

General Guide	3
Turning On And Off	3
Battery Replacement.....	3
Auto Power-Off Function	3
Reset Operation	3
Contrast Adjustment	3
Display Readout.....	4
Before starting calculation	5
Changing a mode	5
Selecting an item from display menus	5
Using " 2nd " Keys.....	5
Cursor	5
Making corrections during input	6
Replay function	6
Error Position Display Function	6
Memory Calculation	6
Order Of Operations	7
Accuracy And Capacity	8
Error Conditions	10
Mode 0 - MAIN	11
Arithmetic Calculations	11
Display formats	11
Parentheses Calculation.....	11
Percentage Calculation.....	12
Continuous calculation function	12
Answer Function	12
Logarithm And Antilogarithm.....	12
Fraction Calculation.....	12

Angle Unit Conversion	13
Trigonometric / Inverse-Tri. Functions	14
Hyperbolic / Inverse-Hyp. Functions	14
Coordinates Transformation	14
Probability	14
Other Functions (X^{-1} , $\sqrt{\quad}$, $\sqrt[\times]{\quad}$, X^2 , \wedge)	15
Unit Conversions	15
Physics Constants	15
Mode 1 - STAT	16
Single-Variable / Two-Variable Statistics	16
Process capability	17
Probability distribution	17
Linear regression	18
Correcting data	18
Mode 2 - Base-n	19
Bases conversions	19
Negative expression	19
Basic arithmetic operations for bases	20
Logical operation	20
Mode 3 - CPLX	20
Mode 4 - VLE	20
Mode 5 - QE	20

General Guide

■ Turning On And Off

To turn the calculator on, press [ON] ; To turn the calculator off, press [2nd] [OFF].

■ Battery Replacement

SRP-285II is dual power system which is powered by one alkaline battery (GP76A) and a solar cell. If the display becomes dim and difficult to read (especially when lighting is dim), the batteries should be replaced as soon as possible.

To replace batteries :

- 1) Remove the screws and the back cover.
- 2) Replace the old batteries and install new ones with polarity in correct directions, then secure the screws in place and press [ON] to turn the power on.

■ Auto Power-Off Function

This calculator automatically turns it off when not operated for approximately 6~12 minutes. It can be reactivated by pressing [ON] key and the display, memory, settings are retained.

■ Reset Operation

If the calculator is on but you get unexpected results, press [2nd] [RESET] in sequence. A message appears on the display to confirm whether you want to reset the calculator and clear memory contents.

RESET : N Y

Move the cursor to " Y " by [►], then press [ENTER] to clear all variables, programs, pending operations, statistical data, answers, all previous entries, and memory; To abort the reset operation without clearing the calculator, please choose " N " .

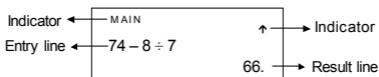
If the calculator is lock and further key operations becomes impossible, please press [0] [DMS] at the same time to release the condition. It will return all settings to default settings.

■ Contrast Adjustment

Pressing the [▼] or [▲] following [MODE] key can make the contrast of the screen lighter or darker. Holding either key down will make the display become respectively lighter or darker.

■ Display Readout

The display comprises the entry line, the result line, and indicators.



Entry line SRP-285II displays an entry of up to 76 digits. Entries begin on the left ; those with more than 11 digits scroll to the left. Press [▶] and [◀] to move the cursor through an entry. Press [2nd] [▶] or [2nd] [◀] to move the cursor immediately to the beginning or end of the entry.

Result line It displays a result of up to 10 digits, as well as a decimal, a negative sign, a " x10 " indicator, and a 2-digits positive or negative exponent. Results that exceed the digit limit are displayed in scientific notation.

Indicators The following indicators appear on the display to indicate you the current status of the calculator.

