

**CASIO.**

Scientific calculator  
Technisch/wissenschaftlicher Rechner  
Calculatrice scientifique  
Calculadora científica  
Calcolatore scientifico  
Vetenskapskalkylator  
Calculator voor wetenschappelijk gebruik

*fx-250c/fx-82c*

**CASIO.**

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CASIO 118

Printed in Japan  
Imported by Japan

英 独 仏 西 伊 大 蘭

FTZ

Dear customer,

Thank you very much for purchasing our electronic calculator.

To fully utilize its features no special training is required, but we suggest you study this operation manual to become familiar with its many abilities. To help ensure its longevity, do not touch the inside of the calculator, avoid hard knocks and unduly strong key pressing. Extreme cold (below 32°F or 0°C), heat (above 104°F or 40°C) and humidity may also affect the functions of the calculator. Never use volatile fluid such as lacquer thinner, benzene, etc. when cleaning the unit. For servicing contact your retailer or nearby dealer.

**Before starting calculation, be sure to press the **ON** key and to confirm that "0." is shown on the display.**

*\* Special care should be taken not to damage the unit by bending or dropping. For example, do not carry it in your hip pocket.*

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## 1/GENERAL GUIDE

### 1-1 The keys

In order to keep your calculator as compact as possible, each key has more than one use. You can change the function of a key by pressing certain other keys before it, or by setting the calculator in a certain mode. The following pages will give you a more detailed explanation of the use and functions of each key.

#### **ON** ON key

Before starting calculation, be sure to press **ON** and to confirm that "0." is shown on the display. The **ON** key also overrides the auto power-off function (see page 11).

#### **INV** Inverse key

Some of the keys have brown lettering above or below them. To use a function that is brown lettering, press **INV**. **INV** will appear on the Display. Then press the key that the brown lettering identifies. **INV** will disappear from the Display.

#### **MODE** Mode key

To put the calculator into a desired operating mode, or to select a specific angular unit, press **MODE** first, then **□**, **0**, **4**, ... or **9**.

- MODE** **□** – SD is displayed. Calculate standard deviation. Page 129
- MODE** **0** – COMP mode. Carry out ordinary arithmetic and functional calculations. Page 103
- MODE** **4** – DEG is displayed. Use degrees as the unit of angle measurement. Page 120
- MODE** **5** – RAD is displayed. Use radians as the unit of angle measurement. Page 120
- MODE** **6** – GRA is displayed. Use grads as the unit of angle measurement. Page 120
- MODE** **7** – Press any number from 0 to 7 to indicate how many decimal places you want displayed (FIX is displayed). Page 125
- MODE** **8** – Press any number from 1 (1 digit) to 8 (8 digits) to indicate how many significant digits you want displayed (SCI is displayed). Page 125
- MODE** **9** – Releases instructions entered in **MODE** **7** and **MODE** **8**. Page 125

### General keys

#### **0**–**9**, **□** Data entry keys

To enter numerical values into the calculator, press these keys in their logical sequence. Page 105

#### **+**, **−**, **×**, **÷**, **=** Basic calculation keys

For addition, subtraction, multiplication, division and to display answers, press these keys in their logical sequence. Page 105

#### **AC** All clear key

Press **AC** to clear everything except the contents of the Memory.

## **C** Clear key

Press **C** to erase wrong entries (including exponential notation) and to erase functional results during mixed calculations. The process of calculation remains un-erased.

## **±/√** Sign change key

**±/√** changes the displayed number from positive to negative or from negative to positive. If you press **±/√** after **EXP**, the sign of the exponent will change. Page 9

## Memory keys

### **MR** Memory recall key

Press **MR** to display the contents of the Memory. (**MR** does not clear the contents of the Memory.) Page 110

### **MIn** Memory in key

Press **MIn** to put the displayed value into the Memory. The previous value in the Memory will be automatically erased. Page 108

### **M+**, **INV M-** Memory plus and Memory minus keys

Press **M+** to add the displayed value to the value in the Memory. Press **INV M-** to subtract the displayed value from the value in the Memory.

