

# HL Series

Compact Scales

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## Instruction Manual

1163-2A-IE-1997.03.11

HL-200

HL-2000

HL-400

HL-4000

**AND**

**A&D WEIGHING**

*...Clearly a Better Value*

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# SAFETY PRECAUTIONS

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

 <b>WARNING</b>	<b><i>Important information to alert you to a situation that might cause serious injury and damage to your property if instructions are not followed.</i></b>
 <b>CAUTION</b>	<b><i>Important information that tells how to prevent damage to equipment .</i></b>

When using the HL, the following safety precautions should always be followed.

 **WARNING**

***Use only the AC adapter which comes with the scale. Other adapter may cause damage. (AC adaptor is optional)***

***Internal service or adjustment to this product should be performed by a qualified person.***

 **CAUTION**

***Avoid installing the scale in direct sunlight, that may cause discoloration or malfunctions .***

***Do not mix the type of batteries. Replace all other batteries at the same time.***

***If the scale is not to be used for a long period of time, remove all batteries from the battery compartment to avoid leakage which may cause damage to the instrument.***

***Avoid overloading that could cause damage to the scale.***

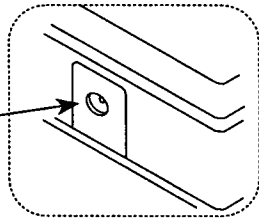
***Do not drop water in the scale which is not water-resistant. It causes damage, if inside of the scale is wet.***

***The weighing could be influenced by matter charged static electricity. Discharge the static electricity. As example, the method is to use the electrification prevention spray, to spray it to both side of weighing platform.***

# PARTS DESCRIPTION

## ► REAR

AC adaptor socket



## ► TOP

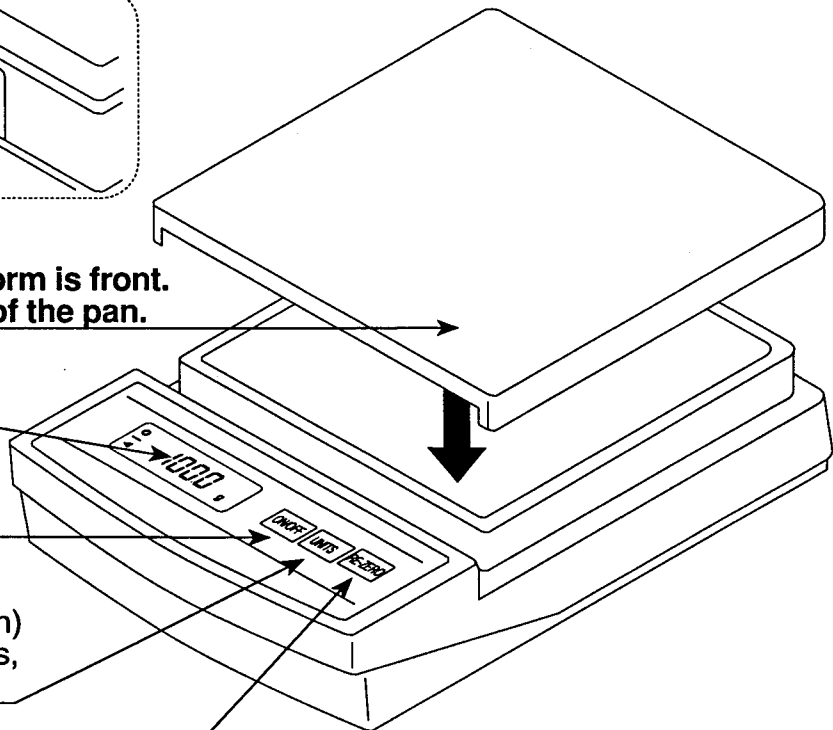
Weighing platform  
The arch face of platform is front.  
Correct the direction of the pan.

Display

ON/OFF key  
Turns the scale power on/off.

UNITS key  
(only for g-lb/oz version)  
Changes weighing units, g or lb/oz.

RE-ZERO key  
Sets display to zero or subtracts weight of a container.