Indicator	Meaning
M	Independent memory
-	Result is negative
2nd	2nd set of function keys is active.
MODE	Mode selection is active
MAIN	Main mode is active
STAT	Statistics mode is active
Base-n	Base-n mode is active
VLE	Variable linear equation mode is active
QE	Quadratic equation mode is active
CPLX	Complex number mode is active
DEGRAD	Angle mode : DEG rees, GRAD s, or RAD s
ENGSCI	ENG ineering or SCI entific notation
TAB	Number of decimal places displayed is fixed
HYP	Hyperbolic-trig function will be calculated
BUSY	While an operation is executing
← →	There are digits to the left or right of the display
↑ ↓	There are earlier or later results that can be displayed

Before starting calculation

■ Changing a mode

Pressing [MODE] can enter mode menus. You can choose one of six operating modes, including " 0) MAIN ", " 1)STAT ", " 2)Base-n ", " 3)CPLX ", " 4)VLE ", " 5)QE ".

Give " 2)Base-n " as an example :

Method 1 : Scroll through the menus using [◀] or [▶] until " 2)Base-n " is shown, then enter the desired mode by pressing [ENTER].

Method 2 : Key in directly the number of the mode, [2], to enter the desired mode immediately.

■ Selecting an item from display menus

Many functions and settings are available on menus. A menu is a list of options displayed across the entry line.

Give " Pressing [DRG] key displays the menu for choosing the angle setting under MAIN mode " as an example :

Method : Press [DRG] to display the menu, and then move the cursor [◀] or [▶] to an item you want. Press [ENTER] while the item is underlined.

For menu items followed by an argument value, you can press [ENTER] while the item is underlined or enter directly the corresponding argument value.

■ Using " 2nd " Keys

To execute the functions marked in yellow, please press [2nd] and then the corresponding key. When you press [2nd], the " 2nd " indicator shown in the display is to tell you that you will be selecting the second function of the next key you press. If you press [2nd] by mistake, simply press [2nd] again to remove the " 2nd " indicator.

■ Cursor

Pressing [◀] or [▶] key can move the cursor to the left or the right. Hold down any of those keys to move the cursor at high speed.

Pressing [▼] or [▲] can scroll the display up or down while there are previous entries hidden the display. You can reuse or edit a previous entry when it is on the entry line.

■ Making corrections during input

To delete a character at the cursor, make the character underlined by using [◀] or [▶] to move the cursor, and then press [DEL] to delete the character.

To replace a character, make the character underlined by using [◀] or [▶] to move the cursor, and then enter a new entry to replace the character.

To insert a character, move the cursor to the position of the character where you want to insert, it will be inserted in the front of the character after pressing [2nd] [INS] and entering a new character.

(Note) : The blinking cursor " ◀ " means the calculator is in insert mode. On the contrary, the blinking cursor is displayed as " _ " and it means the calculator is in overwrite mode.

To clear all characters, clear all input character by [CL] key.

■ Replay function

- This function stores the latest operation executed. After execution is complete, pressing [▼] or [▲] key will display the operation from the beginning or the end. You can continue moving the cursor by [▶] or [◀] to edit it. To delete a digit, press [DEL]. (or, in overwrite mode, just type over the digit). See Example 1.
- The replay function can keep input digits up to 254 characters for SRP-285II. After execution is complete or during entering, you can press either [◀] or [▶] to display previous input steps and edit values or commands for subsequent execution. See Example 2.

(Note) : The replay function isn't cleared even when [CL] is pressed or power is turned off, so contents can be recalled even after [CL] is pressed. However, replay function is cleared when mode or operation is switched.

■ Error Position Display Function

- When a mathematically illegal calculation is performed, error position display function will tell you with the cursor where the error is. Press [▶] or [◀] to move the cursor and then give it a correct entry. You can also clear an error by pressing [CL] and then re-entered the values and expression from the beginning. See Example 3.

■ Memory Calculation

- Press [M+] to add a result to running memory. Press [2nd] [M-] to subtract the value from running memory. To recall the value in running memory, press [MRC]. To clear running memory, press [MRC] twice. See Example 4.

- The calculator has ten memory variables for repeated use : **A, B, C, X, Y, X1, X2, PROG1** and **PROG2**. You can store a real number in variables **A, B, C, X, Y, X1, X2** and an expression in **PROG1** and **PROG2**. See Example 5.

