brother®

ELECTRONIC

MULTIPLIER

MODEL 310

INSTRUCTION MANUAL

NOTES BEFORE USE

1. The numeral key [5] has a small etched point in the center for easier blind touch operation. So place your middle finger of left hand on this key and practise to depress [1] [4] [7] key with third finger, [2] [5] [8] key with middle finger and [3] [6] [9] key with forefinger so that you can do blind touch operation easily.

2. This machine has not an automatic "clear" device, so, anytime when the switch is on, or before starting an operation, you must depress the [C] (Clear) key & the [CM] (Clear Memory) key first.

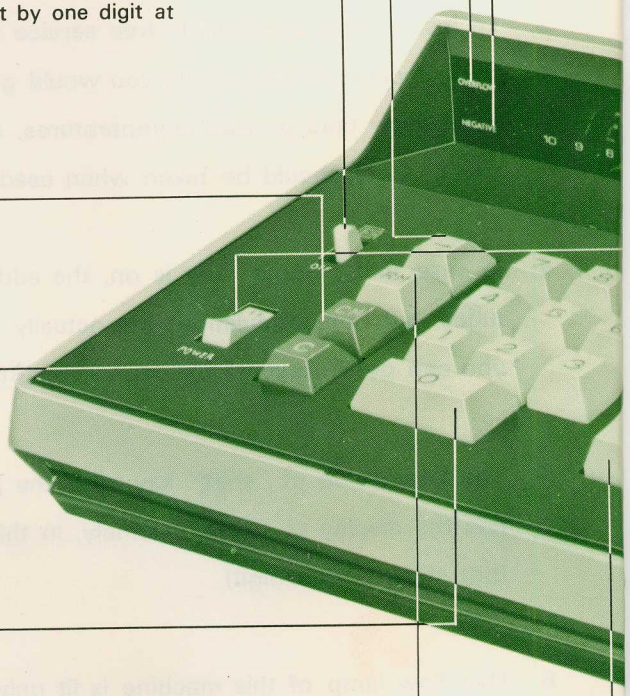
3. To insure long and trouble free service from your machine, it is suggested you take the same kind of care of this unit as you would give to any fine instruments.
   Excessively cold or warm temperatures, and dusty or damp areas, can affect all Electronic Units. Care should be taken when used under other than normal conditions.

4. In case that "Sigma" key is on, the addition and the subtraction are not made on the display tubes, but both calculations are actually made in the memory, so, if you need the answer, you can get it anytime by depressing [RM] (Recall Memory) key.

5. The depression of "shift" key after the [±] (plus/equal) key or [−] (minus) key operation changes the display to "Zero", namely, in this case, the "shift" key clears all displays at once. (not shift by one digit)

6. Overflow lamp of this machine is lit only when the results of Addition and Subtruction are overflowed or when the contents of memory are overflowed, because this machine can automatically prevent both overflows of indexing and multiplication. (by key lock)

KEY DESIGNATION



Shift key

→ shifts fiqures indicated on the display to the right by one digit at a time to correct indexing.

Clear memory key

CM clears memorized number (memory register only)

Clear key

C clears all the registration on the caclculator except the memory register.

Read in (input) key

7 8 9
4 5 6
1 2 3
0

Recall Memory key

RM The depression of this key will recall all results stored into the memory register.

Σ

OFF

Sigma Switch

When the sigma switch is set to the sigma side, all calculated results (addition, subtraction, products of multiplication) are entered into the "memory" and the results are recalled by depressing "Recall memory,, key

Overflow

Overflow lamp

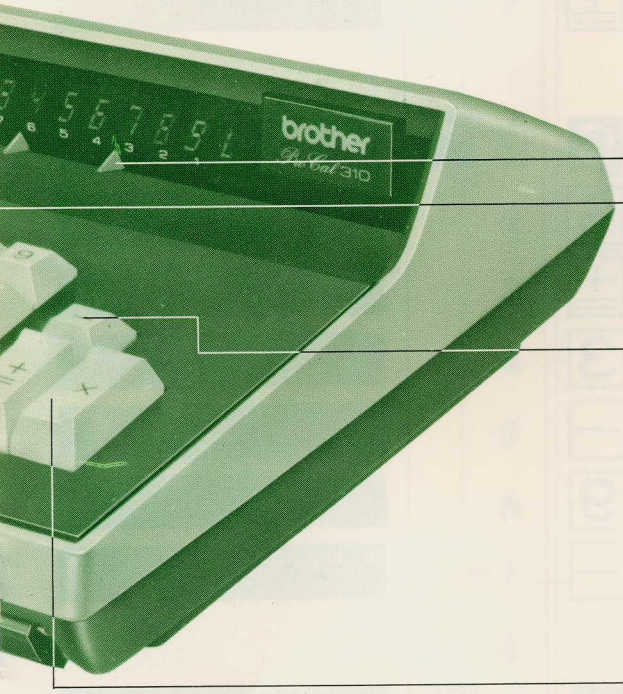
lights up and stops further operations when

1) the results of (Addition & Subtraction) are over flowed.
2) the contents of memory are overflowed.

Negative lamp

Negative lamp

lights up when the results of a calculation come to a negative value.



Manual decimal system

Power Switch

Minus Key

orders subtraction and negative multiplication.

When the sigma key is set to the sigma side, and the minus key is depressed, the calculated result is automatically memorized to the "memory" (subtracted from "memory").

Multiplication Key — orders multiplication.

Plus/equal Key

orders the results of calculations.

When the sigma key is set to the sigma side, and the plus/equal key is depressed. the calculated result is automatically memorized (added) to the "memory".

