR	2
R408		RC:NAT47KJT	CARBON RESISTOR	1
R409	PZ:2888	RC:NAT390KJT	CARBON RESISTOR	1
	PZ:2888A	RC:NAT560KJT		
C401,402,406,407		CC:FK26Y5V104T	CERAMIC CAPACITOR 0.1 μ /50V	4
C403		CC:0.01 μ T	CERAMIC CAPACITOR 0.01 μ	1
C404		CC:10PT	CERAMIC CAPACITOR 10P	1
C405		CC:68PT	CERAMIC CAPACITOR 68P	1
C408,409		CT:1V010T	TANTALUM CAPACITOR	2
J10A		KO:974-5-5	POSITION SENSOR BOARD CABLE	1
		03:B47515	POSITION SENSOR HOLDER	1
		07:B47814	BUSH	1

PZ:2889 PARTS LIST

TEMPERATURE SENSOR BOARD FOR HM SERIES,HR-202/300

CIRCUIT SYMBOL or DRWG. NO.	PARTS NAME	DESCRIPTION	Q'TY
U501	UA:C4062C	OP AMP	1
D501	DZ:RD5.6EB	ZENNER DIODE	1
Q501~503	QT:A1015YT	TRANSISTOR	3
R501	RM:RNM3KFT	METALIZED RESISTOR	1
R502	RC:NAT6.8KJT	CARBON RESISTOR	1
R503	RC:NAT10KJT	CARBON RESISTOR	1
R504	RC:NAT680RJT	CARBON RESISTOR	1
C501,502	CT:1V010T	TANTALUM CAPACITOR	2
C503~505	CC:FK26Y5V104T	CERAMIC CAPACITOR 0.1 μ /50V	3
J5A	J1:7P-S2T2-EF	CONNECTOR	1
J10	J1:05P-S2T2-EF	CONNECTOR	1
J11	J1:3P-S2T2-EF	CONNECTOR	1
J12	J1:4P-ST2-EF	CONNECTOR	1

PZ:2890/A PARTS LIST

REFERENCE BOARD FOR HM-202/300,HR-202/300(PZ:2890)

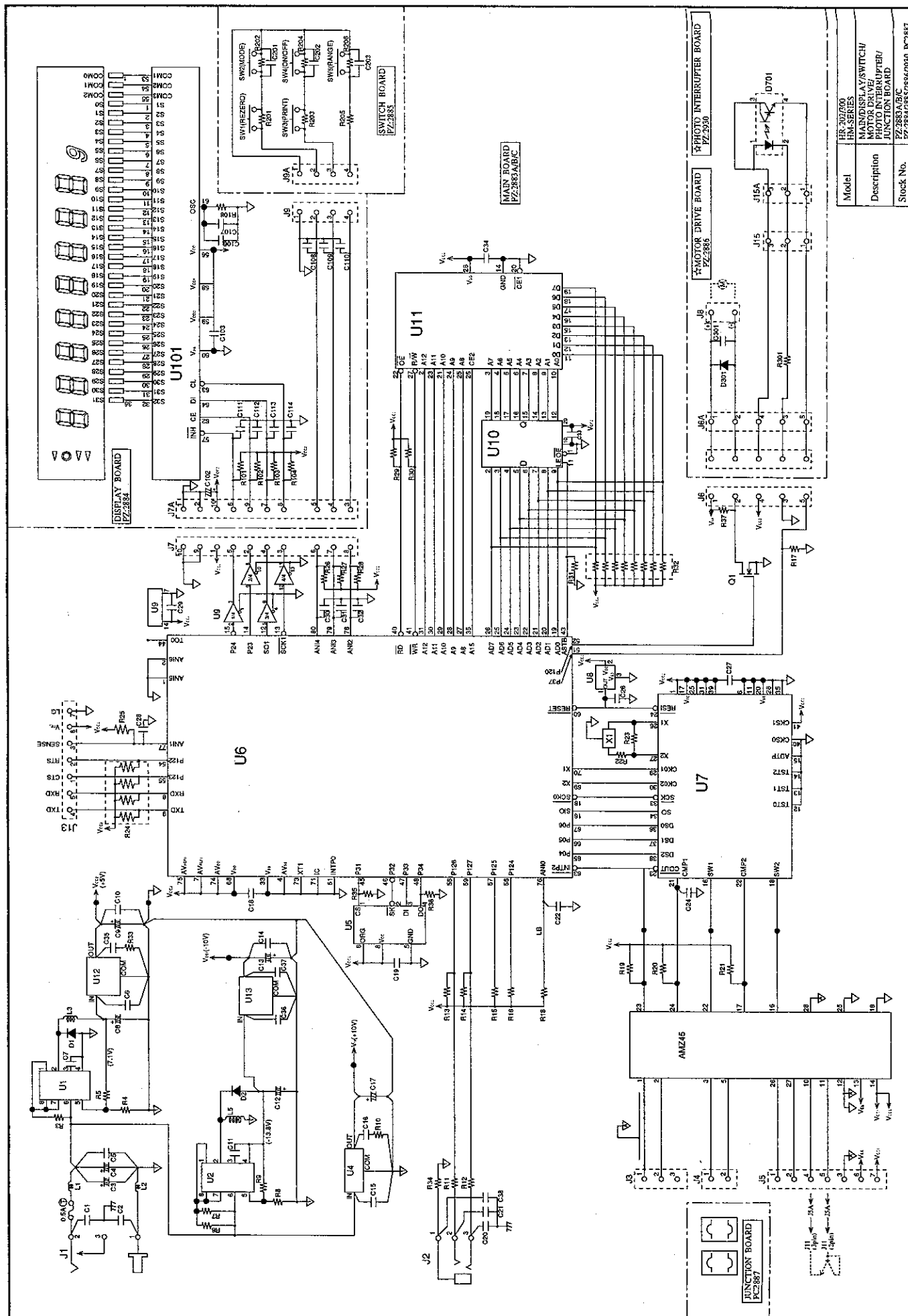
REFERENCE BOARD FOR HM-120/200(PZ:2890A)