- * [P/V RCL] recalls all variables.
- * [SAVE] lets you store values to variables.
- * [2nd] [RECALL] recalls the value of variable.
- * [2nd] [CL-VAR] clears all variables except **PROG1, PROG2**.
- * [2nd] [CL-PROG] clears the contents of **PROG1, PROG2**.

(Note) : Besides pressing [SAVE] key to store a value, you can also assign values to memory variable **M** by [M+] or [2nd] [M-]. However, anything currently stored in variable **M** will be deleted and replaced by the newly assigned value.

■ Order Of Operations

Each calculation is performed in the following order of precedence :

- 1) Expression inside parentheses.
- 2) Coordinates transformation, and Type B functions which are required pressing the function key before entering, for example, sin, cos, tan, \sin^{-1} , \cos^{-1} , \tan^{-1} , sinh, cosh, tanh, \sinh^{-1} , \cosh^{-1} , \tanh^{-1} , log, ln, 10^x , e^x , $\sqrt{\quad}$, NEG, NOT, X'(), Y'()
- 3) Type A functions which are required entering values before pressing the function key, for example, x^2 , $\circ\prime\prime\prime$, !, X^{-1} , %, r, g.
- 4) Exponentiation (^), $\sqrt[\text{ }]{\quad}$
- 5) Fractions
- 6) Abbreviated multiplication format in front of variables, π , RANDM, RANDMI.
- 7) (-)
- 8) Abbreviated multiplication format in the front of Type B functions, $2\sqrt{3}$, Alog2, etc.
- 9) nPr, nCr
- 10) $x \div$
- 11) +, -
- 12) AND, NAND
- 13) OR, XOR, XNOR
- 14) Conversion($A^b/c \leftarrow \rightarrow^d / e$, $F \leftarrow \rightarrow D$, $\rightarrow DMS$)
 - When functions with the same priority are used in series, execution is performed from right to left.

$$e^x \ln 120 \rightarrow e^x \{ \ln (120) \}$$
 otherwise, execution is from left to right.

- Compound functions are executed from right to left.
- Anything contained within parentheses receives the highest priority.

■ Accuracy And Capacity

Output digits : Up to 10 digits

Calculating digits : Up to 24 digits

In general, every reasonable calculation is displayed up to 10 digits mantissa, or 10-digits mantissa plus 2-digits exponent up to $10^{\pm 99}$.

Numbers used as input must be within the range of the given function as follow :

Functions	Input range
sin x cos x tan x	Deg : $ x < 4.5 \times 10^{10}$ deg Rad : $ x < 2.5 \times 10^8 \pi$ rad Grad : $ x < 5 \times 10^{10}$ grad however, for tan x Deg : $ x \neq 90 (2n+1)$ Rad : $ x \neq \frac{\pi}{2} (2n+1)$ Grad : $ x \neq 100 (2n+1)$, (n is an integer)
$\sin^{-1}x, \cos^{-1}x$	$ x \leq 1$
$\tan^{-1}x$	$ x < 1 \times 10^{100}$
sinh x, cosh x	$ x \leq 230.2585092$
tanh x	$ x < 1 \times 10^{100}$
$\sinh^{-1}x$	$ 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}$
x^{-1}	$ x < 1 \times 10^{100}, x \neq 0$
x!	$0 \leq x \leq 69, x$ is an integer.

