HV/HW SERIES

INSTRUCTION MANUAL

Digital Platform Scale

HV-150KA1	HW-150KA1
HV-60KA1	HW-100KA1
HV-60KA2	HW-60KA1
HV-30KA2	HW-60KA2
	HW-30KA2
	HW-15KA2
	HW-10KA2

946-1E-IE-96.04.04

A&D Company, Limited

Table of contents

Compliance with FCC Rules 2

1. Outline 2

2. Preparations for use 3
   2-1 Unpacking 3
   2-2 Assembly 4
   2-3 Separating the display pod 5
   2-4 Installation 7
   2-5 Power sources 8

3. Panel parts names and functions 9
   3-1 Front panel 9
   3-2 Rear panel 11

4. Method of use 12
   4-1 Starting 12
   4-2 Weight display ("kg", "lb", "oz") mode 12
   4-3 Counting ("pcs") mode 13
   4-4 Comparator 14
   4-5 % Percentage mode (HW series only) 17

5. Setting the functions 18
   5-1 Automatic power off 18
   5-2 RS-232C mode (HW series only) 19
   5-3 Comparator functions 19

6. Changing the batteries 20

7. Method of calibration 21
   7-1 Correction for acceleration due to gravity 21
   7-2 Zero and span calibrations 23
   7-3 Error displays during calibration 24

8. Options and accessories 25
   8-1 OP-02 Extension cable 25
   8-2 OP-03 Data output (RS-232C and comparator output) 26
   8-3 OP-04 Printer mounting base for the AD-8121) 30
   8-4 AX-WM-B31727 Wall mounting fixture 30

9. Specifications 31

10. Check list when breakdown is suspected 33

11. External dimensions 34

12. Appendix 36

©A&D Co. Ltd., International Division

Compliance with FCC Rules

Please note that this equipment generates, uses and can radiate radio frequency energy. This equipment has been tested and has been found to comply with the limits of a Class A computing device pursuant to Subpart J of Part 15 of FCC rules. These rules are designed to provide reasonable protection against interference when equipment is operated in a commericial environment. If this unit is operated in a residential area it might cause some interference and under these circumstances the user would be required to take, at his own expense, whatever measures are necessary to eliminate the interference. (FCC = Federal Communications Commission in the U.S.A.)

1. Outline

When using dry cell batteries as the power source, this equipment functions as a fully cordless platform scale, capable of around 100 hours of continuous operation. Additionally, it is also possible to use this equipment with an AC adaptor.

Because this scale employs a load cell that has damp-proofing and water-proofing characteristics, it can be safely used for outside work and for weighing objects that contain moisture.

As the display pod can be used remote from the base unit, it is possible to freely use the display pod on a desk or mounted on the wall.

A parts counting function is provided.

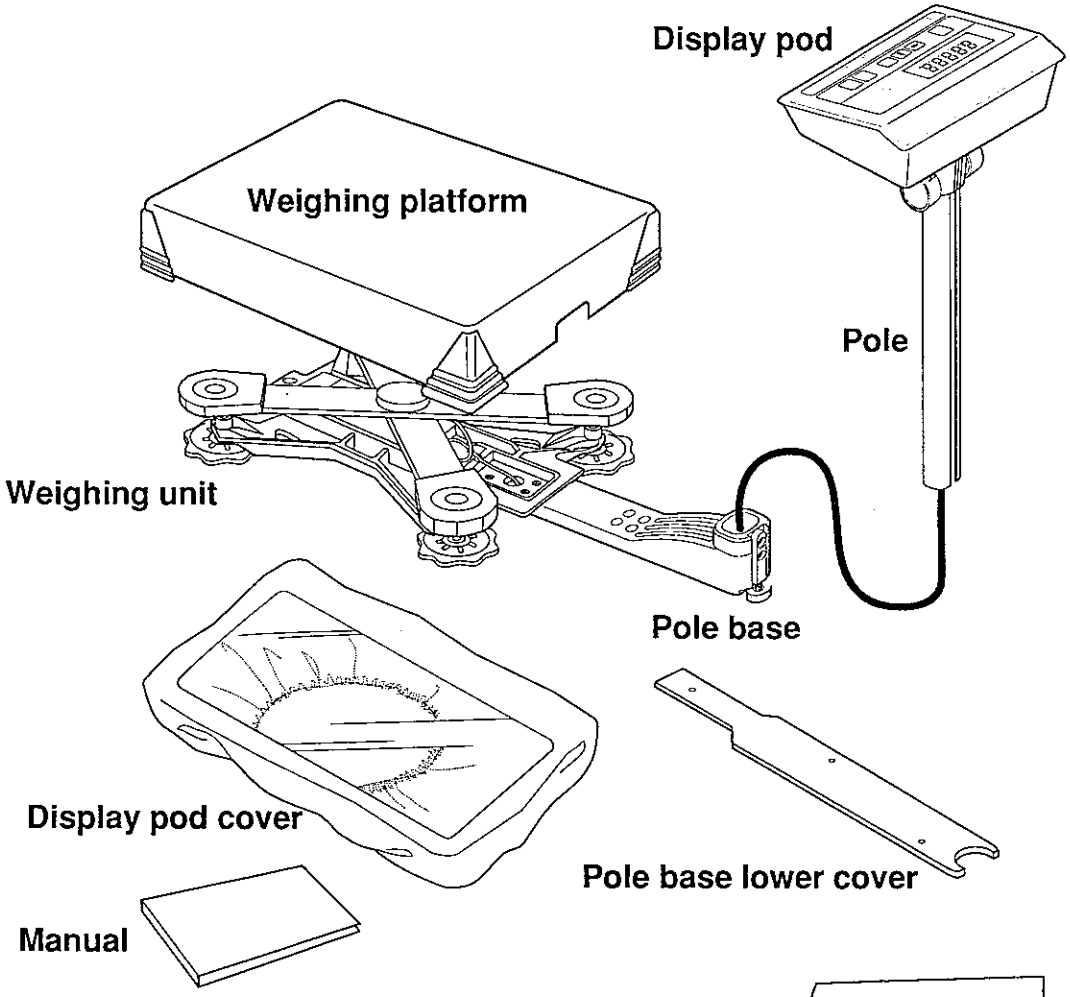
A comparator function is provided, which can be used for check weighing.

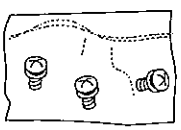
RFI and EMI protection has been included to provide countermeasures agains problems caused by electrical waves.

2. Preparations for use

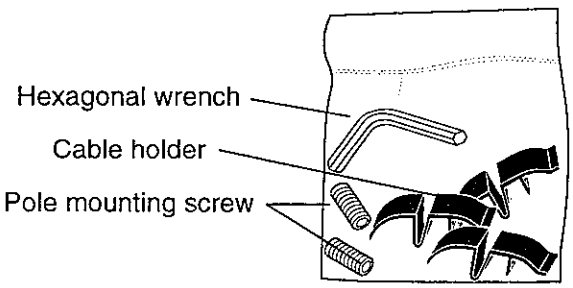
2-1 Unpacking

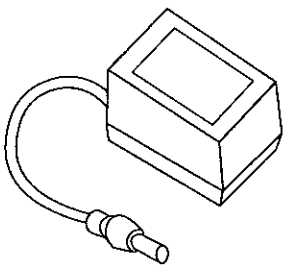
When opening the packing box, confirm that the following items are inside the box:





M3x6 Screw with spring washer and flat washer.

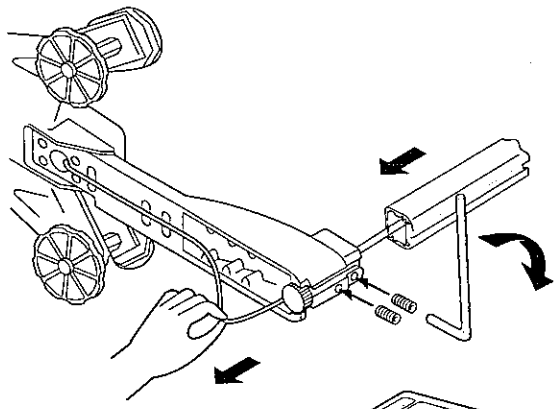




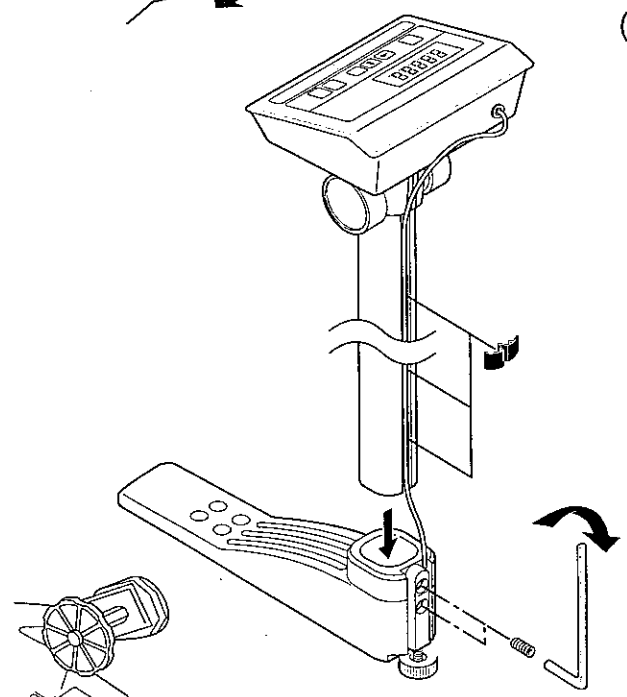
AC adaptor

The AC adatptor is one of options without Australia. (This adaptor is one of accessories in Australia)
Please check that adaptor type is correct for your line voltage.

2-2 Assembly

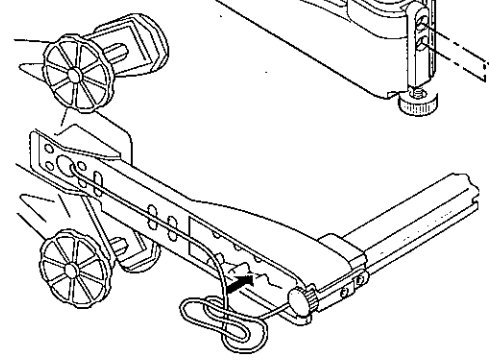


(1) Insert the pole into the pole base. During insertion, gently pull on the load cell cable to ensure that it does not become caught between the pole and the pole base. If the load cell cable is not passed through the inside of the pole, press the load cell cable into the pole recess, then attach the cable with the cable holders.

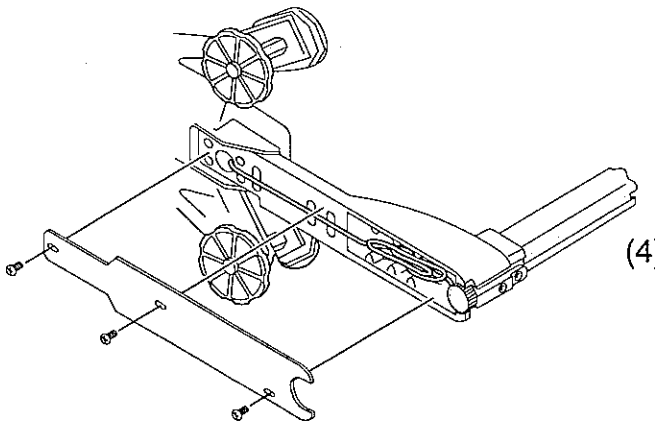


(2) Attach the pole to the pole base with the pole mounting screws.

(When the load cell cable is not passed through the inside of the pole.)



(3) Insert the surplus load cell cable into the lower part of the pole base.

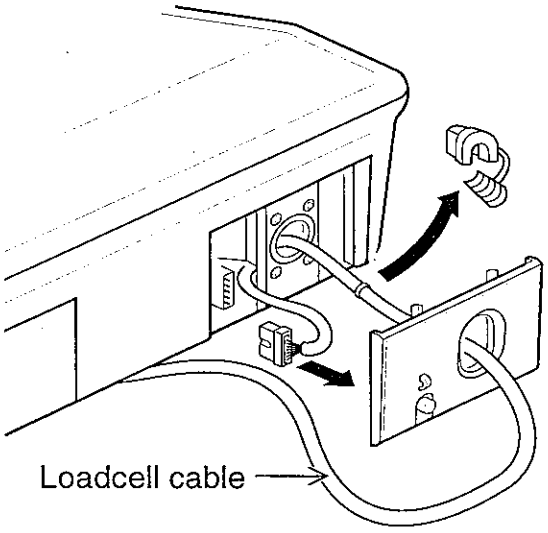


(4) Attach the pole base lower cover with the M3x6 screws.

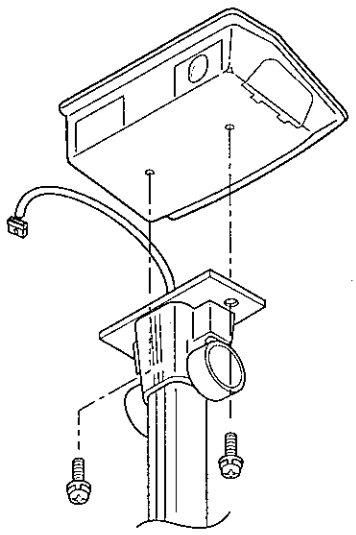
2-3 Separating the display pod

It is possible to use the display pod remote from the main unit base part. In this situation, it is necessary to disassemble the pole and pole base.