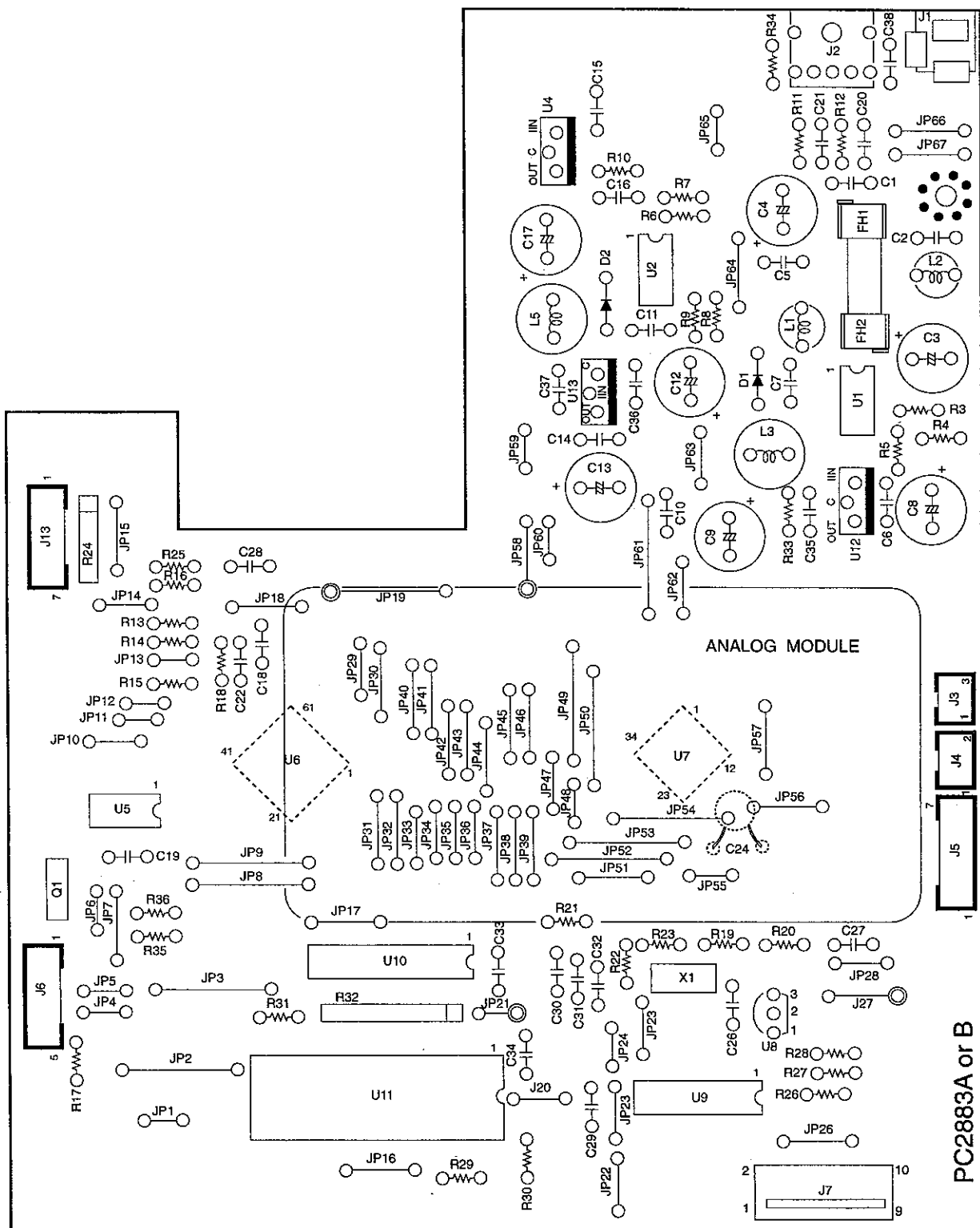
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U601		UA:OP07DP	OP AMP	1
D601		DZ:RD5.6EB	ZENNER DIODE	1
D602		UA:LM329AZ	REFERENCE	1
Q601		QT:A1015YT	TRANSISTOR	1
Q602		QF:K982	FET	1
R601,603		RC:NAT680RJT	CARBON RESISTOR	2
R602		RC:NAT4.7KJT	CARBON RESISTOR	1
R604,605		RC:NAT100RJT	CARBON RESISTOR	2
R606	PZ:2890	RL:70R0F	METAL FOIL RESISTOR	1
	PZ:2890A	RL:140R00F		
C601,603,604		CC:FK26Y5V104T	CERAMIC CAPACITOR 0.1 μ /50V	3
C602		CC:68PT	CERAMIC CAPACITOR 68P	1
J3A		KO:1253-020	ANALOG SHIELD CABLE	1
J12A		KO:974-4-6	REFERENCE BOARD CABLE	1

