HC SERIES

HC-3K / 6K / 12KA
HC-3K / 6K / 12KB
HC-03 / 04 / 05

COUNTING SCALE

INSTRUCTION MANUAL

INSTRUCTION-HC SERIES-V.1.A

A&D

A&D Company, Limited

The contents of this manual and the specifications of the instrument covered by this manual are subject to change for improvement without notice.

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 commercial 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 USA.)

SAFETY TERMS USED IN THIS MANUAL

All safety messages are identified by the following the words "*CAUTION* " and "*NOTE*". These words mean the following:

CAUTION

Important information that tells how to prevent damage to equipment or permanent loss of data.

NOTE

Important information that helps users operates the instruments.

CONTENTS

ABOUT THIS MANUAL

Thank You for Your Purchase of an A&D Scale

Every care has been take during the manufacturing process of this scale to ensure that it will perform accurately and reliably for many years.

Electronic Counting Scales are in one sense extremely simple products, that is they are very easy to use. In another sense they are rather complex in that they are high technology products. This manual will try to tell you in simple language how this scale works and how to get the most out of it in terms of performance.

ORGANIZATION

Section	Contents
1	INTRODUCTION; main features, specifications, descriptions of parts and their functions are provided.
2	INSTALLATION; installation conditions and procedures for a scale to perform accurately and reliably are described.
3	OPERATION; basic operation and each functions are described.
4	CALIBRATION; general information, needs and procedures of calibration are described.
5	FUNCTION SETTING; available functions, how to set up and factory settings are described.
6	MAINTENANCE; cleaning, calibration and in { Problem solving / Before calling a repair }, error codes and their meanings are described.
7,8,9	OPTIONS; specifications of HC-03 (RS-232C Interface card), HC-04 (Comparator / Relay Output) and HC-05 (Printer Interface) are described.
Appendix A	The external dimensions for both A and B type are described.
Appendix B	A table / map of acceleration due to gravity is described.

UNPACKING AND INSPECTIONS

CAUTION
**This is a precision instrument and therefore, please handle with care.
Strong impact may causes malfunctions.**

NOTE
*The scale is shipped in a container that is specially designed to prevent
damage during shipment. However, you should inspect the instrument
carefully and immediately report any damage to the shipper.
Keep the packing material If you are likely to transport the instrument again
in the future.*

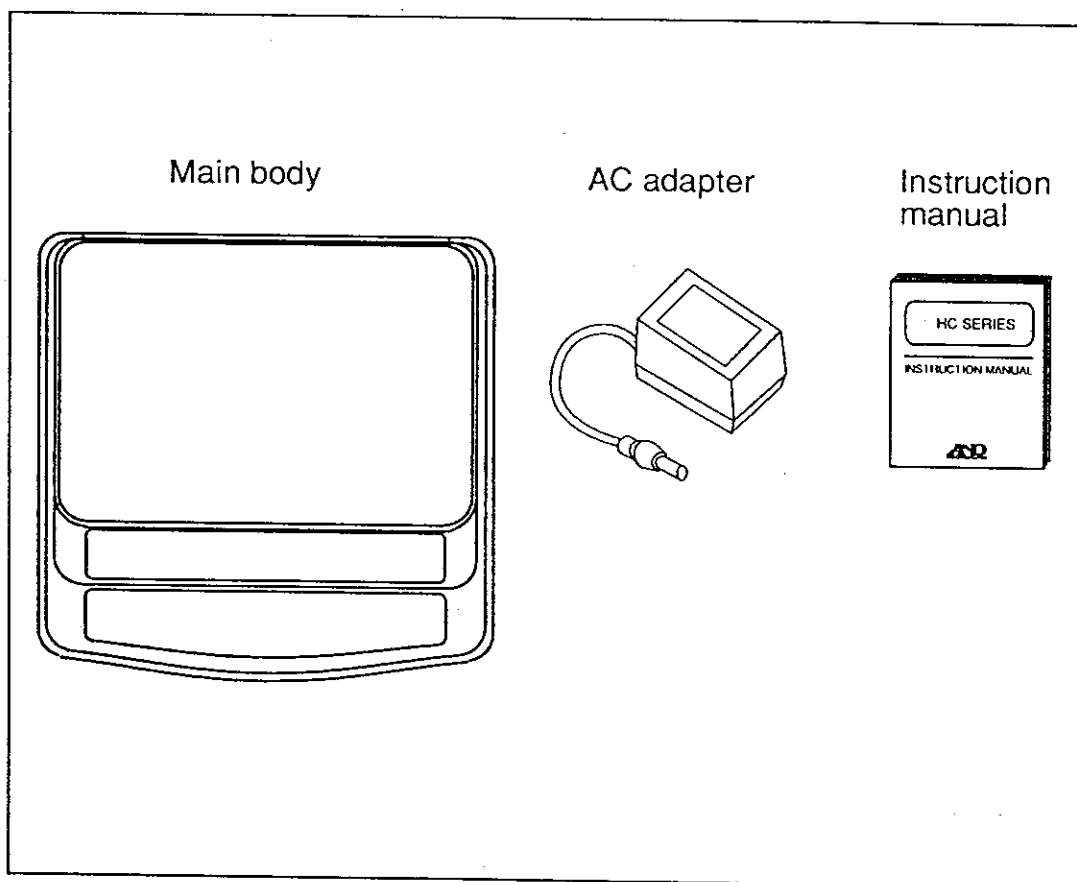Unpack the scale carefully and in the carton you should find this manual plus:

Figure: Item contained

1. INTRODUCTION

The HC series Counting Scales are the products of years of research, design, development and in-field testing. They incorporate the latest advances in electronic and mechanical engineering and offer increased features and functions, all at a reduced cost.

There are 6 models with three different capacities and two different display / keyboard types..