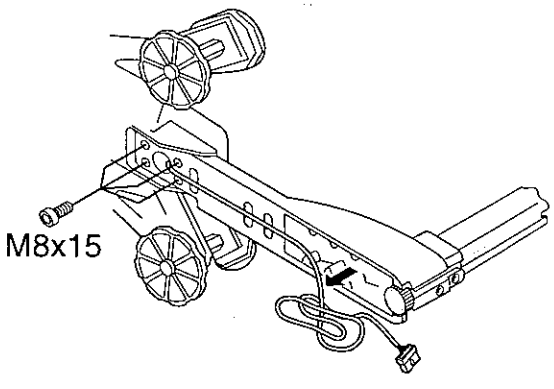
Disassembly



(1) After confirming that the power is OFF, remove the load cell cable out of the display pod.



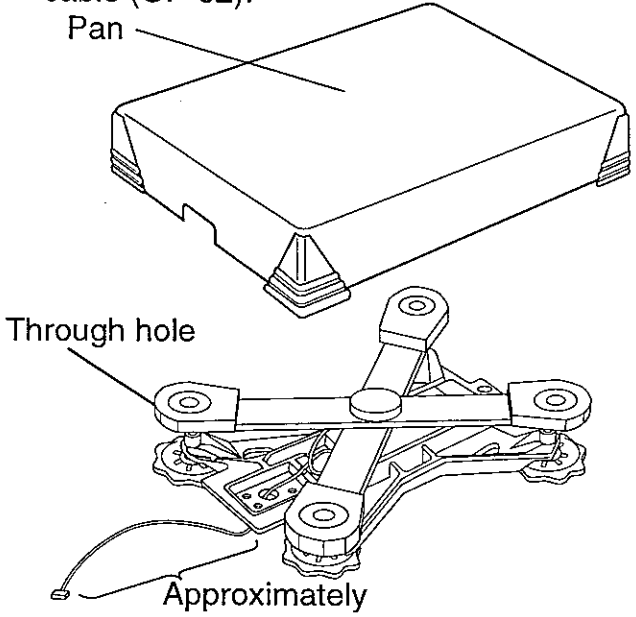
(2) Loose the M4x8 screws off and remove the display pad from the pole.



(3) Remove the hexagonal hole screws (M8x15) and disassemble the pole base carefully not to damage the load cell cable.

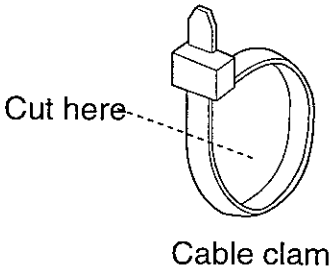
(4) Pull out the load cell cable through the pole.

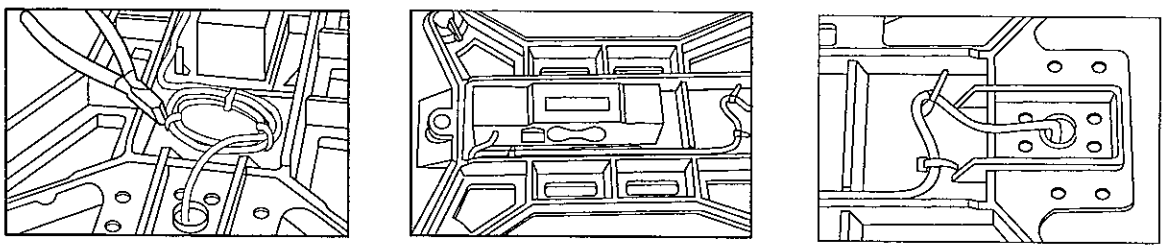
If the weighing platform is to be used remotely, the maximum length of the removed cable is around 2.5m. This length can be extended another 5m using the optional extension cable (OP-02).

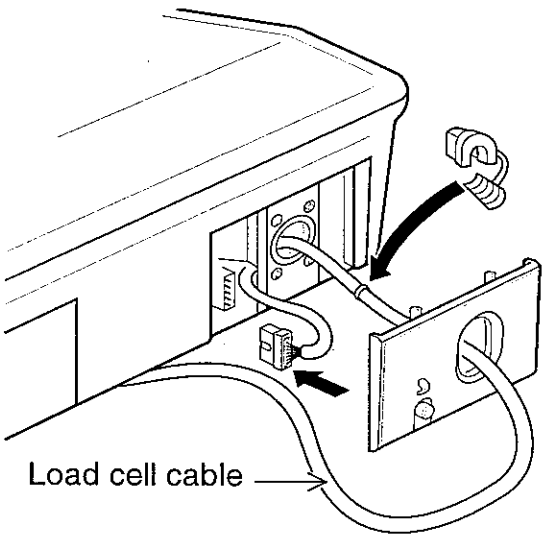


(1) Cut the cable clamps on the load cell cable which is wrapped into the inside of the base unit at the place shown in the figure below (in order to be able to use the clamps again), and pull out the required length of cable.

Fix the surplus cable with the clamps.







(2) After confirming that the power is OFF, insert the load cell cable into the display pod.

When using the display pod remote from the weighing base unit, take care that the load cell cable does not come into contact with the weighing base pan, etc.

2-4 Installation

(1) Install the scale in a level location that is not affected by vibration or wind.

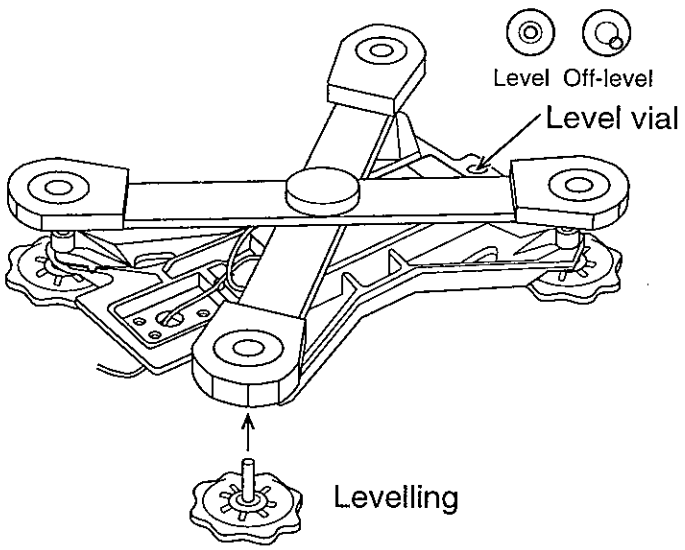
(2) Avoid locations that receive direct sunlight.

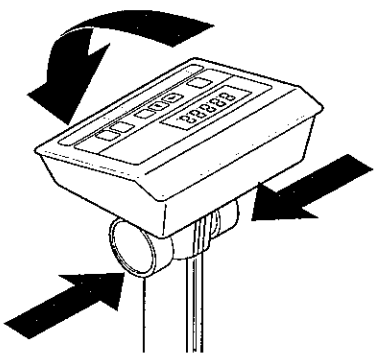
(3) Avoid power source noise, strong electric waves and magnetism, etc.

(4) Rotate the levelling to adjust the base unit until the bubble of the level vial comes to the center of the circle.

(5) For a location where the display pod is liable to be splashed with water, use the included vinyl cover.

(6) While pressing the caps at the pole top (display pod lower part) from both sides, adjust the position of the display pod to a suitable angle.



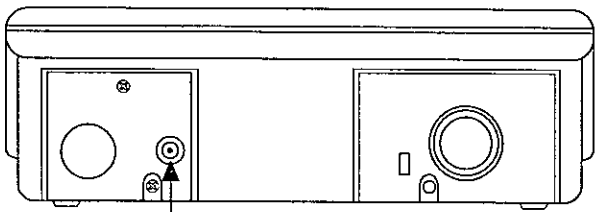


Although the load cell of the HV/HW series has excellent water-proofing and may be washed, do not scrub or scour with a brush, etc., because there is a danger that the load cell may be damaged. Further, immediately after washing, the temperature balance of the load cell is disturbed and stable weighing may not be carried out. After washing, wait for a short period before using the scale.

2-5 Power sources

For the power source, it is possible to use dry cell batteries (six "C" size (SUM-2) dry cell batteries: sold separately), the optional AC adaptor or a NiCd battery pack (AD-1681: sold separately).

- When using the AC adaptor:
  If the power source used is unstable and is liable to momentary power cuts, or if the power source includes a noise component, there is a possibility that mis-operation may occur. To avoid this possibility, use a stable power source.
  When using the AC adaptor, the dry cell batteries can not be used. If using the AC adaptor for a long period, remove the batteries.

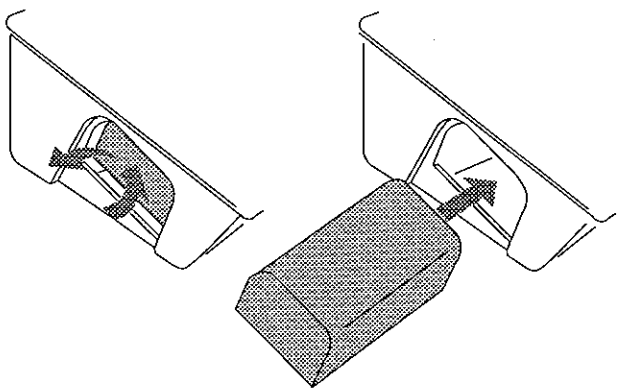


- When using dry cell batteries:
  Insert the batteries into the battery box, then insert the battery box into the display pod.

  Battery box
  At the time of shipping, the battery box is inserted in the main unit.

  To remove the battery box, press it in and up, then slide it out.

  When inserting the batteries in the box, take care not to mistake the battery polarity.



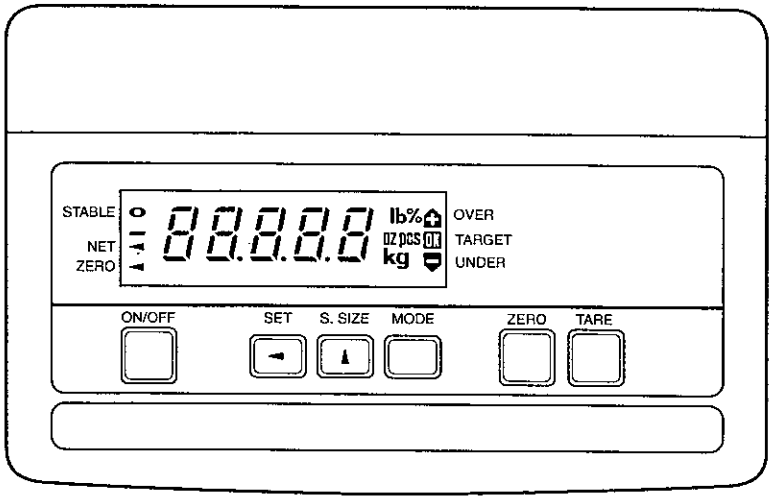
- When using the NiCd battery pack
  Insert the NiCd battery pack in place of the dry cell battery box.

  When re-charging, remove the AD-1681 and re-charge with the supplied charger. For an empty battery, it will take about 15 hours for charging. When the charging is finished, detach the charger as soon as possible to avoid over-charging the battery.

The AC adaptor used for the scale main unit can not be used for charging the NiCd battery. Be sure to use the supplied charger for recharging.
In the same way, the charger can not be used to power the scale. Use the supplied AC adaptor.

3. Panel parts names and functions

3-1 Front panel



ON/OFF

Power ON/OFF switch.
After power on, if zero continues to be displayed for about 3 minutes, this machine will automatically switch itself off. This automatic power off function can be disabled using the function settings.

SET

This switch has the following four functions:

(1) Counting mode:
Used for recording the unit weight of the sample.

(2) % Percentage mode [HW series only]:
Used to record the sample as the 100% weight.

(3) Comparator ON/OFF
In weighing display mode, this switch is used to switch the comparator function on and off .

(4) Setting the upper and lower limit values
For the upper and lower limit values displayed using the MODE switch, the required figure that is to be changed can be set using this SET switch.
Each time the key is pressed, the digit to be changed will be moved one digit to the left and will flash.
(Changing of the value of the digit is carried out using the S.SIZE switch.)

S.SIZE

This switch has the following two functions:

(1) In counting mode:
Changes the sample size.
The sample size is normally 5 units, but it is also possible to set 10 units, 20 units, 50 units or 100 units.

(2) Setting the upper and lower limit values:
After selecting the digit using the SET switch, the S.SIZE switch is used to change the digit value.
Each time the key is pressed, the value (or sign) will change.

