MANUAL

OF THE

FACIT

CALCULATING MACHINE

MODEL TK

Its operation use and care

INSTRUCTIONS

for using the

FACIT

CALCULATING MACHINE

MODEL TK

Manufacturers:
AKTIEBOLAGET FACIT
ÅTVIDABERG
SWEDEN

Aktiebolaget Åtvidabergs Industriers Tryckeri
1 9 4 8
FH e. 1 M. 12. 48.
Printed in Sweden

CONTENTS

An important introduction that should not be ignored.

Facit's 10-key calculating machines have attained a strong position in the world market by reason of their invaluable calculating qualities and the high standard and precision of manufacture.

The main advantages are

1. 10 setting keys giving fast and safe setting of numbers.
2. Transfer of tens in the product and quotient registers which permits short-cut calculating, fastest reading and complete calculating safety.
3. Direct division setting which saves considerable brainwork and increases the speed of carrying out such calculations.
4. Fast clearing of the registers which also speeds up the calculating operation.

The machine type which is dealt with in this handbook is the.

Facit TK

Operation of the machine.

(See diagram at the end of the handbook).

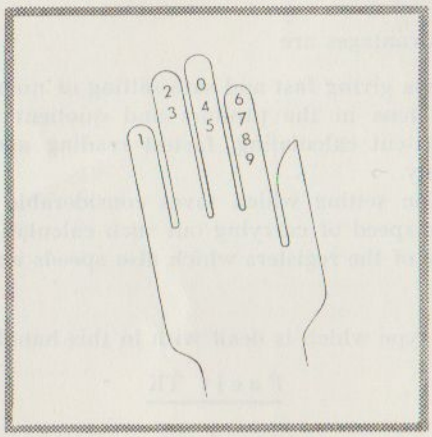
Clear all the registers of the machine. This is done by pressing together the two clearing levers at the right with the thumb and forefinger of the right hand. The front lever clears the setting register and the back one clears the quotient register. At the same time the thumb or the forefinger of the left hand presses the clearing lever of the product register. This lever is placed on the left side of the machine.

Using the black figure keys the desired number is now set and appears immediately in the setting register. The figure keys are pressed in the same order as the number to be set is read, that is

from left to right. The most rational use of the machine is achieved by placing it to the left and when setting the number, using the following »touch» system for the left hand

Left little finger —	Figure key 1
third finger —	2 & 3
middle finger —	0, 4 & 5
index finger —	6, 7 8 & 9

By this system the varying capacities of the individual fingers are rationally used. The diagram below will make it easier to memorize these figures.



When the number is set the actual calculating is carried out by using the crank. The crank and the clearing arms, which are on the right hand end of the machine, are manipulated by the right hand.

The machine is so constructed that each turn of the crank adds or subtracts the number in the setting register from the number in the product register, depending on whether the crank is turned forwards or backwards. By this it is clear that a turn in either direction is cancelled out by a turn made in the opposite direction, so long as the position of the setting mechanism remains unaltered. Thanks to this arrangement it is easy to rectify any mistake made immediately. The number in the setting register remains undisturbed during the whole operation.

To enable the crank to be turned, pull the handle to the right. If a number of turns are to be made in succession, the handle is

kept drawn out the whole time so that the stop can pass the normal position freely.

The crank should be turned steadily and evenly, not in jerks. After each calculation the crank must take up its normal position before any other manipulation is carried out.

The machine is provided with a stop device which prevents the crank from being turned back so far as to risk miscalculation. A turn of the crank which has been started must be completed before the turn in the opposite direction can be made.

Each turn of the crank is recorded in the quotient register. The position of the setting mechanism is also recorded in this register by a red position indicator which shows the figure which is recording the turns of the crank.

The quotient register has transfer of tens throughout and automatic change. The value of the tens transfer in the quotient is made clear in subsequent practice examples — see »Shortened multiplication» and »Division».

As a result of the automatic change gear the first turn of the crank decides the 'direction' (positive or negative) of the quotient mechanism's calculation. When the quotient register is cleared the authomatic change gear is placed in a neutral position. When a forward movement of the crank is started the quotient register immediately shows a plus calculation and vice versa.

When the quotient register is calculating minus, or negative quantities, a red point (cranking direktion signal) appears to the right of the quotient register By a single glance it is possible to control as to whether the register is coupled for plus (positive) or minus (negative) calculations.

The setting register can be moved to the left and to the right by depressing the red tabulator keys.

When the red division key is depressed, the setting register will be moved to the extreme left, which is the correct position for starting division. The position and the movement of the setting register are indicated in the quotient and product registers by the red indicators. It is easy to remember that these red indicators can only be moved by the red keys.

Locking devices.

Certain parts are locked if certain other parts are in such a position that faulty calculation or mechanical interlocking could take place. Thus two conflicting operations can never be executed together.

The machine is thus practically foolproof and complete mechanical safety is ensured.

Never try to overcome resistance by force. Such resistance indicates that some of the operating parts must be restored to normal before calculation can proceed.

If any part of the machine should be locked, when a calculation is being commenced, it is generally released by the action of clearing the registers. In the event of the part remaining locked, despite this clearing action, the machine should be left to an authorised Facit service mechanic for examination and adjustment.

Locking of the crank occurs:

If the setting register has not been perfectly cleared.
If some of the black or red keys are depressed.
If the clearing levers are not in their normal position.

Locking of the clearing levers occurs:

If the crank is not in its normal position.
The clearing lever of the setting register is locked if a black or red key is depressed.

Locking of the stepping keys and of the division key (the red keys) occurs:

If the crank is not in its normal position.
If some of the black keys are depressed.
If the clearing lever of the setting register is not in its normal position.

Locking of the figure keys (the black keys) occurs:

As soon as the crank or some of the red keys have been touched. This is an important feature of the machine and means that the figures set up cannot be accidentally changed during calculation. They are perfectly protected against errors until the register is cleared after operation is completed.

Locking of the black keys occurs immediately when the crank or some of the red keys are touched. It is important to remember that this locking occurs as soon as the crank or the red keys have been touched even when no figures have been set up in the setting register. This locking is cleared through the clearing lever of the setting register. It is essential always to clear the whole machine before starting to calculate.

Care of the machine.

The mechanism of Facit Model TK is perfectly enclosed and protected against dust like the works of a watch, but as watches now and then have to be cleaned it is necessary to have this machine cleaned and inspected once a year by a capable mechanic. It is very risky to allow an unskilled mechanic to take the machine to pieces for cleaning and oiling.

Oiling, in the ordinary sense of the word, must not be attempted. This applies especially to the setting mechanism.

The factory guarantee and full responsibility can only be assumed if the machines are properly treated, carefully and correctly oiled with suitable lubricants. We, therefore, advise to allow only mechanics from authorised Facit agents to take care of your machine.

Regard it as a carefully made instrument of precision and treat it accordingly. If you feel that some part is locked, do not try to clear it by force but read the introductory remarks »When locking occurs», and you will probably find the reason. If you do not find it, however, deliver the machine to the Facit agency where the matter will be investigated.

Basic examples of the four methods of calculating.

Explanation of signs.

In the following description:

+ denotes plus (addition, turning forwards).
— » minus (subtraction, turning backwards).
× » times (multiplication, turning forwards).
: » by (division, turning backwards).

Addition.

Example: 75 384 + 6 278 + 9 507 = 91 169.

1) Set 75 384 with the black keys, turn the crank forward once, clear the setting register.

2) Set 6 278 with the black keys, turn the crank forward once, clear the setting register.

3) Set 9 507 with the black keys, turn the crank forward once.

Should a mistake be made when setting the figures the wrong number should be removed, by clearing the setting register, and the correct figures set before using the crank.

The figure shown in the product register, 91 169, is the required total. The figure 3 in the quotient register indicates in this case the number of terms added. Clear the whole machine.

Subtraction.

Example: 2 765 930 — 2 748 693 = 17 237.

1) Set the larger figure, 2 765 930, by the keys and turn the crank forward once. Clear the setting register.

2) The smaller figure, 2 748 693, is set by the keys and one turn made backwards.

The remainder, 17 237, appears in the product register.

