

SYMBOL

ORIGINAL

- SCALE Indicates that a scale factor is stored
- HOLD Indicates that the **HOLD** key is pressed and the displayed figure is frozen
- MEMO Lights up when **END** key is pressed. The displayed figure is memorized
- Batt Indicates low battery level
- E Indicates 1) overflow (more than eight digits on the display) 2) **END** key has been pressed more than ten times, in an attempt to make averaging of the repeatedly measured area. The limit is nine times.
- cm² ♦ in²
m² ♦ ft²
km² ♦ acre Indicates metric system (cm², m², km²) or english system (in², ft², acre) selected by **m.=ft** key
- ♦ Indicates the unit selected by **UNIT** key. No unit displayed, pulse count only mode.
- X When you press **SF ?** key, the value of the stored horizontal scale factor is displayed with this X mark.
- Y When you press **SF ?** key twice, the value of the stored vertical scale factor is displayed with this Y mark.

1. Symbol
2. Number display
3. Unit Symbol
4. Numeric Keys

PLANIX 7

PLANIMETER

INSTRUCTIONS

OPERATION KEYS

- START** Ready for the measurement. Display shows "0".
- HOLD** Hold the displayed figure. When pushed for the second time it releases the **HOLD** , and the counting is continued. Accumulative measurement is possible by the use of this key.
- END** Used to measure the same area repeatedly
- AVER** Each measurement is stored by the push of the **END** key, and averaged by the **AVER** key.
- ON/C** Power on/Clear memory or displayed figure.
- OFF** Power off.
- 0-9** Numeric keys.
- m=ft.** Selects Metric or English system.
- UNIT** Selects display unit; cm^2 , m^2 , km^2 , in Metric system and in^2 , ft^2 , acre in English system. In either case pulse count only mode can be also selected.
- SCALE** Scale input key.
- D-SCL** Dual scale input key.
- SF ?** Asks for Scale Factor. When the scale of the map is $1/N$, and N is stored as the scale.

POWER SOURCE

The PLANIX 7 operates on either AC or DC.

(1) DC source

The unit contains a Ni-Cd battery, which need not be replaced unless its charging capacity is reduced.

(2) AC source

The unit operates on AC power with the special adaptor plugged into an available AC 100/120/220/240V outlet and the adaptor plug fitted into the unit. With the adaptor connected and the unit off, the Ni-Cd battery can be charged in approx. 8 hours.

(The battery will allow continuous 16-hour operation of the PLANIX 7.)


• Battery power saving provision

The power will be automatically turned off if the unit is not used for three minutes.

MEASUREMENT PROCEDURE

1. Preparatory Steps

Level and paste the object on a drawing board placed nearly horizontal. Set the PLANIX 7 with its roller axle and tracer arm placed at right angles to each other, and placed the tracer arm on the approximate centre line of the area of the object.



2. Power On

Push the **ON/C** key. The display will indicate "0".

3. Selection of Metric or English Scale

Push the **m.⇌ft.** key, and the units of the Metric system and the English system are displayed alternately on the right side of the display. Select and set either unit symbol. (If no unit symbols appear with the power turned on, it means that the PLANIX 7 is in the pulse count mode. Push the **UNIT** key, making the selected unit symbols displayed.)

The unit km² (or acre) is followed by no unit symbol but the pulse count mode. In this case, one pulse is equivalent to 0.1 cm² for areas on a 1:1 scale.

*Once set, the unit system and its symbol will be protected even after the power is turned off unless the **m.⇌ft.** key and the **UNIT** key are pushed.

