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## Daro Soemtron 220

### Elektronischer Tischrechenautomat

### Bedienungsanleitung

69-220-000-5

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It has been published by us to disseminate information about the Soemtron 22x range of electronic desk calculators manufactured by V.E.B. (\*1) Büromaschinenwerk Sömmerda, as a project to gather and centralise whatever information can be found about these increasingly rare early electronic calculators.

If you have or know of any information, books, drawings, circuits, hardware, test equipment (prüfgerät) or other memorabilia relating to the Soemtron 220, 221, 222 or 224 calculators, their trade names - Daro or Soemtron, manufactured by - V.E.B. Büromaschinenwerk Sömmerda, please email us at - [mike@soemtron.org](mailto:mike@soemtron.org)

This document has been scanned from an original book, processed through an on-line OCR software package to regenerate the original German text and then automatically translated to English and imported into Microsoft Word. Layout has been duplicated in line with the original document as much as possible to retain the flow of the original document. Drawings, circuits and photographs are scans from the original document.

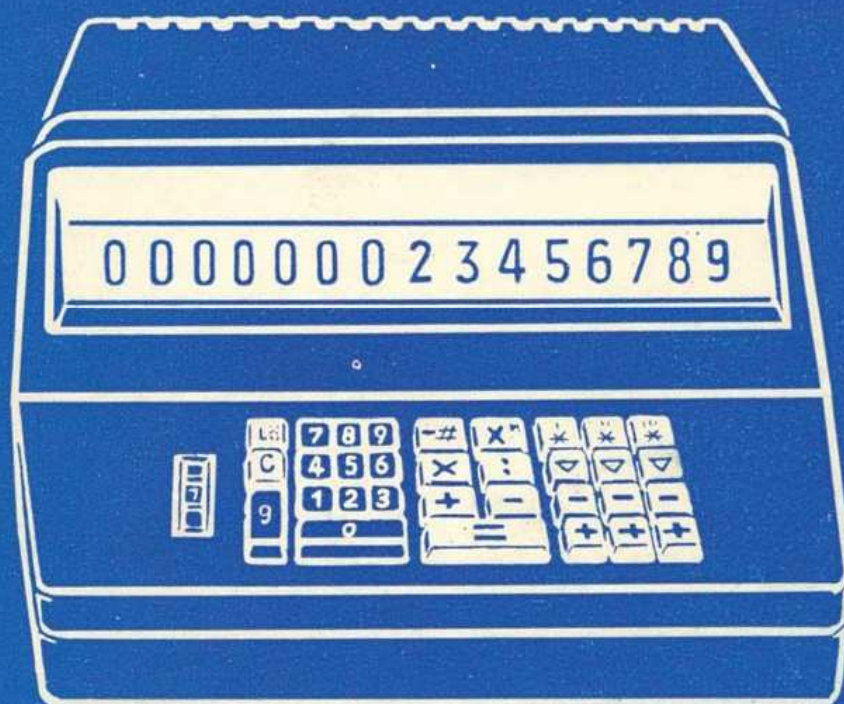
With this effort in mind some of the syntax in the document may be a little strange. Some portions have been reworked to be more readable English text but there is obviously more to be done. If you can help with this, or indeed have any helpful information or comments, please email us at - [mike@soemtron.org](mailto:mike@soemtron.org)

Please use, and hopefully enjoy, this information in the spirit in which we undertook to generate it - as an information source for an interesting piece of early calculator history before the advent of modern electronics, in the days when “hands on” engineers thought through the problems and challenges of designing equipment with little resources, to produce the best end product they could.

Bedienungsanleitung

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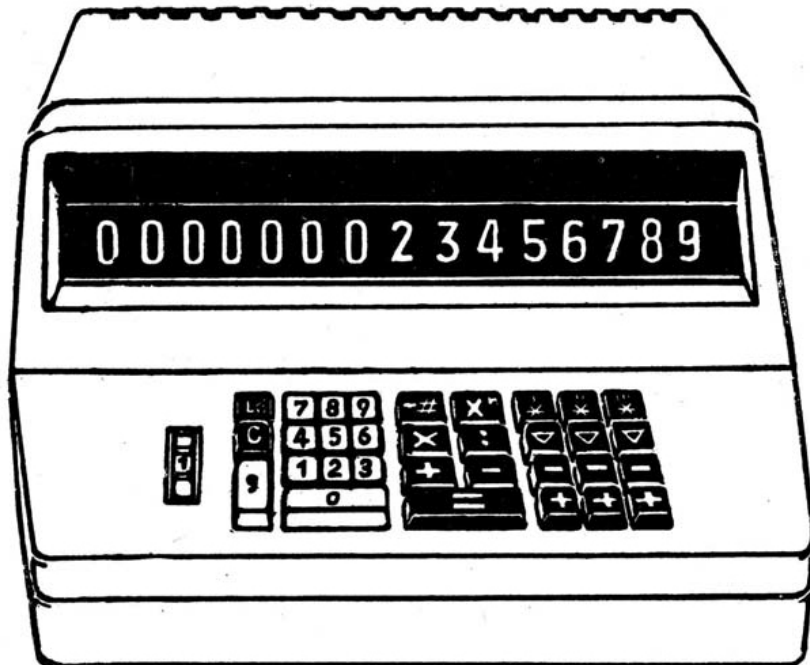


Elektronischer Tischrechenautomat



# 220

Elektronischer Tischrechenautomat



## Bedienungsanleitung

69-220-0000-5

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## 1. INTRODUCTION

Decades of experience in the design of computing machines have found their expression in the technical design of the electronic desktop calculator "Soemtron 220".

A device was developed with the electronic desktop calculator, which corresponds to the state of the art and significant advantages for its customers.

High computing power, noiseless operation of the arithmetic operations and simple operation are characteristic features of the electronic desktop calculator, with the time compared with the working on an electromechanical base of automatic calculators high economic efficiency can be achieved.

The electronic desktop calculator "Soemtron 220" solves the most varied tasks at all levels of commercial and scientific knowledge technical and technical sector.

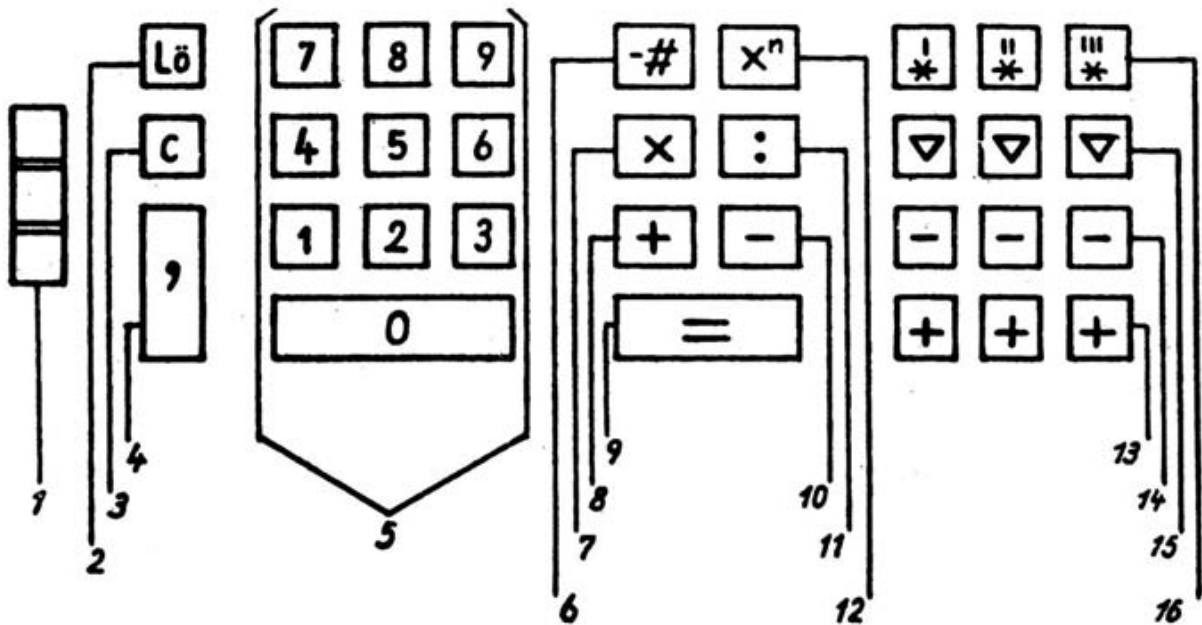
The electronic desktop calculator comes in 2 variants - as type 220/1 with a memory and as type 220/3 with 3 memories - manufactured.