PZ:2930 PARTS LIST

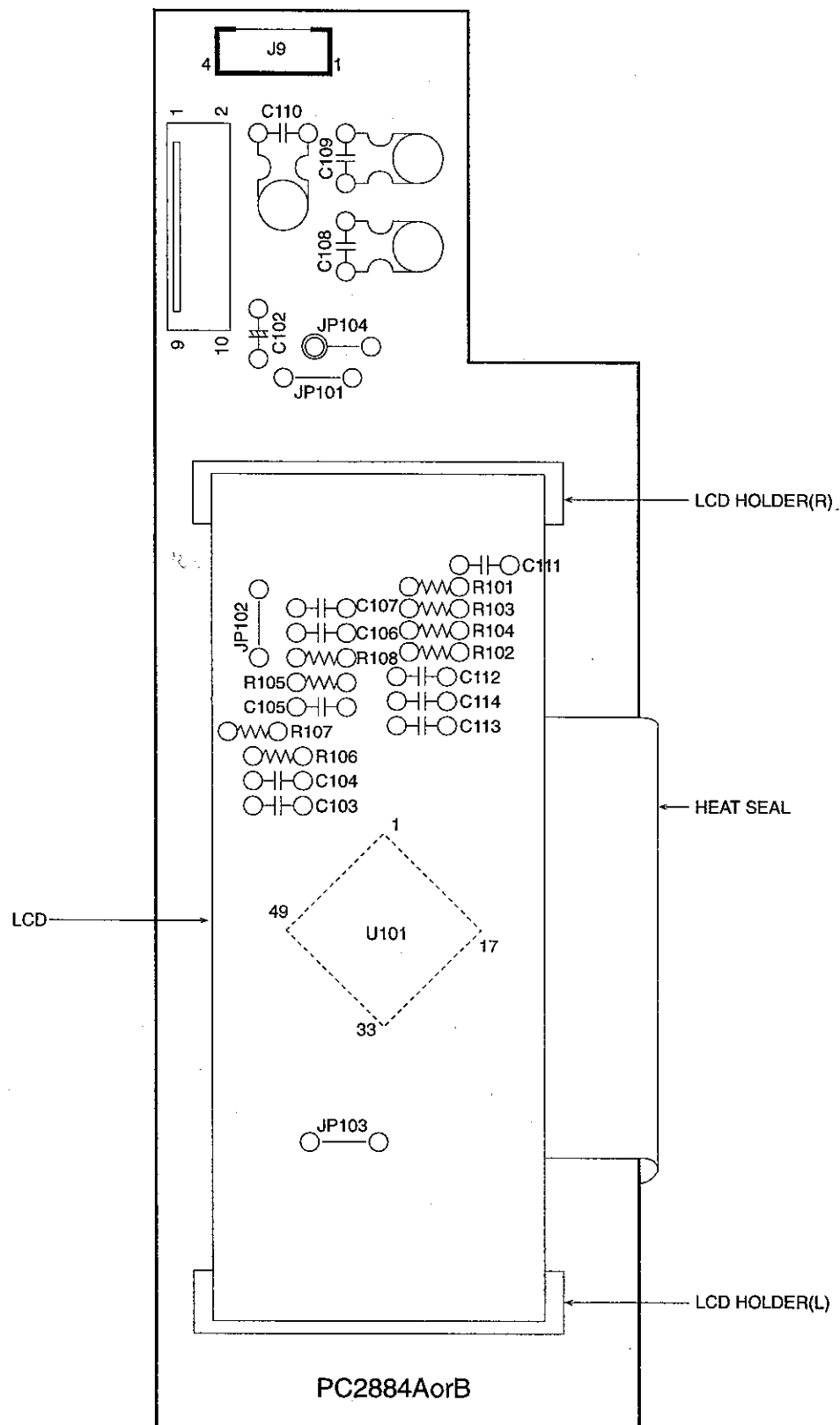
PHOTO INTERRUPTER BOARD FOR HM SERIES

CIRCUIT SYMBOL or DRWG. NO.		PARTS NAME	DESCRIPTION	Q'TY
D701		DF:TLP852	PHOTO INTERRUPTER	1

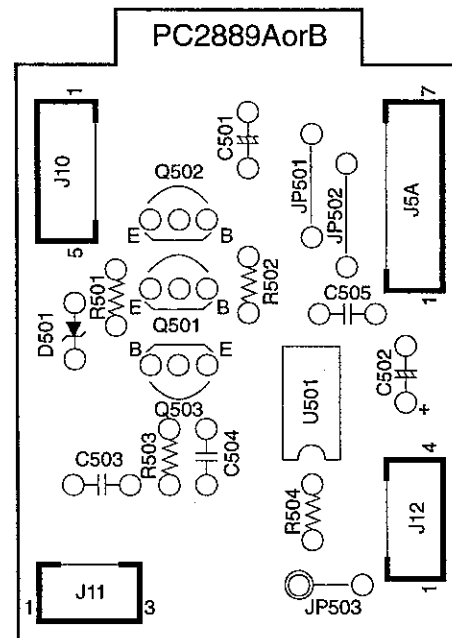
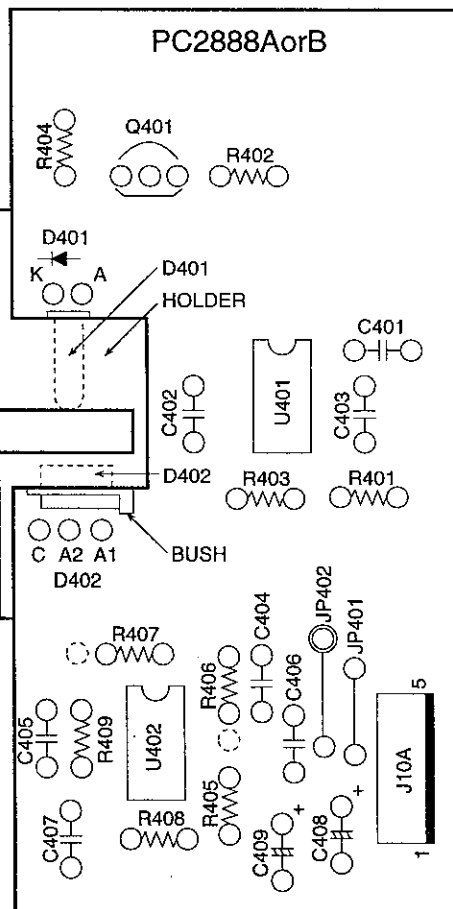
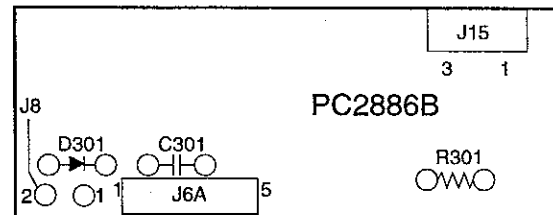
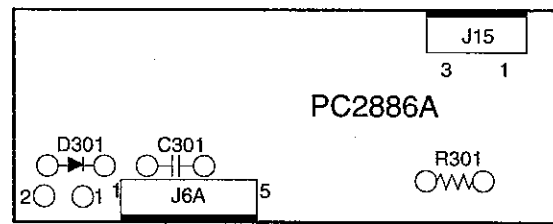
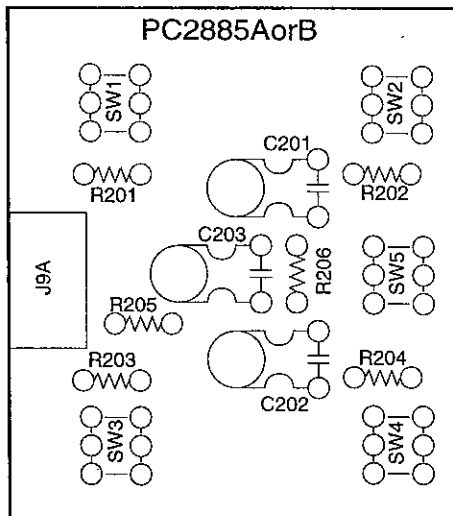




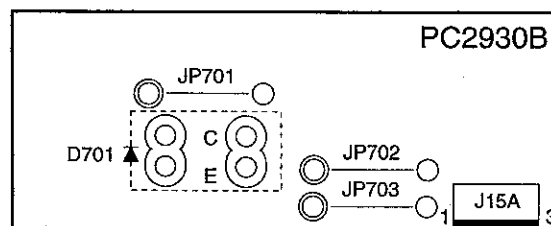
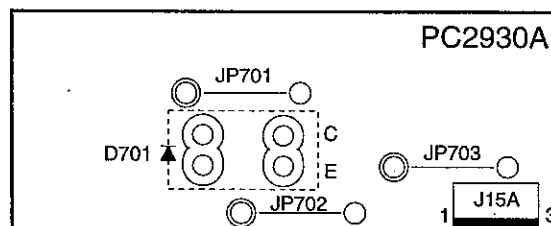
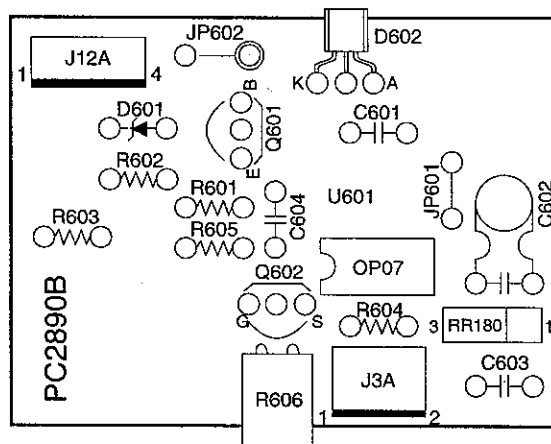
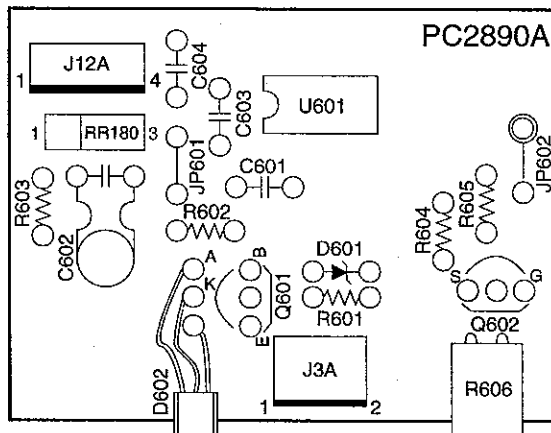
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Description	COMPONENT LAYOUT
Stock No.	PZ:2883A/B/C