**M+** (**INV M-**) also obtains an answer of 4 basic calculations,  $x^y$  and  $x^1/y$ , and automatically adds (subtracts) it to (from) the contents of the Memory. The answer obtained by this addition or subtraction will be the new value in the Memory. Page 110

## Special Keys

### **[ ]** Parentheses keys

This calculator calculates in this order: 1) functions, 2)  $x^y$  and  $x^1/y$ , 3) multiplication and division and 4) addition and subtraction. To change this order enclose the parts that must be calculated first with **[ ]** and **[ ]**. In a single expression, a maximum of 18 nesting parentheses at 6 levels can be used. Pages 105 and 106

### **EXP** Exponent key

To enter a number in scientific notation, press the correct numbers for the mantissa, **EXP** and the correct numbers for the exponent. Page 9

## **π** Pi key

Press **π** to display the value of  $\pi$  (ratio of the circumference of a circle to its diameter – 3.1415927). Page 120

## **[ ]**, **INV [ ]** Sexagesimal notation/decimal notation conversion keys

To change from sexagesimal (base 60) notation (degree, minute, second) to decimal notation (degree), enter the degree, press **[ ]**, enter the minute, press **[ ]**, enter the second and press **[ ]**. To change from decimal notation to sexagesimal notation, press the correct number keys for the degree and then press **INV [ ]**. Page 119

## **X↔Y** Register exchange key

Press **X↔Y** to exchange the displayed value (X-register) with the contents of the working register (Y-register). Press **X↔Y** again to exchange them again, so that the value that had been displayed previously is displayed again. Page 105

## **INV X↔M** Register exchange key

To exchange the displayed number (X-register) with the contents of the Memory (M-register), press **INV X↔M**. Press the same keys again to display the originally displayed value. Page 110

## **INV RND** Rounding off internal value key

To round off the internal value (held in the Y-register) so as to be equal to the displayed value. Page 125

## Function keys

### **sin**, **cos**, **tan** Sine, cosine, tangent keys

Use **sin**, **cos** and **tan** to calculate the trigonometric functions. Page 120

### **INV sin**, **INV cos**, **INV tan** Arc sine, arc cosine, arc tangent keys

To calculate the inverse trigonometric functions of the displayed value, press **INV sin**, **INV cos** and **INV tan**. Page 121

**hyp** [sin], **hyp** [cos], **hyp** [tan] **Hyperbolic keys**

Press **hyp** [sin], **hyp** [cos] and **hyp** [tan] to calculate the hyperbolic functions of the displayed value. Page 121

**INV** [hyp] [sin], **INV** [hyp] [cos], **INV** [hyp] [tan] **Inverse hyperbolic keys**

Press **INV** [hyp] and [sin], [cos] or [tan] to calculate an inverse hyperbolic function of the displayed value. Pages 121 and 122

**log**, **INV** [10<sup>x</sup>] **Common logarithm and common antilogarithm keys**

To obtain the common logarithm of the displayed value, press [log]. To obtain the common antilogarithm of the displayed value (to raise 10 to  $x$  powers), press **INV** [10<sup>x</sup>]. Page 123

**ln**, **INV** [e<sup>x</sup>] **Natural logarithm and natural antilogarithm keys**

To obtain the natural logarithm of the displayed value, press [ln]. To obtain the natural antilogarithm of the displayed value (to raise  $e$  (2.7182818) to  $x$  powers), press **INV** [e<sup>x</sup>]. Page 123

**√**, **INV** [x<sup>2</sup>] **Square root and square keys**

Press **√** to find the square root of the displayed value. To square the displayed value, press **INV** [x<sup>2</sup>]. Page 124

**ENG**, **INV** [ENG] **Engineering keys**

Allows the displayed number to be shown with exponents of ten that are multiples of three (e.g., 10<sup>3</sup>, 10<sup>-6</sup>, 10<sup>9</sup>). Page 126

Ex.)	12	□	3456		12.3456
	<b>ENG</b>				12.3456 00
	<b>ENG</b>				12345.6 - 03
	<b>ENG</b>				12345600. - 06
	<b>ENG</b>				12345600. - 06

123 □ 456

		123.456	
<b>INV</b>	<b>ENG</b>	0.123456	03
<b>INV</b>	<b>ENG</b>	0.0001234	06
<b>INV</b>	<b>ENG</b>	0.0000001	09
	<b>ENG</b>	0.0001234	06
	<b>ENG</b>	0.123456	03

**INV** [∛] **Cube root key**

Press **INV** [∛] to find the cube root of the displayed value. Page 124

**INV** [1/x] **Reciprocal key**

Press **INV** [1/x] to obtain the reciprocal of the displayed value. Page 124

**INV** [x!] **Factorial key**

To find the factorial of the displayed value, press **INV** [x!]. Page 124

**INV** [x<sup>y</sup>] **Power key**

Press any number  $x$ , **INV** [x<sup>y</sup>], any number  $y$  and [=] to raise  $x$  to the  $y$  power. Page 123