Subtraction with minus quantities.

If a number of plus and minus quantities are to be added as, for example, in a debit and credit reckoning, and the minus amounts are greater than the plus amounts, the answer given in the product register is preceded by a number of 9 s. To be able to understand this answer follow the example below.

Example: + 57 — 68 + 34 — 136 = — 113

At the completion of the calculation the figures 999999999887 would be shown in the product register. Set the figures 887, with a number of 9s before it, in the setting register e.g. 9999887. Now a minus turn on the crank, clear the product register and a further minus turn will give the negative result of 113 in the product register. The sum of the above calculation is therefore — 113.

The remaining 9s furthest to the left in the product register can be ignored.

Addition and subtraction of numbers which have more than 9 figures.

Example: 578329567 · 82 + 1568796231 · 63 —
52894332 · 23 = 2094231557 · 22

Using the figure keys set the first 9 figures of the number — viz. 578329657. Using the key for spacing to the left move the number

two steps and make a plus turn on the crank. Clear the setting register. Set the figures 82 and add them to the previous number. The number in the product register is now 578329657 · 82· Proceed in the same way with the next number. This number has, however, 3 figures, 163, to be added which is beyond the capacity of the setting register and so needs a slightly different method than the first number. Using the key for spacing to the left make 3 steps to the left *before* the first nine figures are set. Add the figures 163 as explained previously. Finally the first nine figures of the last number are set, moved 1 step to the left and a minus turn made (as this number is to be subtracted). Set the figure 3 and make another minus turn. The answer 2,094,231,557 · 22 is now given

Multiplication.

Simple multiplication.

Example: 49 563 × 24 = 1 189 512.

A multiplication is nothing but a repeated addition. It follows directly that in order to perform the multiplication 49 563 × 24, the figure in question might be set by the keys and the crank turned forward 24 times.

However, owing to the setting register being movable, the number of turns can be reduced to 2 + 4 = 6. First of all set 49 563 by the keys, make 4 turns forward with the red position indicator in its normal position. The setting register is then shifted on place to the left and 2 further forward turns are made when the product 1 189 512 is shown in the product register. The multiplier 24 will have appeared in the quotient register.

The multiplier, 24, has appeared in the quotient register and the multiplicand, 49 563, is still visible in the setting register.

Example: 87 659 × 6 034 = 528 934 406.

A nought in the multiplier is given by mowing the setting register an extra step to the left.

After the multiplicand 87 659 has been set by the keys, the crank must be turned:

4 times with the setting register in its normal position;
3 times with the setting register shifted one place to the left;

6 times with the setting register shifted further two places to the left.

This completes the multiplication. The product, 528 934 406, can be read in the product register and the multiplier, 6 034, in the quotient register. The multiplicand remains visible in the setting register.

Example: 36 541 × 2 350 = 85 871 350.

In the example above a step to the left is made first and then 5, 3 and 2 plus turns are made in conjunction with steps.

Multiplication of decimal fractions.

In multiplying a decimal fraction by a whole number or by another decimal fraction, the procedure is the same as in multiplying whole numbers.

The following rules should be observed for the placing of decimals.

The number of decimals in the product register is equal to the sum of the decimals in both the setting and quotient registers.

Indicate in the quotient and the setting register the number of decimals of the multiplier and multiplicand with the respective decimal pointers. This is very easy because the figure which becomes visible (in the aperture) of the decimal pointer always indicates the number of decimals. Then one only has to indicate the same number of decimals in the product register, as the multiplier and the multiplicand have decimals added. Consequently the figure visible in the aperture of the decimal pointer in the product register must be the same as the total of the figures visible in the apertures of the decimal pointers of the quotient and setting registers.

Short-cut multiplication with a smaller number of turns.

Example: 758 × 99 = 75 042.

Carried out in the usual way this multiplication requires 9 + 9 = 18 turns. The figure 99 will then appear in the quotient register.

The multiplication can be done much quicker as follows thanks to the tens transfer in the quotient register:

After the number 758 has been set, using the figure keys as usual, the crank is moved forward about 2 centimetres followed by a full turn backwards whereupon the figures 99999999 appear in the quotient register. Move two steps to the left and make 1 turn forwards. Multiplication by 99 (100—1) has now been carried out as can be clearly seen in the quotient register. The product, 75 042, is now given in the product register.

It is important to remember that the crank must be moved forwards 2 cms before the first minus turn is made so that the quotient register is coupled to multiplication.

Example: $1\,555 \times 682 = 1\,060\,510$.

Set the figures 1 555. Make 2 plus turns. Move 1 step to the left and make 2 minus crank turns. Move 1 step to the left and make 3 minus turns. Make 1 step to the left and make 1 plus turn. The multiplier 682 is now in the quotient register, the multiplicand 1 555 in the setting register and the product 1 060 510 in the product register.

Multiplication with addition of the products.

Example: $2\,495 \times 374 + 4\,694 \times 38 = 1\,111\,502$.

The multiplication $2\,495 \times 374$ is carried out first. The setting and quotient registers are cleared but the product register is left untouched. The multiplication $4\,694 \times 38$ is now carried out. The sum of both products can now be read in the product register viz. 1 111 502.

Continuous multiplication of products.

This can be performed by either of the following methods:

1) $12 \times 127 \times 311 = 473\,964$.

In the first place, the two factors 12×127 are multiplied. The setting register is cleared and the product 1 524 is then set by the keys. One backward turn is now made when the product register should indicate zero, this being a check as to the product having been correctly set. The quotient register is cleared. The new multiplicand 1 524 is multiplied by the third factor 311. The product register now shows 473 964, which consequently represents the required product of the three factors.

2) $12 \times 127 \times 311 = 473\,964$.

First multiply $12 \times 127 = 1\,524$ and clear the setting register. Then set by the keys the third factor less 1, viz: $311 - 1 = 310$, which figure is to serve as multiplicand. Clear the quotient register. The product previously arrived at, 1 524, will now serve as multiplier. Consequently, 310 is multiplied by 1 524. The result of this, together with the number remaining in the product register, 1 524, will be the required product 473 964.

Clear the whole machine.

Division.

Division can be made in two different ways, and as both have their advantages we describe the same problems solved in both fashions.

The following simple rule applies to both cases.

If the number of figures in the divisor exceeds the number of figures in the dividend a nought is set before the divisor in the setting register.

By this simple measure even the 8th position in the quotient register is utilised and it is unnecessary to start the calculation with spacing.

Division by subtracting the divisor.

The red signal to the right of the quotient register is visible when carrying out division by this method and indicates that the quotient register is calculating the minus turns.

Example: $672 \div 28 = 24$.

Set 672 by the black figure keys. Press the tabulator key and make 1 plus turn with the crank. Clear the quotient and setting registers. This is carried out in one movement by squeezing together the two levers which are on the right hand end of the machine. Set the number 28 and press the tabulator key. Crank minus turns until the bell rings, then one plus turn. Move the setting register 1 step to the right. Crank minus turns again until the bell rings and then 1 turn forward. The product register is now clear of figures. The answer of 24 is seen in the quotient register and the red signal to the right

indicates that the quotient register has calculated the minus turns which is correct for this method of division. Thanks to the transfer of tens in the quotient register, division can also be carried out by the following method making alternate plus and minus crank turns.

Example: 672 —//—28 = 24.

Set 672 using the figure keys, press the tabulator key and make 1 plus crank turn. Clear the setting and quotient registers. Set 28 and press the tabulator key. Crank minus turns until the bell rings. Move the setting register 1 step to the right by the spacing key and crank plus turns until the bell rings. The quotient register now gives the result 24 and the product register the remainder which in this case is 0.

The placing of the decimal points with division.

The following rule applies when placing these decimals.

The number of decimal places in the dividend reduced by the number of decimals in the divisor is equal to the number of decimals in the quotient.

Example: $55.19 : 2.3 = 23.\overline{996}$.

Set 5 519 by the keys; press down the division key. Turn once forward. Mark the decimal position in the product register so that 11 will appear in the decimal pointer. Clear the setting and quotient registers. Set 23 by the keys and press down the division key. The setting register has then, according to the rule on page 12, 5 decimal places. The quotient must therefore be marked off so: 11 — 5 = 6 decimals. Carry out the calculation in the usual way. The answer is $23.\overline{996}$ after the third decimal has been raised.