P (x, y)	$\sqrt{x^2 + y^2} < 1 \times 10^{100}$
R (r, θ)	$0 \leq r < 1 \times 10^{100}$ Deg : $ \theta < 4.5 \times 10^{10}$ deg Rad : $ \theta < 2.5 \times 10^8 \pi$ rad Grad : $ \theta < 5 \times 10^{10}$ grad however, for tan θ Deg : $ \theta \neq 90 (2n+1)$ Rad : $ \theta \neq \frac{\pi}{2} (2n+1)$ Grad : $ \theta \neq 100 (2n+1)$, (n is an integer)
►DMS	$ \text{DD} , \text{MM}, \text{SS.SS} < 1 \times 10^{100}$, $0 \leq \text{MM}, \text{SS.SS}$ $ x < 10^{100}$
x^y	$x > 0 : -1 \times 10^{100} < y \log x < 100$ $x = 0 : y > 0$ $x < 0 : y = n, 1/(2n+1), n$ is an integer. but $-1 \times 10^{100} < y \log x < 100$
$\sqrt[x]{y}$	$y > 0 : x \neq 0, -1 \times 10^{100} < \frac{1}{x} \log y < 100$ $y = 0 : x > 0$ $y < 0 : x = 2n+1, 1/n, n$ is an integer. ($n \neq 0$) but $-1 \times 10^{100} < \frac{1}{x} \log y < 100$
nPr, nCr	$0 \leq r \leq n, n \leq 10^{100}$, n,r are integers.
STAT	$ x < 1 \times 10^{100}, y < 1 \times 10^{100}$ 1-VAR : $n \leq 40$, 2-VAR : $n \leq 40$ FREQ. = n, $0 \leq n < 10^{100}$: n is an integer in 1-VAR mode. $\sigma x, \sigma y, \bar{x}, \bar{y}, a, b, r : n \neq 0$; $Sx, Sy : n, n \neq 0, 1$

Mode 0 - MAIN

■ Arithmetic Calculations

- Arithmetic operations are performed by pressing the keys in the same sequence as in the expression. See Example 6.
- For negative values, press [(-)] before entering the value. See Example 7.
- For mixed arithmetic operations, multiplication and division are given priority over addition and subtraction. See Example 8.
- Results greater than 10^{10} or less than 10^{-9} are displayed in exponential form. See Example 9.

■ Display formats

- Decimal places formats are selected by pressing [2nd] [TAB] to display the menu. To set decimal places to **n** (**F0123456789**), enter a **n** value directly or press [ENTER] key while the item is underlined. (The default setting is floating point notation **F** and the **n** value is **•**). See Example 10.
- Even if the number of decimal places is specified, internal calculation for a mantissa is performed up to 24 digits, and the display value is stored in 10 digits. To round off those values to the specified number of decimal places, press [2nd] [RND]. See Example 11~12.
- Number display formats are selected by pressing [2nd] [SCI/ENG] to display the menu. The items on the menu are **FLO** (for floating point), **SCI** (for scientific), and **ENG** (for engineering). Press [◀] or [▶] until the desired formats is underlined, and then press [ENTER]. See Example 13.

(Note) : The engineering format is similar to the scientific format, except the mantissa can have up to three digits left of the decimal, instead of only one, and the exponent is always a multiple of three. It is useful for engineers to convert units based on multiples of 10^3 .
- You can enter a number in mantissa and exponent form by [EXP] key. See Example 14.

■ Parentheses Calculation

- Operations inside parentheses are always executed first. SRP-285II can use up to 13 levels of consecutive parentheses in a single calculation. See Example 15.
- Closed parentheses occurring immediately before operation of the [ENTER] key may be omitted, no matter how many are required. See Example 16.

- A multiplication sign " x " occurring immediately before an open parenthesis can be omitted. See Example 17.

(Note) : The calculator can auto-correct abbreviated multiplication in front of all functions, except memory variables, left parenthesis, type B functions.

- Henceforth, abbreviated type will not be used in this manual. See Example 18.
- The correct result cannot be derived by entering [() 2 [+] 3 ()] [EXP] 2. Be sure to enter [x] 1 between the ()] and [EXP] in the below example. See Example 19.

■ Percentage Calculation

- [2nd] [%] divides the number in the display by 100. You can use this key sequence to calculate percentages, add-ons, discounts, and percentages ratios. See Example 20~21.

■ Continuous calculation function

- The calculator enables you to repeat the last operation executed by pressing [ENTER] key for further calculation. See Example 22.
- Even if calculations are concluded with the [ENTER] key, the result obtained can be used for further calculation. See Example 23.