The calculation functions are the same for both models. It accounts for only the type 220/1, the 2 rows of keys for the memory II and III. This means that tasks that require more than one memory, not with ETR 220/1.

As an effective means of organization, the electronic table calculating machine "Soemtron 220" is involved in the rational solution of arithmetical tasks their many variants take a decisive position and themselves prove by its great performance everywhere, where you look his served.

KEYBOARD of electronic desktop calculator

TASTATUR des elektronischen Tischrechenautomaten



1. Decimal point adjustment.
2. Delete key
3. Correction key
4. Decimal point key
5. Numeric Keypad
6. Sign key
7. Multiplication key
8. Addition Key
9. Result key
10. Subtraction
11. Division key
12. Exponentiation
13. Memory Addition
14. Memory subtraction
15. Memory recall without deletion
16. Memory recall with deletion

## 2. DESCRIPTION OF CONSTRUCTION AND EQUIPMENT

The electronic desktop calculator type 220 is a fully transistorized device. In addition to all the throat operations of the elementary calculation, he performs extensive combination calculations and exponentiation tasks quickly and mathematically exactly.

The machine is built according to the modular principle, so that a secure maintenance is guaranteed.

The electronic desktop computer consists of the following modules:

### Keyboard

The keyboard is arranged clearly and within reach. It is divided in 3 key groups:

Left key group:

Numeric keypad

0-9 Digits  
Decimal point dial  
LÖ Delete key  
C Correction key  
Decimal point key

Middle button group :

Function keys

# Enter a negative number  
Xn Exponentiation  
X Multiplication  
: Division  
+ Addition  
- Subtraction  
= Result

Right button group:

Memory function keys

\* Memory recall with deletion  
∇ Memory recall without deletion  
+ Memory addition  
- Memory subtraction



**DISPLAY DEVICE**

The input and output values are displayed clearly legible in the display device by means of digital display tubes.

**DECIMAL POINT DEVICE**

To the left of the keyboard is a thumbwheel for setting the decimals. Before starting an arithmetic operation here is the required to set the decimal place. The Decimal point is indicated by a red dot in the display unit shown.

**COMPUTATION UNIT**

The "computing unit" assembly comprises all the electronics of the machine, including the ferrite core memory and the control system of the machine Display unit.

**POWER ADAPTER**

The power supply generates the necessary voltages of the machine. Form and colour match the modern line.

Dimensions and mass make an effortless job change. An advantageous utilization of the workplace is due to the relocation of weight on 3 feet guaranteed.

### 3. COMMISSIONING

The computer is designed for connection to the following mains voltages:

110V +10 % 50-60 Hz  
-15 %

127V +10 % 50-60 Hz  
-15 %

220V +10 % 50-60 Hz  
-15 %

242V +10 % 50-60 Hz  
-15 %

From the factory the automaton, if no other delivery agreement exists supplied for connection to 220 V mains voltage. A change may only be done by a specialist.

The set mains voltage is at a selector switch located on the Power supply is located, to recognize from the outside through the breather.

For commissioning, the computer must be connected to the mains using the protective earthing cord provided after checking the setting. After pressing the switch on the lower right side of the Cover is the operational readiness of the machine by a red indicator lamp is displayed in the display unit. Before the start of the calculation to press the (Delete) and (C) keys. The display tubes adjust to the digit "0" and the calculator is ready for operation.

Opening the calculator is permitted by special tools only for repair purposes by trained professionals.

## 4. CALCULATION OPERATIONS

### 4.1. Addition

Button

Additions are possible in the calculator and in the memories.

Press the (+) button to enter the addend values.

The total is displayed after pressing the (=) button.

The addends are entered into the calculator by (+)

In the memory I, II, III (+)

Memory recall without deletion I, II, III ( $\nabla$ )

Memory recall with deletion I, II, III (\*)

### 4.2. Subtraction

Subtractions are possible in the calculator and in the memories.

The minuend is entered by the (+) button.

Press the (-) button to subtract the entered values.

The total is displayed after pressing the (=) button.

The subtrahends are entered into the calculator by (-)

In the memory I, II, III (-)

Memory recall without deletion I, II, III ( $\nabla$ )

Memory recall with deletion I, II, III (\*)

### 4.3. Multiplication

The multiplicand is entered by the (X) key.

Pressing the (=) key is used to transfer the multiplier to the calculator, the multiplication is triggered and the product is displayed.

If a sum or a difference in the arithmetic unit has been formed before or after entering the multiplicand, this sum or difference becomes a multiplier when the (=) key is pressed.

Example :  $a \times b = c$   
 $a(b + c) = d$   
 $(a - b) \times c = d$

The displayed product can be processed further (see also Calculation example 7).

### 4.4. Division

The dividend is entered by pressing the (:) key. After entering the divisor, press the (=) button to start the display process

and the quotient is displayed. If a sum or a difference is formed before or after entering the dividend in the calculator, this sum or difference becomes the divisor when the (=) key is pressed, and with this the division is automatically executed.

Example :    a : b = c  
          a : (b + c) = d  
          (a - b) : c = d

The calculated quotient, which is displayed, can be processed further (see also calculation example 12).

#### 4.5. Exponentiation

The base is entered by the (X) key. Each further press of the (Xn) key increases the exponent by one. The power is automatically displayed (see also calculation example 8).

#### 4.6. Memories

All input values, results and constant factors can be stored in an additive and subtractive way. Negative values are mathematically processed correctly.

Values stored in the memories can be queried as often as desired by pressing the ( $\nabla$ ) key, whereby the value transferred in sequence is retained in the memory. It is possible to transfer values from one memory to another with the correct sign.

Example : ( $\nabla$ )       - Memory I, then  
          (+)       - Memory II

By pressing the (\*) button (\*I, \*II, \*III) the corresponding memory is called up and deleted at the same time.

The value in the calculator can be processed further. Pressing the (Delete L $\ddot{o}$ ) key does not clear the memories.

Should the memory contents be checked during a calculation process. without the last displayed value, eg. If the result or operand is lost, proceed as follows:

The displayed value can be transferred to a calculation register by pressing the (+) key. Thereafter, the memory can be queried, so that the occupancy or content is known. By pressing the (=) - key the value in the calculation register is displayed again..

#### 4.7. Decimal point facility

The number of decimal places is set before the beginning of the calculation by the knurled wheel to the left of the keyboard. When setting the decimal point, the highest decimal place must be used. The following decimal places are adjustable:

1-2-3-4-6-9-10-11-12-14

If the thumbwheel is set to "0", it is calculated without decimal places. The setting "Z" is irrelevant for the type 220.

