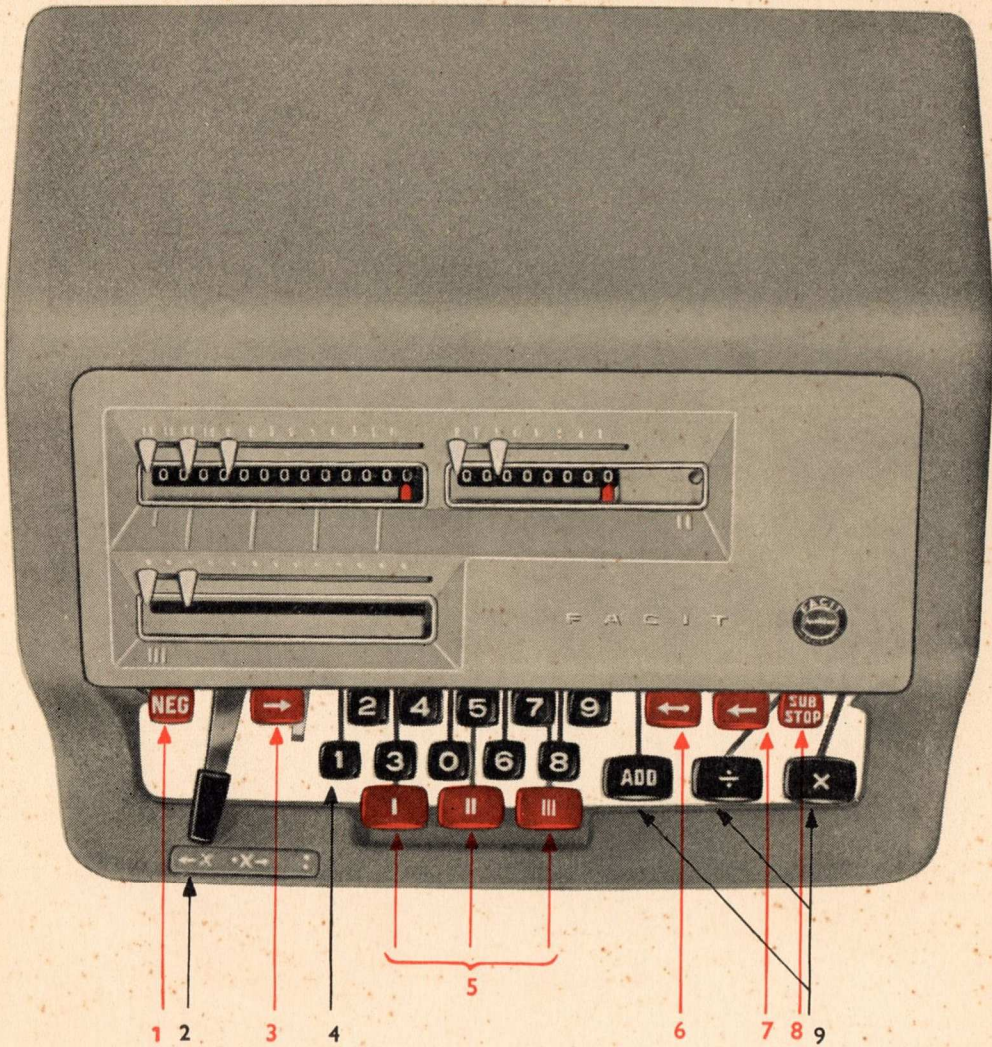