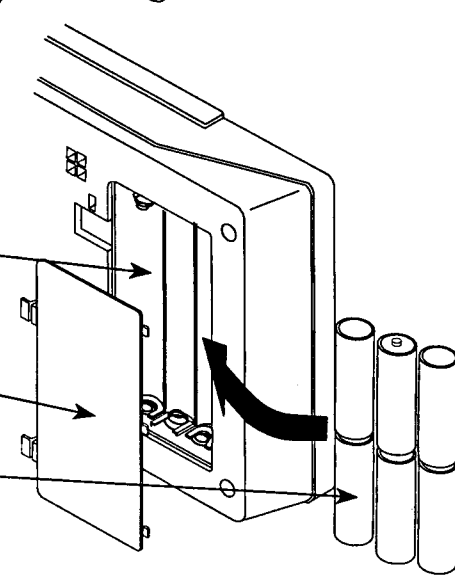


## ► BOTTOM

Battery compartment

Battery compartment cover

Batteries.  
\*Batteries are not included



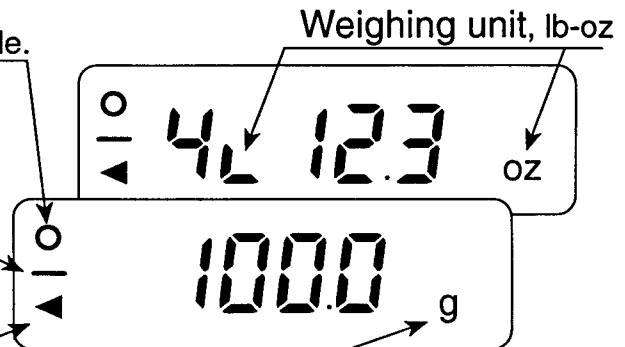
## ► DISPLAY

STABLE indicator  
Indicates when the reading is stable.

Polarity

ZERO indicator  
Indicates when the scale zero is correct. (Only works when the scale zero is within 2% of capacity.)

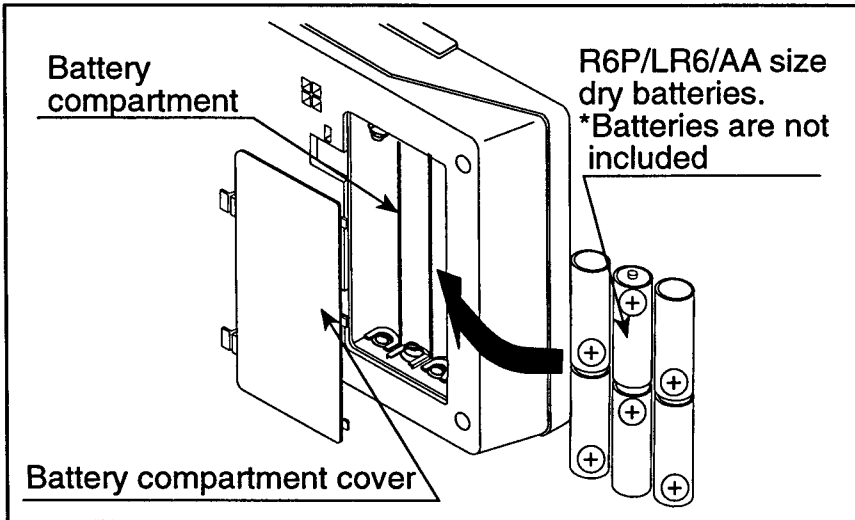
Weighing unit, g



# PREPARATION

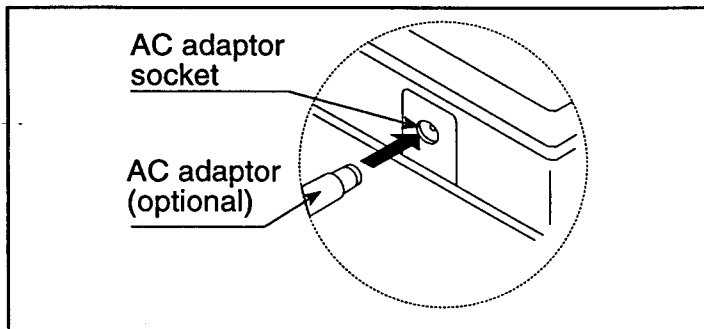
## 1. Installing batteries / Connecting the AC adaptor

### Batteries



Remove the battery compartment cover and insert six batteries (R6P/LR6/AA size) into the battery compartment, taking extreme care that the polarities plus and minus are observed.