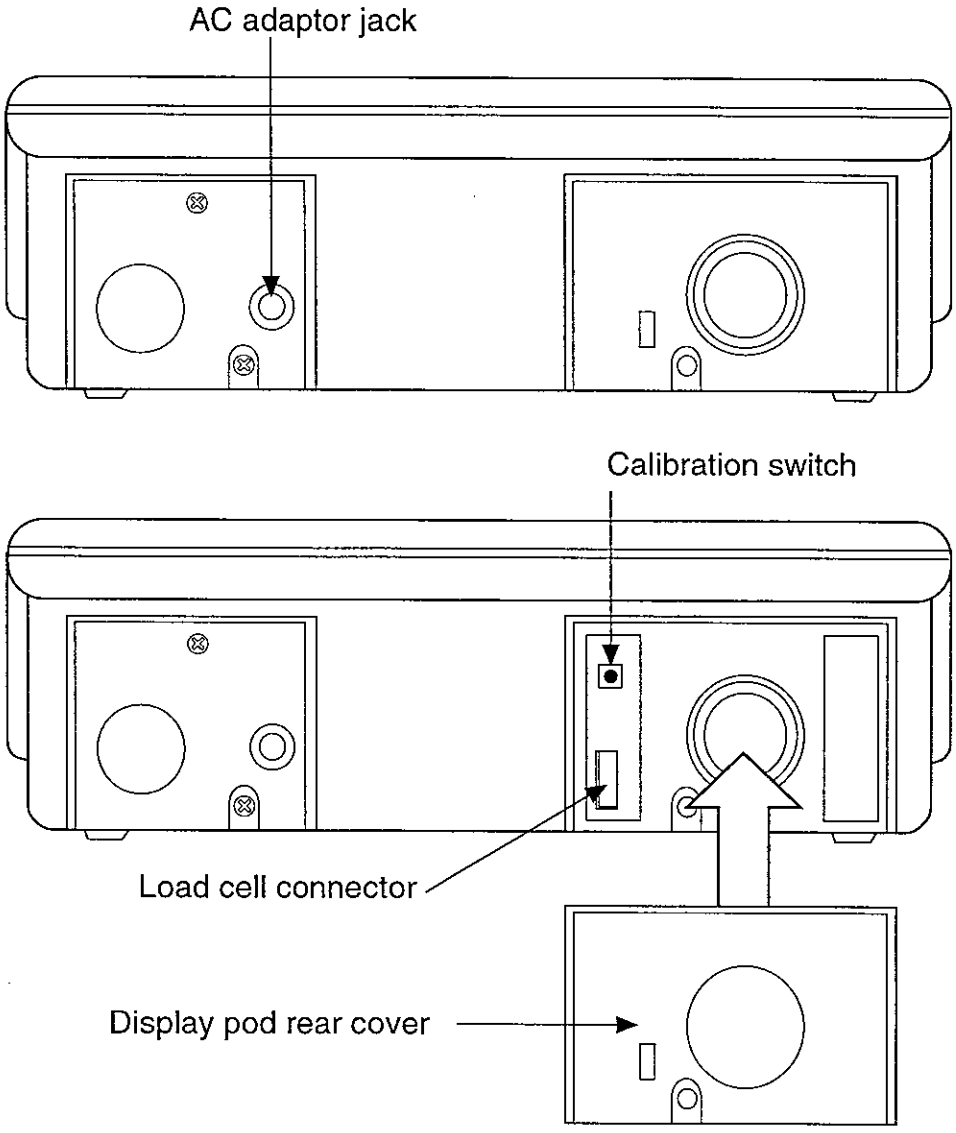
MODE

This switch is used to change between the displayed units and to set the upper and lower limits.
The units can be changed as follows:

Might lable

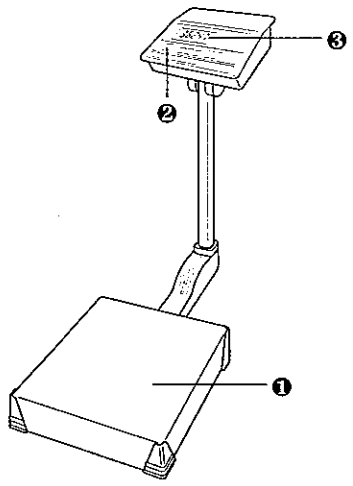
3-2 Rear panel

- ❑ Calibration switch:
- ❑ Load cell connector:
- ❑ AC adaptor jack:



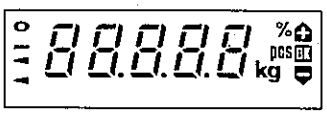
4. Method of use

4-1 Starting

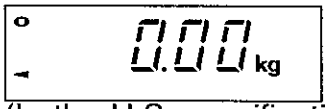


(1) Ensure that there is nothing on the weighing platform.

(2) Switch ON the power.
(Press the ON/OFF switch.)

(3) 

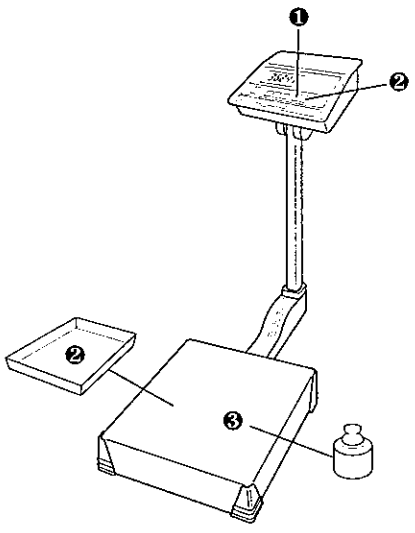
Display check
(All the display segments light for 3 seconds.)

(4) 

(In the U.S. specification scales, the displayed units are lbs.)
In the U.S. specification weighing scales, by pressing the MODE switch the displayed units can be selected as "kg", "lb" or "oz".
Start of weighing

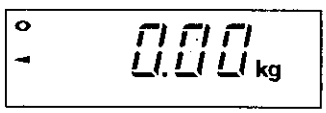
(5) Switch OFF
(Press the ON/OFF switch again.)

4-2 Weight display ("kg", "lb.","oz.") mode

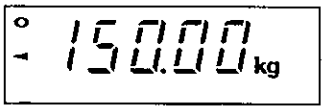


(1) Press the ZERO switch to set the zero.

(2) If a tare (container) is being used, place the container on the weighing platform. When the "O" stable mark is displayed, press the TARE switch to set the zero point.

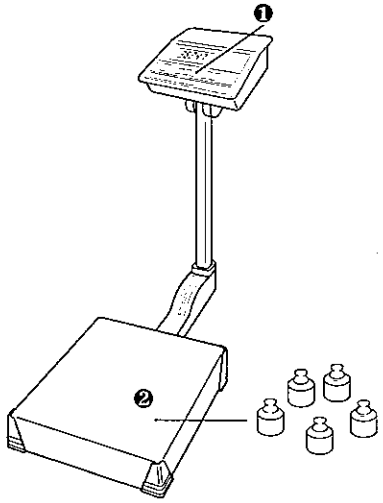


(3) Place the sample that is to be weighed on the weighing platform and read out the numerical value when the "O" stable mark is displayed.

Confirm → 

4-3 Counting ("pcs") mode

4-3-1 Parts counting

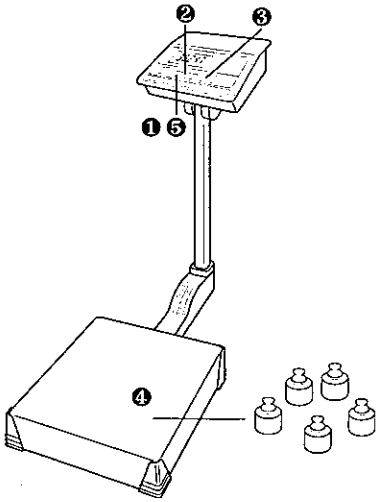


(1) Press the mode switch until the displayed units change to "pcs".

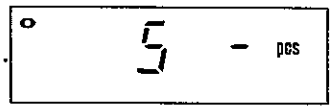
Place the samples on the weighing platform, and the counting will begin.

(2) The unit weight previously input will be used to calculate the number of units, and this number will be displayed.

4-3-2 Recording the unit weight



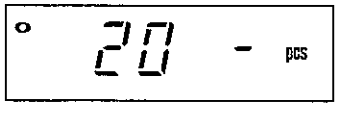
(1) In counting mode, by pressing the SET switch, it is possible to record a new unit weight.
To discontinue the recording process, press the MODE switch to exit from the counting mode.

e.g. 

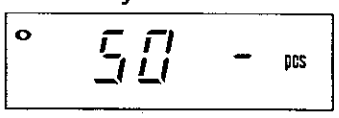
5 unit sample

(2) Press the S.SIZE switch and select the number of units to be used as the standard. The 5 types of samples that can be used as the standard are 5, 10, 20, 50 or 100 units. Note that a larger sample will give greater accuracy.

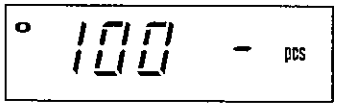
10 unit sample



20 unit sample

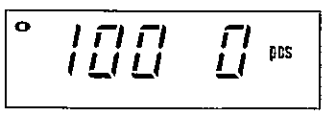


50 piece sample

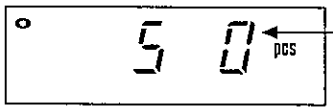


100 piece sample

Note: The display of this symbol indicates that either there are objects on the weighing platform, or else that the zero point is disturbed.If there is no load on the weighing platform when this display is shown, press either the ZERO switch or the TARE switch to set the zero point.



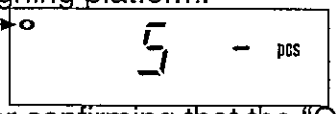
(3) Set the zero point as described in 4-2 (1) or 4-2 (2).



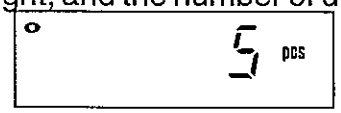
Set to zero

(4) Place the selected number of samples on the weighing platform.

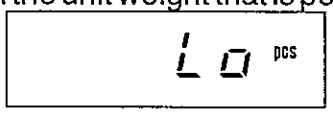
Confirm →



(5) After confirming that the "○" stable mark is displayed, press the SET switch. The average weight of the sample will be recorded as the unit weight, and the number of units can be weighed.



(6) If Lo is displayed when the SET switch is pressed in (5), this indicates that the sample weight is less than the unit weight that is possible to be counted.



(7) The recorded unit weight is stored and will not be deleted, even by switching off the power.

* When shipped from the factory, the unit weight was set to zero.

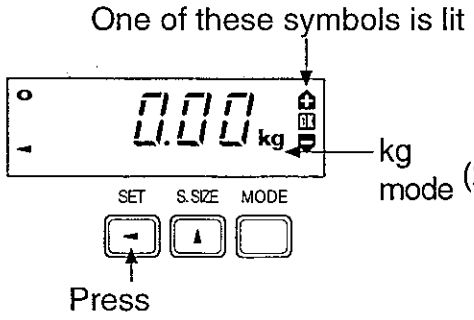
4-4 Comparator

4-4-1 Comparator function

(1) The comparator function operates in weighing, counting and % percentage modes. If the displayed value is greater than the upper limit value, "▲" is displayed, and if it is less than the lower limit value, "▼" is displayed. "OK" will be displayed when the value is between the upper limit and lower limit values.

▲ > Upper limit value ≥ OK ≥ Lower limit value > ▼

"▲" is displayed for a plus overload (E display), and "▼" is displayed for a minus overload (-E display). If the data output option (OP-03) is installed, "+", "OK" and "–" signals can be output.

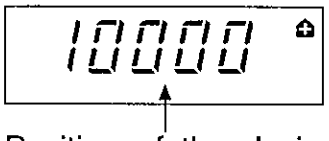


(2) To switch on the comparator in weight display mode, press the SET switch. (It is not possible to switch on the comparator in counting mode.)
One of the "▲, OK, ▼" signs will light to show that the comparator is in the operating condition.

(3) To switch OFF the comparator function in weight display mode, press the SET switch once again.

4-4-2Setting the upper and lower limit values

e.g. In the HW-150K1, 100K1 and 60K2 machines, if the display is set to "10000":



Position of the decimal point for "kg" units in weight display mode (not displayed).

Note: When setting these values, the decimal point is not shown. In the example in the figure at left, because there is no decimal point in counting mode, the display is as shown.
For example, for a display of 10000, in "kg" weight display mode this would be 100.00kg, and in counting mode it would be 10000 pieces.

Note: In the above conditions, because the same memory is used for the weighing display, counting and % percentage modes, it is not possible to set or use independent values for each mode.

(1) Upper limit

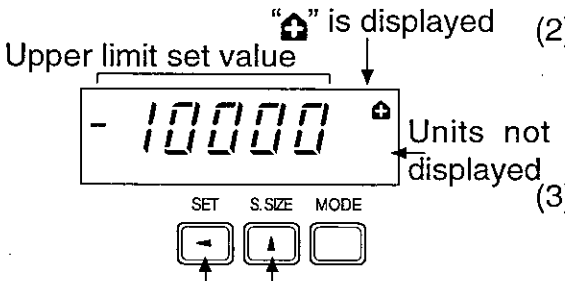
(1) Switch on the comparator function.