■ Answer Function

- Answer function stores the most recently calculated result. It is retained even after the power is turned off. Once a numeric value or numeric expression is entered and [ENTER] is pressed, the result is stored by this function. See Example 24.

(Note) : Even if execution of a calculation results in an error, however, Answer memory retains its current value.

■ Logarithm And Antilogarithm

- The calculator can calculate common and natural logarithms and anti-logarithms using [LOG], [LN], [2nd] [10^x], and [2nd] [e^x]. See Example 25~27.

■ Fraction Calculation

Fraction value display is as follow :

5 / 12

Display of $\frac{5}{12}$

56 \cup 5 / 12

Display of $56\frac{5}{12}$

- To enter a mixed number, enter the integer part, press [A ^b/_c], enter the numerator, press [A ^b/_c], and enter the denominator ; To enter an improper fraction, enter the numerator, press [A ^b/_c], and enter the denominator. See Example 28.
- During a fraction calculation, if the figure is reducible, a figure is reduced to the lowest terms after pressing a function command key ([+], [-], [x] or [÷]) or the [ENTER] key. By pressing [2nd] [A ^b/_c \leftrightarrow ^d/_e], the displayed value will be converted to the improper fraction and vice versa. See Example 29.
- To convert between a decimal and fractional result, press [2nd] [F \leftrightarrow D] and [ENTER]. See Example 30.
- Calculations containing both fractions and decimals are calculated in decimal format. See Example 31.

■ Angle Unit Conversion

- The angle units (**DEG**, **RAD**, **GRAD**) is set by pressing [DRG] to display the angle menu. The relation among the three angle units is :

$$180^\circ = \pi \text{ rad} = 200 \text{ grad}$$

Angle conversations (See Example 32.) :

1. Change the default angle settings to the units you want to convert to.
 2. Enter the value of the unit to convert.
 3. Press [DMS] to display the menu. The units you can select are ° (degrees), ' (minutes), " (seconds), r (radians), g (gradians) or ►DMS (Degrees-Minutes-Seconds).
 4. Choose the units you are converting from.
 5. Press [ENTER] twice.
- To convert an angle to **DMS** notation, select "►DMS " which converts an entry to **DMS** notations, i.e., where **1°30'0"** represents 1 degrees, 30 minutes, 0 seconds. See Example 33.
 - To convert a **DMS** notation to decimal, select °(degrees), ' (minutes), " (seconds). See Example 34.

■ Trigonometric / Inverse-Tri. Functions

SRP-285II provides standard trigonometric functions and inverse trigonometric functions - \sin , \cos , \tan , \sin^{-1} , \cos^{-1} and \tan^{-1} . See Example 35~37.

(Note): When using those keys, make sure the calculator is set for the angle unit you want.

■ Hyperbolic / Inverse-Hyp. Functions

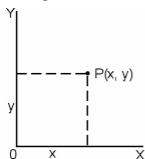
SRP-285II uses [2nd] [HYP] to calculate the hyperbolic functions and inverse-hyperbolic functions – \sinh , \cosh , \tanh , \sinh^{-1} , \cosh^{-1} and \tanh^{-1} . See Example 38~39.

(Note): When using those keys, make sure the calculator is set for the angle unit you want.

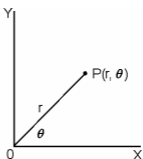
■ Coordinates Transformation

Pressing [2nd] [R \blacktriangleleft P] displays a menu to convert rectangular coordinates to polar coordinates or vice versa. See Example 40~41.

Rectangular Coordinates



Polar Coordinates



$$x + y i = r (\cos \theta + i \sin \theta)$$

(Note): When using those key, make sure the calculator is set for the angle unit you want.

■ Probability

• Pressing [PRB] displays the probability menu. See Example 42~46. With the following functions :

nPr Calculates the number of possible permutations of n item taken r at a time.

nCr Calculates the number of possible combinations of n items taken r at a time.

! Calculates the factorial of a specified positive integer n , where $n \leq 69$.

RANDM Generates a random number between 0 and 1.