Division by multiplication.

Division by multiplication or, more accurately, division by the addition of the divisor, is carried out in this way. The divisor is first set, using the black figure keys, press the tabulator key and then turn the crank until the dividend appears in the product register. As soon as this is completed the calculation is clear and the answer is given in the quotient register.

Example: 672 : 28 = 24.

Using the black figure keys set the number 28. Press the tabulator key. Crank in a plus (forward) direction until the first two figures in the product register come as near to the figures 67 as possible. After two turns the figures 56 are given and if the turning is continued the next figures will be 84. This shows that in this case it is more advantageous to make only two crank turns. Using the spacing key move the setting register 1 step to the right and make the necessary plus crank turns until the number 672 appears in the product register. This will take four turns. The result has now been given in the quotient register 672 : 28 = 24.

The advantage of division by multiplication is that the dividend, divisor and the quotient, or answer, are all visible on the machine at the completion of the calculation.

Example: $55.19 : 2.3 = 23.\overline{996}$.

Using the figure keys set the number 23. Press the tabulator key. Mark off the decimal place in the setting register (1 decimal + 0 000 = 5). Crank in the plus direction until the first two figures in the product register are as near to 55 as possible which in this case is after two turns. Press the key for spacing to the right once and thereafter make plus turns with the crank until the first two figures in the product register are 55. This needs four turns. The product register now shows 552 but the number desired is 5 519. This is achieved by making two steps to the right and then 1 minus crank turn, one step to the right and 6 plus turns. Indicate the decimal place in the product register, which means that the figure 11 is visible in the decimal point window. As the number of decimals in the setting register was 5 the correct position of the decimal point in the quotient register will be 6 (11 5 = 6). The answer is therefore $23.\overline{996}$.

Compound equations.

Compound equations take such form as e.g. $\frac{A \times B}{C}$ This form of calculation is quite common in practical calculation and can be handled two different ways requiring two or one operation.

1. *Compound equations in two operations.*

The factor in the dividend (i.e. A or B) consisting of the most figures is first set in the setting register *preceded by a nought.* The nought is included to prevent the capacity of the machine being exceeded when multiplying. Press the tabulator key. Multiply from the left to the right by the other dividend factor. The product of A × B is now at the left of the product register. This is the correct position in preparation for the division by C which follows.

Example: $\frac{358.75 \times 43}{72} = 214{,}25.$

Set 035 875 in the setting register and press the tabulator key. Make 4 plus turns, one step to the right and 3 more plus turns. Mark off 6 decimal places in the quotient register and consequently 8 (6 + 2) decimals in the product register where the product 358.75 × 43 = 15 426.25 is to be read. Clear the setting and quotient registers. Set 072 and press the tabulator key. Mark off 3 decimal places in the setting register and 5 (8—3) decimals in the quotient. The division then gives the result of 214.25 which is correctly shortened to two decimals.

2. *Compound equations in one operation.*

This method is decidedly quicker than the above method but demands more efficiency on the part of the operator. Furthermore the capacity of the machine is more restricted as the sum of the figures in the dividend factor with the least number of figures plus the number of figures in the divisor must not exceed 7.

The dividend factor with the most figures is set in the setting register preceded by a number of noughts. The number of noughts should be equal to the number of figures in the other dividend factor plus two. Press the tabulator key, make 1 minus turn and then clear the setting and quotient registers. Set, at the same time, the two remaining factors in the setting register, firstly the remaining dividend factor preceded and followed by a nought, then the divisor. Press the tabulator key. With the following calculation the factor in the product register is reduced to 0 by the addition of the divisor. At the same time the other factor is multiplied by the quotient and the final result will appear to the left in the product register.

Example: $\frac{358.75 \times 43}{72} = 214{,}25.$

Set 000 035 875 in the setting register. The four noughts represent the number of figures in 43 plus two. Press the tabulator key and make 1 minus turn. Clear the setting and quotient registers. Set the figures 043 072 and press the tabulator key. Mark off 6 decimal places in the product register. As 72 has no decimals the decimal places in the quotient register will be 6 (6 — 0 = 6). In the multiplication by 43 the setting register has 3 decimals therefore the final product will have 9 decimals (6 + 3 = 9).

Now the 72 is added so that the remaining portion of the product register's right-hand side shall be as little as possible. After 1 plus turn the registers will show:

0430361250000 10000000
043072

Make one step to the right and crank minus turns, counting them carefully. After five minus turns registers will show:

0215001250000 05000000
043072

In this position it is no longer possible to carry out subtraction as 1 is less than 72. Make two steps to the right followed by 1 minus turn and a further step. The calculation is then continued to its completion with 7, 3, 6 and 1 minus turns and 1 step to the right after each group of turns is completed. The registers show finally:

0214253477008 04982639
043072

To the left of the product register is seen the answer $214.253\,477$. The two final figures being uncertain this is shortened to 214.25.

The quotient register gives the quotient $\frac{358.75}{72} = 4.982639$.

Calculations which occur frequently in practice.

Calculating with fractional values.

Should fractional values occur in the calculation these must, generally speaking, be converted to decimal parts whereafter the method of calculation for decimal parts and whole figures is used. The most common fractions will be found converted to decimal parts in table 1. It can be mentioned that the table 1 c for 30ths will give

the decimal equivalent of any number of days in a 30 day month. This table can be used, for instance, for certain wage calculations. In those cases where table 1 is insufficient the fraction is converted into a decimal part by division on the machine.

Multiplication with one constant.

If the amounts of American invoices, for example, have to be converted from American dollars into Swedish kronor, the exchange (3.68) is set up by the keys, and is then multiplied by the dollar amount in one of the invoices. This amount will appear in the quotient register after the multiplication, while the corresponding value in Swedish kronor is shown in the product register.

As, however, the exchange is a constant, we gain time by not returning the registers into the zero position. By a required number of turns we can bring up the dollar amount of the next invoice in the quotient register, and after each completed calculation read off and note down the value in Swedish kronor in the product register.

The following examples will illustrate the manner of proceeding:

Amount of invoice.	Dollar exchange.	Value in Sw. kronor calculated culated as described below.
$ 399.25	3.68	1 469.24
$ 402.30	3.68	1 480.46
$ 1 397.18	3.68	5 141.62

The exchange rate is set up by the keys. The amount of the first invoice is 399.25. Make 5 turns forward, move the setting register one place to the left, make 2 turns forward; then one place to the left, 1 turn backward; finally two places to the left and 4 turns forward. The value in Sw. kronor 1 469.24, is read off in the product register. In the quotient register appears the dollar amount, and in the setting register the exchange rate.

Do not clear any of the registers.

The amount of the next invoice is 402.30. Move the position indicator from the 5th position, in which it is now, to the 3rd position. Make 3 plus turns, two steps to the right and make 5 plus turns. The quotient register will then show the dollar value of the second invoice, 402.30, and the setting up register the rate of exchange, 3.68, while in the product register the value of Swedish kronor 1 480.46, can be read off.

The amount of the next invoice is 1 397.18. As the setting up register is still in the 1st position, 2 minus turns are made. Then move the position indicator one step to the left, make 1 minus turn; move the indicator one more step to the left, make 5 plus turns; move the position indicator one step to the left, make one minus turn, make two steps to the left and make 1 plus turn. The dollar value of the third invoice then appears in the quotient register and the corresponding value of Swedish kronor, 5 141.62, in the product register.

The advantage of the method described above is evident when it is a question of converting many of dollar invoices into some other currency. The same procedure is always used when it is a question of multiplying by a constant factor. Similar calculations that occur in every day practice are for instance:

Conversion of bills in one currency to another at a certain rate of exchange.
Conversion of metric weights and measures to lbs. and feet.
For computing taxes when the incomes of different persons vary and are assessed by a constant amount per hundred.

The above are only a few of the many examples in which a number of variable amounts have to be multiplied by a constant.

