HV-CS

Digital Chair Scale

Instruction Manual v.1b

A&D

A&D MERCURY PTY. LTD.

Contents of this manual

1. General Description

The HV-CS is an ergonomic digital chair scale designed for patient comfort and ease of use in the hospital / nursing home environment. The weight is displayed on a battery powered digital indicator in clear numbers on a high contrast liquid crystal display. The chair is supported on a five wheel frame, and safety brakes are provided on two of the wheels. A footrest at the front allows the patient to sit comfortably in the chair. For moving the scale between locations a convenient push handle is fitted at the rear of the chair. All surfaces are easy to clean and may be wiped with a damp cloth.

2. Preparation for use

2.1 Unpacking

The HV-CS chair scale is supplied, in specialised packaging, in a partially assembled condition. To unpack the scale, first cut through the sealing tape, remove the top sheet of cardboard and then remove the cardboard packing which secures the seat.
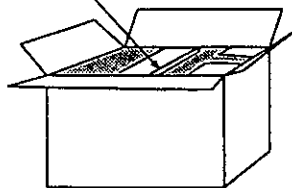
Remove the plastic seat from the carton and place to one side. Now remove the indicator and column assembly from the corner box and place on top of the scale. Remove the 2 corner boxes from the carton, one containing the handle and accessories, the other which contained the indicator and column. At the opposite end to the 2 corner boxes remove the 2 corner packing pieces at the bottom of the carton.
Carefully support the complete scale and and place on the floor on it's wheels. Be sure to support the indicator and column assembly which is attached to the scale by a cable. At the rear of the scale carefully feed the excess cable into the tube and secure the column and indicator assembly to the tube using the 4 screws and Allen key provided in the acessory kit. Secure the end cap to the tube using the 2 mushroom head screws.
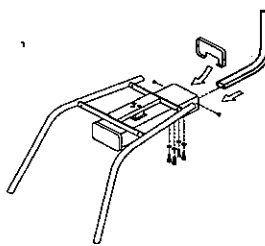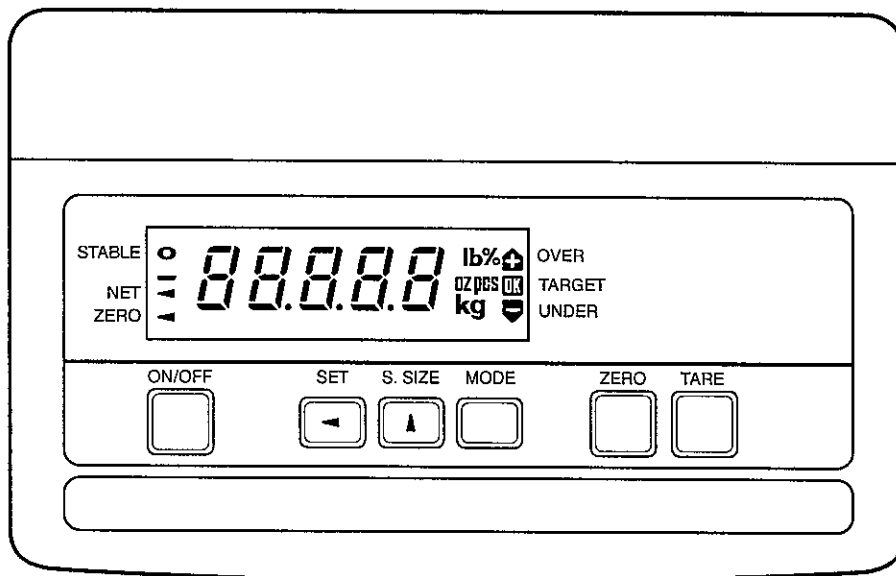

Finally place the plastic seat onto the support frame and secure with the 4 screws from the accessory kit. The screws are inserted through the frame from the rear of the scale and into the plastic chair. Ensure that these screws are securely tightened.