Key (A)	Display (B)
ON/C	<input type="checkbox"/> ^{*in²} ft ² acre
m.⇌ft.	<input type="checkbox"/> ^{cm² *} m ² km ² Metric system (C)
m.⇌ft.	<input type="checkbox"/> ^{*in²} ft ² acre English system (D)
m.⇌ft.	<input type="checkbox"/> ^{cm² *} m ² km ² Metric system (E)

4. Selection of Unit

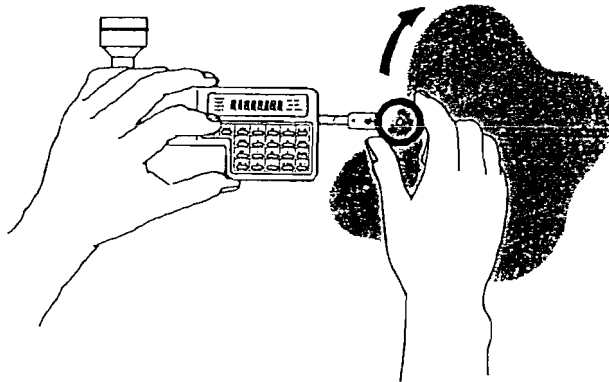
Each time the **UNIT** key is pushed, the

◆ mark shifts to the higher unit (namely, cm^2 (in^2) to m^2 (ft^2), or m^2 (ft^2) to km^2 (acre)), and eventually returns to the lowest, thus repeating that sequence. Set the selected unit when the mark reaches it.

* If an area cannot be covered by a certain unit display because of overflow, then the display unit shifts automatically to the higher unit symbol (e.g., $\text{cm}^2 \rightarrow \text{m}^2 \rightarrow \text{km}^2 \rightarrow$ pulse count).

Even if an overflow occurs at the highest unit (km^2), the pulse count mode results and the measured figure will not be lost. (The display will return to 0 and continue counting after it counts up to 99999.)

Key	Display
	□ $\begin{matrix} \text{cm}^2 \bullet \\ \text{m}^2 \\ \text{km}^2 \end{matrix}$... cm^2
UNIT	□ $\begin{matrix} \text{cm}^2 \\ \text{m}^2 \bullet \\ \text{km}^2 \end{matrix}$... m^2
UNIT	□ $\begin{matrix} \text{cm}^2 \\ \text{m}^2 \\ \text{km}^2 \bullet \end{matrix}$... km^2
UNIT	□ pulse count (A)
Key	Display
	□ $\begin{matrix} \bullet \text{in}^2 \\ \text{ft}^2 \\ \text{acre} \end{matrix}$... in^2
UNIT	□ $\begin{matrix} \text{in}^2 \\ \bullet \text{ft}^2 \\ \text{acre} \end{matrix}$... ft^2
UNIT	□ $\begin{matrix} \text{in}^2 \\ \text{ft}^2 \\ \bullet \text{acre} \end{matrix}$... acre
UNIT	□ pulse count (A)



5. Tracing of an Area

Mark the starting point at any position on the outline of the area to be measured. Set the pinpoint of circle in the tracer lens on it.

Push the **START** key and see that "0." appears on the display (with a sound "beep"). Then move the tracer clockwise along the outline of the area until it comes to the starting point. The figure displayed indicates the area of the object that has been measured.

6. Memory of Measured Figures by **HOLD** key

The measured figures on the display are frozen by the **HOLD** key. In this mode, both the "HOLD" symbol appear on the left side of the display unit. This prevents an inadvertent loss of the result when it is memorized.

7. Accumulative Measurement by **HOLD** Key

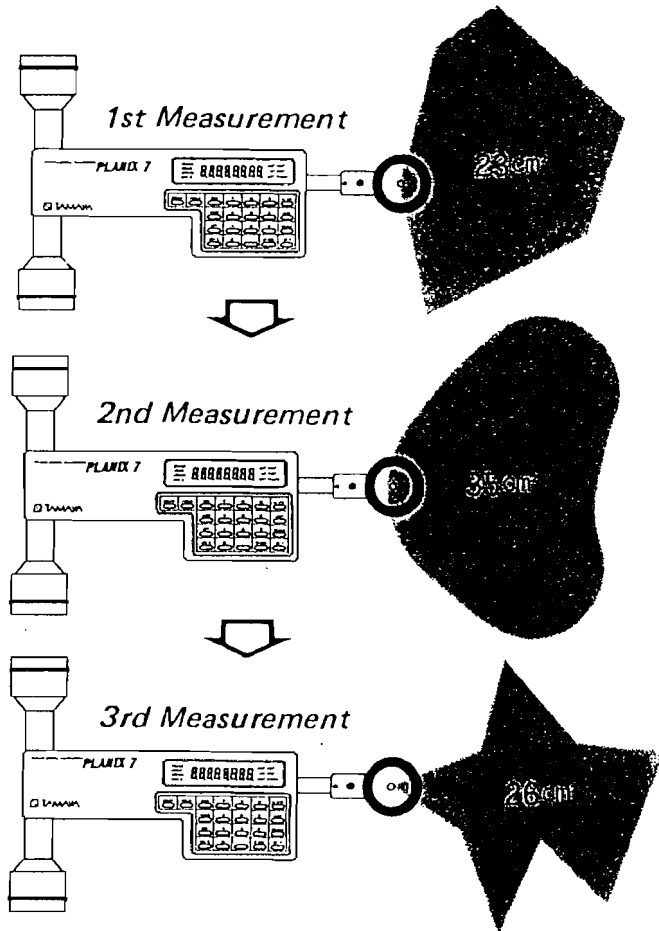
The **HOLD** key may be used to accumulate segments of a large area or measure two or more different areas accumulatively.