When multiplying with a constant factor and the multipliers consist of many figures and differ widely from one another in value it is advantageous to clear the quotient and product registers between the different multiplications. The calculations are, of course, still carried out with alternation to the left and right. The advantage of this clearing is, that one is only dependent on a single multiplier at a time. The quotient register does not need to be considered in such a case and the usual shortened calculation can be carried out.

Division with a constant divisor.

The problem of carrying out a number of divisions with the same divisor is quite often met with. This happens when, for instance, it is necessary to reckon the gross price from the nett price and a certain percentage of profit on the gross price is to be included, overhead-costs sheets, yearly balance sheets for savings clubs, sick benefit clubs etc., where it is desired to know just how large a percentage of the whole sum every item represents.

In all these cases the problem is handled according to »multiplication with a constant factor» as the division is carried out by multiplication, using the inverted value of the divisor. This means that,

using the letter A to represent the divisor, the multiplication formula would be $\frac{1}{A}$.

The actual calculating operation is shown below.

Example: Give the actual of the total cost for each item below.

Castings	5 676	9.60 %
Other raw materials	13 743	23.23 %
Accessories bought	2 944	4.98 %
Production salaries	9 626	16.27 %
Transport costs	1 245	2.10 %
Assembling costs	11 551	19.53 %
Diverse costs	14 365	24.29 %
Total	59 150	100.00 %

The total 59 150 is the constant factor by which all the varying sums are to be divided. Firstly the divisors inverted value is reckoned out

$$\frac{1}{59150} = 0{,}0000169062.$$

The inverted value can be reckoned out by the usual method of division, but can best be arrived at by means of the following simple operation whereby the necessity of setting the figure 1 to the left in the product register is avoided.

Set the number 59 150, press the tabulator key and turn the crank in a plus (forward) direction until the bell rings. Make a step to the right and crank minus (backwards) turns until the bell rings. Continue with alternate plus and minus turns and the number which subsequently appears in the quotient register is the inverted value. To determine the placing of the decimal, set as many noughts before the resultant figure as there are figures in the divisor, in this case 59 150 = 5 noughts. The first nought is a whole figure. The inverted value of 59 150 is therefore 0.0000169062.

The figures 169 062 are set as the constant multiplicand and the different amounts as given in the example are multiplied with this. Finally control that the percentage total is 100 %. Should it happen that the total exceeds 100 % by a small fraction of a percent adjust one of the items, preferably the largest.

Practical examples.

Example: 1 dozen costs $ 3.75. What is the cost of $^1/_{12}$ doz. and what is the cost of $^7/_{12}$ doz.?

Both calculations can be made simultaneously in the following manner. Set 120 000 007 by the keys. Depress the division key. Turn the crank forwards as many turns as necessary and move the setting register, depressing the right stepping key in the same way as mentioned under »Division by multiplication» until the figure 375 appears at the extreme left in the product register. One dozen costs 3.75. Consequently the decimal pointer should be placed between 3 and 7, so that the figure 12 becomes visible in the aperture of the decimal pointer in the product register. Set the decimal pointer in the setting register immediately after the figure 12 in this register, when it has its original position. In the aperture of the decimal pointer in the setting register the figure 7 appears. Consequently the decimal pointer in the quotient register should be placed in the fifth position, because the total of the decimals in the quotient and the setting registers is the same as the decimals in the product register. Now the result can be read. 3.75 : 12 = 0.3125. The price per unit is 0.31. As 7 however, is visible at the extreme right in the setting register, by placing the other decimal pointer in the product register on the same figure as visible in the aperture of the decimal pointer in the quotient register (5) it is evident that 0 31 25 multiplied by 7 = 2.1875, and consequently 7 units cost 2.19 $ by rounding up to the second decimal.

Accounts.

When calculating accounts it is possible to carry out a normal addition to the right of the product register and a lesser multiplication to the left at the same time.

Example: 1	at		12.76
1	»		3.75
1	»		2.84
3	»	0.84 each	2.52
2	»	9.48 each	18.96
			40.83

Add as usual 12.76 + 3.75 + 2.84. Let the result 19.35 remain in the product register. Using the figure keys set the number 084, press the tabulator key and make 3 plus turns. Indicate the decimal places as

usual and read the answer 2.52. Add this result to 19.35. In order to carry out the next multiplication the figures 2.52 must be removed from the left hand part of the product register. Set 2.52 in the setting register. Press the tabulator key and make 1 minus crank turn. The machine is now ready for the next multiplication. Set 0948, press the tabulator key and make 2 plus turns. The number 18.96 is seen in the product register and this is added to the number 21.87 which is still present in the product register's right side. The answer of 40.83 is now given.

Calculating rebates.

Example: 155 shall be increased by 42 %.

This calculation is carried out in one consecutive operation. Using the figure keys set the number 155, make 2 plus turns, one step to the left followed by 4 more plus turns. If desired the rebate can now be notated from the product register after which a step to the left is made followed by 1 plus turn. In the product register the figures 22 010 are now given. Mark off 2 decimal places and the answer is 220.10.

If, for example, 33 % have to be deducted from Kr. 315:—, proceed as follows.

315 is set up by the keys. Move the setting register 2 places to the left and make 1 turn forward. 31 500 is then obtained in the product register and 100 in the quotient register. Clear the quotient register. Move the setting register 1 place to the right and turn the crank 3 times backwards. With this action a red signal is now visible to the right of the quotient register which shows that the quotient register is now reckoning the minus turns. Move one more step to the right and make 3 minus turns. The number 21 105 now stands in the product register and the number 33 in the quotient register. As 33 was the percentage, the position of the decimal in the quotient register will be 2. From this it follows that even in the product register 2 decimal places should also be marked off. The answer is 33 % from 315 = 211.05.

Computation of interest.

1) Without tables.

Example: What is the interest on $ 35 876.37 for 43 days at the rate of 5 %?

The calculation is made in accordance with the wellknown formula:

$$\text{interest} = \frac{\text{principal} \times \text{rate} \times \text{days.}}{100 \times 360.}$$

$$\frac{35\,876.37 \times 5 \times 43}{100 \times 360.} = \$\ 214.26.$$

The multiplication is made as described under »Continuous multiplication of products», page 15. The product obtained should be divided by 36 000 according to methods described under »Division».

2) With the aid of the tables on page 37.

In the tables on page 37 the expression $\frac{\text{rate}}{100 \times 360}$ which is a part of the formula mentioned above is computed for the respective percentages so that the calculation is simplified to

$$\text{interest} = \frac{\text{principal} \times \text{days}}{\text{interest divisor}} \text{ or}$$

principal $\times$ days $\times$ interest factor.

The amount of interest is thus obtained by multiplication of the principal with the number of days; after this the product is either divided by the divisor of percentage, or multiplied by the factor of percentage.

Example: What is the interest on \$ 1 238 for 53 days at the rate of 4.5 %?

$$\frac{1\,238 \times 53}{8\,000} = \$\ 8.20 \text{ or}$$

$$1238 \times 53 \times 0.000125 = \$\ 8.20$$

Estimating the selling price when the purchase price and amount of selling cost, profit, and discount are known.

Example: At what price shall a merchandise be sold of which the cost price is \$13.75, and for which the selling costs are 14 % of the selling price, in order that the profit shall be 25 % of that price?

The calculation is made by aid of the table on page 38 in the following way:

First the two percentes 14 and 25 are added when 39 is obtained. This figure is looked up in the column of the rates in the table and the corresponding factor is 1.6393, which should be multiplied by 13.75. The product 22.540375, or shortened $ 22.54, is the selling price wanted.

If it is desired to learn the gross price which, after deducting a certain discount, will give the previously decided salesprice, the operation is carried out in the same manner as above.

Example: What gross price is necessary so that with a 10 % discount the price will be 22.54 crowns?

Using the factor of 1.1111 (10 % in table 4 at the end of the book) multiply by 22.54. This gives 25.04, which is the desired gross price.

If one has to fix different prices with the same percentages, one can obtain the gross amounts directly from the cost prices if these are multiplied by the products of the factors which correspond to the percentage. In the above example $ 13.75 should thus be multiplied by 1.6393 × 1.1111 = 1.8214, which makes the gross amount of $ 25.04.

Wage calculations.