### AC adaptor (optional)



Plug the AC adaptor to the AC adaptor socket on the side. The AC input requirement could be 100, 120, 220, 230, or 240Volts (50/60Hz) depending on the area where used, so please verify that the adaptor is correct.

## 2. Setting up the HL

### ⚠ CAUTION

*Avoid installing the scale in direct sunlight, that may cause discoloration or malfunctions. Place your HL on a firm weighing table so that the scale is level. (The scale will not perform accurately when it is not level.)*

Place the HL on the firm surface that is flat and level for an accurate weighing.

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# WEIGHING

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## Before weighing

### Be aware of the Automatic power-off function.

If this unit is left ON and the stable indicator is displayed, an automatic power-off function turns power off after approximately 5 minutes. To disable this function, press [ON/OFF] while pressing [RE-ZERO]. "P-XX" will be displayed and the scale returns to the weighing mode.

### Error messages

**E** Overload  
---- The scale zero is out of range.  
**Lb** Low battery

### Calibration may be required before weighing.

Read "CALIBRATION" first and if necessary, calibrate your scale for accurate weighing.

## Weighing procedures

### 1. Press [ON/OFF] to turn on the scale.

When power is turned ON, all display segments appear for a few seconds and "0" will appear on the display.

### Only for the "g-lb/oz" version

### 2. Select the weighing unit with [UNITS].

Press [UNITS] to select a weighing unit either "g" or "lb/oz". Once the unit has been selected, the selected unit will be displayed to the right of the weight value .

### 3. Start weighing

#### If you do not use a container for weighing,

Verify the reading is "0". If not, press [RE-ZERO] to display "0".

Place objects on the weighing platform to weigh.

When the reading becomes stable, the stable indicator is displayed.

#### If you use a container for weighing,

Place an empty container on the platform.

Wait for the stability indicator to be displayed and press [RE-ZERO].

Place the objects to be weighed in the container.

When the reading becomes stable, the stable indicator is displayed.

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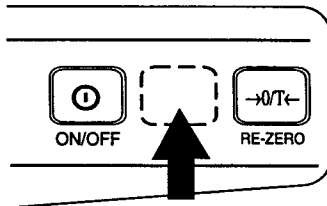
# CALIBRATION

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## When to calibrate

Calibration may be 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.

### The [UNITS] key for "g" only model



"g" only model has no [UNITS] key, but a key is located under the overlay. Press the area between [ON/OFF] and [RE-ZERO] for [UNITS].

## Calibration using a calibration weight

Calibrate a scale with calibration weights at capacity.

200g  $\pm$  0.02g for the HL-200 / 2000g  $\pm$  0.2g for the HL-2000

400g  $\pm$  0.02g for the HL-400 / 4000g  $\pm$  0.2g for the HL-4000

### 1. Enter calibration mode.

Press [ON/OFF] to turn the power off. While pressing both [RE-ZERO] and \*[UNITS], press [ON/OFF]. "CAL" will be displayed.

### 2. Zero calibration

Press [RE-ZERO] to calibrate zero. "CAL 0" will be displayed.

Wait for the stable indicator to be displayed and press [RE-ZERO]. "CAL F" will be displayed in a few seconds.

### 3. Span calibration

Place the weight at the center of the platform for an accurate calibration.

Wait for the stable indicator to be displayed, then press [RE-ZERO]. The display will show "END" and automatically the scale return to the weighing mode.

## Calibration by gravity compensation

*If you have calibration weights at the capacity of the scale, you can calibrate the scale with the weights instead of compensating for acceleration due to gravity.*

The HL is calibrated at 9.798 m/sec<sup>2</sup>. If the acceleration of gravity at your location is not the same, calibrate the scale by compensating the acceleration of gravity. (See page 7 "The Value of Gravity at Various

Locations" and page 8 "World Map" and find your location' value.)