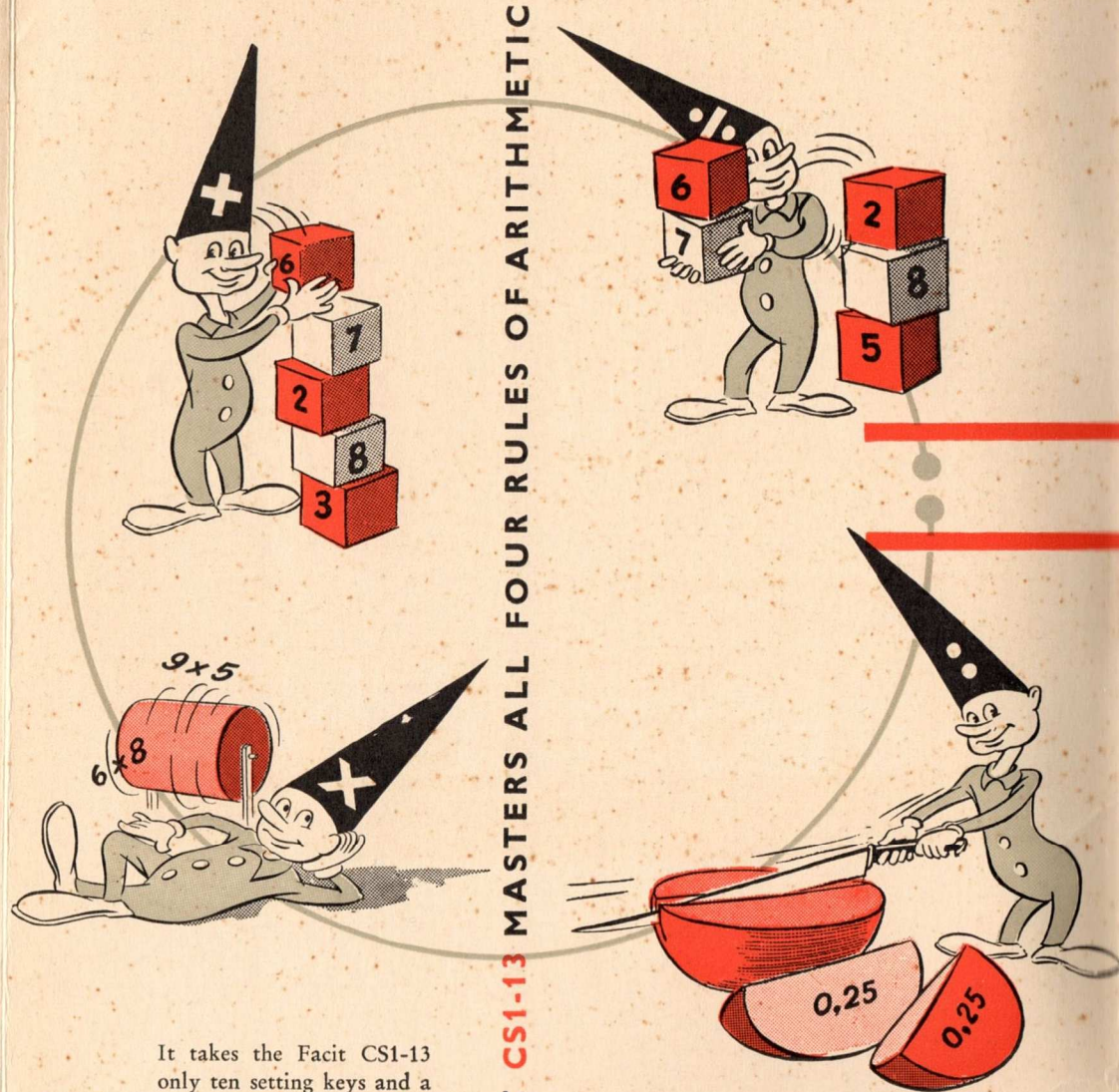