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HC-3K   A or B  3kg  x  0.5g   (  6 lb  ×  0.001 lb )
HC-6K   A or B  6kg  x   1g    ( 12 lb  ×  0.002 lb )
HC-12K  A or B 12kg  x   2g    ( 30 lb  ×  0.005 lb )
```

A type = Single display, simple operation
B type = 3 displays, 10 key operation

Optional interfaces allow you to connect the scale to a computer or printer as well as a relay output of Comparator results.

HC-03 RS-232C Interface
HC-04 Comparator / Relay output
HC-05 Printer Interface / Current Loop

1-1. FEATURES

The main features of the HC series Counting Scale are as follows;

1. EASY TO STORE UNIT WEIGHT

Storing the unit weight is simple and easy with [SAMPLE] key and [ENTER/M+./ PRT] key. With B type, keyboard input of the unit weight is also available.

2. ACCURATE PIECE COUNTING

Built-in Automatic Counting Accuracy Improvement (ACAI) function assures accurate piece counting operation by re-calculating unit weight as more pieces are added.

3. M+ MEMORY

You can accumulate piece count data by pressing [ENTER/M+./PRT] key or automatically each time you count. Total piece count and number of additions can be shown on the display or sent via optional interfaces.

4. COMPARATOR FUNCTION

You can set the upper and lower limits for weights or piece count and Comparator function gives you the results on the display and / or by buzzer. Also the results can be output using the optional comparator/relay output (HC-04).

5. SERIAL INTERFACE(HC-03)

An optional RS-232C serial interface allows the instrument to communicate with a personal computer to control the scale and / or to record counting data. It also provides an output for a printer.

6. COMPARATOR / RELAY OUTPUT (HC-04)

Compared results can be output as a relay signal withthe optional comparator/ relay output (HC-04).

7. THREE POWER SOURCES

The scale is designed to be operated with an AC adapter, but may be also operated on six AM2 ("C" type) 1.5V dry batteries or a rechargeable NiCd battery pack (AD-1681).

1-2. SPECIFICATIONS

Table 1-1. Specifications

Model	HC-A Series			HC-B Series		
	HC-3KA	HC-6KA	HC-12KA	HC-3KB	HC-6KB	HC-12KB
Capacity	3kg 6 lb	6kg 12 lb ·	12kg 30 lb	3kg 6 lb	6kg 12 lb	12kg 30 lb
Resolution	0.5g 0.001 lb	1g 0.002 lb	2g 0.005 lb	0.5g 0.001 lb	1g 0.002 lb	2g 0.005 lb
Internal Resolution	0.025g 0.0551 lb/1000	0.05g 0.1102 lb/1000	0.1g 0.2205 lb/1000	0.025g 0.0551 lb/1000	0.05g 0.1102 lb/1000	0.1g 0.2205 lb/1000
Min. Unit Weight	0.1g 0.2205 lb/1000	0.2g 0.4410 lb/1000	0.4g 0.8819 lb/1000	0.1g 0.2205 lb/1000	0.2g 0.4410 lb/1000	0.4g 0.8819 lb/1000
Sample Size	5, 10, 25, 50 or 100 pcs			5, 10,25,50,100 pcs or numbers desired , user selectable		
Max. Count Pieces	30,000 Pcs, 120,000 Pcs					
Sensitivity Drift	20 ppm / °C (5~35°C)					
Operating Temp	0°C to 40°C(32 °F to 104 °F), Less than 85% RH (Non-condensing)					
Display	LCD / 6 Digits			LCD / Weight 5 Digits, Unit Weights 5 Digits, Piece Count 6 Digits		
Power	AC Adapter, six AM2 (C type) 1.5V dry batteries or rechargeble NiCd battery Pack (AD-1681)					
Battery life	Approximately 100 hours continuous operation with manganese batteries, 200 hours with alkalline, 20 hours with rechargeble NiCd battery Pack, AD-1681 at 20°C/68°F					
Pan Size	216 (W) x 294(D) (mm)					
Dimension	320 (W) x 330(D) x 118(H) (mm)					
Weight	Approx. 3(kg)					

1-3. PARTS DESCRIPTIONS

MAINBODY (A AND B TYPE)

The [CAL]switch is under the cover.
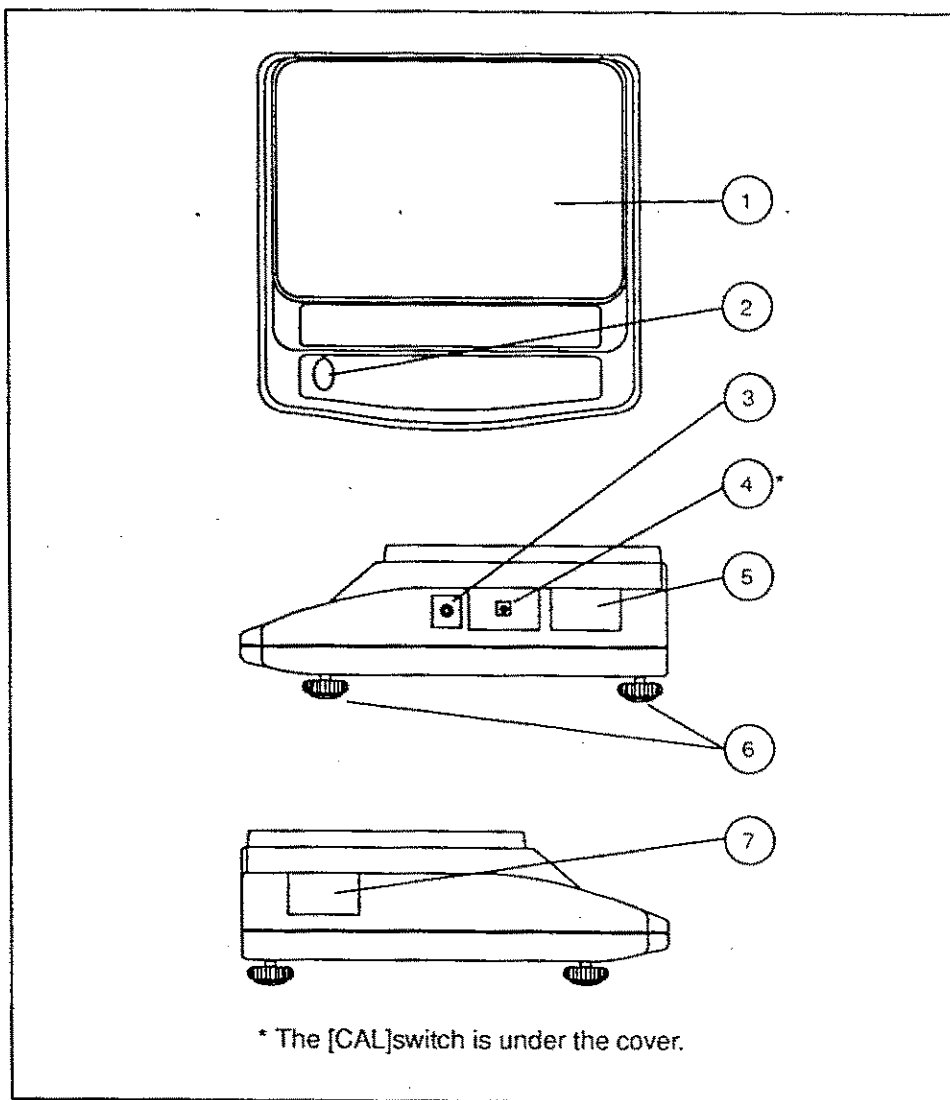
Figure 1-1. Main body

Table 1-2. Main body

No.	Name	Function
1	Weighing Pan	Place for weighing and counting
2	Spirit Level	Confirm the level of the scale
3	AC Adapter port	Plug AC Adapter here
4	[CAL] Switch	Switch which enables calibration
5	Slot for options	Location for options to be installed
6	Leveling Feet	Adjusts the level of the scale
7	Battery compartment cover	Location for batteries to be installed

DISPLAY PANEL (A TYPE)

NOT A WEIGHING RESULT
STABLE
NET
ZERO
SAMPLE TOO LIGHT   UNIT WEIGHT   N

ON/OFF

TOTAL ►   SAMPLE ▲   ENTER U→PCS

MODE   ZERO/CLEAR   TARE +/-

NOT A WEIGHING RESULT
STABLE

ACAI   TOTAL   M+   HI   OK   LO

8.8.8.8.8.8. kg
PCS

NET
ZERO

SAMPLE TOO LIGHT   UNIT WEIGHT   N
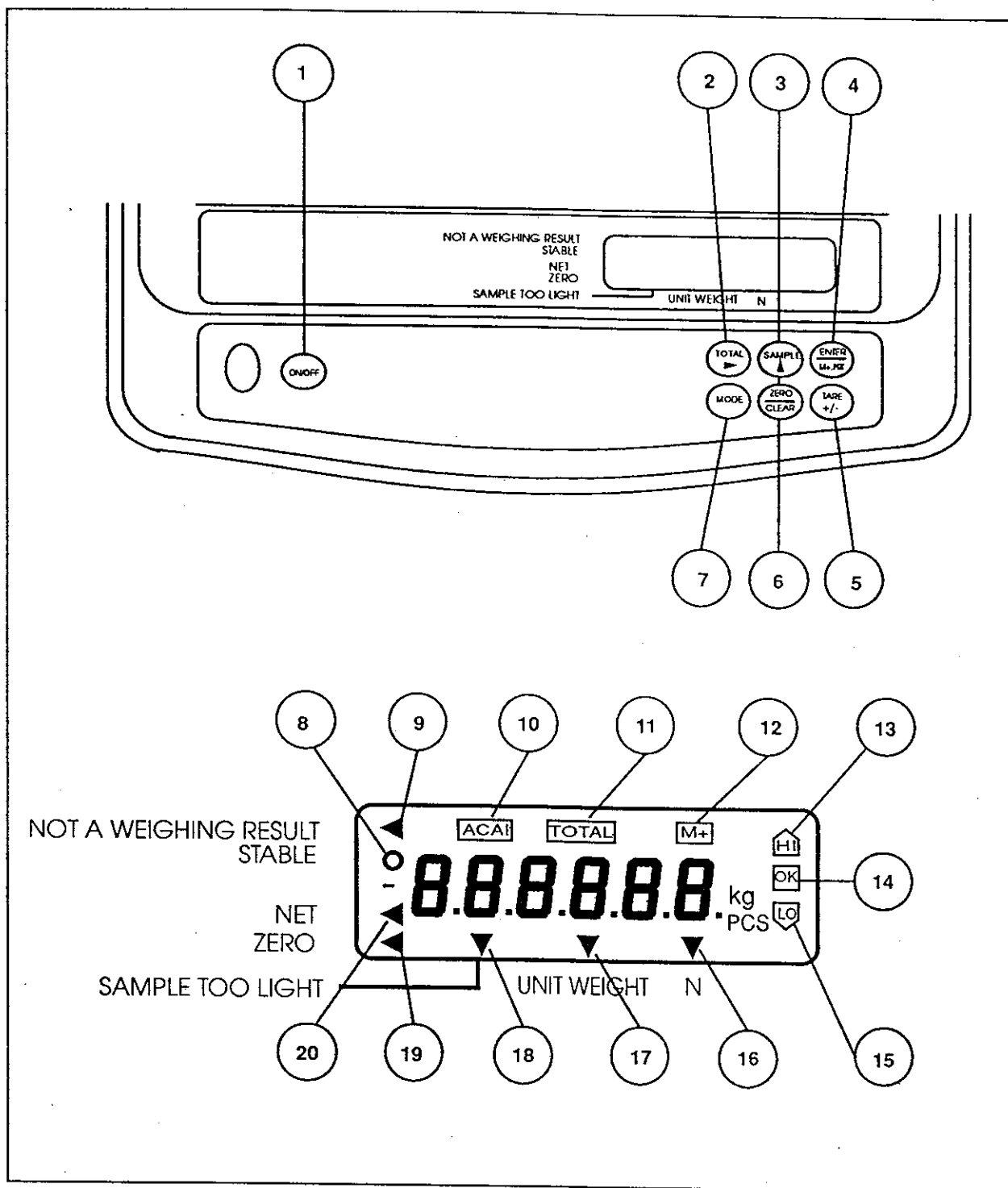
Figure 1-2. Description of Panel (A type)

Table 1-3. Description of Panel (A type)

No.	Name	Function
1	[ON/OFF] key	Turns the scale power on /off.
2	[TOTAL] key	Displays TOTAL when accumulating / Shifts the digit when setting values
3	[SAMPLE] key	Stores unit weight / Changes sample size / Changes values when setting
4	[ENTER / M+. /PRT] key	Stores values / Adds the piece count / Prints (with HC-03 or HC-05)
5	[TARE / +/-] key	Tares (Subtract weight of a container) / Changes polarity (+/-) when setting
6	[ZERO / CLEAR] key	Adjusts zero point / Clears total and additions
7	[MODE] key	Changes display mode / Aborts setting and goes back to previous display
8	[STABLE] indicator	Indicates the scale is stable
9	[NOT A WEIGHING RESULT] indicator	Indicates when in unit weight display or in various setting procedures
10	[ACAI] indicator	Indicates when ACAI is activated
11	[TOTAL] indicator	Indicates when TOTAL is displayed
12	[M+] indicator	Flashes when the [ENTER / M+. /PRT] key is pressed for addition, indicates when adding has been done.
13	[HI] indicator	Indicates comparator result is over the upper limit
14	[OK] indicator	Indicates comparator result is between the upper/lower limits
15	[LO] indicator	Indicates comparator result is under the lower limit
16	[N] indicator	Indicates when the number of addition is displayed
17	[UNIT WEIGHT] indicator	Indicates when Unit weight is displayed
18	[SAMPLE TOO LIGHT] indicator	Indicates when sample weight is too light
19	[ZERO] indicator	Indicated when the scale zero is correct
20	[NET] indicator	Indicates when NET weight is displayed (Tare function is used).

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DISPLAY PANEL (B TYPE)

Figure 1-3. Description of panel (B type)

Table 1-4 . Description of Panel (B type)

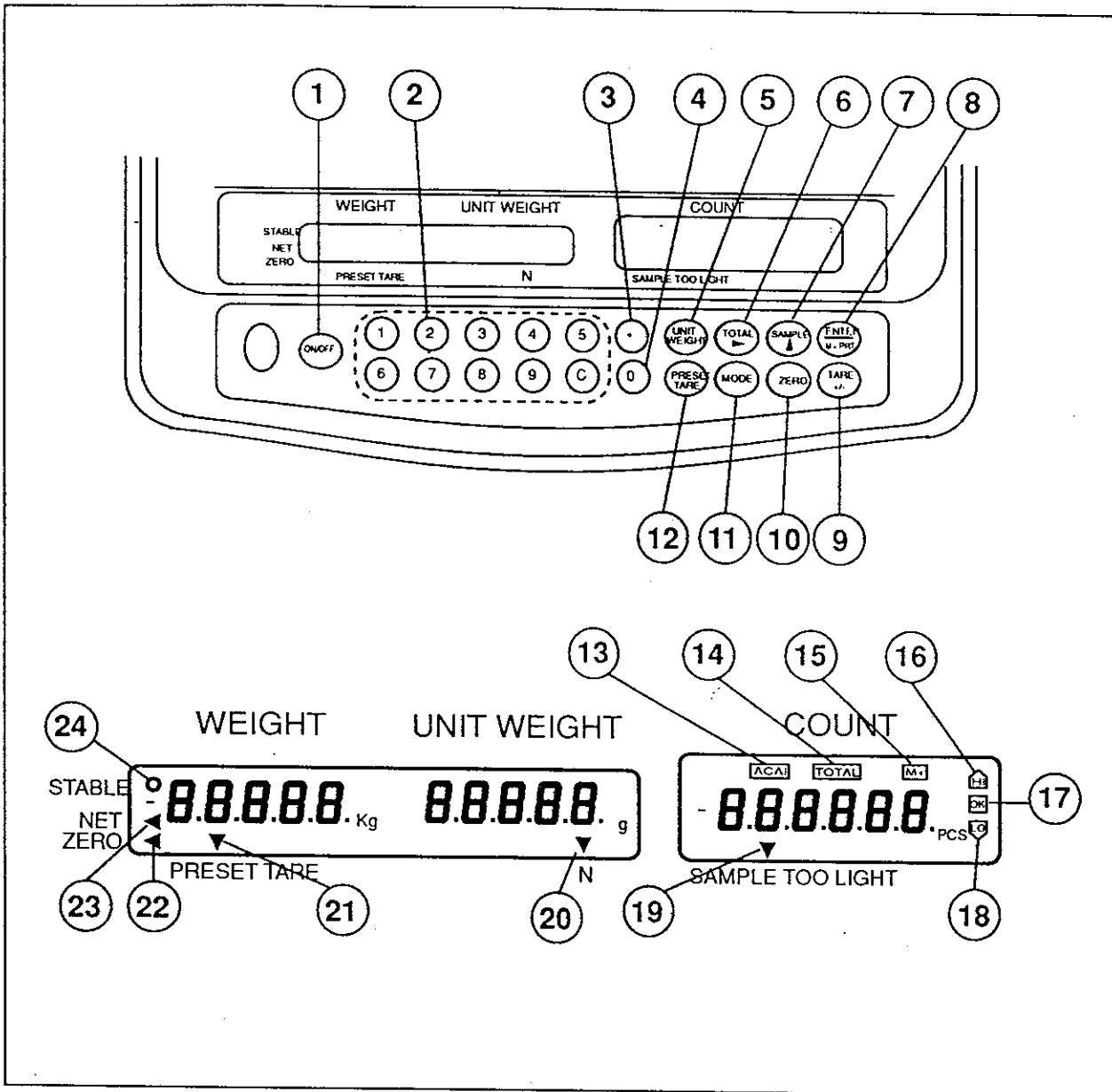| NO.	No.	Function
1	[ON/OFF] key	Turns the scale on /off
2	Number pad	Enter values in various setting modes
3	[.] key	Decimal point entry
4	[C] key	Clear the value when setting.
5	[UNIT WEIGHT] key	Set to Unit Weight Store mode
6	[TOTAL] key	Displays TOTAL when accumulating / Shifts the digit when setting values
7	[SAMPLE] key	Stores unit weight / Changes sample size / Changes values when setting
8	[ENTER / M+./PRT] key	Stores values / Changes sample size / Prints (with HC-03 or HC-05)
9	[TARE / +/-] key	Tares (Subtract weight of a container) / Changes polarity (+/-) when setting
10	[ZERO] key	Adjusts zero point
11	[MODE] key	Changes display mode / Aborts setting and goes back to previous display
12	[PRESET TARE] key	Enter Tare Setting mode
13	[ACAI] indicator	Indicates when ACAI is activated
14	[TOTAL] indicator	Indicates when TOTAL is displayed