2.2 Power sources

The HV-CS digital chair scale may be powered from dry batteries, (normally already fitted to your scale), an optional AC power adaptor, or from an optional rechargeable battery pack (AD-1681). If the batteries are not already in place in your scale please refer to page 7, Changing the Batteries.

3. The indicator pod.

3.1 The front panel

STABLE | NET | ZERO | O | 8.8.8.8.8 | lb% | oz pcs | kg | OVER | TARGET | UNDER

ON/OFF   SET   S. SIZE   MODE   ZERO   TARE

The front panel provides the essential buttons for operation of the scale and display of the patient's weight.

ON/OFF
This button is used to switch the scale on or off.

ZERO
This button is used to set the scale reading to 0.00 when the chair is empty.

TARE
This button is used to set the scale reading to 0.00 when there is something on the scale e.g a blanket or cushion.

The remaining buttons are used by the service technician during calibration etc.

The weight is shown on the large digits in kilogrammes.

The STABLE circle shows when the weight is not changing. Readings should only be taken when the STABLE circle is lit, to ensure accuracy of weighing.

The ZERO arrow shows when the scale is exactly at zero reading.

The NET arrow shows when the weight of an object, such as a cushion, has been zeroed out by use of the TARE button. To cancel this tare simply press TARE again when the chair is empty.

The OVER, TARGET and under symbols are not used in this chair scale.

3.2 Rear Panel

The rear panel provides the connections to the weighing loadcell, in the support frame, to the optional AC adaptor, and also provides access to the calibration switch for the service technician.

Calibration switch access

AC adaptor connector

Loadcell connector
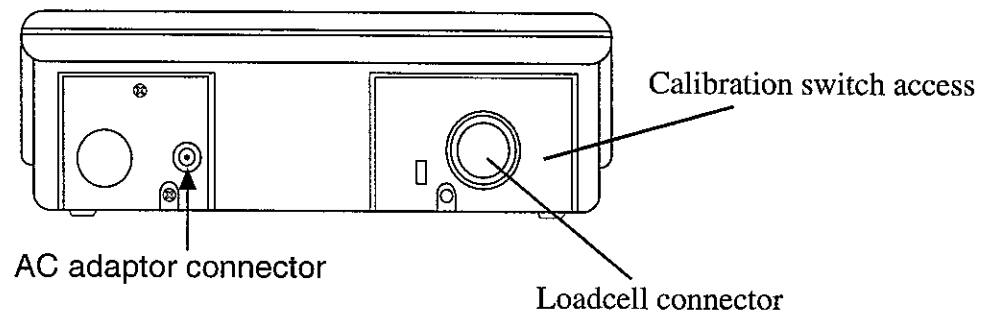
4 The Chair

4.1 Safety Brakes
The chair is mounted upon the wheel base in such a manner as to provide the maximum stability for the patient. It is essential that the chair is always positioned with the foot brakes, red tabs, to the rear of the scale, when a patient is getting on or off the seat. The brakes should be applied securely whenever the scale is in use. The chair scale can easily be moved from one area to another by releasing the brakes and then pushing the scale forward by use of the rear mounted handle. To apply the brakes press firmly down on the red tabs with the foot.
To release the brakes lift the red tabs with the foot.

4.2 Footrest
A footrest is provided to allow the patient to sit comfortably and provide a stable weight reading. For easy access to the chair the footrest can be raised up each side to provide a clear area for the patient to stand.

4.3 Handle
A handle is provided, at the rear of the display, to allow the chair to be easily moved from area to area once the brakes have been released.

5 Weighing

To weigh a patient the following steps should be carried out:-
1. Ensure that the chair is correctly positioned with the red brake tabs at the rear of the chair.
2. Ensure that the safety brakes are firmly applied and that the footrest is in the up position.
3. Ensure the seat is empty and switch on the scale.
4. Wait for the reading to show 0.00 kg
5. Assist the patient into the chair and lower the footrest, placing the patient's feet comfortably.
6. Watch for the STABLE circle to light and then read the weight from the display.
7. Raise the footrest and assist the patient in leaving the chair.

