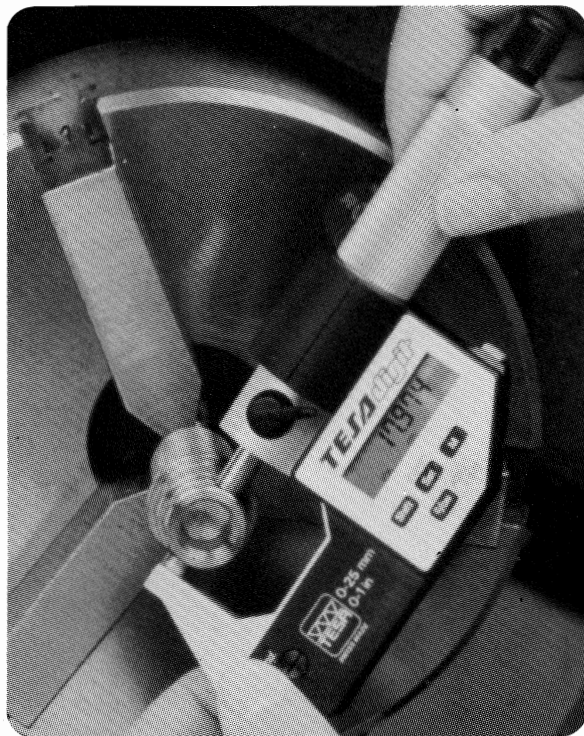




**TESA** Digit<sup>®</sup>



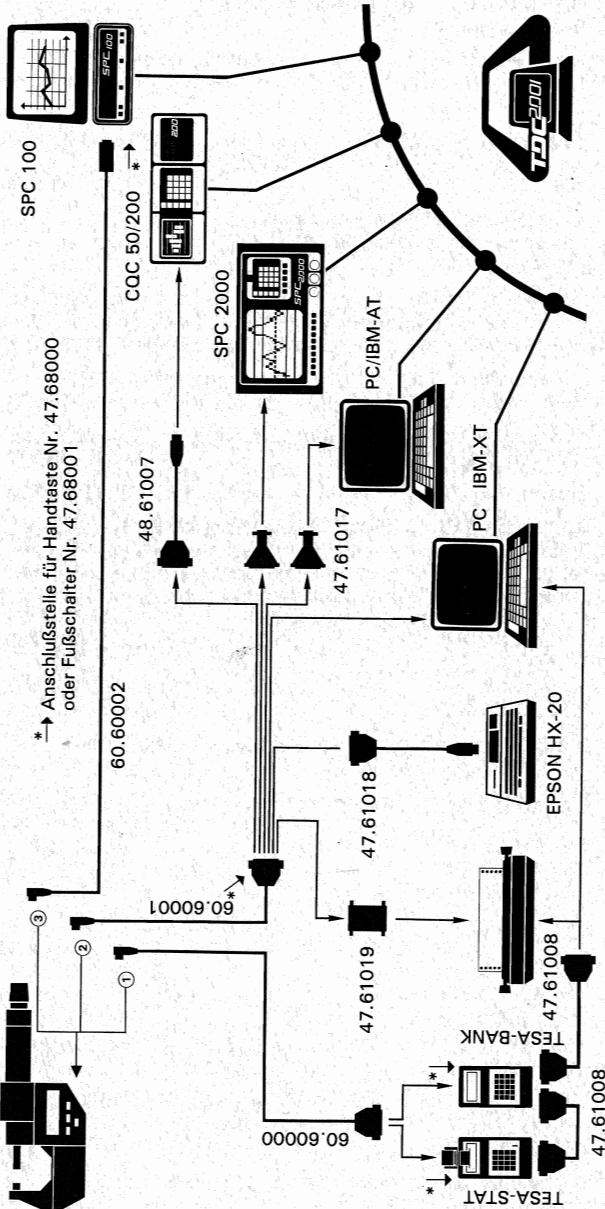
**Micromètre d'extérieur à affichage  
électronique numérique**

