

fx-500A

العربية

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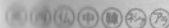
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U.S. Pat. 4,810,850

CASIO.

fx-500A

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Handling precautions

- Your calculator is made up of precision components. Never try to take it apart.
- Avoid dropping your calculator and subjecting it to other strong impacts.
- Do not store the calculator or leave it in areas exposed to high temperatures or humidity, or large amounts of dust. When exposed to low temperatures, the calculator may require more time to display results and may even fail to operate. Correct operation will resume once the calculator is brought back to normal temperature.
- The display will go blank and keys will not operate during calculations. When you are operating the keyboard, be sure to watch the display to make sure that all your key operations are being performed correctly.
- Never leave dead batteries in the battery compartment. They can leak and damage the unit.
- Avoid using volatile liquids such as thinner or benzene to clean the unit. Wipe it with a soft, dry cloth, or with a cloth that has been dipped in a solution of water and a neutral detergent and wrung out.
- In no event will the manufacturer and its suppliers be liable to you or any other person for any damages, expenses, lost profits, lost savings or any other damages arising out of loss of data and/or formulas arising out of malfunction, repairs, or battery replacement. The user should prepare physical records of data to protect against such data loss.
- Never dispose of batteries, the liquid crystal panel, or other components by burning them.
- Before assuming malfunction of the unit, be sure to carefully reread this manual and ensure that the problem is not due to insufficient battery power or operational errors.

KEY INDEX

Page	Page	Page	Page	Page
SHIFT	x^2	10^x	e^x	
5	140	138	138	
MODE	$\sqrt{\quad}$	log	In	OFF
6	140	137	138	5
d/c	←	\sin^{-1}	\cos^{-1}	\tan^{-1}
123	132	136	135	135
$\alpha\%$	0999	hyp	cos	tan
120	132	136	134	134
$\sqrt[3]{\quad}$	←	$X \leftrightarrow Y$	$1/x$	$x!$
140	143	112	134	141
$+/-$	ENG	(π)	Min	MR
9	142	10	116	118

GENERAL GUIDE

7	8	9	C	AC ON
112	112	115	11	ON 5
152	152	151	139	147
\bar{x}	σ_n	σ_{n-1}	x^y	SAC
4	5	6	X	$x^{1/y}$
111	111	111	111	\div
153	152	152	145	P \leftrightarrow R
Σx^2	Σx	π	R \leftrightarrow P	-
1	2	3	+	M \leftrightarrow R
111	111	111	125	M
RND	RAN #	π	%	M+
142	148	134	111	118
0	\bullet	EXP	9	118
111	111	9	111	151

Important

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1/GENERAL GUIDE

1-1 Power ON/OFF

To turn your unit on, press **AC ON**.
To turn your unit off, press **OFF**.

Auto power-off function

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

1-2 The keyboard

Many of the calculator's keys are used to perform more than one function. The functions marked on the keyboard are color coded to help you find the one you need quickly and easily.

Shifted function → 10^x

Primary function → **log**

Primary function → **7**

SD mode function → $\overline{L} \overline{x}$

Primary functions

These are the functions that are normally executed when you press the key.

Shifted functions

You can execute these functions by first pressing the **SHIFT** key, followed by the key that is assigned the shifted function you want to execute.

SD mode functions

You can execute these functions in the SD mode.

1-3 Modes

When using this calculator, it is necessary to select the proper mode to suit your calculation requirements. This can be done by using the **MODE** key in combination with the number keys. (Refer to plate below the display.)

- MODE** **•**: **SD** is displayed. Standard deviation calculation.
- MODE** **0**: **COMP** mode. General calculations, including function calculations.
- MODE** **1**: **QUAD** is displayed. Quadratic equation calculation.
- MODE** **2**: **SIMUL** is displayed. Simultaneous linear equation calculation (two unknowns).
- MODE** **3**: **SIMUL** is displayed. Simultaneous linear equation calculation (three unknowns).
- MODE** **4**: **DEG** is displayed. Specifies measurement in "degrees".
- MODE** **5**: **RAD** is displayed. Specifies measurement in "radians".
- MODE** **6**: **GRA** is displayed. Specifies measurement in "grads".
- MODE** **7**: **FIX** is displayed. Specifies number of decimal places from 0 to 9.
- MODE** **8**: **SCI** is displayed. Specifies number of significant digits 1 to 10.
- MODE** **9**: Cancels "FIX" and "SCI" specifications. This operation also changes the range of the exponent display (see page 7).