6 Setting the Function

The HV-CS digital, chair scale is provided with a battery saving feature which causes the scale to switch off if not used for a period of approximately three minutes. This function can be activated or disabled by setting function F1 in the software.
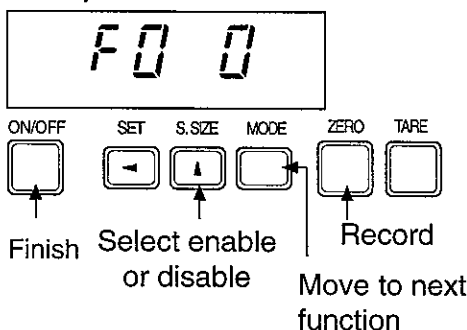
Setting method

Auto power off enabled
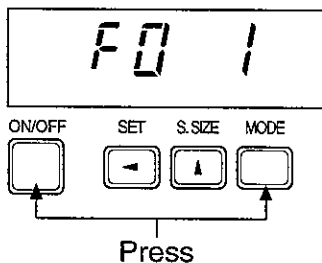
Press

(1) Switch off the power, 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. The current value will not be changed.

Auto power off disabled

Finish Select enable or disable

Record

Move to next function

(3) To change the setting, press the S.SIZE switch,
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 new setting will be stored in memory. "F6" will be displayed.

(5) Now just switch the power off.

*   When shipped from the factory, the auto power off function is enabled.

7. Low battery indication

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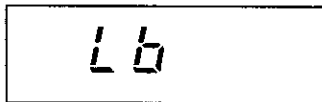
If "Low battery" is displayed during use, discontinue use and either replace the batteries or use the AC adaptor.

7.1 Changing the Batteries
To replace the batteries open the battery compartment on the side of the display pod by sliding the access panel down. Then remove the captive cover followed by the battery holder. Note that it will be necessary to push on the end of the battery holder and raise it above the lip to complete the removal. Remove the old batteries and replace with 6 new 'C' size cells. Please be careful to get the batteries positioned correctly, the polarity is moulded into the battery holder. Finally slide the battery holder back into the display pod, followed by the captive cover and the compartment access panel.

7.2 Fitting the rechargeable battery pack AD-1681
To fit the AD-1681 rechargeable battery pack firstly remove the standard battery holder as detailed above. Then simply slide the AD-1681 into the battery compartment and replace the captive and compartment covers as above.
Note the AC adaptor supplied with the AD-1681 rechargeable must be used to recharge the pack.

7.3 Using the optional AC adaptor
To use the TB-108 optional adaptor simply plug it's flying lead into the rear panel connector. (See drawing on page 5), and connect the adaptor to a source of mains voltage. When the AC adaptor is in use the batteries are disconnected. If the mains adaptor is to be used for a long time it is recommended that the batteries be removed from the instrument to avoid the risk of leakage.

8. Specifications

| Capacity	150 kg
Minimum division	50 g
Weight Display	Liquid Crystal
Power	6 x 'C' size batteries, AC adaptor (optional), AD-1681 NiCd.
Chair	White high strength moulded plastic seat
Base	Grey plastic spider
Wheels	5 x 100 mm diameter
Security	2 x wheels fitted with brakes
Loadcell	Allows 200% overload without damage

9. Problem solving

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 there anything touching the chair? • 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 chair? • Try pressing the MODE key. Is the zero point value greatly different? Obtain the zero point from the calibration. (Refer to section 11)
The weight value is not correct.	• Is the gravity acceleration value appropriate? • Is there something touching the chair?
$E0$ 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.