15	[M+] indicator	Flashes when the [ENTER / M+./PRT] key is pressed for addition, lights when addition has been done.
16	[HI] indicator	Indicates comparator result is over the upper limit
17	[OK] indicator	Indicates comparator result is between the upper/lower limits
18	[LO] indicator	Indicates comparator result is under the lower limit
19	[SAMPLE TOO LIGHT] indicator	Indicates when sample weight is too light
20	[N] indicator	Indicates when the number of addition is displayed
21	[PRESET TARE] indicator	Indicates when pre-set tare value is displayed
22	[ZERO] indicator	Indicated when the scale zero is correct
23	[NET] indicator	Indicates when NET weight is displayed (Tare function is used).
24	[STABLE] indicator	Indicates the scale is stable

2 . INSTALLATION

2-1. INSTALLATION CONDITIONS

Best conditions for weighing / piece counting operation are as follows;

- The scale must be level (check the spirit level).
- Best temperature is about 20°C/68°F at about 50% Relative Humidity.
- The weighing table, if used, should be of a solid construction.
- Corners of rooms are best as they are less prone to vibrations.
- Don't install the scale in direct sunlight.
- Try to ensure a stable AC power source when using the AC adapter.
- Clean the scale with mild soap and water (don't use solvents).
- Avoid locations close to machines which may generate electrical noises

2-2 . INSTALLATION PROCEDURES

1. LEVELING THE SCALE

Place the scale on a firm weighing table, or flat floor and turn the adjustable leveling feet until the spirit level shows that the scale is level.

Note
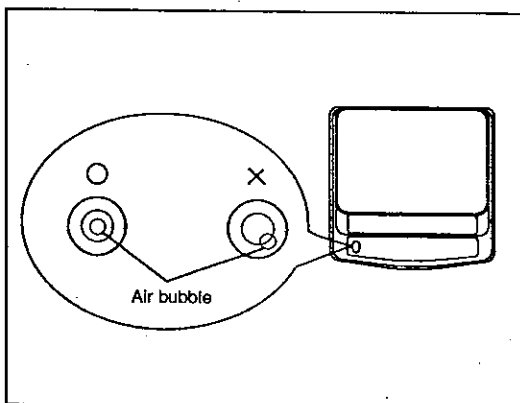*The scale will not perform accurately when it is not level.*
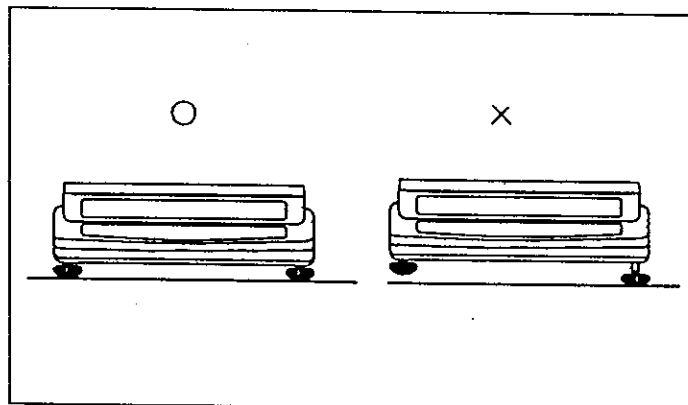
Figure 2-1. Spirit level

Figure 2-2. Leveling feet

2. APPLY POWER

AC ADAPTER

Plug the AC adapter to the AC adapter port on the side of a display pod. The AC input requirements could be 100,120,220 or 240 Volts (50/60Hz) depending on the area where used so please verify that the adapter is correct. The DC output should be 9 Volts (please note that an alternative 9 V DC power supply might not be stable enough for this scale. Also please note that the center pin of the connector is the negative contact.).
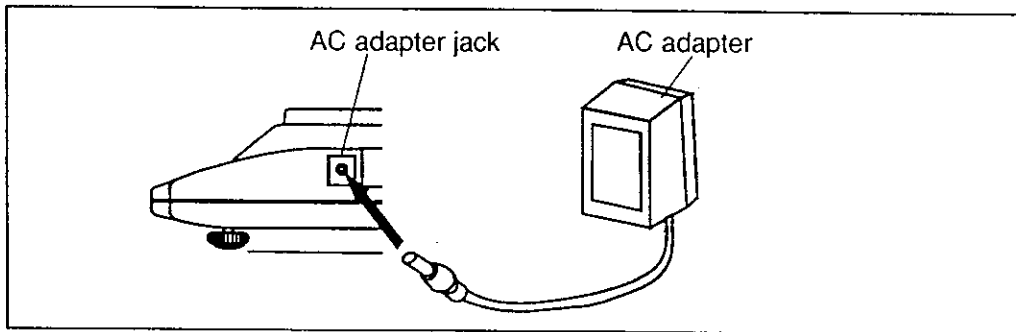
Figure 2-3. AC adapter

Caution
Use only the AC adopter which comes with the scale. Other adapter may cause damage.

DRY BATTERY

Remove the cover at the side of the display by lifting it straigt up. Put six AM2 ("C" type) 1.5V dry batteries into a battery holder and insert the holder into the display pod.

Caution
• **If the scale is not used for a long period of time, remove all batteries from the holder to avoid leakage which may cause damage to the electronics.**
• **Do not mix the type of batteries (standard with Alkaline)**
• **Replace all at the same time.**

Figure 2-4. Dry battery

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RECHARGEABLE NiCd BATTERY PACK (AD-1681)

Place the AD-1681 in the battery holder after charging. (Also refer the instruction manual for the AD-1681)
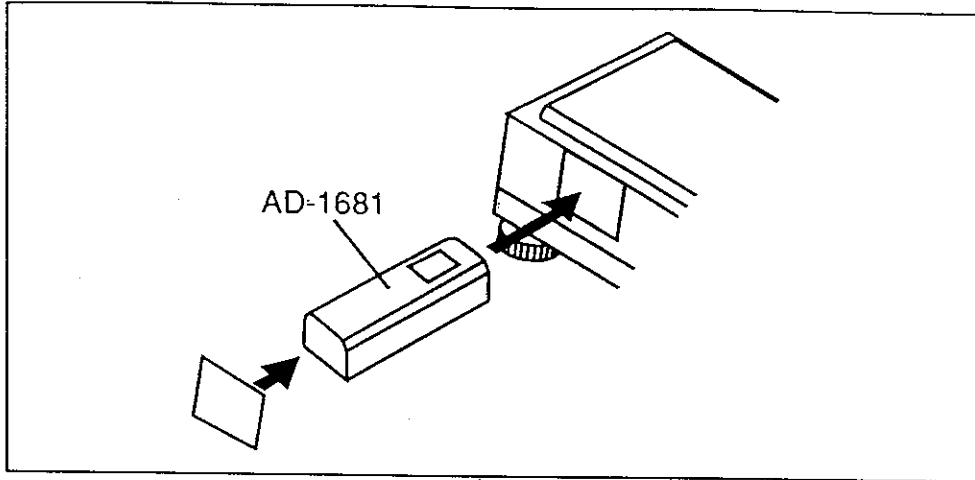
Figure 2-5. NiCd battery Pack

3 . OPERATION

3 -1. BASIC COUNTING OPERATION

For piece count, the following is the basic counting operation.

1. ADJUSTMNET

Upon powering on, the scale's Zero point is automatically adjusted. Press the [ZERO] key when you see weight value or piece count with nothing on the weighing pan.
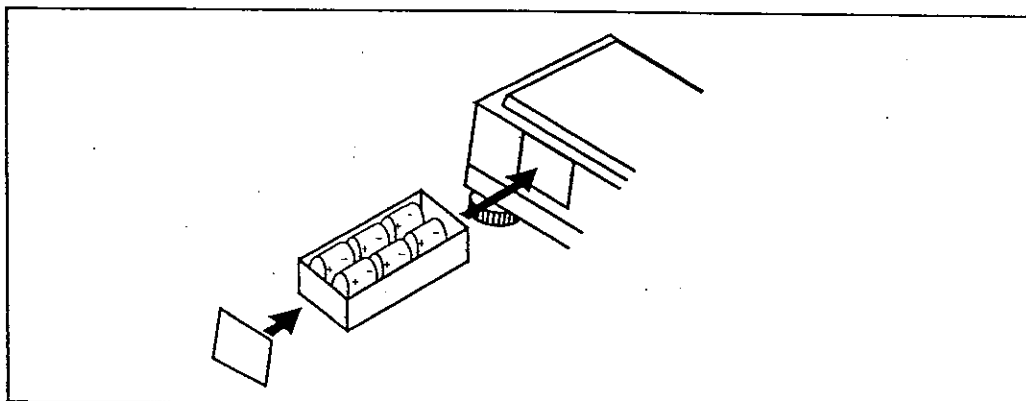Also refer to {3 -2 Zero adjustment} for more detail.

2. TARE FUNCTION (subtract the weight of a container to be used)

When you weigh or count with a container, you need to tare (subtract the weight of a container) by pressing [TARE] key. with a B type scales, you can also input a value to be subtracted using the number pad.
Also refer to { 3-3 Tare} for more detail.

3. STORING THE UNIT WEIGHT (WEIGHT OF A PIECE)

Unit weight can be stored by preparing 10 items to be counted (1/10 of the weight of 10 pieces is the unit weight). With a B type scale, you can also input known unit weight using the keyboard.
Also refer to { 3-4 Unit weight Recording} for more detail.

4. AUTOMATIC COUNTING ACCURACY IMPROVEMENT (ACAI)

Add more pieces within the ACAI function range to improve accuracy.
Also refer to { 3 -5 Automatic Counting Accuracy Improvement (ACAI)} for more detail.

5. PIECE COUNTING

After Tare, place the items to be counted in the container, then the piece count will be displayed.
Also refer to { 3 -6 Piece counting} for more detail.

3 -2. ZERO ADJUSTMENT

If zero point has drifted (showing a weight value or piece count even with nothing on the weighing pan), [ZERO] key will correct it. Upon powe up, the scale adjust its zero point automatically. However, it is possible for the zero point to shift during operation. Please confirm the zero before operation. The zero point indicator is displayed when the scale has the correct zero point.

Please note that the [ZERO] key is only valid in the range set as the zero range 2% or 10% of capacity (please refer to {Function Setting} CF-13).

3 -3. TARE FUNCTION

When you use a container, you can subtract (tare) the weight of the container by pressing the [TARE] key, to display only net weight or count.

The [TARE] key can be used in either the weight mode or the count mode.

There are two ways of subtracting the weight of a container;

WITH AN ACTUAL CONTAINER (BOTH A TYPE AND B TYPE SCALE)

Step 1.   Make sure that the scale is stable and zero indicator appears on the display.

Step 2.   Place an empty container on the weighing pan. Wait for the stability indicator to be displayed.

Step 3.   Press the [TARE] key. Verify that the scale displays "0.0 kg" or "0 pcs".

Step 4.   Start weighing or counting.

SUBTRACT KNOWN WEIGHT USING THE KEYBOARD(B TYPE SCALE ONLY)

Step 1.   Make sure that the scale is stable and zero indicator appears on the display.

Step 2.   Press the [PRESET TARE] key. The tare value indicator appears on the display. If the value is already set, the value is shown above the indicator.

Step 3.   Input a value using the keyboard. (Press the [C] key to revise the value or press the [MODE] key to abort tare value input.)

Step 4.   Press the [ENTER/M+. /PRT] key to store the value.

When the TARE function is in use, the TARE indicator appears on the display.

3 -4. STORING THE UNIT WEIGHT

The HC scale counts by knowing the weight of one piece, called the unit weight, then dividing it into the total weight of what you are trying to count. For example, if you are weighing bolts that have a unit weight of 1 g and the batch weighs 100 g, then the scale indicates that you have 100 pieces. The HC takes all the trouble out of counting and has many features that will make repeated counting easy and precise.

Note:
The more precise unit weight you enter, the more precise count results you get. Larger sample sizes (25, 50 or 100 instead of 5 or 10 pieces) increase accuracy when there are very light unit weights or when the unit weights are not precisely wqual or activate the ACAI function.