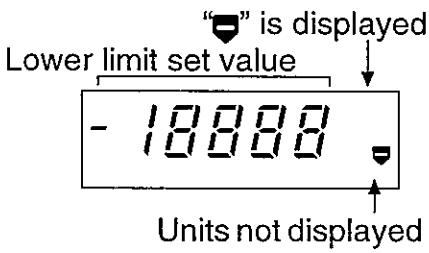
(2) Press the MODE switch to enter the upper limit setting mode. When the setting mode is entered, the units are not displayed, and instead the currently set value and "⏏" are displayed.

(3) If the currently set value is not to be changed, press the MODE switch to move forward to the lower limit setting mode.

(4) To change the currently set value, press the SET switch to select the digit to be changed, then press the S.SIZE switch to change the value. The digit selected by the SET switch will flash to show that it is selected, but after pressing the S.SIZE switch the flashing will stop.

(5) When the setting of the upper limit value is finished, press the MODE switch to move on to the lower limit setting mode.





(2) Lower limit

(1) Using the same method as for the upper limit, set the lower limit value.
However, ensure that the upper limit value ≥ the lower limit value.

(2) After completing the setting, press the MODE switch to exit from the setting mode. At this time, the set upper and lower limit values will be automatically stored in memory.

e.g. Example for the HW-150KA

Upper limit \ Lower limit		-00005	00500
00100	kg	1.00kg≥OK≥-0.05kg	*1 _
	pcs	100pcs≥OK≥-5pcs	*1 _
10000	kg	100.00kg≥OK≥-0.05kg	100.00kg≥OK≥5.00kg
	pcs	*2E>OK≥-5pcs	*2E>OK≥500pcs

*1. The upper limit value ≥ lower limit value is not satisfied (automatically returns to the upper limit setting mode).

*2. In the plus overload display situation, "⏏" is displayed. (In the minus overload situation, "⏏" will be displayed.)

* When shipped from the factory, both the upper and lower limit values were set to zero.

* Even after switching off the power, the set upper and lower limit values will not be deleted and will remain in memory.

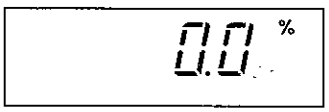
* In comparator function, whether the judgement of "+", "OK" and "–" is carried out simultaneously at power ON, or whether the judgement is started by pressing the SET switch can be selected.
Further, when using the relay output of the data output board (OP-03), when the display is close to zero (within +/- 4 units), the relay output can be set so that it does not turn ON. Both of the above settings are carried out in function 6.

4-5 % Percentage mode [HW series only]

4-5-1 % Percentage display [HW series only]

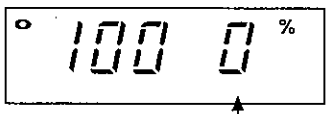
(1) Press the MODE switch to set the units display to "%".

(2) By placing an object on the weighing platform, the percentage weight of the object compared to a previously recorded 100% weight value will be displayed.



4-5-2 Recording the 100% weight

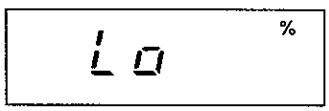
(1) By pressing the SET switch in % percentage mode, a new 100% weight can be recorded. To discontinue the recording, press the MODE switch to exit from the % percentage mode.



Set to zero

(2) If "-" is displayed on the right hand side of the 100 value, this shows either that the zero point is displaced, or that the tare on the weighing platform is not displaying zero.

(3) Set the zero using the methods in 4-2 (1) or 4-2 (2).



(4) Place the sample that is to be set to 100% on the weighing platform. After confirming that the "O" stable mark is displayed, by pressing the SET switch the weight will be stored in memory and displayed as the 100% weight.

(5) If when the SET switch is pressed in step (4), "Lo" is displayed, this shows that the sample weight is less than the weight possible to be stored as the 100% weight.

(6) The stored unit weight is not deleted even after switching off the power.

Note: If for, example, a lower limit value of 1000 has been set in the comparator, in this percentage display, the value will be treated as 100.0%.

5. Setting the functions

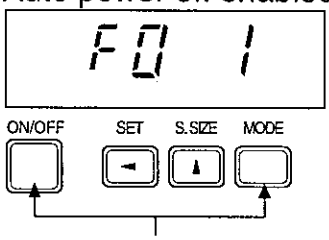
In the function settings, the following functions can be selected:

5-1 Automatic power off

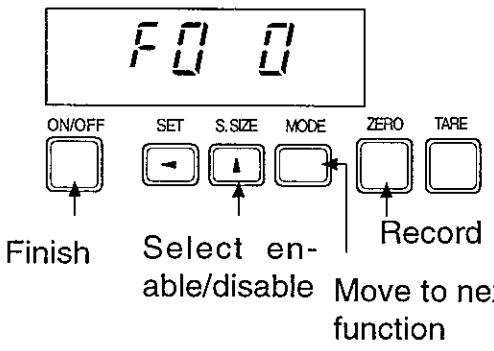
In this function, if zero is displayed continuously during use for approximately 3 minutes, the power will automatically switch off to conserve the batteries.
Using the function settings, the auto power off function can be enabled or disabled.

Setting method

Auto power off enabled



Auto power off disabled



(1) Switch the power off, then while pressing and holding the MODE switch, switch the power on again.

(2) If the set value is not to be changed, press the MODE switch to move on to the next function setting. The set value will not be changed.

(3) To change the setting value, each time the S.SIZE switch is pressed, the value of the first figure changes:
F0 = 0: Auto power off function disabled
F0 = 1: Auto power off function enabled
Set either of the settings.

(4) When the setting is finished, press the ZERO switch and the setting will be stored in memory. In the HV series, "F6" will be displayed, and in the HW series, "F5" will be displayed.

(5) If only the auto power off function is to be changed, just switch the power off.
To continue with the function changing, the HV series moves to the 5-3 Comparator function setting and the HW series moves to the RS-232C mode setting.

* When shipped from the factory, the auto power off function is set to enable.

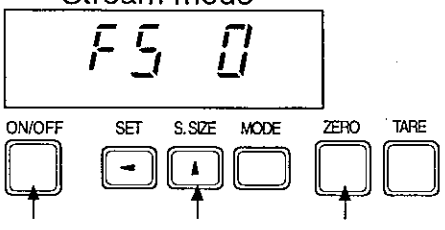
5-2 RS-232C mode [HW series only]

When using the OP-03 data output option, and when the AD-8121 compact printer or a personal computer is connected, stream mode or command mode can be selected as the RS-232C mode.

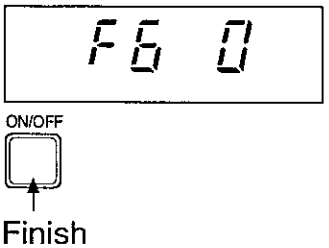
For the differences between each of the modes, refer to section 8-2 OP-03 Data output.

Setting method

Stream mode



Comparator function



(1) As a continuation of the 5-1 auto power off function setting:

(2) If the set value is not to be changed, switch off the power.
The previously set value will not be changed.

(3) To change the set value, each time the S.SIZE switch is pressed, the value of the first figure changes as follows:
F5 = 0: Stream mode
F5 = 1: Command mode: Terminator C_RL_F
F5 = 2: Command mode: Terminator C_R
Select any one of the options.

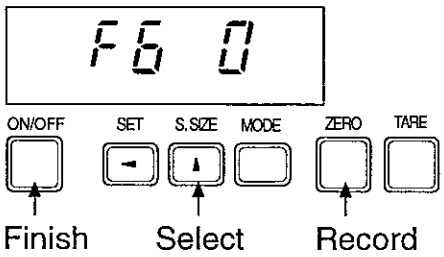
(4) When the setting has been finished, press the ZERO switch. The set value is stored in memory and F6 is displayed.

* When shipped from the factory, the stream mode was set.

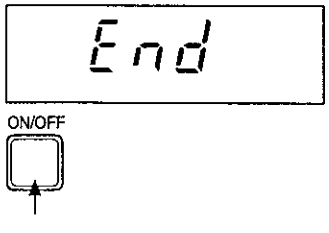
5-3 Comparator functions

Immediately after power on, the comparator is normally OFF. However, according to the settings, it is possible to set the function so that the comparator is automatically switched on when the power is switched on. Additionally, when the comparator function signal is output to an external device using the optional data output, normal output or prohibition of output when the display is close to zero (within +/-4 units) can be selected.

Setting method



"End" display



(1) As a continuation of the 5-1 Auto power off setting (HV series) or 5-2 RS-232C setting (HW series):

(2) If the currently set value is not to be changed, switch off the unit. The set value will not be changed.

(3) To change the set value, each time the S.SIZE switch is pressed, the value of the first figure changes as follows:
F6 =0: At power on, the comparator is OFF (Normal output)
F6 =1: At power on, the comparator is OFF (Output prohibited)
F6 = 2: At power on, the comparator is ON (Normal output)
F6 = 3: At power on, the comparator is ON (Output prohibited)

Select any one of the options.

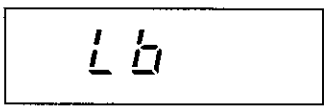
(4) When the setting is finished, press the ZERO switch. The set value is stored in memory, and "End" will be displayed.

(5) When "End" is displayed, the function setting has been completed, so switch off the power.

* When shipped from the factory, the scale is set to "At power on, the comparator is OFF (Normal output)".

6. Changing the batteries

Low battery display



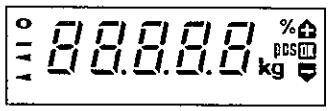
If "Low battery" is displayed during use, discontinue use and either replace the batteries or use the AC adaptor.

7. Method of calibration

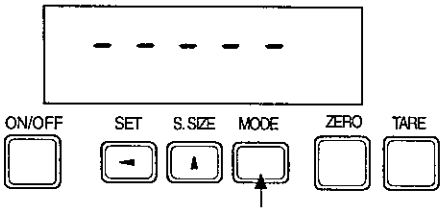
7-1 Correction for acceleration due to gravity

In the HV/HW series machines, in order to obtain the correct weight, a correction function for the acceleration due to gravity is provided. To perform correct weighing, it is necessary to set the acceleration due to gravity to match the area that the scale is being used in. **(Refer to the appendix: Values of acceleration due to gravity.)**

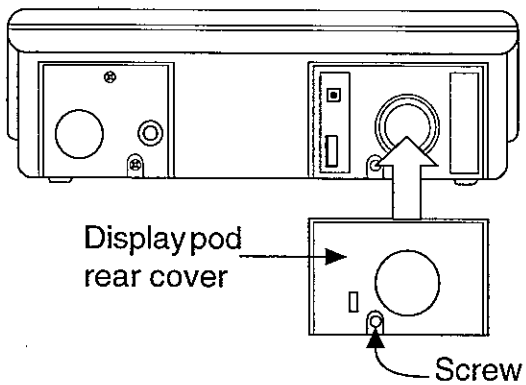
Display check



Bar display

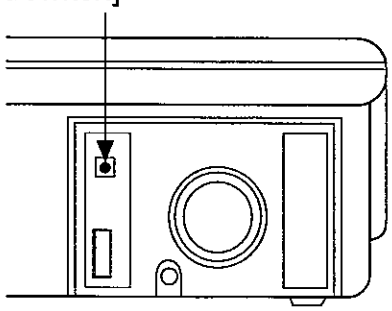


(1) Switch the power on.
After the display checking, if the bar display is shown, press the [MODE] switch to display the weighing result, etc. (including E and -E displays).

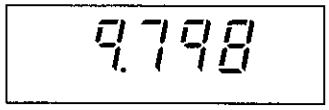


(2) Remove the screw from the rear cover and take off the cover.

[CAL switch]



(3) Press the [CAL] switch.
By pressing the [CAL] switch, the calibration mode is entered and a four-figure numerical value [9. ***] is displayed.



(4) Accelration due to gravity
The four-figure number displayed when the calibration mode is entered is the currently set gravity acceleration value. Confirm that this gravity acceleration value is appropriate for the area that the scale is being used in.

If the gravity value matches the area it is being used in, press the [MODE] switch to move on to the 7-2 zero span calibration. If the value is different, set the correct value according to the following method:

Method of setting the gravity acceleration (e.g. Change 9.798 to 9.806 the value for milan or ottawa) (See appendix)

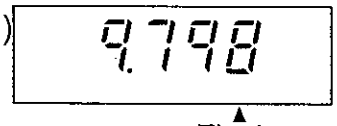
Functions of the key switches used:

S.SIZE Adds 1 to the value of the digit that is flashing. After pressing this key, the value stops flashing.

SET The digit to be changed moves one figure to the left and flashes.

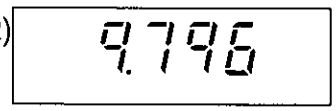
ZERO Stored the data in memory.

MODE Data is not changed and the mode progresses to the zero adjustment mode.

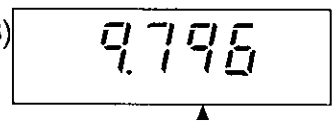
(1) 

Flashes

Press the SET switch to select the first figure. (The first figure flashes.)