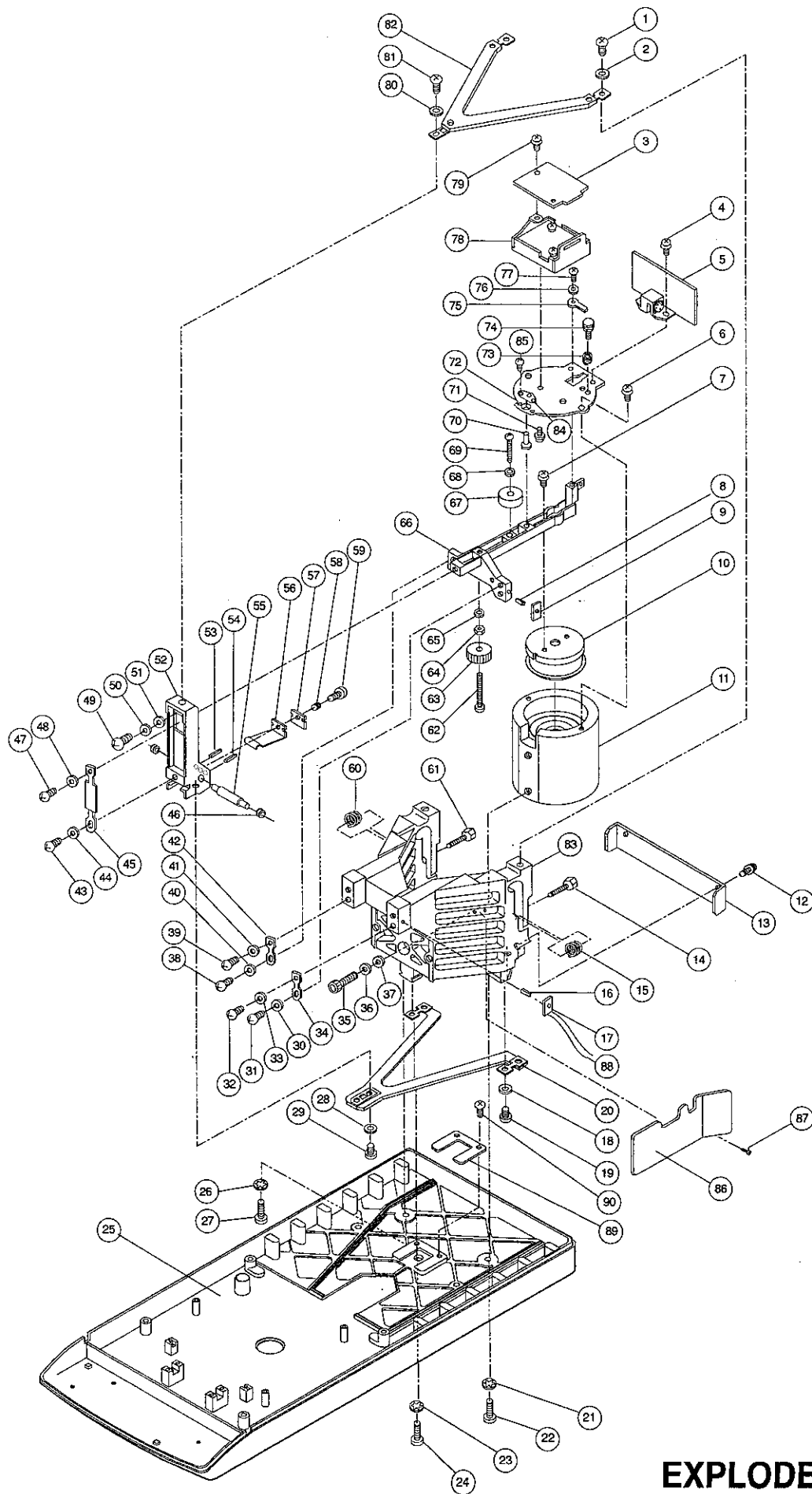
Model	HR-202/300 HM SERIES
Description	COMPONENT LAYOUT
Stock No.	PZ:2884



Model	HR-202/300 HM SERIES
Description	COMPONENT LAYOUT
Stock No.	PZ:2885/2886/ 2888/A /2889



Model	HR-202/300 HM SERIES
Description	COMPONENT LAYOUT
Stock No.	PZ:2890/A / 2930



