

HP SERIES

MAINTENANCE MANUAL

PRECISION INDUSTRIAL BALANCE

HP-12K
HP-20K
HP-22K
HP-30K
HP-40K
HP-60K
HP-100K
HP-102K



A&D Company, Limited



This is hazard alert mark.



This is an information mark to inform you about the operation of the balance.

Note

This manual and / or the HP series balances may be changed at any time to improve the product without notice.

Specifications of products are subject to change without any obligation on the part of the manufacture.



Contents

1. Introduction	2
1.1 Equipment and Tools Required	2
1.2 Corrective Maintenance Outline	3
2. Performance Test	3
2.1 Performance Test Procedure	3
2.2 Test Details	4
3. Corrective Maintenance	7
3.1 Troubleshooting Table	7
3.2 Maintenance Flowchart	10
4. Force Motor	11
4.1 Disassembly	12
4.2 Cleaning the Force Motor magnet and Bobbin	16
4.3 Force Motor Assembly	17
5. Adjustment	22
5.1 Adjustment Specifications	22
5.2 Adjustment Flow Chart	23
5.3 General Precautions	23
5.4 Check Mode	24
6. Circuit Diagrams and Parts List	34
7. Parts layout	53
8. Exploded Views and Parts List	63



1. Introduction

For smooth maintenance, the products must be technically understood, and the required equipment and tools must be prepared. Since the HP series 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

Phillips screwdriver 3 mm
Phillips screwdriver 4 mm
Wrench (spanner), 8 - 10 mm
Allen wrench, 3 mm
Allen wrench, 4 mm
Allen wrench, 5 mm
Adhesive tape approx. 8 cm
Mechanical alignment fixture set
Soldering iron (25-40 W)

Weight	Calibration weights	four corner	Linearity-hysteresis
HP-12K:	10 kg	5 kg	5 kg x 2
HP-20K:	20 kg	10 kg	5 kg x 4
HP-22K:	20 kg	10 kg	5 kg x 4
HP-30K:	30 kg	10 kg	5 kg x 6
HP-40K:	40 kg	20 kg	10 kg x 4
HP-60K:	60 kg	20 kg	10 kg x 6
HP-100K:	100 kg	40 kg	20 kg x 5
HP-102K:	100 kg	40 kg	20 kg x 5

AC adapter

The adapter will be dependent on the area of use.
See the Parts List for the proper adapter.

Multimeter

Oscilloscope

Room Controlled Temperature

A room where the temperature can be maintained
at $10 \pm 1^\circ\text{C}$ and $30 \pm 1^\circ\text{C}$ for 8 hours or more.



1.2 Corrective Maintenance Outline

Performance Test to locate defects	To perform the corrective maintenance, defects must be located and their cause determined. The easiest ways to locate a defect is to perform an operation check replacing suspected components.
Corrective maintenance procedure	Corrective maintenance is described by using a flowchart and a trouble-shooting table.
Adjustment details	An adjustment procedure is described that covers all units.



2. Performance Test

Warm-up the product before the performance test for 8 hours.



2.1 Performance Test Procedure

Verify as follows :

- Read the user request report. Check this defect point and this condition.
- External view (is the unit properly assembled and clean)
The balance has been leveled using the bubble spirit level.
The pan is level. (check for correct assembly)
- Check for plastic case crack at built-in nut of display lower case.
- Check for power supply circuit in main board.
- Functions for keys and key sheet.
- Weighing precision of "2.2 Test details".
- Interface functions.



2.2 Test Details

Keep this defective condition. This test has not sequence for each test.

Calibration

Calibrate the balance with the following mass. After calibration, place the calibration mass on the pan. Check the weighing error within the following value.

Weight	Calibration weights	Weighting error
HP-12K:	10 kg	± 0.1 g
HP-20K:	20 kg	± 0.1 g
HP-22K:	20 kg	± 1 g
HP-30K:	30 kg	± 0.1 g
HP-40K:	40 kg	± 0.5 g
HP-60K:	60 kg	± 1 g
HP-100K:	100 kg	± 1 g
HP-102K:	100 kg	± 10 g

Repeatability

After calibration, place the specified mass on the pan and read the displayed value. Repeat the test 10 times. The difference between the values of all five tests and the true value must be within the specifications.

Weight	Test weights	Zero (max. - min.)	Span (Standard deviation)
HP-12K:	10 kg	± 0.2 g	± 0.1 g
HP-20K:	20 kg	± 0.2 g	± 0.1 g
HP-22K:	20 kg	± 0.2 g	± 0.25 g
HP-30K:	30 kg	± 0.2 g	± 0.1 g
HP-40K:	40 kg	± 1.0 g	± 0.5 g
HP-60K:	60 kg	± 2 g	± 1.0 g
HP-100K:	100 kg	± 2 g	± 1 g
HP-102K:	100 kg	± 2 g	± 1 g

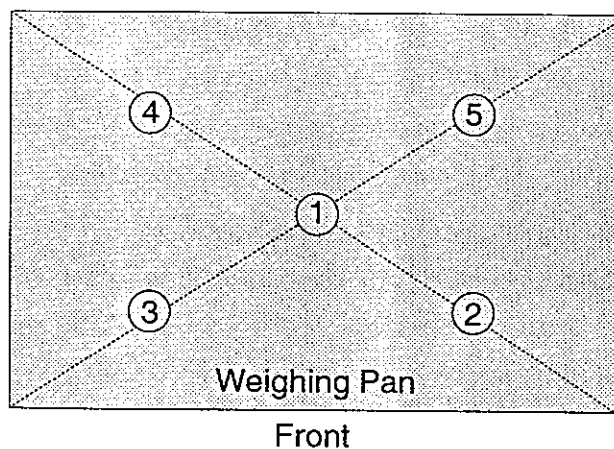
Use Check mode D2 for HP-22K and HP-102K. Refer to "Internal Count Display" for D2.

Corner Load Error

- Step 1 Do not display zero to avoid the "zero track mode".
- Step 2 Place the following test mass at the center of the pan (point 1) and record the displayed value.
- Step 3 Place this mass at position 2. Check the difference between this value and the center.
- Step 4 Place this mass at position 3. Check the difference between this value and the center.
- Step 5 Place this mass at position 4. Check the difference between this value and the center.
- Step 6 Place this mass at position 5. Check the difference between this value and the center.
- Step 7 Check these difference value are within the following value.

Weight	Test mass	Four corner error (each position 2,3,4,5 - position 1)
HP-12K:	5 kg	± 0.3 g
HP-20K:	10 kg	± 0.4 g
HP-22K:	10 kg	± 0.6 g
HP-30K:	10 kg	± 0.3 g
HP-40K:	20 kg	± 1.0 g
HP-60K:	20 kg	± 1 g
HP-100K:	40 kg	± 4 g
HP-102K:	40 kg	± 5 g

Use Check mode D2 for HP-22K. Refer to "Internal Count Display" for D2.



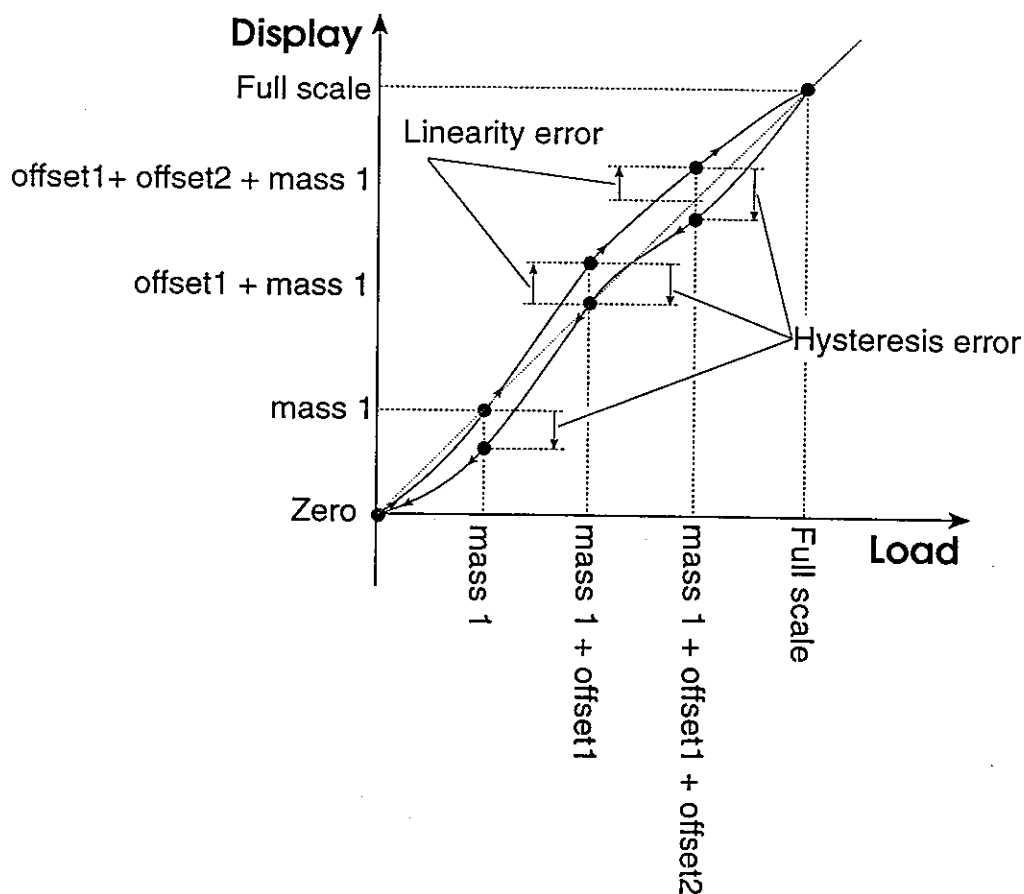
Linearity and Hysteresis

Linearity

- Step 1 After calibration, place mass 1 on the pan. Record this display value 1.
- Step 2 Place offset mass gradually. Place mass 1, record this display value and check difference between this value and value 1. (Linearity check)
- Step 3 When the load reach to full scale, remove a mass, record these display value and check difference between this value and step 2 value at same load. (Hysteresis check)
- Step 4 Check these difference using the following table.

Weight	Test mass 1	Offset mass	Linearity error	hysteresis error
HP-12K:	5 kg	5 kg	± 0.2 g	± 0.3 g
HP-20K:	5 kg	5 kg x 3	± 0.2 g	± 0.3 g
HP-22K:	5 kg	5 kg x 3	± 0.4 g	± 0.5 g
HP-30K:	5 kg	5 kg x 5	± 0.2 g	± 0.3 g
HP-40K:	10 kg	10 kg x 3	± 1.0 g	± 1.5 g
HP-60K:	20 kg	20 kg x 2	± 1 g	± 3 g
HP-100K:	20 kg	20 kg x 4	± 2 g	± 3 g
HP-102K:	20 kg	20 kg x 4	± 2 g	± 8 g

Use Check mode D2 for HP-22K and HP-102K. Refer to "Internal Count Display" for D2.





3. Corrective Maintenance

Perform corrective maintenance for the HP 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.

Type A: Replacing, disassembling, or assembling mechanical unit.

Type B: Replacing or adjusting electrical parts.

Type C: Initializing a board and inputting specific data.

Type D: Adjusting the characteristics of the mechanical unit.

Type E: Inputting temperature data.

Type F: Performing function tests.

Type G: Performing drift check.



3.1 Troubleshooting Table

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

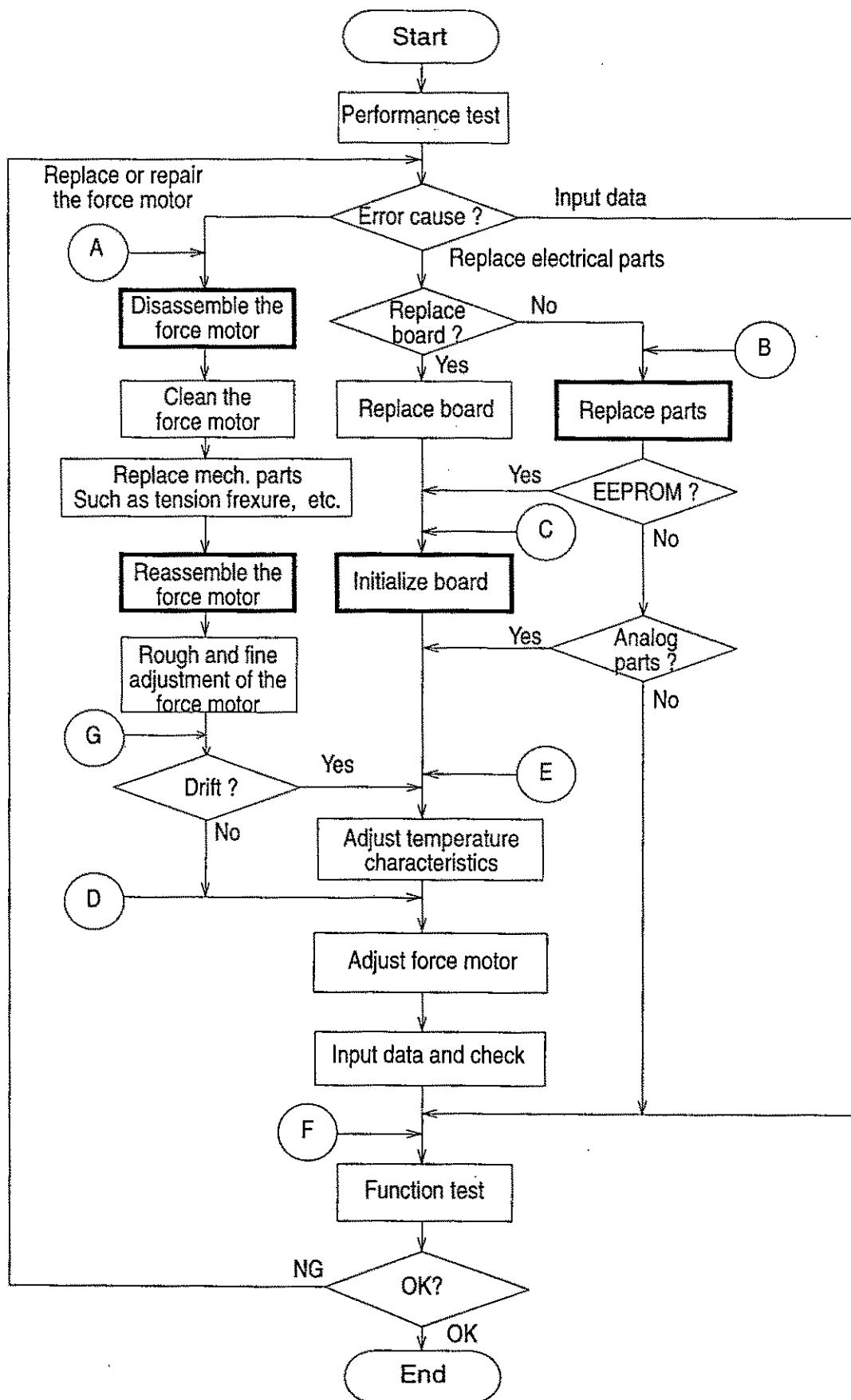
Problem	Location	Checkpoint	Solution	Type
No display, beam is not balanced	AC adapter	Is it the correct AC adapter for the power source used	Replace with the correct AC adapter	Type F
		Is the output correct. Measure the output of the AC adapter with it connected to the balance (contacts of the power input connector on the power board). The DC output should be at least 12 volts, but no greater than 20 volts	If the output is not correct, replace the AC adapter	Type F
	Fuse	Disconnect the AC adapter and measure the fuse with an ohm meter	Replace with correct fuse	Type F

Problem	Location	Check	Solution	Type
No display, beam is not balanced	Force motor	Check that the connectors are installed correctly	Replacing, disassembling, or assembling mechanical unit.	Type A
	Power supply section on Main board	Check voltage at +5V, -12V, Vh, Vf1, Vf2 and Q2	Replace parts or main board. pull down Q2. Exchange display lower case to new one.	Type B
	Display lower case	Check built-in nut about crack.	Exchange display lower case to new one.	Type B
Unstable, repeatability error, hysteresis error	Flexures	test weighing spec. .	Replace flexures	Type A
	Main board	Check voltages. Test AMZ43 using new one.	Replace them and adjust all.	Type B
	Force motor	Check for particles between the magnet and force coil	Clean the force motor, assemble it and adjust balance.	Type A
4 corner error	Flexures	test weighing spec. .	Adjust 4 corner error. Replace it.	Type A
Zero error, -----	Flexures	Check zero point, tension & fulcrum flexure principally.	Adjust balance. Replace it.	Type A
Error 0, Temp. error	Force motor Main board	Check the "T1" count within 600,000 ~ 900,000.. Check stability within 20 digit/5sec.	Replace analog module in force motor.	Type A
Error 1 Unstable	Force motor AMZ43	Check them using new one.	Replace it.	Type B
Error 2 Incorrect value	Data entry	Select data within acceptable range.	Try to enter data once more.	Type F

Problem	Location	Check	Solution	Type
Linearity error	Main board	Check linearity.	Input linearity data.	Type F
	Force motor	Check linearity data.	Replace flexure principally.	Type A
Error 3 E ² PROM error	RAM of Main board	Replace the main board with substitute or replace the E ² PROM IC.	Replace the main board with substitute or replace the E ² PROM IC.	Type B Type C
Error 4 RAM error	Main board	Microprocessor RAM error.	Replace microprocessor.	Type D
Error 8 E ² PROM version error	Main board	Data in the E ² PROM does not agree with the data in the microprocessor.	Press RE-ZERO keys to update the version.	Type F
Error 9 E ² PROM format error	Main board	E ² PROM is not initialized (IC was changed).	Press and hold RE-ZERO and MODE keys, press PRINT key to initialize E ² PROM	Type C
CAL E -CAL E		Calibration mass not within expected weight range.	Calibrate and Change the calibration mass.	Type F
P FAIL		Power was interrupted without turning the balance off using the ON/OFF key.	Press the ON:OFF key	
Lo		The balance can not count because of too light unit sample or 100% sample.	Increase a sample weight.	
from 20 - pcs to 100 - pcs		Sample weight is light. Increase sample number to display number.	Add samples to display number.	



3.2 Maintenance Flowchart





4. Force Motor

This chapter describes the procedures and notes for the flexure assembly replacement, bobbin cleaning, and adjustment after reassembly of the mechanical unit.

Notes: Use a dust free environment for disassembly and reassembly. Adjustments are needed after reassembly for linearity, repeatability, and cornerload error.

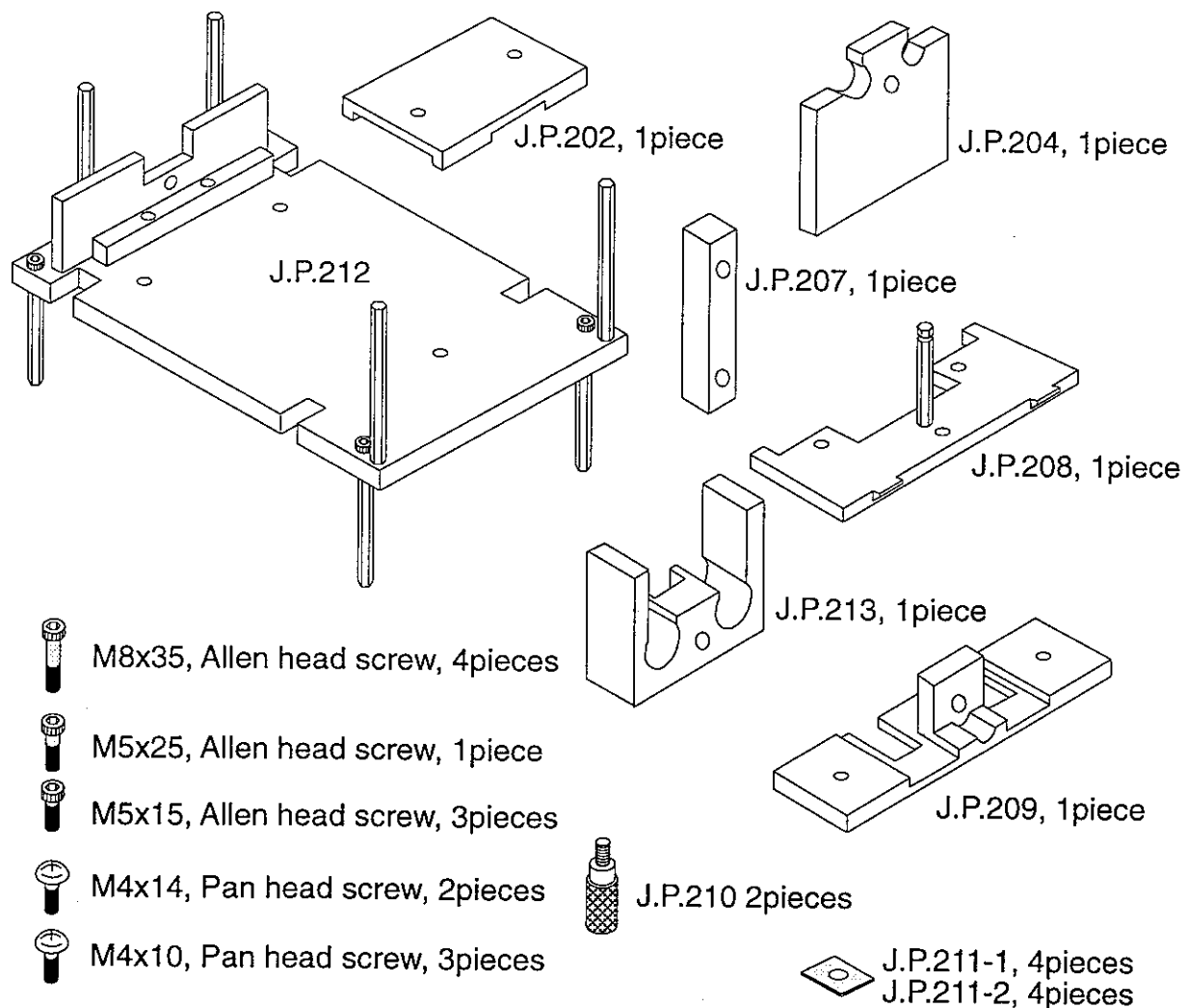
Temperature adjustment is also needed since the balance is affected by tightening torque or stress. If you do not have the proper facilities to do the temperature adjustment, do not attempt to disassemble the force motor.

The tools that are model specific to this operation are for the:

J.P.212, 202, 204, 213, 207, 208, 209, 210, 211 of common use.

The tools will be referred to in the text as 'J.P. numbers.