**Bügelmeßschraube mit elektronischer  
Zifferanzeige**

**Micrometer with electronic digital display**

Mode d'emploi  
*Gebrauchsanleitung*  
Instruction manual

Valable dès modèle 01  
*Gültig ab Modell 01*  
Valid as from model 01



# TESADIGIT®

## Instruction manual

### Important remark

This micrometer is equipped with an ultra-modern microprocessor. However, strong impulses emanating from electromagnetic fields and which appear in some sectors of manufacture may destroy the electronic functions. They may emanate from:

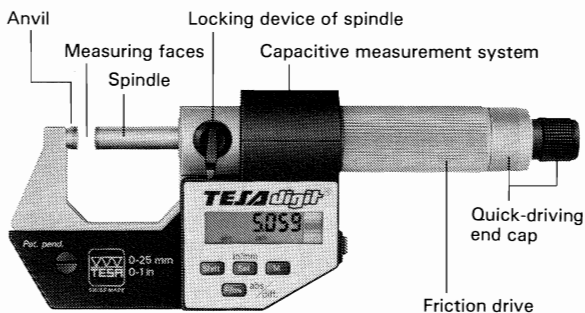
- instruments for electric marking,
- magnetic holding plates at the time of their commutation,
- manufacturing machines by electro-erosion,
- demagnetizing apparatuses.

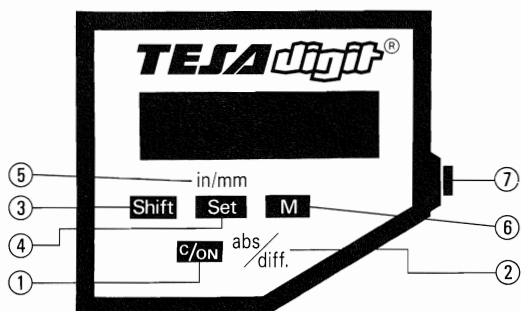
### 1 Initial operation

With the TESADIGIT, you have acquired a micrometer of the most modern design. This is a product of Swiss precision, developed and manufactured by TESA. Its high precision mechanics coupled with the most advanced electronics commanded by microprocessor, guarantee high measuring certainty and lasting reliability.

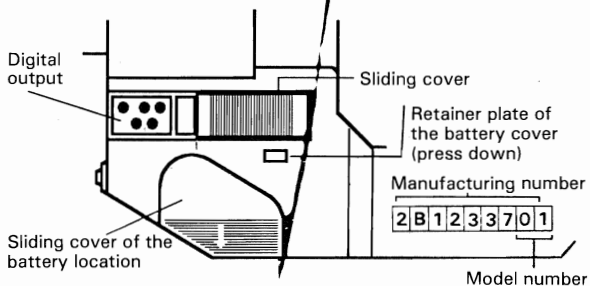
After having inserted the batteries and set up the display (see chapter 4), your instrument is ready for immediate use. We wish you full satisfaction in measuring with your TESADIGIT.

### 2 Functional elements

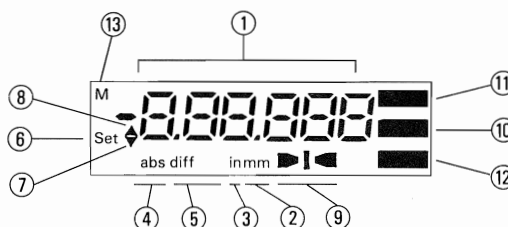




- ① «C/ON» button
  - Switching on/off the instrument
  - Temporary zero-setting of display in measuring method «Differential measurement»
  - GOTO digit when numerical enterings
  - Cancelling an «Error» message as well as «Blocking of a measured value» function
- ② «abs/diff» function (activated by pressing both buttons «Shift» and «C/ON»)
  - Changing the measuring method either in mode «Direct measurement» (abs) or «Differential measurement» (diff)
- ③ «Shift» button (menu function)
  - Commutation to the 2nd function of both buttons «C/ON» and «Set»
- ④ «Set» button
  - Start entry of a digital value, and close
- ⑤ «in/mm» function (activated by pressing both buttons «Shift» and «Set»)
  - Conversion from the metric (mm) to the inch (in) system
- ⑥ «M» button
  - Blocking of a measured value
- ⑦ «T» button
  - Triggering transfer of data via the digital output