Dimensions

All dimensions are in millimetres

370

510

830

880

680

1125

600

430

635
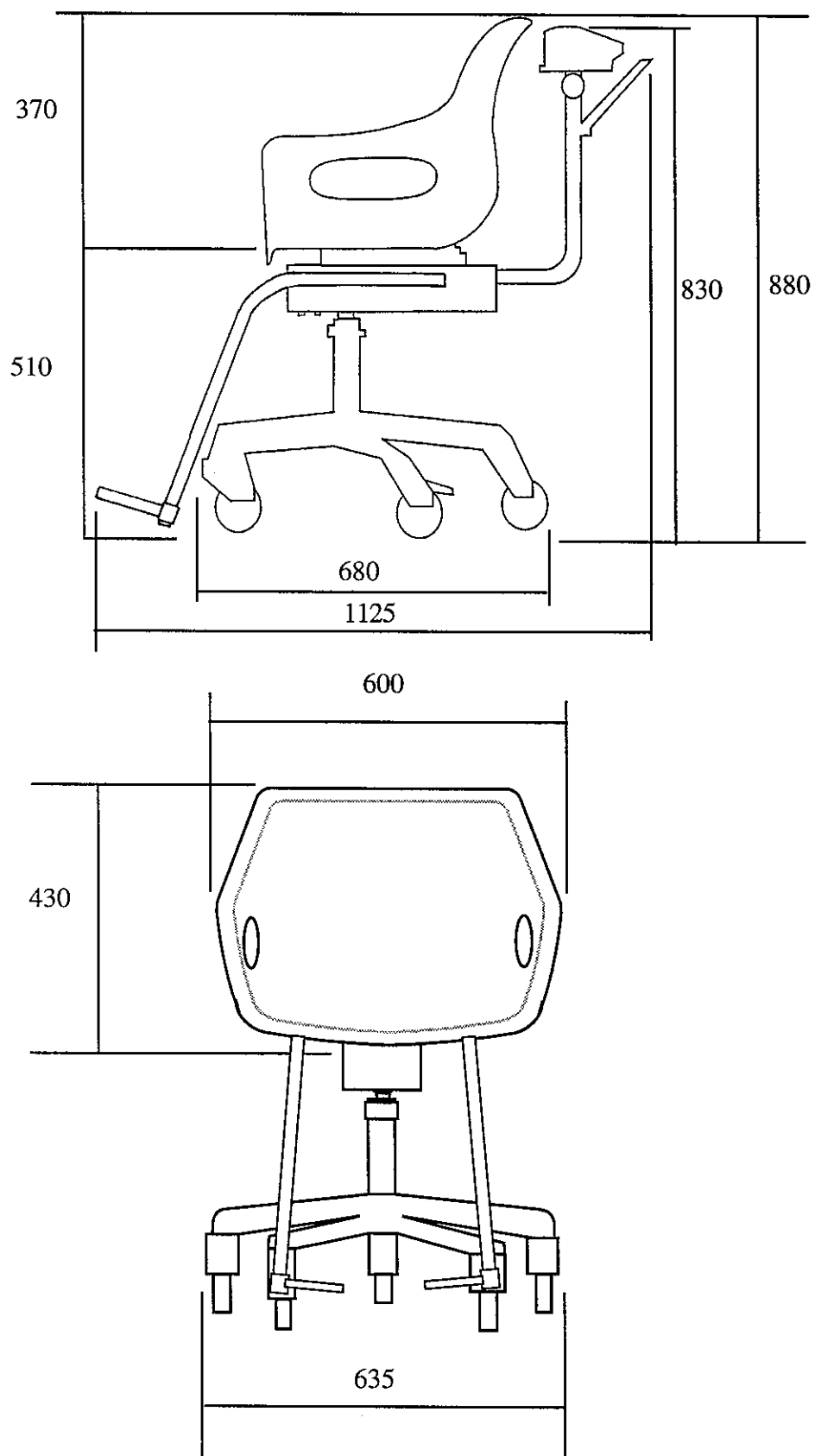
11.Method of calibration

11-1 Correction for acceleration due to gravity

In the HV-CS chair scale, 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.)**
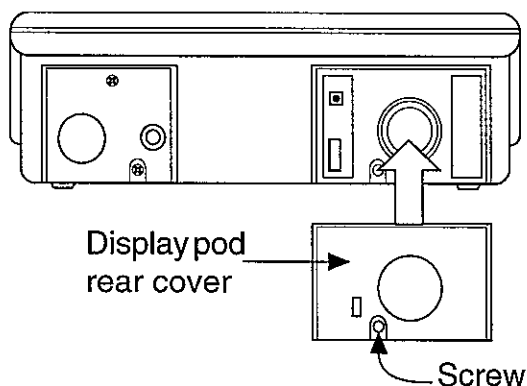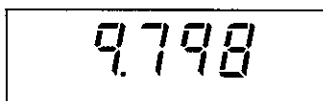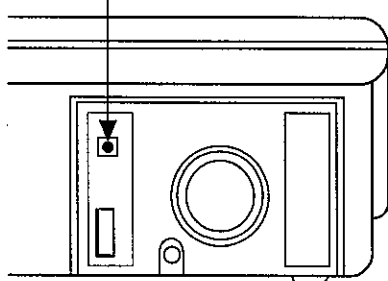
Display check

Bar display
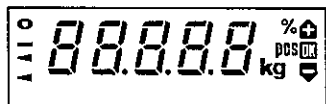
Press

Display pod rear cover
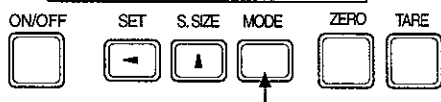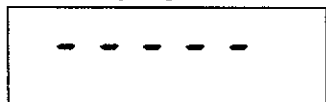
Screw

[CAL switch]

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

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

(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) Acceleration 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 11-2 (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)
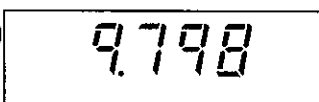
Functions of the key switches used:

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

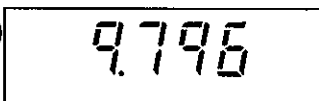SET The digit to be changed moves one figure to the left and flashes.

ZERO Stores the data in memory.

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

(1)

```
9.798
```
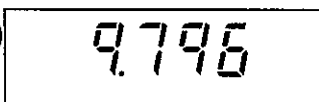▲
Flashes

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

(2)

```
9.796
```