In the following example a calculation is made based on an hourly wage.

Example: Calculate the wage in the following case.

Worker	Working hours	Crowns per hour	Total	
No. 3483	46.5	1.28	59.52	
Deductions:				
Income tax			3.25	
Trade union dues			4.70	
Sick club dues			1.60	
Life insurance			2.10	
Accident insurance			1.05	12.70
				nett 46.82

This example is worked out in the following way.

Set the number 465 and multiply by 128. This gives 59 520 in the product register. In the setting register, which shows the factor 465, 1 decimal place is indicated, in the quotient register 2 and in the product register 3 decimal places.

The product register now shows the gross wage of 59.52 crowns. The five deductions are added up in the empty left hand portion of the product register. After the setting of each item a step is made to the left, then the tabulator key is pressed and then a plus crank turn. The sum of the deductions 12.70, is now set in the setting register as 12 700 on account of the gross wage in the product register having 3 decimals. A minus turn is made and the product register gives the nett wage of 46.82.

Calculating in English quantities.

By using table 5 the greatest even number of shillings is first reckoned. This number, divided by two, is the first decimal in the desired decimal fraction, as can be seen from the heading of the table. The remaining decimals can be obtained direct from the table.

When the decimals of a pound are to be converted into shillings and pence the following method is employed. The first decimal is doubled and should the second decimal be greater than 4 the first decimal is raised. By this means the number of whole shillings is given. Table 5 is then consulted to ascertain which decimal fraction most nearly corresponds to the remaining decimal fraction, that is the 2nd to the 5th decimal places. The pence amount, to the left of the table, is then noted. It has been shown that this form of pound table is handier than a complete calculation of the decimals for the different amounts of shillings and pence.

Example: What is the cost of 3 1/4 lbs. at £ 6.17.7d. per lb.

The sum of £ 6.17.7d. can be written as £ 6.16s + 1.7d. Using table 5 this is converted to £ 6.87917 and the calculation becomes

$$6.87917 \times 3.25 = 22.3573025$$

The product, 22.3573025, can be thought of as 22.3 + .0573025. As the second decimal is 5 the shilling amount would be 7 ($3 \times 2 + 1 = 7$). By table 5 the answer is given as £ 22.7.2d.

Note: If it should be necessary to give a more exact answer, e.g. to the nearest farthing, the decimal fraction remaining after the subtraction of the pounds and shillings must be multiplied by 240.

In this case the equation would be $.0073025 \times 240 = 1.75$ and the answer would therefore be £ 22.7.1 3/4d.

When the sum is small, or when it contains a fraction of a penny, shillings are used as units. This is handled in the same way as when the amounts are pounds but table 6 is used.

Example: How much does a person earn in 83 hours if he recieves 1.7 $^{3}/_{4}$ per hour?

From table 6 the sum of 1.7 $^{3}/_{4}$ is given as 1.64583 shillings.
The total salary is, therefore $1.64583 \times 83 = 136.60389$.
The sum 136.60389 sh. is then converted to pounds, shillings and pence. Reckoning in the head gives 136 shillings as £ 6.16.0 and from table 6 the remainder, .60389, is given as 7d. if it is taken to the nearest penny. The easiest way to find this in the table is to look down the column for $^{1}/_{2}$ d. It will be seen that .60389 is greater than 6 ½ but less than 7. It is, however, nearer to 7 than 6 ½ so the answer is £ 6.16.7d.
In table 7 it should be noted that the first decimal is given when the number of cwts. is divided by two. The remaining decimals are taken direct from the table. This is the same rule as for table 5.

Example: What is the cost of 5 ton 11 cwts. 3 qrs. 13 lbs. at £ 3.13.7 $^{1}/_{2}$ per ton?

The weights are divided up into 5 ton 10 cwts. and 1 cwt. 3 qrs. 13 lbs. Reckoning in the head and using table 7 this becomes 5.593304 tons. According to table 5 the price per ton is £ 3.68125. The calculation is therefore 5.593304×3.68125 which gives the product of 20.59035. From table 5 the answer of £ 20.11.10d is given.

Example: Out of 13 cwts. 1 qr. 14 lbs. of goods 1 cwt. 3 qrs. 17 lbs. is destroyed. What is the percentage of loss?

From table 8 the following is given

1 qr. 14 lbs. = .37500 cwts.
3 qrs. 17 lbs. = .90179 cwts.

The percentage of loss is therefore

$$\frac{1.90179}{13.37500} \times 100 = 14.22\ \%.$$

Calculating square roots.

The method of finding the square root which has been given in all the Facit handbooks up to the present is that devised by Dr. Kerl.

This method is based on the mathematical formula

$$\frac{(x+h)^2}{x} = x + 2h + \frac{h^2}{x} \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

which then gives

$$\frac{1}{2}\left[x + \left(x + 2h + \frac{h^2}{x}\right)\right] = (x+h) + \frac{h^2}{2x} \ldots (2)$$

This means that the given number $(x + h)^2$ is divided by the approximate root x whereupon the common factor of the divisor and the quotient gives a new 'nearest value' for the root. On condition that h is small in comparison to x the margin of error in $\frac{h^2}{2x}$ will be very small in the root value. To increase the accuracy the same operation can be repeated, based on the later approximation. The approximate value x is decided by slide rule or table, after the number in the usual way, taking it from the decimal point, is divided into two figure groups.

It should be observed that the number of exact numbers increases to almost double from one approximation to another. In this way it is possible to estimate the accuracy of a square root obtained by seeing how many figures correspond in the previous approximate value. With the help of a slide rule, 30 cms long, 6 correct figures are generally available after the first division.

The following simple rule for the deciding of the error in $\frac{h^2}{2x}$ does away with the need of considering the decimals.

The difference in the fifth figure from one approximation to the next is squared and divided by double the value of the number which is made up of the first two figures in the root. The error is then found in the eighth figure in the later approximation and must be subtracted to find the final value. This correcting can easily be done in the head as the error is usually confined to only a few cases.

Should only six figures be required in the root, which is the case when the slide rule is used, the following rule is applied.

The alteration in the *fourth* figure is squared and divided by twice the value of the first two root figures. This is the error in the *seventh* figure.

The above average value reckoning can be avoided, thus saving time and reducing the risk of errors. The machine gives the average value direct if the method of calculation is altered as follows: The

previous example (1) can be written as

$$\frac{(x+h)^2-x^2}{2x}=h+\frac{h^2}{2x}\ldots\ldots\ldots(3)$$

This equation represents an addition to x in the form of

$$(x+h)+\frac{h^2}{2x}.$$

Set the given number $(x + h)^2$ to the left in the product register. Clear the setting and quotient registers. Set the first approx. value x in the setting register and multiply *negatively* by x. The number x then appears in the quotient register, which is coupled for division, and in the product register appears the remainder $-(x + h)^2 - x^2$. This is later divided by the value 2 x, which can be done in the head. The given quotient is then added to the value x, which is already in the quotient register. By this the next root approximation is given direct.

Note. If the remainder $[(x + h)^2 - x^2]$ is negative the following division is started with a plus turn.

With this method the finding of the root is carried out faster and there is no need to write down the progressive stages. The calculation can, like division, be carried out by means of multiplication. In this case $(x + h)^2$ is not set in the product register but instead it is built up in the product register according to the formula:

$$(x+h)^2=x\times x+2x\left(h+\frac{h^2}{2x}\right)$$

Should $(x + h)^2$ be comprised of many figures a considerable amount of time would be lost in observing the figures in the product register and therefore the earlier method is recommended.

Example: Give $\sqrt{453278}$ with 8 figures according to the first method.

Transfer the figures 453278 to the left of the product register. From the sliding rule take the root 673. Set $\overline{0673}$ in the setting register and press the tabulator key. Mark off 7 decimal places in the product register and consequently 5 (7—2) in the quotient register. Direct division gives the quotient 673.51857. The new approximation is therefore $673.\overline{25929}$ where at least 5 of the figures are correct.

As the next approximation 673.26 is taken. A new division gives the quotient of 673.25847 and the root value $673.\underline{25924}$ where all the figures are correct.

Example: give $\sqrt{453278}$ with 8 figures according to the second method.