RANDMI Generates a random integer value between two specified integers, A and B, where $A \leq \text{random value} \leq B$

■ Other Functions (X^{-1} , $\sqrt{\quad}$, $\sqrt[3]{\quad}$, X^2 , \wedge)

- The calculator also provides reciprocal ([x^{-1}]), square root ([$\sqrt{\quad}$]), universal root ([$\sqrt[3]{\quad}$]), square ([x^2]) and exponentiation ([\wedge]) functions. See Example 47~50.

■ Unit Conversions

- The calculator has a built-in unit conversion feature that enables you to convert numbers from metric to English units and vice versa. See Example 51.
 1. Enter the number you want to convert.
 2. Press [2nd] [CONV] to display the menu. There are 7 menus, covering distance, area, temperature, capacity, weight, energy, and pressure.
 3. Use the [\blacktriangledown] [\blacktriangle] to scroll through the list of units until a appropriate units menu is shown, then [ENTER].
 4. Pressing [\blacktriangleright] or [\blacktriangleleft] can convert the number to another unit.

■ Physical Constants

- You can use a number of physical constants in your calculations. See table below :

Symbol	Meaning	Value
c	Speed of light in vacuum	299792458 m / s
g	Acceleration of gravity	9.80665 m.s ⁻²
G	Gravitational constant	6.6725985 x 10 ⁻¹¹ N.m ² kg ⁻²
V _m	molar volume of ideal gas	0.0224141 m ³ mol ⁻¹
N _A	Avagadro's number	6.022136736 x 10 ²³ mol ⁻¹
e	Elementary charge	1.6021773349 x 10 ⁻¹⁹ C
m _e	Electron mass	9.109389754 x 10 ⁻³¹ kg
m _p	Proton mass	1.672623110 x 10 ⁻²⁷ kg
h	Plank's constant	6.626075540 x 10 ⁻³⁴ J.s
k	Boltzmann's constant	1.38065812 x 10 ⁻²³ J.K ⁻¹
R	Gas constant	8.3145107 J / mol • k
F	Faraday constant	96485.30929 C / mol
m _n	Neutron constant	1.67492861 x 10 ⁻²⁷ kg
μ	Atomic mass constant	1.66054021 x 10 ⁻²⁷ kg
ε ₀	Dielectric permittivity	8.854187818 x 10 ⁻¹² F/m
μ ₀	Magnetic permittivity	0.000001257 H / m
φ ₀	Flux quantum	2.067834616 x 10 ⁻¹⁵ Vs
a ₀	Bohr radius	5.2917724924 x 10 ⁻¹¹ m
μ _B	Bohr magneton	9.274015431 x 10 ⁻²⁴ A•m ²
μ _N	Neutron magnetic moment	5.050786617 x 10 ⁻²⁷ J / T

To insert a constant at the cursor position (See Example 52.) :

1. Press [CONST] to display the physical constants menu.
2. Press [►] until the constant you want is underlined.
3. Press [$\underline{\text{ENTER}}$].

Mode 1 - STAT

There are three menu operations in statistics menu : **1-VAR** (for analyzing data in a single dataset), **2-VAR** (for analyzing paired data from two datasets) and **D-CL** (for clearing all datasets). See Example 38.

■ Single-Variable / Two-Variable Statistics

Step :

1. From the statistics menu, choose **1-VAR** or **2-VAR** and press [$\underline{\text{ENTER}}$].
2. Press [DATA] and there are three menus: **DATA-INPUT**, **LIMIT-SET**, **DISTR**. Please select **DATA-INPUT** and press [$\underline{\text{ENTER}}$].
3. Enter an x - value and press [▼].
4. Enter the frequency (**FREQ**) of the x - value (in **1-VAR** mode) or the corresponding y - value (in **2-VAR** mode) and press [▼].
5. To enter more data, repeat from step 3.
6. Press [2nd] [STATVAR] and scroll through the statistical result menus by [►] or [◀] to find out statistical variables you want. (See table below)

