

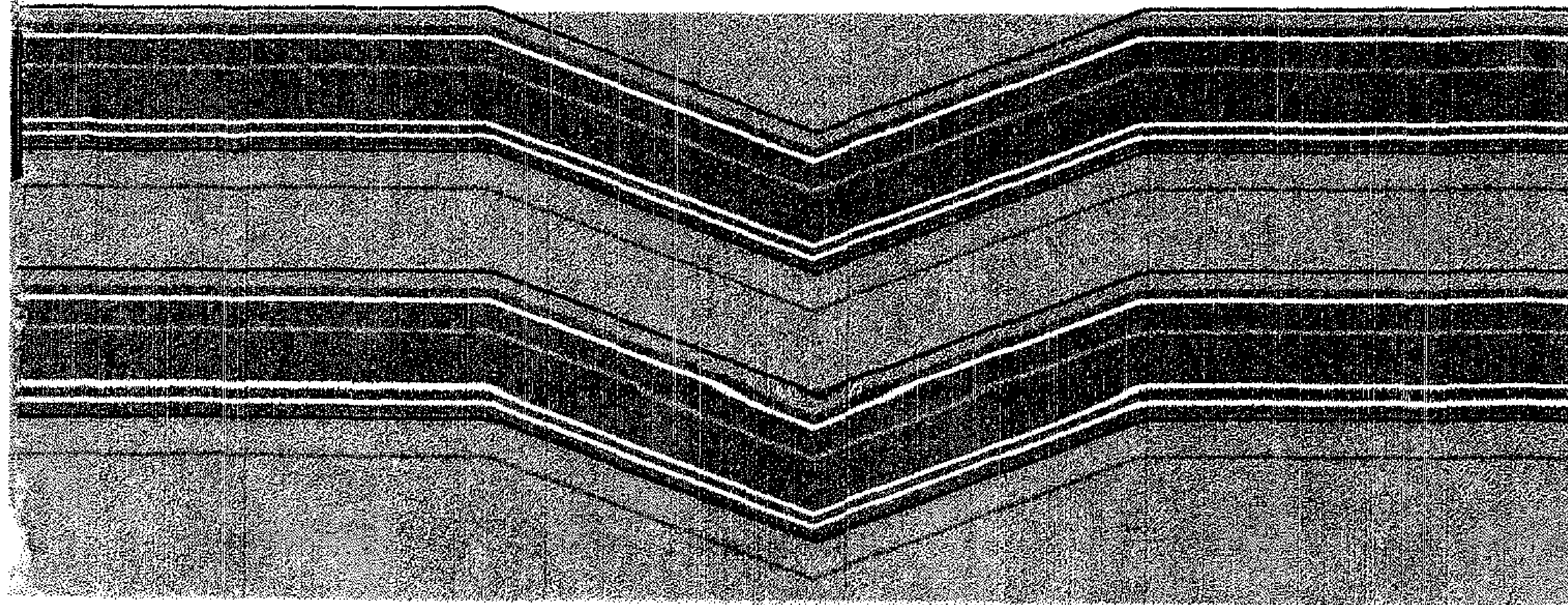
SHARP COMPET

ELSI MATE

ELECTRONIC CALCULATOR

EL-8131

INSTRUCTION MANUAL



LIMITED WARRANTY

Sharp Electronics Corporation warrants its calculator products to the original purchaser to be free from defective materials and workman-ship. Under this warranty the product will be repaired or replaced, at our option, without charge for parts or labor, with the exception of batteries, when returned to a SHARP CONSUMER FACTORY SERVICE CENTER listed in the instruction booklet supplied with your calculator.

This warranty does not apply to any appearance items nor to any product whose exterior has been damaged or defaced, nor to any product subjected to misuse, abnormal service, or handling, nor to any product altered or repaired by other than a SHARP CONSUMER FACTORY SERVICE CENTER. This warranty does not apply to any product purchased outside the United States, its territories or possessions.

The period of this warranty covers one (1) year on parts and one (1) year on labor from date of purchase, except the solar cell contained on the solar calculator, which cell is warranted for three (3) years from date of original purchase.