- You can use **MODE** **4** through **MODE** **6** in combination with the COMP Mode and SD Mode. The unit of angular measurement is retained when you switch power off.
- Make sure you press the **AC** key before making **MODE** **4** through **MODE** **6** settings.

1-4 Display symbols

Indicators appear on the display to show you the current status of the calculator.

a	x	y	z	?	SHIFT	MODE	M	K	DEG	RAD	GRA	FIX	SCI	SD
b														
c														
d														

1.234567891

-99
SIMUL
QUAD

- a, b, c, d: Equation term indicators
- x, y, z: Equation result indicators
- E- or -C-: Error indicators
- SHIFT**: **SHIFT** key pressed
- MODE**: **MODE** key pressed
- M**: Independent memory indicator
- K**: Constant calculation indicator
- DEG** or **RAD** or **GRA**: Angular unit
- FIX**: Number of decimal places specified
- SCI**: Number of significant digits specified
- SD**: Standard deviation calculation
- SIMUL**: Simultaneous linear equation (2 unknowns or 3 unknowns) calculation mode
- QUAD**: Quadratic equation calculation mode

1-5 Exponential displays

During normal calculation, this calculator is capable of displaying up to 10 digits. Values that exceed this limit, however, are automatically displayed in exponential format. You can choose between 2 different types of exponential display formats.

NORM 1 mode:

$$10^{-2} (0.01) > |x|, |x| \geq 10^{10}$$

NORM 2 mode:

$$10^{-9} (0.000000001) > |x|, |x| \geq 10^{10}$$

You can select between the NORM 1 and NORM 2 mode by pressing **MODE** **(9)**. There is no indication of which mode is currently in effect, but you can confirm the mode by performing the following calculation.

1 **200** **=** 5.⁻⁰³ (NORM 1 mode)

1 **200** **=** 0.005 (NORM 2 mode)

(All of the example in this manual show calculation results using the NORM 1 mode.)

How to interpret exponential format

1.2¹¹

$$\rightarrow 1.2 \times 10^{11} \rightarrow 120,000,000,000$$

1.2^{11} indicates that the result is equivalent to 1.2×10^{11} . This means that you should move the decimal point in 1.2 eleven places to the right, since the exponent is positive. This results in the value 120,000,000,000.

1.2⁻⁰³

$$\rightarrow 1.2 \times 10^{-3} \rightarrow 0.0012$$

1.2^{-03} indicates that the result is equivalent to 1.2×10^{-03} . This means that you should move the decimal point in 1.2 three places to the left, since the exponent is negative. This result in the value 0.0012.

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

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

$$-1.234567891 \times 10^{-3}$$

$$(= -0.001234567891)$$

1 234567891 1/x²	-1.234567891
EXP	-1.234567891⁰⁰
3 1/x²	-1.234567891⁻⁰³

1-6 Special display formats

Special display formats are used for the representation of fraction and sexagesimal values.

Fraction value display

456 **1/2** **23**. Display of $456 \frac{12}{23}$

Sexagesimal value display

12⁰ 34⁰ 56.78 Display of $12^{\circ} 34' 56.78''$

Before assuming a problem with your calculator...

If the result produced by the calculator is not what you expect or if an error occurs, perform the following operation to initialize the calculator.

1. **MODE** **(0)** (COMP mode)
2. **MODE** **(4)** (DEG mode)
3. **MODE** **(9)** (NORM mode)
4. Check the formula you are working with to confirm that it is correct.
5. Enter the correct modes to perform your calculation and try again.

2/ORDER OF OPERATIONS AND LEVELS

Operations are performed in the following order of precedence:

1. Functions
2. x^y , $x^{\frac{1}{y}}$, $R \rightarrow P$, $P \rightarrow R$
3. \times , \div
4. $+$, $-$

Operations with the same precedence are performed from left to right, with operations enclosed in parentheses performed first. If parentheses are nested, the operations enclosed in the innermost set of parentheses are performed first.

*Registers L₁ through L₆ are provided to store operations of lower precedence (including parenthetical operations). Since six registers are provided, calculations up to six levels can be retained.

*Since each level can contain up to three open parentheses, parentheses can be nested up to 18 times.