Mechanical alignment tools:





4.1 Disassembly

NOTE For the purposes of this update, the sides of the Force Motor will be referred to as they are situated when the Force Motor is installed in the balance. In other words - the front of the Force Motor is facing the front of the balance; the top of the Force Motor is facing the top of the balance, etc., before the Force Motor is removed.

PREPARATION

The balance will have to be disassembled to the point where the Force Motor Assembly is free from the balance housing.

- Step 1 Situate the Assembly / Disassembly Stand (J.P. 212) with the head piece on top.
- Step 2 Place the Force Motor on the J.P. 212 with the back of the Force Motor fitting onto the Stand head (Figure A).
- Step 3 Using a long neck 4mm Allen wrench, loosen the upper screw on the tension bearing (Figure A).
- Step 4 Going underneath the Assembly / Disassembly plate, attach the two hex bolts into the holes underneath the jig head (Figure A).
- Step 5 Attach the three allen head screw and tighten (Figure A).

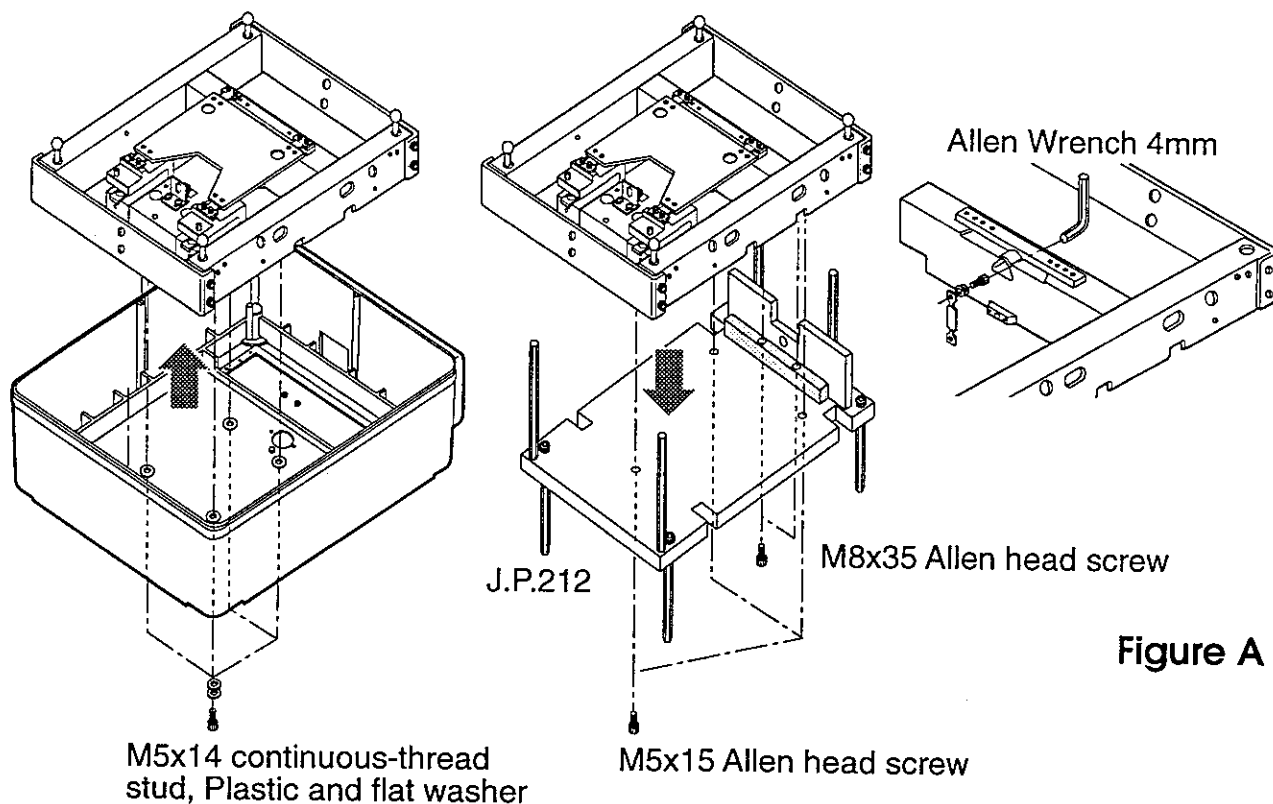


Figure A

- Step 6 First loosen, then remove the four sets of two hex bolts that connect the upper flexible beam to the Force motor assembly (Figure B).
- Step 7 Remove the upper flexible beam (Figure B).
- Step 8 Turn the whole assembly over.
- Step 9 First loosen, then remove the four sets of two hex bolts that connect the lower flexible beam to the Force motor assembly (Figure B).
- Step 10 Turn the whole assembly over.
- Step 11 Remove the top screw and washer on the back tension flexure (Figure C).
- Step 12 Remove the two allen head screw in the holes underneath the jig head (Figure D).
- Step 13 Remove the three allen head screw (Figure D).
- Step 14 Lift off the Force motor housing - be careful of the front tension flexure and its fitting plate (Figure D).
- Step 15 Lift the Force motor assembly off of the Assembly / Disassembly Stand (Figure D).

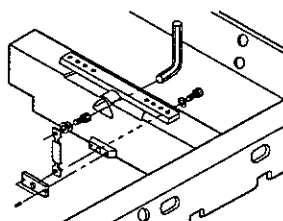
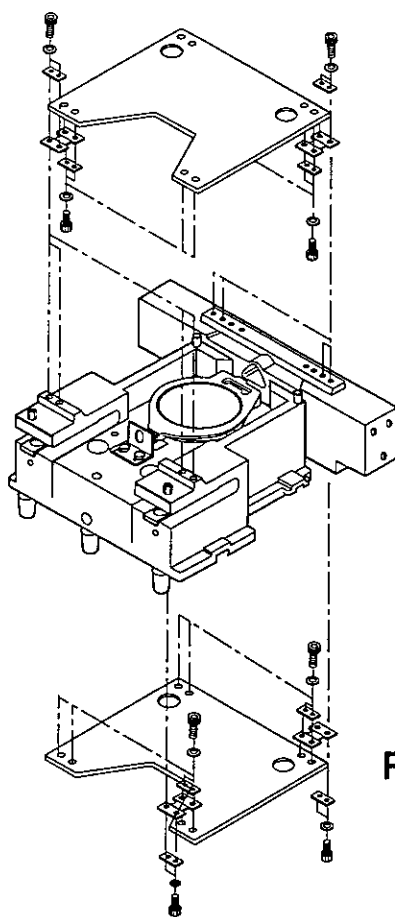


Figure C

Figure B

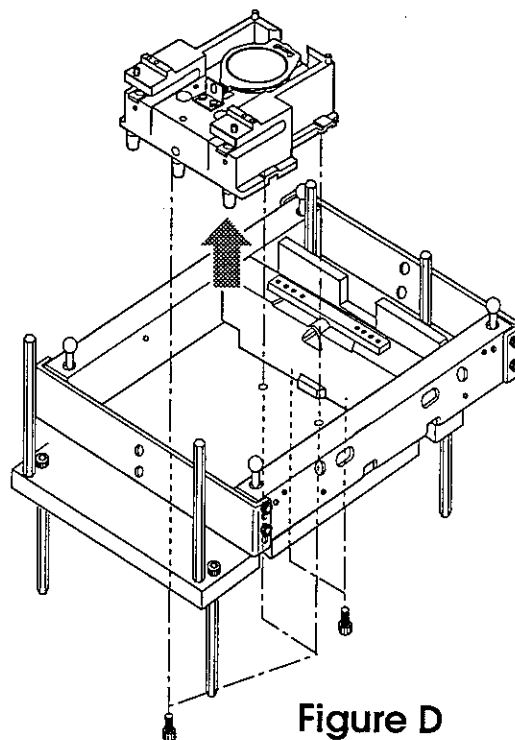


Figure D

Step 16 Loosen and remove the right angle guide (Figure E).

Step 17 Holding the outer beam (it will drop without support) - Loosen and remove the upper on the inner tension flexure (Figure E).

Step 18 Still holding the upper beam (it will drop without support) - Turn the whole assembly around.

Step 19 Still holding the outer beam (it will drop without support) - Loosen and remove the lower screws on the back fulcrum tension flexure (Figure E).

Step 20 Remove the outer beam.

Step 21 Take the outer beam and remove the back fulcrum tension flexure.

Step 22 Turn the assembly over.

Step 23 Loosen and remove overload stopper plate (Figure F).

Step 24 Loosen and remove screws and lift away balance plate - watch out for the washers.

Step 25 Holding the balance beam, remove the remaining lower hex screw on the inner flexure.

Step 26 Loosen and remove the four screws holding the magnet assembly.

Step 27 Lift out the magnet assembly.

Step 28 Loosen and remove the screws on the position detector sensor board taking note of which board holes they came out of (Figure F).

Step 29 Lift away the position detector sensor board.

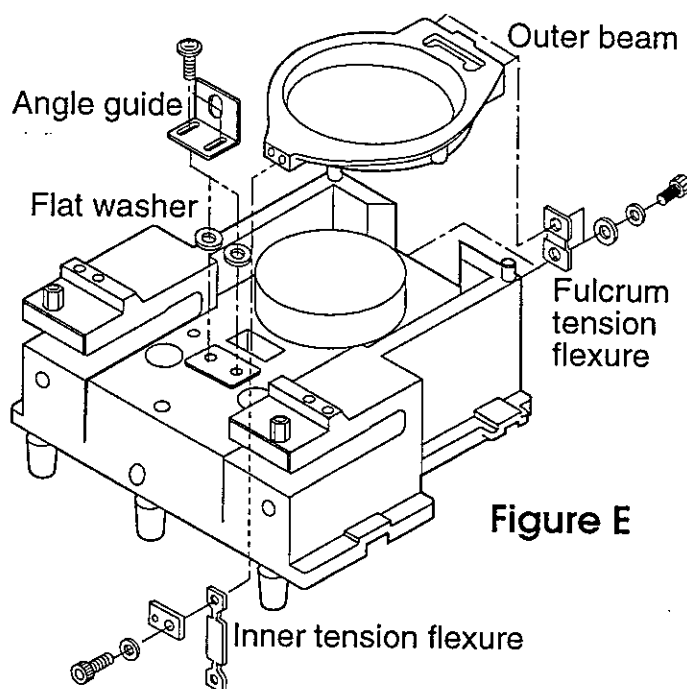


Figure E

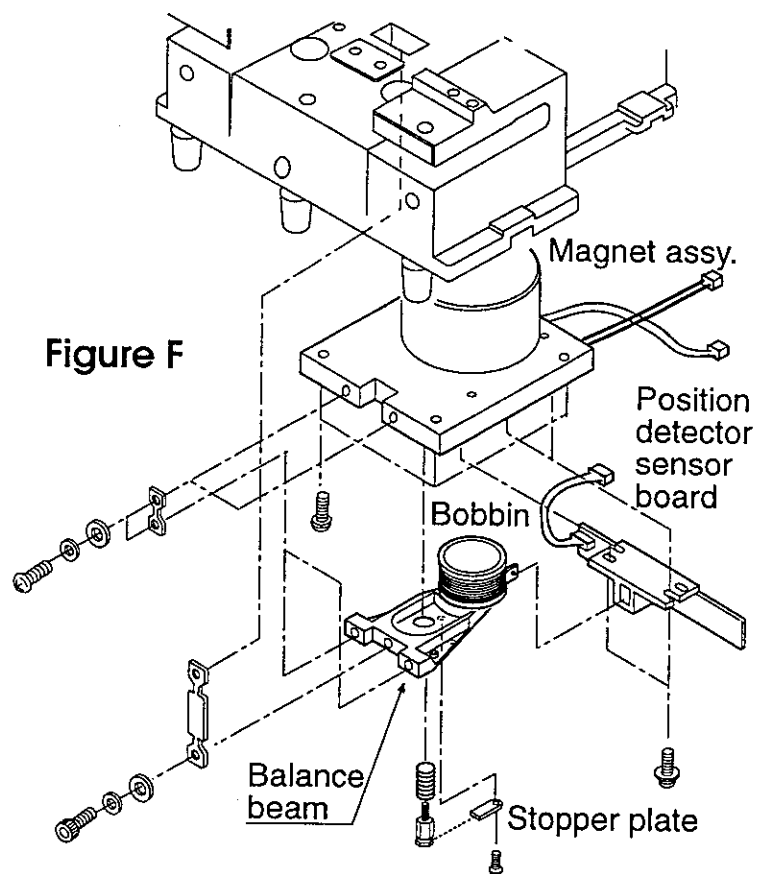
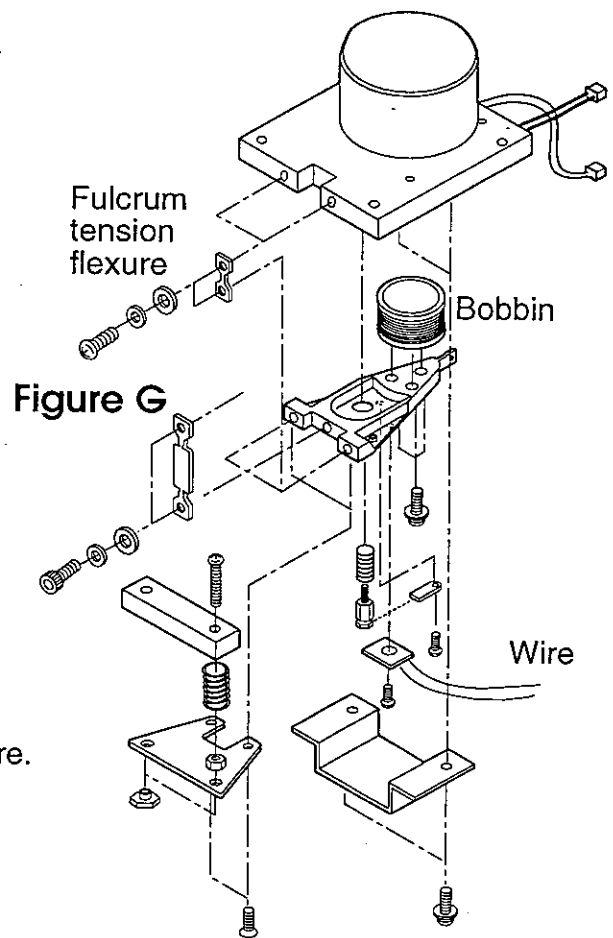


Figure F

- Step 30 Loosen the screw on the position detector beam stopper plate - slide the stopper plate away.
- Step 31 Unsolder the two wires which is attached to the force coil bobbin. (Figure G)
- Step 32 Holding the balance beam (it will drop without support) - Loosen and remove the bottom screws on the lower fulcrum flexure.
- Step 33 Carefully lift off the balance beam.
- Step 34 Loosen and remove the remaining screws on the lower fulcrum flexure.

End of FORCE MOTOR DISASSEMBLY procedure.



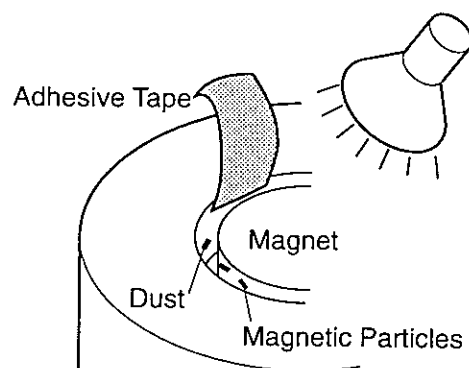


4.2 Cleaning the Force Motor magnet and Bobbin

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 length of 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 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 7 Reassemble the force motor and test it for repeatability. A 4 corner 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. If a balance is used around food, check for contamination caused by insects. The force motor is warm and insects find this a good place to lay their eggs.

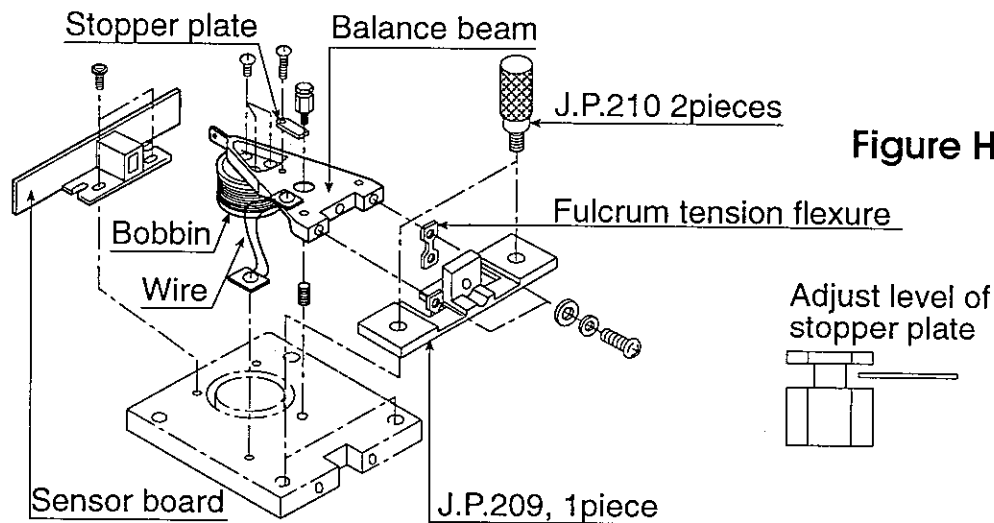
END End of CLEANING THE FORCE MOTOR MAGNET procedure.



4.3 Force Motor Assembly

Note: The tools will be referred to in the text as "J.P. 2XX". Please identify which is the correct tool for the model you are working on.

Step 1 Loosen the three screws on the Force Coil Bobbin bolt using a screw driver.



- Step 2 Place the J.P. 209 and 210 to support the balance beam.
- Step 3 Carefully put the balance beam into place.
- Step 4 Attach the bottom screws on the lower fulcrum flexure, then the upper ones - tighten
- Step 5 Please note that the round hole and notch go up on the fulcrum flexure.
- Step 6 Remove the J.P. 209 or 210.
- Step 7 By tightening and loosening these screws, center the bobbin in the Force motor magnet until the balance beam moves free and smooth -when it does, tighten the three screws on the Bobbin.
- Step 8 Check that the balance beam is moving freely. This whole process could take a couple of tries.
- Step 9 Resolder the two wires which is attached to the Inner beam.
- Step 10 Replace the position detector sensor board. Make sure that the hole of the Inner beam is centered.
- Step 11 Reconnect connectors J4 and J5 to the balance power supply board.
- Step 12 Connect the balance to power - and press the ON/OFF key.
- Step 13 Press the RE-ZERO key. "0.0" should be displayed.
- Step 14 Lightly touch the Bobbin screw, the display should fluctuate. If not readjust the Force Coil Bobbin.

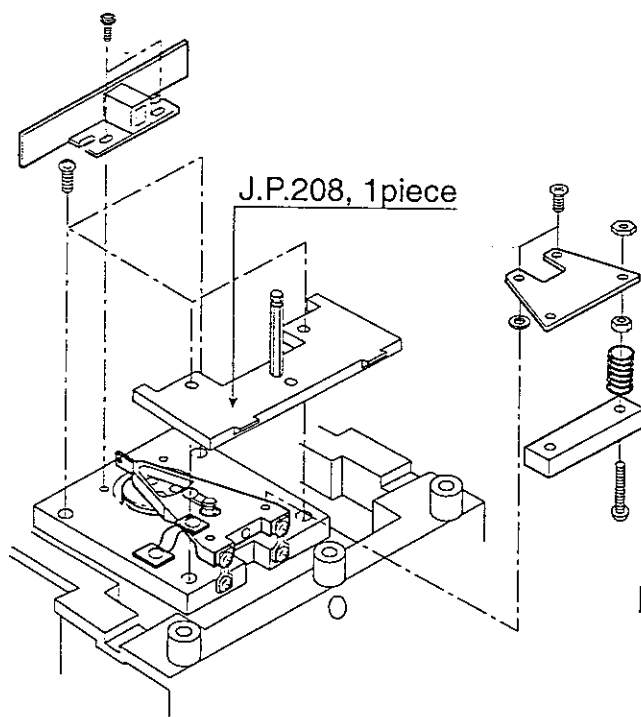


Figure J

- Step 15 Replace and position the position detector beam stopper plate .
- Step 16 Disconnect the power and connectors J4 and J5.
- Step 17 Replace the Force motor into its housing - be careful that the wires go back in their proper channels.
- Step 18 Loosely attach the four magnet-to-frame screws.
- Step 19 Take the J.P. 208 and position it as shown a figure.
- Step 20 Tighten the four screws down.
- Step 21 Replace the cover plate for the wires.
- Step 22 Replace the top screws of the lower fulcrum flexure with the round hole up, and the shinny side out.
- Step 23 Replace balance plate (including washers if they were any during disassembly), tighten.

Step 24 Turn the whole assembly over.

Step 25 Attach J.P. 213 (be sure you have the correction one for your balance! See list above) to the upper beam.

Step 26 Re-attach the top screws on the back fulcrum tension flexure with the round hole up, and the shiny side out using the J.P. 213 to hold them in place, tighten.

Step 27 Remove J.P. 213.

Step 28 Attach J.P. 204.

Step 29 Use J.P. 204 to make sure that the flexure are in the correct place - attach the lower screws on the back fulcrum tension flexure.

Step 30 Remove J.P. 204.

Step 31 Turn the whole assembly around and attach, do not tighten, the top screw on the front tension flexure.

Step 32 Turn the whole assembly around and attach the J.P. 207.

Step 33 Use the metal right-angle to get the tool perpendicular to the repair surface - then tighten the top screw on the front tension flexure, tighten lower screw, remove J.P. 207.