**INV** [x<sup>y</sup>] **Root key**

Press any number  $x$ , **INV** [x<sup>y</sup>], any number  $y$  and [=] to display the  $y$  root of  $x$ . Page 123

**INV** [R→P] **Rectangular to polar key**

To convert displayed rectangular coordinates to polar coordinates, press **INV** [R→P]. Page 129

**INV** [P→R] **Polar to rectangular key**

To convert displayed polar coordinates to rectangular coordinates, press **INV** [P→R]. Page 128

**INV** [%] **Percent key**

To find a percent of a displayed number, press the correct numbers for the percent and **INV** [%]. Page 111

## **(INV) (RAN#)** Random number key

Press **(INV) (RAN#)** to generate a random number between 0.000 and 0.999. Page 126

## *Statistical keys (Use in the SD mode only)*

### **(INV) (SAC)** Statistical register clear key

Before beginning statistical calculations, press **(INV) (SAC)** to clear the statistics registers. Page 129

### **(X)**, **(INV) (DEL)** Data entry and delete keys

(With the fx-250C, **(X)** is indicated as **(DATA)**.)

In the SD mode, enter data by pressing the correct numbers and **(X)**. If you enter incorrect data and don't notice your mistake until after you have pressed **(X)**, enter the same incorrect data and then press **(INV) (DEL)** to delete the data. Pages 131 and 134.

### **(INV) (X)** Arithmetic mean key

Press **(INV) (X)** in the SD mode to get the arithmetic mean ( $\bar{x}$ ) of the data. Page 132

### **(INV) (σ<sub>n</sub>)** Population standard deviation key

Press **(INV) (σ<sub>n</sub>)** in the SD mode to display the population standard deviation ( $\sigma_n$ ) of the data. Page 132

### **(INV) (σ<sub>n-1</sub>)** Sample standard deviation key

Press **(INV) (σ<sub>n-1</sub>)** in the SD mode to display the sample standard deviation ( $\sigma_{n-1}$ ) of the data. Page 132

### **(INV) (Σx<sup>2</sup>)** Sum of square value key

Press **(INV) (Σx<sup>2</sup>)** in the SD mode to display the sum of the square value ( $\Sigma x^2$ ) of the data. Page 133

### **(INV) (Σx)** Sum of value key

Press **(INV) (Σx)** in the SD mode to display the sum of the value ( $\Sigma x$ ) of the data. Page 132

### **(INV) (n)** Number of data key

Press **(INV) (n)** to display the number of data ( $n$ ). Page 132

## 1-2 The display

INV	M	K	DEG	RAD	GRA	FIX	SCI	SD
- 1.2345678								-99

Mantissa

Exponent

The Display shows input data, interim results and answers to calculations. The mantissa section displays up to 8 digits. The exponent section displays up to  $\pm 99$ .

-E- or -C -

Error indication - see page 9.

INV

Pressing of **(INV)** - see page 2.

M

Something is being stored in the Memory - see page 108.

K

A constant is being used in calculations - see page 106.

DEG or RAD or GRA

Angular unit - see page 120.

FIX

Decimal places of a displayed value is being designated - see page 125.

SCI

Significant digits of a displayed value is being designated - see page 125.

SD

Standard deviation calculation - see page 129.

$12^{\circ}3'45.6$

$12^{\circ}3'45.6''$  - see page 120.

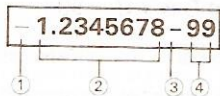
## 2/CALCULATION RANGE AND SCIENTIFIC NOTATION



 Normal display

 Scientific notation

When the answer exceeds the normal display capacity, it is automatically shown by scientific notation, 8-digit mantissa and exponents of 10 up to  $\pm 99$ .



- ① The minus (-) sign for mantissa
- ② The mantissa
- ③ The minus (-) sign for exponent
- ④ The exponent of ten

The whole display is read:

$$- 1.2345678 \times 10^{-99}$$

\*Entry can be made in scientific notation by using the **EXP** key after entering the mantissa.