**1. Enter the calibration mode.**

Press [ON/OFF] to turn the power off. While pressing both [RE-ZERO] and \*[UNITS], press [ON/OFF]. "CAL" will be displayed.

**2. Select a digit to be changed.**

Press \*[UNITS]. "9.798" will be displayed. Press [RE-ZERO], the decimal point will move and the last digit will be selected.

Select a digit to be changed with [UNITS]. The first digit after decimal point is the selected digit.

**3. Set value.**

Set the value of the digit selected by pressing [RE-ZERO]. (See "The Value of Gravity at Various Locations" and "World Map" and find your location' value.)

**4. Enter the value in memory.**

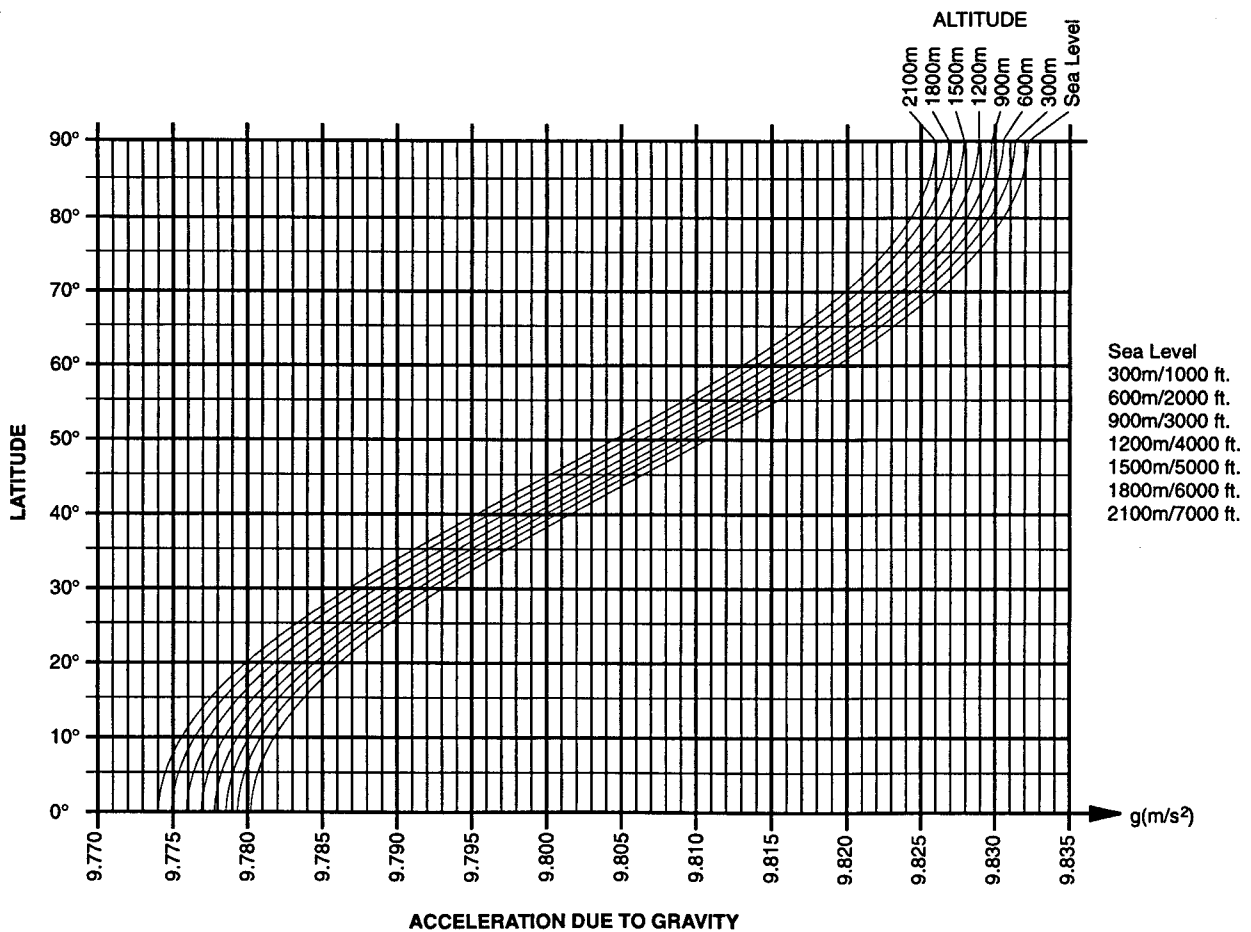
While pressing [UNITS], press [RE-ZERO] to enter the value. "END" will be displayed.