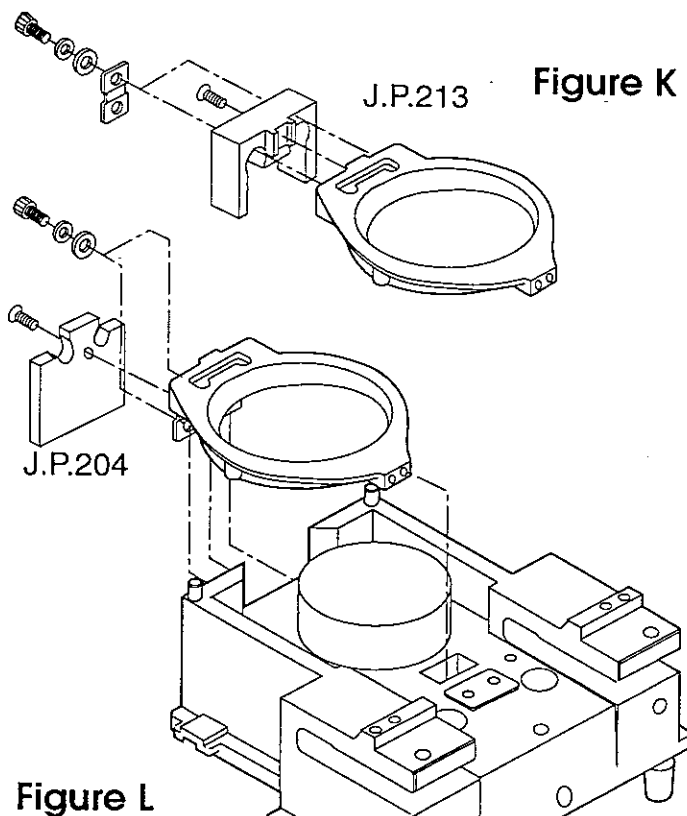


Figure L

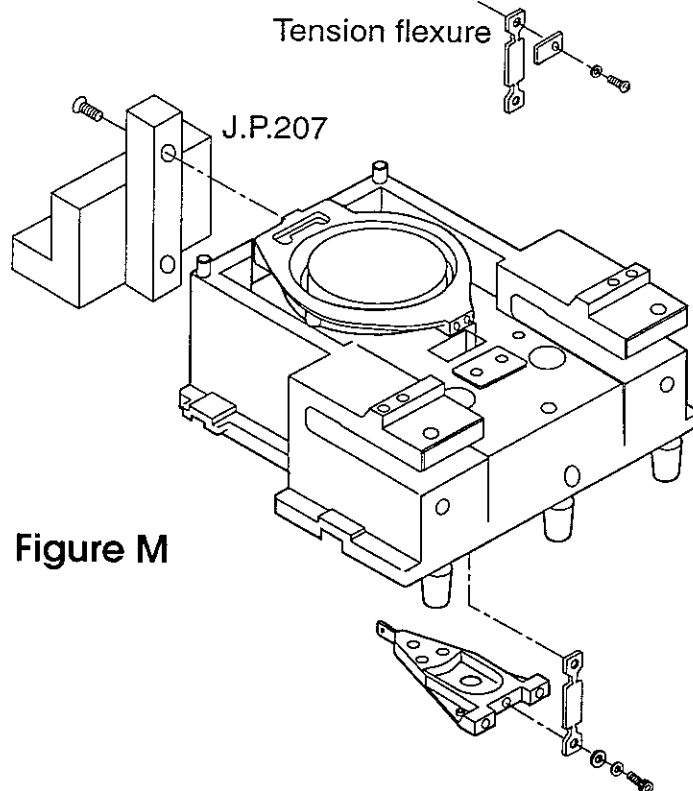
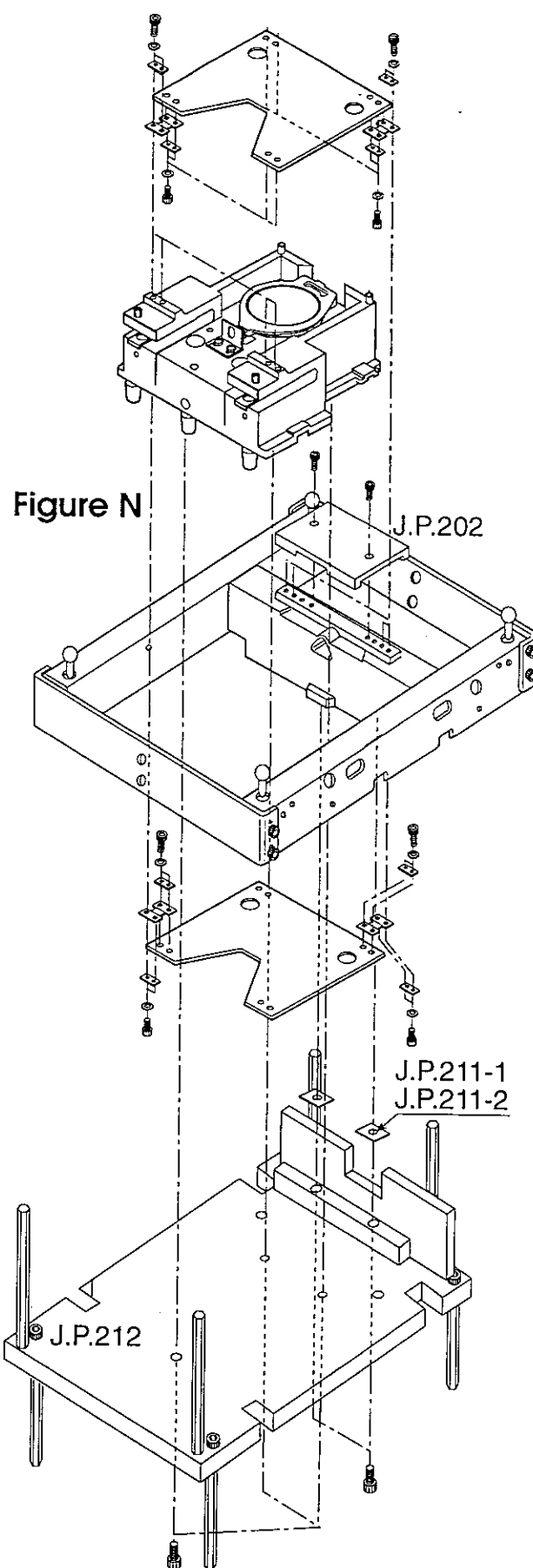
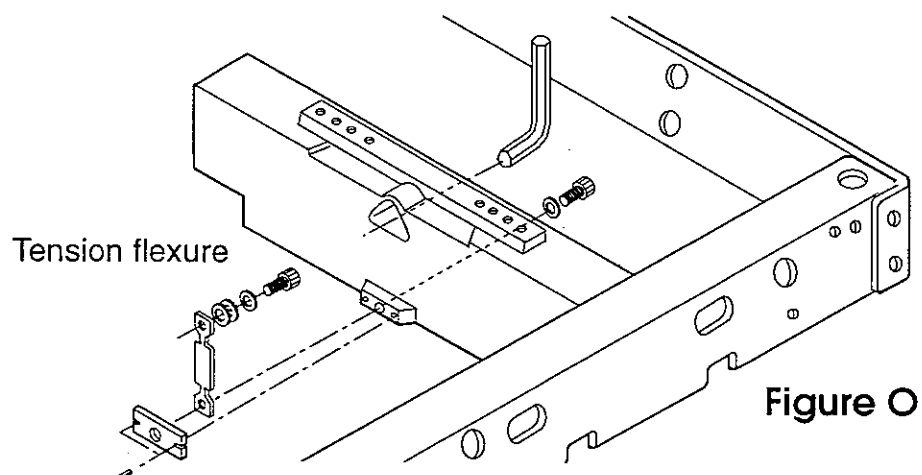


Figure M

- Step 34 Set the lower flexure down on the Assembly / Disassembly Stand (J.P. 212).
- Step 35 Place the Force motor over it (the two legs go through the holes).
- Step 36 Attach tension flexure to the Force motor housing.
- Step 37 Replace the Force motor housing, carefully placing it down and over.
- Step 38 Attach the two hex bolts into the holes underneath the jig head.
- Step 39 Take the J.P. 202 and attach it with two screws as shown a figure N.
- Step 40 Attach the three wing bolts and tighten.
- Step 41 Remove the J.P. 202.
- Step 42 Attach the upper screw on the tension flexure. If the hole does not match, use a shim (J.P. 211) to raise assembly up.
- Step 43 Taking the upper flexure beam, loosely replace the four sets of two allen head bolts that connect the upper flexure beam to the Force motor assembly.
- Step 44 Turn the whole assembly over.
- Step 45 Replace the spacers.
- Step 46 Loosely replace the four sets of two allen head bolts that connect the lower flexure beam to the Force motor assembly.
- Step 47 Turn the whole assembly over and tighten the upper flexure beam allen head bolts.
- Step 48 Remove the two allen head bolts into the holes underneath the jig head.
- Step 49 Remove the three bolts.



- Step 55 Turn the assembly front forward, attach the overload stopper . Make sure that the top screw of the front tension flexure is centered in the overload stopper hole.



END End of FORCE MOTOR ASSEMBLY procedure.



5. Adjustment



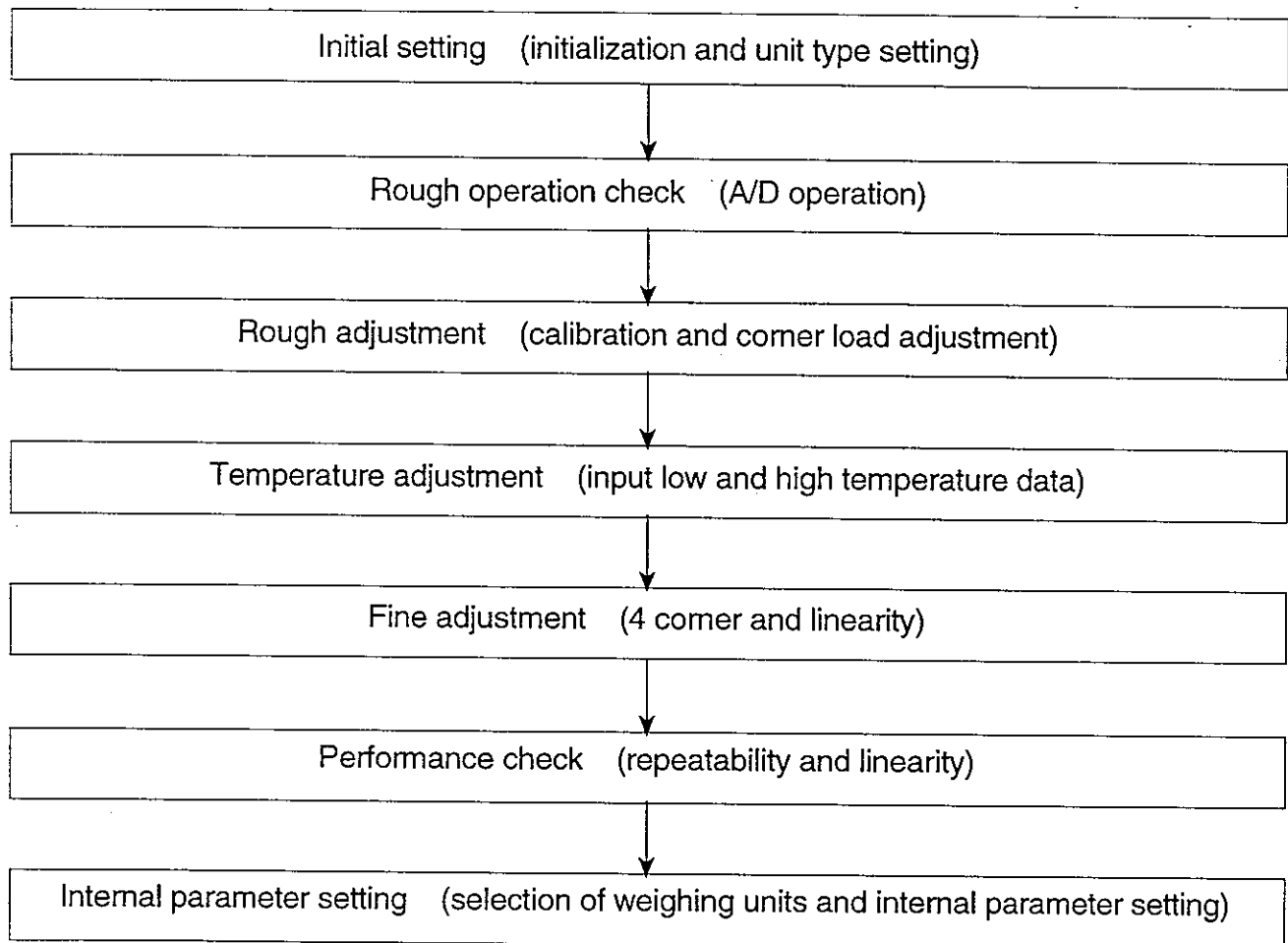
5.1 Adjustment Specifications

This adjustment specifications use check mode D2 that displays gram weighing.

Products	HP-12K	HP-20K	HP-22K	HP-30K	HP-40K	HP-60K	HP-100K	HP-102K
Comer load error	±0.3 g	±0.4 g	±0.6 g	±0.3 g	±1.0 g	±1 g	±4 g	±5 g
Test weight	5 kg	10 kg	10 kg	10 kg	20 kg	20 kg	40 kg	40 kg
Repeatability, 10 times, The σ is Standard deviation σ .								
Zero	±0.2 g	±0.2 g	±0.2 g	±0.2 g	±1.0 g	±2 g	±2 g	±2 g
Span, σ	≤0.1g	≤0.1g	≤0.25 g	≤0.1 g	≤0.5 g	≤6 g	≤1g	≤1 g
Test weight	10 kg	20 kg	20 kg	30 kg	40 kg	60 kg	100 kg	100 kg
Linearity / hysteresis								
Linearity error	±0.2 g	±0.2 g	±0.4 g	±0.2 g	±1.0 g	±1 g	±2 g	±2 g
Hysteresis error	±0.3 g	±0.3 g	±0.5 g	±0.3 g	±1.5 g	±3 g	±3 g	±8 g
Check weight	5kgx2	5kgx4	5kgx4	5kgx6	10kgx4	20kgx3	20kgx5	20kgx5
CAL weight	10kg	20 kg	20 kg	30 kg	40 kg	60 kg	100 kg	100 kg
Temperature compensation, Hight temp. = 30°C±3°C, Low temp. = 10°C±3°C, 8 hours or more								
Zero drift	±4.0 g/20°C				±20.0 g/20°C		±20.0 g/20°C	
Span drift	±3.0 ppm/°C				±5.6 ppm/°C		±5.8 ppm/°C	
Test weight	20kg				40kg		60kg	
List sensitivity	±0.5 g				±1.0 g		±1 g	
D0 display								
Zero, approx.	1600 ~ 3400				1600 ~ 3400		1600 ~ 3400	
Span, approx.	7800 ~ 9600 /30kg				6100 ~ 7600 / 60kg		6000 ~ 7000 / 100kg	

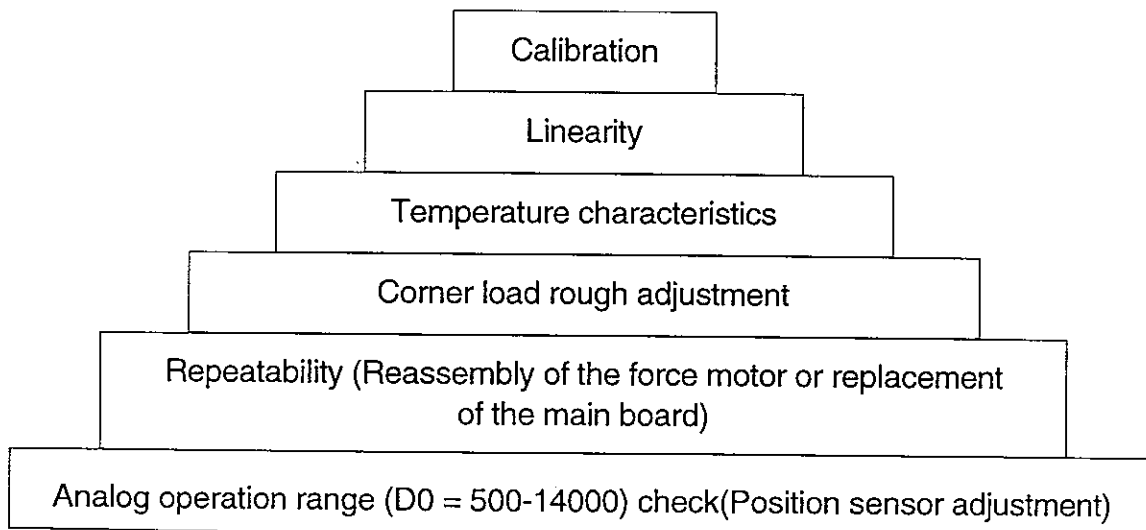


5.2 Adjustment Flow Chart



5.3 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.

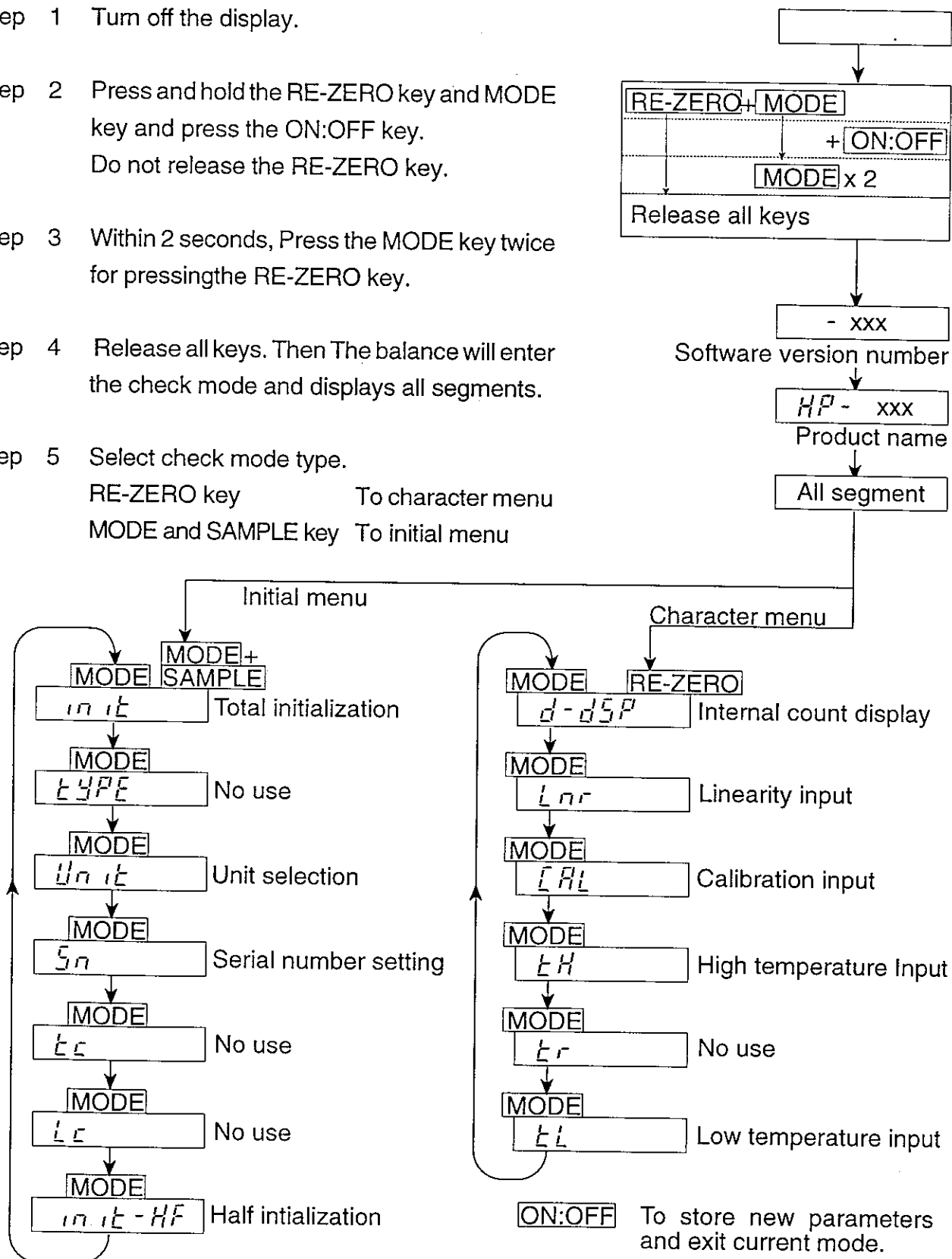




5.4 Check Mode

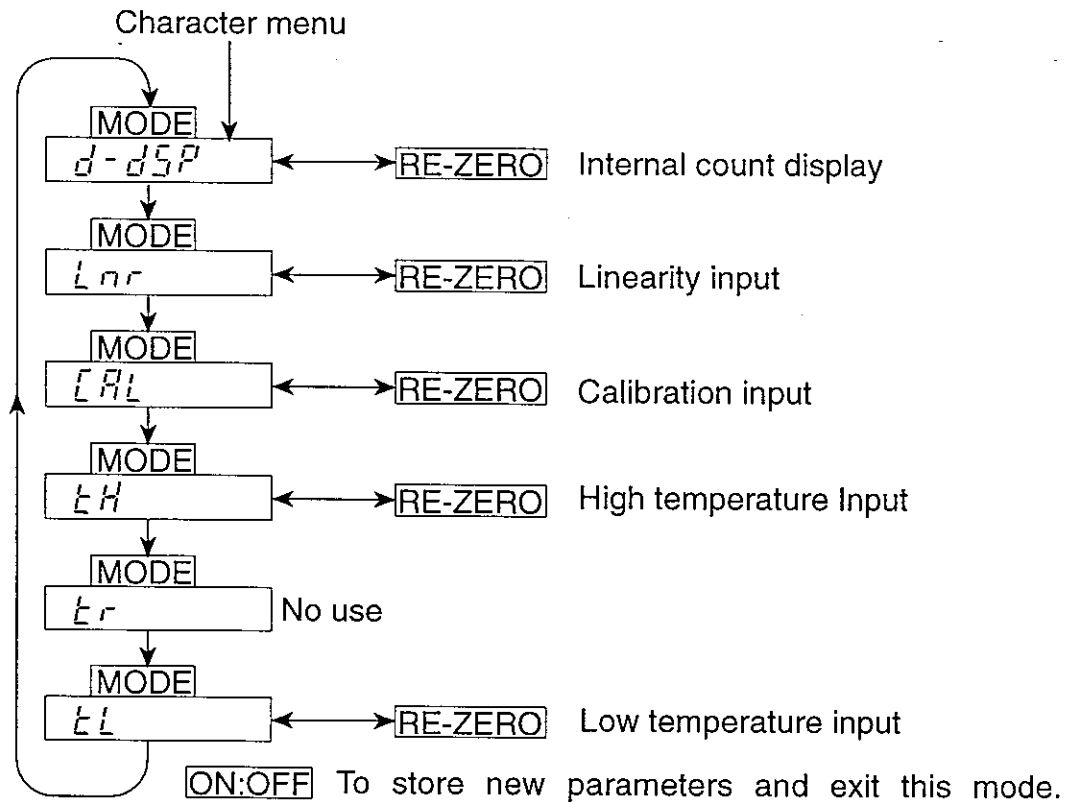
Entering Check Mode

- Step 1 Turn off the display.
- Step 2 Press and hold the RE-ZERO key and MODE key and press the ON:OFF key.
Do not release the RE-ZERO key.
- Step 3 Within 2 seconds, Press the MODE key twice for pressing the RE-ZERO key.
- Step 4 Release all keys. Then The balance will enter the check mode and displays all segments.
- Step 5 Select check mode type.
RE-ZERO key To character menu
MODE and SAMPLE key To initial menu

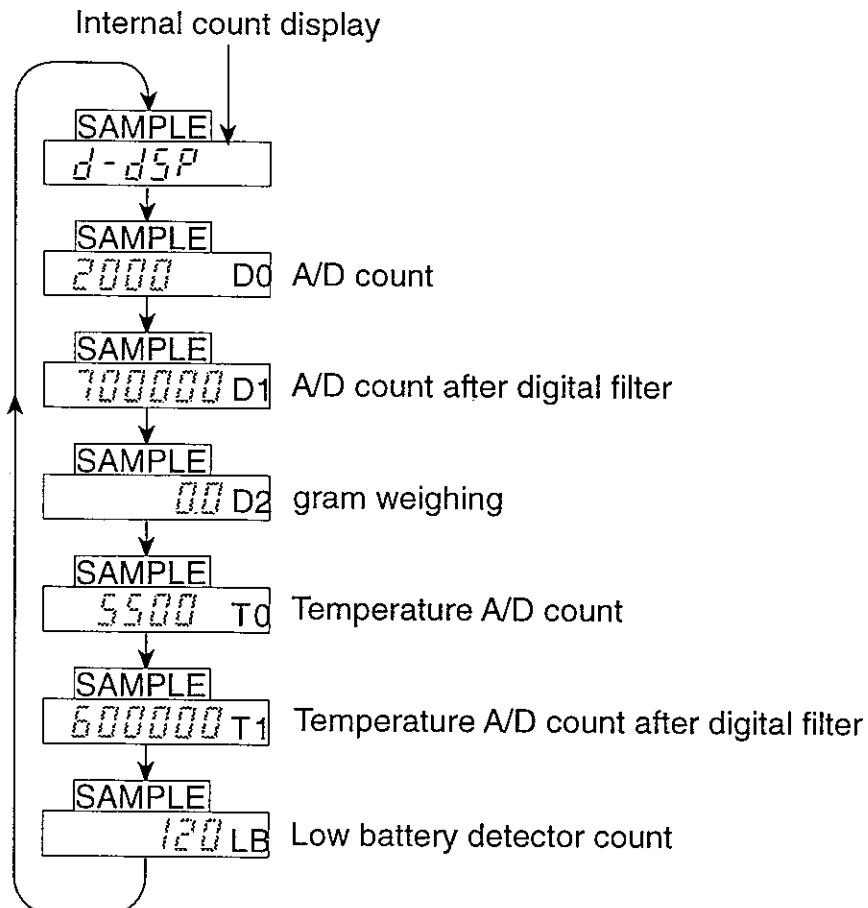


Note Menu is updated without announcement and some menu is added or deleted.