Transfer the figures 453278 to the left of the product register. From the sliding rule take the root 673. Set 0673 in the setting register. Press the tabulator key by which means two noughts appear after 0673. Mark off the decimal places as in the previous example. Reckon in 673 in the quotient register, *using minus turns*. The remainder in the product register is then $349.0\ldots$ Clear the setting register and set 1346 (2 x 0673). Press the tabulator key so that two noughts again appear and thus the decimal places be correct. Thereafter a normal division gives the root value of $673.\underline{25929}$ in which at least 5 figures are correct.

The difference in the fifth figure between 673.25929 and 673.00 is 26 parts. According to this the error in the eighth figure will be

$$\frac{26^2}{2\times 67} = \text{approx: } \frac{700}{140} = 5.$$

The correct square root is therefore $673.25929 - 0.00005 = 673.25924$. This can be seen to agree with the value given after a second division in the previous example.

If greater accuracy than that given by a slide rule is desired, or if the use of the slide rule is undesired, the first approximation, or estimate, should be decided with the help of the table on page 42 of the squares of the numbers 10.0—99.9. This table, printed on stout cardboard, can be had from the Facit representative on request.

The table gives three figures direct and the fourth can be worked out approximately in the head. The second approximation shows a slight error in the eighth figure. This error can be adjusted in a second in the head, using the demonstrated rule.

Example: Give $\sqrt{453278}$ with 8 figures using the table.

Find the squares between which 4532.8 is found in the table. This gives

$$4529 = 67.3^2$$
$$4543 = 67.4^2$$

The first three figures of the root are, therefore, 673 and the fourth can be produced mentally. The greatest difference is

$$4543 - 4529 = 14$$

and the smallest difference is

$$4532.8 - 4529 = 3.8$$

It should be observed that the decimal in the smallest difference must be included. The fourth figure is therefore

$$\frac{3.8 \times 10}{14} = 3$$

The four first figures of the root are now 6733 and, as in the previous example, the square root is $6733.\overline{25924}$.

The answer can be controlled by the rule on page 32.

First value: 67330000
Second value: 67325924

The difference between the fifth figures is 4.1 parts and the two first figures doubled are 134. The error in the eighth figure is therefore

$$\frac{4{,}1^2}{134} < 0{,}2$$

The answer of $673.\overline{25924}$ is therefore correct.

4. Tables.

Table 1. Conversion of common fractions into decimal fractions.

a) 4 ths. 8 ths. 16 ths. 32 ths

1/4	1/8	1/16	1/32		1/4	1/8	1/16	1/32	
				0,	2				0,50000
			1	03125				17	53125
		1		06250			9		56250
			3	09375				19	59375
	1			12500		5			62500
			5	15625				21	65625
		3		18750			11		68750
			7	21875				23	71875
1				25000	3				75000
			9	28125				25	78125
		5		31250			13		81250
			11	34375				27	84375
	3			37500		7			87500
			13	40625				29	90625
		7		43750			15		93750
			15	46875				31	96875

b. 6 ths. 12 ths.

1/6	1/12	
		0,
	1	08333
1	2	16667
	3	25000
2	4	33333
	5	41667
3	6	50000
	7	58333
4	8	66667
	9	75000
5	10	83333
	11	91667

c) 30 ths.

1/30	
	0,
1	03333
2	6667
3	10000
4	3333
5	6667
6	20000
7	3333
8	6667
9	30000
10	3333
11	6667
12	40000
13	3333
14	6667
15	50000
16	3333
17	6667
18	60000
19	3333
20	6667
21	70000
22	3333
23	6667
24	80000
25	3333
26	6667
27	90000
28	3333
29	6667

Table 2. Interest factors. 1 year = 360 days.

%	0	1/4	1/2	3/4
	0,000	0,000	0,000	0,000
0	0000 000	0069 444	0138 889	0208 333
1	0277 778	0347 222	0416 667	0486 111
2	0555 555	0625 000	0694 444	0763 889
3	0833 333	0902 778	0972 222	1041 667
4	1111 111	1180 556	1250 000	1319 444
5	1388 889	1458 333	1527 778	1597 222
6	1666 667	1736 111	1805 556	1875 000
7	1944 444	2013 889	2083 333	2152 778
8	2222 222	2291 667	2361 111	2430 556
9	2500 000	2569 444	2638 889	2708 333
10	2777 778	2847 222	2916 667	2986 111
11	3055 556	3125 000	3194 444	3263 889
12	3333 333	3402 778	3472 222	3541 667
13	3611 111	3680 556	3750 000	3819 444
14	3888 889	3958 333	4027 778	4097 222
15	4166 667	4236 111	4305 556	4375 000

Table 3. Interest divisors. 1 year = 360 days.

%	0	1/4	1/2	3/4
0		144 000,000	72 000,000	48 000,000
1	36 000,000	28 800,000	24 000,000	20 571,429
2	18 000,000	16 000,000	14 400,000	13 090,909
3	12 000,000	11 076,923	10 285,714	9 600,000
4	9 000,000	8 470,588	8 000,000	7 578,947
5	7 200,000	6 857,143	6 545,455	6 260,870
6	6 000,000	5 760,000	5 538,462	5 333,333
7	5 142,857	4 965,517	4 800,000	4 645,161
8	4 500,000	4 363,636	4 235,294	4 114,286
9	4 000,000	3 891,892	3 789,474	3 692,308
10	3 600,000	3 512,195	3 428,571	3 348,837
11	3 272,727	3 200,000	3 130,435	3 063,830
12	3 000,000	2 938,776	2 880,000	2 823,529
13	2 769,231	2 716,981	2 666,667	2 618,182
14	2 571,429	2 526,316	2 482,759	2 440,678
15	2 400,000	2 360,656	2 322,581	2 285,714

Table 4. Factors for converting cost prices to selling prices at a given percentage profit.

The percentage profit is reckoned on the selling price.

%	Factors	%	Factors	%	Factors	%	Factors
1	1,0101	26	1,3514	51	2,0408	76	4,1667
2	1,0204	27	1,3699	52	2,0833	77	4,3478
3	1,0309	28	1,3889	53	2,1277	78	4,5455
4	1,0417	29	1,4085	54	2,1739	79	4,7619
5	1,0526	30	1,4286	55	2,2222	80	5,0000
6	1,0638	31	1,4493	56	2,2727	81	5,2632
7	1,0753	32	1,4706	57	2,3256	82	5,5556
8	1,0870	33	1,4925	58	2,3810	83	5,8824
9	1,0989	34	1,5152	59	2,4390	84	6,2500
10	1,1111	35	1,5385	60	2,5000	85	6,6667
11	1,1236	36	1,5625	61	2,5641	86	7,1429
12	1,1364	37	1,5873	62	2,6316	87	7,6923
13	1,1494	38	1,6129	63	2,7027	88	8,3333
14	1,1628	39	1,6393	64	2,7778	89	9,0909
15	1,1765	40	1,6667	65	2,8571	90	10,0000
16	1,1905	41	1,6949	66	2,9412	91	11,1111
17	1,2048	42	1,7241	67	3,0303	92	12,5000
18	1,2195	43	1,7544	68	3,1250	93	14,2857
19	1,2346	44	1,7857	69	3,2258	94	16,6667
20	1,2500	45	1,8182	70	3,3333	95	20,0000
21	1,2658	46	1,8519	71	3,4483	96	25,0000
22	1,2821	47	1,8868	72	3,5714	97	33,3333
23	1,2987	48	1,9231	73	3,7037	98	50,0000
24	1,3158	49	1,9608	74	3,8462	99	100,0000
25	1,3333	50	2,0000	75	4,0000		

Table 5. Conversion of shillings and pence to decimals of a pound.

1 s. = 0,05 £ 1 d. = 0,00416 667 £

The table gives 5 decimals.