# SPECIFICATIONS

MODEL	HL-200	HL-2000	HL-400	HL-4000
Capacity	200g/7oz	2000g/4lb 6oz	400g/14oz	4000g/8lb 13oz
Calibration weight	200g±0.02g	2000g±0.2g	400g±0.02g	4000g±0.2g
Resolution	0.1g/0.01oz	1g/0.1oz	0.1g/0.01oz	1g/0.1oz
Non-linearity	±0.2g	±2g	±0.2g	±2g
Repeatability	±0.1g	±1g	±0.2g	±2g
Span drift	±0.015%/°C TYP (5°C~35°C /41°F~86°F)			
Display	8mm/0.31inch, 7segment liquid crystal display			
Platform size	136mm(W)×136mm(D) / 5.35in(W)×5.35in(D)			
Dimensions	140(W)×198(D)×44.5(H) mm 5.51(W)×7.79(D)×1.75(H) inches			
Weight	Approximately 500g/1lb			
Power	6 × R6P/LR6/ "AA" size batteries or AC adaptor			
Battery life cells	Approximately 100 hours with manganese type / 200 hours with alkaline cells at 20°C/68°F			
Operating temp.	-10°C~40°C /14°F~104°F, Less than 85%RH (Non-condensing)			
Accessories	This manual			
Options	AC Adaptor			

# THE VALUE OF GRAVITY AT VARIOUS LOCATIONS

Amsterdam	9.813 m/s <sup>2</sup>	Manila	9.784 m/s <sup>2</sup>
Athens	9.800 m/s <sup>2</sup>	Melbourne	9.800 m/s <sup>2</sup>
Auckland NZ	9.799 m/s <sup>2</sup>	Mexico City	9.779 m/s <sup>2</sup>
Bangkok	9.783 m/s <sup>2</sup>	Milan	9.806 m/s <sup>2</sup>
Birmingham	9.813 m/s <sup>2</sup>	New York	9.802 m/s <sup>2</sup>
Brussels	9.811 m/s <sup>2</sup>	Oslo	9.819 m/s <sup>2</sup>
Buenos Aires	9.797 m/s <sup>2</sup>	Ottawa	9.806 m/s <sup>2</sup>
Calcutta	9.788 m/s <sup>2</sup>	Paris	9.809 m/s <sup>2</sup>
CapeTown	9.796 m/s <sup>2</sup>	Rio de Janeiro	9.788 m/s <sup>2</sup>
Chicago	9.803 m/s <sup>2</sup>	Rome	9.803 m/s <sup>2</sup>
Copenhagen	9.815 m/s <sup>2</sup>	San Francisco	9.800 m/s <sup>2</sup>
Cyprus	9.797 m/s <sup>2</sup>	Singapore	9.781 m/s <sup>2</sup>
Djakarta	9.781 m/s <sup>2</sup>	Stockholm	9.818 m/s <sup>2</sup>
Frankfurt	9.810 m/s <sup>2</sup>	Sydney	9.797 m/s <sup>2</sup>
Glasgow	9.816 m/s <sup>2</sup>	Taichung	9.789 m/s <sup>2</sup>
Havana	9.788 m/s <sup>2</sup>	Taiwan	9.788 m/s <sup>2</sup>
Helsinki	9.819 m/s <sup>2</sup>	Taipei	9.790 m/s <sup>2</sup>
Kuwait	9.793 m/s <sup>2</sup>	Tokyo	9.798 m/s <sup>2</sup>
Lisbon	9.801 m/s <sup>2</sup>	Vancouver, BC	9.809 m/s <sup>2</sup>
London (Greenwich)	9.812 m/s <sup>2</sup>	Washington DC	9.801 m/s <sup>2</sup>
Los Angeles	9.796 m/s <sup>2</sup>	Wellington NZ	9.803 m/s <sup>2</sup>
Madrid	9.800 m/s <sup>2</sup>	Zurich	9.807 m/s <sup>2</sup>