### 3 Display



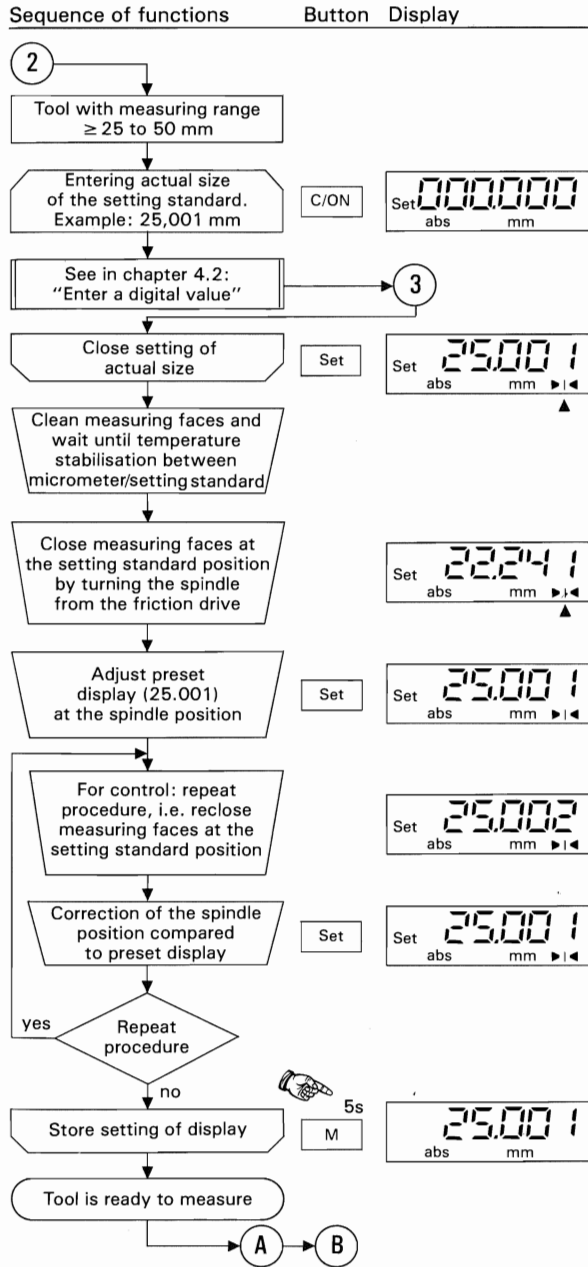
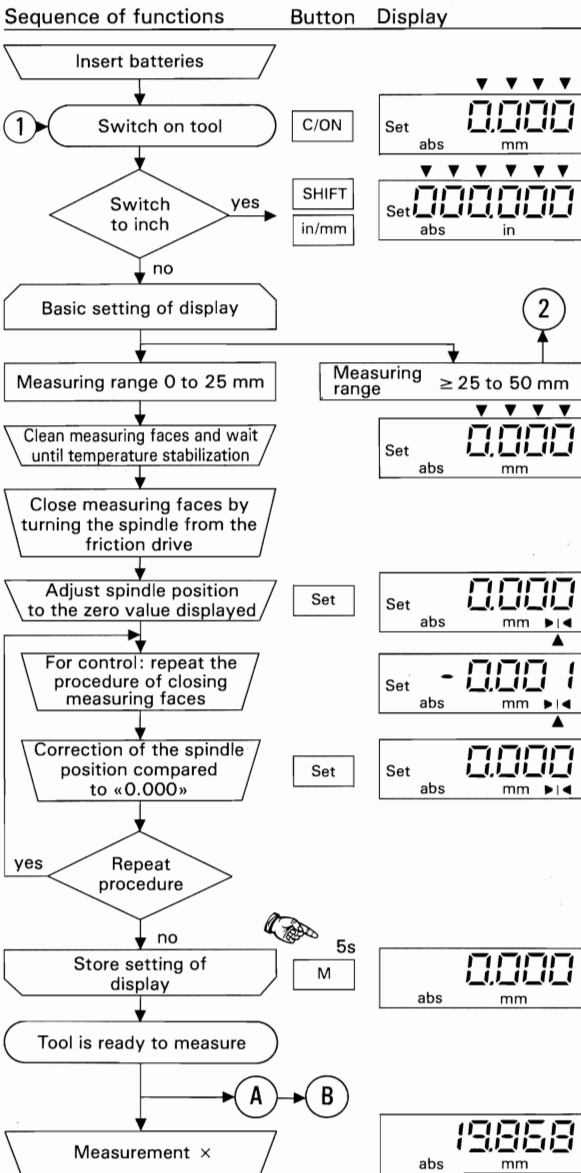
- ① Display of measured values with digital scale value 0.001 mm / .00005 in: «Error» message
- ② Display of a measured value in mm
- ③ Display of a measured value in inch
- ④ Measuring method chosen: «Direct measurement»
- ⑤ Measuring method chosen: «Differential measurement»
- ⑥ Function: «Enter a digital value» is activated
- ⑦ Enter the lower limit of size, resp. lower limit deviation
- ⑧ Enter the upper limit of size, resp. upper limit deviation
- ⑨ Call-up activation of closing measuring faces when «Basic setting of the display»
- ⑩ Display of a green LCD field indicating that a measured value belongs to the class «GOOD»
- ⑪ Display of a yellow LCD field indicating that a measured value belongs to the class «RE-WORK»
- ⑫ Display of a red LCD field indicating that a measured value belongs to the class «SCRAP»
- ⑬ Additional display appears when a measured value is blocked