This warranty entitles the original purchaser to have the warranted parts and labor rendered at no cost for the period of the warranty described above when the calculator is carried or shipped, prepaid, to a SHARP CONSUMER FACTORY SERVICE CENTER together with proof of purchase.

THIS SHALL BE THE EXCLUSIVE WRITTEN WARRANTY OF THE ORIGINAL PURCHASER AND NEITHER THIS WARRANTY NOR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, SHALL EXTEND BEYOND THE PERIOD OF TIME LISTED ABOVE. IN NO EVENT SHALL SHARP BE LIABLE FOR CONSEQUENTIAL ECONOMIC DAMAGE OR CONSEQUENTIAL DAMAGE TO PROPERTY. SOME STATES DO NOT ALLOW A LIMITATION ON HOW LONG AN IMPLIED WARRANTY LASTS OR AN EXCLUSION OF CONSEQUENTIAL DAMAGE, SO THE ABOVE LIMITATION AND EXCLUSION MAY NOT APPLY TO YOU. IN ADDITION, THIS WARRANTY GIVES SPECIFIC LEGAL RIGHTS, AND YOU MAY HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.

INTRODUCTION

Thank you for your purchase of SHARP ELSI MATE model EL-8131. Though small in size, this unit is capable of performing complex calculations with amazing speed and simplicity. Careful reading of this manual will enable you to use your new SHARP calculator to its fullest capability.

OPERATIONAL NOTES

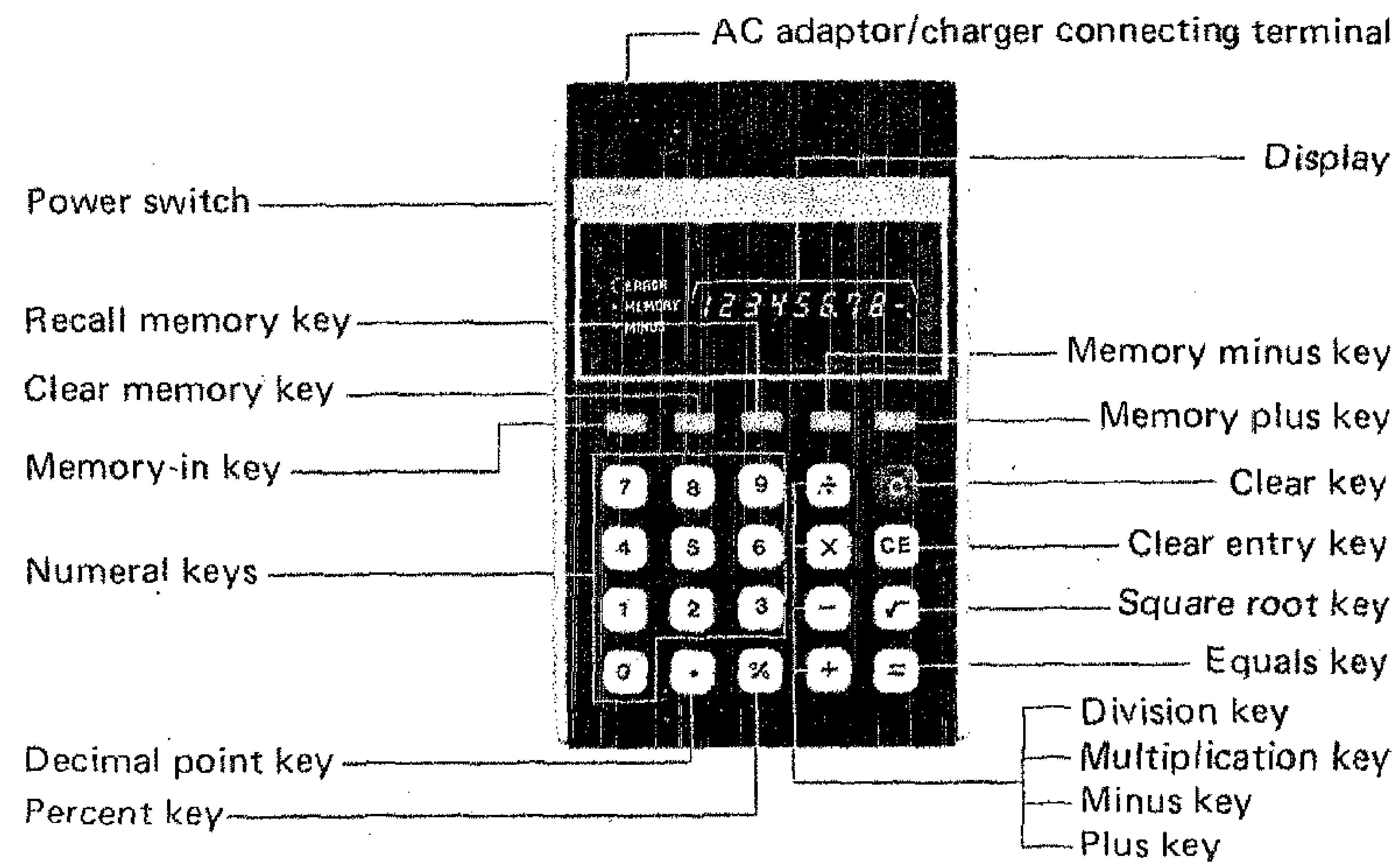
To insure trouble-free operation of your SHARP calculator, we recommend the following:

1. The calculator should be kept in areas free from extreme temperature changes, moisture and dust.
2. A soft, dry cloth should be used to clean the calculator. Do not use solvents or a wet cloth.
3. If the calculator will not be operated for an extended period of time, remove the batteries to avoid possible damage caused by battery leakage. Do not incinerate used batteries when disposing of them.
4. When you are using an optional AC adaptor, turn off the power switch prior to disconnecting the AC cord.
5. If service of your calculator is required, use only an authorized SHARP Service center.


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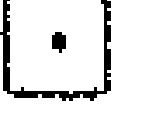
THE KEYBOARD



OPERATING CONTROLS

ON  OFF **Power switch:** When the power switch pushed to "ON", the calculator is ready for operation.

 } **Numeral keys**

 Used to enter numbers.

 **Arithmetic function keys**

Depress these keys according to mathematical formula in addition, subtraction, multiplication and division.

 **Equals key**

Completes the arithmetic function of +, -, x and ÷.

 **Clear key**

Clears the contents of the calculation registers. The contents of the memory are not affected.

 **Clear entry key**

Used to clear a falsely entered number.

 **Square root key**

Calculates the square root of the displayed number.

 **Percent key**

Performs percentage calculation.

X→M

Memory-in key

Clears the number in the memory and then stores the displayed number in the memory.

RM

Recall memory key

Displays the contents of the memory. The contents of the memory remain unchanged.

CM

Clear memory key

Clears the contents of the memory register only.

M-

Memory minus key

Used to subtract the equivalent to a displayed number or a calculated result from the memory.

M+

Memory plus key

Used to add the equivalent to a displayed number or a calculated result to the memory.

SYMBOLS

- ▣ (E) Error symbol
Appears when an overflow or an error is detected (E for a negative result).
- Memory symbol
Appears when a number is stored in the memory.
- Minus symbol
Appears when a displayed number is a negative.