To measure and accumulate several areas, trace the first area and push the **HOLD** key, then trace the second and push the **HOLD**. Repeat the same steps for the third, fourth,

To start a new measurement during accumulative measurement after releasing the "hold" function by the second or any subsequent push on the **HOLD** key, return the tracer to the original starting point and push the **ON/C** key. Then the figure frozen at the previous measurement appears on the display unit.

Key	Display		
START	0	cm ² m ² km ²	
1st (A)	23	cm ² m ² km ²	
HOLD	^{HOLD} 23	cm ² m ² km ²	Hold (B)
HOLD	23	cm ² m ² km ²	Release Hold (C)
2nd (D)	58	cm ² m ² km ²	...23cm ² + 35cm ²
HOLD	^{HOLD} 58	cm ² m ² km ²	Hold (E)
HOLD	58	cm ² m ² km ²	Release Hold (F)
3rd (G)	84	cm ² m ² km ²	...58cm ² + 26cm ²
HOLD	^{HOLD} 84	cm ² m ² km ²	Hold (H)

Accumulative Measurement



$$23 \text{ cm}^2 + 35 \text{ cm}^2 + 26 \text{ cm}^2 = 84 \text{ cm}^2$$

Precautions to be taken when a large area is measured: The PLANIX 7 can measure and display the area of up to approx. 300 x 30 cm with one stroke. A larger area can be measured by dividing it into several segments and accumulating their areas. The accumulation is limited to 8 digits; if the accumulated figure exceeds the limit, it will automatically shift to the higher unit.

To measure a large area with a single stroke, an area equivalent to 100,000 pluses must be added to the measured figure because the counter returns to "0" following the 99,999 count. The value to be added is 100,000 multiplied by an appropriate unit area constant (see page 32).
Accumulative Measurement.

[NOTE] Pushing the **ON/C** key two times continuously will cause the frozen data to be lost and the display to show "0".

8. Average Measurement by AVER Key

The same area measured repeatedly up to nine times may be averaged to obtain the most reliable results.

Measure an area, push the END key, and measure the same area again. Repeat this procedure continuously several times. Eventually, push the AVER key to obtain the final averaged result.

Pushing the END key causes the display to become "0." This value is not frozen but changes as the tracer moves. If the "0." display changed when the tracer was aligned the starting point to make the second measurement, push the ON/C key to bring the display to "0." In this condition, the data effective before the END key was pushed is stored and only the figure in display is cleared, permitting average measurement to continue.

The averaged figure finally obtained is frozen.

Key	Display	
START	0	cm ² * m ² km ²
	19.8	cm ² * m ² km ² 1st measurement (A)
END	MEMO 0	cm ² * m ² km ² ...
	MEMO 20	cm ² * m ² km ² 2nd measurement (B)
END	MEMO 0	cm ² * m ² km ² ...
	MEMO 20.2	cm ² * m ² km ² 3rd measurement (C)
END	MEMO 0	cm ² * m ² km ² ...
AVER	20	cm ² * m ² km ²

9. Measurement of Drawings on a Reduced Scale

1:N reduced scale:

Register "N" by numeric keys (0...9) and then the **SCALE** key before measuring the area on a 1:N drawing. The computer in the PLANIX 7 will do the necessary conversion and display a correct figure in the unit selected and set.