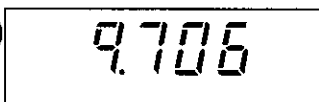
Press the S.SIZE switch to change the number of the first figure to "6".
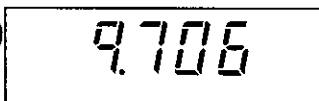
(3)

```
9.796
```
▲
Flashes

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

(4)

```
9.706
```

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

(5)

```
9.706
```
▲
Flashes

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

(6)

```
9.806
```

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

(7)

```
CAL 0
```

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 load 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 11-2 Zero and span calibrations. (See note 1, page 13)

For the span adjustment, use an accurate weight (standard weight or equivalent weight) to carry out the procedures.
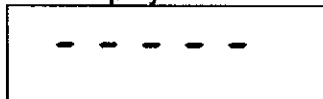
If an accurate weight is not available, do not carry out the calibration.

11-2 Zero and span calibrations

Display check
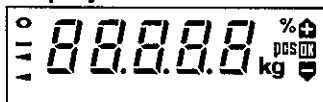
Bar display

Ensuring that there is nothing on the weighing platform, switch on the scale. 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 11-1 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 point value in memory.

SET   The data is not changed, and the machine moves forward to the span adjustment.
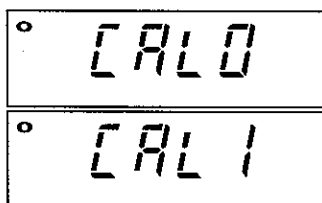
With nothing on the weighing platform, wait for the "O" stable mark to be displayed.