BATTERY REPLACEMENT

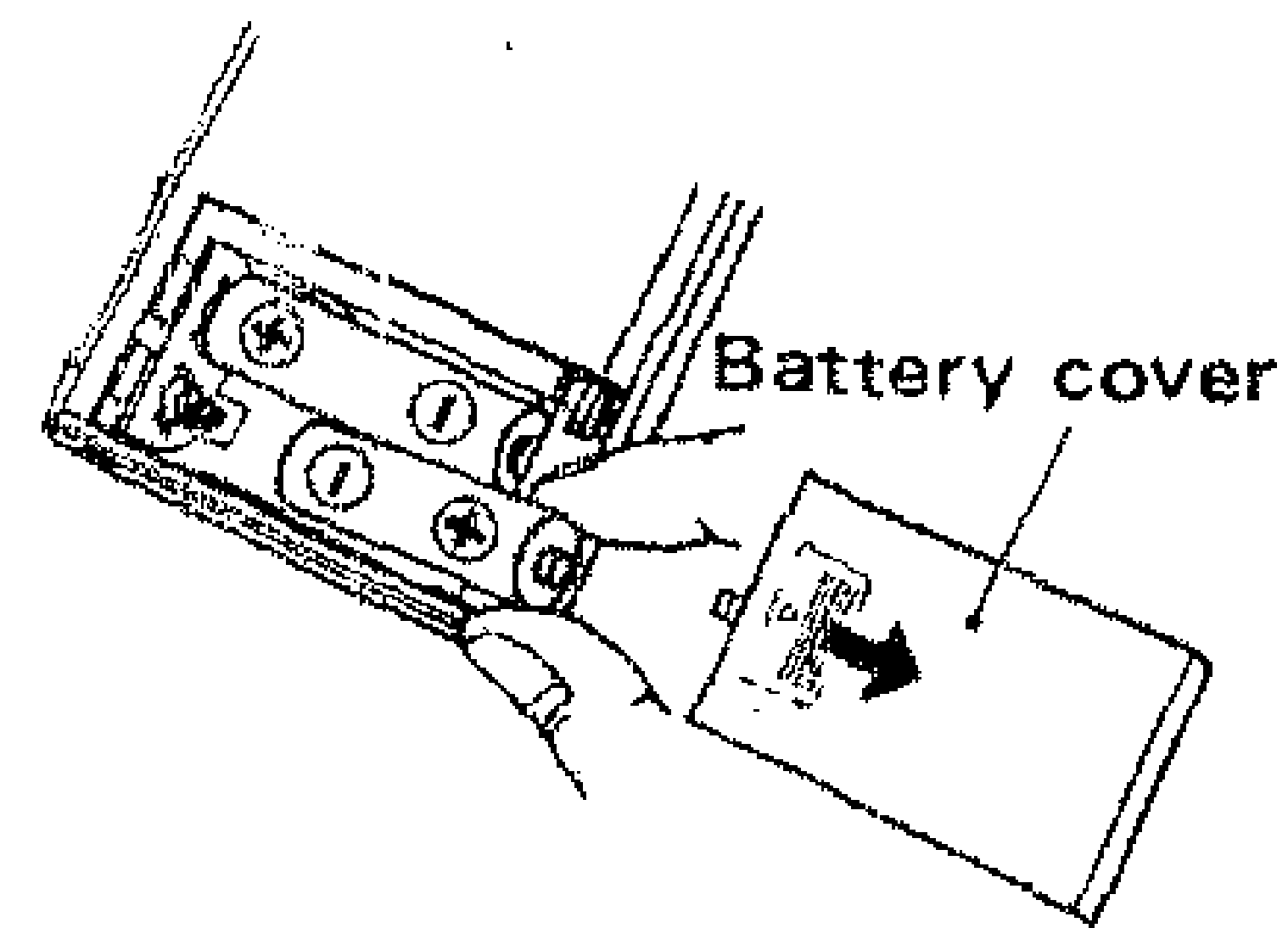
Dimming of the display indicates that the batteries should be replaced or recharged.

(The left most digit and right symbol part become dimmer than the other digits.)

Batteries: Two "AA" dry batteries or the optional Ni-Cd battery pack EA-18B.