After pressing the (,) - key (Decimal point key) appears at this point the numbers 0 and 1 on top of each other to indicate the entered Decimal place.

If a function key is pressed, the value automatically moves to the appropriate position.

Example :    71,5    X 22,123 = 1 581,795  
Decimal point position 3  
Enter        71,5    X 71,500  
Enter        22,123 = 1531,795

Example :    4,73 : 2,4 = 1,97  
Decimal point position 2  
Enter        4,73 : 4,73  
Enter        2,4    = 1,97

Example :    720,1 : 11,23 = 64,122 9  
Decimal point position 4  
Enter        720,1 : 720,1000  
Enter        11,23 = 64,1229

In the last example, the number of decimal places to set depends on the result, which is desired with 4 decimal places. After the decimal place zeros are filled up automatically. The decimal position must be maintained during the computation process, you may be added values in the memory or be returned from the memory. The results (products and Quotient) are automatically rounded in the last place, IE. from paragraph 5 is rounded up. The decimal position must be maintained during the computation process, you may have added values to the memory or be returned from the memories.

Example :    Decimal point position 6  
              1,000000 : 6,000000 = 0,166667  
              Decimal point position 3  
              2,58 X 3,01 = 7,766 (7,7658  $\approx$  7.766)

#### **4.8. Constant factors**

During multiplication, the exponentiation (Xn key) can be used for the calculation with a constant factor.

By pressing the (X) key, the multiplicand is adopted as a constant factor. After entering the variable multiplier, press the (Xn) key. The respective product is displayed (see also calculation example 6):

#### **4.9. Correction**

If you have not yet pressed any function keys, you can delete an entry by pressing the (C) key. If a function key is pressed after entering the digits, the correction is made by pressing the (Delete) key. The bill is to be repeated.

## 5. INPUT AND OUTPUT CAPACITY

The capacity of the electronic desktop calculator "Soemtron 220" is in input and output of 15 digits.

### **Multiplication whole: numbers**

The maximum positions of the multiplicand and the multiplier must not exceed 15 in total.

Example: 9 999 999 X 99 999 999 = 999 999 890 000 001

### **Multiplication of decimal places**

When multiplying decimals, the sum of the digits before the Decimal point of the multiplier and the multiplicand must not be greater than the digits of the [ad] remaining before the decimal point.

Example: 9,999,999 999 X 99 999,999 999 = 999,999 999,890,000

### **Division of whole numbers**

The digits of the dividend and the divisor to be entered in the division can be a maximum of 15 digits, the quotient always being smaller.

Example : 999 999 999 999 999 : 999 999 999 999 = 1

### **Division of decimal places**

When dividing numbers with decimal places, make sure that the quotient increases if the divisor is less than one.

Example : Decimal point position 9

456,123 578 000 : 0,051 = 8 943,599 568 627  
456,123 578 000 : 0,005 1 = 39 435,995 686 275  
456,123 578 000 : 0,000 51 = 894 359,956 862 745  
456,123 578 00u : 0,000 051 = Overrun

If the capacity is exceeded, the indicator goes off The keyboard is electrically locked. The lock is released by pressing the (Delete) and (C) keys.

## 6. CALCULATION EXAMPLES

### 1. Addition

Example :  $512 + 309 = 821$

Walk through

| Sequence of the calculation |     | Function key | Display |
|-----------------------------|-----|--------------|---------|
| 1. Decimal point position   | 0   |              |         |
| 2. Enter                    | 512 | +            | 512     |
| 3. Enter                    | 309 | +            | 309     |
| 4.                          |     | =            | 521     |

### 2. Subtraction

Example :  $461 - 207 = 254$

Walk through

| Sequence of the calculation |     | Function key | Display |
|-----------------------------|-----|--------------|---------|
| 1. Decimal point position   | 0   |              |         |
| 2. Enter                    | 461 | +            | 461     |
| 3. Enter                    | 207 | -            | 207     |
| 4.                          |     | =            | 254     |

Example :  $397,98 - 612,17 = 214,19 -$

Walk through

| Sequence of the calculation |        | Function key | Display  |
|-----------------------------|--------|--------------|----------|
| 1. Decimal point position   | 2      |              |          |
| 2. Enter                    | 397,98 | +            | 397,98   |
| 3. Enter                    | 612,17 | -            | 612,17   |
| 4.                          |        | =            | 214,19 - |

### 3. Addition and subtraction in 3 stores with nett balance

Example :

|       |   |       |   |                       |
|-------|---|-------|---|-----------------------|
| I     |   | II    |   | III                   |
| 467   |   | 533   |   | 650                   |
| 890   |   | 123   |   | -2400                 |
| ----- |   | ----- |   | -----                 |
| 1357  | - | 656   | = | 701 + (-1750) = 1049- |

Walk through

| Sequence of the calculation |      | Function key  | Display |
|-----------------------------|------|---------------|---------|
| 1. Clear the memory         |      | *I, *II, *III |         |
| 2. Decimal point position   | 0    |               |         |
| 3. Enter                    | 467  | +I            | 467     |
| 4. Enter                    | 890  | +I            | 890     |
| 5. Recall                   |      | 1             | 1357    |
| 6. Enter                    | 533  | +II           | 533     |
| 7. Enter                    | 123  | +II           | 123     |
| 8. Recall                   |      | *II           | 656     |
| 9.                          |      | -I            | 656     |
| 10. Recall                  |      | I             | 701     |
| 11. Enter                   | 650  | +III          | 650     |
| 12. Enter                   | 2400 | III           | 2400    |
| 13. Recall                  |      | *III          | 1750 -  |
| 14.                         |      | +I            | 1750 -  |
| 15. Recall                  |      | *I            | 1049 -  |

#### 4. Multiplication with different decimal points

Example : a)  $1234,56 \times 17,5671 = 21\,687,639\,0$   
 b)  $5\,678,123 \times 0,000 = 11,356$   
 c)  $1,1 \times 9576,5432 = 10\,364,1975$

Walk through

| Sequence of the calculation  |            | Function key | Display      |
|------------------------------|------------|--------------|--------------|
| a) 1. Decimal point position | 4          |              |              |
| 2. Enter                     | 1234,56    | X            | 1 234,560 0  |
| 3. Enter                     | 17,567 1   | =            | 21 687,639 0 |
| b) 1. Decimal point position | 3          |              |              |
| 2. Enter                     | 5678,123   | X            | 5 678,123    |
| 3 Enter                      | 0,1112     | =            | 11,356       |
| c) 1. Decimal point position | 4          |              |              |
| 2. Enter                     | 1,1        | X            | 1,100 0      |
| 3. Enter                     | 9876.543 2 | =            | 10 364,197 5 |



### 5. Multiplication with different decimal points

Example :  $623,3 \times 1,22 \times 0,031 = 23,573$

Walk through

| Sequence of the calculation |       | Function key | Display |
|-----------------------------|-------|--------------|---------|
| 1. Decimal point position   | 3     |              |         |
| 2. Enter                    | 623,3 | X            | 623,300 |
| 3. Enter                    | 1,22  | =            | 760,426 |
| 4.                          |       | X            | 760,426 |
| 5. Enter                    | 0,031 | =            | 23,573  |

### 6. Constant factor - average calculation (2 memories)

Example :

|                   |   |          |
|-------------------|---|----------|
| $22 \times 2,70$  | = | 59,40    |
| $22 \times 2,55$  | = | 56,10    |
| $5,55 : 2 = 2,63$ |   | $115,50$ |