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.
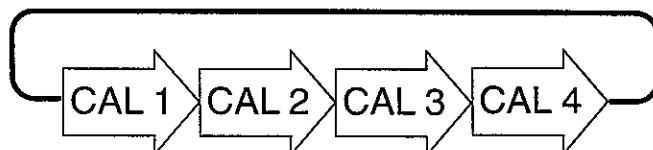
(4) Span adjustment

In span adjustment, there is a full scale adjusting mode and a 2/3 scale adjusting mode. Perform one or other of the procedures.

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 it's unavoidable due to not having enough weights, etc.
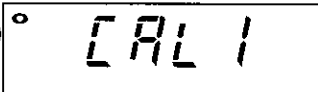
Functions of the key switches used:

ZERO   Stores the span data in memory.

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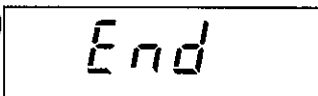   Each time the switch is pressed, the mode changes as follows:

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

(5) Span adjustment (Full scale)

(1) ° ⌐ A L ¦

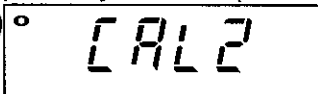By pressing the MODE switch, select the CAL1 (Kg) mode.

Place the full scale weights(150 kg) on the chair and wait until the "O" stable mark is shown.

(2) ⌐ n d

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) ° ⌐ A L ⌐

By pressing the MODE switch, select the CAL2 (Kg) mode.

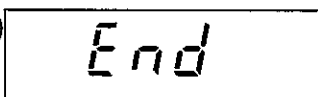Place 2/3 scale capacity (100 kg) on the chair and wait until the "O" stable mark is shown.

(2) ⌐ n d

When the stable mark is shown, press ZERO to record the span adjusting data. After the data has been recorded, "End" is automatically displayed.
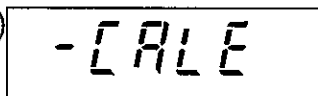
(7) Ending the calibration
After the zero span adjustment is finished and "End" is displayed, if the calibration has been completed, press the CAL switch. This exits from the calibration mode and returns to the normal weighing display mode.
To complete the calibration, replace the display pod rear cover that was previously removed.
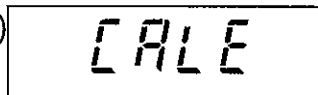
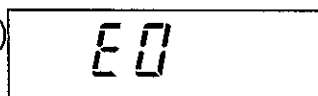## 11-3 Error displays during calibration

(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) - ⌐ A L ⌐

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) ⌐ A L ⌐

The load cell output is too large.