EXAMPLE	OPERATION	READ-OUT
---------	-----------	----------

$$- 1.2345678 \times 10^{-3}$$

$$(= -0.0012345678)$$

1 <b>□</b> 2345678 <b>MC</b>	- 1.2345678	
<b>EXP</b>	- 1.2345678	00
3 <b>MC</b>	- 1.2345678	- 03

### 3/OVERFLOW OR ERROR CHECK

Overflow or error is indicated by the “-E-” or “-[-” sign and stops further calculation.

**Overflow or error occurs:**

- a) When an answer, whether intermediate or final, or accumulated total in the memory is more than  $1 \times 10^{100}$  (“-E-” sign appears).
- b) When function calculations are performed with a number exceeding the input range (“-E-” sign appears).
- c) When unreasonable operations are performed in statistical calculations (“-E-” sign appears).

d) When the total number of levels of explicit and/or implicit (with addition-subtraction versus multiplication-division including  $x^y$  and  $x^{\frac{1}{y}}$ ) nested parentheses exceeds 6, or more than 18 pairs of parentheses are used (“-[-” sign appears).

Ex.) You have pressed the **MC** key 18 times continuously before designating the sequence of **2** **+** **3** **×**.

To release these overflow checks:

- a), b), c) ..... Press the **AC** key.
- d) ..... Press the **AC** key. Or press the **CE** key, and the intermediate result just before the overflow occurs is displayed and the subsequent calculation is possible.

**Memory protection:**

The content of the memory is protected against overflow or error and the accumulated total is recalled by pressing the **MR** key after the overflow check is released by the **AC** key.

### 4/POWER SOURCE

•fx-250C

Two alkaline-manganese batteries (LR44) give approximately 750 hours continuous operation (1,820 hours on type SR44 (G-13)) silver oxide batteries). When battery power decreases, the whole display darkens. Batteries should then be renewed. Be sure to switch OFF the power before changing.

**Battery replacement**

1. Open the battery compartment lid on the back of the unit by loosening the screw. Never touch the inside of the unit except the battery compartment.
2. Remove dead batteries and insert new batteries with polarity as indicated.
3. Replace the lid. Screw carefully.
  - \*Be sure to replace both batteries.
  - \*Do not leave dead batteries in the battery compartment as they cause malfunctions.
  - \*It is recommended that batteries be replaced every 2 years to prevent the chance of malfunctions due to battery leakage.

Two AA size manganese dry batteries (UM-3) gives approximately 9,000 hours continuous operation (approx. 11,000 hours on type R6P (SUM-3)).

When battery power decreases, the whole display darkens. Batteries should then be renewed. Be sure to switch OFF the power before changing.

### Battery replacement

1. Open the back panel of the unit by loosening the screws and remove dead batteries.
2. Insert new batteries with polarity as indicated.
3. Replace the back panel.

\*Be sure to replace both batteries.

\*Never leave dead batteries in the unit as they may cause malfunctions.

\*It is recommended that batteries be replaced every 2 years to prevent the chance of malfunctions due to battery leakage.

### Auto power-off function

This unit automatically switches OFF if not operated for approximately 6 minutes. Power can be restored by pressing the **ON** key. Memory contents and mode setting are retained even when power is switched off.

## 5/SPECIFICATIONS

### BASIC OPERATIONS

4 basic calculations, constants for  $+/-/ \times / \div / x^y / x^y$ , parenthesis calculations and memory calculations.

### BUILT-IN FUNCTIONS

Trigonometric/inverse trigonometric functions (with angle in degrees, radians or grads), hyperbolic/inverse hyperbolic functions, common/natural logarithms, exponential functions (common antilogarithms, natural antilogarithms), powers, roots, square roots, cube roots, squares, reciprocals, factorials, conversion of coordinate system (R $\rightarrow$ P, P $\rightarrow$ R), random number,  $\pi$  and percentages.

### POPULATION STATISTICS

Population standard deviation, sample standard deviation, arithmetic mean, sum of square value, sum of value and number of data.

### CAPACITY

#### Entry/basic calculations

8-digit mantissa, or 8-digit mantissa plus 2-digit exponent up to  $10^{\pm 99}$ .