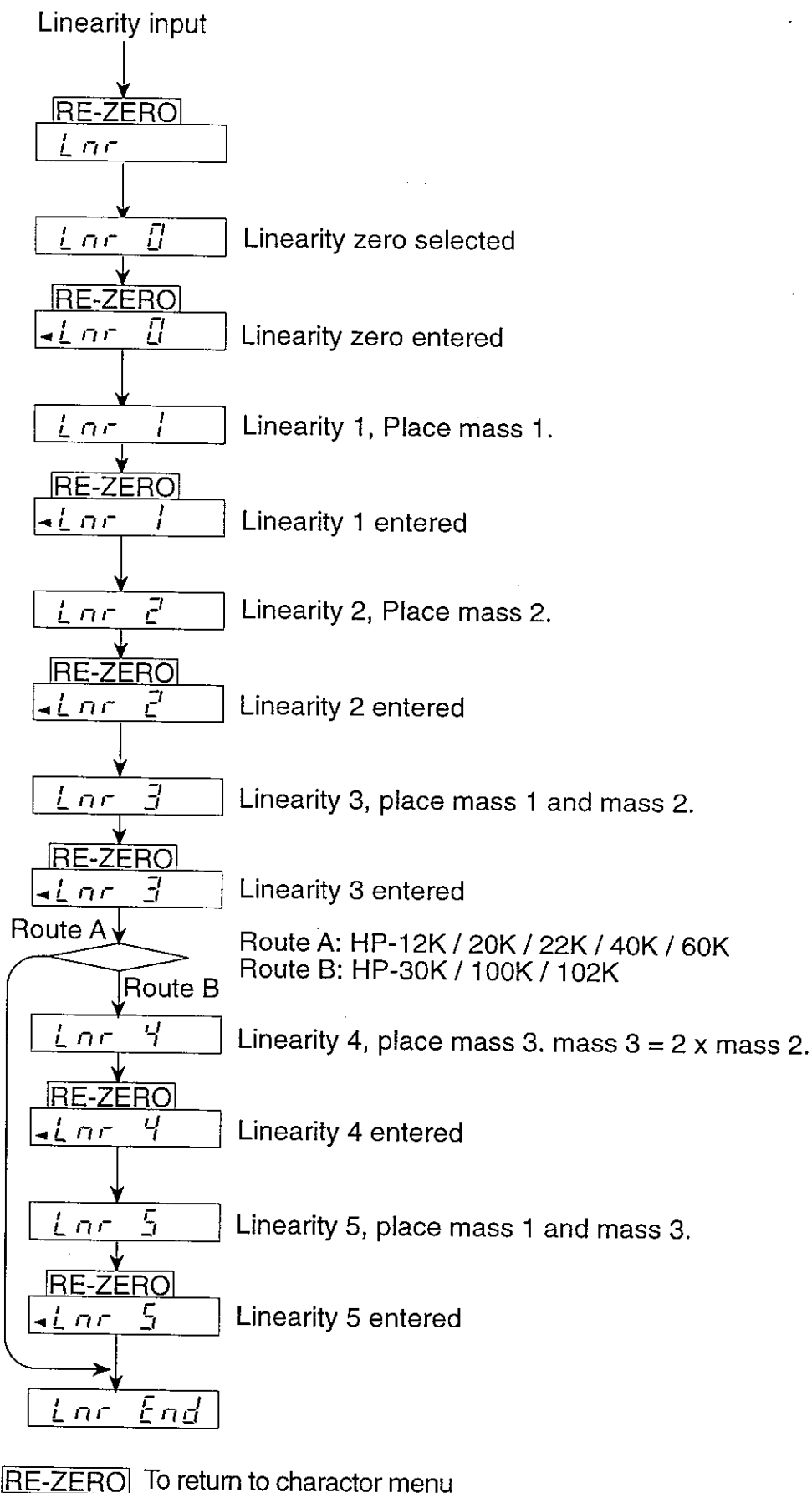
Character Menu



Internal Count Display



Linearity Input



Calibration Input

Calibration input

[CAL]

[RE-ZERO]

[CAL] 0

Calibration zero selected

[PRINT]

[MODE]

3000000

[MODE]

[RE-ZERO]

[PRINT]

To select digit to change

To change digit value

To store the calibration mass data

[RE-ZERO]

[CAL] 0

Calibration zero entered

[RE-ZERO]

[CAL] xxx

Calibration span selected

[RE-ZERO]

[CAL] xxx

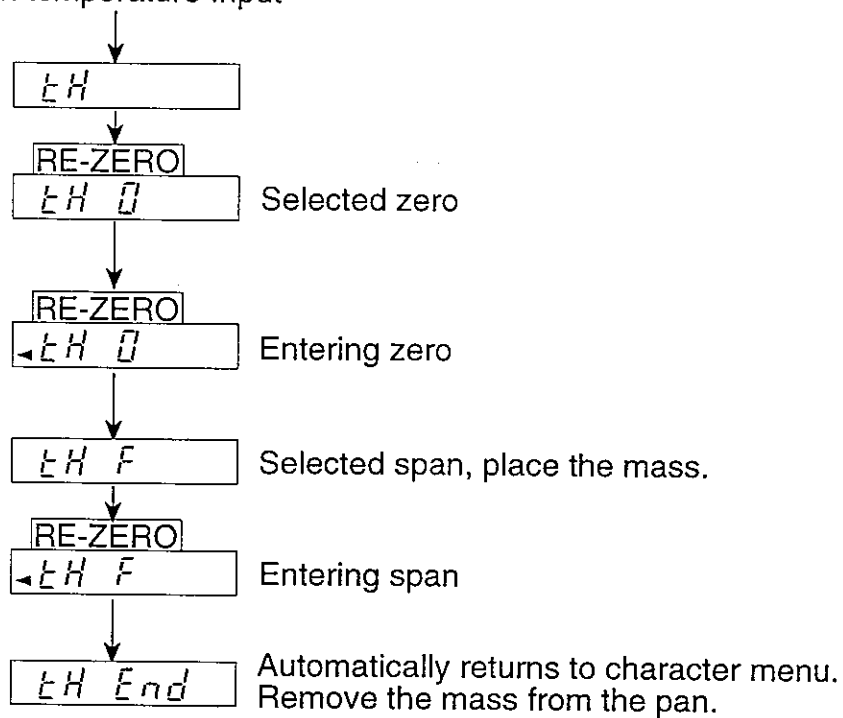
Calibration span entered

[CAL] End

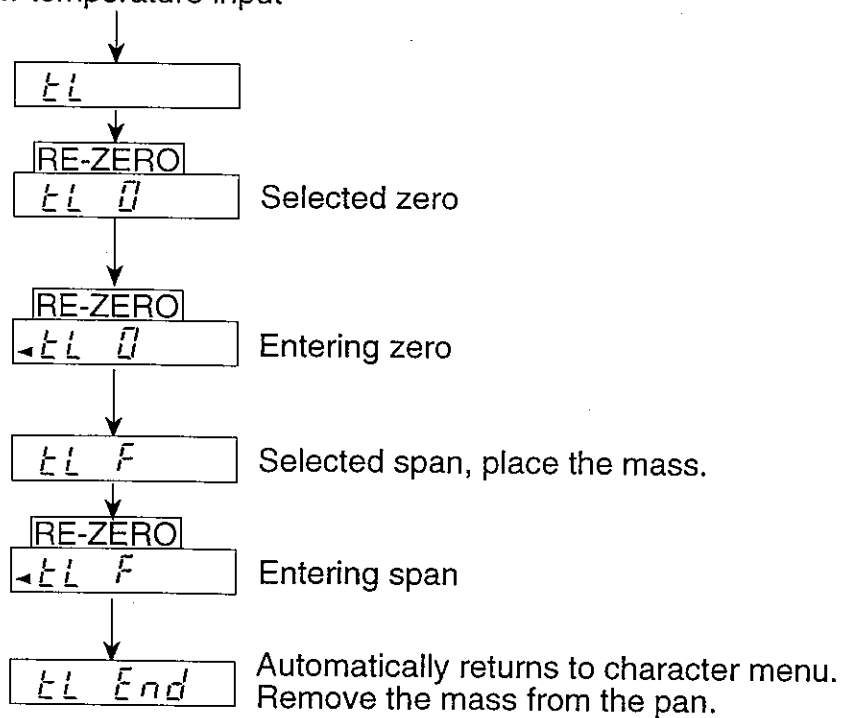
Automatically returns to character menu.
Remove the mass from the pan.

Temperature Compensation

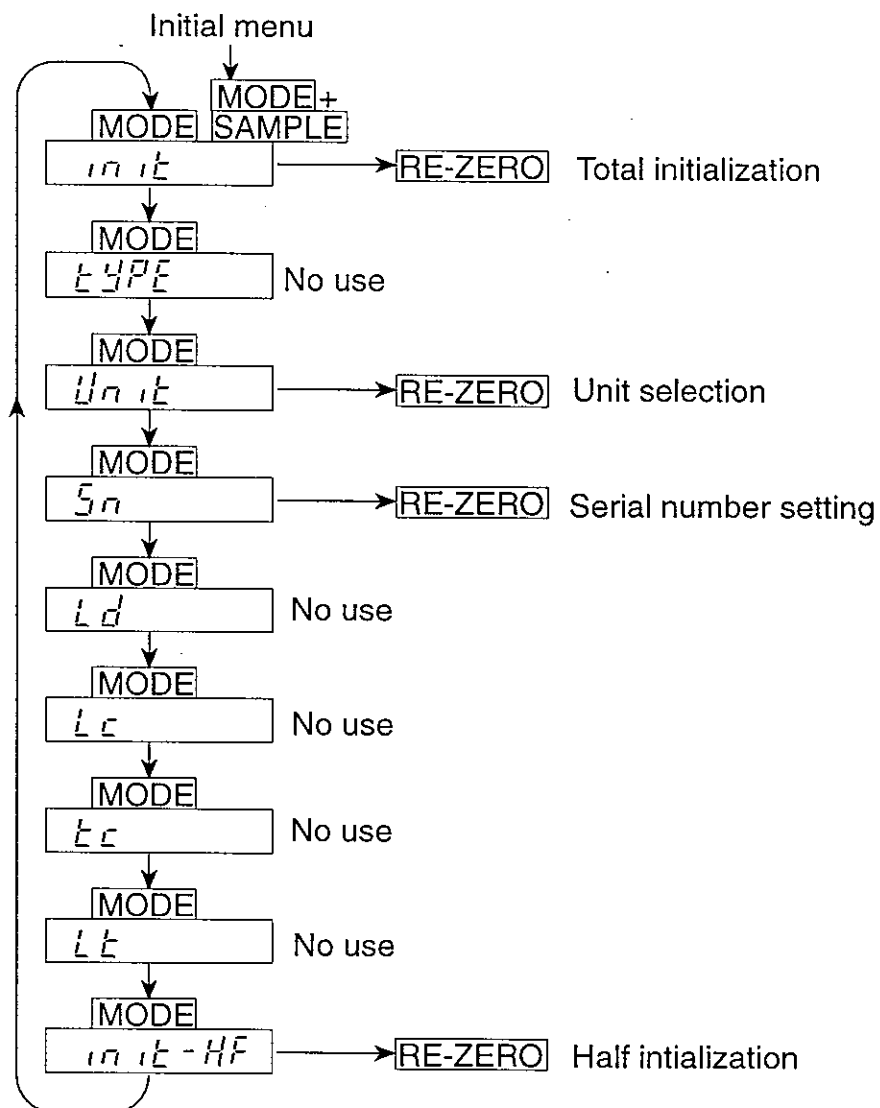
High temperature Input



Low temperature input



Initial Menu



Note Menu is updated without announcement and some menu is added or deleted.

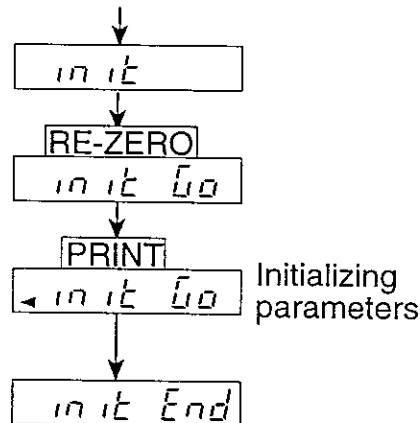
Total Initialization

Caution Do not use this procedure if you do not have a temperature controlled room.

Use this procedure only if a new main board is installed or the main board does not work correctly. This operation initializes all of the following data.

- Calibration data
- Serial number data
- Temperature data (cleared). (Requires a temperature controlled room that can be set to $10^{\circ}\text{C} \pm 1^{\circ}\text{C}$ and $30^{\circ}\text{C} \pm 1^{\circ}\text{C}$)
- Linearity data (cleared)
- Initializing items of "Half Initialization".
- Internal parameter settings (reset to manufacturers setting)

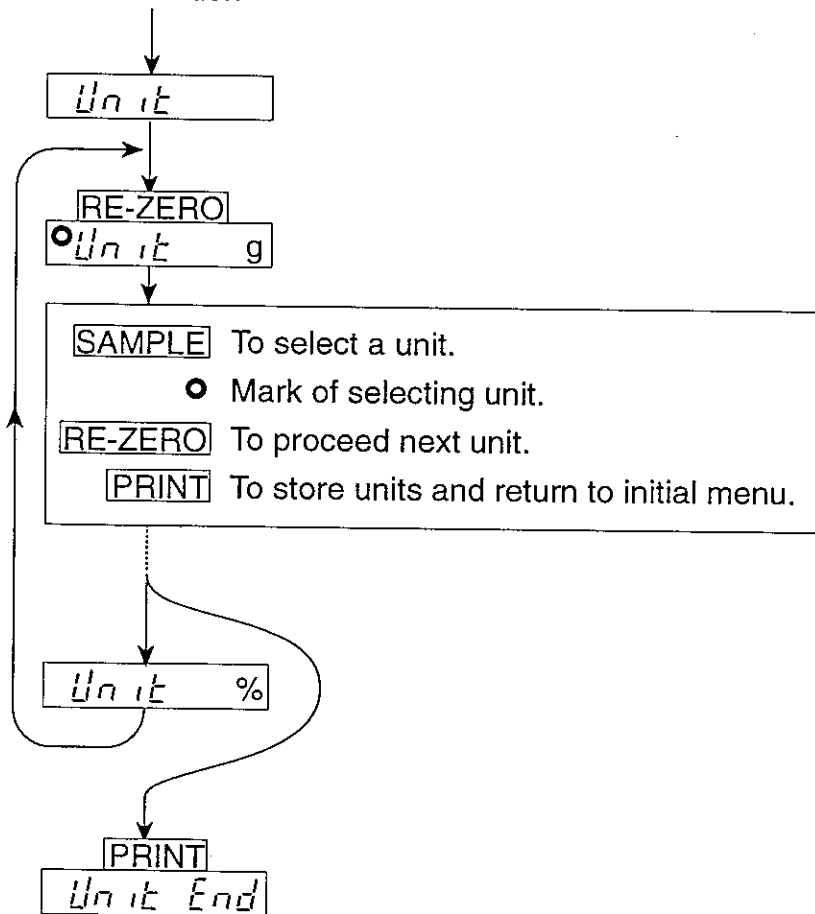
Total initialization



Automatically returns to initial menu.

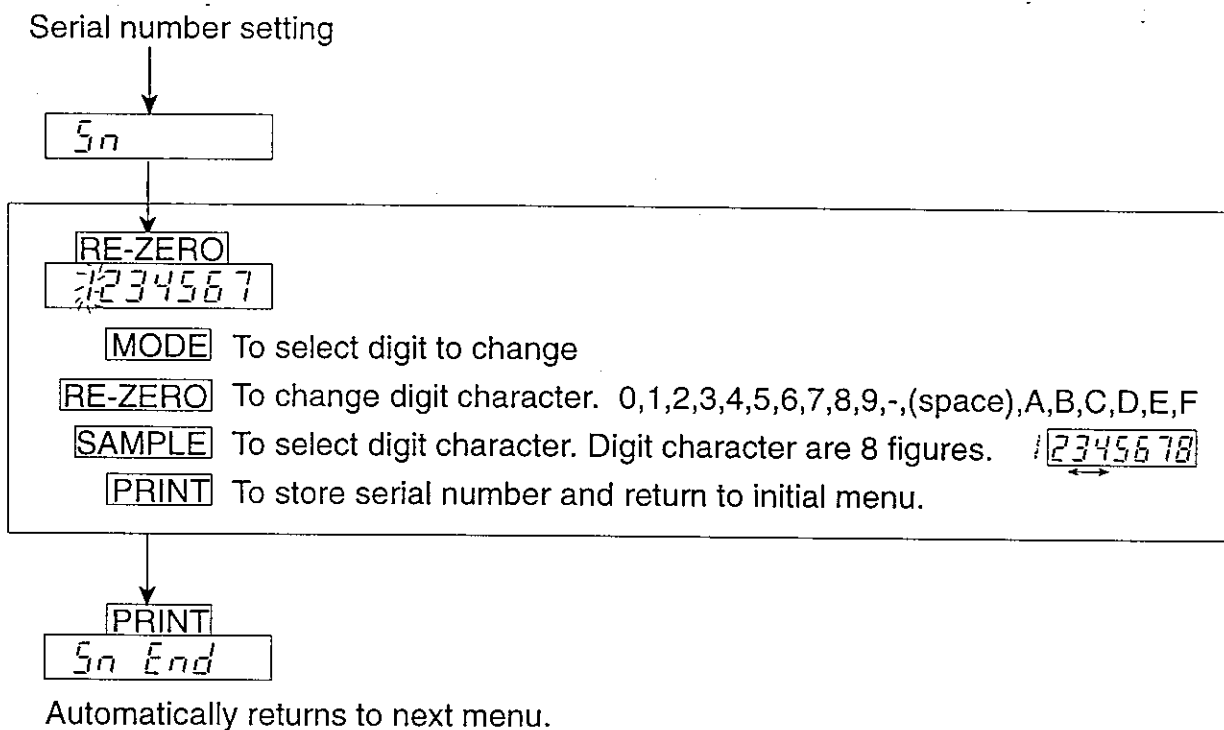
Unit Selection

Unit selection



Automatically returns to next menu.

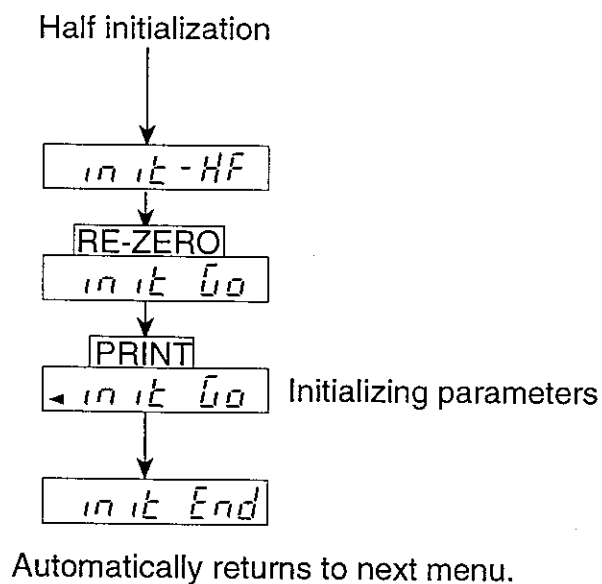
Serial Number setting



Half Initialization

The following parameters are initialized.