UNIT WEIGHT BY A SAMPLE

Step 1.   Make sure the scale displays " 0 ", if not press [ZERO] key.

Step 2.   Place a container if needed. (See 3-3.Tare function)

Step 3.   Press [SAMPLE] key. The scale indicates:

"10 0 PCS" (A type)
"Add" "10 PCS" (B type)

If you want to change the sample size (10 pieces), refer " Change of sample size".

Step 4.   Put 10 sample pieces on the weighing pan (if with other sample sizes, count out the sample required).

Step 5.   Press the [ENTER/M+./PRT] key.

• If [SAMPLE TOO LIGHT] indicator is displayed, refer {SAMPLE TOO LIGHT} described latter.
• If "Lo" is displayed, refer {UNIT THE WEIGHT STORING IS UNSUCCESSFUL } described latter.

Step 6.   The scale is ready to count.

UNIT WEIGHT BY THE KEYBOARD (B TYPE ONLY)

The B type model allows you to set a unit weight directly using the keyboards.

NOTE
The ACAI function is not used when a unit weight is stored using the keyboard.

Step 1.   Press the [UNIT WEIGHT] key.

Step 2.   Type in a unit weight using the keyboards. Press [C] key for correction or the [MODE] key for cancellation of input.

Step 3.   Press the [ENTER/M+./PRT] key to store the unit weight.

CHANGING THE SAMPLE

Before pressing [ENTER/M+./PRT] key, press [SAMPLE] key to change the size of sample if needed. Every time you press [SAMPLE] key, 10 (initial setting), 5, 25, 50 and 100 sample pieces will be shown. When the desirable sample size is shown, press the [ENTER/M+./PRT] key and count pieces accordingly.
With a B type scale, you can set sample size using the keyboard.

SAMPLE TOO LIGHT

If the total weight of pieces is too light to obtain sufficient accuracy:

"Add 33 "(A type)
"Add 33 " "10 PCS" (B type)

Then count the pieces requested (33 pieces, for this example), add them to pieces which are already on the weighing pan and press the [ENTER/M+./PRT] key.

Entering the unit weight using the keyboard (B type only)
You can store a known unit weight using the [ENTER/M+./PRT] key.

Note:
ACAI is not used when the unit weight being set using the keyboard.

Step 1.   Press the [Unit Weight] key.

Step 2.   Input the unit weight using the keyboard. Press the [C] key when you need to clear the value, press the [MODE] key when you want to abort the unit weight input.

Step 3.   Press the [ENTER/M+./PRT] key to register the unit weight.

Step 4.   Start counting.

UNIT THE WEIGHT STORING IS UNSUCCESSFUL

When unit weight is too light to be stored, "Lo" is displayed and the scale awaits further actions such as changes of sample size, new unit weight value input etc. The minimum value which can be recorded as a unit weight is 1/5 of the minimum weighing resolution or greater. See the Table 3-1.

Note:
1/20 of minimum weighing resolution can be set in Function setting F1-2 minimum unit weight. However, this does not mean that the counting accuracy is changed. Counting accuracy depends upon both scale accuracy and consistancy of unit weights.

Table 3-1 Minimum Unit

Model	Minimum Unit Weight (Standard) 1/5 of Scale Res.	Minimum Unit Weight (With F12 Setting) 1/20 of Scale Res.	Scale Resolution
HC-3KA HC-3KB	0.1g 0.2205 lb/1000	0.025g 0.0551 lb/1000	0.5g 0.001 lb
HC-6KA HC-6KB	0.2g 0.4410 lb/1000	0:05g 0.1102 lb/1000	1g 0.002 lb
HC-12KA HC-12KB	0.4g 0.8819 lb/1000	0.1g 0.2204 lb/1000	2g 0.005 lb

3 -5. ACAI *(Automatic Counting Accuracy Improvement)*

The ACAI (Automatic Counting Accuracy Improvement) function is an exclusive A&D software advancement that re-calculates the unit weight as more pieces are added, to improve count accuracy.

When the scale calculates the unit weight from sample pieces, the more sample pieces that are used, the greater the accuracy. For example,: let's say that you use 10 pieces (simplified operation) as your sample and the unit weight calculated by the scale from your sample is 1 g. Using the ACAI function, after loading on 200 pieces, the scale determines that the average unit is really 0.98 g instead of 1 g. This improves accuracy and could make a big difference when you are counting thousands of pieces.

To get highly accurate counting results, you need to stay within the ACAI counting range as you add more pieces. But, this is easy to do and only needs to be done once, up to 200 pieces. After that, the ACAI remembers the most accurate unit weight.

Note:
You can disable the ACAI function at [F1-1] of Function setting chapter if needed.

OPERATION OF ACAI

Step 1.   The initial unit weight storing can be done with a sample size of 5, 10 or 25 pieces.

Step 2.   Add approximately 10 pieces if the initial sample is 10 pieces (if 5, add approximately 5 and if 25, add approx.. 25 pieces). Approximately the same number of pieces as the piece count displayed on the scale (within the ACAI range).
You will see [ACAI] indicator blinks after [STABLE] indicator is displayed.

Step 3.   Add additional pieces, approximately the same amount as shown on the display. Wait for the [ACAI] indicator to blink each time you add pieces.

Step 4.   Continue the above until reaching the maximum amount you expect to count. With the more accurate unit weight, your piece count will be more accurate.

3 -6. PIECE COUNTING

Note:
Before you start counting, please register a unit weight referring to 3-4
{ Storing Unit weight}.

Step 1.   When using an A type scale, press the [MODE] key. You now see "PCS" on the display. (If "kg" is displayed, you are in weighing mode.)

Step 2.   Press the [ZERO] key if it is not " 0 PCS ".

Step 3.   Press the [TARE] key after placing a container on the weighing pan. Confirm " 0 PCS" again.

Step 4.   Place the items to be counted on the weighing pan / container and wait until the [STABLE] indicator comes on. The piece count result is shown on the display.

3 -7. COMPARATOR

Note:
In order to activate the Comparator function, please set the functions at F3-1, F3-2 and F3-3 in { Function Setting}.

This function checks whether a weight or count is within a prescribed range. The Lo Limit and Hi Limit are set, and a weight or count is judged to be in one of 3 categories: under, accept, or over (Indications of LO, OK and HI on the display).

"LO "< Lo Limit ≤ "OK" ≤ Hi Limit <"HI"

The result is shown on the display and also by buzzer. With option HC-04 Comparator / Relay output, the result can be obtained as a relay output so that you can drive other instruments such as an external buzzer or lights.

Various comparison modes can be selected. F3-1
The internal buzzer can be sounded according to the judgement. F3-3
The Comparator function can be turned on /off. F3-1
Change of the Hi/Lo Limits can be disabled. F3-4
If an external signal is necessary, HC-04 is used.

The Comparator can be used for either Weight or Counting mode.

SETTING OF THE UTTPPER AND LOWER LIMITS

Note:
Press the [MODE] key when you need to abort the setting procedure.