Example: Drawing on a 1:10 scale

Key	Display
1 0	1 0 Reduced scale value set (A)
SCALE	^{SCALE} 1 0 1:10 set (B)
START	0 Measurement started (C)

10. Measurement of Drawings on an Enlarged Scale

N:1 enlarged scale:

The area on an N:1 enlarged drawing can also be measured by taking the same procedure as for reduced drawings. The only difference is "1/N" to be keyed instead of "N". To input this kind of scale which is smaller than 1. You have to convert it into a decimal fraction.

Example: Drawing on a 10:1 scale

Key	Display
0 . 1	0 . 1 Enlarged scale value set (A)
SCALE	^{SCALE} 0 . 1 10:1 set (B)
START	0 Measurement started (C)

Example: Vertical scale 1:1
Horizontal scale 1:10

Key	Display	
<input type="text" value="1"/> <input type="text" value="0"/>	1 <input type="checkbox"/>	Horizontal scale value set (Either axis may precede) ^(A)
<input type="text" value="0-SCL"/>	^{SCALE} * 1 <input type="checkbox"/>	Ready to set vertical scale value ^(B)
<input type="text" value="1"/>	1	Vertical scale value set ^(C)
<input type="text" value="SCALE"/>	^{SCALE} , 1	Both 1:10 and 1:1 set ^(D)
<input type="text" value="START"/>	<input type="checkbox"/>	Measurement start ^(E)

11. Measurement of Drawings when the Vertical Scale Differs from the Horizontal Scale

Horizontal scale: 1:M

Vertical scale: 1:N

Register either "N" or "M" and press the key. Then register the other scale and press the key.

* If no scale value is entered, the microprocessor will automatically calculate the area of the drawing assuming 1:1 scale.

NOTE) SCALE MUST BE RATIO OF IDENTICAL UNITS

Example: Scale on drawing is 1 mm: 1 m or 1 inch: 100 feet. For entry in planimeter, ratio should be converted to 1 mm: 1000 mm or 1 inch: 1200 inches. Either 1000 or 1200 should be entered as the scale.

12. Clearing or Alteration of Stored Scale Values

Once set, a scale value is stored in the instrument unless it is changed or the charger is attached to the unit. Attaching the charger or alteration of stored scale values do erase the scale value.

A new scale value can be set at any time as long as the power stays on. If a new value N; is set and the **[SCALE]** key is pressed, the previous value N disappears and the new N' is displayed.

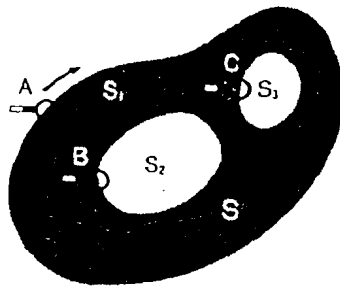
The memory data is stored with the power turned off. To return a certain reduced scale value to 1:1, press the **[1]** and **[SCALE]** keys.

Example: 1:50000 reduced scale

Key	Display	
$\text{S} \text{ } \text{O} \text{ } \text{O} \text{ } \text{O} \text{ } \text{O}$	50000	$\frac{\text{cm}^2}{\text{km}^2}$
SCALE	SCALE 50000	$\frac{\text{cm}^2}{\text{km}^2}$
START	0	$\frac{\text{cm}^2}{\text{km}^2}$
SF ?	SCALE 50000	$\frac{\text{cm}^2}{\text{km}^2}$
SF ?	SCALE 50000	$\frac{\text{cm}^2}{\text{km}^2}$

Example: Horizontal scale 1:30
Vertical scale 1:50

Key	Display	
$\text{A} \text{ } \text{O}$	30	$\frac{\text{cm}^2}{\text{km}^2}$
O-SCL	SCALE 30	$\frac{\text{cm}^2}{\text{km}^2}$
$\text{S} \text{ } \text{O}$	50	$\frac{\text{cm}^2}{\text{km}^2}$
SCALE	SCALE 50	$\frac{\text{cm}^2}{\text{km}^2}$
SF ?	SCALE 30	$\frac{\text{cm}^2}{\text{km}^2}$
SF ?	SCALE 50	$\frac{\text{cm}^2}{\text{km}^2}$



13. Confirmation of Scale Factor

You can tell what scale factors are stored by pressing the **SF ?** key. When you press it once, it displays the horizontal value. Then, when you press the key again in succession, it displays the vertical value.