How to become
an expert computer
on FACIT **CS1** 13





- | | |
|-----------------------------|-------------------------|
| 1. Revolution direction key | 6. Tabulator |
| 2. Main control lever | 7. Right-hand shift key |
| 3. Left-hand shift key | 8. Substop key |
| 4. Setting keys | 9. Operating keys |
| 5. Clearing keys | |



It takes the Facit CS1-13 only ten setting keys and a minimum of auxiliary keys to master all four rules of arithmetic.

FACIT CS1-13 MASTERS ALL FOUR RULES OF ARITHMETIC

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Anyone with a previous knowledge of calculating machines will be interested in the following features of the Facit CS1-13: *It incorporates:* 10 setting keys allowing rapid and reliable setting of numerals;

FACIT CS1-13 at your service...

overall tens transmission in the product and multiplier registers, which facilitates shortcuts, allows immediate readings and assures complete reliability;

electric clearing of all registers;

separate key for addition;

automatic clearing of the setting register in addition and subtraction;

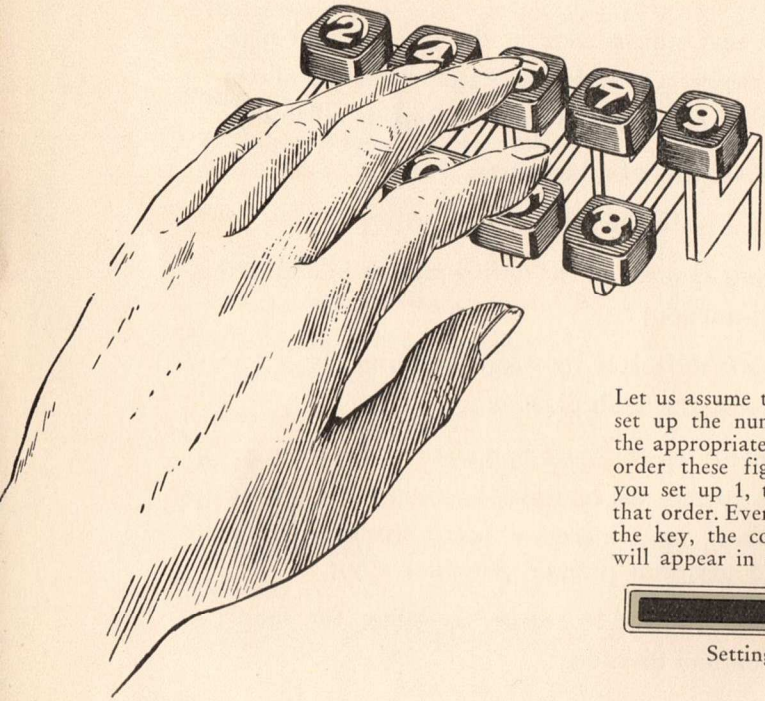
automatic shift, step by step, to the right or left in semi-automatic multiplication;

a tabulator which in one operation moves the number set up into the position for division — it saves brainwork and increases speed (otherwise the CS1-13 performs division automatically);

automatic multiplier register coupling for multiplication and division.

Above the connection at the back of the machine you will find the voltage for which the machine has been made. Check that it is the same as your voltage before inserting the plug to use the machine.

Only **10** Setting Keys – but they are sufficient for all calculations



Let us assume that you're going to set up the number by depressing the appropriate setting keys in the order these figures appear. First you set up 1, then 3, 6 and 5 in that order. Every time you depress the key, the corresponding figure will appear in the setting register.

1 3 6 5

Setting register



Here's how to boost your speed from the start:

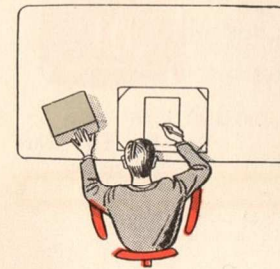
Set up the figures with your left hand

— make notes with your right hand

The illustration shows which finger to use for each setting key, according to the touch system for which the machine is designed.

By practicing this system from the start you will very soon learn how to calculate speedily and accurately. After a short time you'll discover that you're no longer even looking at the keys and that, as in touch-typing, there is no need for it.

Thanks to this left-hand system your right hand is always free for making notes.



A systematic way to master one-hand touch calculating is to place the machine at your left, as shown here.

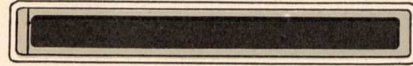
The 3 Registers



Product register



Multiplier register



Setting register

The product register

In addition, subtraction and multiplication the answer will appear in the product register. This register also shows the remainder left after a division.

The setting register

Every figure depressed on the setting keyboard is immediately shown in the setting register.

The multiplier register

In division the answer (the quotient) appears in this register. In addition it registers the number of items added together and in multiplication it shows the multiplier.

The terms employed for the four rules of arithmetic will be found on page 24.

Clearing the Registers

Always remember to clear all registers after completing calculation. Each one of the three registers has its own clearing key.



Red key I clears the product register



Red key II clears the multiplier register



Red key III clears the setting register



The Facit CS1-13 is Foolproof

The Facit CS1-13 is specifically designed to oppose any manipulation that might upset accuracy or damage the mechanism.

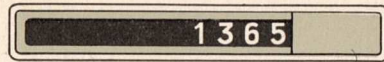
Should you unintentionally try to perform two calculations at the same time, Facit will simply refuse to cooperate. Further, its working parts are locked as long as the machine is not connected to the electric current.

The Carriage Shift Keys

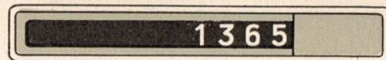
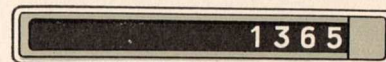
The red carriage shift keys move the set-up number in the setting register step by step to the right or left. The arrow on each key indicates the direction of the movement.