The set value will be cleared if further input is made to the setting at F3-2 in { Function Setting}.

Step 1.   Press [MODE] until you see " 000000 pcs ^{HI} "/ "000000 kg ^{HI} " or
            "000000 pcs $_{LO}$" / " 000000 kg $_{LO}$"

Step 2.   A type:
            Press the [TOTAL] and [SAMPLE] keys to select a digit and increment it.

            [TOTAL] = Select a digit
            [SAMPLE] =Increment the flashing digit
            [TARE/+/-]= Sets positive / negative

Step 2.   B type:
            Input value using the keyboard.

Step 3.   When the setting is completed, press the [ENTER/M+./PRT] key. The set value is then stored.

Step 4.   The display automatically switches back to weight or count display, then start operation.
            When the [MODE] key is pressed, the operation ends without updating the value.

3 -8. M+ MEMORY FUNCTION

The HC scale can accumulate count data by pressing the [M+] key or automatically (see F2-2) each time you count. It also keeps track of the number of times you add to the total. These are called ' additions'.

When you view the total by pressing the [TOTAL] key, you view the number of pieces accumulated and the number of additions (how many times the total was added to.). Please see the following pages for instructions to add, view or clear the total count.

Note:
M+ memory function is valid only in the count mode.
Before you start, please refer F2-1, F2-2 and F2-3 in { Function setting}

TO USE THE M+ FUNCTION

Step 1.   Press [MODE] to ente the piece count mode. "   pcs" is diplayed.

Step 2.   To clear previous value, refer to { To clear total value}

Step 3.   Count the first batch of pieces.

Step 4.   Press the [ENTER/M+./PRT] key. (Or automatically added) Then the "M+" indicator will flash and stay on. If you need to cancel the addition, press [ENTER/M+./PRT] key while pressing the [ZERO] or [ZERO/CLEAR] key.

Step 5.   Remove all pieces which were added this time.

Step 6.   Next piece count.

Step 7.   Repeat 4. to 6. until you complete all necessary additions. The total value will be retained until the following procedure for memory clear is done. (Power off does not clear the memory.)

TO CLEAR THE TOTAL VALUE FROM MEMORY

Step 1.   Press the [TOTAL] key to display " total pcs". Press the [TOTAL] key while pressing the [ZERO] or [ZERO/CLEAR] key. You should see "CLEAR " on the display.

Step 2.   Press the [ENTER / M+./PRT] key to clear memory. In case you decide not to clear the total value at this stage, press the [MODE] key then you retain the total value.

TO CANCEL THE LAST M+ ADDITION

This works only for the last addition.

Press the [TOTAL] key to display " total pcs". Press [ENTER/M+./PRT] key while pressing the [ZERO] or [ZERO/CLEAR] key. The "M+" indicator flashes and the last addition is cancelled.

VIEWING THE TOTAL COUNT AND THE NUMBER OF ADDITIONS

A type:
> Press the [TOTAL] key and then " total pcs" is displayed. Press the [TOTAL] key again to display the number of additions.

B type:
> Press the [TOTAL] key. " total pcs" will be displayed on the count display and the number of additions is displayed on the unit weight display.

3 -9. OTHER FUNCTIONS

There are many other functions in the HC scale in order to provide the maximum possible convenience to operators. Please refer to { Function Setting} for details.

AUTOMATIC POWER OFF (F5-1)

The HC scale comes with an automatic power-off function which turns the main display off after five minutes to conserve power. It only works if " 0.00 " is displayed, any other reading and the scale will remain on.

DISABLES SWITCHES (F5-2)

Disables all key functions except [ON/OFF], [ZERO], [TARE], [SAMPLE] and [ENTER/M+./PRT].

RETURN-TO-FACTORY SETTING (F5-3)

All setting can be set as the factory pre-set combination of settings / functions.

POWER ON UNIT (F5-4)

You can choose which display mode, Weight or Count to have at power-on.

4. CALIBRATION

Calibration of the scale is required when it is initially installed, if the scale is moved a substantial distance, or in accordance with local regulations. This is necessary because the weight of a mass in one location is not necessarily the same in another location. Also, with time and use, mechanical deviations can occur. "Weight" equals mass times acceleration due to Earth's field of gravity. The internationally adopted value for gravitational acceleration "g" is 9.80665 m/s^2 (32.174 ft/s^2) in a vacuum. however, this varies by about ± 0.3% depending on how far you are from the Earth's center of mass. Mass distorts space in such a way that the gravitational power of attraction is inversely proportional to the square of the distance between material objects (if non-gravitational forces are ignored). So, gravitational acceleration is greatest at the poles, least at the equator and decreases with altitude.

When we weigh a mass we are trying to find its weight expressed as kilograms or pounds. Because "g" and other factors very from location to location, we must calibrate the scale whenever we move it. Otherwise a mass of 12 kg might display 12.000 kg in one location and 12.032 kg in another (i.e. : "g" may have changed by + 0.267%. w = mXg). This would be an error, it can be prevented by placing an accurate mass on the scale (say 12 kg) and then telling the scale, in effect, "this is what 12 kg weighs at this location so please display 12.0 kg"... this is calibration.

The HC series is also equipped with a gravity compensation function which means that it can be calibrated in one location and then adjusted to match the acceleration of gravity at another location. We call this " setting the value of 'g'". If you wish to take advantage of this feature, please read the Calibration by Gravity Compensation Function and refer to the {Appendix B }.

Caution
In territories where the HC scale is registered for commercial use, the end-user will not be permitted to break the seals to carry out span calibration for himself. In this case, calibration would be carried out by the responsible authorities, and the calibration setting would then be sealed. the scale must be shipped to the end-user in a fully assembled form for commercial use.

4 -1. CALIBRATION PROCEDURE

The HC scale uses a calibration system called " FDC" for Full Digital Calibration. This means that the zero point and maximum capacity points are entered digitally through the keyboard, and it makes the calibration method very easy to remember. The HC scale can be calibrated using " kg" (kilogram) or "lb" (pound avoirdupois) calibration weights at maximum capacity or at a selected value. Maximum capacity calibration is preferred, if possible, to reduce the risk of span errors at weight above the calibration point.

Note
Masses to be used for the calibration ideally should have accuracy better than the scale's minimum division (for example, 12 kg ± 2g mass for HC-12KA/B).

Step 1.   Warm up the scale for at least 30 minutes before calibration.