14. When the Figure has Smaller Inner Figure

PLANIX 7 shows the area in minus quantity if you trace the figure anticlockwise. Therefore, by using this feature, you can subtract the area of the inner contained figures from the area of the outer figure.

- 1) First trace the figure A clockwise, then freeze the value by the **HOLD** key. Then move the unit close to figure B.
- 2) Release the **HOLD** key and trace the figure B anti-clockwise. Automatically, PLANIX 7 subtracts the area of the figure B from the stored area of the figure A.
- 3) Do the same procedure for the figure C. In this way PLANIX 7 can measure the area of the most complicated figure.

<i>Scales</i>	<i>area/digit</i>
1:1	0.1cm ²
1:10	10cm ²
1:50	250cm ²
1:100	0.1m ²
1:200	0.4m ²
1:250	0.625m ²
1:300	0.9m ²
1:400	1.6m ²
1:500	2.5m ²
1:600	3.6m ²
1:1000	10m ²
1:1500	22.5m ²
1:2000	40m ²
1:2500	62.5m ²
1:5000	250m ²
1:10000	1000m ²
1:25000	6250m ²
1:50000	25000m ²

15. Measurement of Areas in Units other than cm², m², km², in², ft² and Acre

An area can be measured and directly read in ha, or any unit other than cm², m², km², in², ft² and acre.

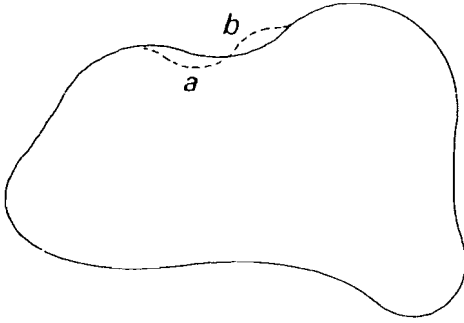
Example: 1:5000 reduced scale area measured in ha instead of m²

Since 1 ha equals 10⁴ m², use scale N = 5000 ÷ 10² = 50. Although the measured value is given in m², the area can actually be measured in ha on a 1:5000 reduced scale basis.

16. Calculation of an Area from Pulse Count

If the UNIT has not been set, the pulse count mode is automatically selected (see Selection of Unit, page 14). In this mode, an area can be measured from the pulse count multiplied by a unit area constant. For example, if the measured value is 3210 for a 1:1000 map, then the actual area is 3210 × 1000² × 0.1 cm² = 321,000,000 cm² = 321,000 m². The "1000² × 0.1 cm²" is called a unit area constant. The unit area constants for frequently used reduced scales are as follows:

SOME TECHNIQUES FOR THE PRACTICAL MEASUREMENT



Correction of the Accidental Errors

In tracing, you should trace exactly on the outline of the area. However, if you felt you came off slightly to the left of the line this error may be quickly compensated by going about the same amount off to the right. This kind of the personal technique gained with practice and experience may help you a great deal in reducing the measuring time.

a = accidental error

b = corrective error

Scale Ratio Simplification

The PLANIX 7, 7P, 8 and PLANIX 5000 will compute the area of a plan or drawing if the scale is entered via the numeric keyboard. However, the scale ratio must be entered as a ratio of like units.

Example:

- A. Many plans or drawings have a scale ratio of 1" equals x feet such as 1" = 100'. To enter this, convert the 100' to inches by multiplying by 12 to obtain a ratio of 1" = 1200".
- B. Architectural drawings will often show a ratio based on fractional inches. One might find 1/8" = 1'. This can be converted to a form suitable for entering into the PLANIX by first multiplying both sides of the ratio by eight (1" = 8') and then multiplying the 8' by 12 to convert to inches (1" = 96").