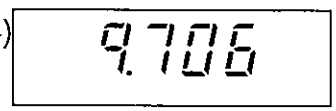
(2) 

Press the S.SIZE switch to change the number of the first figure to "6".

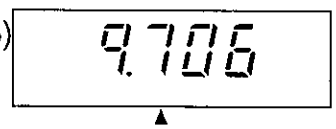
(3) 

Flashes

Press the SET switch to select the second figure. (The second figure flashes.)

(4) 

Press the S.SIZE switch to change the number of the second figure to "0".

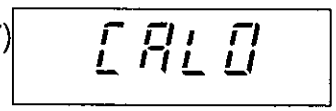
(5) 

Flashes

Press the SET switch once to select the third figure. (The third figure flashes.)

(6)

Press the S.SIZE switch to change the number of the third figure to "8".

(7) 

Using the above procedure, the gravity acceleration setting has been completed. Press the ZERO switch to store the data in memory.

After the data has been stored, the calibration will automatically move forward to the zero adjustment. If the set value is not to be used, and the system is to be returned to the previous condition, press the MODE switch instead of the ZERO switch. The data will not be recorded and the calibration will automatically move forward to the zero adjustment.

(5) For a normal calibration, after carrying out the correction of the gravity acceleration as described above, the calibration has been completed. Press the CAL switch to exit from the calibration mode.

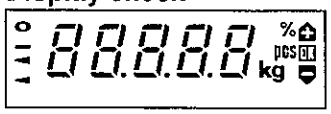
However, if an inappropriate strength has been applied, or if changes through time have caused the zero or span to change, or after replacing the load cell or circuit boards, re-calibration of the zero and span will be required. Carry out the 7-2 Zero and span calibrations. (See note 1)

For the span adjustment, use an accurate weight (standard weight or equivalent weight) to carry out the procedures.

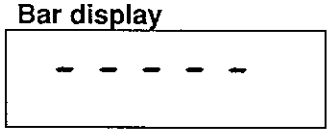
If an accurate weight is not available, do not carry out this calibration.

7-2 Zero and span calibrations

Display check



Bar display



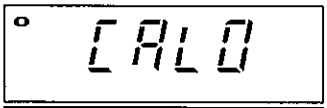
Ensuring that there is nothing on the weighing platform, switch on the power. If the bar display is shown after the display check, the zero point is displaced. In this situation, carry out the zero point calibration.

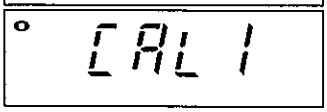
(1) Switch on, and allow an adequate amount of time for warming up (10 minutes or longer) During warming up, disable the auto power off function, or place an object on the weighing platform so that the display is not zero.
(2) Set the gravity acceleration according to procedure 7-1 Correction for acceleration due to gravity. After finishing this setting, the machine enters the zero point calibration.
(3) Zero adjustment

Functions of the key switches used:

ZERO Stores the zero adjusting value in memory.

SET The data is not changed, and the machine moves forward to the span adjustment.





With nothing on the weighing platform, wait for the "O" stable mark to be displayed.

When this stable mark is displayed, press ZERO to store the zero data. When the data has been stored, the calibration mode moves forward to the span adjusting procedure.
If only the zero point is to be calibrated, press the CAL switch to exit from the calibration mode after the above procedure.

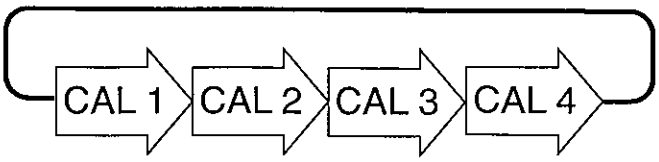
(4) Span adjustment

In span adjustment, there is a full scale adjusting mode and a 2/3 scale adjusting mode. Perform one or other of the procedures. (For each of the values, refer to the calibration weights in Section 10. Specifications.)
If at all possible, carry out the adjustment using the full scale weights. Only carry out the adjustment using the 2/3 scale weights when unavoidable due to not having enough weights, etc.

Functions of the key switches used:

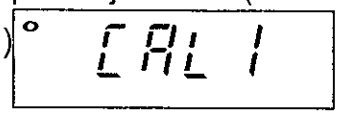
ZERO Stores the span data in memory.

MODE The data is not changed, and the span adjusting mode changes.
Each time the switch is pressed, the mode changes as follows:



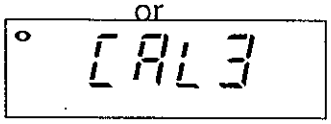
The CAL3 and CAL4 (pound) modes are only available for the U.S. specification scales.

(5) Span adjustment (Full scale)

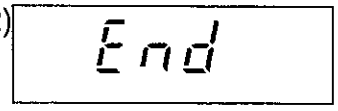
(1) 

By pressing the [MODE] switch, select either the CAL1 (Kg) or CAL3 (1b) modes.

or

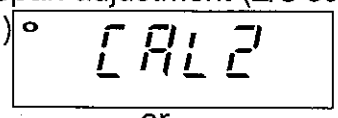


Place the full scale weights on the weighing platform and wait until the "O" stable mark is shown.

(2) 

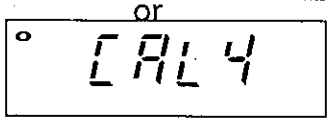
When the stable mark is shown, press [ZERO] to record the span adjusting data. After the data has been recorded, "End" is automatically displayed.

(6) Span adjustment (2/3 scale)

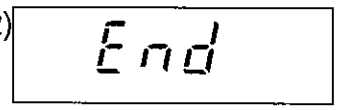
(1) 

By pressing the [MODE] switch, select either the CAL2 (Kg) or CAL4 (1b) modes.

or



Place the 2/3 scale weights on the weighing platform and wait until the "O" stable mark is shown.

(2) 

When the stable mark is shown, press [ZERO] to record the span adjusting data. After the data has been recorded, "End" is automatically displayed.

(7) Ending the calibration

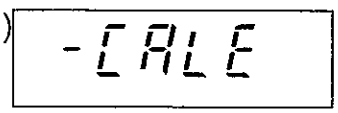
After the zero span adjustment is finished and "End" is displayed, if the calibration has been completed, press the [CAL] switch. This exits from the calibration mode and returns to the normal weighing display mode.

To complete the calibration, replace the display pod rear cover that was previously removed.

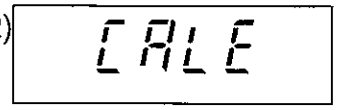
7-3 Error displays during calibration

(8) Error displays

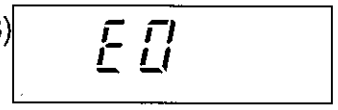
The following are the error displays that may be shown during calibration. If these displays are shown, confirm whether the operation has been mistaken and if the correct weights are being used, etc., then switch off and perform the procedure again.

(1) 

The output from the load cell is too small. When carrying out the span adjustment, if this error is only displayed when the [ZERO] switch is pressed, the load cell output is too small compared to the zero adjusting data.

(2) 

The load cell output is too large.

(3) 

The data that was to be stored in the memory has not been correctly stored.

*** Note 1: It is essential that the acceleration due to gravity is set before carrying out the zero and span adjustments.**

8. Options and accessories

In the HV/HW series, the following options and accessories are available:

(1) OP-02 Extension cable (5m)
(2) OP-03 Data output board
(3) OP-04 Printer mounting base (for the AD-8121)
(4) OP-13 Roller conveyor (small)
(5) OP-14 Roller conveyor (large)
(6) AX-WM-B31727 Wall mounting fixture
(7) AX-KO577A-200 RS-232C cable (2m)
(8) AD-1681 NiCd battery pack

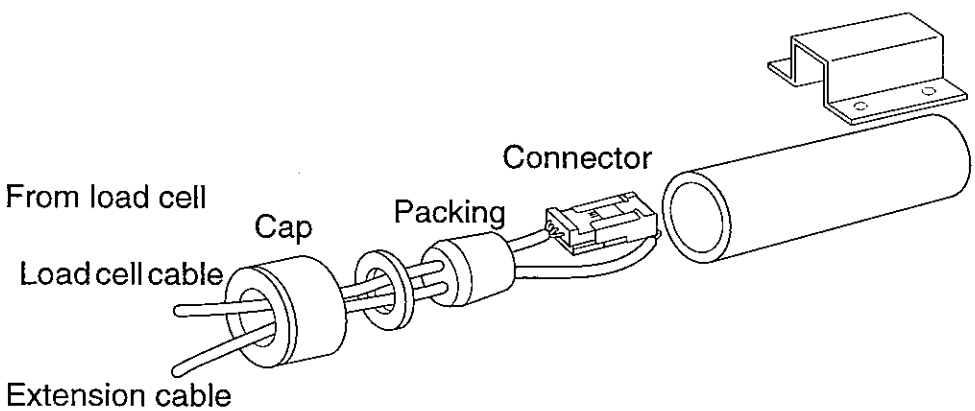
For the handling of the OP-13, OP-14 and AD-1681, please read the optionally included manuals.

8-1 OP-02 Extension cable

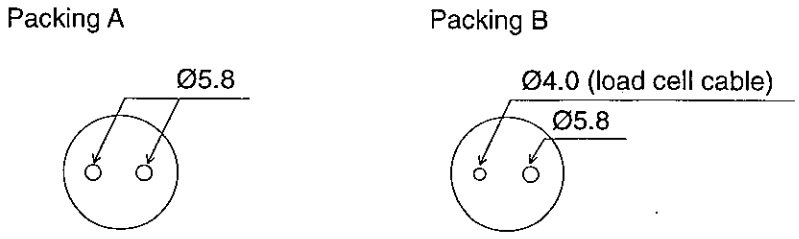
This load cell cable is for use when the display is to be mounted in a location remote from the base unit.
However, when this extension cable is connected, it is necessary to carry out the zero calibration and span calibration.

Note: Do not connect two or more extension cables together.

Connection diagram for extension cable and load cell cable.



* **The packing should match the load cell cable type. Packing A should be used for HV150K1, HV60K1, HW150K1 and HW100K1, and packing B should be used for HV60K2, HV30K2, HW60K2, HW15K2 and HW10K2.**



8-2 OP-03 Data output (RS-232C and comparator output)

The RS-232C and comparator outputs are available from the same connector.

8-2-1 RS-232C section

This interface is used to connect the HV/HW series to the AD-8121 compact printer or a personal computer. In the HW series the RS-232C has two modes, either of which can be set using the 5-2 function setting. The HV series only has the stream mode, and does not have the command modes.

(1) Stream mode

The value being displayed is output normally, and the data sending speed is four or five times per second. However, there is no output while setting the unit weight in counting mode, while setting the 100% weight in % percentage mode, and while setting the comparator upper and lower limits.

When the AD-8121 compact printer is connected, set the stream mode.

(2) Command mode [HW series only]

Commands can be sent from a personal computer, etc. to the HV/HW, causing the displayed data to be output and allowing zero setting and tare subtraction to be carried out.

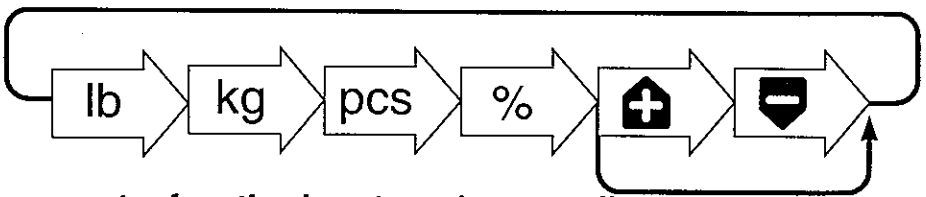
The commands that can be used are as follows:

T term: The tare subtraction operation is carried out only when the display is stable.

Z term: The zero operation is carried out only when the display is stable.

Q term: Regardless of the stability or instability of the display, output the displayed data one time. However, output is not carried out while the unit weight is being set in counting mode, or while setting the 100% weight in % percentage mode.

U term: Switch between the units. Each time the command is sent, the units change as follows:



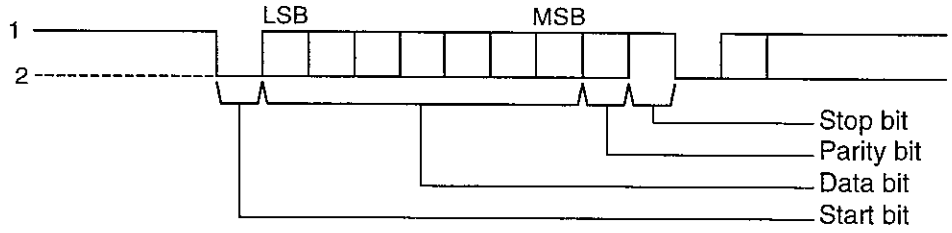
If the comparator function is not on, the upper limit and lower limit values will not be displayed. The lb. display is only for the U.S. specification scales.

* "term" represents terminator. Using the 5-2 function setting, set either CR+LF or CR to match the type of personal computer, etc. that is connected. When sending a command continuously, ensure that there is an interval of 500msec or longer between the commands.