### 4 Basic setting of the display as well as measurements in mode «Direct measurement»; switching on/off functions

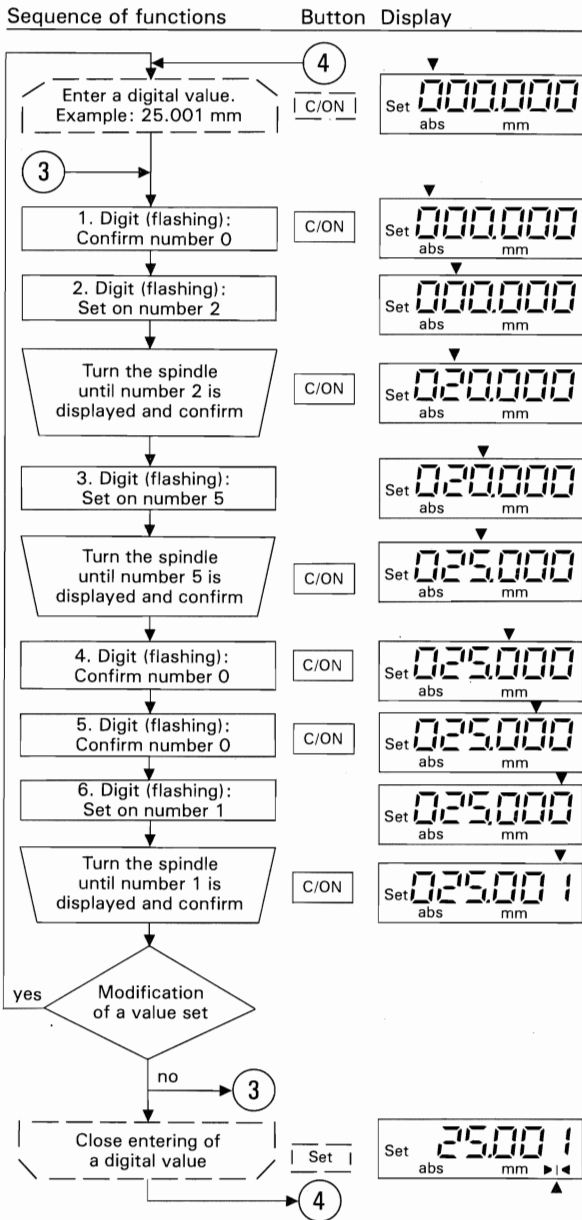
Basic setting of the display is explained in chapter 4.1, beginning with point 1. The zero-setting for instruments with measuring range from 0 to 25 mm is usually carried out with closed measuring faces. However, this function can also be set at any point within the field of measurement. This needs the use of a reference standard whose nominal dimension is known. For instruments with measuring range from 25 to 50 mm, setting of the display is always performed by means of a reference standard (e.g. gauge blocks or TESA standards). With respect to this, see procedure of connection described in chapter 4.1, point 2 as well as chapter 4.2 «Enter a digital value». Switching on/off functions are stated in chapter 4.3.