- ID number
- Upper limit and Lower limit
- Calibration data
- Unit weight (for counting)
- 100% weight (for percent)
- Weighing unit by user
- Function settings



Corner Load Adjustment

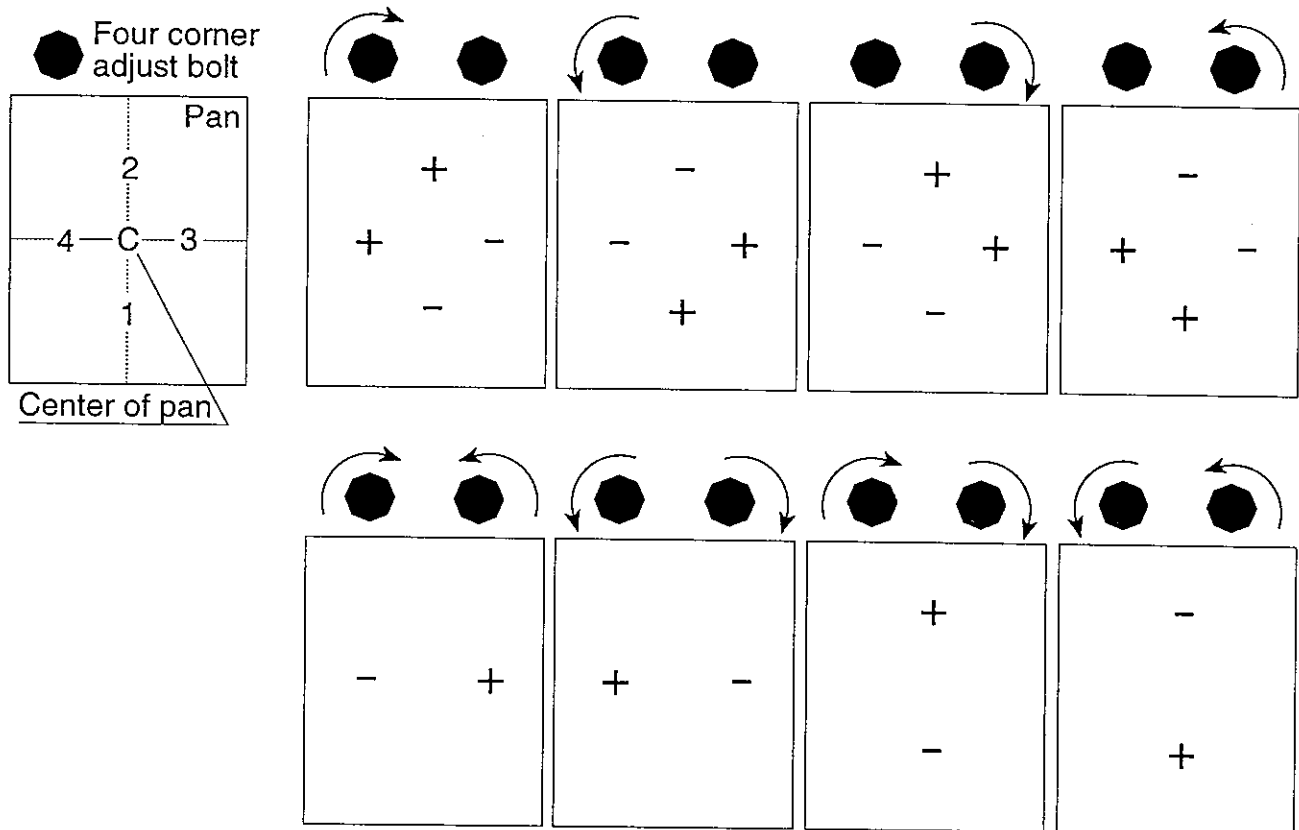
Use check mode D2 for corner load adjustment. Use a mass for this adjustment as follows :

Products	HP-12K	HP-20K	HP-22K	HP-30K	HP-40K	HP-60K	HP-100K	HP-102K
Corner load spec.	± 0.3 g	± 0.4 g	± 0.6 g	± 0.3 g	± 1.0 g	± 1 g	± 4 g	± 5 g
Mass	5 kg	10 kg	10 kg	10 kg	20 kg	20 kg	40 kg	40 kg

Step 1 Place mass to center of the pan. Press RE-ZERO key.

Step 2 Place mass to 1 - 4 points and read these error in order.

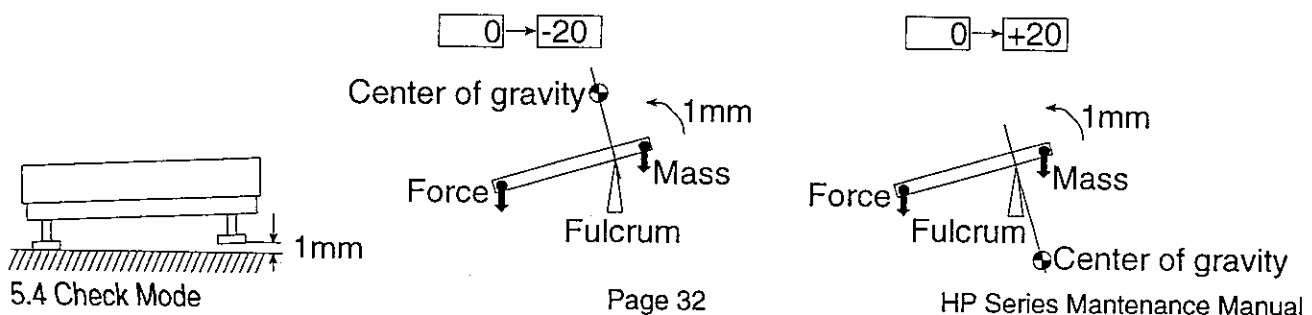
Step 3 Adjust the error using "four corner adjust bolt".

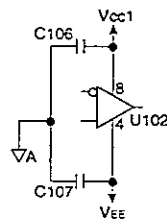
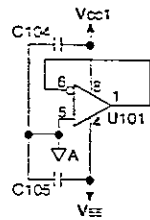
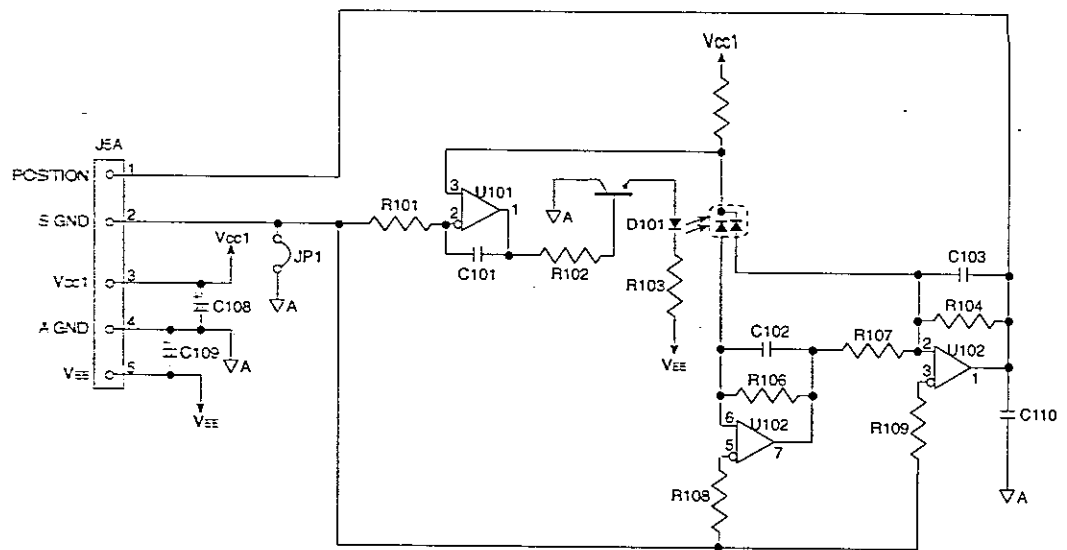


List Sensitivity Check (Adjust)

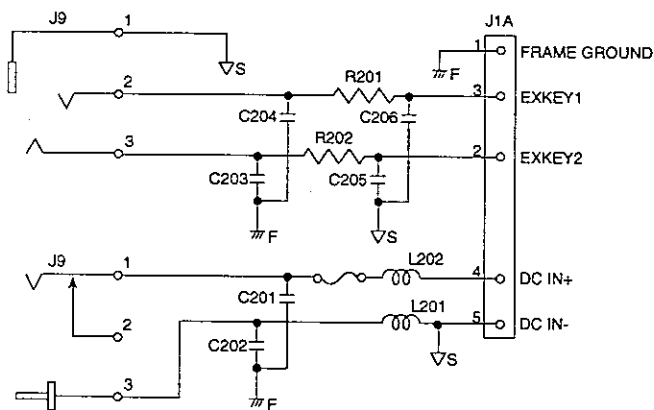
Use check mode D2 for this adjustment. Adjust this zero error using "balance weight".

Products	HP-12K	HP-20K	HP-22K	HP-30K	HP-40K	HP-60K	HP-100K	HP-102K
List sensitivity	± 0.5 g				± 1.0 g		± 1 g	

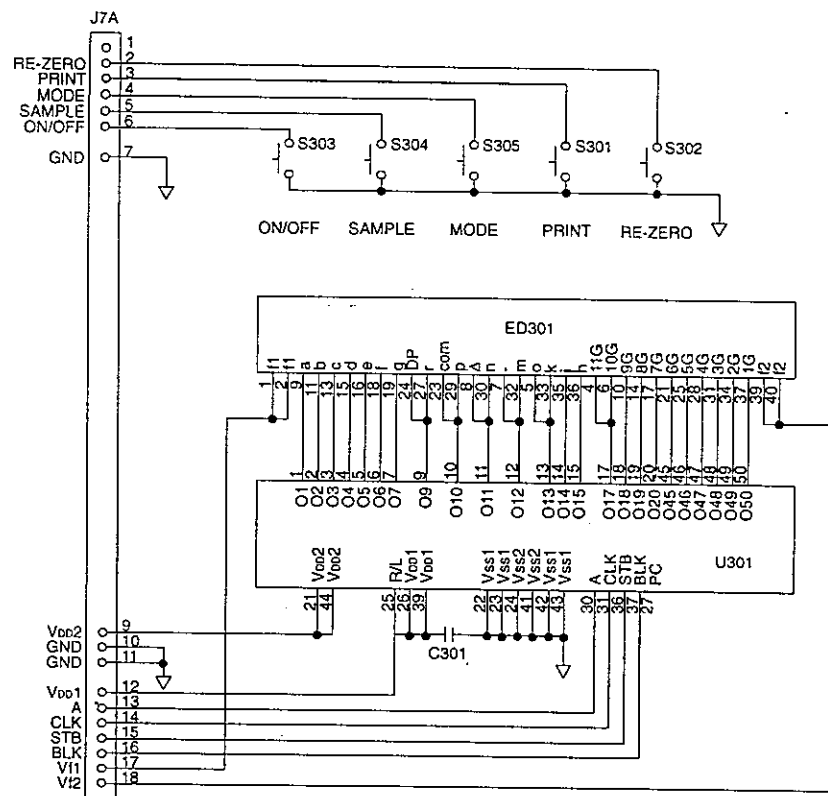




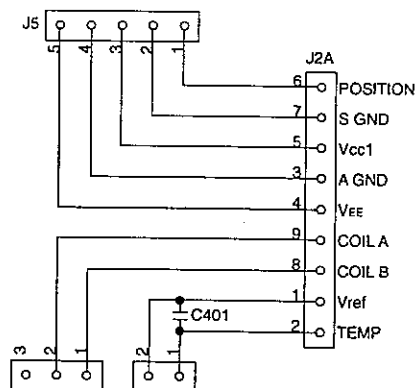
Model	HP Series
Description	Position Sensor Board
Stock No.	PZ:2785
Drwg. No.	QD-EC3-000050I



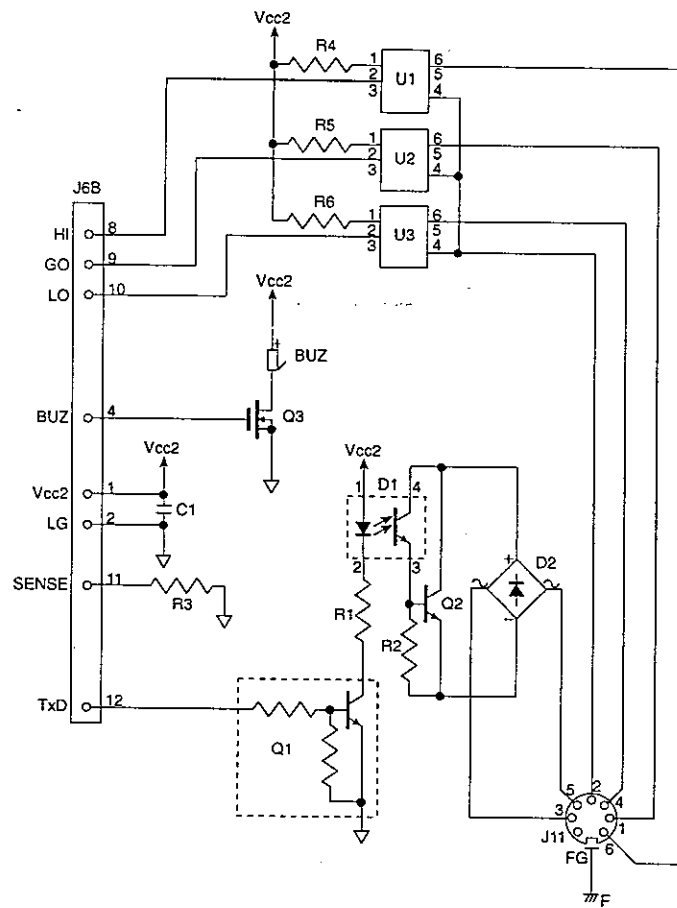
Model	HP Series
Description	Power Supply Board
Stock No.	PZ:2786
Drwg. No.	QD-EC3-000050I



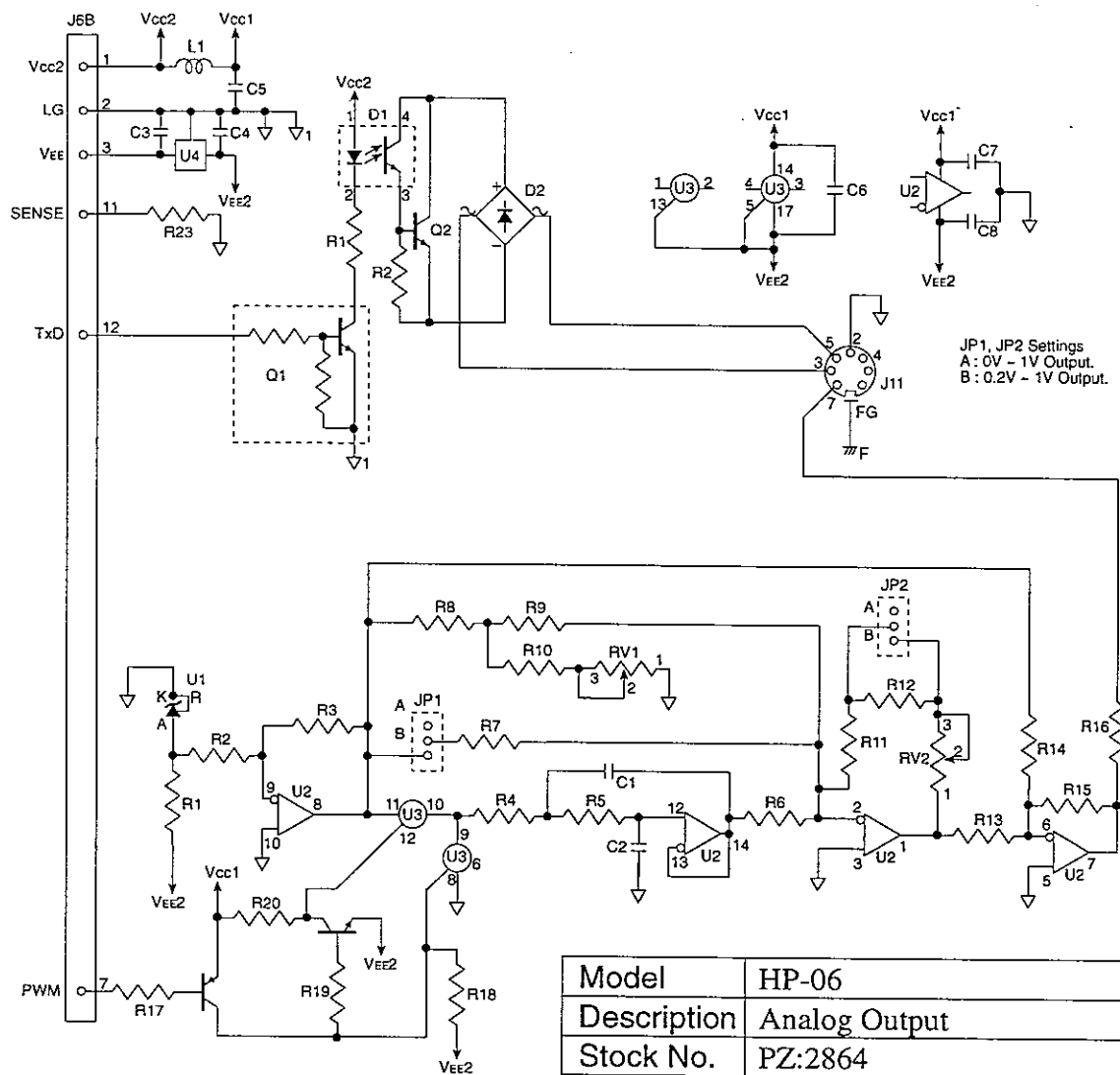
Model	HP Series
Description	Display Board
Stock No.	PZ:2787
Drwg. No.	QD-EC3-000050I



Model	HP Series
Description	Tempreture A/D Board
Stock No.	PZ:2788
Drwg. No.	QD-EC3-000050I



Model	HP-04
Description	Comparator
Stock No.	PZ:2863
Drwg. No.	QD-EC4-000026



HP Series
Main Board, 7PZ:2784A

Circuit Symbol	Parts Name	Description	Quantity
	PC:2784B	PRINTED CIRCUIT BOARD	1
	BKE:AMZ43	AD MODULE	1
C1,4,13,14,16,20,21,28	CC:FK26Y5V104T	CAPACITOR 0.1 μ F 50V	8
C19	CC:0.022UT	CAPACITOR 0.022 μ F	1
C26,27	CC:0.1U25V	CAPACITOR 0.1 μ F 25V	2
C25	CC:330P	CAPACITOR 330pF	1
C11,12,15,22,23	CC:330PT	CAPACITOR 330pF	5
C7,8,9,10	CK:ECA1EM471-T	CAPACITOR 470 μ F 25V	4
C2,3	CK:ECA1VM471-T	CAPCITOR 470 μ F 35V	2
C18	CK:SM50VB10	CAPACITOR 10 μ F 50V	1
C17	CK:SRA50VB-3.3T	CAPACITOR 3.3 μ F 50V	1
C6	CT:1V010T	CAPACITOR 1 μ F 35V	1
D1,2	DI:SB10-03A2-T	DIODE	2
D3	DI:1SS270T	DIODE	1
D6	DI:1S1585T	DIODE	1
D5	DZ:05Z5.6T	ZENER DIODE	1
D4	DZ:05Z9.1T	ZENER IODE	1
	HT:6073PB	HEAT SINK	1
J1	J1:05P-S2T2-EF	CONNECTOR	1
J2	J1:09P-S2T2-EF	CONNECTOR	1
J6	J1:14P-S2L2-EF	CONNECTOR	1
L3	LL:LHL06TB100K	CHOKE COIL	1
L1	LL:LHL08TB471K	CHOKE COIL	1
L2	LL:LHL10NB222J	CHOKE COIL	1
Q1	QT:C1815YT	TRANSISTOR 2SC1815Y	1
Q2	QT:C2562Y	TRANSISTOR 2SC2562Y	1
R29	RC:NAT1MJT	RESISTOR 1M Ω 1/4W	1
R1,2,3	RC:NAT1RJT	RESISTOR 1 Ω 1/4W	3
R11,12	RC:NAT1.5KJT	RESISTOR 1.5K Ω 1/4W	2
R18,19,20,21,27,34,35	RC:NAT100KJT	RESISTOR 100K Ω 1/4W	7
R13	RC:NAT15KJT	RESISTOR 15K Ω 1/4W	1
R9	RC:NAT180R	RESISTOR 180 Ω 1/4W	1
R16,17	RC:NAT22KJT	RESISTOR 22K Ω 1/4W	2
R10	RC:NAT270RJT	RESISTOR 270 Ω 1/4W	1
R8	RC:NAT33KJT	RESISTOR 33K Ω 1/4W	1
R23,24,25	RC:NAT4.7KJT	RESISTOR 4.7K Ω 1/4W	3

HP Series
Main Board, 7PZ:2784A

Circuit Symbol	Parts Name	Description	Quantity
R28	RC:NAT470RJT	RESISTOR 470Ω 1/4W	1
R31	RF:27KRF	RESISTOR 27KΩF	1
R26	RL:54R000F	RESISTOR 54Ω (max.)	1
R5,6	RM:RNM1KFT	RESISTOR 1KΩF	2
R14	RM:RNM150KFT	RESISTOR 150KΩF	1
R15	RM:RNM22KFT	RESISTOR 22KΩF	1
R4	RM:RNM3KFT	RESISTOR 3KΩF	1
R7	RM:RNM8.66KFT	RESISTOR 8.66KΩF	1
R30	RN:IHR-4-104JA	RESISTOR NETWORK	1
R22	RN:IHR-6-104JA	RESISTOR NETWORK	1
T1	TF:431A	DC/DC TRANSFORMER	1
U4	UA:S-8054ALR-Z	VOLTAGE COMPARATOR	1
U1	UC:D78064GF-051	CPU	1
U7	UC:HC04	HCMOS IC	1
U2	UC:TC140G02AU12	GATE ARRAY	1
U3	UC:93LC56P	EEPROM	1
U5,6	UR:IR3M03A	DC/DC CONVERTOR	2
X1	XT:C4SB12M-K02u	CERAMIC OSC	1
	07:C43674	SHEET	1