Walk through

| Sequence of the calculation |      | Function key | Display |
|-----------------------------|------|--------------|---------|
| 1. Clear the memory         |      | *I, *II      |         |
| 2. Decimal point position   | 2    | X            | 22,00   |
| 4. Enter                    | 2,7  | +I           | 2,70    |
| 5.                          |      | Xn           | 59,40   |
| 6.                          |      | +II          | 59,40   |
| 7. Enter                    | 2,55 | +I           | 2,55    |
| 8.                          |      | Xn           | 56,10   |
| 9.                          |      | +II          | 56,10   |
| 10. Recall                  |      | *I           | 5,25    |
| 11.                         |      | :            | 5,25    |
| 12. Enter                   | 2,   | =            | 2,63    |
| 13. Recall                  |      | *II          | 115,50  |

### 7. Multiplication by a parenthesized expression

Example :  $958 \times (17,12 + 4,3 - 0,030) = 10\,911,620$

Walk through

| Sequence of the calculation |       | Function key | Display   |
|-----------------------------|-------|--------------|-----------|
| 1. Decimal point position   | 93    |              |           |
| 2. Enter                    | 958,  | X            | 958,000   |
| 3. Enter                    | 7,12  | +            | 7,120     |
| 4. Enter                    | 4,3   | +            | 4,300     |
| 5. Enter                    | 0,030 | -            | 0,030     |
| 6.                          |       | =            | 10911,620 |

## 8. Exponentiation

Example :  $13^5 = 371\ 293$

Walk through

| Sequence of the calculation |    | Function key | Display |
|-----------------------------|----|--------------|---------|
| 1. Decimal point position   | 0  |              |         |
| 2. Enter                    | 13 | X            | 13      |
| 3.                          |    | Xn           | 169     |
| 4.                          |    | Xn           | 2 197   |
| 5.                          |    | Xn           | 28 561  |
| 6.                          |    | Xn           | 371 293 |

## 9. Division

Example :  $225 : 5 = 45$

Walk through

| Sequence of the calculation |     | Function key | Display |
|-----------------------------|-----|--------------|---------|
| 1. Decimal point position   | 0   |              |         |
| 2. Enter                    | 225 | :            | 225     |
| 3. Enter                    | 5   | =            | 45      |

## 10. Division with constant dividend

Example :  $22\ 33,44 : 22 = 101,52$   
 $22\ 33,44 : 23 = 97,11$   
 $22\ 33,44 : 24 = 93,06$

Walk through

| Sequence of the calculation |         | Function key | Display |
|-----------------------------|---------|--------------|---------|
| 1. Clear the memory         |         | *I           |         |
| 2. Decimal point position   | 2       |              |         |
| 3. Enter                    | 2233,44 | +I           | 2233,44 |
| 4.                          |         | :            | 2233,44 |
| 5. Enter                    | 22,     | =            | 101,52  |
| 6. Recall                   |         | ∇I           | 2233,44 |
| 7.                          |         | :            | 2233,44 |
| 8. Enter                    | 23,     | =            | 97,11   |
| 9. Recall                   |         | ∇I           | 2233,44 |
| 10.                         |         | :            | 2233,44 |
| 11. Enter                   | 24,     | =            | 93,06   |

### 11. Division with constant divisor

Example :  $1266,55 : 123 = 10,297$   
 $5678,12 : 123 = 46,164$

Walk through

| Sequence of the calculation |          | Function key | Display   |
|-----------------------------|----------|--------------|-----------|
| 1. Clear the memory         |          | *I           |           |
| 2. Decimal point position   | 3        |              |           |
| 3. Enter                    | 1 266,55 | :            | 1 266,550 |
| 4. Enter                    | 123,     | +I           | 123,000   |
| 5.                          |          | =            | 10,297    |
| 6. Enter                    | 5678,12  | :            | 5 673,120 |
| 7. Recall                   |          | I            | 123,000   |
| 8.                          |          | =            | 46,164    |

### 12. Division with a parenthetical expression

Example  $750 : (47,623 + 710,21 - 304.1) = 1,653$

Walk through

| Sequence of the calculation |        | Function key | Display |
|-----------------------------|--------|--------------|---------|
| 1. Decimal point position   | 3      |              |         |
| 2. Enter                    | 750,   | :            | 750,000 |
| 3. Enter                    | 47,623 | +            | 47,623  |
| 4. Enter                    | 710,21 | +            | 710,210 |
| 5. Enter                    | 304,1  | -            | 304,100 |
| 6.                          |        | =            | 1,653   |

### 13. Percentage searched

Example : 86 work pieces = 100%  
 54 work pieces = ?

$$\frac{100 \times 54}{86} = 62,8\%$$

Walk through

| Sequence of the calculation |       | Function key | Display |
|-----------------------------|-------|--------------|---------|
| 1. Decimal point position   | 1     |              |         |
| 2. Enter                    | 5400, | :            | 5400,0  |
| 3. Enter                    | 86,   | =            | 62,8    |

#### 14. Number sought

Example : 100% = 86 work pieces  
62.8% = ?

$$\frac{86 \times 62.8}{100} = 54 \text{ work pieces}$$

Walk through

| Sequence of the calculation |      | Function key | Display |
|-----------------------------|------|--------------|---------|
| 1. Decimal point position   | 1    |              |         |
| 2. Enter                    | 86,  | X            | 86,0    |
| 3. Enter                    | 62,8 | =            | 5 400,8 |
| 4.                          |      | :            | 5 400,8 |
| 5. Enter                    | 100, | =            | 54,0    |

#### 15. Increased value

The daily standard of A is 54 workpieces, 68 workpieces are produced. By what percentage was the standard exceeded ?

Example : 54 work pieces = 100%  
68 work pieces = ?

$$\frac{100 \times 68}{54} = 125,9 \%$$

Walk through

| Sequence of the calculation |       | Function key | Display |
|-----------------------------|-------|--------------|---------|
| 1. Decimal point position   | 1     |              |         |
| 2. Enter                    | 6800, | -            | 6800,0  |
| 3. Enter                    | 54,   | =            | 125,9   |

#### 16. Reduced value

B produces 120 work pieces per day, which corresponds to a standard compliance of 130%. What is the norm?

Example : 130% = 120 work pieces  
100% = ?  
 $\frac{120 \times 100}{130} = 92 \text{ work pieces}$

Walk through

| Sequence of the calculation |       | Function key | Display |
|-----------------------------|-------|--------------|---------|
| 1. Decimal point position   | 0     |              |         |
| 2. Enter                    | 12000 | :            | 12 000  |
| 3. Enter                    | 130   | =            | 92      |

### 17. Reduced value (Normal operation)

Example : 16 m costs 39,00 M  
 19 m costs ?  
 $39 \times 19$   
 ----- = 43,31 M  
 16

Walk through

| Sequence of the calculation |     | Function key | Display |
|-----------------------------|-----|--------------|---------|
| 1. Kommulellung             | 2   |              |         |
| 2. Enter                    | 39, | X            | 39,00   |
| 3. Enter                    | 19, | =            | 741,00  |
| 4.                          |     | :            | 741,00  |
| 5. Enter                    | 16, | =            | 46,31   |

### 18. Interest calculation by days

Example : M 1695,00 3 3/6 % 45 days  
 Interest rate divisor from table or  $360 : 3,375 = 106,667$   
 Shortened interest formula :  

$$\frac{\text{Capital} \times \text{days}}{100 \times \text{Interest}} = \frac{1695 \times 45}{100 \times 106,667} = 7,151$$

Walk through

| Sequence of the calculation |         | Function key | Display    |
|-----------------------------|---------|--------------|------------|
| 1. Decimal point position   | 3       |              |            |
| 2. Enter                    | 1695,   | X            | 1 695,000  |
| 3. Enter                    | 45,     | =            | 76 275,000 |
| 4.                          |         | :            | 76 275,000 |
| 5. Enter                    | 100,    | =            | 762,750    |
| 6.                          |         | :            | 762,750    |
| 7. Enter                    | 106,667 | =            | 7,151      |

### 19. Distribution task (3 memories)

A has been allocated a budget of 150 375.50 m. The amount is broken down and at the same time the percentage of the loan is calculated.