**EXPLODED VIEW-1
HM/HR SERIES**

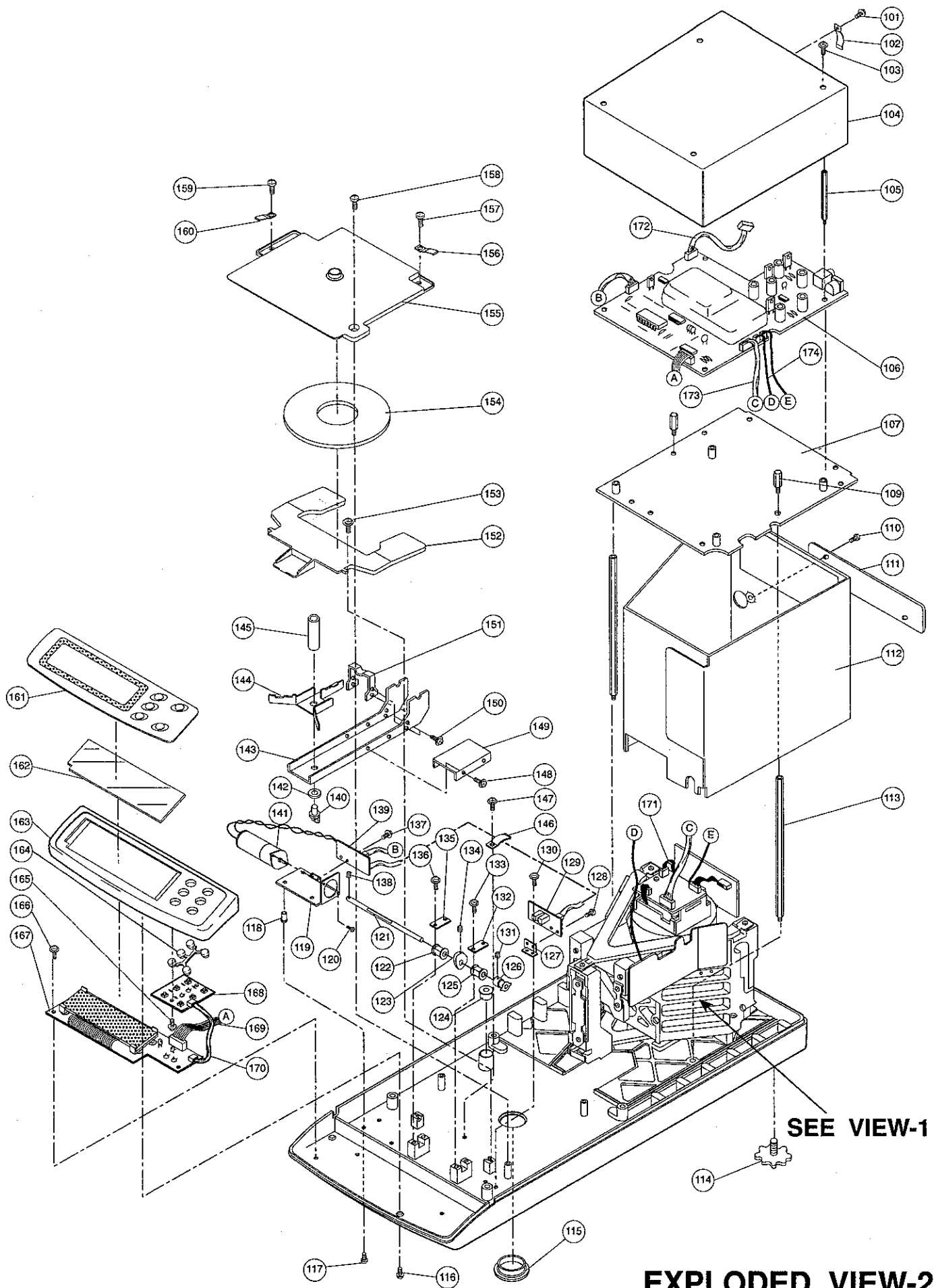
Exploded view 1

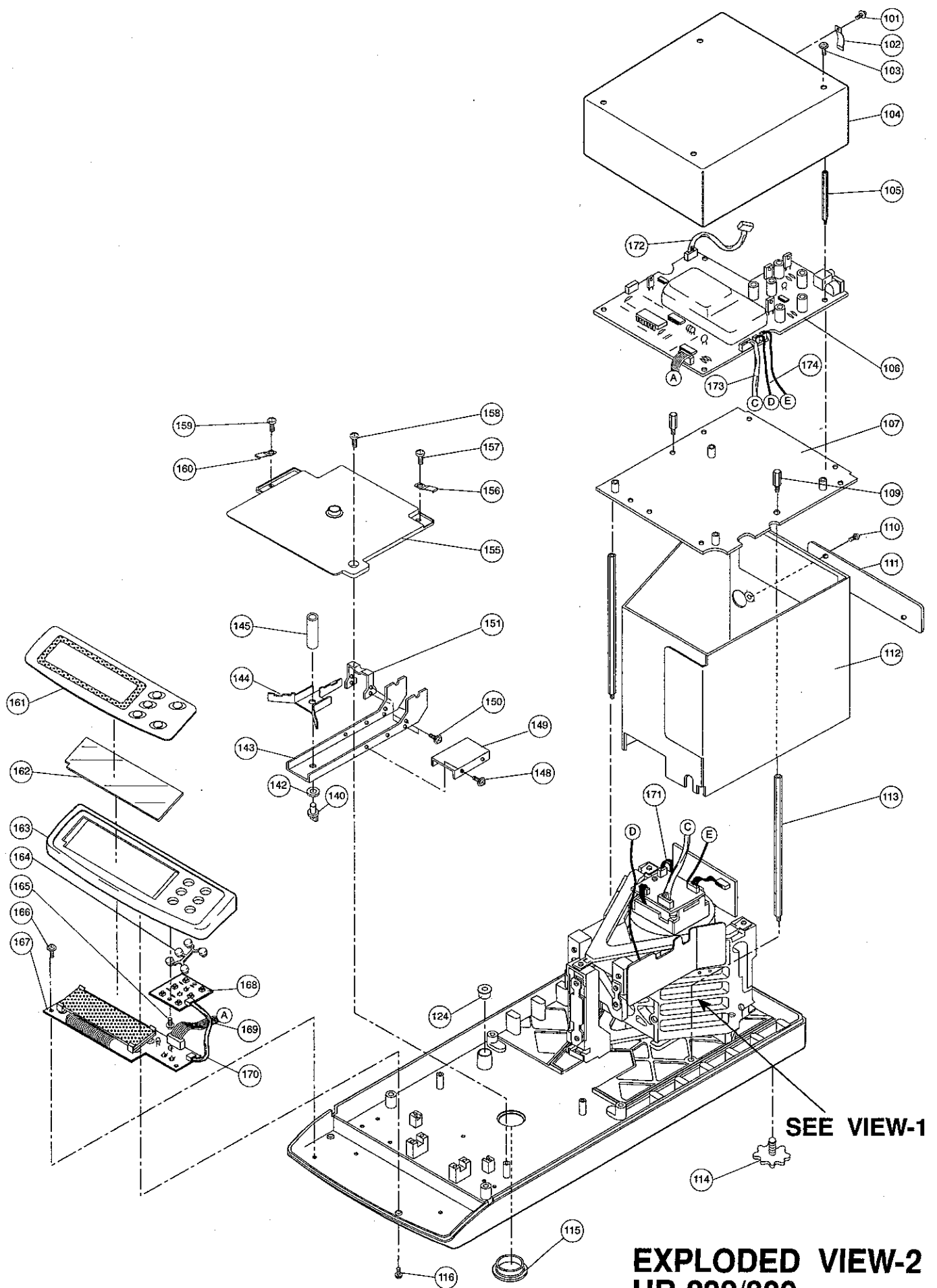
NO.	PARTS NAME	DESCRIPTION
1		PAN HEAD M4×6
2	2:C41775	FLEXURE WASHER
3	PZ:2889	TEMPERATURE SENSOR BOARD
4		PAN HEAD WITH WASHER M3×6
5	PZ:2888A	POSITION SENSOR BOARD FOR HM-120/200
	PZ:2888	POSITION SENSER BOARD FOR HM-202/300 HR-202/300
6		PAN HEAD WITH WASHER M3×6
7		PAN HEAD WITH WASHER M3×8
8	10:20008	SPRING PIN
9	PC:2887	JUNCTION BOARD
10	09:A38695A	FORCE COIL BOBBIN FOR HM-120/200
	09:A38259A;C	FORCE COIL BOBBIN FOR HM-202/300 HR-202/300
11	PB:HA230M-1	MAGNET ASSEMBLY FOR HM-120/200
	PB:HA200A-1	MAGNET ASSEMBLY FOR HM-202/300 HR-202/300
12		PAN HEAD WITH WASHER M3×6
13	04:B49180	COVER
14	05:B48376	FOUR CORNER ADJUST SCREW
15	00:A47004	SPRING
16	10:20008	SPRING PIN
17	PC:2887	JUNCTION BOARD
18	02:C41775	FLEXURE WASHER
19		PAN HEAD M4×6
20	PB:HA180M-3	LOWER FLEXURE ASSEMBLY
21		TOOTHED LOOK WASHER M5
22		PAN HEAD M5×12
23		TOOTHED LOOK WASHER M5
24		PAN HEAD M5×12
25	03:1000016	LOWER CASE
26		TOOTHED LOOK WASHER M5
27		PAN HEAD M5×12
28	02:C41775	FLEXURE WASHER
29		PAN HEAD M4×6
30	02:C41775	FLEXURE WASHER
31		PAN HEAD M4×6
32		PAN HEAD M4×6
33	02:C41775	FLEXURE WASHER
34	04:B46626A;B	FULCRUM FLEXURE
35		HEXAGON BOLT M5×15
36		SPRING WASHER M5
37		WASHER M5
38		PAN HEAD M4×6
39		PAN HEAD M4×6
40	02:C41775	FLEXURE WASHER
41	02:C41775	FLEXURE WASHER
42	04:B46626A;B	FULCRUM FLEXURE
43		PAN HEAD M4×6
44	02:C41775	FLEXURE WASHER
45	04:B46627A;B	TENSION FLEXURE
46	07:C41726B	S. A. BUSH
47		PAN HEAD M4×6