HP Series,
Main Board, 7PZ:2784B/C

Circuit Symbol	Parts Name	Description	Quantity
	PC:2784B	PRINTED CIRCUIT BOARD	1
	BKE:AMZ43	AD MODULE	1
C1,4,13,14,16,20,21,28	CC:FK26Y5V104	CAPACITOR 0.1 μ F 50V	8
C19	CC:0.022UT	CAPACITOR 0.022 μ F	1
C26,27	CC:0.1U25V	CAPACITOR 0.1 μ F 25V	2
C11,12,15,22,23	CC:330PT	CAPACITOR 330pF	5
C7,8,9,10	CK:ECA1EM471-T	CAPACITOR 470 μ F 25V	4
C2,3	CK:ECA1VM471-T	CAPCITOR 470 μ F 35V	2
C18	CK:SM50VB10	CAPACITOR 10 μ F 50V	1
C17	CK:SRA50VB-3.3T	CAPACITOR 3.3 μ F 50V	1
D1,2	DI:SB10-03A2-T	DIODE	2
D3	DI:1SS270T	DIODE	1
D6	DI:1S1585T	DIODE	1
D5	DZ:05Z5.6T	ZENER DIODE	1
D4	DZ:05Z9.1T	ZENER IODE	1
	HT:6073PB	HEAT SINK	1
J1	JI:05P-S2T2-EF	CONNECTOR	1
J2	JI:09P-S2T2-EF	CONNECTOR	1
J6	JI:14P-S2L2-EF	CONNECTOR	1
L3	LL:LHL06NB100K	CHOKE COIL	1
L1	LL:LHL08TB471K	CHOKE COIL	1
L2	LL:LHL10NB222J	CHOKE COIL	1
Q1	QT:C1815YT	TRANSISTOR 2SC1815Y	1
Q2	QT:C2562Y	TRANSISTOR 2SC2562Y	1
R29	RC:NAT1MJT	RESISTOR 1M Ω 1/4W	1
R1,2,3	RC:NAT1RJT	RESISTOR 1 Ω 1/4W	3
R11,12	RC:NAT1.5KJT	RESISTOR 1.5K Ω 1/4W	2
R18,19,20,21,27,34,35	RC:NAT100KJT	RESISTOR 100K Ω 1/4W	7
R13	RC:NAT15KJT	RESISTOR 15K Ω 1/4W	1
R9	RC:NAT180R	RESISTOR 180 Ω 1/4W	1
R16,17	RC:NAT22KJT	RESISTOR 22K Ω 1/4W	2
R10	RC:NAT270RJT	RESISTOR 270 Ω 1/4W	1
R8	RC:NAT33KJT	RESISTOR 33K Ω 1/4W	1
R23,24,25	RC:NAT4.7KJT	RESISTOR 4.7K Ω 1/4W	3
R28	RC:NAT470RJT	RESISTOR 470 Ω 1/4W	1
R31	RF:20KRF	RESISTOR 20K Ω F	1

HP Series,
Main Board, 7PZ:2784B/C

Circuit Symbol	Parts Name	Description	Quantity
R26	RL:21R000F	RESISTOR 21 Ω F (max.)	1
R4,5	RM:RNM1KFT	RESISTOR 1K Ω F	2
R14	RM:RNM150KFT	RESISTOR 150K Ω F	1
R15	RM:RNM22KFT	RESISTOR 22K Ω F	1
R4	RM:RNM3KFT	RESISTOR 3K Ω F	1
R7	RM:RNM8.66KFT	RESISTOR 8.66K Ω F	1
R30	RN:IHR-4-104JA	RESISTOR NETWORK	1
R22	RN:IHR-6-104JA	RESISTOR NETWORK	1
T1	TF:431A	DC/DC TRANSFORMER	1
U4	UA:S-8054ALR	VOLTAGE COMPARATOR	1
U1	UC:D78064GF-051	CPU	1
U7	UC:HC04	HCMOS IC	1
U2	UC:TC140G02AU12	GATE ARRAY	1
U3	UC:93LC56P	EEPROM	1
U5,6	UR:IR3M03A	DC/DC CONVERTOR	2
X1	XT:C4SB-12M-K02	CERAMIC OSC	1
	07:C43674	SHEET	1

HP Series
Position Sensor Board, 7PZ:2785

Circuit Symbol	Parts Name	Description	Quantity
	PC:2785B	PRINTED CIRCUIT BOARD	1
C104,105,106,107	CC:FK26Y5V104T	CAPACITOR 0.1 μ F 50V	4
C101	CC:0.01UT	CAPACITOR 0.01 μ F 50V	1
C102	CC:10PT	CAPACITOR 10pF	1
C103,110	CC:68PT	CAPACITOR 68pF	2
C108,109	CT:1V010T	CAPACITOR 1 μ F 35V	2
D102	DI:MI-33H-2D	PHOTO DIODE	1
D101	DL:SLR-935A	LED	1
J5A	KO:975-5-45T	CABLE	1
Q101	QT:C1815YT	TRANSISTOR 2SC1815Y	1
R101,108	RC:NAT100KJT	RESISTOR 100K Ω 1/4W	2
R102	RC:NAT3.3KJT	RESISTOR 3.3K Ω 1/4W	1
R104	RC:NAT390KJT	RESISTOR 390K Ω 1/4W	1
R109	RC:NAT47KJT	RESISTOR 47K Ω 1/4W	1
R103	RC:NAT680RJT	RESISTOR 680 Ω 1/4W	1
R105	RM:RNM240KFT	RESISTOR 240K Ω F	1
R106,107	RM:RNM390KFT	RESISTOR 390K Ω F	2
U101	UA:C4062C	OP AMP	1
U102	UA:C4072C	OP AMP	1
	07:C43431	HOLDER	1

**HP Series
Power Supply Board, 7PZ:2786**

Circuit Symbol	Parts Name	Description	Quantity
	PC:2786B	PRINTED CIRCUIT BOARD	1
C203,204,205,206	CC:FK26Y5V104T	CAPACITOR 0.1 μ F 50V	4
C201,202	CC:220P1KV	CAPACITOR 220pF 1KV	2
J8	EJ:0470-01-230	JACK	1
FH201,202	FH:85PN0819	FUSE HOLDER	2
	FS:EAWK-500MA	FUSE 500mA	1
J9	JE:HSJ1415-01	JACK	1
J1A	KO:974-5-10T	CABLE	1
L201,202	LL:LHL06TB470K	CHOKE COIL	2
R201,202	RC:NAT2.2KJT	RESISTOR 2.2K Ω 1/4W	2

HP Series
Display Board, 7PZ:2787

Circuit Symbol	Parts Name	Description	Quantity
	PC:2786B	PRINTED CIRCUIT BOARD	1
C301	CC:FK26Y5V104T	CAPACITOR 0.1 μ F 50V	1
ED301	ED:FIP11C11	VFD	1
	KO:1184	EARTH CABLE	1
J7A	KO:619-18-80	PC JOINER	1
SW301,302,303,304,305	SK:EVQ21307K	TACT SWITCH	5
U301	UC:D16310GF	VFD DRIVER	1
	06:4893 000	SHEET	2

HP Series
Temperature A/D Board, 7PZ:2788

Circuit Symbol	Parts Name	Description	Quantity
	PC:2788B	PRINTED CIRCUIT BOARD	1
C401	CC:FK26Y5V104T	CAPACITOR 0.1 μ F 50V	1
J5	JI:05P-S2T2-EF	CONNECTOR	1
J2A	JI:09P-S2T20EF	CONNECTOR	1
J4	JI:2P-S2T2-EF	CONNECTOR	1
J3	JI:3P-S2T2-EF	CONNECTOR	1

HP Series
RS232C Current Loop Board, 7PZ:2791A

Circuit Symbol	Parts Name	Description	Quantity
	PC:2791B	PRINTED CIRCUIT BOARD	1
C10	CC:FK16Y5V1H104	CAPACITOR 0.1 μ F 50V	1
C1 ~ 4	CK:SRA25VB-47	CAPACITOR 47 μ F 25V	4
D1	DF:PS2501-1L/K	PHOTO CUPPLER	1
D2	DI:1B4B42	BRIDGE DIODE	1
J11	JA:TCS1270	CONNECTOR DIN8P	1
J10	JA:17LE-13250	CONNECTOR D-sub	1
J6A	Jl:B14B-XH-A	CONNECTOR	1
L1	NF:D-42C	NOISE FILTER	1
Q1	QT:BA1A4P	TRANSISTOR BA1A4P	1
Q2	QT:C1815Y	TRANSISTOR 2SC1815Y	1
R2	RC:NAT1K	RESISTOR 1K Ω 1/4W	1
R3	RC:NAT3.3K	RESISTOR 3.3K Ω 1/4W	1
R1	RC:NAT5.6K	RESISTOR 5.6K Ω 1/4W	1
U1	UC:MAX232CPE	RS232C	1
	05:A42208	LOCK SCREW	1
	01:C43610C	PLATE	1

HP Series
Current Loop Board, 7PZ:2791B

Circuit Symbol	Parts Name	Description	Quantity
	PC:2791B	PRINTED CIRCUIT BOARD	1
C10	CC:FK16Y5V1H104	CAPACITOR 0.1 μ F 50V	1
D1	DF:PS2501-1L/K	PHOTO CUPPLER	1
D2	DI:1B4B42	BRIDGE DIODE	1
J11	JA:TCS1270	CONNECTOR DIN8P	1
J6A	JI:B14B-XH-A	CONNECTOR	1
Q1	QT:BA1A4P	TRANSISTOR BA1A4P	1
Q2	QT:C1815Y	TRANSISTOR 2SC1815Y	1
R2	RC:NAT1K	RESISTOR 1K Ω 1/4W	1
R1	RC:NAT5.6K	RESISTOR 5.6K Ω 1/4W	1
	05:A42208	LOCK SCREW	1
	01:4000913A	PLATE	1

HP Series
Comparator output 7PZ:2863

Circuit Symbol	Parts Name	Description	Quantity
	PC:2863A		1
C1	CC:FK16Y5V1H104	CAPACITOR 0.1 μ F 50V	1
D1	DF:PS2501-1L/K	PHOTO CUPPLER	1
D2	DI:1B4B42	BRIDGE DIODE	1
J11	JA:TCS5076-17	CONNECTOR DIN8P	1
J6B	JI:B14B-XH-A	CONNECTOR	1
Q1	QT:BA1A4P	TRANSISTOR BA1A4P	1
Q2	QT:C1815Y	TRANSISTOR 2SC1815Y	1
Q3	QF:701	TRANSISTOR 2K701	1
R2	RC:NAT1K	RESISTOR 1K Ω 1/4W	1
R1	RC:NAT5.6K	RESISTOR 5.6K Ω 1/4W	1
R3	RC:NAT18K	RESISTOR 18K Ω 1/4W	1
R4,5,6	RC:NAT3.3K	RESISTOR 3.3K Ω 1/4W	3
U1,2,3	DF:AQV253	MOS PHOT RELAY	3
	05:A42208	LOCK SCREW	1
	01:4001696A	PANEL	1

Circuit Symbol	Parts Name	Description	Quantity
	JA:TCP0576	Adaptable connector	1

HP Series
Analog output 7PZ:2864

Circuit Symbol	Parts Name	Description	Quantity
	PC:2864A		1
C3,4,5,6,7,8	CC:FK16Y5V1H104	CAPACITOR 0.1 μ F 50V	6
C2	CM:5002223J1	FILM CAPACITOR .222 μ F	1
C1	CM:5002473J1	FILM CAPACITOR .247 μ F	1
D1	DF:PS2501-1L/K	PHOTO CUPPLER	1
D2	DI:1B4B42	BRIDGE DIODE	1
J11	JA:TCS5076-17	CONNECTOR DIN8P	1
J6C	JI:B14B-XH-A	CONNECTOR	1
JP1,2	JI:8261-0361-10	CONNECTOR PIN	2
	JE:6646-102	CONNECTOR	2
L1	LL:LHL08NB471K	INDUCTOR	1
Q3	QT:BA1A4P	TRANSISTOR BA1A4P	1
Q2,4	QT:C1815Y	TRANSISTOR 2SC1815Y	2
Q1	QA:A1015Y	TRANSISTOR 2SA1015Y	1
R16	RC:NAT10R	RESISTOR 10 Ω 1/4W	1
R17	RC:NAT47K	RESISTOR 47K Ω 1/4W	1
R18,20	RC:NAT22K	RESISTOR 22K Ω 1/4W	2
R19	RC:NAT82K	RESISTOR 82K Ω 1/4W	1
R21	RC:NAT5.6K	RESISTOR 5.6K Ω 1/4W	1
R22	RC:NAT1K	RESISTOR 1K Ω 1/4W	1
R23	RC:NAT56K	RESISTOR 56K Ω 1/4W	1
R2,6,8,13,15	RM:RNM10KF	METAL FILM RESISTOR 10k Ω	5
R3	RM:RNM5.9KF	METAL FILM RESISTOR 5.6k Ω	1
R4,5	RM:RNM100KF	METAL FILM RESISTOR 100k Ω	2
R7	RM:RNM56KF	METAL FILM RESISTOR 56k Ω	1
R9	RM:RNM3.3K	METAL FILM RESISTOR 3.3k Ω	1
R10	RM:FNM120RF	METAL FILM RESISTOR 120k Ω	1
R11	RM:RNM8.25KF	METAL FILM RESISTOR 8.25k Ω	1
R1,12	RM:RNM2.2KF	METAL FILM RESISTOR 2.2k Ω	2
R14	RM:RNM113KF	METAL FILM RESISTOR 113k Ω	1
U1	UR:TL431CLPB	SWITCHING REGULATOR	1
U2	UA:C4064G	OP AMP	1
U3	UC:4066BF	CMOS SWITCH	1
U4	UR:TA79L005P	REGULATOR	1
VR1	RV:V201	POTENTIONMETER 200 Ω	1

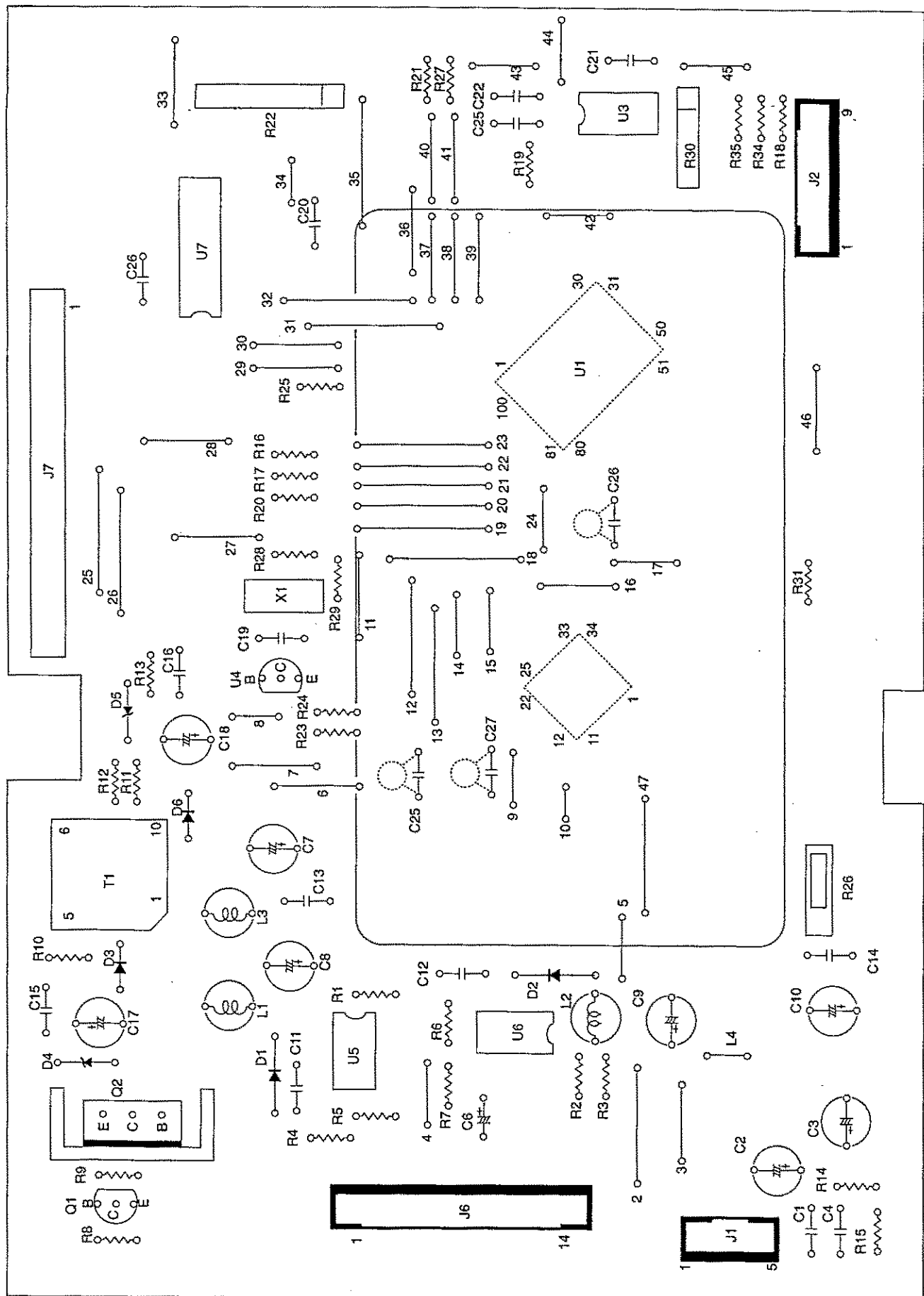
HP Series
Analog output 7PZ:2864

Circuit Symbol	Parts Name	Description	Quantity
VR2	RV:V102	POTENTIONMETER 100Ω	1
	05:A42208	LOCK SCREW	1
	01:4002559	PANEL	1

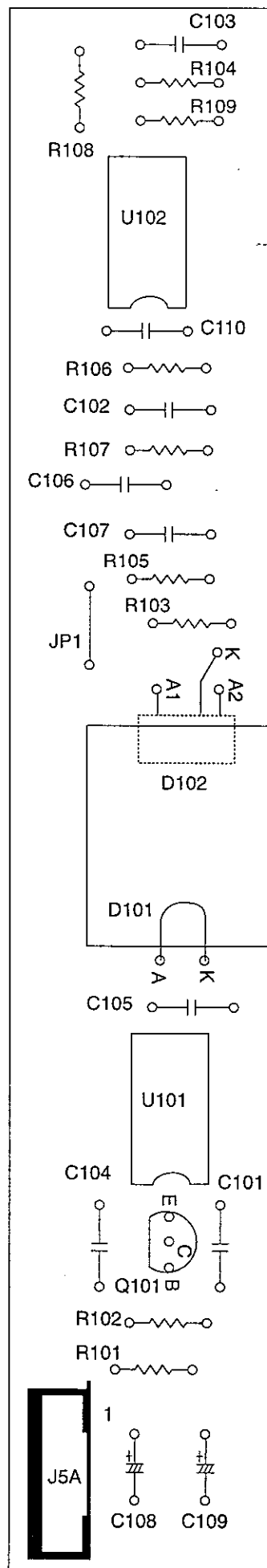
Circuit Symbol	Parts Name	Description	Quantity
	10:NO1900PA50L	Driver	1
	JA:TCP0576	Adaptable connector	1



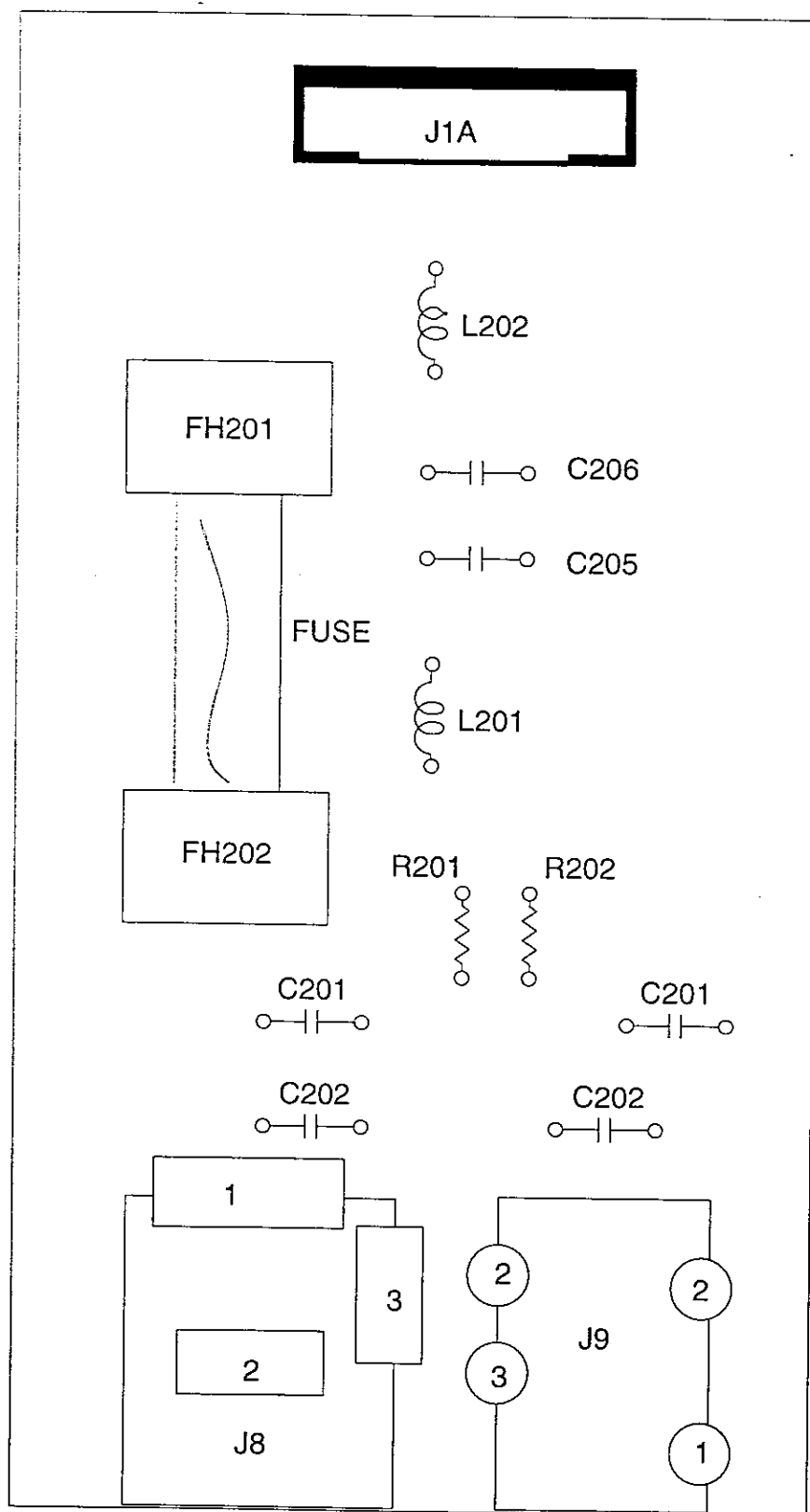
7. Parts layout



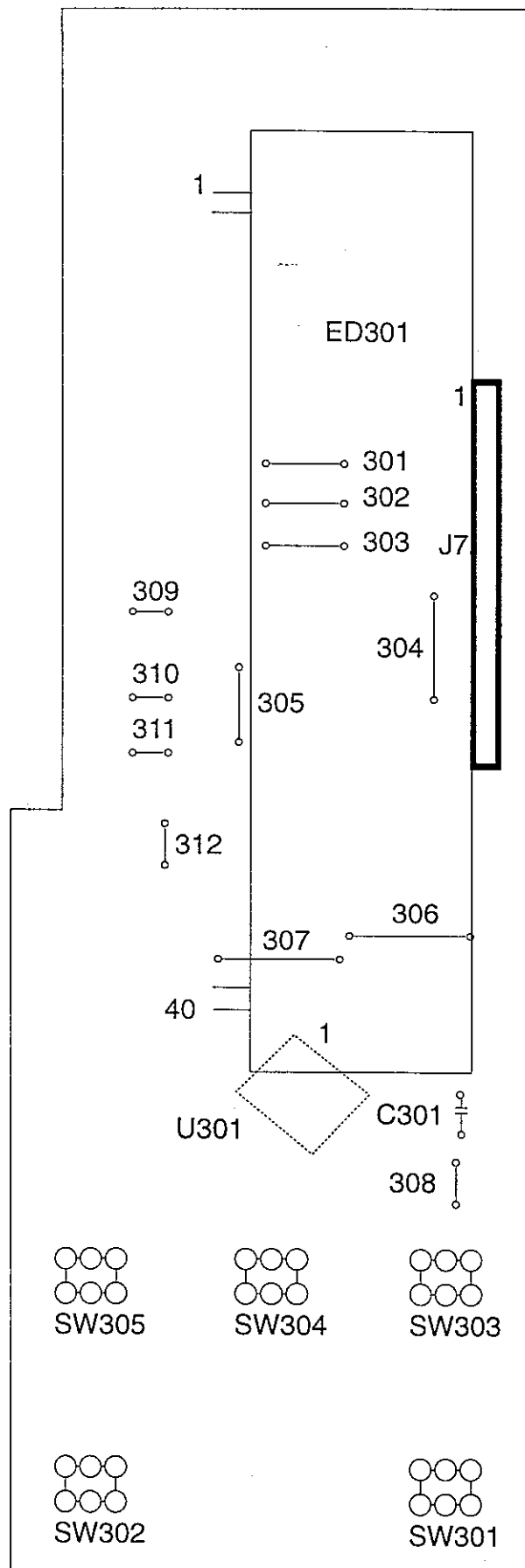
Model	HP Series
Description	Main Board
Stock No.	PZ:2784A/ B /C
Drwg. No.	QD-KZ2-000007