You must be careful of the auto power off function, which turns off the power after 5 minutes. This can be avoided by:
- Placing an object on the weighing pan,
- Setting the Tare function so the display shows a negative number after the container weight is set and the container removed, Disabling the auto power-off function.(Set function F5-1 to 0)

Step 2.   Press the [CAL] switch.(Refer to {1-3. PARTS DESCRIPTION})
"CAL" will be displayed.

Step 3.   Press the [ZERO] key. The scale enters the calibration mode with "CXX" on the display ("C12" when HC-12KA/B).

Step 4.   If the prepared mass is 12 kg (as for the HC-12KA/B), proceed to Step 6.
If you prefer a different mass to be used, press the [SAMPLE] key and select value of mass to be used. Every time you press [SAMPLE] key, the value decreases by 1 kg.

Step 5.   Press the [ENTER/M+./PRT] key once you have chosen the value of the mass.

Step 6.   "CAL 0" is displayed. Confirm that nothing is on the weighing pan and press the [ENTER/M+./PRT] key. Then display shows "CAL F".

Step 7.   Place the mass at the center of weighing pan carefully.

Step 8.   Press the [ENTER/M+./PRT] key. When the calibration has completed, "End" will be displayed.

Step 9.   Remove the mass and press the [CAL] switch.

4 -2. GRAVITY COMPENSATION

This scale is equipped with a gravity compensation function which means that it can be calibrated in one location and then adjusted to match the acceleration of gravity at another location.

Dealer and Weights & Measures authorities may find this function useful as it will save them having to transport up to 12 kg in calibration weights to end-user's location during scale installation. It is solely for this use (when the scale is to be transported to a different geographical are), and it is not intended, nor needed for local or on-site calibration.

The HC scale was calibrated before shipping so, if you do not wish to calibrate the scale again, you can simply set the known acceleration rate (setting the value of "g") for your customer's location (or your own if it is to be used locally).

Otherwise, you must complete Zero and Span calibration, and you will be overriding the " g " function.
If you are going to use the gravity compensation function, then you must:

      1. Set the know acceleration rate ("g") for your location.
      2. Carry out zero and span calibration by a mass.
      3. Then set in the value of "g" at the end-user's location.
      4. Ship to the end-user (the scale will not be accurate in your area now).

It is best to set the "g" with the actual value of gravity, measured at the location. This can be found in reference tables for the country (or area), or sometimes from a physics laboratory at a local academic institution. Also, if you know the latitude and altitude, you can use the following formula:

Helmert's formula can be used to find the value of "g", the acceleration due to terrestrial gravity, for giving latitude and altitude:

$g = 9.806\ 16 - 0.025\ 928 \cos. 2l + 0.000\ 069 \cos. 2l - 0.000\ 003\ 086H$
"g" is in m/s^2, "l" means latitude and "H" is meters above sea level.

Alternatively, please refer to the value of gravity at various locations for the value of "g" at various world wide locations or plot the end-user's position in terms of latitude and altitude using the Acceleration due to gravity table.

Step 1.   Warm up the scale for at least 30 minutes before calibration. You must
          be careful of the auto power off function, which turns off the power after
          5 minutes. This can be avoided by:
          Placing an object on the weighing pan,
          Setting the Tare function so the display shows a negative number after
          the container weight is set and the container removed,
          Disabling the auto power-off function.(Set function F5-1 to 0)

Step 2.   Determine the "g" value.

Step 3.   Press the [CAL] switch.(Refer {1-3.PARTS DESCRIPTION} for the
          swtich location) "CAL" will be displayed.

Step 4.   Press the [TARE] key.   "9.798" (or the current "g" value) is displayed.

Step 5.   Enter the "g" value using the [ENTER/M+./PRT] key (select a digit to
          enter) and the [SAMPLE] key (select a number to enter).

Step 6.   Press the [ENTER/M+./PRT] key.

Step 7.   Press the [CAL] switch.

5. FUNCTION SETTINGS

In the HC series scale's various features can be set by means of F-functions. Set values are stored in non-volatile memory, and thus are not lost when the batteries are removed or the AC adapter is disconnected.

Functions are divided into two kinds:
- "F" Functions control internal settings of the scale to have the most suitable combination of functions for your work.

- "CF" Functions control calibration-related settings. If a seal is affixed to the calibration switch access plate, these settings cannot be changed after certification,

5 - 1. TABLE OF FUNCTIONS

Table 5-1. Function table

Function		Function No.	
Counting	ACAI	F1	1
	Minimum Unit Weight		2
Addition,Print,Mod	[ENTER /M+ /PRT} key	F2	1
	Operation Mode		2
	Polarity		3
Comparator	Mode	F3	1
	Data		2
	Buzzer		3
	Hi/Lo limit change disabling		4
Data output (HD-03/05)	Output mode	F4	1
	Output data		2
	Data format		3
	Baud rate		4
	Stop bit		5
Others	Auto Power off	F5	1
	Disabling key input		2
	Return to Factory Setting		3
	Unit at power on		4
Scale Function	Zero track	CF	11
	Stabilization detection		12
Key operation	Zero range		13
	Tare setting		14
	Zero, Tare operation		15

5 -2. FUNCTION SETTING

"F "- FUNCTION SETTING CAN BE DONE AS FOLLOWS;

Step 1.   Turn the power off, if the power is on.

Step 2.   Press and hold the [ZERO] key, then press the [ON/OFF] key..
           " F " values are displayed after a brief display of the software version.

Step 3.   Use the [MODE], [TOTAL] and [SAMPLE] keys to select the values for
           each digit.
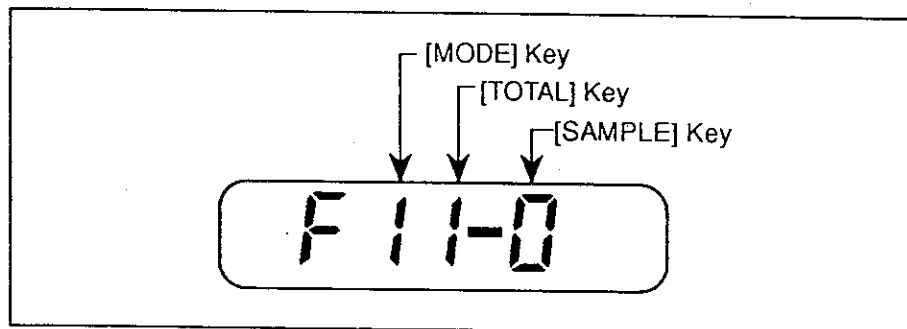
Figure 5-1. F-function setting

Step 4.   Press [ENTER/M+./PRT] when you complete the settings.

"CF "- FUNCTION SETTING CAN BE DONE AS FOLLOWS;

Step 1.   Turn the power off, if it is on.

Step 2.   Press and hold the [ZERO] key, then press the [ON/OFF] key.." F"
           values are displayed after a brief display of the software version.

Step 3.   Press the [CAL] switch on the rear side of the display pod.
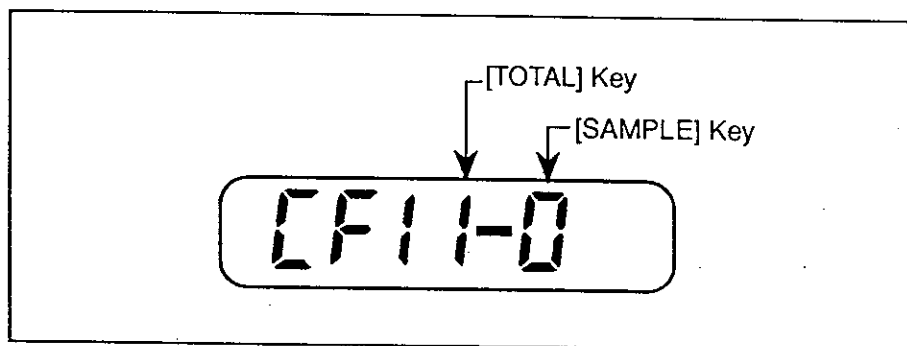
Figure 5-2 CF-function setting

Step 4.   Use the [TOTAL] and [SAMPLE] keys to select the values for each digit.

Step 5.   Press [ENTER/M+./PRT] when you complete the settings.

FUNCTION TABLE (* Indicates Factory Setting)

Table 5-2. F1 and F2 functions

Function NO.		Value	Description
F1			Counting
	1		ACAI (Refer 3 -5 { ACAI Function})
		* 0	Functioning
		1	Disabled
	2		Minimum Unit Weight (Refer 3 - 4 { Storing the Unit Weight})
		* 0	1/5 of minimum display
		1	1/20 of minimum display
F2			Addition, Print, Mode (Refer 3 - 8 { M+ Memory Function})
	1		[ENTER/M+./PRT] key
		* 0	Works as [PRT] key