(3) ⌐ U

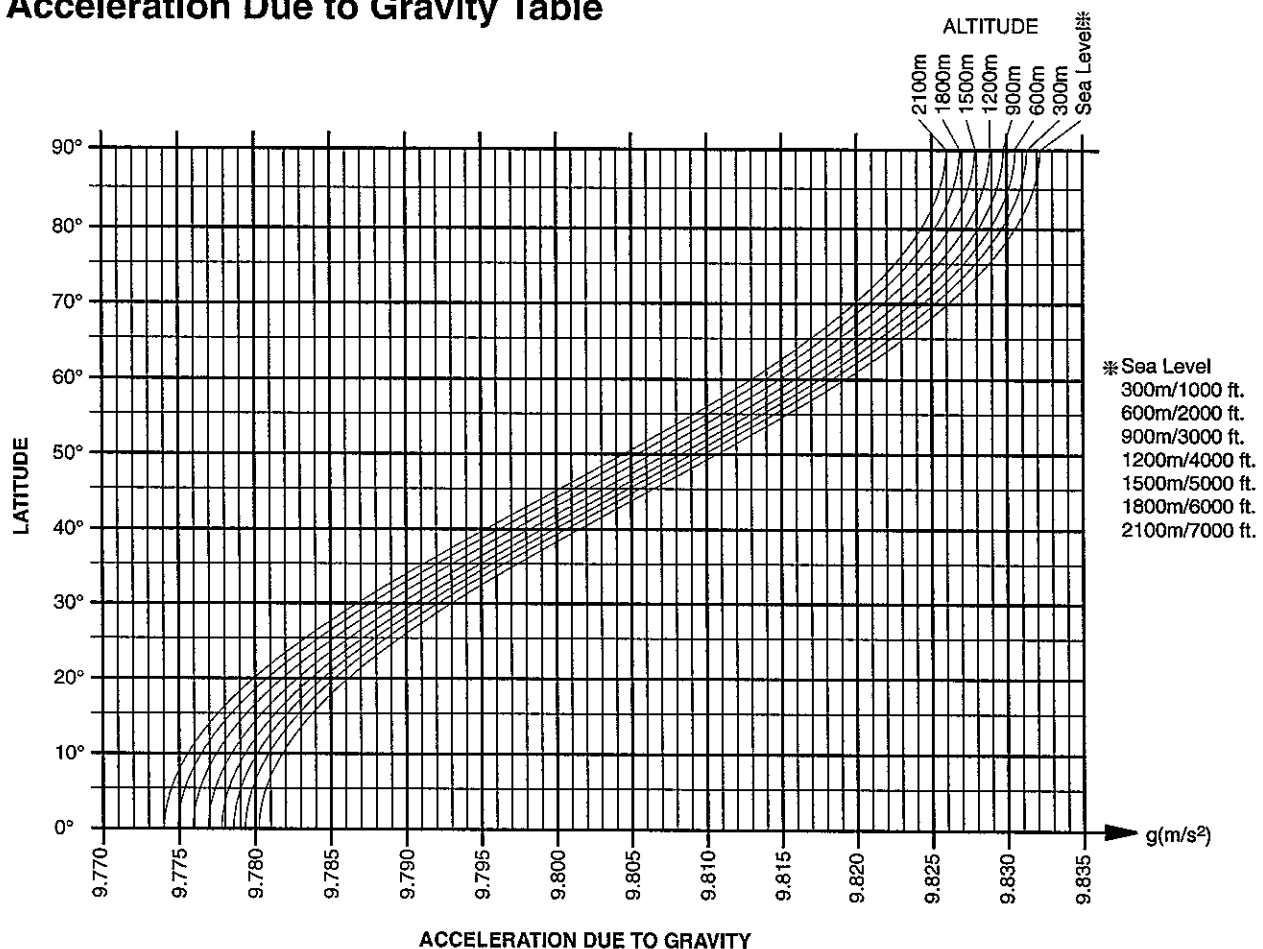The data that was to be stored in the memory has not been correctly stored.