HM SERIES HR-202/300

Exploded view 1

NO.	PARTS NAME	DESCRIPTION
48	02:C41775	FLEXURE WASHER
49		PAN HEAD WITH WASHER M4×10
50		WASHER M4
51		WASHER M4
52	03:A38696C;B	RISER
53	10:20008	SPRING PIN
54	10:20008	SPRING PIN
55	05:B46640A	S. A. SHAFT
56	04:B46628A	S. A. LEAF SPRING
57	04:B46629A	S. A. SPACER PLATE
58		CONTINUOUS-THREAD STUD M4×6
59		PAN HEAD WITH WASHER M4×6
60	00:A47004	SPRING
61	05:B48376	FOUR CORNER ADJUST SCREW
62		PAN HEAD M3×30
63	09:B49798A	COUNTER BALANCE WT. (LOWER) FOR HM-120/200
	09:A45376	COUNTER BALANCE WT. (LOWER) FOR HM/HR-202/300
64		NUT M3
65		SPRING WASHER M3
66	03:A21310A;B	BEAM
67	05:B48702C	COUNTER BALANCE WT. (UPPER) FOR HM-120/200
	05:C40650	COUNTER BALANCE WT. (UPPER) FOR HM/HR-202/300
68		SPRING WASHER M3
69		PAN HEAD M3×12
70	05:B47536	BEAM STOPPER
71		PAN HEAD WITH WASHER M3×6
72	04:B47535C	SHIELD PLATE
73	00:B48842A	STOPPER SPRING
74	05:B48791	STOPPER BOLT
75	04:B47537A	STOPPER PLATE
76		SPRING WASHER M3
77		PAN HEAD M3×6
78	PZ:2890A	REFERENCE BOARD FOR HM-120/200
	PZ:2890	REFERENCE BOARD FOR HM-202/300 HR-202/300
79		PAN HEAD WITH WASHER M3×6
80	02:C41775	FLEXURE WASHER
81		PAN HEAD M4×6
82	PB:HA180M-2	UPPER FLEXURE ASSEMBLY
83	03:A10181C;B	MAGNET FRAME
84	04:B40498A	BEAM STOPPER PLATE
85		PAN HEAD WITH WASHER M3×6
86	04:B48924B	CABLE LIFTER
87		PAN HEAD WITH WASHER M4×6
88	08:A45993B	FLEX WIRE
89	04:B48181	PILLAR GUIDE PLATE
90		PAN HEAD WITH WASHER M4×6