(3) Interface specifications

Output standards:	According to EIA RS-232C
Transmission format:	Start/stop synchronous transmission
Signal speed:	2400bps (fixed)
Data bit length:	7 bits
Parity:	1 bit (even)
Stop bit:	1 bit
Code:	ASCII

(4) Data format



S	T	,	+	0	0	0	.	0	0	K	g	CR	LF

Header — Data — Units — Terminator

- There are the following six types of headers:

  ST In weighing mode and % percentage mode, the data is stable.
  QT In counting mode, the data is stable.
  US Data is unstable.
  OL Data is overloaded (the maximum display is exceeded)
  HI Upper limit value Only used in command mode
  LO Lower limit value

- The data is a 7 figure value when including the sign and decimal point. If there is no decimal point, the data will be 6 figures long.
  When the data is overloaded, "+999.99" or "-99.999" will be output. (The position of the decimal point will be different depending on the instrument type and the displayed units.)

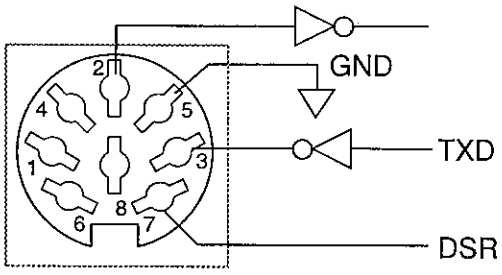
- There are the following types of units:

  kg Weight display mode (kg)
  lb Weight display mode (lb)
  oz Weight display mode (oz)
  PC Counting mode
  % % Percentage mode
  Upper limit value and lower limit value (represents a space)

- Regardless of the function setting, CR+LF is output as the terminator.

(5) Interface circuit

Uses a DIN 8 pin connector



RXD (Only possible to be used in the HW series machines)

Internal connection diagram

* Short the RTS and CTS pins of the connected personal computer.

8-2-2Comparator section

Outputs the comparator function +, OK and - signs to an external unit.

When outputting the +, OK and - signs, it is possible to select whether to output the data only when it is stable, or to output data even when it is unstable. Further, it is possible to prohibit the data output when the data is close to zero (-4 units ~ +4 units). (Refer to 5-3 function settings.)

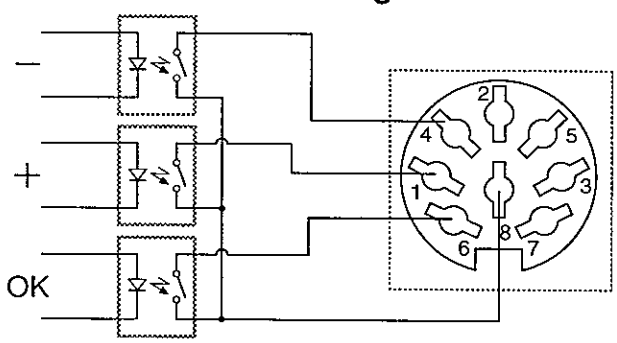
Because this option is also provided with a buzzer, it is possible to have buzzer output at the same time as the +, OK and - signs. Whichever of the +, OK and - output signals are to have the buzzer output can be selected with the switches.

Dip switch settings:

Dip switch settings		
1	OFF	Stable only, contact output: No buzzer
	ON	Normal, contact output: Buzzer output
2	OFF	When minus (-): No buzzer
	ON	When minus (-): Buzzer output
3	OFF	When OK: No buzzer
	ON	When OK: Buzzer output
4	OFF	When plus (+): No buzzer
	ON	When plus (+): Buzzer output

Refer to p.35
Dip switches.

Internal connection diagram

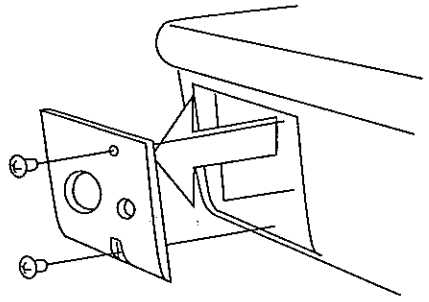


Solid state relay

The absolute maximum rating of the contact is as shown below:
Use the contact in a way that does not exceed these values.

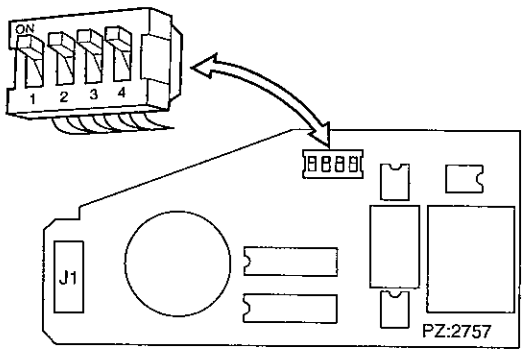
- Maximum voltage: 50V or less
- Maximum current: 100mA or less
- Maximum ON resistance: 8Ω or less

Method of mounting the data output board

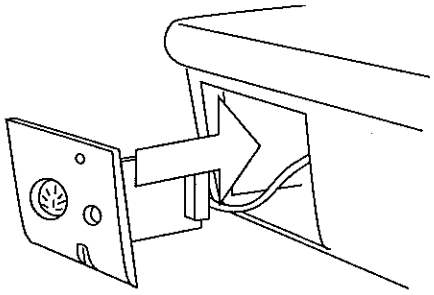


(1) Take out the two screws and remove the cover.

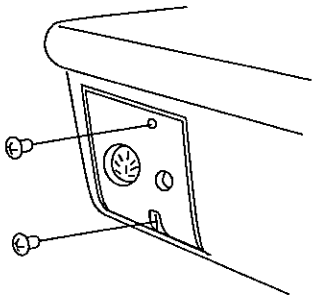
(2) Cut the cable clamp which secures the cable to the cover.



(3) After setting the dip switches on the data output board according to 8-2-2 Dip switch settings, connect the cable to J1.



(4) Insert the data output board into the main unit.



(5) Install the cover with the two screws.

8-2-2Comparator section

Outputs the comparator function +, OK and - signs to an external unit.

When outputting the +, OK and - signs, it is possible to select whether to output the data only when it is stable, or to output data even when it is unstable. Further, it is possible to prohibit the data output when the data is close to zero (-4 units ~ +4 units). (Refer to 5-3 function settings.)

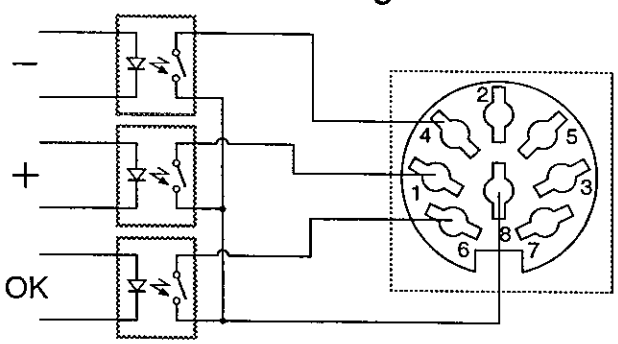
Because this option is also provided with a buzzer, it is possible to have buzzer output at the same time as the +, OK and - signs. Whichever of the +, OK and - output signals are to have the buzzer output can be selected with the switches.

Dip switch settings:

Dip switch settings		
1	OFF	Stable only, contact output: No buzzer
	ON	Normal, contact output: Buzzer output
2	OFF	When minus (-): No buzzer
	ON	When minus (-): Buzzer output
3	OFF	When OK: No buzzer
	ON	When OK: Buzzer output
4	OFF	When plus (+): No buzzer
	ON	When plus (+): Buzzer output

Refer to p.35
Dip switches.

Internal connection diagram

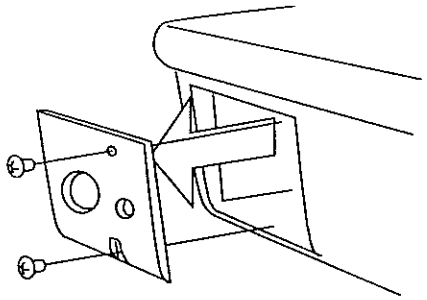


Solid state relay

The absolute maximum rating of the contact is as shown below:
Use the contact in a way that does not exceed these values.

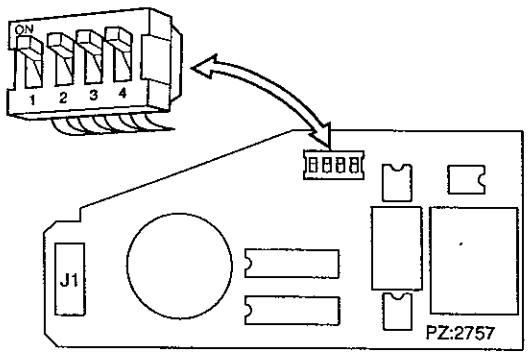
- Maximum voltage: 50V or less
- Maximum current: 100mA or less
- Maximum ON resistance: 8Ω or less

Method of mounting the data output board

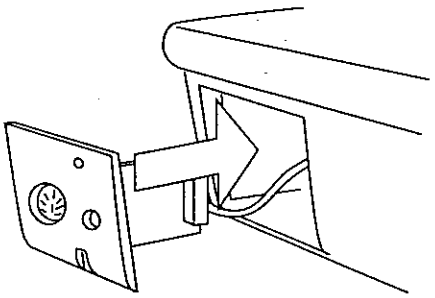


(1) Take out the two screws and remove the cover.

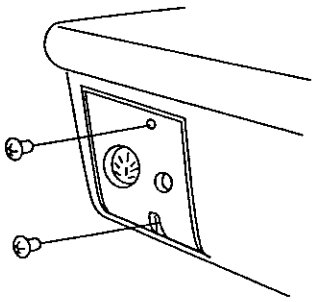
(2) Cut the cable clamp which secures the cable to the cover.



(3) After setting the dip switches on the data output board according to 8-2-2 Dip switch settings, connect the cable to J1.



(4) Insert the data output board into the main unit.



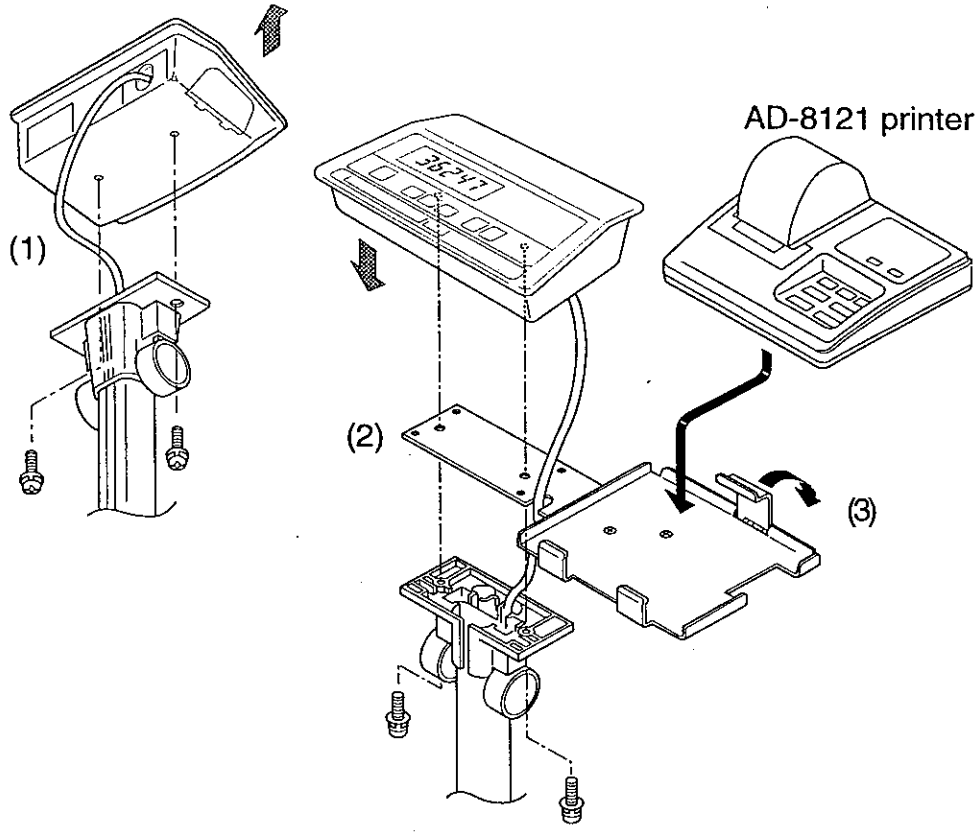
(5) Install the cover with the two screws.