The left-hand shift key moves the number to the right.



The right-hand shift key moves the number to the left.



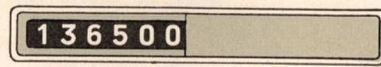
The Tabulator

A single depression of the red tabulator key (to the right on the keyboard) brings the setting carrier to the left as far as it will travel. This is the usual procedure for division.

At the same time the number set up is completed with noughts if it contains less than 6 digits.

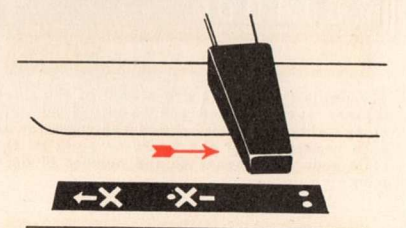
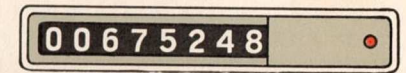
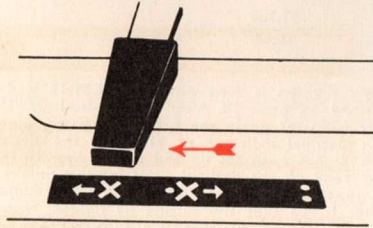
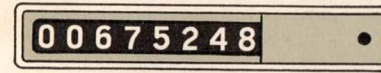


Note! These noughts will not appear if you use the left-hand shift key before pressing the tabulator, nor will the number travel completely to the left.



The Revolution Direction Indicator

At the extreme right of the multiplier register is a revolution direction indicator which shows whether the multiplier register is counting plus or minus turns. When you move the main control lever into the position for multiplication, the indicator shows up as a black dot. When you move the lever over to the division position, the dot becomes red.



On the left side of the machine is a key by means of which you can have the multiplier register count plus or minus turns regardless of the position of the main control lever. If you wish to do negative multiplication or division or if you want the reciprocal value of a number, this key is to be used.

The Position Indicators

The red position indicators in the multiplier and product registers are controlled by the red shift and tabulator keys. They show in which column the mechanism is operating.

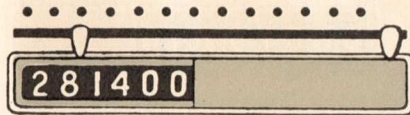
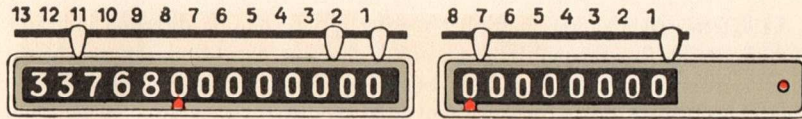


Product register



Multiplier register

The Decimal Points



Example of decimal point positioning in division:

$$\frac{33.768}{28.14} = 1.2$$

The decimal indicators are placed at the three register apertures and can be moved sideways along calibrated scales. Place the indicator of each register under the figure or point on the scale that corresponds to the number of decimals.

How division is done with Facit CS1-13 is described on page 18. After the dividend (33.768) has been set up in the product register, place the decimal indicator at 11. After the divisor (28.14) has been set up and moved over to the left read off the decimal point for this number. Note that the number now has two noughts after it, so that the setting up register shows 28.1400. These noughts are also counted as decimals, which means that there are 4 in all. The difference between 11 and 4 is 7. The multiplier register decimal indicator must therefore be positioned under 7. The result of the division is 1.2.

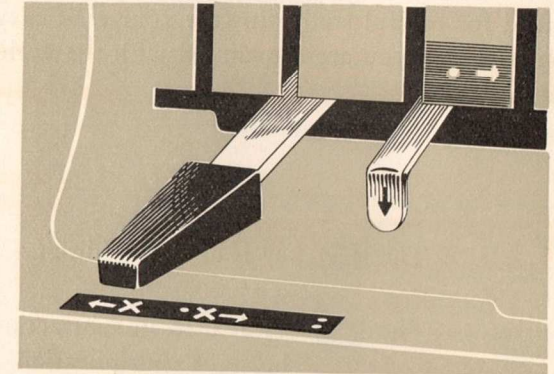
Rules for decimal points

Addition and subtraction. Position the decimal indicator identically in the setting and in the product register. Set up all numbers with the same number of decimals so that they come right relative to the decimal point in the setting register.