Shillings 2 4 6 8 10 12 14 16 18 Pounds ,1 ,2 ,3 ,4 ,5 ,6 ,7 ,8 ,9		
d.	0 s.	1 s.
	0,0	0,0
0	0000	5000
1	0417	5417
2	0833	5833
3	1250	6250
4	1667	6667
5	2083	7083
6	2500	7500
7	2917	7917
8	3333	8333
9	3750	8750
10	4167	9167
11	4583	9583

1/4 d. = 0,00104 £ 1/2 d. = 0,00208 £ 3/4 d. = 0,00313 £

Table 6. Conversion of pence (inch) to decimals of 1 sh. (foot).

1 d. (inch) = 0,083333 sh. (foot)

d. (inch)	0	1/8	1/4	3/8	1/2	5/8	3/4	7/8
	0,	0,	0,	0,	0,	0,	0,	0,
0	00000	01042	02083	03125	04167	05208	06250	07292
1	08333	09375	10417	11458	12500	13542	14583	15625
2	16667	17708	18750	19792	20833	21875	22917	23958
3	25000	26042	27083	28125	29167	30208	31250	32292
4	33333	34375	35417	36458	37500	38542	39583	40625
5	41667	42708	43750	44792	45833	46875	47917	48958
6	50000	51042	52083	53125	54167	55208	56250	57292
7	58333	59375	60417	61458	62500	63542	64583	65625
8	66667	67708	68750	69792	70833	71875	72917	73958
9	75000	76042	77083	78125	79167	80208	81250	82292
10	83333	84375	85417	86458	87500	88542	89583	90625
11	91667	92708	93750	94792	95833	96875	97917	98958

1/32 d. = 0,00260 s. 1/16 d. = 0,00521 s. 3/32 d. = 0,00781 s.

Table 7. Conversion of cwts. qrs. and lbs. to decimals of a ton.

1 lb. = 0,000446429 ton.

The table gives 6 decimals.

Cwts.	2	4	6	8	10	12	14	16	18
Tons	,1	,2	,3	,4	,5	,6	,7	,8	,9

lb.	0 cwt.				1 cwt.			
	0 qr.	1 qr.	2 qrs.	3 qrs.	0 qr.	1 qr.	2 qrs.	3 qrs.
	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
0	00000	12500	25000	37500	50000	62500	75000	87500
1	00446	12946	25446	37946	50446	62946	75446	87946
2	00893	13393	25893	38393	50893	63393	75893	88393
3	01339	13839	26339	38839	51339	63839	76339	88839
4	01786	14286	26786	39286	51786	64286	76786	89286
5	02232	14732	27232	39732	52232	64732	77232	89732
6	02679	15179	27679	40179	52679	65179	77679	90179
7	03125	15625	28125	40625	53125	65625	78125	90625
8	03571	16071	28571	41071	53571	66071	78571	91071
9	04018	16518	29018	41518	54018	66518	79018	91518
10	04464	16964	29464	41964	54464	66964	79464	91964
11	04911	17411	29911	42411	54911	67411	79911	92411
12	05357	17857	30357	42857	55357	67857	80357	92857
13	05804	18304	30804	43304	55804	68304	80804	93304
14	06250	18750	31250	43750	56250	68750	81250	93750
15	06696	19196	31696	44196	56696	69196	81696	94196
16	07143	19643	32143	44643	57143	69643	82143	94643
17	07589	20089	32589	45089	57589	70089	82589	95089
18	08036	20536	33036	45536	58036	70536	83036	95546
19	08482	20982	33482	45982	58482	70982	83482	95982
20	08929	21429	33929	46429	58929	71429	83929	96429
21	09375	21875	34375	46875	59375	71875	84375	96875
22	09821	22321	34821	47321	59821	72321	84821	97321
23	10268	22768	35268	47768	60268	72768	85268	97768
24	10714	23214	35714	48214	60714	73214	85714	98214
25	11161	23661	36161	48661	61161	73661	86161	98661
26	11607	24107	36607	49107	61607	74107	86607	99107
27	12054	24554	37054	49554	62054	74554	87054	99554

$^1/_2$ lb. = 0,000223 ton.

Table 8. Conversion of qrs. and lbs. to decimals of 1 cwt.

1 lb. = 0,00892857 cwt.

lb.	0 qr.	1 qr.	2 qrs.	3 qrs.
	0,	0,	0,	0,
0	00000	25000	50000	75000
1	00893	25893	50893	75893
2	01786	26786	51786	76786
3	02679	27679	52679	77679
4	03571	28571	53571	78571
5	04464	29464	54464	79464
6	05357	30357	55357	80357
7	06250	31250	56250	81250
8	07143	32143	57143	82143
9	08036	33036	58036	83036
10	08929	33929	58929	83929
11	09821	34821	59821	84821
12	10714	35714	60714	85714
13	11607	36607	61607	86607
14	12500	37500	62500	87500
15	13393	38393	63393	88393
16	14286	39286	64286	89286
17	15179	40179	65179	90179
18	16071	41071	66071	91071
19	16964	41964	66964	91964
20	17857	42857	67857	92857
21	18750	43750	68750	93750
22	19643	44643	69643	94643
23	20536	45536	70536	95536
24	21429	46429	71429	96429
25	22321	47321	72321	97321
26	23214	48214	73214	98214
27	24107	49107	74107	99107

1/2 lb. = 0,00446 cwt.

Table 9. Conversion of ounces to decimals of a pound.

1 oz. = 0,062500 lb.

oz.	lb.	oz.	lb.
	0,		0,
		8	500000
1/4	015625	8 1/4	515625
1/2	031250	8 1/2	531250
3/4	046875	8 3/4	546875
1	062500	9	562500
1 1/4	078125	9 1/4	578125
1 1/2	093750	9 1/2	593750
1 3/4	109375	9 3/4	609375
2	125000	10	625000
2 1/4	140625	10 1/4	640625
2 1/2	156250	10 1/2	656250
2 3/4	171875	10 3/4	671875
3	187500	11	687500
3 1/4	203125	11 1/4	703125
3 1/2	218750	11 1/2	718750
3 3/4	234375	11 3/4	734375
4	250000	12	750000
4 1/4	265625	12 1/4	765625
4 1/2	281250	12 1/2	781250
4 3/4	296875	12 3/4	796875
5	312500	13	812500
5 1/4	328125	13 1/4	828125
5 1/2	343750	13 1/2	843750
5 3/4	359375	13 3/4	859375
6	375000	14	875000
6 1/4	390625	14 1/4	890625
6 1/2	406250	14 1/2	906250
6 3/4	421875	14 3/4	921875
7	437500	15	937500
7 1/4	453125	15 1/4	953125
7 1/2	468750	15 1/2	968750
7 3/4	484375	15 3/4	984375

Table 10. Table of squares, correctly rounded off to four figures. The first four figures of the square root are found in the tables, of which the last figure is estimated. A following division process gives the square root required with 7 to 8 figures.