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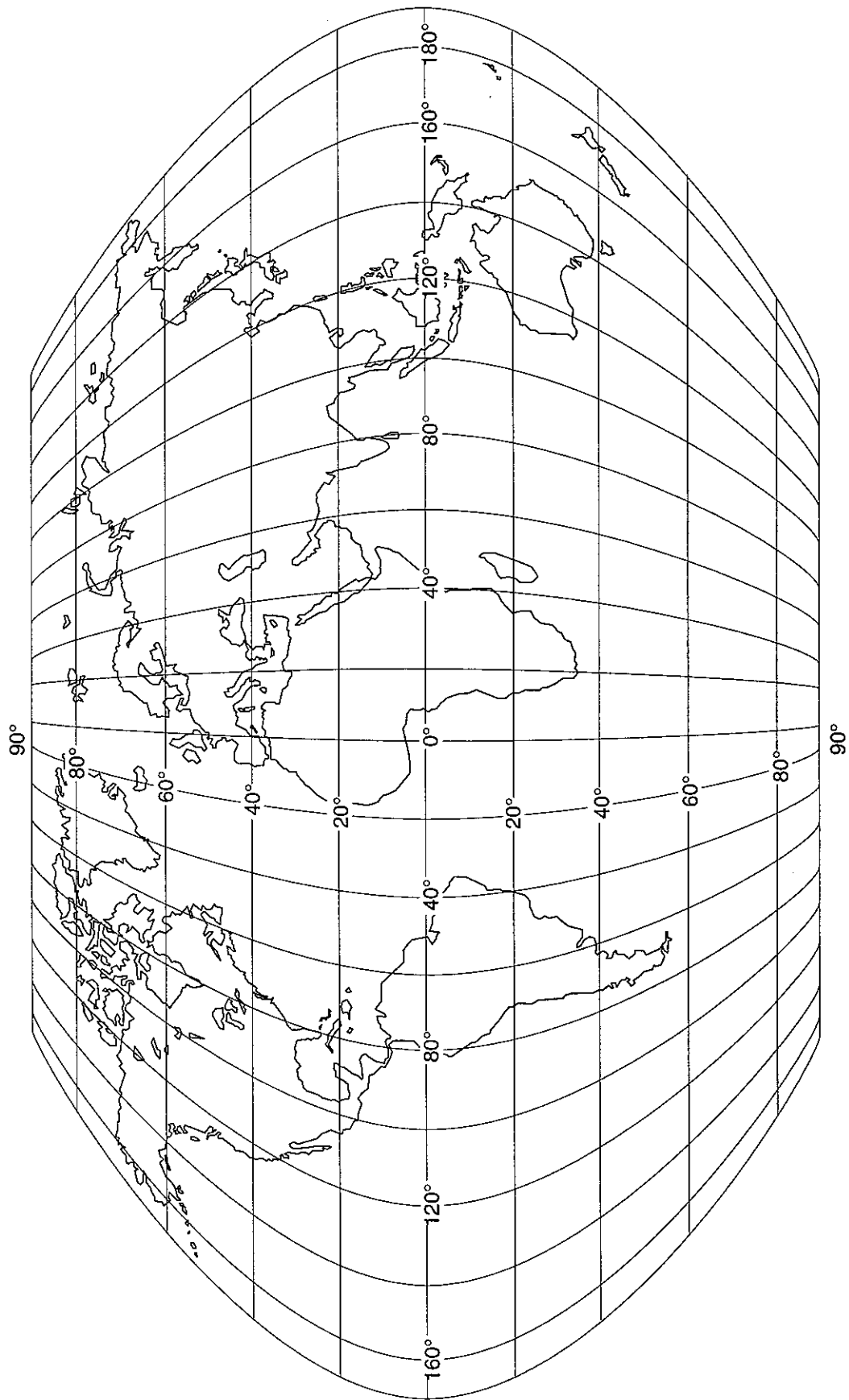
12. Appendix

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

ALTITUDE

2100m 1800m 1500m 1200m 900m 600m 300m Sea Level※

※ Sea Level
300m/1000 ft.
600m/2000 ft.
900m/3000 ft.
1200m/4000 ft.
1500m/5000 ft.
1800m/6000 ft.
2100m/7000 ft.

LATITUDE — 90° 80° 70° 60° 50° 40° 30° 20° 10° 0°

g(m/s²)

9.770 9.775 9.780 9.785 9.790 9.795 9.800 9.805 9.810 9.815 9.820 9.825 9.830 9.835

ACCELERATION DUE TO GRAVITY

World Map

Head Office:
32, Dew Street
THEBARTON
S.A. 5031
Tel: (08) 8352 3033
Fax: (08) 8352 7409

Victorian Office:
Unit 4
Corner Arden & Lloyd Street
KENSINGTON
VIC. 3031
Tel: (03) 9372 1522
Fax: (03) 9372 1193

NSW Office:
Unit 2
49 Derby Street
SILVERWATER
NSW 2128
Tel: (02) 9748 4766
Fax: (02) 9748 4724