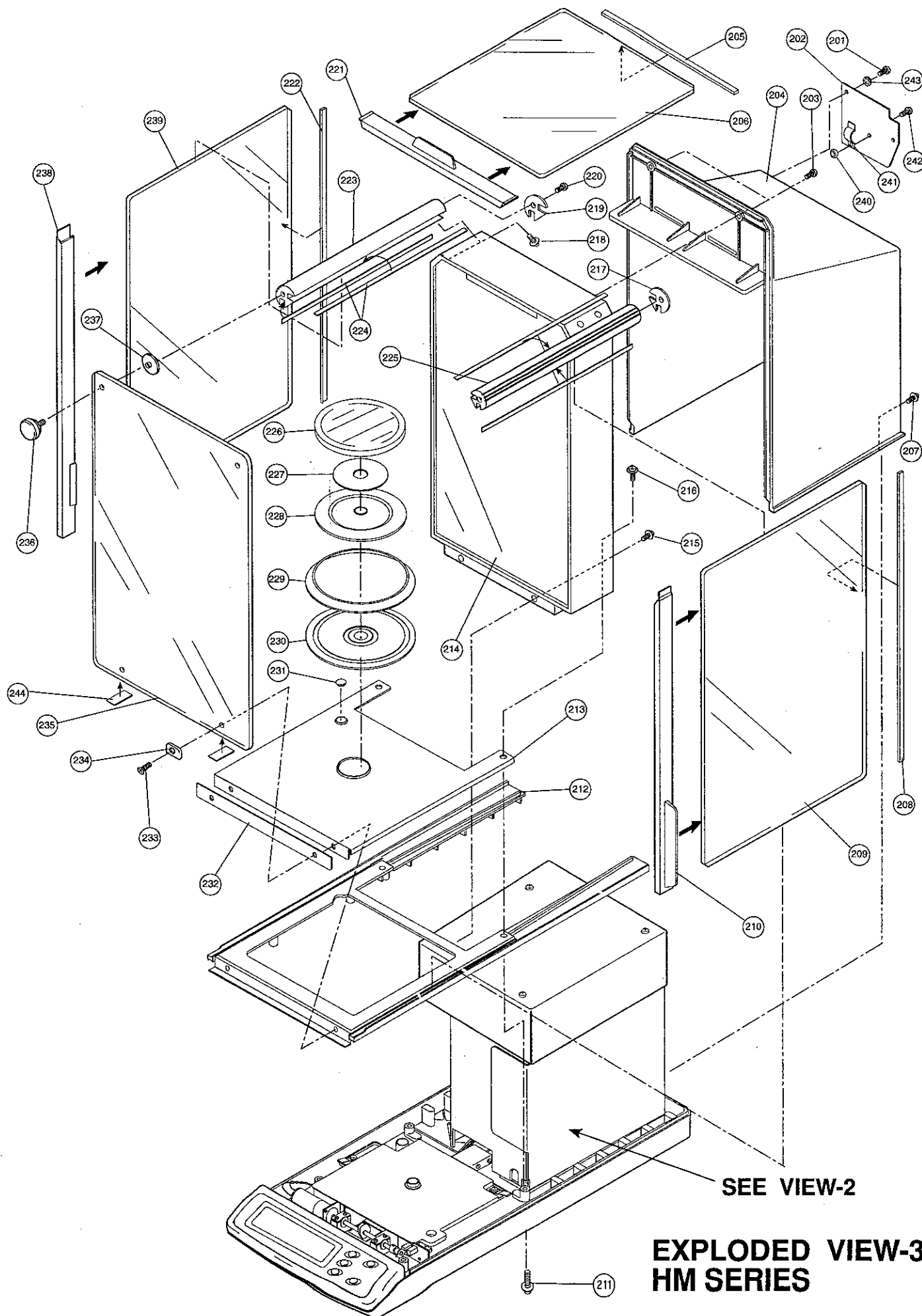
Exploded view 2

NO.	PARTS NAME	DESCRIPTION
101		PAN HEAD WITH WASHER M3×6
102	04:4001814	GROUND PLATE
103		PAN HEAD WITH WASHER M3×6
104	04:3000795A	SHIELD COVER
105	05:4001815	SPACER
106	PZ:2883C	MAIN BOARD FOR HM-120/200
	PZ:2883B	MAIN BOARD FOR HM-202/300
	PZ:2883A	MAIN BOARD FOR HR-202/300
107	09:A39679	SHIELD
108		
109	05:B40473	STOP SCREW
110		PAN HEAD M3×3
111	04:B47855	FOUR CORNER ADJUST COVER PLATE
112	04:A38850A	INNER CASE
113	05:B48179	SUPPORT PILLAR
114	07:A46735A	FOOT
115	07:A46858	UNDER HOOK COVER FR
116		FLAT HEAD M3×6
117		PAN HEAD WITH WASHER M3×15 FOR HM ONLY
118	10:C-330L	BLIND NUT FOR HM ONLY
119	04:4001806	MOTOR HOLDER FOR HM ONLY
120		PAN HEAD M1.4×4 FOR HM ONLY
121	05:4001804	MOTOR SHAFT FOR HM ONLY
122	07:B40278	SHAFT HOLDER FOR HM ONLY
123	07:4001795	UPPER CAM FOR HM ONLY
124	00:B40469	LEVEL GUIDE HOLDER
125	07:B40278	SHAFT HOLDER FOR HM ONLY
126	09:B48190	SWITCHING CAM FOR HM ONLY
127	04:B40546	INTERRUPTER HOLDER FOR HM ONLY
128		PAN HEAD M3×4 FOR HM ONLY
129	PZ:2930	INTERRUPTER BOARD FOR HM ONLY
130		PAN HEAD WITH WASHER M3×6 FOR HM ONLY
131		CONTINUOUS-THREAD STUD M3×6 FOR HM ONLY
132	04:B40464	SHAFT STOP FOR HM ONLY
133		PAN HEAD WITH WASHER M3×6 FOR HM ONLY
134		CONTINUOUS-THREAD STUD M3×3 FOR HM ONLY
135	04:B40464	SHAFT STOP FOR HM ONLY
136		PAN HEAD WITH WASHER M3×6 FOR HM ONLY
137		PAN HEAD WITH WASHER M3×6 FOR HM ONLY
138		CONTINUOUS-THREAD STUD M3×3 FOR HM ONLY
139	PZ:2886	MOTOR BOARD FOR HM ONLY
140	05:B43355	UNDER HOOK FR
141	10:A35234	GEARED MOTOR FOR HM ONLY
142	10:S-NO-1-SUS	CONVEX WASHER
143	04:4001807	ARM
144	04:4001805	WEIGHING RECEPTER
145	05:4001808	WEIGHING PAN RECEPTER
146	04:B40416	CABLE STOP FOR HM ONLY
147		PAN HEAD WITH WASHER M3×6 FOR HM ONLY
148		PAN HEAD WITH WASHER M3×6