EXAMPLES OF CALCULATIONS

SPECIFIC PROBLEM TO BE SOLVED	STEPS	KEY OPERATION	REMARKS	DISPLAY
Addition Addition Addition Adición 123+456+789=1368	1	C	Σ OFF	0000000000
	2	1 2 3		0000000123
	3	+		0000000123
	4	4 5 6		0000000456
	5	+		0000000579
	6	7 8 9		0000000789
	7	+		0000001368
Subtraction Soustraction Subtraktion Sustracción 456−123−789=−456	1	C	Σ OFF	0000000000
	2	4 5 6		0000000456
	3	+		0000000456
	4	1 2 3		0000000123
	5	−		0000000333
	6	7 8 9		0000000789
	7	−	−	0000000456
Multiplication Multiplication Multiplikation Multiplicación 123×456=56088	1	C	Σ OFF	0000000000
	2	1 2 3		0000000123
	3	×		0000000123
	4	4 5 6		0000000456
	5	+		0000056088

SPECIFIC PROBLEM TO BE SOLVED	STEPS	KEY OPERATION	REMARKS	DISPLAY
Chain Multiplication Multiplication en chaîne Kettenmultiplikation Multiplicación en cadena 123×456×789= =44253432	1	C	Σ OFF	0000000000
	2	1 2 3		0000000123
	3	×		0000000123
	4	4 5 6		0000000456
	5	×		0000056088
	6	7 8 9		0000000789
	7	=		0044253432
Constant Factor Multiplication Multiplication par un facteur constant. Multiplikation mit einem konstanten Faktor Multiplicación con un factor constante. 123×4=492 123×5=615 123×6=738	1	C CM	Σ OFF	0000000000
	2	1 2 3		0000000123
	3	=		0000000123
	4		Σ OFF	0000000123
	5	×		0000000123
	6	4		0000000004
	7	=		0000000492
	8	RM		0000000123
	9	×		0000000123
	10	5		0000000005
	11	=		0000000615
	12	RM		0000000123
	13	×		0000000123

SPECIFIC PROBLEM TO BE SOLVED	STEPS	KEY OPERATION	REMARKS	DISPLAY
	14	6		0000000006
	15	±		0000000738
	*	RM	Key should be depressed first(always, should be first factor).	
Multiplication with accumulation of products Multiplication avec accumulation des produits Multiplikation und Addition der Produkte Multiplicación con acumulación de los productos 123×4= 492 −)456×5=−2280 +)789×6= 4734 (TOTAL)·····2946	1	C CM	Σ OFF	0000000000
	2	1 2 3		0000000123
	3	×		0000000123
	4	4		0000000004
	5	±		0000000492
	6	4 5 6		0000000456
	7	×		0000000456
	8	5		0000000005
	9	−	−	0000002280
	10	7 8 9		0000000789
	11	×		0000000789
	12	6		0000000006
	13	±		0000004734
	14	RM	(TOTAL)·····	0000002946

SPECIFIC PROBLEM TO BE SOLVED	STEPS	KEY OPERATION	REMARKS	DISPLAY
Chain Multiplication with accumulation of products Multiplication en chaîne avec accumulation des produits Kettenmultiplikation und Addition der Produkte Multiplicación en cadena, con acumulación de los productos $3\times4\times5=\ 60$ $+)2\times6\times8=\ 96$ $+)9\times5\times7=315$ (TOTAL)·····471	1	C CM	Σ OFF	0000000000
	2	3		0000000003
	3	×		0000000003
	4	4		0000000004
	5	×		0000000012
	6	5		0000000005
	7	±		0000000060
	8	2		0000000002
	9	×		0000000002
	10	6		0000000006
	11	×		0000000012
	12	8		0000000008
	13	±		0000000096
	14	9		0000000009
	15	×		0000000009
	16	5		0000000005
	17	×		0000000045
	18	7		0000000007
	19	±		0000000315
	20	RM	(TOTAL)·····	0000000471

SPECIFIC PROBLEM TO BE SOLVED	STEPS	KEY OPERATION	REMARKS	DISPLAY
Division(by "Reciprocal Number List")		C		0000000000
Division		186		0000000186
Division		×		0000000186
Divisió n		4	(0.0400000→4)	0000000004
$186 \div 25 = 7.44$		=		0000000744
$(186 \div 25 = 186 \times \frac{1}{25}$			(4⟶0.04) 2digits	0000000744 (2digits)
$= 186 \times 0.04 = 7.44$				
by "Reciprocal Number List"				

"$186 \div 25$" is equal to "$186 \times \frac{1}{25}$," and from the "Reciprocal Number List", you can find easily the "Reciprocal Number($\frac{1}{25}$) of the divisor "25" in the right column of "25", namely "0.0400000."

SPECIFICATIONS

Size of body (Height x Width x Depth)	98 x 220 x 263(m/m) (3 6/7 x 8 2/3 x 10 1/3 (inch))	
Weight	2.2 kgs. (4.8 lbs.)	
Keyboard	Ten-key system	
Display panel	10 digits	
Decimal point	NO DECIMAL	
Elements (Calculator components)	LSI	3
	MSI	1
	Transistor	36
	Diode	15
Types of calculation	Addition, subtraction, multiplication Chain multiplication Addition & Subtraction of Products with each individual answer Constant factor multiplication by memory Mixed calculations etc.	
Power source	AC 100/110/120, 200/220/240 50 – 60 Hz	
Power consumption	7 watts	
Clock frequency	50 KHz	
Temperature	0°C. . . . . 40°C (32°F. . . . 104°F)	
Calculation capacity	Maximum answer display is 10 digits for all functions.	

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THE QUIET DEPENDABLE ONE

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