√	,0	,1	,2	,3	,4	,5	,6	,7	,8	,9
10	100,0	102,0	104,0	106,1	108,2	110,3	112,4	114,5	116,6	118,8
11	121,0	123,2	125,4	127,7	130,0	132,3	134,6	136,9	139,2	141,6
12	144,0	146,4	148,8	151,3	153,8	156,3	158,8	161,3	163,8	166,4
13	169,0	171,6	174,2	176,9	179,6	182,3	185,0	187,7	190,4	193,2
14	196,0	198,8	201,6	204,5	207,4	210,3	213,2	216,1	219,0	222,0
15	225,0	228,0	231,0	234,1	237,2	240,3	243,4	246,5	249,6	252,8
16	256,0	259,2	262,4	265,7	269,0	272,3	275,6	278,9	282,2	285,6
17	289,0	292,4	295,8	299,3	302,8	306,3	309,8	313,3	316,8	320,4
18	324,0	327,6	331,2	334,9	338,6	342,3	346,0	349,7	353,4	357,2
19	361,0	364,8	368,6	372,5	376,4	380,3	384,2	388,1	392,0	396,0
20	400,0	404,0	408,0	412,1	416,2	420,3	424,4	428,5	432,6	436,8
21	441,0	445,2	449,4	453,7	458,0	462,3	466,6	470,9	475,2	479,6
22	484,0	488,4	492,8	497,3	501,8	506,3	510,8	515,3	519,8	524,4
23	529,0	533,6	538,2	542,9	547,6	552,3	557,0	561,7	566,4	571,2
24	576,0	580,8	585,6	590,5	595,4	600,3	605,2	610,1	615,0	620,0
25	625,0	630,0	635,0	640,1	645,2	650,3	655,4	660,5	665,6	670,8
26	676,0	681,2	686,4	691,7	697,0	702,3	707,6	712,9	718,2	723,6
27	729,0	734,4	739,8	745,3	750,8	756,3	761,8	767,3	772,8	778,4
28	784,0	789,6	795,2	800,9	806,6	812,3	818,0	823,7	829,4	835,2
29	841,0	846,8	852,6	858,5	864,4	870,3	876,2	882,1	888,0	894,0
30	900,0	906,0	912,0	918,1	924,2	930,3	936,4	942,5	948,6	954,8
31	961,0	967,2	973,4	979,7	986,0	992,3	998,6	1005	1011	1018
32	1024	1030	1037	1043	1050	1056	1063	1069	1076	1082
33	1089	1096	1102	1109	1116	1122	1129	1136	1142	1149
34	1156	1163	1170	1176	1183	1190	1197	1204	1211	1218
35	1225	1232	1239	1246	1253	1260	1267	1274	1282	1289
36	1296	1303	1310	1318	1325	1332	1340	1347	1354	1362
37	1369	1376	1384	1391	1399	1406	1414	1421	1429	1436
38	1444	1452	1459	1467	1475	1482	1490	1498	1505	1513
39	1521	1529	1537	1544	1552	1560	1568	1576	1584	1592
40	1600	1608	1616	1624	1632	1640	1648	1656	1665	1673
41	1681	1689	1697	1706	1714	1722	1731	1739	1747	1756
42	1764	1772	1781	1789	1798	1806	1815	1823	1832	1840
43	1849	1858	1866	1875	1884	1892	1901	1910	1918	1927
44	1936	1945	1954	1962	1971	1980	1989	1998	2007	2016
45	2025	2034	2043	2052	2061	2070	2079	2088	2098	2107
46	2116	2125	2134	2144	2153	2162	2172	2181	2190	2200
47	2209	2218	2228	2237	2247	2256	2266	2275	2285	2294
48	2304	2314	2323	2333	2343	2352	2362	2372	2381	2391
49	2401	2411	2421	2430	2440	2450	2460	2470	2480	2490
√	,0	,1	,2	,3	,4	,5	,6	,7	,8	,9

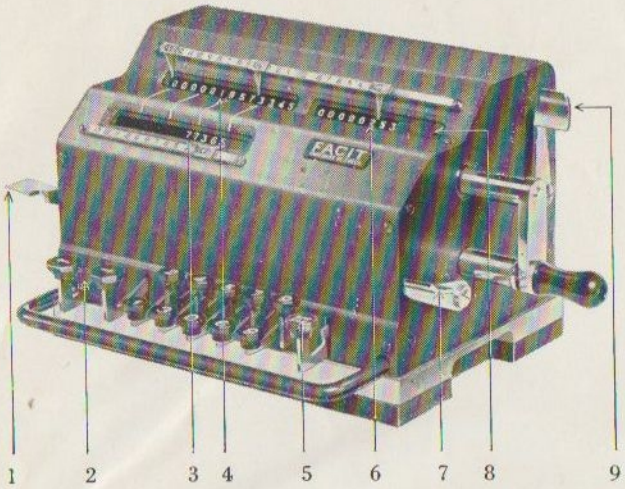
The tables of squares, printed on cardboard, are supplied separately, on request.

Table 10. Table of squares (continued from previous page).

V	,0	,1	,2	,3	,4	,5	,6	,7	,8	,9
50	2500	2510	2520	2530	2540	2550	2560	2570	2581	2591
51	2601	2611	2621	2632	2642	2652	2663	2673	2683	2694
52	2704	2714	2725	2735	2746	2756	2767	2777	2788	2798
53	2809	2820	2830	2841	2852	2862	2873	2884	2894	2905
54	2916	2927	2938	2948	2959	2970	2981	2992	3003	3014
55	3025	3036	3047	3058	3069	3080	3091	3102	3114	3125
56	3136	3147	3158	3170	3181	3192	3204	3215	3226	3238
57	3249	3260	3272	3283	3295	3306	3318	3329	3341	3352
58	3364	3376	3387	3399	3411	3422	3434	3446	3457	3469
59	3481	3493	3505	3516	3528	3540	3552	3564	3576	3588
60	3600	3612	3624	3636	3648	3660	3672	3684	3697	3709
61	3721	3733	3745	3758	3770	3782	3795	3807	3819	3832
62	3844	3856	3869	3881	3894	3906	3919	3931	3944	3956
63	3969	3982	3994	4007	4020	4032	4045	4058	4070	4083
64	4096	4109	4122	4134	4147	4160	4173	4186	4199	4212
65	4225	4238	4251	4264	4277	4290	4303	4316	4330	4343
66	4356	4369	4382	4396	4409	4422	4436	4449	4462	4476
67	4489	4502	4516	4529	4543	4556	4570	4583	4597	4610
68	4624	4638	4651	4665	4679	4692	4706	4720	4733	4747
69	4761	4775	4789	4802	4816	4830	4844	4858	4872	4886
70	4900	4914	4928	4942	4956	4970	4984	4998	5013	5027
71	5041	5055	5069	5084	5098	5112	5127	5141	5155	5170
72	5184	5198	5213	5227	5242	5256	5271	5285	5300	5314
73	5329	5344	5358	5373	5388	5402	5417	5432	5446	5461
74	5476	5491	5506	5520	5535	5550	5565	5580	5595	5610
75	5625	5640	5655	5670	5685	5700	5715	5730	5746	5761
76	5776	5791	5806	5822	5837	5852	5868	5883	5898	5914
77	5929	5944	5960	5975	5991	6006	6022	6037	6053	6068
78	6084	6100	6115	6131	6147	6162	6178	6194	6209	6225
79	6241	6257	6273	6288	6304	6320	6336	6352	6368	6384
80	6400	6416	6432	6448	6464	6480	6496	6512	6529	6545
81	6561	6577	6593	6610	6626	6642	6659	6675	6691	6708
82	6724	6740	6757	6773	6790	6806	6823	6839	6856	6872
83	6889	6906	6922	6939	6956	6972	6989	7006	7022	7039
84	7056	7073	7090	7106	7123	7140	7157	7174	7191	7208
85	7225	7242	7259	7276	7293	7310	7327	7344	7362	7379
86	7396	7413	7430	7448	7465	7482	7500	7517	7534	7552
87	7569	7586	7604	7621	7639	7656	7674	7691	7709	7726
88	7744	7762	7779	7797	7815	7832	7850	7868	7885	7903
89	7921	7939	7957	7974	7992	8010	8028	8046	8064	8082
90	8100	8118	8136	8154	8172	8190	8208	8226	8245	8263
91	8281	8299	8317	8336	8354	8372	8391	8409	8427	8446
92	8464	8482	8501	8519	8538	8556	8575	8593	8612	8630
93	8649	8668	8686	8705	8724	8742	8761	8780	8798	8817
94	8836	8855	8874	8892	8911	8930	8949	8968	8987	9006
95	9025	9044	9063	9082	9101	9120	9139	9158	9178	9197
96	9216	9235	9254	9274	9293	9312	9332	9351	9370	9390
97	9409	9428	9448	9467	9487	9506	9526	9545	9565	9584
98	9604	9624	9643	9663	9683	9702	9722	9742	9761	9781
99	9801	9821	9841	9860	9880	9900	9920	9940	9960	9980
V	,0	,1	,2	,3	,4	,5	,6	,7	,8	,9

The tables of squares, printed on cardboard, are supplied separately, on request.

FACIT model TK



Capacity: 9 × 8 × 13.

1. Clearing lever for the product register.
2. Spacing keys.
3. Setting register.
4. Product register.
5. Tabulator.
6. Multiplier (or quotient) register.
7. Clearing lever for the setting register.
8. Direction indicator (+ or —) for multiplier register.
9. Clearing lever for multiplier register.

FACIT
STOCKHOLM — SWEDEN

FH1e 1M 12. 48