8-3 OP-04 Printer mounting base (for the AD-8121)

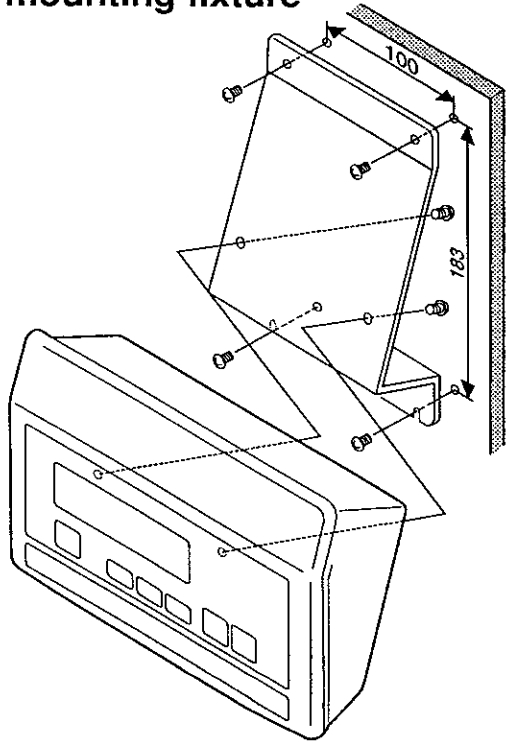
(1) Remove the display pod (M4 x 8 screws).

(2) Insert the printer base between the pole and the display pod and install with the M4 x 8 screws.

(3) Mount the printer on the base after releasing the hook in the arrowed direction.



8-4 AX-WM-B31727 Wall mounting fixture



9. Specifications

HV series

Function type	HV150KA1	HV60KA1	HV60KA2	HV30KA2
Maximum weight	150kg	60kg		30kg
	300lb	120lb		60lb
	4800oz	1920oz		720oz
Minimum display	50g	20g		10g
	0.1lb	0.05lb		0.02lb
	2oz	1oz		0.5oz
No. of samples	5 units (can be changed to 10, 20, 50 or 100 units)			
Maximum count number	3000 units			
Minimum weight possible for count weighing	50g	20g		10g
Display	7 segment liquid crystal display. Character height 22mm.			
Ambient temperature range	-10°C~40°C			
Ambient humidity range	Maximum 85% relative humidity (non-condensing)			
Repeatability	±50g	±20g		±10g
Linearity	±50g	±20g		±10g
Power source	DC9V Size C (R14P) x 6 dry cell batteries or AC adaptor.			
Battery life	Manganese dry cell batteries: Approximately 80 hours High performance manganese dry cell batteries: Approximately 100 hours Alkaline dry cell batteries: Approximately 200 hours			
Dimensions of weighing platform	390 x 530mm		330 x 424mm	
Weight	Approximately 17.5kg		Approximately 11.5kg	
Calibrating weight (CAL1)	150kg	60kg		30kg
Calibrating weight (CAL2)	100kg	40kg		20kg
Calibrating weight (CAL3)	300lb	120lb		60lb
Calibrating weight (CAL4)	200lb	80lb		40lb

CAL3 and CAL4 are only available in U.S. specification scales.
lb. and oz. displays are only available in U.S. specification scales.
Dry cell batteries and AC adaptor are not standard accessories.

HW series

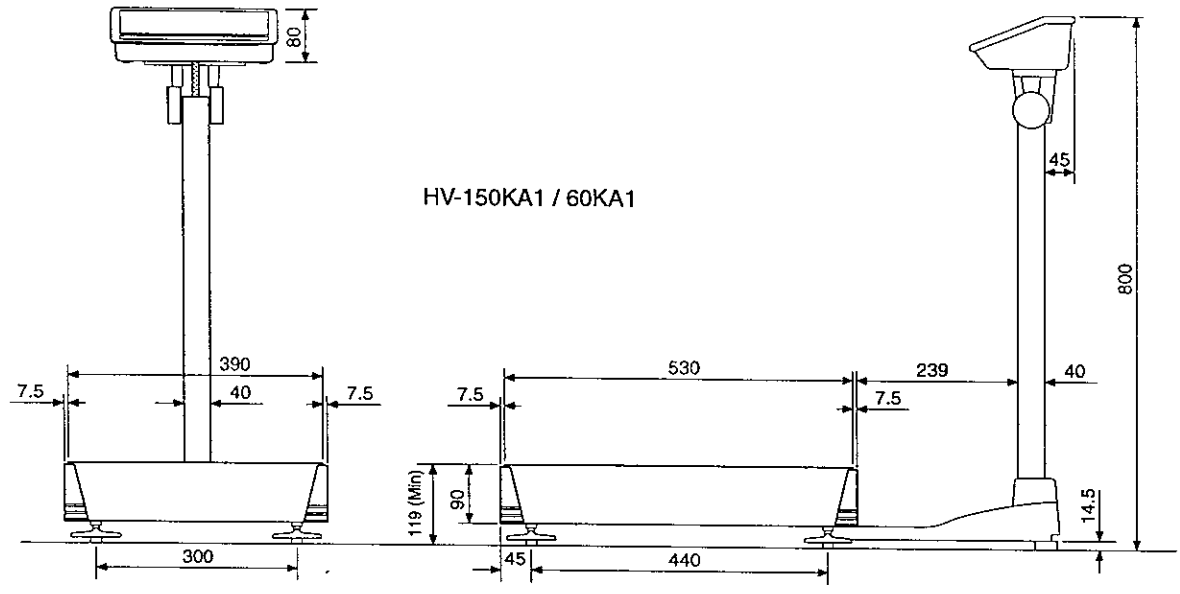
Function type	HW150KA1	HW100KA1	HW60KA2	HW30KA2	HW15KA2	HW10KA2
Maximum weight	150kg	100kg	60kg	30kg	15kg	10kg
	300lb	200lb	120lb	60lb	30lb	20lb
Minimum display	20g	10g	10g	5g	2g	1g
	0.05lb	0.02lb	0.02lb	0.01lb	0.005lb	0.002lb
No. of samples	5 units (can be changed to 10, 20, 50 or 100 units)					
Maximum count numbers	7,500units	10,000units	6,000units	6,000units	7,500units	10,000units
Minimum weight possible for count weighing	20g	10g	10g	5g	2g	1g
% Percentage maximum display	7500%	9999.9%	6000%	6000%	7500%	9999.9%
% Percentage minimum display	0.1%					
Minimum weight possible for 100% weight recording	2kg or greater	1kg or greater	1kg or greater	0.5kg or greater	0.2kg or greater	0.1kg or greater
Display	7 segment liquid crystal display. Character height 22mm.					
Ambient temperature range	-10°C~40°C					
Ambient humidity range	Maximum 85% relative humidity (non-condensing)					
Repeatability	±20g	±10g	±10g	±5g	±2g	±1g
Linearity	±30g	±20g	±15g	±7.5g	±3g	±2g
Power source	DC9V Size C (R14P) x 6 dry cell batteries or AC adaptor.					
Battery life	Manganese dry cell batteries: Approximately 80 hours High performance manganese dry cell batteries: Approximately 100 hours Alkaline dry cell batteries: Approximately 200 hours					
Dimensions of weighing platform	390 x 530mm		330 x 424mm			
Weight	Approximately 18kg		Approximately 12kg			
Calibrating weight (CAL1)	150kg	100kg	60kg	30kg	15kg	10kg
Calibrating weight (CAL2)	100kg	60kg	40kg	20kg	10kg	6kg
Calibrating weight (CAL3)	300lb	200lb	120lb	60lb	30lb	20lb
Calibrating weight (CAL4)	200lb	150lb	80lb	40lb	20lb	15lb

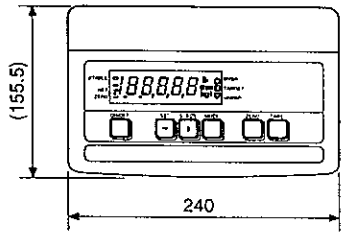
CAL3 and CAL4 are only available in U.S.A. specification scales.
Lb and oz displays are only available in U.S.A. specification scales.
Dry cell batteries and AC adaptor are not standard accessories.

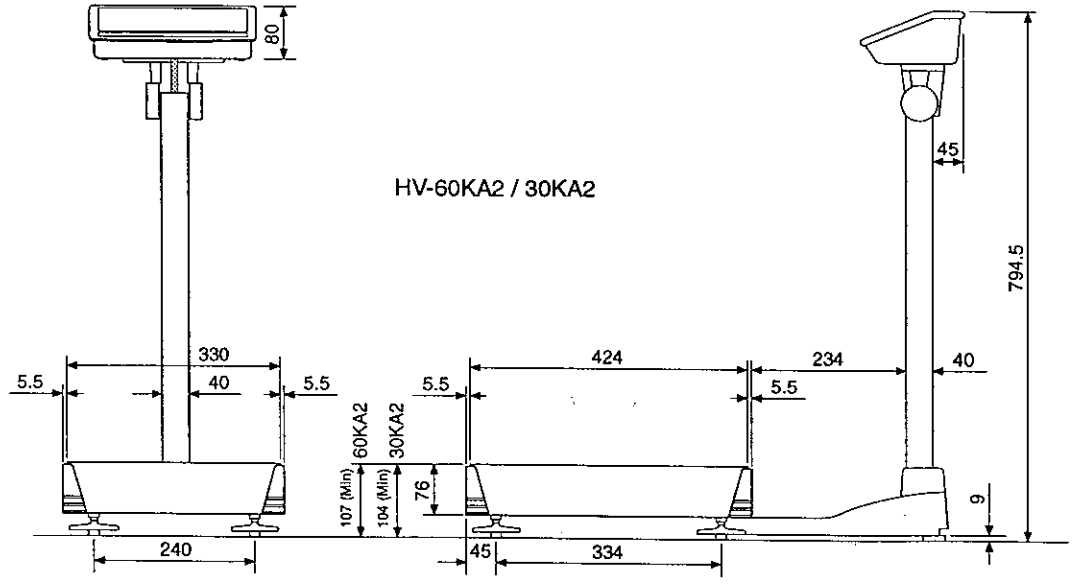
10.Check list when a malfunction is suspected

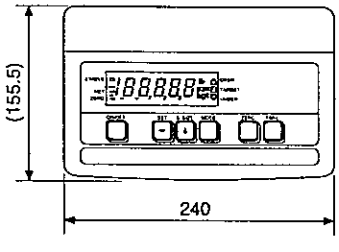
In this situation...	Confirm these items
The instrument does not switch on.	• Have the batteries been correctly inserted? • Are the batteries dead? • Is the AC adaptor properly connected? • Is the AC adaptor the correct voltage?
The display shows 88888 constantly and does not proceed.	• Is the scale being subjected to wind or vibration? • Is there a generator of electronic noise nearby? (e.g. Solenoid valve or motor) • Is the weighing platform correctly installed? • Is there anything touching the weighing platform? • Is there anyting touching or under the load cell preventing it from moving (cable, shipping block, etc.) • Is the load cell cable properly connected to the indicator.
The display shows "___" constantly	• Was the power switched on when there was something on the weighing platform? • Try pressing the MODE key. Is the zero point value greatly different? Obtain the zero point from the calibration. (Refer to section 7-2)
The weight value is not correct.	• Is the machine level? • Is the gravity acceleration value appropriate? • Is there something touching the weighing platform?
E0 is constantly displayed.	• Switch the power off, then repeat the operation again.
Switch input is not accepted. The display does not change.	• Remove the batteries or AC adaptor to switch off the power, then re-apply power and test again.