Variable	Meaning
n	Number of the x values or x-y pairs entered.
\bar{x} or \bar{y}	Mean of the x values or y values
Xmas or Ymax	Maximum of the x values or y values
Xmin or Ymin	Minimum of the x values or y values
Sx or Sy	Sample standard deviation of x values or y values.
	$S_x = \sqrt{\frac{\sum(x - \bar{x})^2}{n-1}}, \quad S_y = \sqrt{\frac{\sum(y - \bar{y})^2}{n-1}}$
σ_x or σ_y	Population standard deviation of x values or y values
	$\sigma_x = \sqrt{\frac{\sum(x - \bar{x})^2}{n}}, \quad \sigma_y = \sqrt{\frac{\sum(y - \bar{y})^2}{n}}$
Σx or Σy	Sum of all x values or y values

Σx^2 or Σy^2 Sum of all x^2 values or y^2 values

Σxy Sum of $(x \cdot y)$ for all x-y pairs

■ Process capability

Step : (See Example 53~54.)

1. Press [DATA] and there are three menus : **DATA-INPUT**, **LIMIT-SET**, **DISTR**. Please select **LIMIT-SET** and press [ENTER].
2. Enter an upper spec. limit value (**X USL** or **Y USL**), then press [\blacktriangledown].
3. Enter a lower spec. limit value (**X LSL** or **Y LSL**), then press [ENTER].
4. Enter the datasets you want under **DATA-INPUT** mode.
5. Press [2nd] [STATVAR] and scroll through the statistical results menu by [\blacktriangleright] or [\blacktriangleleft] to find out process capability variables you want. (See table below)

Variable	Meaning
Cax or Cay	Capability accuracy of the x values or y values $C_{ax} = \frac{\left \left(\frac{X_{USL} + X_{LSL}}{2} - \bar{x} \right) \right }{\frac{X_{USL} - X_{LSL}}{2}}, C_{ay} = \frac{\left \left(\frac{Y_{USL} + Y_{LSL}}{2} - \bar{y} \right) \right }{\frac{Y_{USL} - Y_{LSL}}{2}}$
Cpx or Cpy	Potential capability precision of the x values or y values, $C_{px} = \frac{X_{USL} - X_{LSL}}{6\sigma}, C_{py} = \frac{Y_{USL} - Y_{LSL}}{6\sigma}$
Cpkx or Cpky	Minimum (C_{PU} , C_{PL}) of the x values or y values, where C_{PU} is upper spec. limit of capability precision and C_{PL} is lower spec. limit of capability precision $C_{pkx} = \text{Min} (C_{PUX}, C_{PLX}) = C_{px}(1 - C_{ax})$ $C_{pky} = \text{Min} (C_{PUY}, C_{PLY}) = C_{py}(1 - C_{ay})$

(Note) : When calculating process capability in **2-VAR** mode, the x_n and y_n are independent with each other.

■ Probability distribution

Step : (See Example 55.)

1. Based on the datasets in **1-VAR** mode, press [DATA] and there are three menu : **DATA-INPUT**, **LIMIT-SET**, **DISTR**. Please choose **DISTR** and press [ENTER].
2. Enter a a_x value, then press [ENTER].
3. Press [STATVAR] and scroll through the statistical results menu by [\blacktriangleright] or [\blacktriangleleft] to find out probability distribution variables you want. (See table below)

Variable	Meaning
t	Test value $t = \frac{a_x - \bar{x}}{\sigma}$
P (t)	Represent the cumulative fraction of the standard normal distribution that is less than the value t
R (t)	Represent the cumulative fraction of the standard normal distribution that lies between the value t and 0. $R (t) = 1 - (t)$
Q (t)	Represent the cumulative fraction of the standard normal distribution that is greater than the value t $Q (t) = 0.5 - (t) $

■ Linear regression

Step : (See Example 56.)