Multiplication. The number of decimals in the product register is to be the same as the sum of the decimals in the setting up and multiplier registers. Mark the position of the decimal point in the product register according to rule before starting calculation.

Division. The number of decimals in the multiplier register is to be the same as the difference between the number of decimals in the product and setting up registers. You can avoid unnecessary calculating work if you determine the position of the decimal point and how many decimals are needed in the answer (quotient) before you start to divide. See also the example at the top of the page.

The Control Levers



The Main Control Lever is placed at the lower left front of the machine. It has three positions.

The *left-hand position*, being the most frequent, is also called *normal position* and is used for addition, subtraction, and multiplication. In multiplication, the shifting movement towards the left is automatic.

The *right-hand position* is used for division. When the main control lever is in *intermediate position* it regulates the shift mechanism together with

The Secondary Control Lever, which is placed to its right. If the secondary control lever is placed under the dot in its left-hand position, the shift is disengaged in multiplication. If the secondary control lever is moved over to the right, the machine automatically shifts to the right in multiplication.

The signs on the front plate above the main control lever indicate the various positions.

The substop key is set at "sub" (lower position) only in subtraction. Otherwise it should always be in the upper position. You can also use the key as a division stop after having obtained the required number of decimals in the answer.



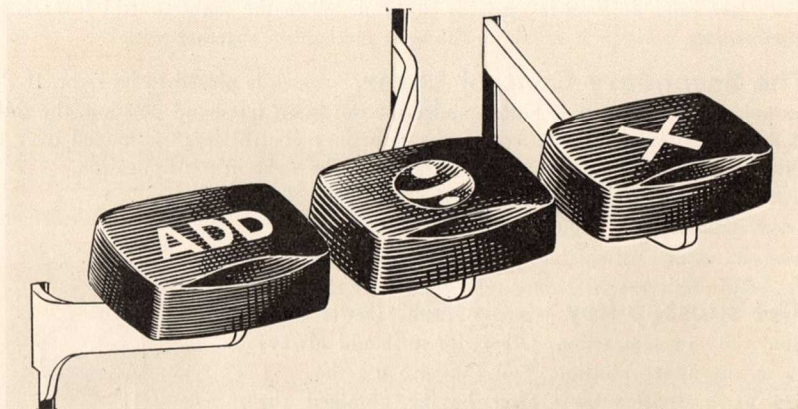
The Operating Keys

Facit CS 1-13 has three operating keys, the use of which we recommend for careful study. In fact your efficiency will greatly depend on how well you are acquainted with the various functions of these keys.

The **ADD** key is used in addition.

The **÷** key is used in subtraction and division and in short-cut multiplication.

The **×** key is used in multiplication and in addition when you want the number set up to remain in the setting register.



Addition

Example: $3478 + 394 + 85 = ?$

Check that all registers are cleared before you begin the operation. The main control lever should be in its left-hand position, that is, the normal position.

Set up the first number, 3478, in the setting register and then depress the **ADD** key. This moves the number to the product register and automatically clears the setting register. Set up the next number, 394, in the setting register. Press the **ADD** key. The product register

now shows **000000003872**

and the multiplier register

Set up the number 85. Press the **ADD** key. The product register now

records the result **000000003957**

and the multiplier register

the number of items

added together **00000003** •



Have the *decimal indicator* pointing to the same number in the setting and product registers. Make sure to set up all numbers with the same amount of decimals so that they appear in their right position in relation to the decimal point in the setting register.

Subtraction

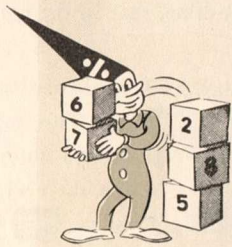
Example: $276\,543 - 80\,927 = ?$

Clear all registers and place the main control lever in its left-hand position.

Set up the number 276543 using the setting keys and press the **ADD** key. Again using the setting keys, set up the subtrahend 80927, holding down the **SUB STOP** key, and at the same time pressing down the **÷** key. The product register records the answer

0000000195616

The decimal indicator is placed as in addition.



Addition and Subtraction

of numbers with 10 to 13 digits

Example: $578\,329\,657\,82 + 156\,879\,623\,163 - 528\,943\,322\,3 = ?$

Set the main control lever in its left-hand position. Set up as many of the digits of the number as the setting register can hold (9 digits).