Example :

|   |            |              |           |
|---|------------|--------------|-----------|
| B | 5 640,00   | : 150 375,50 | = 3,75 %  |
| C | 10 123,50  | : 150 375,50 | = 15,73 % |
| D | 1 750,00   | : 150 375,50 | = 1,16 %  |
| E | 65 865,00  | : 150 375,50 | = 43,50 % |
| F | 16 500,00  | : 150 375,50 | = 10,97 % |
| G | 9 860,40   | : 150 375,50 | = 6,56 %  |
| H | 25 650,60  | : 150 375,50 | = 17,06 % |
| I | 14 936,00  | : 150 375,50 | = 9,97 %  |
|   | 150 375,50 |              | 100,00 %  |

Walk through

| Sequence of the calculation |           | Function key  | Display       |
|-----------------------------|-----------|---------------|---------------|
| 1. Clear the memory         |           | *I, *II, *III |               |
| 2. Decimal point position   | 4         |               |               |
| 3. Enter                    | 5640,     | +II           | 5 640,000 0   |
| 4.                          |           | :             | 5 640,000 0   |
| 5. Enter                    | 150 375,5 | +I            | 150 375,500 0 |
| 6.                          |           | =             | 0,037 5       |
| 7.                          |           | +III          | 0,037 5       |
| 8. Enter                    | 10123,5   | +II           | 10 123,500 0  |
| 9.                          |           | :             | 10 123,500 0  |
| 10. Recall                  |           | ∇I            | 150 375,500 0 |
| 11.                         |           | =             | 0,067 3       |
| 12.                         |           | +III          | 0,067 3       |
| .                           |           | .             | .             |
| .                           |           | .             | .             |
| .                           |           | .             | .             |
| n. Recall                   |           | *II           | 150 375,500 0 |
| n. Recall                   |           | *III          | 1,000 0       |

If you are reading percent of memory III, multiply the displayed values by 100.

20. Wage settlement with a consonant factor (2 storages)

In the post-calculation, the per-hundred-minute rates of each individual operation must be multiplied by the wage group factor become.

| Example : | Wage group | Factor | Min./% | Wage   |
|-----------|------------|--------|--------|--------|
|           | 3          | 2,23   | 230    | 5,13   |
|           | 3          | 2,23   | 145    | 3,23   |
|           |            | 2,23   | X 375  | = 3,36 |

Walk through

| Sequence of the calculation |      | Function key | Display |
|-----------------------------|------|--------------|---------|
| 1. Clear the memory         |      | *I, *II      |         |
| 2. Decimal point position   | 2    |              |         |
| 3. Enter                    | 2,23 | X            | 2,23    |
| 4. Enter                    | 2,3  | +I           | 2,30    |
| 5.                          |      | Xn           | 5,13    |
| 6.                          |      | +II          | 5,13    |
| 7. Enter                    | 1,45 | +II          | 1,45    |
| 8.                          |      | Xn           | 3,23    |
| 9.                          |      | +II          | 3,23    |
| 10. Recall                  |      | *I           | 3,75    |
| 11.                         |      | Xn           | 8,36    |
| 12. Recall                  |      | *II          | 8,36    |

## 21. Conversion of English currency

When converting the English currency, shillings and pence must be converted into decimal of pounds.

$$1 \text{ sh} = 1/20 = 0.05$$

$$1 \text{ d} = 1/240 = 0.004 \text{ 166 6 ... (0.0042)}$$

Example : How many Marks are: £ 25.8.11

$$\text{Exchange: } \quad \quad \quad \text{£ 1} = 9.85 \text{ M}$$

Walk through

| Sequence of the calculation |        | Function key | Display   |
|-----------------------------|--------|--------------|-----------|
| 1. Clear the memory         |        | *I           |           |
| 2. Decimal point position   | 4      |              |           |
| 3. Enter                    | 25,    | +I           | 25,000 0  |
| 4. Enter                    | 8,     | X            | 8,000 0   |
| 5. Enter                    | 0,05   | =            | 0,400 0   |
| 6.                          |        | +I           | 0,400 0   |
| 7. Enter                    | 11,    | X            | 11,000 0  |
| 8. Enter                    | 0,0042 | =            | 0,046 2   |
| 9.                          |        | +I           | 0,040 2   |
| 10. Recall                  |        | *I           | 25,446 2  |
| 11.                         |        | X            | 25,446 2  |
| 12. Enter                   | 9,85   | =            | 250,645 1 |

$$250.65 \text{ M} = \text{£ } 25.8.11$$

## 22. Insurance calculation (insurance) (premium calculation)

How much 0/00 is the premium, if A has insured his house at 95000,00 M, his furniture at 13000,00 M and his carriage at 11500,00 M?

The annual premium is 334.60 M.

$$\begin{array}{r} \text{Insurance: } 95 \text{ 000} + 13 \text{ 000} + 11 \text{ 500} = 119 \text{ 500 M} \\ \quad \quad \quad 334,60 \times 1000 \\ \quad \quad \quad \text{-----} = 2,8 \text{ 0/00} \\ \quad \quad \quad 119 \text{ 500} \end{array}$$

Walk through

| Sequence of the calculation |        | Function key | Display  |
|-----------------------------|--------|--------------|----------|
| 1. Clear the memory         |        | *I           |          |
| 2. Decimal point position   | 1      |              |          |
| 3. Enter                    | 95000, | +I           | 95000,0  |
| 4. Enter                    | 13000, | +I           | 13000,0  |
| 5. Enter                    | 11500, | +I           | 11500,0  |
| 6. Recall                   |        | ∇I           | 119500,0 |
| ?. Enter                    | 334,6  | X            | 334,6    |
| 8. Enter                    | 1000,  | =            | 334600,0 |
| 9.                          |        | :            | 334600,0 |
| 10. Recall                  |        | *I           | 119500,0 |
| 11.                         |        | =            | 2,8      |

### 23. Weight calculation

How heavy is an oak column of 0.30 m in diameter and 3 m in height?  
 Specific gravity of oak: 0.72

Formula:  $r^2 \times \pi \times h \times \text{specific weight}$   
 $0,19 \times 0,19 \times 3,14 \times 3,00 \times 0,72 = 244,845 \text{ kg}$

Walk through

| Sequence of the calculation |      | Function key | Display   |
|-----------------------------|------|--------------|-----------|
| 1. Decimal point position   | 6    |              |           |
| 2. Enter                    | 0,38 | :            | 0,380 000 |
| 3. Enter                    | 2,   | =            | 0,119 000 |
| 4.                          |      | X            | 0,190 000 |
| 5.                          |      | =            | 0,036 100 |
| 6.                          |      | X            | 0,036 100 |
| 7. Enter                    | 3,14 | =            | 0,113 354 |
| 8.                          |      | X            | 0,113 354 |
| 9. Enter                    | 3,   | =            | 0,340 062 |
| 10.                         |      | X            | 0,340 062 |
| 11. Enter                   | 0,72 | =            | 0,244 845 |

The result must then be multiplied by 1000, since it is kg.