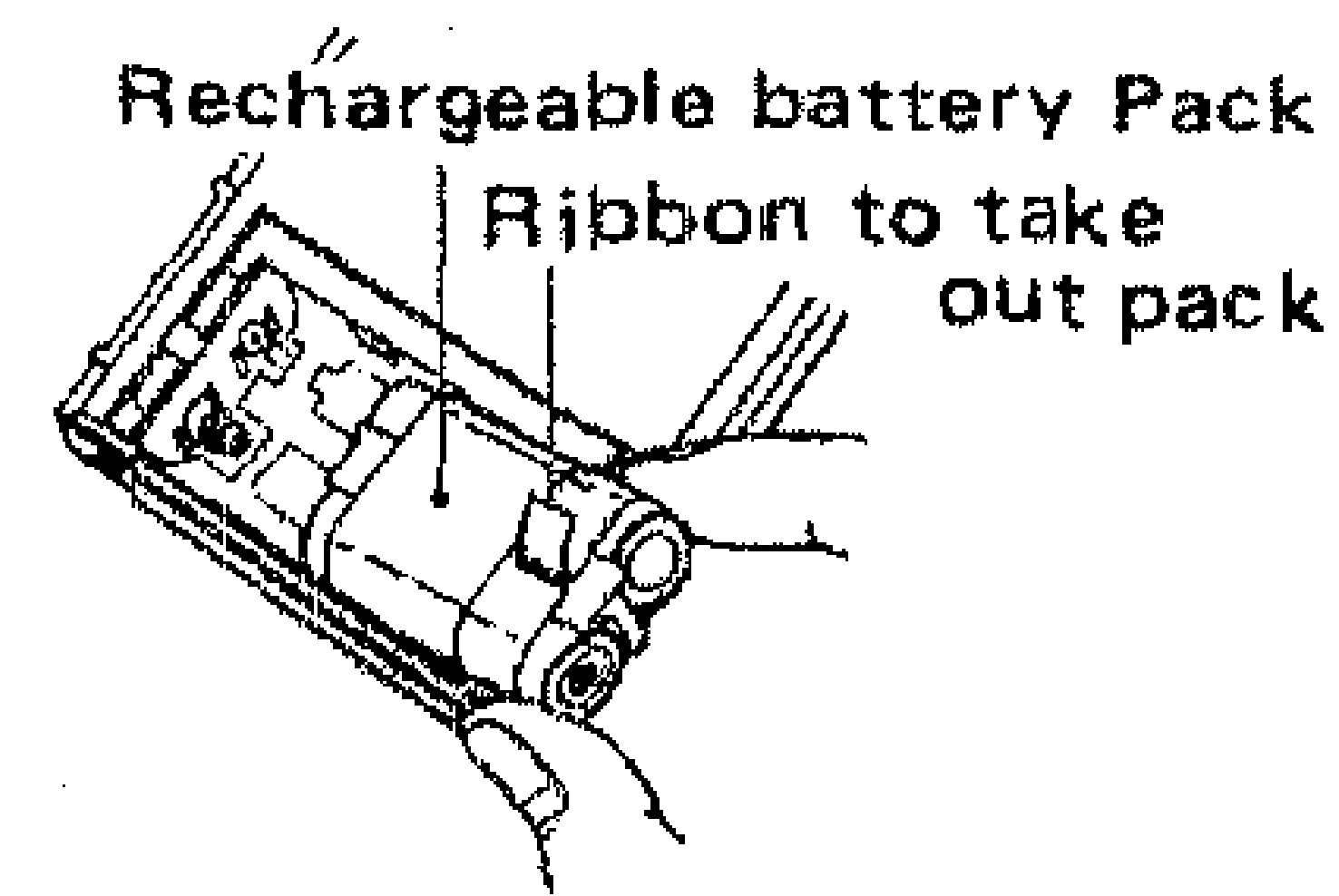
Ni-Cd Recharger: Model EA-17 (optionally available).

1. Turn off the power switch.
2. Remove the battery cover by sliding it in the direction of the arrow on the cover (Fig. 1).
3. Replace the batteries. Be sure that the "+" and "-" mark on the battery correspond to the "+" and "-" mark in the case. (Fig. 1).
4. Replace the battery cover.



(In the case of dry battery)

Fig. 1



(In the case of rechargeable battery)

Fig. 2

Note

- Always replace both batteries at the same time.
- If the used batteries are kept in the battery compartment of the calculator, damage to the calculator by battery leakage may result.
- Before plugging or unplugging the AC adaptor, be sure that the power switch is in the OFF position
- Never use any AC adaptor except EA-17 (optionally available.)

CAUTION: Use of other than the AC adaptor EA-17 may apply improper voltage to your SHARP calculator and will cause damage.