Computing a scale ratio when the scale ratio is unknown:

Occasionally the scale ratio given may be incorrect because the drawing or map has been enlarged or reduced. Aerial photographs may also lack a scale ratio. In both cases it is easy to compute a scale ratio if a known distance can be measured.

Example:

The known distance between two points is one mile (5280') and is measured as 2.5".

Set a ratio 2.5" = 5280'. Divide both sides by 2.5": 1" = 2112'.

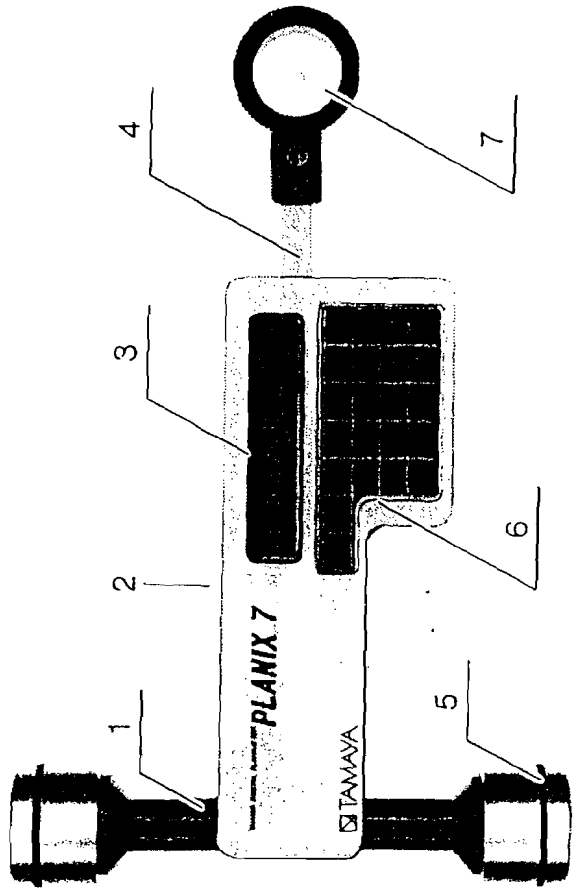
Multiply by 12": 1" = 25,344". Enter 25,344 as the scale value.

TABLE OF SCALE RATIOS

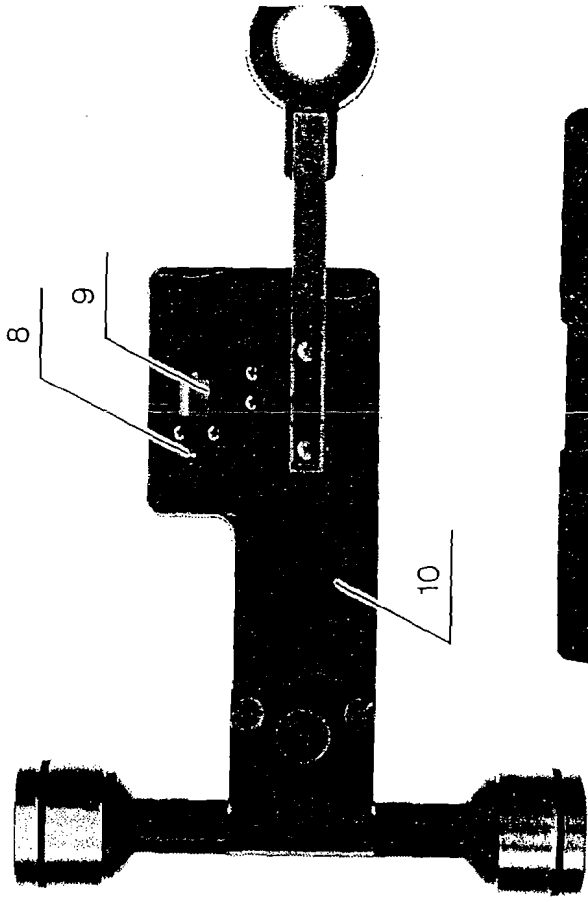
Ratio as given	Converted ratio	Value to enter
1" = 10'	1' = 120"	120
1" = 25'	1' = 300"	300
1" = 50'	1' = 600"	600
1" = 100'	1' = 1200"	1200
1" = 330'	1' = 3960"	3960
1" = 660'	1' = 7920"	7920
1/8" = 1'	1' = 96"	96
1/4" = 1'	1' = 48"	48
3/16" = 1'	1' = 64"	64
3/8" = 1'	1' = 32"	32
3/32" = 1'	1' = 128"	128
1-1/2" = 1'	1' = 8"	8
1" = 1/4'	1' = .25"	.25*
1" = 3/8'	1' = .375"	.375*