### 24. Subtraction of two quotients

Example 
$$\begin{array}{r} (2,604) \\ (-\text{-----}) \\ (1,315) \end{array} - \begin{array}{r} (0,342) \\ (-\text{-----}) \\ (1,910) \end{array} = 1,801$$

Walk through

| Sequence of the calculation |       | Function key | Display |
|-----------------------------|-------|--------------|---------|
| 1. Clear the memory         |       | *I           |         |
| 2. Decimal point position   | 3     |              |         |
| 3. Enter                    | 2,604 | :            | 2,604   |
| 4. Enter                    | 1,315 | =            | 1,980   |
| 5.                          |       | +I           | 1.900   |
| 6. Enter                    | 0,342 | :            | 0,342   |
| 7. Enter                    | 1,91  | =            | 0,179   |
| 8.                          |       | -I           | 0,179   |
| 9. Recall                   |       | *I           | 1,801   |



Example : 
$$\frac{(6 \times 5)}{(2)} - \frac{(3 \times 4)}{(3)} = 11$$

Walk through

| Sequence of the calculation |   | Function key | Display |
|-----------------------------|---|--------------|---------|
| 1. Clear the memory         |   | *I           |         |
| 2. Decimal point position   | 0 |              |         |
| 3. Enter                    | 6 | X            | 6       |
| 4. Enter                    | 5 | =            | 30      |
| 5.                          |   | :            | 30      |
| 6. Enter                    | 2 | =            | 15      |
| 7.                          |   | +I           | 15      |
| 8. Enter                    | 3 | X            | 3       |
| 9. Enter                    | 4 | =            | 12      |
| 10.                         |   | :            | 12      |
| 11. Enter                   | 3 | =            | 4       |
| 12.                         |   | -I           | 4       |
| 13. Recall                  |   | *I           | 11      |

## 25. Technical calculation - calculation of the cutting speed

The cutting speed is always given in m / min (grind m/sec).

Example :

v = Speed 141,3  
n = speed (rpm, rev/sec) 300  
d = diameter of the rotary part 150

$$v = \frac{d \times 3,14 \times n}{1000} \quad n = \frac{1000 \times v}{d \times 3,14} \quad d = \frac{1000 \times v}{3,14 \times n}$$

$$v = \frac{150 \times 3,14 \times 300}{1000} \quad n = \frac{1000 \times 141,3}{150 \times 3,14} \quad d = \frac{1000 \times 141,3}{3,14 \times 300}$$

Walk through

| Sequence of the calculation |   | Function key | Display |
|-----------------------------|---|--------------|---------|
| 1. Clear the memory         |   | *I, *II      |         |
| 2. Decimal point position   | 2 |              |         |

| Sequence of the calculation |        | Function key | Display    |
|-----------------------------|--------|--------------|------------|
| 3. Enter                    | 150,   | X            | 150,00     |
| 4. Enter                    | 3,14   | +I           | 3,14       |
| 5.                          |        | =            | 471,00     |
| 6.                          |        | X            | 471,00     |
| 7. Enter                    | 300,   | =            | 141 300,00 |
| 8.                          |        | +I!          | 141 300,00 |
| 9.                          |        | :            | 141 300,00 |
| 10. Enter                   | 1 000, | =            | 141,30     |
| 11. Recall                  |        | ∇II          | 141 300,00 |
| 12.                         |        | :            | 141 300,00 |
| 13. Enter                   | 1 50,  | =            | 942,00     |
| 14.                         |        | :            | 942,00     |
| 15. Recall                  |        | ∇I           | 3,14       |
| 16.                         |        | =            | 300,00     |
| 17.                         |        | X            | 300,00     |
| 18. Recall                  |        | ∇I           | 3,14       |
| 19.                         |        | =            | 942,00     |
| 20.                         |        | +            | 942,00     |
| 21. Recall                  |        | *II          | 141 300,00 |
| 22.                         |        | :            | 141 300,00 |
| 23.                         |        | =            | 150,00     |

## 26. Repayment schedule

Example :

With an initial capital of 45 000,00 M, an annual interest rate of 8.50% and a 4% repayment, the following semi-annual repayment based payment scheme.

Constant multiplier is the semi-annual interest rate of 4.25% and repayment of 1.50%.

| Capital   | Figures  | Repayment | Annuity   | Time                  |
|-----------|----------|-----------|-----------|-----------------------|
| 45 000,00 | 1 912,50 | 675,00    | 2 0587,50 | 1. 1. 66 - 30. 6. 66  |
| 44 325,00 | 1 503,81 | 703,69    | 2 587,501 | 1. 7. 66 - 31. 12. 66 |
| 43 621,31 | usw.     |           |           |                       |

During these amortization calculations only multiplications with the same folder are performed. The respective capital is multiplied by the factor 4.25 (semi-annual interest rate). The result is the interest, which is subtracted from the annuity. Your calculated repayment is subtracted from the capital so that the residual capital results. From this the new interest amount is again calculated by multiplication by the constant factor (4.25).

Walk through

| Sequence of the calculation |         | Function key  | Display    |
|-----------------------------|---------|---------------|------------|
| 1. Clear the memory         |         | *I, *II, *III |            |
| 2. Decimal point position   | 2       |               |            |
| 3. Enter                    | 45 000, | +II           | 45 000,00  |
| 4.                          |         | X             | 45 000,00  |
| 5. Enter                    | 4,25    | +I            | 4,25       |
| 6.                          |         | =             | 191 250,00 |
| 7.                          |         | :             | 191 250,00 |
| 8. Enter                    | 100,    | =             | 1 912,50   |
| 9.                          |         | -             | 1 912,50   |
| 10. Enter                   | 2 587,5 | +III          | 2 587,50   |
| 11.                         |         | +             | 2 587,50   |
| 12.                         |         | =             | 675,00     |
| 13.                         |         | -II           | 675,00     |
| 14. Recall                  |         | II            | 44 325,00  |
| 15.                         |         | X             | 44 325,00  |
| 16. Recall                  |         | I             | 4,25       |
| 17.                         |         | -             | 188 381,25 |
| 18.                         |         | :             | 188 381,25 |
| 19. Enter                   | 100,    | :             | 1 883,81   |
| 20.                         |         | -             | 1 883,81   |
| 21. Recall                  |         | *I            | 2 587,50   |
| 22.                         |         | +             | 2 587,50   |
| 23.                         |         | = -           | 703,69     |
| 24.                         |         | -II           | 703,69     |
| 25. Recall                  |         | II            | 43 621,31  |
| usw.                        |         |               |            |

**27. Invoice control with 3 memories**

|                                     |            |               |       |                 |               |
|-------------------------------------|------------|---------------|-------|-----------------|---------------|
| Invoice                             |            | Execution     |       | Expiration date | Invoice total |
| Page                                | Number     | Number        | Sheet |                 |               |
|                                     |            |               |       | 30. 8. 1965     | 577 209,90    |
| Discount for cash until expiry date |            |               |       |                 | Nett amount   |
| Factor                              | Good value | Date of issue |       |                 |               |
| 5%                                  | 521 560,06 | 12/8/65       |       | 551 131,90      |               |

| Article Number  | E | Amount | Article - Designation | Single           | Disc. price | Amount          |
|-----------------|---|--------|-----------------------|------------------|-------------|-----------------|
| 12 345          | 3 | 52,21  |                       | 3 452,00         | 6%          | 169 415,10      |
| 23 456          | 3 | 3,25   |                       | 32 419,00        | 4%          | 101 147,28      |
| 34 567          | 3 | 112,00 |                       | 2 359,00         | 5%          | 250 997,60      |
| Signing         |   | Tare   | Price                 | Designation      | Value       | 521 560,06      |
|                 |   |        |                       | Packing material | Packaging   | 1 275,00        |
| Aggregate value |   |        |                       |                  |             | 522 835,06      |
| Sales tax I     |   |        |                       |                  |             | 8%   41 826,80  |
| Sales tax II    |   |        |                       |                  |             | 30%   12 548,04 |
| Invoice sum     |   |        |                       |                  |             | 577 209,90      |