		1	Works as [M+.] key
		2	Works as[M+./PRT] key
	2		Operation Mode
		* 0	Adds/Prints by pressing the [ENTER/M+./PRT] key
		1	Automatically adds/Prints when the scale becomes stable
	3		Polarity
		* 0	Works only with plus (+) data
		1	Works with both plus (+) and minus (-) data

Table 5-3. F3 functions

Function NO.		Value	Description
F3			Comparator (refer 3 -7 {Comparator function})
	1		Mode
		* 0	Comparator function off
		1	On for both stable and unstable data
		2	On only for stable data
		3	On for both stable and unstable data except near 0
		4	On only for stable data except near 0
		5	On for both stable and unstable (+) data except near 0
		6	On only for stable (+) data except near 0
	2		Data
		* 0	Comparison by counting
		1	Comparison by weighing
	3		Buzzer
		* 0	No buzzer
		1	Sound when LO
		2	Sound when OK
		3	Sound when HI
		4	Sound when LO and OK
		5	Sound when LO and HI
		6	Sound when OK and HI
	4		Hi/Lo limit change disabling
		* 0	Enabled
		1	Disabled

Table 5-4. F4 functions

Function NO.		Value	Description
F4			Data output (HC-03/05)
	1		Output mode
		* 0	Command mode
		1	Stream mode
	2		Output data
		* 0	Display data (A type), Count (B type)
		1	Display data (A type), Weight (B type)
		2	Display data (A type), Unit weight (B type)
		3	Weight, Unit weight, Count
	3		Data format
		* 0	A&D Standard format (AD-8121 mode 1&2)
		1	Dump print format (AD-8121 mode 3)
		2	Others (AD-8119, PC etc.)
	4		Baud rate
		0	600 bps
		1	1200 bps
		* 2	2400 bps
		3	4800 bps
		4	9600 bps
	5		Stop bit
		* 0	1 bit
		1	2 bit

Table 5-5. F5 functions

Function	Value	Description
F5		Others
	1	Auto Power off
		* 0	Disabled
		1	Enabled
	2	Disabling key input
		* 0	All keys enabled
		1	Only the [ON/OFF], [ZERO], [TARE], [SAMPLE] and [ENTER/M+./PRT] keys may be used.
	3	Return to Factory Settings
		* 0	Keep all user settings
		1	Go back to Factory Settings
	4	Unit at power on(A type scale only)
		* 0	Counting, if a unit weight stored
		1	Weighing
	5	Weight unit
		0	lb
		* 1	kg
	6	Unit weight in lb
		* 0	0 lb
		1	1/1000 lb

(F5-5 and F5-6 are available for only U.S.A)

Table 5-6. CF functions

Function NO.		Value	Description
CF	11		Zero track
		* 0	ON
		1	OFF
	12		Stabilization detection
		0	0.5 division / sec.
		* 1	1.0 division / sec.
		2	2.0 division / sec.
	13		Zero range
		* 0	2% of capacity
		1	10% of capacity
	14		Tare setting
		* 0	Enabled
		1	Disabled
	15		Zero, Tare operation
		* 0	Enabled
		1	Disabled

6. MAINTENANCE

6 -1. CLEANING

Caution

- *When you clean the scale, turn power it off and remove the AC adapter if used.*
- *Do not immerce the scale in water. The HC is not designed as water-proof.*
- *Use dry (or with water, neutral detergent), clean cloth to clean.*
- *Do not use strong solvent for resin / plastic parts.*
- *Make sure the weighing pan is located in right position after cleaning the pan.*

6 -2. CALIBRATION

Calibration is recommended every 12 months. When the scale is re-located, calibration is required. (refer 4-1, 4-2 {Calibration})

6 -3. PROBLEM SOLVING

Caution

Do not disassemble the scale unless you are a qualified service person.

The following table describes some troubleshooting tips. Before you call for a repair, please refer this table first.

Table 6-1. Problem solving   1/2

Error Message	Possible Cause and Action
No display	Confirm the AC adapter is correctly connected.
	Replace the batteries. Recharge the AD-1681. (if used)
E	Overload. Repeat operation with smaller quantity.
-E	Zero point has shifted, or the weighing pan is not correctly installed. Check the pan installation and press [ZERO] key.
Hi	The value being input exceeds acceptable upper or lower limits.
Lo	Sample weight is too light to be stored as a unit weight. Refer 5-2 {Function Setting} or 3-4 {Storing the Unit Weight}.
Lb	Low battery. Replace the batteries with a new set, or recharge the AD-1681 Rechargeable Battery.(if used)
____	Zero point has shifted. Remove all items on the weighing pan and turn the scale power off then on again.

Table 6-2. Problem solving   2/2

Error Message	Possible Cause and Action
Err -	Check the installation of the weighing pan.
Err C	Mismatch of Upper/Lower limit value. Refer { 3-7. Comparator}.
Err G	Invalid value for ACCELERATION FUE TO GRAVITY. The value should be between 9.835 and 9.770.
Err ı	Zero shifted out of range. The range is ether ±2% or ±10% of the capacity. Refer { 5-2.Function Setting}.
Err n	Memory for Addition is full. Clear the memory.
Err S	It is not possible to perform a stable weighing operation, change the location of the scale according to { 2. Inatallation }.
Err t	Memory for Total is full. Clear the memory.
Err EP	Memory Error. Call for a repair.
Err Lo	Calibration was not done correctly.Refer to {4.Calibration}.
Err Lt	Mismatching between registered weight of mass and actual weight ofmass. Refer to {4.Calibration}.

7. *OPTION : HC-03*(RS-232C SERIAL INTERFACE)

HC-03 RS-232C Serial Interface for connection to a peripheral devise such as a Printer, personal computer etc. The input / Output standards conform to EIA-RS-232C. It is DCE (Data Communication Equipment). To interface the option with a personal computer, please use an A&D cable (AX-KO445-200, sold separately) or a cable for a modem.

7 -1. *FUNCTION SETTING*

When option HC-03 is installed in the scale, the scale's Function Settings in F4-1 to F4-5 are displayed. Please select appropriate settings according to the connected devise.

Table 7-1. Function setting for HC-03

Output mode	
*F4 - 1 - 0	Command mode
F4 - 1 - 1	Stream mode
Output data	
*F4 - 2 - 0	Display data (A type), Count (B type)
F4 - 2 - 1	Display data (A type), Weight (B type)
F4 - 2 - 2	Display data (A type), Unit weight (B type)
F4 - 2 - 3	Weight, Unit weight, Count
Data format	
*F4 - 3 - 0	A&D Standard format (AD-8121 mode 1&2)
F4 - 3 - 1	Dump format (AD-8121 mode 3)
F4 - 3 - 2	Others (AD-8119, PC etc.)
Baud rate	
F4 - 4 - 0	600 bps
F4 - 4 - 1	1200 bps
*F4 - 4 - 2	2400 bps
F4 - 4 - 3	4800 bps
F4 - 4 - 4	9600 bps
Stop bit	
*F4 - 5 - 0	1 bit
F4 - 5 -1	2 bit

7 -2. INTERFACE

Method	Conforms to EIA-RS-232C
Transmission method	Half-duplex, asynchronous
Baud rate	600, 1200, 2400, 4800, 9600 bps
Start bits	1 or 2
Data bits	7
Parity bits	1 (even)
Stop bits	1
Code used	ASCII
Output level	1: -10 V
	0: +10V
Terminator	$C_R L_F$ (Send), C_R or $C_R L_F$ (Receive)
Connector	HCB-25P male & HCB-CTF cover

Table 7-2. Pin connection

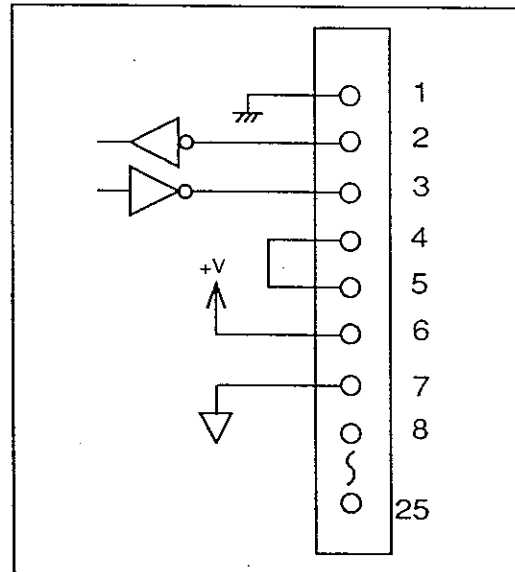| Pin No.	Signal	Description
1	FG	Frame Ground
2	RXD	Receive Data
3	TXD	Transmit Data
4	RTS	Request to Send
5	CTS	Clear to Send
6	DSR	Data Set Ready
7	SG	Signal Ground
8 to 25	Not used	

Figure 7-1. Pin connection

7 - 3. COMMAND

Note: Terminator is C_R or $C_R L_F$. Sp = Space

DATA SETTING COMMAND

Table 7-3. Data setting command

Command + Data to input	Description	
D , 1 . 2 3 4 5	Setting Tare value.	
	Example <AK> (06H)	
G , 1 . 2 3 4 5	Setting Unit weight(g)	
	Example <AK> (06H)	