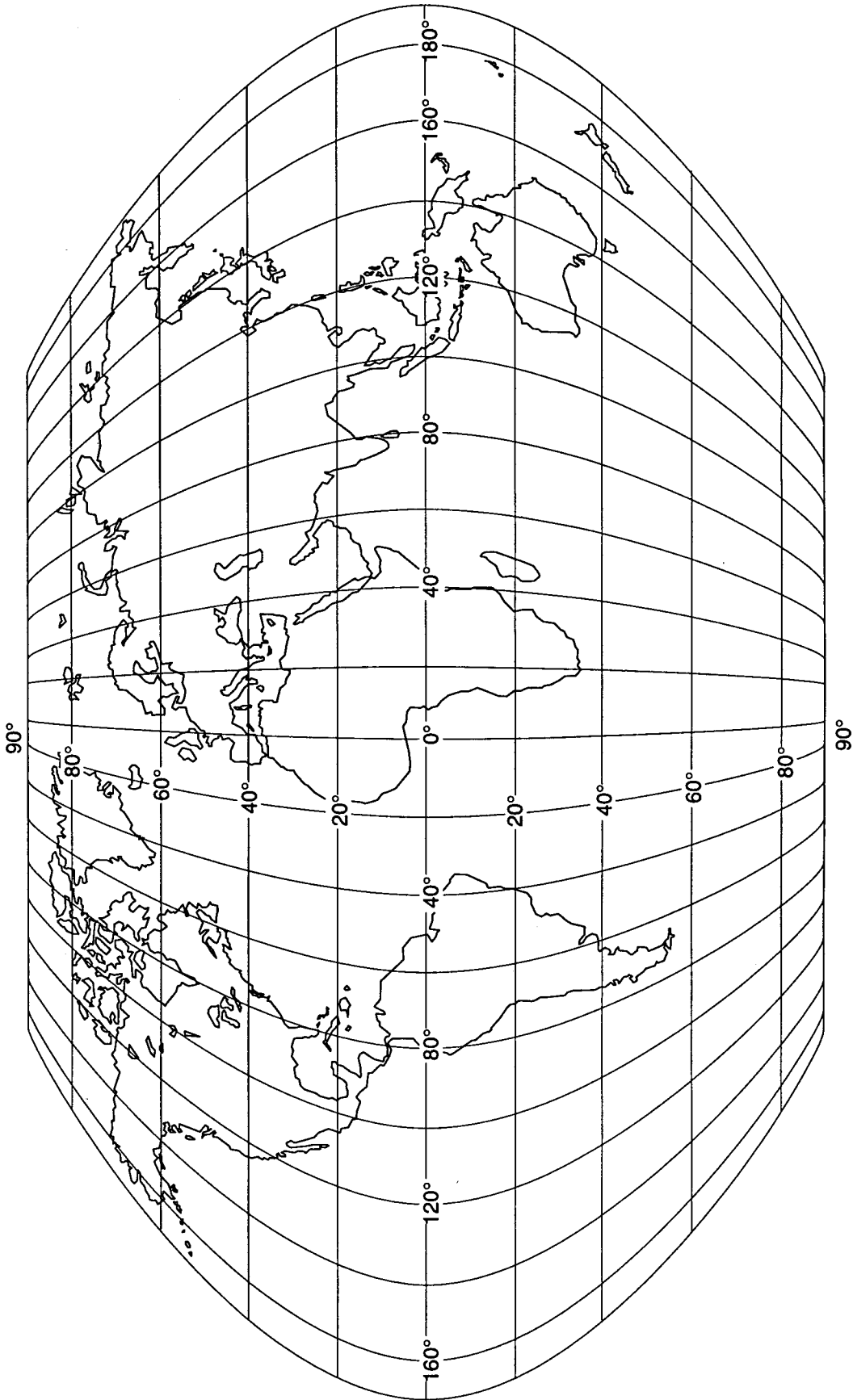




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# WORLD MAP

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