OVERFLOW ERRORS

There are several situations which will cause an overflow or an error condition. An overflow or an error is detected in the following cases, and the subsequent calculation becomes impossible.

- 1) When the integer portion of any result exceeds 8 digits and does not exceed 16 digits.
- 2) When the square root of a negative number is calculated. (\sqrt{x} : $x < 0$)
- 3) When any number is divided by zero. ($A \div 0$)
- 4) When the integer portion of the quotient in percentage calculation is 17 digits. (Ex. 10000000 \div 0.0000001 $\%$)
- 5) When the integer portion of a result exceeds 8 digits in memory calculation.
- 6) When the integer portion of a result exceeds 8 digits during tax and discount calculation (Ex. 99009901 \div 101 $\%$)

In the case of 1 above, the first 8 digits of the result is divided by 10^8 (100,000,000) and then it is displayed on the numeral display-part, and an error symbol \square (E for a negative result) is displayed on the symbol display-part.

Therefore, the decimal point of the displayed number means the unit of one hundred million. (Display of approximate number)

While as for the cases 2 to 6, the display are occupied by "0. \square ".

(Note) In all the cases 1 to 6, the memory retains the contents before the overflow error is detected.

Overflow calculation

	Example	Operation
1	$96,857,431 + 4,563,211$ $= 101,420,642$	$96857431 \oplus 4563211 \ominus$ $\rightarrow 1.0142064 \square$ $(1.0142064 \times 10^8 = 101,420,640)$
2	$96,385,274 \div 0.321 \times 456$ $= 136,921,136,897$	$96385274 \div .321 \times 456 \square$ $\square \rightarrow 3.0026565 \square$ $\square \rightarrow 3.0026565$ $456 \ominus \rightarrow 1369.2113$ $(1369.2113 \times 10^8$ $= 136,921,130,000)$

OPERATIONS

Before calculation

- To obtain an accurate result, be sure to perform the following operation before starting calculations.

Power switch "ON" → (display) 0.
 1.111111 \times \equiv → 1.2345678

(1) Addition & Subtraction

	Example	Operation
1	$123 - 45.6 + 789 =$	$123 \text{ } \text{[-]} \text{ } 45.6 \text{ } \text{[+]} \text{ } 789 \text{ } \text{[=]} \rightarrow 866.4$

(2) Multiplication & Division

	Example	Operation
1	$(-1.15) \times 365 \div 0.5 =$	$\text{[C]} \text{ } \text{[-]} \text{ } 1.15 \text{ } \text{[X]} \text{ } 365 \text{ } \text{[}\div\text{]} \text{ } .5 \text{ } \text{[=]} \rightarrow 839.5\text{--}$

(3) Constant calculation

	Example	Operation
1	$273 + 572 =$ $768 + 572 =$	$273 \text{ [+] } 572 \text{ [=] } \rightarrow 845.$ $768 \text{ [=] } \rightarrow 1340.$
2	$597 - 184 =$ $323 - 184 =$	$597 \text{ [-] } 184 \text{ [=] } \rightarrow 413.$ $323 \text{ [=] } \rightarrow 139.$
3	$295 \times 8 =$ $295 \times 6 =$	$295 \text{ [X] } 8 \text{ [=] } \rightarrow 2360.$ $6 \text{ [=] } \rightarrow 1770.$
4	$18 \div 2 =$ $12 \div 2 =$	$18 \text{ [:] } 2 \text{ [=] } \rightarrow 9.$ $12 \text{ [=] } \rightarrow 6.$

(4) Square & Power calculation

	Example	Operation
1	$5^2 =$	$5 \text{ [X] [=] } \rightarrow 25.$
2	$((2^3)^2)^2 =$	$2 \text{ [X] [=] [=] [X] [=] [X] [=] } \rightarrow 4096.$

(5) Reciprocal calculation

	Example	Operation
1	$1/7 =$	$7 \div = \rightarrow 0.1428571$

(6) Square root calculation

	Example	Operation
1	$\sqrt{123 \times 456} =$	$123 \times 456 = \sqrt{\rightarrow 236.82905}$