- Based on the datasets in **2-VAR** mode, press [STATVAR] and scroll through the statistical results menu by [►] or [◀] to find out **a**, **b**, or **r**.
- To predict a value for x (or y) given a value for y (or x), select the x' (or y' variable, press [ENTER], enter the given value, and press [ENTER] again. (See table below)

Variable	Meaning
a	Linear regression y-intercept $a = \frac{\sum y - b \sum x}{n}$
b	Linear regression slope $b = \frac{(n\sum xy - \sum x\sum y)}{(n\sum x^2 - (\sum x)^2)}$
r	Correlation coefficient $r = \frac{(n\sum xy - \sum x\sum y)}{\sqrt{(n\sum x^2 - (\sum x)^2)(n\sum y^2 - (\sum y)^2)}}$
x'	Predicted x values given a, b, and y vales $x' = \frac{y - a}{b}$
y'	Predicted y value given a, b, and x value. $y' = a + bx$

■ Correcting data

Step : (See Example 57.)

- Press [DATA].
- To change x - values or the frequency of the x - value in **1-VAR** mode (or the corresponding y - value in **2-VAR** mode), please choose **DATA-INPUT**. To change upper spec.

limit value, or lower spec. limit value, please choose **LIMIT-SET**. To change ax, please choose **DISTR**.

3. Press [▼] to scroll through the data you have entered.
4. To change an entry, display it and enter the new data. The new data you enter overwrites the old entry. Press [▼] or [ENTER] to save the change.

(Note): Even you exit STAT mode, all data in **1-VAR** and **2-VAR** mode are still retained unless you clear all data by selecting **D-CL** mode.

Mode 2 - Base-n

■ Bases conversions

The number system (10, 16, 2, 8) is set by pressing [2nd] [dhbo] to display the menu, making one of the items underlined followed [ENTER]. A corresponding symbol – " d ", " h ", " b ", " o " appears on the display. (The default setting is **d** : decimal base). See Example 58.


(Note): The total range of numbers handled in this mode is 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, /A, IB, IC, ID, IE, IF. If values not valid for the particular number system are used, attach the corresponding designator (**d**, **h**, **b**, **o**), or an error message will appear.

Binary base (**b**) : 0, 1

Octal base (**o**) : 0, 1, 2, 3, 4, 5, 6, 7

Decimal base (**d**) : 0, 1, 2, 3, 4, 5, 6, 7, 8, 9

Hexadecimal base (**h**) : 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, /A, IB, IC, ID, IE, IF

Pressing [] can use block function to display a result in octal or binary base which exceeds 8 digits. The system is designed to display up to 4 blocks. See Example 59.

■ Negative expression

- In binary, octal, and hexadecimal bases, the calculator represents negative numbers using complement notation. The complement is the result of subtracting that number from 10000000000 in that number's base by pressing [NEG] key in non-decimal bases. See Example 60.

■ Basic arithmetic operations for bases

- The unit enables you to calculate in number base other than decimal. The calculator can add, subtract, multiply, and divide binary, octal, and hexadecimal numbers. See Example 61.

■ Logical operation

Logical operations are performed through logical products (AND), negative logical (NAND), logical sums (OR), exclusive logical sums (XOR), negation (NOT), and negation of exclusive logical sums (XNOR). See Example 62.

Mode 3 - CPLX

- Complex mode enables you to add, subtract, multiply, and divide complex numbers. See Example 63. The results of a complex operation are displayed as follow :

Re	Real value	Im	Imaginary value
ab	Absolute value	ar	Argument value

Mode 4 - VLE

Variable linear equations (VLE) mode can solve a set of simultaneous equations with two unknowns as follows :

$$a x + b y = c$$

$$d x + e y = f, \text{ where } x \text{ and } y \text{ are unknown.}$$

- In VLE mode, you just enter each coefficient (**a**, **b**, **c**, **d**, **e**, **f**) in the correct order, and the calculator automatically solves for **x**, **y**. See Example 64.

Mode 5 - QE

Quadratic equations (QE) mode can solve a equations as follows :

$$a x^2 + b x + c = 0, \text{ where } x \text{ is unknown.}$$

- In QE mode, you just enter each coefficient (**a**, **b**, **c**) in the correct order, and the calculator automatically solves for all **x** values. See Example 65.