Example (4 levels, 5 nested parentheses)

Operation

$$2 \times (3 + 4 \times (5 + 4 \div 3)) \div 5$$

1 level 1 level 1 level 1 level A

$$\div 5 \text{ [] } + 9 \text{ [] } =$$

Register contents at point A.

x	4
L ₁	((((5 +
L ₂	4 ×
L ₃	((((((3 +
L ₄	2 ×
L ₅	
L ₆	

3/CORRECTIONS

If you notice you've made a mistake when inputting a number (but you have not yet pressed an arithmetic operator key), just press **C** to clear the last value and then input it again.

In a series of calculations, you can correct errors in intermediate results by pressing **C** to clear the last calculation performed. You can then continue with the calculation.

If you want to change input of the **+**, **-**, **×**, **÷**, **1/x**, or **1/y** operator key, simply press the operator key you want to change to. In this case, the most recently pressed key operation is used, but the operation retains the order of precedence of the original operation you input.

4/OVERFLOW OR ERROR CHECK

An overflow or error is indicated and further calculation becomes impossible when the symbol “-E-” or “-[-” appears on the display. An overflow or error occurs when any of the following conditions occur.

- When a result (whether intermediate or final) or accumulated total in the memory is more than $\pm(9.999999999 \times 10^{99})$ (“-E-” sign appears).
 - When function calculations are performed with a number exceeding the input range (“-E-” sign appears).
 - When an unreasonable operation (such as an attempt to calculate \bar{x} and σ_n while $n=0$) is performed during statistical calculations (“-E-” sign appears).
 - When a mathematically illegal operation (such as division by zero: $6 \div 0$) is performed (“-E-” sign appears).
 - When the total number of levels of explicitly and/or implicitly nested parentheses exceeds 6, or when more than 18 pairs of parentheses are used (“-[-” sign appears).
- Ex.) Pressing the \square key 18 times before inputting $2+3 \times$.

To release these overflow checks:

- a), b), c), d) Press the **AC** key.
 - e) Press the **AC** key. Or press the **C** key and the intermediate result just before the overflow appears and the subsequent calculation can then be performed.
- * If the result is within the range of $+(1 \times 10^{-99})$ to $-(1 \times 10^{-99})$, an error does not occur. Instead, the display shows all zeros.

5/POWER SUPPLY

The fx-500A powered by two G13 type (SR44 or LR44) batteries. As batteries power weakens, the characters on the display become dim and difficult to read. When this happens, replace the batteries as soon as possible.

Precautions!

Incorrectly using batteries can cause them to burst or leak, possibly damaging the interior of the unit. Note the following precautions.

- Be sure to replace the batteries at least once every two years, regardless of how much the calculator is used during that time. Old batteries may leak, seriously damage the interior of the calculator.
- The batteries that come installed in the calculator when you purchase it are for factory test purposes, and so they may not provide a full service life.
- All data stored in the memory of the calculator is lost when you replace the batteries. Be sure to make a note of any important data before you replace the battery.
- Always be sure to load the batteries in the correct directions.
- Never mix batteries of different types.
- Never mix old batteries and new ones.
- Never try to charge the batteries, take them apart, or allow them to become shorted. Keep batteries away from flame and direct heat at all times.
- Keep batteries out of the reach of small children. If swallowed, consult with your physician immediately.

To replace batteries

1. Press **OFF** to switch power off.
2. Remove the screws that hold the back cover in place, and then remove the cover.
3. Remove the old batteries by turning the battery compartment face down and lightly tapping the calculator.
4. Wipe off the surfaces of new batteries with a soft, dry cloth, and install the batteries with polarity in correct directions.
5. Replace the back cover and secure it in place with the screws.
6. Press **AC ON** to switch power on.

Note

The calculator automatically resets its memory whenever batteries are removed for longer than two or three minutes. The following are the initial settings of the calculator whenever its memory is reset.

- COMP mode
- DEG mode
- NORM1 mode
- Memory cleared
- Input buffer cleared

Important!

If you allow battery power to drop too low, memory contents may become corrupted or lost completely. Be sure to replace the battery as soon as you notice the display becoming dim.

6/SPECIFICATIONS

BASIC OPERATIONS

4 basic calculations, constants for $+/-$ \times \div \sqrt{x} $\sqrt{x^2}$ $\sqrt{x^3}$, 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, π , fractions and percentages.