Press twice on the left-hand shift key, **←** i. e. once for each of the two figures not set up. Press the **ADD** key.

The product register

shows 0057832965700

Set up the remaining two figures, 82, and press the **ADD** key.

The product register now

shows the complete number 0057832965782

Set up the first 9 figures of the next number and press three times on the left-hand shift key **←**. Press the **ADD** key.

Set up the remaining 3 figures and press the **ADD** key. The product register now shows the sum of the two

numbers 0214712588945

Set up the first 9 figures in the next number and press the left-hand shift key once, **←**.

Hold down the **SUB STOP** key and at the same time press the **÷** key.

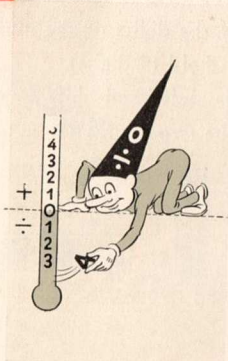
Set up the remaining figure (3) and hold down the **÷** key and at the same time press the **SUB STOP** key. The answer to the entire calculation is now ready and appears in the

product register 0209423155722



Subtraction Below Zero

Example: $57 - 68 + 34 - 136 = ?$



Set up the number 57. Press the **ADD** key. Set up the number 68 and press the **SUB STOP** and **+** keys.

The product register shows **999999999989**

Set up the number 34. Press the **ADD** key.

The product register shows **000000000023**

Set up the last number 136. Press the **+** key.

The product register shows **9999999999887**

(The nines in front of the number show that the answer is a negative number.) It now remains to work out the numerical value of the negative answer. Centre the main control lever.

Set up 999887.

By pressing the **+** key once you clear the right half of the product register. Once again press the **+** key. The product register then shows **9999998000113**

Since you included three nines in the last number to be set up, you now have three noughts in front of the required answer, which is

— 113



Multiplication

Example: $527 \times 132 = ?$



Clear the registers. Check that the main control lever is in its position to the left.

Using the setting keys, set up 527 (the larger factor should always be the multiplicand). You now produce the multiplier in the multiplier register with the aid of the **X** key, keeping it pressed down long enough for the machine to make two revolutions. By this the set-up number is multiplied by 2.

The product register records **000000001054**

At the same time as you let go the key, the counting mechanism moves one step to the left. Press the **X** key again until the machine does three revolutions and the figure 3 appears in the multiplier register. The mechanism moves automatically one space to the left and you press the **X** key for exactly one revolution. You now read the multiplier in the multiplier

register **00000132**

The product register shows the answer **0000000069564**

The setting register shows the multiplicand, 527. If, in working out the desired number in the multiplier, you should stop the machine one or more revolutions too early or too late, you can adjust the error by pressing the right-hand shift key **→** which will return the mechanism to the column with the wrong digit. If this digit is too low, you press the **X** key for as long as is necessary to correct the error. If, on the other hand, the figure is too high, you press the **+** key so that the machine makes the required number of backward revolutions.



Short-cut Multiplication

On Facit CS 1-13 short-cut multiplication is done as follows: After setting up the multiplicand in the setting register by using the appropriate keys, you produce the multiplier in the multiplier register with the aid of the **(X)** and the **(-)** keys.

Example: $75816 \times 1793 = ?$

The main control lever should be in its position to the left.

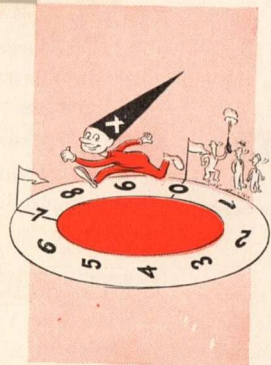
Set up the multiplicand, 75816. To produce the multiplier, 1793, in the multiplier register you proceed in the following manner: Keep the **(X)** key pressed down until the machine does three revolutions. As you let go the key, the counting mechanism moves one step to the left. The next digit is a 9. This figure, as well as all those of a value higher than 5, is produced more rapidly by negative turns. You therefore press the **(-)** key for exactly one revolution of the machine ($10 - 1 = 9$). Then a 9 will appear to the left of the figure 3 in the multiplier register, and the mechanism will have moved one more step to the left.