Walk through

| Sequence of the calculation | Function key | Display    |
|-----------------------------|--------------|------------|
| 1. Clear the memory         | *I, *II      |            |
| 2. Decimal point position 2 |              |            |
| 3. Enter 52,21              | X            | 52,21      |
| 4. Enter 3452,              | =            | 180 228,92 |
| 5.                          | +I           | 180 228,92 |

| Sequence of the calculation |            | Function key | Display    |
|-----------------------------|------------|--------------|------------|
| 6.                          |            | X            | 180 228,92 |
| 7. Enter                    | 0.06       | =            | 10 813,74  |
| 8.                          |            | -I           | 10 813,74  |
| 9. Recall                   |            | *I           | 169 415,18 |
| 10.                         |            | +II          | 169 415,18 |
| 11. Enter                   | 3,25       | X            | 3,25       |
| 12. Enter                   | 32 419,    | =            | 105 361,75 |
| 13.                         |            | +I           | 105 361,75 |
| 14.                         |            | X            | 105 361,75 |
| 15. Enter                   | 0.04       | =            | 4 214,47   |
| 16.                         |            | -I           | 4 214,47   |
| 17. Recall                  |            | *I           | 101 147,28 |
| 18.                         |            | +II          | 101 147,28 |
| 19. Enter                   | 112,       | X            | 112,00     |
| 20. Enter                   | 2 359      | =            | 264 200,00 |
| 21.                         |            | +I           | 264 208,00 |
| 22.                         |            | X            | 264 208,00 |
| 23. Enter                   | 0,05       | =            | 13 210,40  |
| 24.                         |            | -I           | 13 210,40  |
| 25. Recall                  |            | *I           | 250 997,60 |
| 26.                         |            | +II          | 250 997,50 |
| 27. Recall                  |            | ∇I           | 521 560,06 |
| 28. Enter                   | 1 275,     | +II          | 1 275,00   |
| 29. Recall                  |            | ∇II          | 522 835,06 |
| 30.                         |            | X            | 522 835,06 |
| 31. Enter                   | 0.08       | =            | 41 826,60  |
| 32.                         |            | +II          | 41 820,80  |
| 33.                         |            | X            | 41 526,80  |
| 34. Enter                   | 0,30       | =            | 12 548,04  |
| 35.                         |            | +II          | 12 540,04  |
| 36. Abful                   |            | ∇II          | 577 209,90 |
| 37. Enter                   | 521 560,06 | X            | 521 560,06 |
| 38. Einlasten 0,05          |            | =            | 26 075,00  |
| 39.                         |            | =II          | 26 078,00  |
| 40. Recall                  |            | *II          | 551 131,90 |

## 28. Series Development (Minus Division)

The minus division is still used for the series expansion of the cyclometric functions of  $\pi / 4$  Leibniz (1676)

$$\pi/4 = 1 - 1/3 + 1/5 - 1/7 + 1/9 - 1/11 + - \dots = 0.744012$$

Walk through

| Sequence of the calculation |     | Function key | Display   |
|-----------------------------|-----|--------------|-----------|
| 1. Clear the memory         |     | *I, *II      |           |
| 2. Decimal point position   | 6   |              |           |
| 3. Enter                    | 1,  | +II          | 1,000 000 |
| 4.                          |     | +II          | 1,000 000 |
| 5. : 1,000 000              |     |              |           |
| 6. Enter                    | 3,  | =            | 0,333 333 |
| 7.                          |     | -1           |           |
| 8. Recall                   |     | ∇II          | 1,000 000 |
| 9.                          |     | :            | 1,000 000 |
| 10. Enter                   | 5,  | =            | 0,200 000 |
| 11.                         |     | +I           | 0,200 000 |
| 12. Recall                  |     | ∇II          | 1,000 000 |
| 13.                         |     | :I           | 1,000 000 |
| 14. Enter                   | 7,  | =            | 0,142 857 |
| 15.                         |     | -I           | 0,142 857 |
| 16. Recall                  |     | ∇II          | 1,000 000 |
| 17.                         |     | :            | 1,000 000 |
| 18. Enter                   | 9,  | =            | 0,111 111 |
| 19.                         |     | +I           | 0,111 111 |
| 20. Recall                  |     | ∇II          | 1,000 000 |
| 21.                         |     | :            | 1,000 000 |
| 22. Enter                   | 11, | =            | 0,090 909 |
| 23.                         |     | -I           | 0,090 909 |
| 24. Recall                  |     | *I           | 0,744 012 |

## 29. Labour statistics

In one establishment, the following figures are available:

| Wage group | Wages    | Workforce | Wages  | Workforce |
|------------|----------|-----------|--------|-----------|
|            | (L0)     | (Z0)      | (L1)   | (Z1)      |
|            | 1 300,00 | 200       | 330,00 | 200       |
|            | 2 330,00 | 300       | 380,00 | 400       |
|            | 3 370,00 | 400       | 440,00 | 500       |
|            | -        | 900       | -      | 1 100     |

For statistical purposes, the indicators should

1. Development of the number of workers
2. Development of the gross payroll
3. Development of the average wage

be calculated

$$\text{Zu 1.: } \frac{\sum Z1}{\sum Z2} = \frac{1\ 100}{900} = 122\%$$

$$\text{Zu 2 : } \frac{\sum L1 \times Z1}{\sum L0 \times z)} = \frac{(330 \times 200) + (380 \times 400) + (440 \times 500)}{(300 \times 200) + (330 \times 300) + (370 \times 400)}$$

$$= \frac{438\ 000}{307\ 000} = 143\%$$

$$\frac{\frac{\sum L1 \times Z1}{\sum Z1}}{\frac{\sum L0 \times Z0}{\sum Z0}} = \frac{438\ 000}{1\ 100} \div \frac{307\ 000}{900} = 117\%$$

Walk through

| Sequence of the calculation |           | Function key | Display    |
|-----------------------------|-----------|--------------|------------|
| 1. Clear the memory         |           | *I, *II      |            |
| 2. Decimal point position   | 21 100,00 |              |            |
| 4. Enter                    | 900,      | =            | 1,22       |
| 5. Enter                    | 330,      | X            | 330,00     |
| 6. Enter                    | 200,      | =            | 66 000,00  |
| 7.                          |           | +I           | 66 000,00  |
| 8. Enter                    | 380,      | X            | 380,00     |
| 9. Enter                    | 400,      | =            | 152 000,00 |
| 10.                         |           | +I           | 152 000,00 |
| 11. Enter                   | 440,      | X            | 440,00     |
| 12. Enter                   | 500,      | =            | 220 000,00 |
| 13.                         |           | +I           | 220 000,00 |
| 14. Enter                   | 300,      | X            | 300,00     |
| 15. Enter                   | 200,      | =            | 60 000,00  |
| 16.                         |           | +II          | 60 000,00  |
| 17. Enter                   | 330,      | X            | 330,00     |
| 18. Enter                   | 300,      | =            | 99 000,00  |
| 19.                         |           | +II          | 99 000,00  |
| 20. Enter                   | 370,      | X            | 370,00     |
| 21. Enter                   | 400,      | =            | 148 000,00 |
| 22.                         |           | +II          | 148 000,00 |
| 23. Recall                  |           | ∇I           | 438 000,00 |
| 24.                         |           | :            | 438 000,00 |
| 25. Recall                  |           | ∇II          | 307 000,00 |
| 26.                         |           | =            | 1,43       |
| 27. Recall                  |           | *I           | 438 000,00 |
| 28.                         |           | :            | 438 000,00 |
| 29. Enter                   | 1 100,    | =            | 398,18     |

| Sequence of the calculation | Function key | Display    |
|-----------------------------|--------------|------------|
| 30.                         | +I           |            |
| 31. Recall                  | *II          | 307 000,00 |
| 32.                         | :            | 307 000,00 |
| 33. Enter                   | =            | 341,11     |
| 34.                         | +II          | 341,11     |
| 35. Recall                  | *I           | 390,18     |
| 36.                         | :            | 398,18     |
| 37. Recall                  | *II          | 341,11     |
| 33.                         | =            | 1,17       |

The calculated numbers have to be multiplied by 100, since they are percentages.