*Examples of enlarged scale

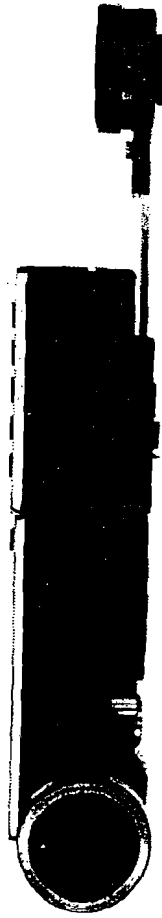
I



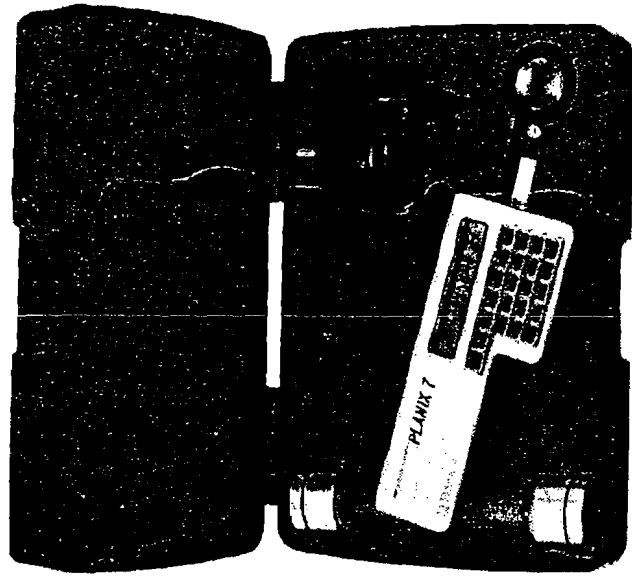
II



III



IV



1. Roller axle
2. Plug
3. Display
4. Tracer arm
5. Roller
6. Operation keys
7. Tracer lens
8. Integrating wheel
9. Encoder
10. Ni-Cd. battery

- I. (FRONT)
- II. (BACK)
- III. (SIDE)
- IV. Carrying case with AC adaptor

1. axe du rouleau
2. prise
3. affichage
4. bras conducteur
5. rouleau
6. touches de fonctionnement
7. loupe
8. roulette intégrante
9. codeur optique
10. accus Cadmium-Nickel

- I. (DESSUS)
- II. (DESSOUS)
- III. (COTE)
- IV. Mallette de transport avec adaptateur courant alter natif

1. Carrello
2. Spinotto
3. Display
4. Braccio
5. Rullo
6. Tastiera
7. Lente
8. Ruotino integrante
9. Encoder
10. Batteria Ni-Cd.

- I. (PARTE SUPERIORE)
- II. (PARTE INFERIORE)
- III. (PROFILO)
- IV. Custodia con trasformatore

1. Eje de rodillos
2. Enchufe
3. Pantalla
4. Brazo de seguimiento
5. Rodillo
6. Teclado
7. Lente de seguimiento
8. Rueda integradora
9. Encoder
10. Bateria de Ni-Cd

- I. PARTE SUPERIOR
- II. PARTE INFERIOR
- III. COSTADO
- IV. Instrumento con estuche y convertidor de corriente alterna

1. ACHSE
2. STECKD
3. ANZEIG
4. FAHRA
5. ROLLE
6. DRUCKT
7. LUPE
8. PLANIME
9. IMPULSG
10. AKKU

- I. (VORN)
- II. (HINTEN)
- III. (SEITE)
- IV. Etui mit