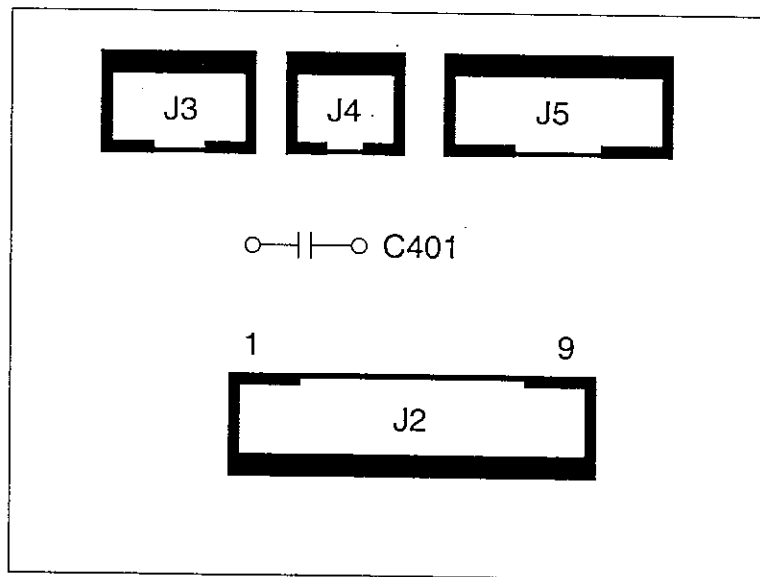
Model	HP Series
Description	PositionSensor Board
Stock No.	PZ:2785
Drwg. No.	QD-KZ2-000007



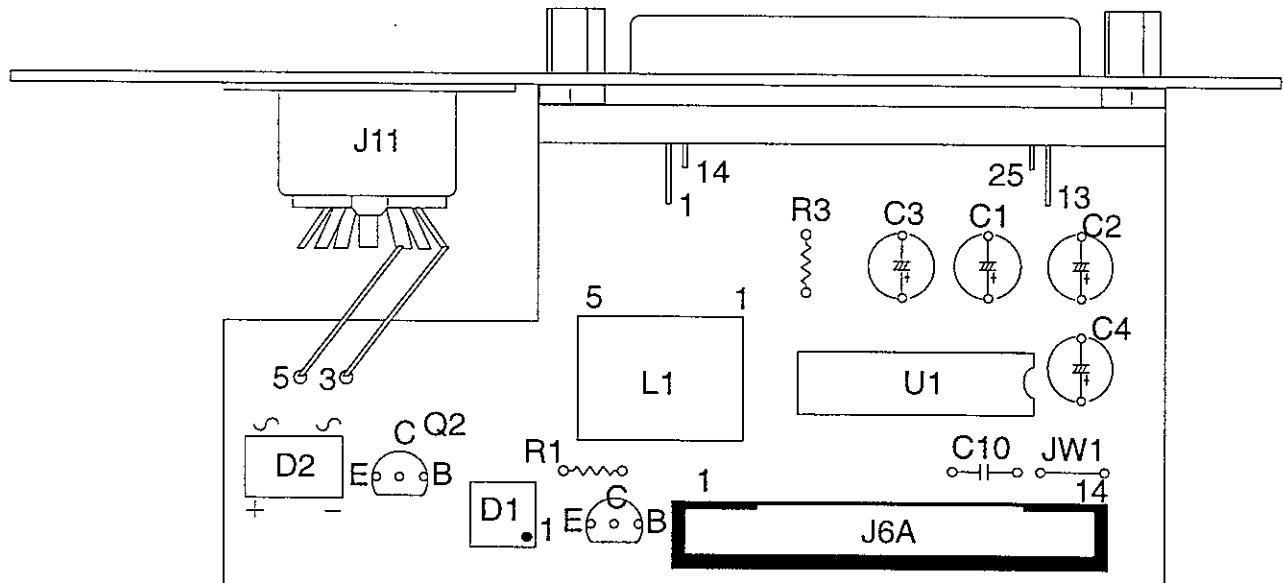
Model	HP Series
Description	Power Supply Board
Stock No.	PZ:2786
Drwg. No.	QD-KZ2-000007

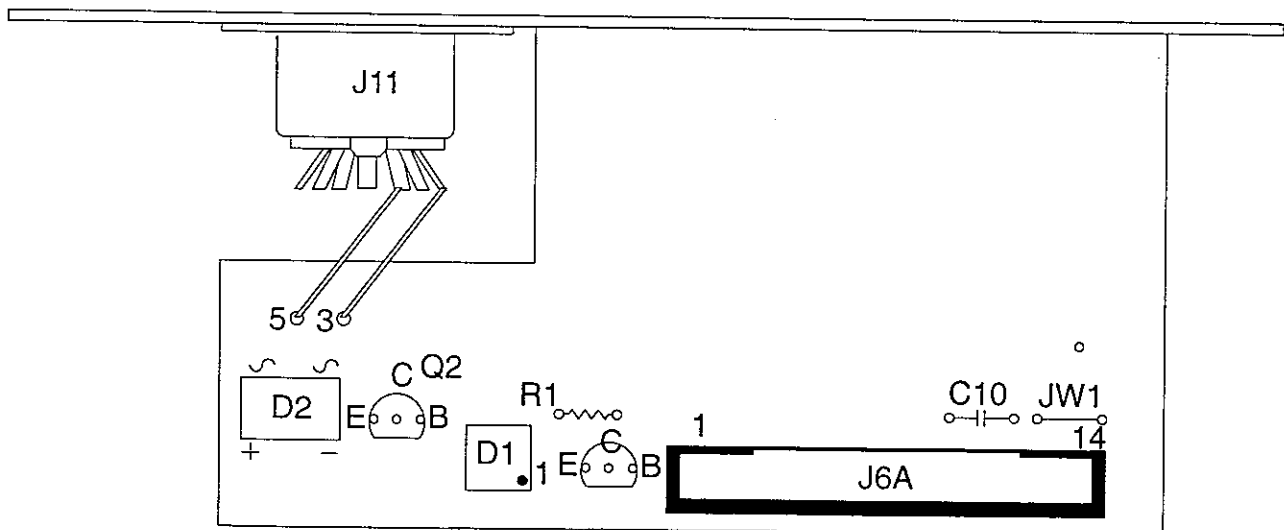
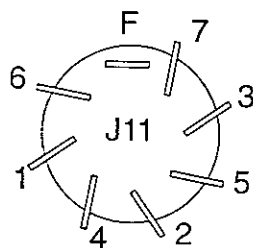


Model	HP Series
Description	Display Board
Stock No.	PZ:2787
Drwg. No.	QD-KZ2-000007

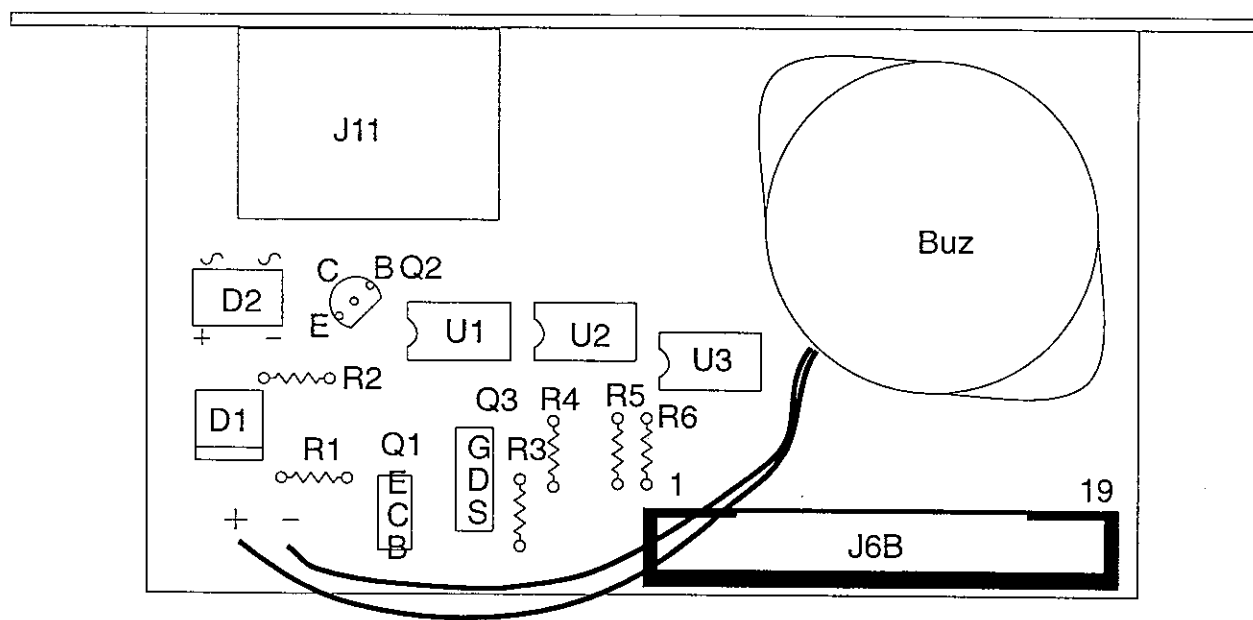


Model	HP Series
Description	Temperature A/D Board
Stock No.	PZ:2788
Drwg. No.	QD-KZ2-000007

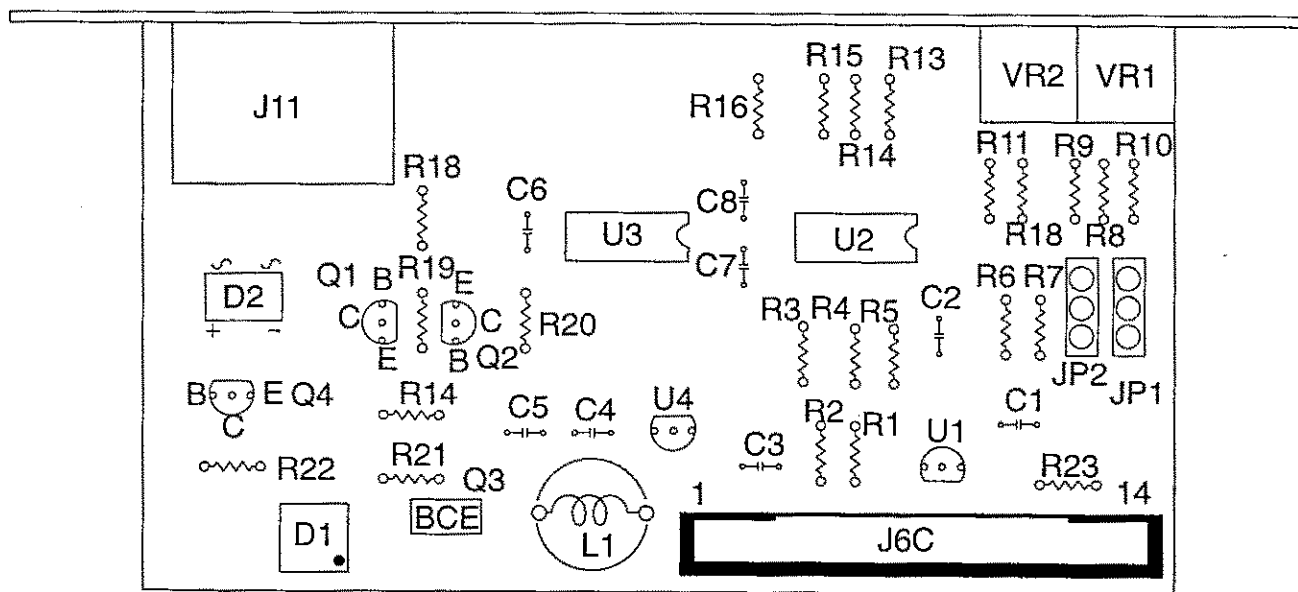




Model	HP Series
Description	Current Loop Board
Stock No.	PZ:2791B
Drwg. No.	QD-KZ3-000038



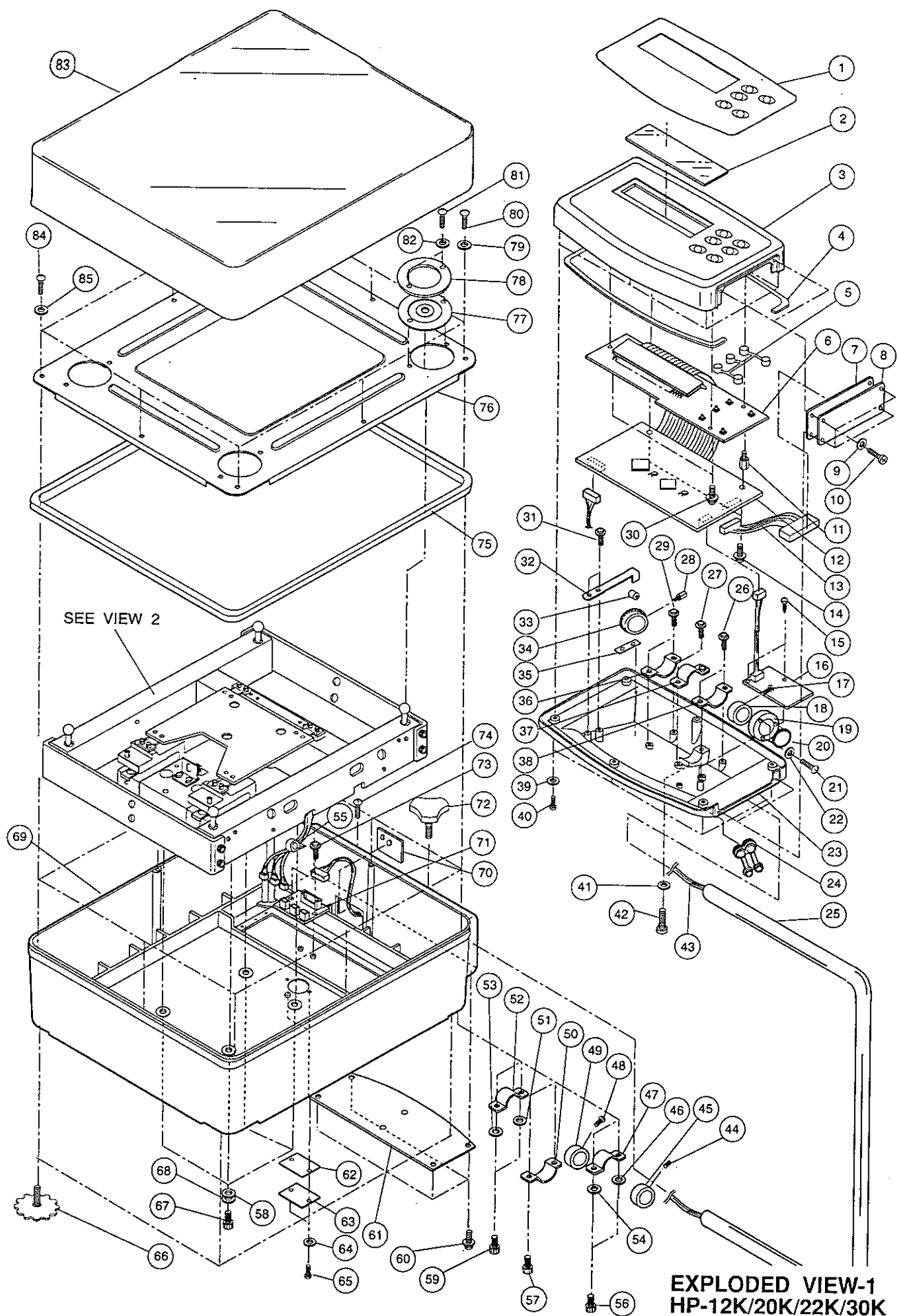
Model	HP Series
Description	Comparator Board
Stock No.	PZ:2863
Drwg. No.	QD-KZ3-000059

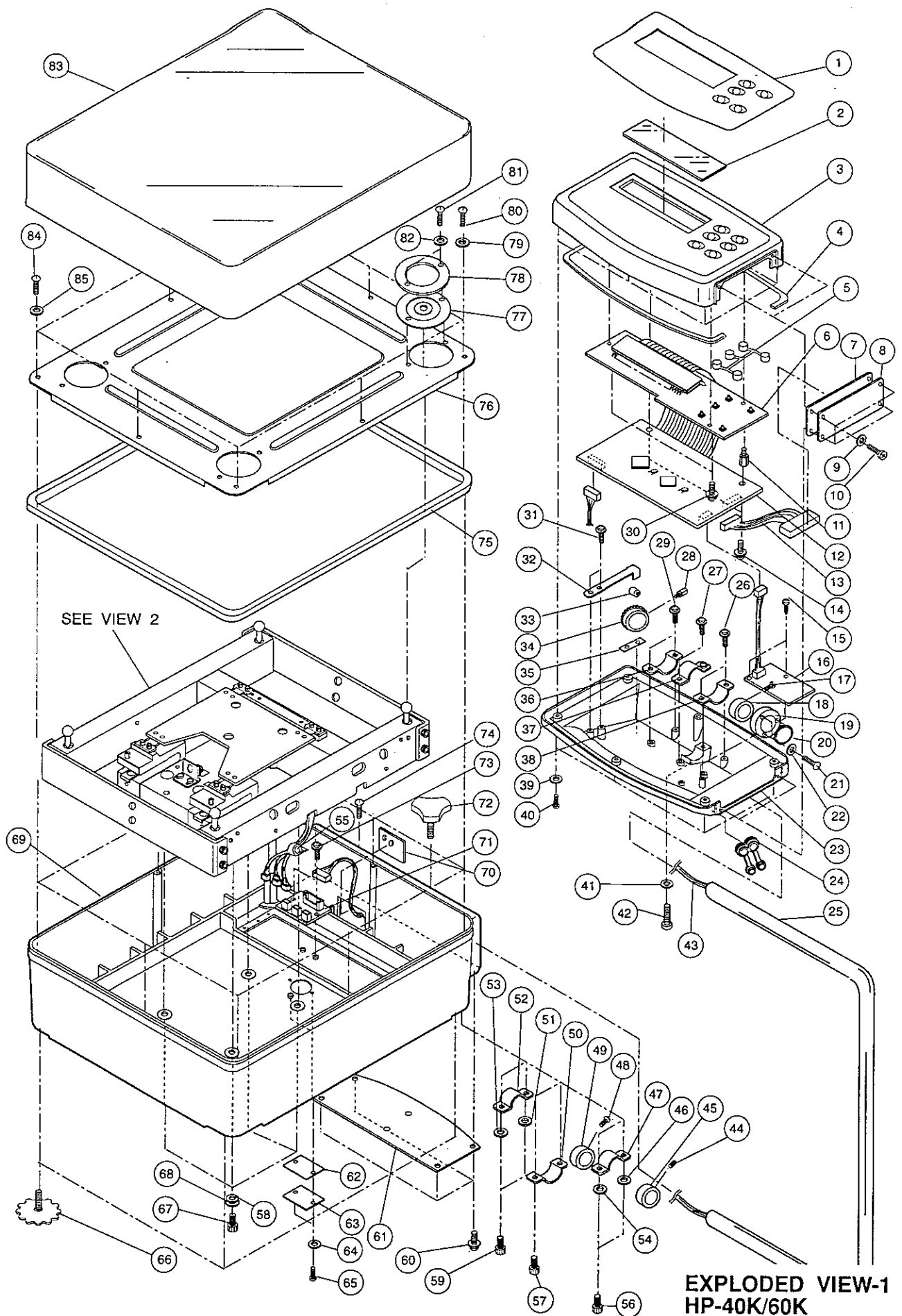


Model	HP Series
Description	Analog Output Board
Stock No.	PZ:2864
Drwg. No.	QD-KZ3-000121