STATISTICAL FUNCTIONS

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

EQUATION CALCULATION FUNCTIONS

Quadratic equations
Simultaneous linear equations (2/3 unknowns)

CAPACITY

Entry/basic calculations

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

*Output accuracy

- ± 1 in the 10th digit (COMP/SD mode)
- ± 1 in the 6th digit (SIMUL/QUAD mode)

Functions	Input range	
$\sin x$	(DEG) $ x < 9 \times 10^9$	However, for $\tan x$:
$\cos x$	(RAD) $ x < 5 \times 10^7 \text{rad}$	$ x \neq 90(2n+1)$: DEG
$\tan x$	(GRA) $ x < 1 \times 10^{10} \text{grad}$	$ x \neq \pi/2(2n+1)$: RAD $ x \neq 100(2n+1)$: GRA
$\sin^{-1} x$	$ x \leq 1$	
$\cos^{-1} x$	$ x \leq 1$	
$\tan^{-1} x$	$ x < 1 \times 10^{100}$	

Functions	Input range	
sinh x cosh x	$ x \leq 230.2585092$	Note: For sinh and tanh, when $x=0$, errors are cumulative and accuracy is affected at a certain point.
sinh ⁻¹ x	$ x < 5 \times 10^{99}$	
cosh ⁻¹ x	$1 \leq x < 5 \times 10^{99}$	
tanh ⁻¹ x	$ x < 1$	
log x / ln x	$1 \times 10^{-99} \leq x < 1 \times 10^{100}$	
10 ^x	$-1 \times 10^{100} < x < 100$	
e ^x	$-1 \times 10^{100} < x \leq 230.2585092$	
\sqrt{x}	$0 \leq x < 1 \times 10^{100}$	
x ²	$ x < 1 \times 10^{50}$	
1/x	$ x < 1 \times 10^{100}, x \neq 0$	
$\sqrt[3]{x}$	$ x < 1 \times 10^{100}$	
x!	$0 \leq x \leq 69$ (x is an integer)	
Pol (x, y)	$\sqrt{x^2 + y^2} < 1 \times 10^{100}$	
Rec (r, θ)	$0 \leq r < 1 \times 10^{100}$	However, for tan θ :
	(DEG) $ \theta < 9 \times 10^{99}$ (RAD) $ \theta < 5 \times 10^7 \pi$ rad (GRA) $ \theta < 1 \times 10^{10}$ grad	$ \theta \neq 90(2n+1)$: DEG $ \theta \neq \pi/2(2n+1)$: RAD $ \theta \neq 100(2n+1)$: GRA
o ^o	$ a , b, c < 1 \times 10^{100}, 0 \leq b, c$	
o ^o	$ x \leq 2.777777777 \times 10^{96}$	
x ^y	$x > 0: -1 \times 10^{100} < y \log x < 100$	
	$x = 0: y > 0$	
	$x < 0: y = n, \frac{1}{2n+1}$ (n is an integer)	
	However; $-1 \times 10^{100} < y \log x < 100$	

Functions	Input range
x ^{1/y}	$x > 0: y \neq 0$
	$-1 \times 10^{100} < \frac{1}{y} \log x < 100$
	$x = 0: y > 0$
	$x < 0: y = 2n+1, \frac{1}{n}$ (n ≠ 0, n is an integer)
	However; $-1 \times 10^{100} < \frac{1}{y} \log x < 100$
a ^{b/c}	•Results Total of integer, numerator and denominator must be within 10 digits (includes division marks).
	•Input Result displayed as fraction for integer when integer, numerator and denominator are less than 1×10^{10} .
SD	$ x < 1 \times 10^{50}$
	$ n < 1 \times 10^{100}$
	$x \sigma n, \bar{x}: n \neq 0$ $x \sigma n - 1: n \neq 0, 1$

*Errors are cumulative with such internal continuous calculations as $x^y, x^{1/y}, x!, \sqrt[3]{\quad}$ so accuracy may be adversely affected.

DECIMAL POINT

Full floating with underflow.

EXPONENTIAL DISPLAY

Norm 1 - $10^{-2} > |x|, |x| \geq 10^{10}$

Norm 2 - $10^{-9} > |x|, |x| \geq 10^{10}$

READ-OUT

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

POWER SOURCE

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

Battery life: The unit gives approximately 700 hours continuous operation on type LR44 (1,800 hours on type SR44).

Power consumption: 0.0004W

AMBIENT TEMPERATURE RANGE

0°C – 40°C (32°F – 104°F)

DIMENSIONS

13.5mmH × 78mmW × 141.8mmD
($1/2$ "H × 3 $1/8$ "W × 5 $17/32$ "D)

WEIGHT

67g (2.4 oz) including batteries

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Scan : casio.ledudu.com