(7) Percentage calculation

	Example	Operation
1	$1,200 \times 25\% =$ $1,200 \times 83\% =$	$1200 \times 25\% \rightarrow 300.$ $83\% \rightarrow 996.$
2	$108 \div 360 = \%$ $162 \div 360 = \%$	$108 \div 360\% \rightarrow 30.$ $162\% \rightarrow 45.$

(8) Mixed calculation

	Example	Operation
1	$(\sqrt{169} - 34) \times 23 \div 4 =$	169 $\sqrt{\quad}$ $-$ 34 \times 23 \div 4 $=$ → 120.75

(9) Tax/discount calculation

	Example	Operation
1	$100.55 + 100.55 \times (15\%) =$	100.55 $+$ 15 $\%$ → 115.6325
2	$100.55 - 100.55 \times (10\%) =$	100.55 $-$ 10 $\%$ → 90.495

(10) Applications (Pro-ration)

	Example	Operation
1	$\frac{123}{123 + 456 + 789} = (\%)$	123 $+$ 456 $+$ 789 \div $=$ 123 $\%$ → 8.991228
2	$\frac{456}{123 + 456 + 789} = (\%)$	456 $\%$ → 33.333333
3	$\frac{789}{123 + 456 + 789} = (\%)$	789 $\%$ → 57.675438

(11) Application (Future value)

Example	Operation
<p>What is the future value when you deposit \$1,500.55 at an annual interest of 6 percent for three years?</p> <p>$b = a(1 + i)^n$ (the compound interest method)</p> <p>a: present value b: future value i: an annual interest n: period (years)</p>	<p>1 $\boxed{+}$.06 $\boxed{\times}$ $\boxed{=}$ $\boxed{=}$ $\rightarrow 1.191016$</p> <p>$\boxed{\times}$ 1500.55 $\boxed{=}$ $\rightarrow 1787.179$</p>

(12) Memory calculation

	Example	Operation
1	$124 =$ ① $-) 125 - 59 =$ ② $+) 72 + 86 =$ ③ <hr/> Total ④	*1 $\boxed{CM} 124 \boxed{M+} \rightarrow 124 \dots$ ① $125 \boxed{-} 59 \boxed{M-} \rightarrow 66 \dots$ ② $72 \boxed{+} 86 \boxed{M+} \rightarrow 158 \dots$ ③ $\boxed{RM} \rightarrow 216 \dots$ ④
2	$(84 - 13 \times 2) \times (527 - 135)$ $\times (73 + 94) =$	*2 $84 \boxed{x \div M} 13 \boxed{\times} 2 \boxed{M-} \rightarrow 26 \dots$ $527 \boxed{-} 135 \boxed{\times} \boxed{RM} \boxed{=} \boxed{x \div M} \rightarrow 22736 \dots$ $73 \boxed{+} 94 \boxed{\times} \boxed{RM} \boxed{=} \rightarrow 3796912 \dots$
3	$147 \times 12 =$ ① $+) 258 \div 4 =$ ② $-) 369 \times 8 =$ ③ <hr/> Total ④	$\boxed{CM} 147 \boxed{\times} 12 \boxed{M+} \rightarrow 1764 \dots$ ① $258 \boxed{\div} 4 \boxed{M+} \rightarrow 64.5 \dots$ ② $369 \boxed{\times} 8 \boxed{M-} \rightarrow 2952 \dots$ ③ $\boxed{RM} \rightarrow 1123.5 \dots$ ④
4	$(57 + 85) \div 32 =$ $54 \times 74 \div (57 + 85) =$	$57 \boxed{+} 85 \boxed{\div} \boxed{x \div M} 32 \boxed{=} \rightarrow 4.4375 \dots$ $54 \boxed{\times} 74 \boxed{\div} \boxed{RM} \boxed{=} \rightarrow 28.140845 \dots$

- * 1 • Depress the **CM** key to clear the memory before starting a memory calculation.
- * 2 • In the case **CM** key is not depressed at first, the previously stored number is cleared away from the memory if a new number is stored in the memory by using of the **X↔M** key.