#### Scientific functions

#### Input range

$$\sin x / \cos x / \tan x \quad |x| < 1440^\circ \left( \begin{array}{l} \leq 8\pi \text{ rad} \\ < 1600 \text{ gra} \end{array} \right)$$

$$\sin^{-1} x / \cos^{-1} x \quad |x| \leq 1$$

$$\tan^{-1} x \quad |x| < 10^{100}$$

$$\sinh x / \cosh x \quad |x| \leq 230.2585$$

$$\tanh x \quad |x| < 10^{100}$$

$$\sinh^{-1} x \quad |x| < 5 \times 10^{99}$$

$$\cosh^{-1} x \quad 1 \leq x < 5 \times 10^{99}$$

$$\tanh^{-1} x \quad |x| < 1$$

$$\log x / \ln x \quad 10^{-99} \leq x < 10^{100}$$

$$e^x \quad -10^{100} < x \leq 230.2585$$

$$10^x \quad -10^{100} < x < 100$$

$$x^y \quad \left\{ \begin{array}{l} x > 0 \rightarrow -10^{100} < y \cdot \log x < 100 \\ x = 0 \rightarrow y > 0 \\ x < 0 \rightarrow y : \text{integer or } \pm 1/2n + 1 \\ \quad (n : \text{integer}) \end{array} \right.$$

$$x^{1/y} \quad \left\{ \begin{array}{l} x > 0 \rightarrow y \neq 0, -10^{100} < 1/y \cdot \log x < 100 \\ x = 0 \rightarrow y > 0 \\ x < 0 \rightarrow y : \text{odd number or } \pm 1/n \\ \quad (n : \text{natural number}) \end{array} \right.$$

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POL→REC  $|\theta| < 1440^\circ \left( \begin{array}{l} \leq 8\pi \text{ rad} \\ < 1600 \text{ gra} \end{array} \right),$

$|r| < 10^{100}$

o''' up to second

$\pi$  8 digits

\*Errors are cumulative with such internal continuous calculations as  $x^y$ ,  $x^y^z$ ,  $x^y^z^3$  so accuracy may be adversely affected.

**\*Output accuracy**

$\pm 1$  in the 8th digit.

**DECIMAL POINT**

Full floating with underflow.

**READ-OUT**

Liquid crystal display, suppressing unnecessary 0's (zeros).

**POWER SOURCE**

**\*fx-250C**

**Power source:** Two alkaline-manganese batteries (LR44 or SR44 (G-13))

**Battery life:** The unit gives approximately 750 hours continuous operation on type LR44 (1,820 hours on type SR44 (G-13)).

**Power consumption:** 0.0004 W

**\*fx-82C**

**Power source:** Two AA size manganese dry batteries (UM-3 or R6P (SUM-3))

**Battery life:** The unit gives approximately 9,000 hours continuous operation on type UM-3 (11,000 hours on type R6P (SUM-3)).

**Power consumption:** 0.0004 W

**AMBIENT TEMPERATURE RANGE**

0°C - 40°C (32°F - 104°F)

**DIMENSIONS**

**\*fx-250C** 10mmH × 73mmW × 140mmD  
( $3/8$ "H ×  $2 7/8$ "W ×  $5 1/2$ "D)

**\*fx-82C** 21.5mmH × 76mmW × 153mmD  
( $7/8$ "H × 3"W × 6"D)

**WEIGHT**

**\*fx-250C** 63 g (2.2 oz) including batteries

**\*fx-82C** 121 g (4.3 oz) including batteries



POL → REC

$$|\theta| < 1440^\circ \left( \begin{array}{l} \leq 8\pi \text{ rad} \\ < 1600 \text{ gra} \end{array} \right),$$

$$|r| < 10^{100}$$

o "" up to second

$\pi$  8 digits

\*Errors are cumulative with such internal continuous calculations as  $x^y$ ,  $x^{1/y}$ ,  $x!$ ,  $\sqrt[n]{\quad}$  so accuracy may be adversely affected.

**\*Output accuracy**

± 1 in the 8th digit.

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Full floating with underflow.

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**Power consumption:** 0.0004 W

**AMBIENT TEMPERATURE RANGE**

0°C - 40°C (32°F - 104°F)

**DIMENSIONS**

**\*fx-250C** 10mmH × 73mmW × 140mmD  
( $3/8$ "H ×  $2 7/8$ "W ×  $5 1/2$ "D)

**\*fx-82C** 21.5mmH × 76mmW × 153mmD  
( $7/8$ "H × 3"W × 6"D)

**WEIGHT**

**\*fx-250C** 63 g (2.2 oz) including batteries

**\*fx-82C** 121 g (4.3 oz) including batteries

Scan = casio.ledudu.com  
Date = novembre 2016