In front of the two figures 93 you will have a row of nines in the multiplier register. Press the **(-)** key for exactly two revolutions of the machine. In front of the figures 93 you will now have the figure 7 and the mechanism has moved another step to the left. Press the **(X)** key long enough for the machine to make two revolutions. In the multiplier register you now read the required number, 1793. (The first of the last two plus revolutions removed the row of nines from the register.) Thus you have completed the multiplication. In the setting register you have the

multiplicand 75816

and in the multiplier register the multiplier ... 00001793

while the product register shows the answer 0000135938088



Multiplication

Multiplication involving addition of the products

Example: $2495 \times 347 + 4694 \times 38 = ?$

The main control lever should be in its position to the left. First multiply 2495 by 347.

The product register now shows 000000865765

Clear the setting register. Multiply 4694 by 38. The product register shows the sum of the two products 0000001044137

The multiplier register shows the sum of $347 + 38$ 00000385



Continuous Multiplication

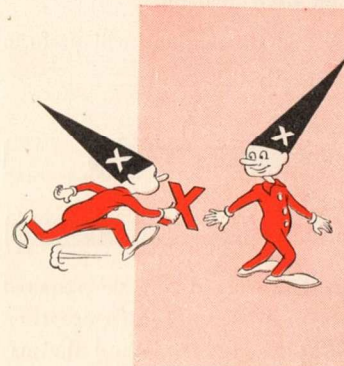
Example: $127 \times 12 \times 311 = ?$

The main control lever should be in its position to the left. First multiply 127 by 12.

The product register shows 0000000001524

Clear the setting register. Set up the number 1524, which you read in the product register. Clear the product and the multiplier registers. Multiply the number set up by 311.


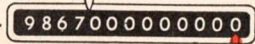
The product register shows 0000000473964





Division

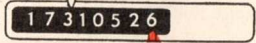
Example: $9867 : 57 = ?$


Clear the registers. Bring the main control lever over to the right.


Set up the dividend 9867, using the setting keys, and press the tabulator  which transfers the number to the left end of the setting register. Press the **ADD** key. The product register shows ... 

Set up the divisor 57 by means of the setting keys. Press the tabulator . In this phase of the operation you have to set the *decimal indicator* of the multiplier register, which should be placed so that the figure above it is equal to the number of decimals in the dividend less the number of decimals in the divisor, as these numbers appear in the registers. Include all decimals, also the noughts following. In the setting register the indicator should always be set after tabulation.

Press the  key and the machine will perform the division automatically.

The multiplier register will record the answer ... 

The product register will contain the remainder ... 

After the machine has worked out the required number of decimals, you can stop further operation by keeping the  key depressed until the machine has finished working. You can also, if you wish, stop the machine immediately by pressing lightly on the supstop key.




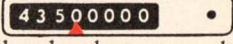
Rule of Three

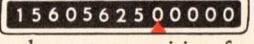
The rule of three applies to problems of the following type:




$$\text{Example: } \frac{35875 \times 435}{147} = ?$$

For this operation the main control lever should be in its intermediate position, and the secondary control lever in its right-hand position.

Set up the number 035875. The nought in front of the number is a safeguard against exceeding the capacity of the machine in performing the operation. Press the tabulator . Multiply by 435 and in this case take the figures from left to right, beginning with four. Thanks to the fact that the main control lever is in its intermediate position and the secondary control lever in its right-hand position, the machine is moved automatically to the right one step at a time.

After completing the multiplication check that the multiplier register shows  and that the calculation thus has been correctly done.

In the product register you will have the result of the multiplication  and this number will be in the correct position for the following division by 147.

Clear the setting and the multiplier registers. Set up the divisor 147 and press the tabulator . (If the first figure of the divisor is bigger than the first figure of the dividend you may set up a nought in front of the divisor. You will then obtain the answer with one more decimal.) Move the main control lever over to the right and press the  key. The machine will do the division automatically and in the multiplier you will find the answer 

By the expression reciprocal values is meant 1 divided by a number, or expressed in fractions:

$$\frac{1}{\text{number}}$$

Example: $\frac{1}{52.27} = ?$



You can obtain the answer (i.e. the reciprocal value of 52.27) through an ordinary division, but the simplest method is the following.

Put the main control lever in its right-hand position and press the **NEG** key once.

Set up 52.27 and press the tabulator **T**. Start the machine by pressing the **X** key. When the machine has completed the calculation, the multiplier register

records



Decimal rule:

Add as many noughts in front of the number in the multiplier register as there were integers in the original number, in this case two. The first of these noughts is always the integer nought. The answer therefore is 0.019131433, which is the reciprocal value of 52.27.