Correction of errors

Ex. 1 When $123 + 455$ to $123 + 456$

Operation	Display	Note
123 $+$ 455 CE 456 $=$	$455.$ $0.$ $579.$	Ans. $123 + 456$

Ex. 2 When $7 \times$ to $7 \div$:

Operation	Display	Note
7 \times \div 8 $=$	$7.$ $7.$ 0.875	Ans.

- For the 4 arithmetic calculations keys ($+$, $-$, \times , \div), depress the correct key immediately after the incorrect key.

SPECIFICATIONS

Type:	8 digits handy-type electronic calculator
Symbols:	Minus, error and memory symbols
Calculations:	4 arithmetic calculations, constant calculation, chain multiplication and division, tax/discount calculation, power calculation, square root calculation percentage calculation, reciprocal calculation, mixed calculation, memory calculation, etc.
Components:	LSI etc.
Display:	Fluorescent display tube
Power supply:	DC: 3V, dry battery SUM-3 (E) (AA) x 2 DC: 2.4V, rechargeable battery (EA-18B, optionally available) AC: 120V, 60Hz (with the use of AC adaptor EA-17 (optionally available))
Operating time:	Mangan long-life battery: Approx. 14 hours (in the case of continuous operation)

Rechargeable battery: Approx. 10 hours (in the case of continuous operation); charging time: Approx. 15 hours (Display: 5555, ambient temperature: 20°C (68°F)). The operating time slightly varies depending upon the use or type of battery)

Operating temperature: 0°C ~ 40°C (32°F ~ 104°F)

Power consumption: DC: 3V, 0.2W (in the case of type SUM-3 (E) (AA) dry battery)
DC: 2.4V, 0.2W (in the case of rechargeable battery (EA-18B))
DC: 3V, 0.35W (in the case of EA-18B plus AC adaptor EA-17)

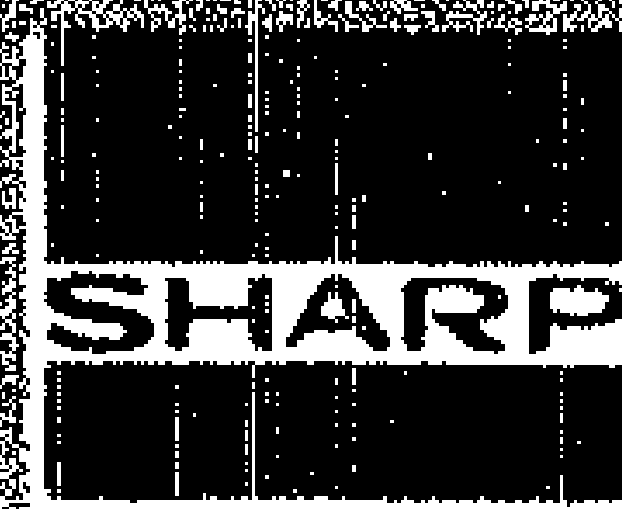
Dimensions: 80 (W) x 131 (D) x 21 (H) mm
(3-5/32" (W) x 5-5/32" (D) x 13/16" (H))

Weight: 170g (with dry batteries) (0.37 lbs.)

Accessories: Type SUM-3 (E) dry battery x 2 and carrying case.

SERVICE CENTER ADDRESS

SHARP ELECTRONICS CORPORATION
CONSUMER CALCULATOR SERVICE CENTER
430 East Plainfield Road
Countryside, La Grange, 111. 60525
(312) 242-0870



SHARP ELECTRONICS CORPORATION

CORPORATE HEADQUARTERS AND EXECUTIVE OFFICES

10 Keystone Place Paramus, New Jersey 07652

Phone: (201) 265-5600

REGIONAL SALES OFFICES AND DISTRIBUTION CENTERS

Eastern: 10 Keystone Place Paramus, New Jersey 07652

Phone: (201) 265-5600

Midwest: 430 East Plainfield Road, Country Side, La Grange, Illinois 60525

Phone: (312) 242-0870

Western: 24580 Wilmington Avenue, Long Beach, California 90801

Phone: (213) 530-4470/7178

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