### 30. Square root calculation nor the iteration formula

$$\text{Formula: } Y_{n+I} = \frac{1}{2} \left( \frac{x}{Y_n} + Y_n \right)$$

In the root calculation with the aid of the iteration formula, it is important to provide an initial solution by estimation so that as few approximation steps as possible are required in order to arrive at the result. In most cases, the result is already obtained with the approximate approximation.

To increase the accuracy of the result. It is necessary to count as many decimals as possible. Therefore, the Decimal point position "6" has been selected in the following examples.

$$\text{Example : } \sqrt[2]{630,01}$$

The Radikand is divided from the left to the left in groups of two digits. In this example, there are two groups.

$$\sqrt[2]{6|30|,01}$$

The number of groups predetermines the number of roots the Decimal point.

From the extreme left group (even if the outermost group consists of only one digit, as in this example, it is considered a group) the worm! estimated.

The root of 6 is about 2.3. Since there are two groups before the Decimal point, the root value is 23. Now the calculation can be started after the iteration formula.



$$\frac{1}{2} \left( \frac{630,01}{23} + 23 \right) = 25,195\ 870 \quad \text{1st Approximation}$$

$$\frac{1}{2} \left( \frac{630,01}{25,195\ 870} + 25,195\ 870 \right) = 25,100\ 183 \quad \text{2nd Approximation}$$

$$\frac{1}{2} \left( \frac{630,01}{25,100\ 183} + 25,100\ 183 \right) = 25,100\ 000 \quad \text{3rd Approximation}$$

Sample:  $25,100\ 000 \cdot 2 = 630,01$

Walk through

| Sequence of the calculation |      | Function key | Display     |
|-----------------------------|------|--------------|-------------|
| 1. Clear the memory         |      | *I, *II      |             |
| 2. Decimal point position   | 6+II |              | 630,010 000 |
| 4.                          |      | :            | 630,010 000 |
| 5. Enter                    | 23,  | +II          | 23,000 000  |
| 6.                          |      | =            | 27,391 739  |
| 7.                          |      | +II          | 27,391 739  |
| 8. Recall                   |      | *II          | 50,391 739  |
| 9.                          |      | :            | 50,391 739  |
| 10. Enter                   | 2,   | =            | 25,195 870  |
| 11.                         |      | +II          | 25,195 370  |
| 12. Abful                   |      | ∇I           | 630,010 000 |
| 13.                         |      | :            | 630,010 000 |
| 14. Ab:ul                   |      | ∇II          | 25,195 870  |
| 15.                         |      | =            | 25,004 495  |
| 16.                         |      | +II          | 25,004 495  |
| 17. Abrul                   |      | *II          | 50,200 365  |
| 18.                         |      | :            | 50,200 365  |
| 19. Enter                   | 2,   | =            | 25,100 103  |
| 20.                         |      | +II          | 25,100 153  |
| 21. Recall                  |      | ∇I           | 630,010 000 |
| 22.                         |      | :            | 630,010 000 |
| 23. Recall                  |      | ∇II          | 25,100 183  |
| 24.                         |      | =            | 25,099 817  |
| 25.                         |      | +II          | 25,099 817  |
| 26. Recall                  |      | *II          | 50,200 000  |
| 27.                         |      | :            | 50,200 000  |
| 28. Enter                   | 2    | =            | 25,100 000  |
| 29. Sample                  |      | X            | 25,100 000  |
| 30.                         |      | Xn           | 30,010 000  |



| Sequence of the calculation | Function key | Display     |
|-----------------------------|--------------|-------------|
| 9.                          | :            | 279,430 000 |
| 10.                         | =            | 6,614 911   |
| 11.                         | +            | 6,614 911   |
| 12.                         | $\nabla$ I   | 6,500 000   |
| 13.                         | -            | 6,500 000   |
| 14.                         | =            | 0,114 911   |
| 15.                         | :            | 0,114 911   |
| 16. Enter                   |              | 0,030 104   |
|                             | 3,           |             |
| 17.                         | +I           | 0,038 304   |
| 18. Recall                  | $\nabla$ I   | 6,538 304   |
| 19.                         | X            | 6,538 304   |
| 20.                         | Xn           | 42,749 419  |
| 21.                         | +            | 42,749 419  |
| 22. Recall                  | $\nabla$ II  | 279,480 000 |
| 23.                         | :            | 279,480 000 |
| 24.                         | =            | 6,537 633   |
| 25.                         | +            | 6,537 633   |
| 26. Recall                  | $\nabla$ I   | 6,538 304   |
| 27.                         | -            | 6,538 304   |
| 28.                         | =            | 0,000 671 - |
| 29.                         | :            | 0,000 671 - |
| 30. Enter                   |              | 0,000 224 - |
|                             | 3,           |             |
| 31.                         | +I           | 0,000 224 - |
| 32. Recall                  | $\nabla$ I   | 6,538 080   |
| 33. Sample                  | X            | 6,538 030   |
| 34.                         | Xn           | 42,746 490  |
| 35.                         | Xn           | 279,479 971 |

## Technical Datasheet ETR Soemtron 220

The ETR "Soemtron 220" is a fully transistorized four-function calculator with ferrite core memory, input keyboard and digitizer tubes for the value display.

1. Size :  
Width: 380 mm  
Length: 464 mm  
Height: 194 mm
2. Mass : 15 kg
3. Operating voltage : 220 V +10 % ) 50Hz  
- 15 % )  
110 V +10 % ) 50Hz  
- 15 % )
4. Input power : 50 VA
5. Clock speed : 25 kHz
6. Capacity :  
Input )  
Display ) 15 digits  
Calculation register ) plus  
Memory ) sign
7. Computing time :  
Addition ) 5 ms  
Subtraction )  
  
Multiplication ) average 0,5 s  
Division )
8. Number of calculation and storage registers : 3 Calculation register  
1-3 storage memories
9. Type of entry : Number keys
10. Type of display : Numeric display tubes
11. Function facilities :  
Addition  
Subtraction  
Multiplication  
Division

Exponentiation  
Memory function with retransmission  
and selective deletion

Constant factor

Automatic Decimal point (fixed point)

Signed calculation

Balance

Rounding up the last digit

Control in case of capacity overrun

12. Operating conditions:      Temperature range of +15°C – +35°C  
   maximum relative humidity 80%

#### **Safety instructions for the operator**

Due to its fault-free covering, the computer has no endangerment for the operator.

Necessary repairs can only be done by specially qualified technicians.

For the handling of electrical devices reference is made to the regulations of the respective country.

In the case of extremely unfavorable operational peculiarities, the operator still has to work out the operational and fire protection instructions according to the national legal regulations.

#### **Operating instructions for malfunctions in functional engineering**

The machine must be switched off when cleaning.

In case of malfunction or longer work stoppages or end of work, the machine must be disconnected by removing the front plug.



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