H , + 1 2 3 4 5 6	Setting Upper limit (piece)	"Piece" or "g" can be sellected by F32 of {FUNCTION SETTING}
H , + 1 . 2 3 4 5	Setting Upper limit (g)	
	Example <AK> (06H)	
L , - 1 2 3 4 5 6	Setting Lower limit (piece)	
L , - 1 . 2 3 4 5	Setting Lower limit (g)	
	Example <AK> (06H)	

DATA REQUEST COMMAND

Table 7-4 Data request command   1/2

Command	Command / Data format (from the sacle side)																
S	Requests for Display, Stable data. (being sent when stable) After returning <AK>, confirmation of receipt of the command, the following data is returned.																
	Example	Q	T	,	+	0	0	1	2	3	4	5	6	Sp	P	C	Stable PCs data
		S	T	,	+	0	0	1	.	2	3	4	5	Sp	k	g	Stable Weight data
		U	W	,	+	0	0	1	.	2	3	4	5	Sp	Sp g		Unit Weight data
		O	L	,	+	0	9	9	9	9	9	9	9	Sp	P	C	PCs data, "E" display
		O	L	,	+	9	9	9	9	.	9	9	9	Sp	k	g	Weight data, "E" display
Q	Request for display data (data is to be immediately returned even																
	Example	U	S	,	+	0	0	1	2	3	4	5	6	Sp	P	C	Unstable PCs data
	Sp kg when weight data, the same as "S" command when stable.																
?QT	Request for PCs data (being sent even in other display mode)																
	Example	Q	T	,	+	0	0	1	2	3	4	5	6	Sp	P	C	Stable PCs data
	US, OL may be returned.																
?WT	Request for Weight data (being sent even in other display mode)																
	Example	S	T	,	+	0	0	1	.	2	3	4	5	Sp	k	g	Stable weight data
	US, OL may be returned.																
?UW	Request for unit weight data (being sent even in other display mode)																
	Example	U	W	,	+	0	0	1	.	2	3	4	5	Sp	Sp g		Unit weight data

Table 7-5. Data request command   2/2

Command	Data format																
?AQ	Request for Total (accumulated)																
	Example	A	Q	,	+	0	0	1	2	3	4	5	6	SP	P	C	Total data
?AN	Request for Number of Additions																
	Example	A	N	,	0	0	1	2	3	4	5	6	Number of addition data				
?TR	Request for Tare value																
	Example	T	R	,	+	0	0	1	.	2	3	4	5	SP	k	g	Tare value data
?HI	Request for Comparator, Upper limit value																
	Example	H	I	,	+	0	0	1	2	3	4	5	6	SP	P	C	Upper limit value data
		[SP k g]instead of [SP P C] in case of the upper limit in weight.															
?LO	Request for Comparator, Lower limit value																
	Example	L	O	,	-	0	0	1	2	3	4	5	.6	SP	P	C	Lower limit value
		[SP k g]instead of [SP P C] in case of the lower limit in weight.															

CONTROL COMMAND

Table 7-6. Control command

Command	Command / Data format	
Z	Performs Zero operation (same as the [ZERO] key)	
	Example	Two <AK> to be sent (Command receipt <AK> (06H) and Action completed <AK> (06H))
T	Perform Tare operation (same as the [TARE] key)	
	Example	Two <AK> to be sent (Command receipt <AK> (06H) and Action completed <AK> (06H))
M	Perform Mode change ,Weight - PCS (same as the [MODE] key)	
	Example	One <AK> to be sent.
K	Perform Addition	
	Example	One <AK> to be sent.

In case of errors, an error code is to be returned. For detail, please refer the following error code table.

7 -4. ERROR CODE TABLE

Table 7-7. error code

Error code EC, E<n>		
E < n >	Name	Description
E0	Communications error	Parity error, Framing error etc.
E1	Undefined command	Command does not exist.
E2	Scale not ready	HD is not in a state where a command could be accepted.
E4	Characters over	Command contains too many characters.
E6	Format error	Command contained invalid characters.
E7	Out of range error	Value is out of range. Tare weight is more than capacity, etc.
EC	Comparator value error	Upper limit < Lower limit. "Err C"is displayed.
EI	Scale not ready	Function settings prohibit the command being executed.
EN	Additions over	Additions value exceeded the limit. "Err n"
ES	Time over	Unstable data when zero, tare. "Err S" is displayed.
ET	Total over	Total value exceeded the limit. "Err t" is displayed.

8.   OPTION : HC-04 (COMPARATOR / RELAY OUTPUT)

The HC-04 Comparator / Relay Output provides relay-output signals of the comparison results HI, OK, LO for an external device.

8 - 1. FUNCTION SETTING

To use this option, the following function settings are required.
Comparator (refer {3 -7.Comparator function})

Table 8-1. Function setting for HC-04

Mode	
*F3-1-0	Comparator function off
F3-1-1	On for both stable and unstable data
F3-1-2	On only for stable data
F3-1-3	On for both stable and unstable data except near 0
F3-1-4	On only for stable data except near 0
F3-1-5	On for both stable and unstable + data except near 0
F3-1-6	On only for stable + data except near 0
Data	
*F3-2-0	Comparison in count
F3-2-1	Comparison in weight
Buzzer	
*F3-3-0	No buzzer
F3-3-1	Sound when LO
F3-3-2	Sound when OK
F3-3-3	Sound when HI
F3-3-4	Sound when LO and OK
F3-3-5	Sound when LO and HI
F3-3-6	sound when OK and LO
Hi/Lo limit change disabling	
*F3-4-0	Enabled
F3-4-1	Disabled

8 -2. INTERFACE

Maximum input voltage	50V
Maximum current	100mA
Connector	TCP-0576 (0ne connector is supplied with The HC-04)

Table 8-2. Pin connection

Pin No.	Signal
1	HI
2	COM
4	LO
6	OK
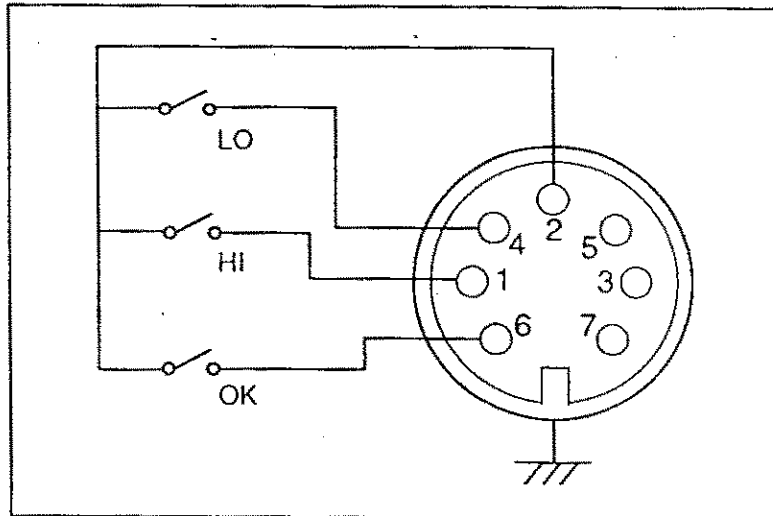
Figure 8-1. Pin connection

9. OPTION : HC-05 (PRINTER INTERFACE / CURRENT LOOP)

HC-05 allows communication simular to the HC-03 using a current loop signal.
This is a passive type so an external power supply is required.

9 -1. FUNCTION SETTING

When you connect the HC scale (with HC-05) with the AD-8121 Printer, refer the
following function setting.

Table 9-1. Function Setting Table

Function of scale		AD-8121 Print Mode		
		Mode 1	Mode 2	Mode 3
[ENTER/ M+. /PRT] key		F2-1-0 or 2	F2-1-0 or 2	F2-1-0 or 2
Operation Mode	Print key	F2-2-0	F2-2-0	F2-2-0
	Auto Print	F2-2-1	N/A	F2-2-1
Output mode		F4-1-0	F4-1-1	F4-1-0
Output data		F4-2-0 to 3	F4-2-0 to 2	F4-2-0 to 3
Data format		F4-3-0	F4-3-0	F4-3-1
Baud rate		F4-4-2	F4-4-2	F4-4-2
Stop bit		F4-5-0	F4-5-0	F4-5-0

9 -2. INTERFACE

Table 9-2. Pin connection

Pin No.	Signal
3	current loop
5	
Others	Not connected
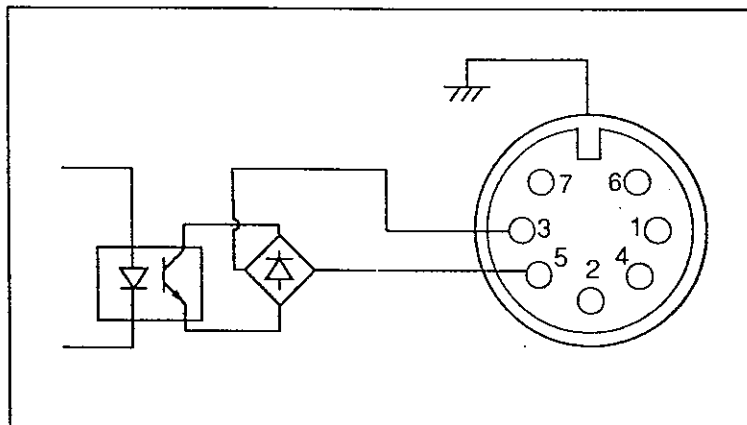
Figure 9-1. Pin connection

10. INSTALLATION OF OPTIONS

Caution
Unplug the AC Adapter and remove the batteries when you install options into the scale. Ignoring this may cause damage to the scale components.
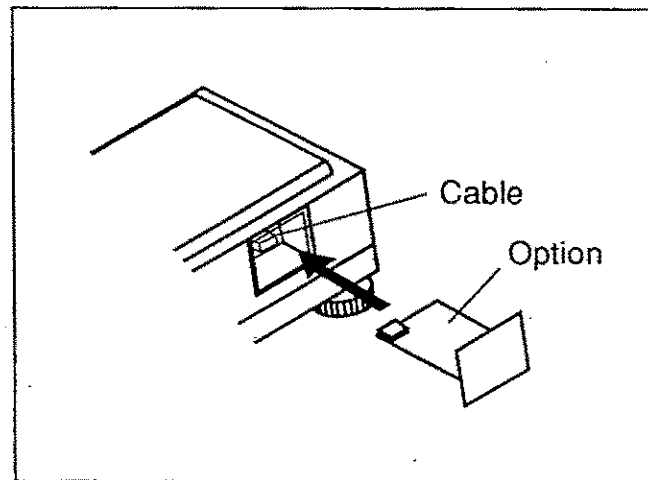
Figure 10-1. Option installation

Step 1.   Unscrew and remove the cover for option slot.

Step 2.   Connect the option's connector to the cable inside the slot.

Step 3.   Install the option using the screw from the cover.

Step 4.   Set the Function Settings according to options being installed.

APPENDIX A: DIMENSIONS
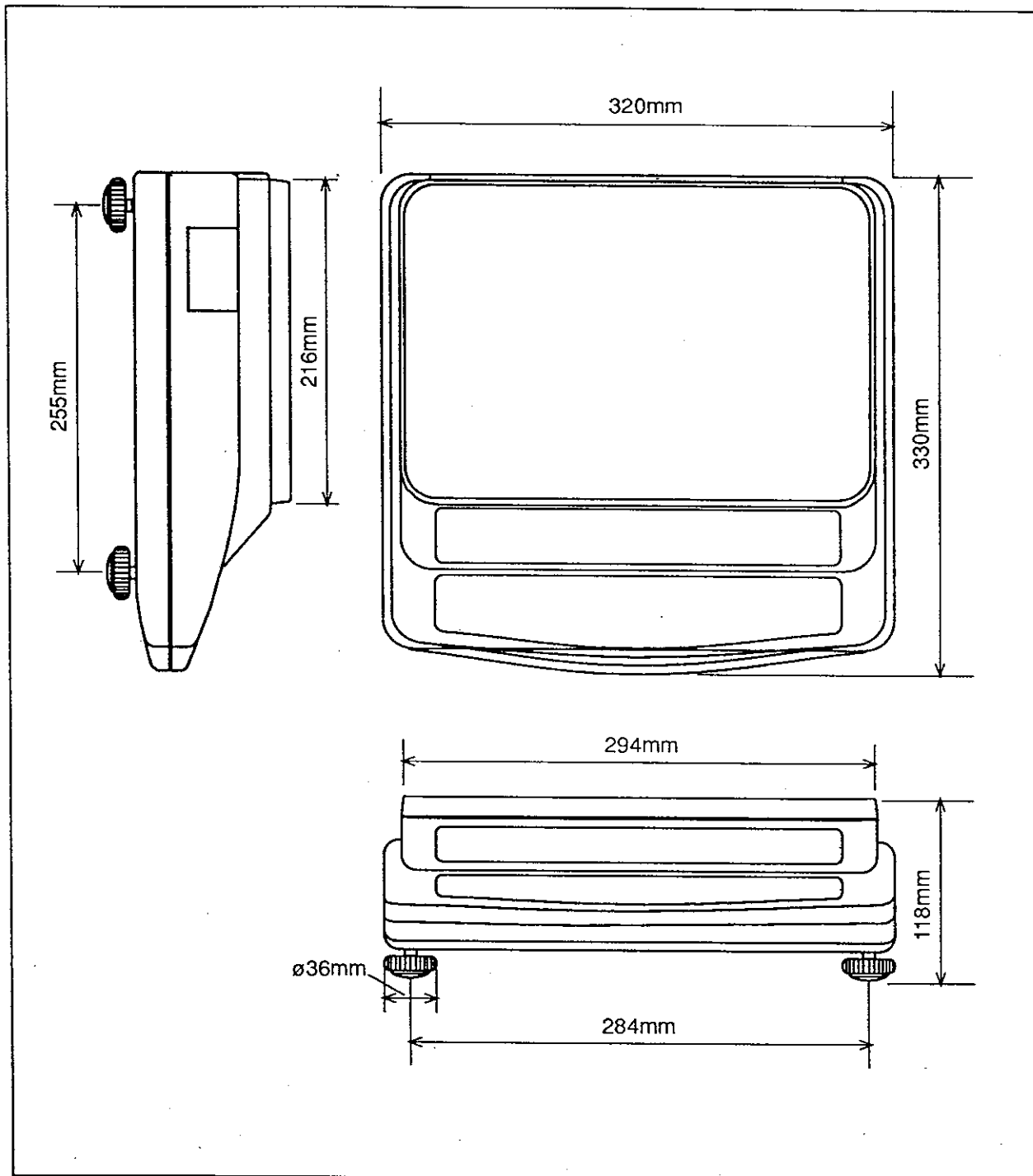
Figure A-1. Dimensions

APPENDIX B: *(GRAVITY ACCELETATION MAP)*

THE VALUE OF GRAVITY AT VARIOUS LOCATIONS

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
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
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

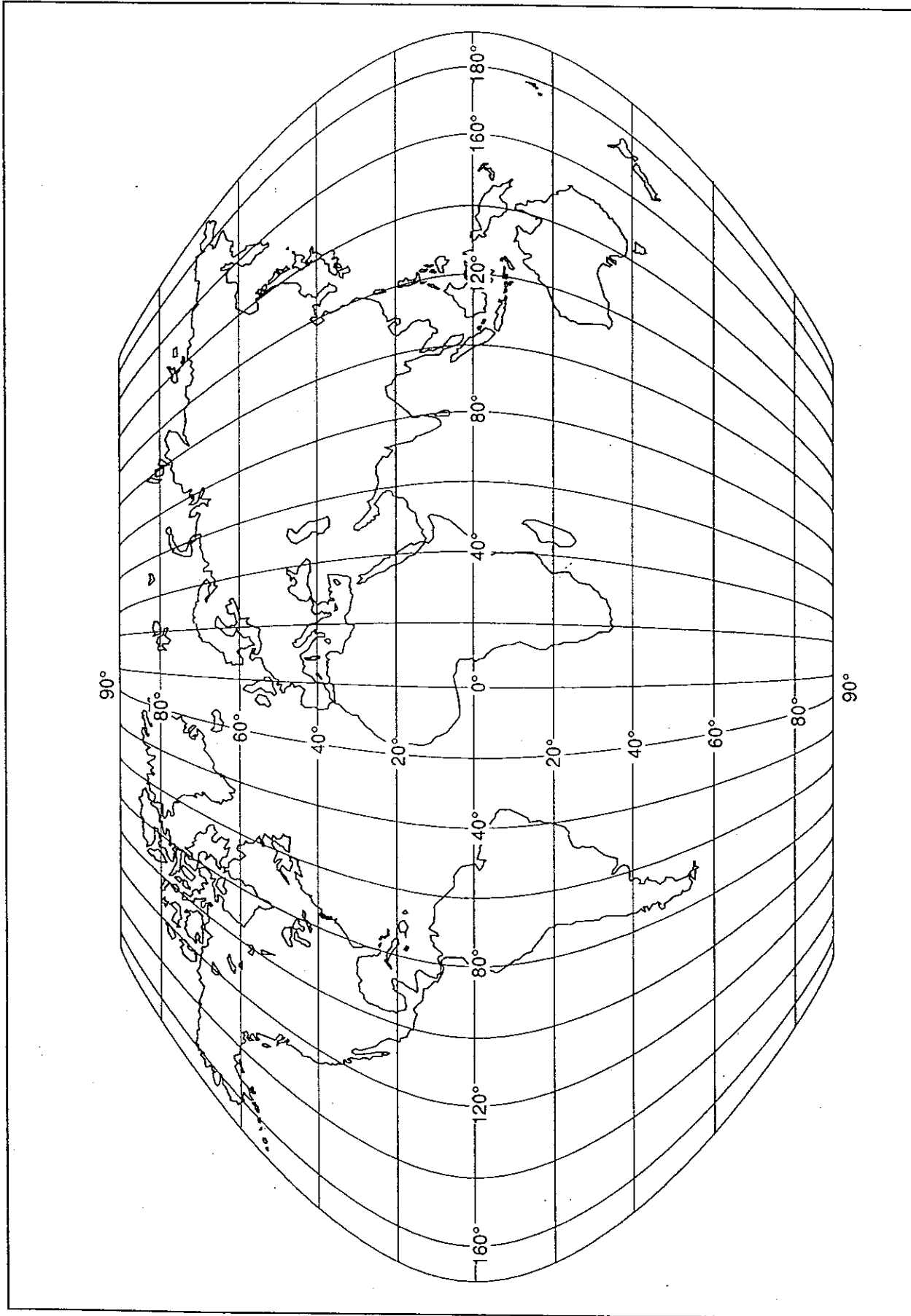*Table B-1. The Value of Gravity at Various Locations*

ACCELERATION DUE TO GRAVITY

WORLD MAP

Figure B-1. World map

MEMORANDA