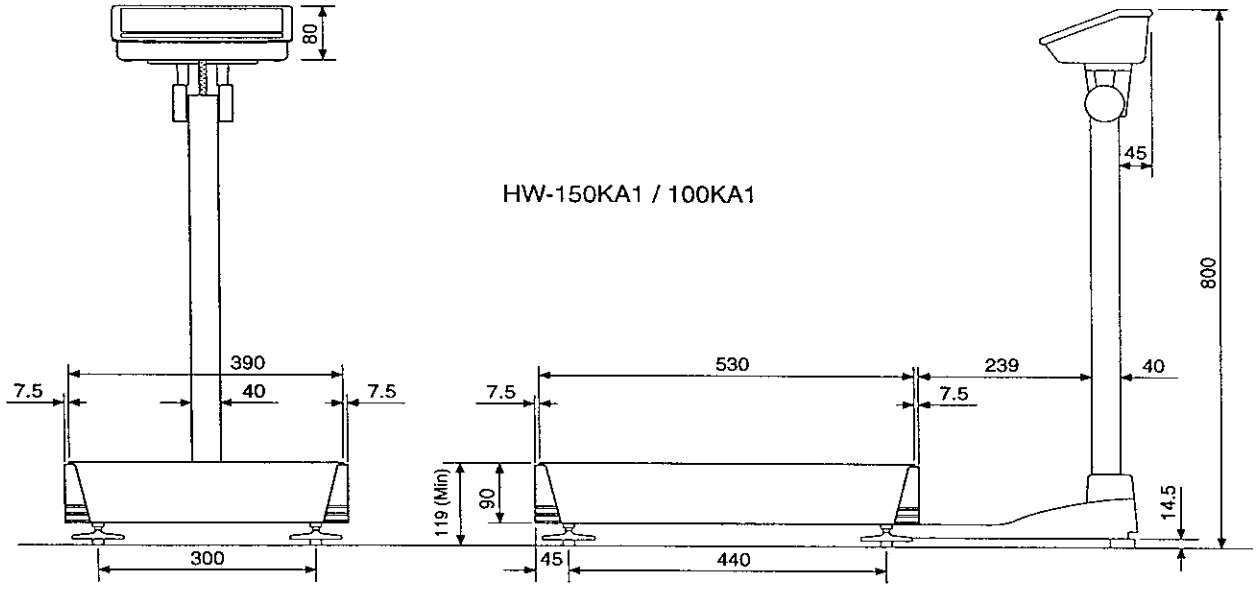
11. External dimensions

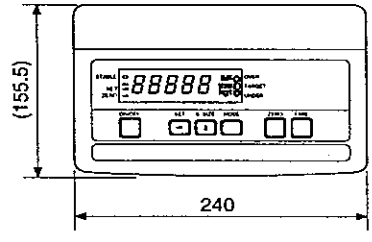


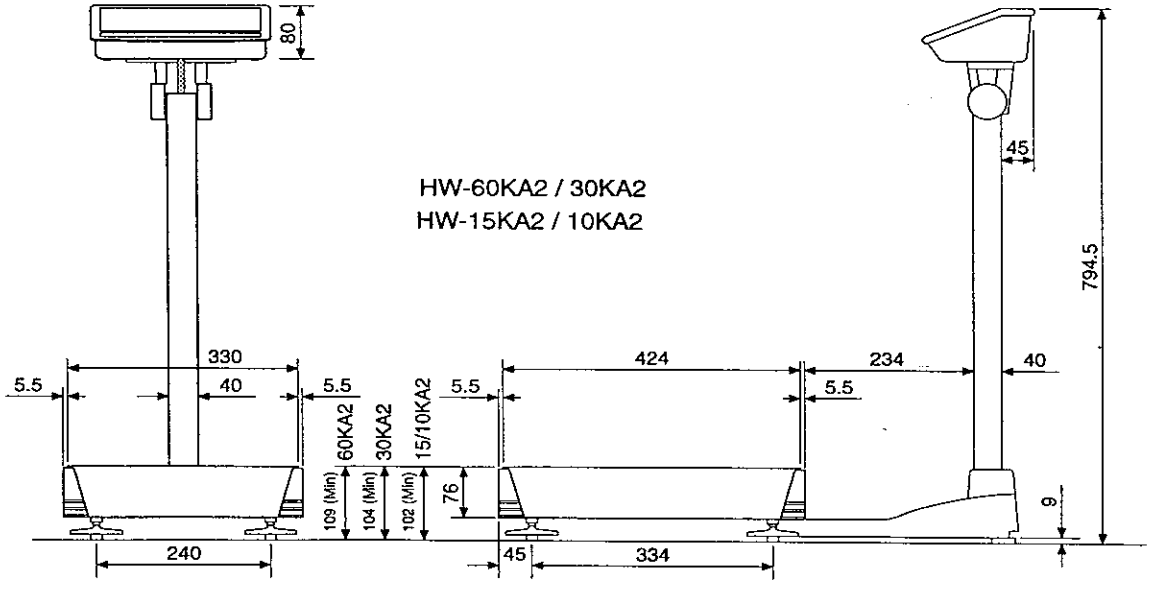


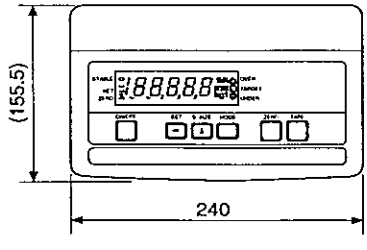





HW-150KA1 / 100KA1
80
390
7.5
40
7.5
300
530
239
40
7.5
7.5
119 (Min)
90
45
440
45
800
14.5


(155.5)
240


HW-60KA2 / 30KA2
HW-15KA2 / 10KA2
80
330
5.5
40
5.5
240
424
234
40
5.5
5.5
60KA2
30KA2
15/10KA2
109 (Min)
104 (Min)
102 (Min)
76
45
334
45
794.5
9

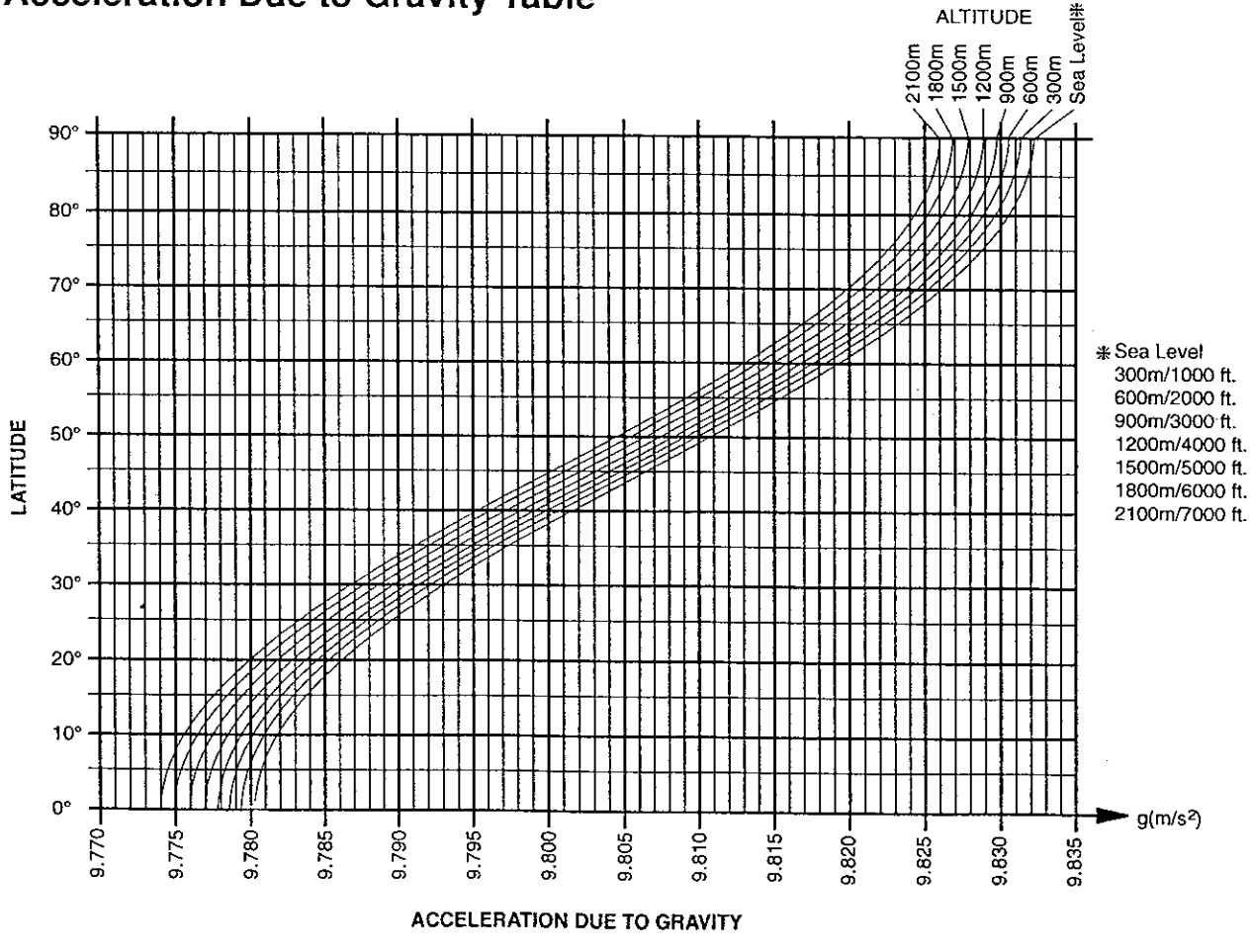

(155.5)
240

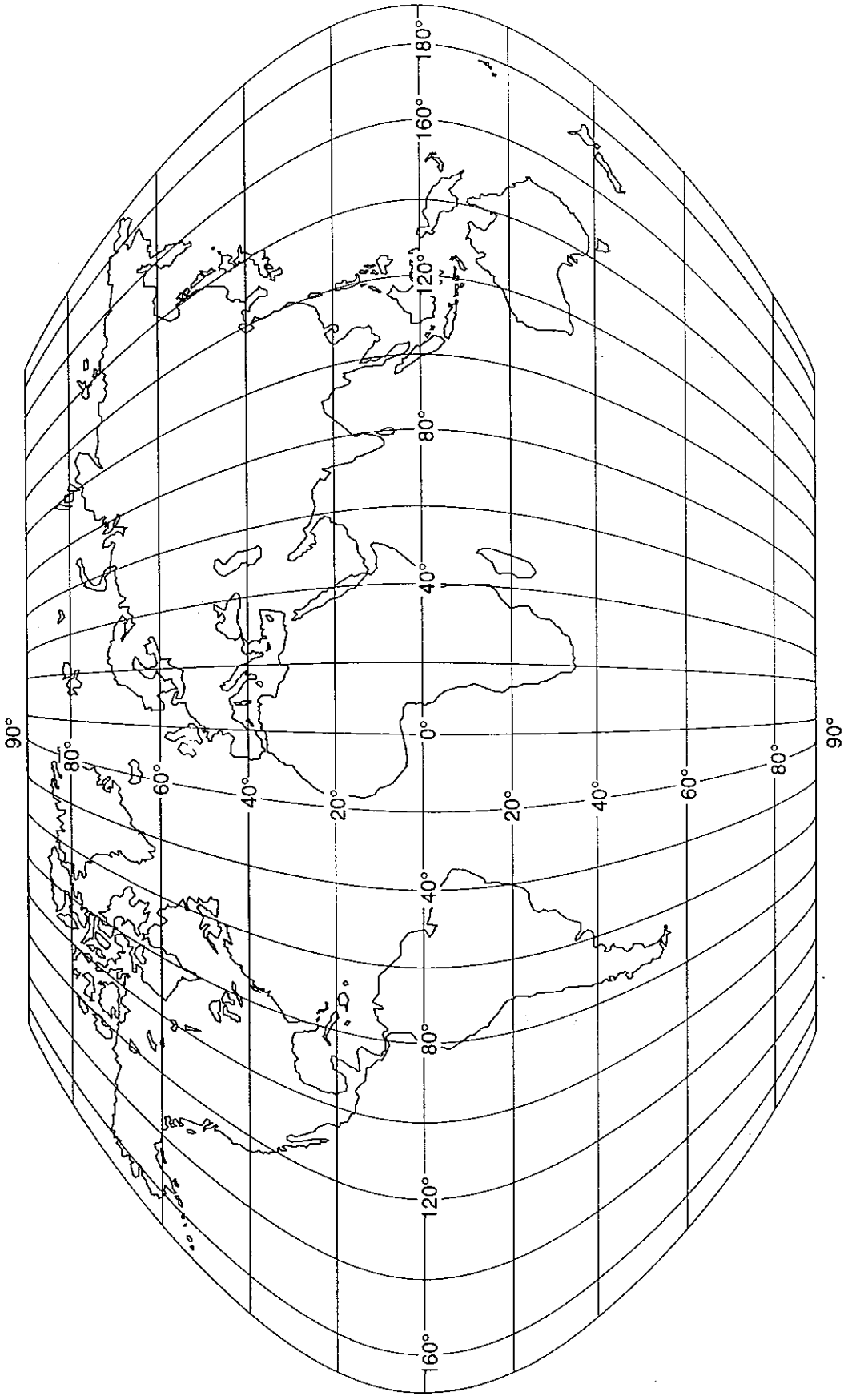
12. Appendix

Gravity Values at Various Locations

Calcutta	9.788	m/s²	Paris	9.809	m/s²
Capetown	9.796	m/s²	Rio de Janeiro	9.788	m/s²
Chicago	9.803	m/s²	Rome	9.803	m/s²
Amsterdam	9.813	m/s²	Manila	9.784	m/s²
Athens	9.800	m/s²	Melbourne	9.800	m/s²
Auckland NZ	9.799	m/s²	Mexico City	9.779	m/s²
Bangkok	9.783	m/s²	Milan	9.806	m/s²
Birmingham	9.813	m/s²	New York	9.802	m/s²
Brussels	9.811	m/s²	Oslo	9.819	m/s²
Buenos Aires	9.797	m/s²	Ottawa	9.806	m/s²
Copenhagen	9.815	m/s²	San Francisco	9.800	m/s²
Cyprus	9.797	m/s²	Singapore	9.781	m/s²
Djakarta	9.781	m/s²	Stockholm	9.818	m/s²
Frankfurt	9.810	m/s²	Sydney	9.797	m/s²
Glasgow	9.816	m/s²	Taichung	9.789	m/s²
Havana	9.788	m/s²	Taiwan	9.788	m/s²
Helsinki	9.819	m/s²	Taipei	9.790	m/s²
Kuwait	9.793	m/s²	Tokyo	9.798	m/s²
Lisbon	9.801	m/s²	Vancouver, BC	9.809	m/s²
London (Greenwich)	9.812	m/s²	Washington DC	9.801	m/s²
Los Angeles	9.796	m/s²	Wellington NZ	9.803	m/s²
Madrid	9.800	m/s²	Zurich	9.807	m/s²

Acceleration Due to Gravity Table




180°
160°
120°
80°
40°
0°
20°
40°
60°
80°
90°
40°
80°
120°
160°