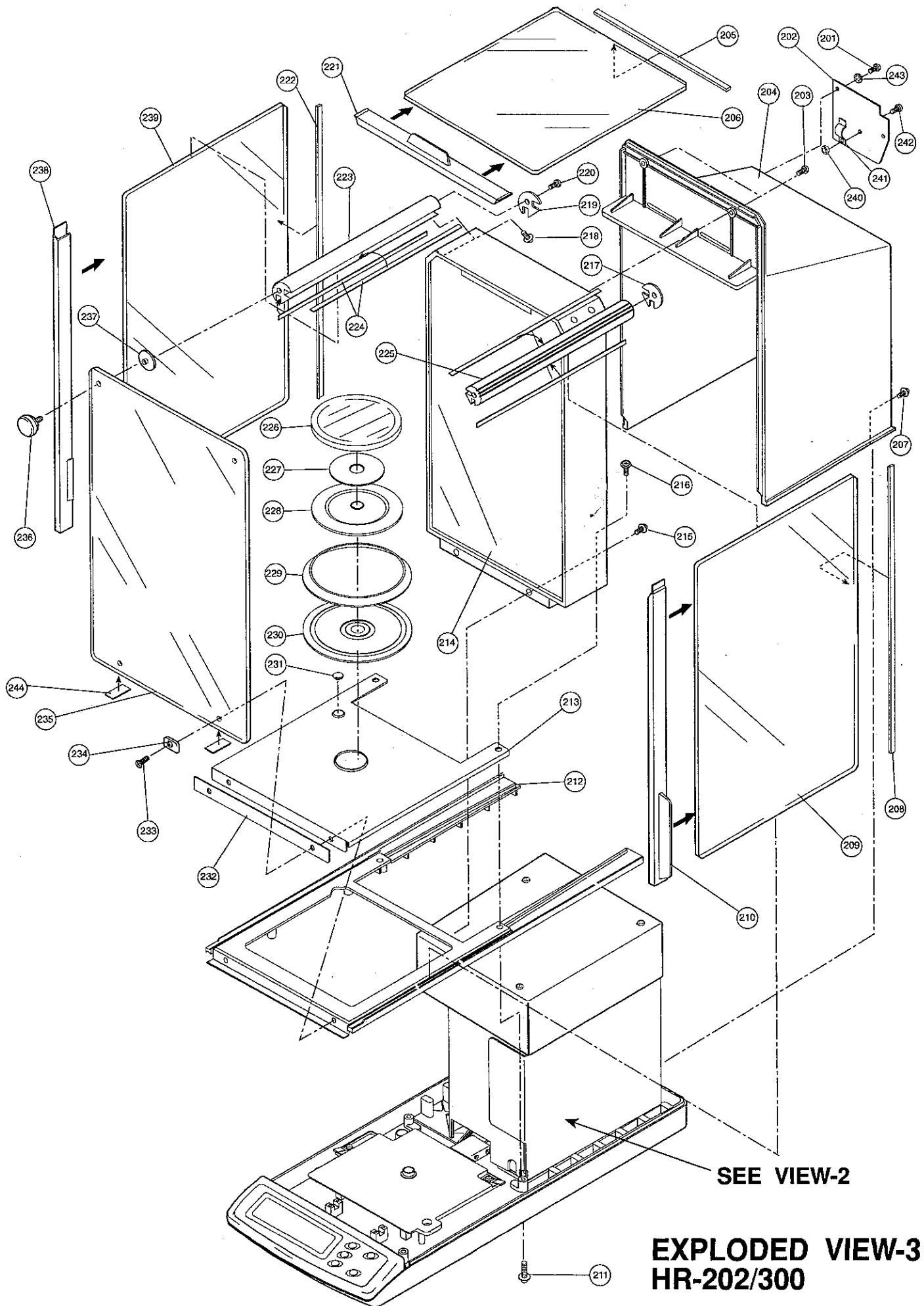
HM SERIES HR-202/300

Exploded view 2

NO.	PARTS NAME	DESCRIPTION
149	04:4001809	FRONT ARM COVER
150		PAN HEAD WITH WASHER M3×6
151	04:B46630B	SPRING RECEPTER
152	03:3000794A	WEIGHING GUIDE FOR HM ONLY
153		PAN HEAD WITH WASHER M4×8 FOR HM ONLY
154	04:4001810	STD WEIGHT (200g) FOR HM ONLY
155	03:3000859	WEIGHING HOLDER
156	04:4001814	GROUND PLATE
157		PAN HEAD M4×8
158		PAN HEAD M4×8
159		PAN HEAD M4×8
160	04:4001814	EARTH PLATE
161	08:3000892A	KEY SHEET FOR HM-120
	08:3000891A	KEY SHEET FOR HM-200
	08:3000890A	KEY SHEET FOR HM-202
	08:3000889A	KEY SHEET FOR HM-300
	08:3000888	KEY SHEET FOR HR-202
	08:3000887	KEY SHEET FOR HR-300
162	07:C42517	DISPLAY FILTER
163	07:2000108	DISPLAY UPPER CASE
164	06:C42512E	KEY TOP
165		PAN HEAD WITH WASHER M3×6
166		PAN HEAD WITH WASHER M3×6
167	PZ:2884	DISPLAY BOARD
168	PZ:2885	SWITCH BOARD
169	KO:1254A	DISPLAY CABLE
170	KO:964-04W005	SWITCH BOARD CABLE
171	KO:993-023	TEMPERATURE SENSOR CABLE FOR HM-120/200
	KO:993-020	TEMPERATURE SENSOR CABLE FOR HM-202/300 HR-202/300
172	KO:1286A-015T	OPTION BOARD CABLE
173	KO:964-07W020	ANALOG BOARD CABLE
174	KO:995-022	FORCE COIL CABLE



EXPLODED VIEW-3 HM SERIES



HM SERIES HR-202/300

Exploded view 3

NO.	PARTS NAME	DESCRIPTION
201		PAN HEAD M3×8
202	02:C42532A	BLANK PANEL
203		PAN HEAD M4×8
204	07:2000109A	REAR CASE
205	07:4001820-1	SHEET
206	19:4001824	TOP GLASS
207		PAN HEAD WITH WASHER M4×6
208	07:4001820-2	SHEET
209	19:4001823	SIDE GLASS
210	07:3000791A-1	SIDE KNOB R
211		PAN HEAD WITH WASHER M4×18
212	07:1000017	BREEZE BREAK ATTACHMENT
213	04:3000796	BREEZE BREAK UNDER PLATE
214	03:3000773A	BREEZE BREAK FRAME
215		PAN HEAD WITH WASHER M4×10
216		PAN HEAD WITH WASHER M4×10
217	07:4001796	CAP
218		PAN HEAD WITH WASHER M3×8
219	07:4001796	CAP
220		BINDING HEAD M2.5×4
221	07:3000790A	TOP KNOB
222	07:4001820-2	SHEET
223	05:4001816A	GUIDE RAIL
224	07:4001819	GLASS SMOOTH TAPE
225	05:4001816A	GUIDE RAIL
226	04:B40478B	WEIGHING PAN FOR HM-120/200/300 HR-300
	04:C40753A	WEIGHING PAN FOR HM-202 HR-202
227	04:B48920	WEIGHING PLATE
228	09:B48214	PAN SUPPORT FOR HM-120/200/300 HR-300
	09:C40767B	PAN SUPPORT FOR HM-202 HR-202
229	04:B40243A	BREEZE BREAK RING FOR HM-120/200/300 HR-300
	04:C40775A	BREEZE BREAK RING FOR HM-202 HR-202
230	04:4001812A	DUST PLATE FOR HM-120/200/300 HR-300
	04:4001813A	DUST PLATE FOR HM-202 HR-202
231	07:4001797A	LEVEL VIAL WINDOW
232	07:4001818	FRONT GLASS CUSHION
233		FLAT HEAD M3×10
234	07:C42757A	FRONT GLASS SUPPORT PLATE
235	19:4001822	FRONT GLASS
236	07:C42754A	FRONT GLASS SCREW
237	07:C42755A	FRONT GLASS BUSHING
238	07:3000791A-2	SIDE KNOB L
239	19:4001823	SIDE GLASS
240		NAT M2.6
241	04:B40416	CABLE STOP
242		PAN HEAD M2.6×6
243		TOOTHED LOCK WASHER M3
244	07:4002333	SEAL



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