Summation of products

For certain business computations, such as making up inventory lists or checking invoices, it is necessary to check only the grand totals and not the sub-totals.

Example:

$$\begin{array}{r} 392 \times 6.59 \\ 1,279 \times 3.22 \\ 58 \times 2.89 \\ 397 \times 1.93 \\ 18 \times 9.27 \\ \hline \end{array} \quad \begin{array}{r} \\ \\ \\ \\ \\ \hline ? \end{array}$$

Set up 659 and multiply by 392. Then clear the setting register only. Repeat this procedure with the remaining multiplications. The product register will show the sum of all the products. All the multipliers are added in the multiplier register. Our problem now looks like this:

Example:

$$\begin{array}{r} 392 \times 6.59 \\ 1,279 \times 3.22 \\ 58 \times 2.89 \\ 397 \times 1.93 \\ 18 \times 9.27 \\ \hline 2,144 \end{array} \quad \begin{array}{r} \\ \\ \\ \\ \\ \hline 7,802.35 \end{array}$$

Example

Computing proportions

Example: Total expenses of 68.75 kronor, are to be proportioned among the following four sums:

23.43	?
294.80	?
49.64	?
153.28	?
<hr/> 521.15	<hr/> 68.75

The total of these amounts, 521.15, is divided into 68.75 to obtain a constant, 0.13192, which is used in the subsequent multiplications. Set the main control lever in its middle position and the secondary lever to the right. Set up the constant with a nought in front, 013192 (the nought prevents you from exceeding the capacity of the machine). Now tabulate and multiply from left to right with 2343. Point off decimal places in the product register and your answer is 3.09. Clear the product and multiplier registers and retabulate the constant, which is retained in setting register. Perform the next multiplication with 294.80. The answer is 38.89. Continue in the same manner with the two remaining amounts, 49.64 and 153.28.

Finally, check your computations by adding the answers. Our problem should now look like this:

23.43	3.09
294.80	38.89
49.64	6.55
153.28	20.22
<hr/> 521.15	<hr/> 68.75

Example

Checking invoices

The following invoice is to be checked:

	6,457.73
+ 5 %	<hr/> 322.89
	6,780.62
— 15 % discount	
on 2,500.50	<hr/> 375.08
	Kronor 6,405.54

The amounts of the extra charge and the discount are already given, so you begin by multiplying 6,457.73 by 1.05.

The answer is 6,780.62.

Clear setting and multiplier registers. The next multiplication is to be negative, which requires a single depression of the **NEG** key. Set up 2,500.50 and multiply by 15 with negative turns.

The answer is 6,405.54.

Always make sure that there are the same number of decimals in both sums.

Repetition of the Arithmetic Terms

The four rules of arithmetic



Addition

$$\text{addendum} + \text{addendum} = \text{total}$$



Subtraction

$$\text{minuend} - \text{subtrahend} = \text{remainder}$$



Multiplication

$$\text{multiplicand} \times \text{multiplier} = \text{product}$$

The multiplicand and the multiplier are also called factors.



Division

$$\text{dividend} : \text{divisor} = \text{quotient}$$

Dividend and divisor can also be expressed thus:

$$\frac{\text{dividend}}{\text{divisor}} \quad \text{and are then called} \quad \frac{\text{denominator}}{\text{numerator}}$$

If the numerator consists of 2 factors we have a form of *rule of three*.

$$\frac{\text{factor} \times \text{factor}}{\text{divisor}} = \frac{(\text{numerator})}{(\text{denominator})} = \text{quotient}$$

Facit CS1-13
is a precision instrument...

... treat the machine accordingly

The Facit CS 1-13 is precision-built throughout. It is designed to give perfect service for many years.

As distinguished from most other calculating machines, the Facit CS 1-13 is entirely enclosed and thus protected against dust.

Naturally the mechanism will be subject to a certain amount of wear and tear as the oil is gradually consumed. Like all other machines it needs cleaning, oiling and adjusting now and then. This should be done once a year and preferably by a serviceman approved by the manufacturer.

Obviously the manufacturer's guarantee will be rendered inoperative if the machine has been oiled or repaired by unskilled labour.



FACIT

ÅTVIDABERGS-STOCKHOLM-SWEDEN



*Thank you for your
attention!*

★ Time spent studying this manual will be saved
many times over when using
the Facit CS1-13 calculator.