8. Exploded Views and Parts List





**HP Series
Exploded View 1**

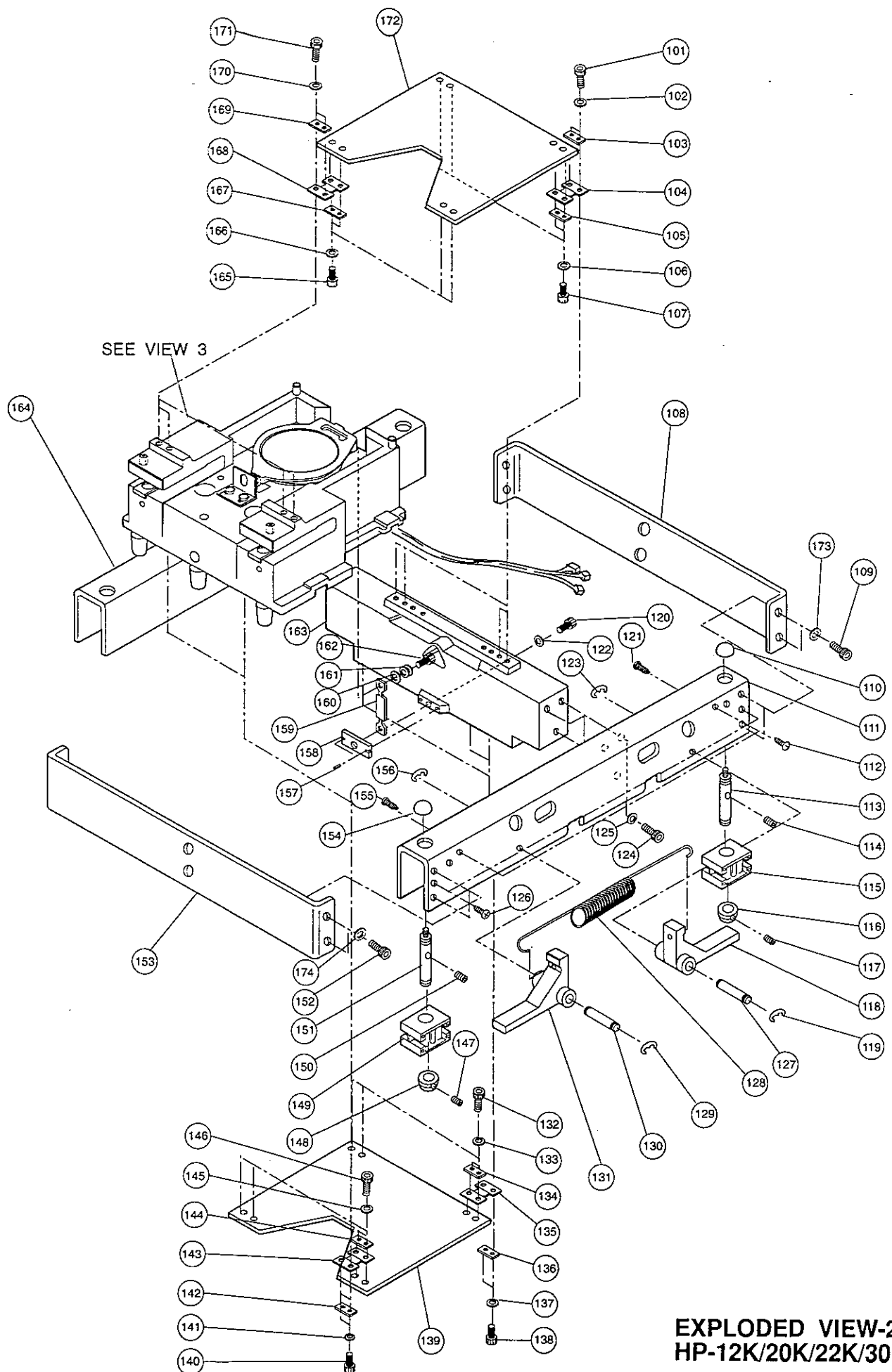
No.	Parts Name	Description
1	08:3000287A	KEY SHEET FOR 12K
1	08:3000288A	KEY SHEET FOR 20K
1	08:3000289A	KEY SHEET FOR 30K
1	08:3000290A	KEY SHEET FOR 40K
1	08:3000291A	KEY SHEET FOR 60K
1	08:3000292A	KEY SHEET FOR 22K
2	08:C43560B	FILTER
3	07:A10250D	DISPLAY UPPER CASE
4	06:C43672B	PACKING
5	06:C43614B	KEE TOP
6	PZ:2787A	DISPLAY BOARD
7	06:B31928A	BLANK PANEL COVER RUBBER
8	02:C43609B	BLANK PANEL
9		PLASTIC WASHER M3
10	10:4003367	PLASTIC HEAD SCREW
11	05:B45376	SPACER BOLT
12	PZ:2784A	MAIN BOARD
13	KO:1141-14-10	BOARD CABLE
14		PAN HEAD WITH WASHER AND SPRING WASHER M3x6
15		PAN HEAD TAPPING SCREW M3x5
16	PZ:2786	POWER SUPPLY BOARD
17		PAN HEAD M3x6
18	07:C43603A	SPACERE
19	07:C43604B	O RING HOLDER
20	10:P22-NBR	O RING
21		PAN HEAD M3x8
22		PLASTIC WASHER M3
23	07:A10251D	DISPLAY LOWER CASE
24	06:B31927A	POWER SUPPLY COVER
25	04:3000294A	DISPLAY ARM
26		PAN HEAD WITH WASHER AND SPRING WASHER M4x8
27		PAN HEAD WITH WASHER AND SPRING WASHER M4x8
28	05:4001710	STOPPER BOLT
29		PAN HEAD WITH WASHER AND SPRING WASHER M3x6
30		PAN HEAD WITH WASHER AND SPRING WASHER M3x6
31		PAN HEAD WITH WASHER AND SPRING WASHER M4x8

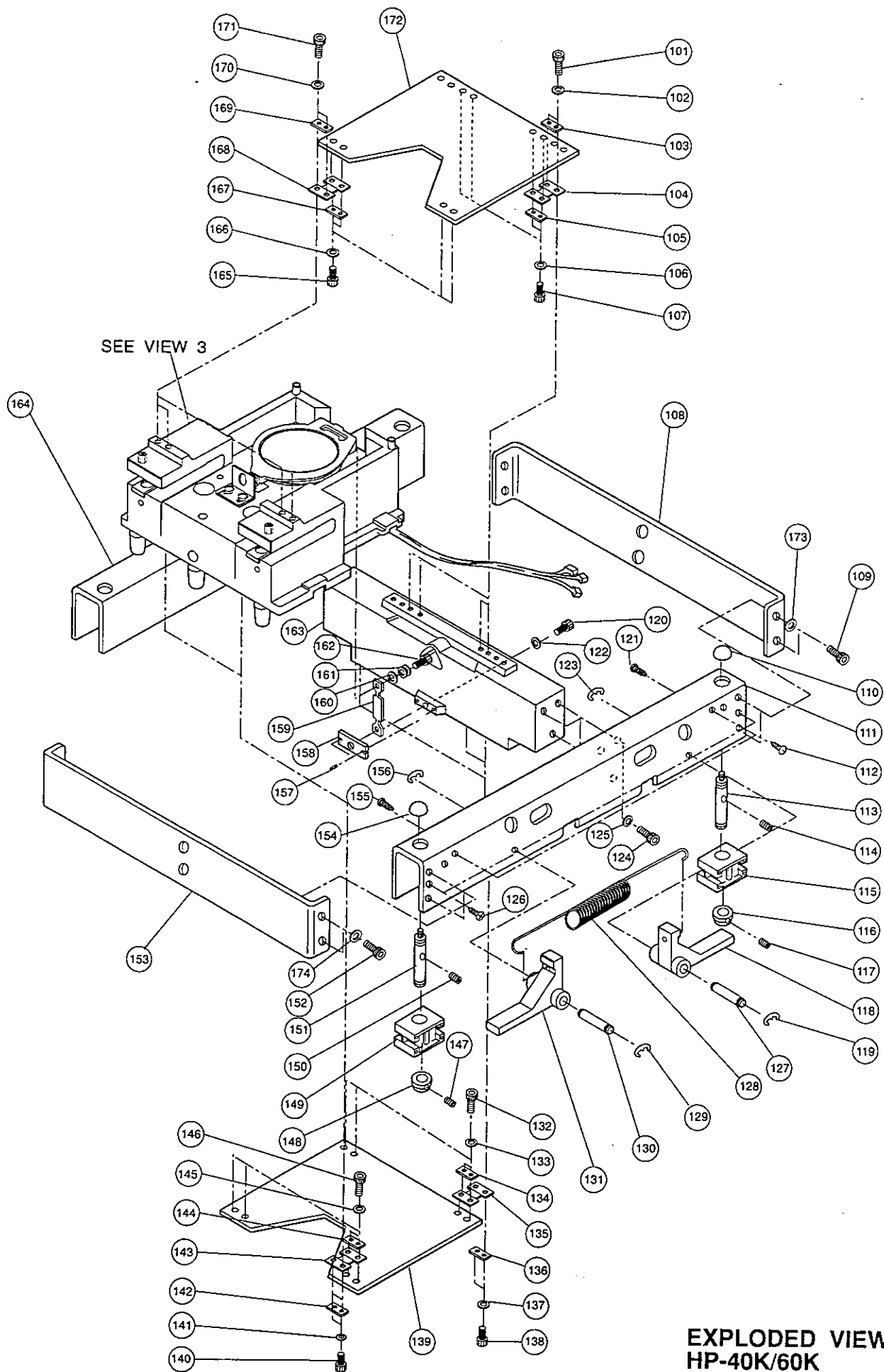
**HP Series
Exploded View 1**

No.	Parts Name	Description
32	04:B41178D	STOPPER PLATE
33	05:B41181	ROLLER
34	09:C43599B	STOPPER
35	04:A45085A-2	SHAFT SUPPORT PLATE
36	04:C43406B	PIPE GUIDE
37	04:C43407B	PIPE GUIDE
38	04:C43406B	PIPE GUIDE
39		PLASTIC WASHER M3
40		PAN HEAD M3x8
41		PLASTIC WASHER M3
42		FLAT FILLISTER HEAD M5x16
43	KO:964-09W110	ANALOGUE CABLE
44		CONTINUOUS-THREAD STUD M3x3
45	07:C43603A	SPACERE
46		WASHER M5
47	04:C43406B	PIPE GUIDE
48		PAN HEAD M4x8
49	07:C43603A	SPACERE
50	04:C43407B	PIPE GUIDE
51		WASHER M5
52	04:C43406B	PIPE GUIDE
53		WASHER M5
54		WASHER M5
55	10:NK-4N	PLASTIC CLAMP
56		HEXAGON BOLT M5x10
57		HEXAGON BOLT M5x10
58		PLASTIC WASHER M5
59		HEXAGON BOLT M5x10
60		PAN HEAD WITH WASHER AND SPRING WASHER M3x6
61	04:B31756B	PORL UNDER PLATE
62	06:C43392	UNDER HOOK COVER RUBBER
63	04:C43409	UNDER HOOK COVER
64		PLASTIC WASHER M3
65		PAN HEAD M3x8
66	07:C43395	FOOT
67		CONTINUOUS-THREAD STUD M5x14

**HP Series
Exploded View 1**

No.	Parts Name	Description
68		WASHER
69	03:A10249E	LOWER CASE
70	06:C43393	CABLE COVER
71	PZ:2788	ANALOG BOARD
72	09:4000910	NOB
73		PAN HEAD WITH WASHER AND SPRING WASHER M3x8
74		PAN HEAD M3x6
75	06:C43671	PACKIG
76	04:B31751C	CASE UPPER PLATE
77	06:C43390A	DIAPHRAGM
78	04:C43408A	DIAPHRAGM RING
79		PLASTIC WASHER M3
80		PAN HEAD M3x12
81		PAN HEAD M3x8
82		PLASTIC WASHER M3
83	04:B31752E	WEIGHT PAN
84		PAN HEAD M3x12
85		PLASTIC WASHER M3





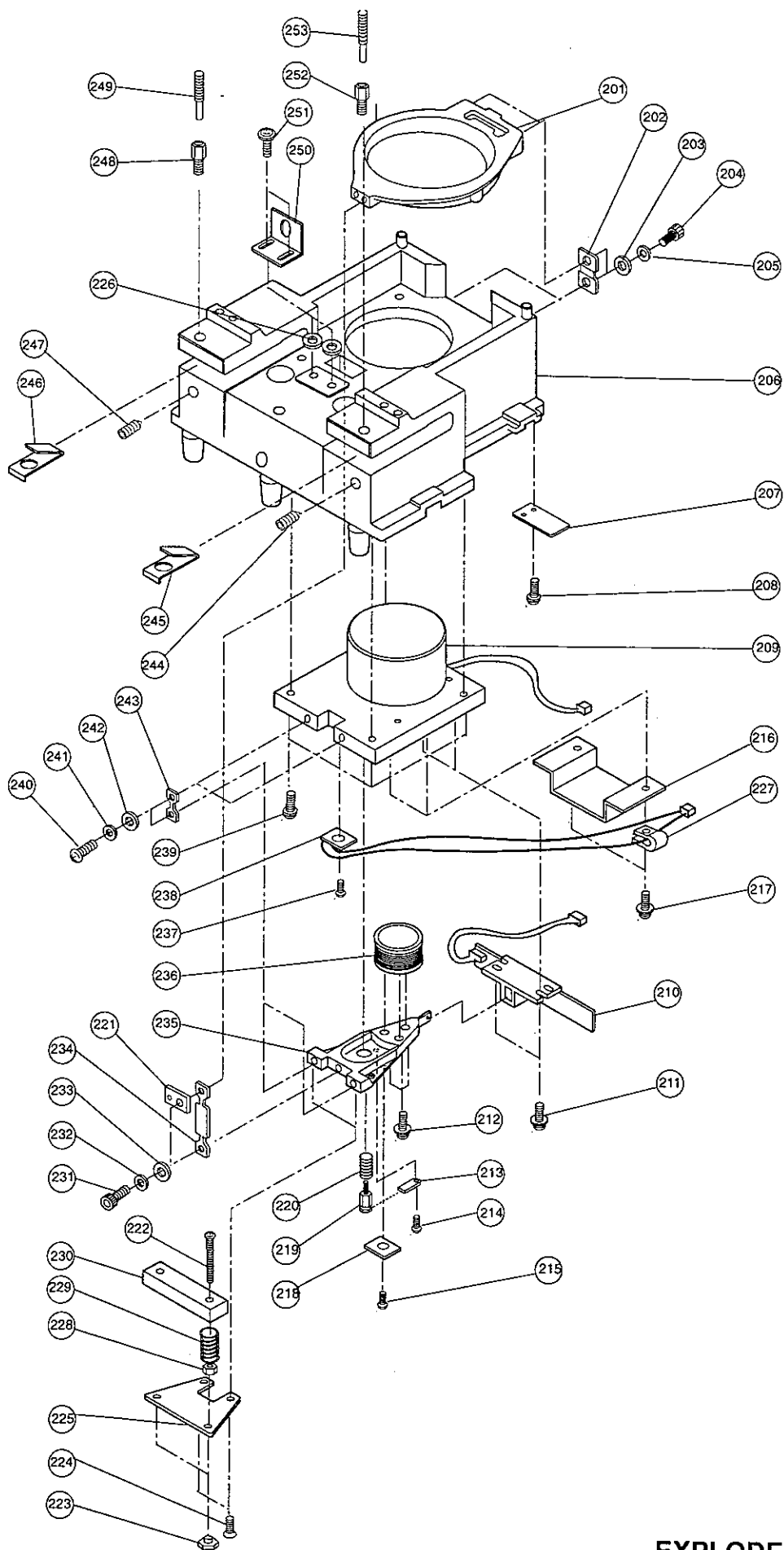
**EXPLODED VIEW-2
HP-40K/60K**

**HP Series
Exploded View 2**

No.	Parts Name	Description
101		HEXAGON BOLT M5x10
102	10:H-NO-2-SUS	CONVEX WASHER
103	04:C43550	FLEXURE BAND ATTACHMENT
104	04:4003768B:C	FLEXURE BAND
105	04:C43550	FLEXURE BAND ATTACHMENT
106	10:H-NO-2-SUS	CONVEX WASHER
107		HEXAGON BOLT M5x6
108	04:B31592B	PAN SUPPORT ARM
109		HEXAGON BOLT M5x10
110	06:C43394A	PAN SUPPORT RUBBER
111	04:B31753B	PAN SUPPORT ARM
112		PAN HEAH TAPPING SCREW M4x8
113	05:C43399	PAN SUPPORT SHAFT
114		CONTIUOUS-THREAD STUD M3x10
115	07:C43398	BUSH
116	05:C42899A	SHAFT GIRD
117		CONTIUOUS-THREAD STUD M3x3
118	03:B31594	SPRING SUPPORT
119		E RING
120		HEXAGON BOLT M5x28
121		PAN HEAD TAPPING SCREW M4x8
122	10:H-NO-2-SUS	CONVEX WASHER
123		E RING
124		HEXAGON BOLT M4x12
125		WASHER M4
126		FLAT HEAD TAPPING SCREW M4x8
127	05:C42900A	SPRING SUPPORT PIN
128	15:B31758	SPRING (FOR 12K,20K,30K,22K)
128	15:B31759	SPRING (FOR 40K,60K)
129		E RING
130	05:C42900A	SPRING SUPPORT PIN
131	03:B31594	SPRING SUPPORT
132		HEXAGON BOLT M5x6
133	10:H-NO-2-SUS	CONVEX WASHER
134	04:C43550	FLEXURE BAND ATTACHMENT
135	04:4003768B:C	FLEXURE BAND
136	04:C43550	FLEXURE BAND ATTACHMENT
137	10:H-NO-2-SUS	CONVEX WASHER

**HP Series
Exploded View 2**

No.	Parts Name	Description
138		HEXAGON BOLT M5x10
139	03:3001499	LOWER BEAM UNIT
140		HEXAGON BOLT M5x10
141	10:H-NO-2-SUS	CONVEX WASHER
142	04:C43550	FLEXURE BAND ATTACHMENT
143	04:4003768B:C	FLEXURE BAND
144	04:C43550	FLEXURE BAND ATTACHMENT
145	10:H-NO-2-SUS	CONVEX WASHER
146		HEXAGON BOLT M5x6
147		CONTINUOUS-THREAD STUD M3x3
148	05:C42899A	SHAFT GIRD
149	07:C43398	BUSH
150		CONTINUOUS-THREAD STUD M3x10
151	05:C43399	PAN SUPPORT SHAFT
152		HEXAGON BOLT M5x10
153	04:B31592B	PAN SUPPORT ARM
154	06:C43394A	PAN SUPPORT RABER
155		PAN HEAD TAPPING SCREW M4x8
156		E RING
157	10:20008	SPRING PIN
158	04:B46498	FLEXURE BAND ATTACHMENT
159	04:4003767A:C	FLEXURE BAND
160	05:A46006	ALUMINUM DISTANCE RING
161	02:C42851	SPRING WASHER COATED WITH TEFLON
162		HEXAGON BOLT M5x12
163	03:2000058	RISER BEAM
164	04:B31753B	PAN SUPPORT ARM
165		HEXAGON BOLT M5x6
166	10:H-NO-2-SUS	CONVEX WASHER
167	04:C43550	FLEXURE BAND ATTACHMENT
168	04:4003768B:C	FLEXURE BAND
169	04:C43550	FLEXURE BAND ATTACHMENT
170	10:H-NO-2-SUS	CONVEX WASHER
171		HEXAGON BOLT M5x10
172	03:3001498	UPPER BEAM UNIT
173		WASHER M5
174		WASHER M5



EXPLODED VIEW-3 HP SERIES

**HP Series
Exploded View 3**

No.	Parts Name	Description
201	03:2000057A	BEAM
202	04:4003769A:C	FLEXURE BAND
203	05:A46006	ALUMINUM DISTANCE RING
204		HEXAGON BOLT M5x10
205	02:C42851	SPRING WASHER COATED WITH TEFLON
206	03:1000009	MAGNET FRAME
207	04:A45005	CABLE STOPPER
208		PAN HEAD WITH SPRING WASHER M4x8
209	PB:HP30K-1	MAGNET UNIT
210	PZ:2785	POSITION SENSOR BOARD
211		PAN HEAD WITH WASHRE AND SPRING WASHER M3x8
212		PAN HEAD WITH WASHER AND SPRING WASHER M3x6
213	04:C43554	STOPPER PLATE
214		PAN HEAD WITH WASHER AND SPRING WASHER M3x6
215		PAN HEAD M3x6
216	04:C42559A	SHIELD PLATE
217		PAN HEAD WITH WASHER AND SPRING WASHER M3x8
218	PZ:2789	WIRE BOARD
219	05:A43630D	STOPPER BOLT
220	00:B48842A	STOPPER SPRING
221	04:A44482-2	FLEXURE BAND ADJUSTMENT PLATE
222		PAN HEAD M4x30
223	05:C43555	ROLL NUT
224		FLAT HEAD M3x8
225	04:C43553A	BALANCE PLATE
226		WASHER M4
227	10:NK-2N	NYLON CLAMP
228		NAT M4
229	15:4000896	SPRING
230	05:C43552A	BALANCE WEIGHT
231		HEXAGON BOLT M4x8
232	02:C42850	SPRING WASHER COATED WITH TEFLON
233	04:A41840	ALUMINUM DISTANCE RING
234	04:A44984:B	FLEXURE BAND
235	03:A33202B	BEAM

**HP Series
Exploded View 3**

No.	Parts Name	Description
236	09:B31368B	FORCE COIL BOBBIN
237		PAN HEAD M3x6
238	PZ:2789	WIRE BOARD
239		PAN HEAD WITH WASHER M4x15
240		PAN HEAD M4x8
241	02:C42850	SPRING WASHER COATED WITH TEFLON
242	04:A41840	ALUMINUM DISTANCE RING
243	04:4004693A:C	FLEXURE BAND
244		CONTINUOUS-THREAD STUD M5x6
245	15:4001458A	FOUR CORNER ADJUST PLATE
246	15:4001458A	FOUR CORNER ADJUST PLATE
247		CONTINUOUS-THREAD STUD M5x6
248	05:4000894	FOUR CORNER ADJUST BOLT
249	05:4000895A	FOUR CORNER ADJUST BOLT
250	04:A45385B	GUIDE ANGLE
251		PAN HEAD WITH WASHER AND SPRING WASHER M4x8
252	05:4000895A	FOUR CORNER ADJUST BOLT
253	05:4000894	FOUR CORNER ADJUST BOLT

[illegible]



A&D Company, Limited

3-23-14 Higashi-Ikebukuro, Toshima-ku, Tokyo 170 JAPAN
Telephone: [81] (3) 5391-6132 Fax: [81] (3) 5391-6148