#### 4.1 Initial operation and basic setting of the display

Set display in measuring method «Differential measurement»

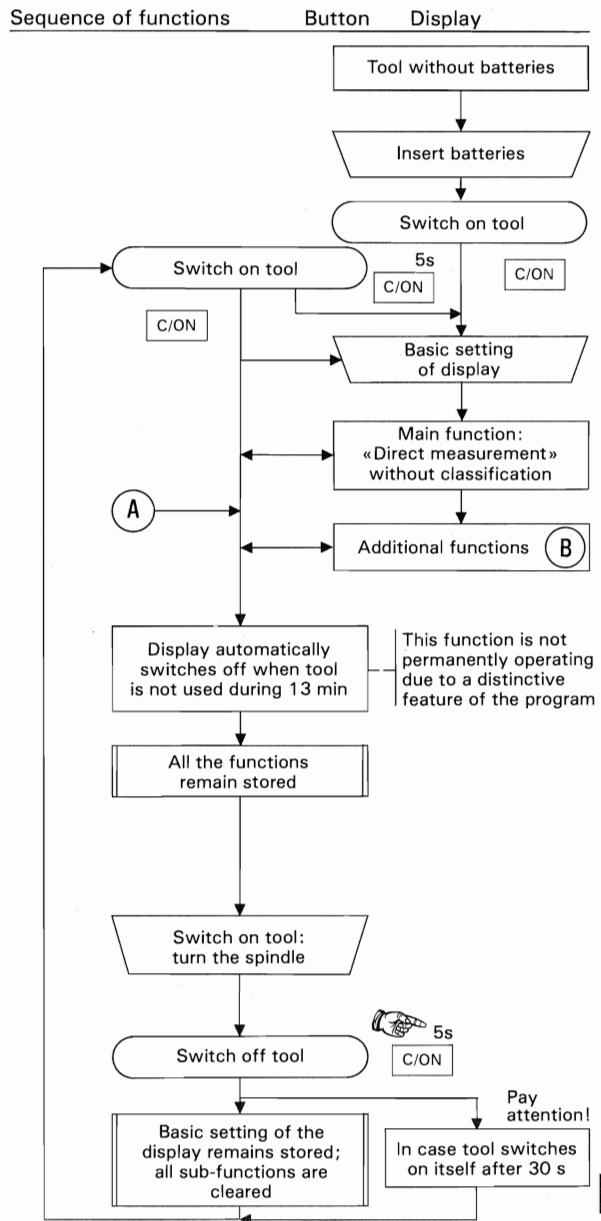


## 4.2 Enter a digital value



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## 4.3 Switching on/off functions (overview)



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## 5 Additional functions

### Classification of measured values in mode «Direct measurement»

See sequence of functions, chap. 5.1

After programming both limits of size (tolerance limits), this function indicates the attribution of a measured value to its corresponding class by colour LCD fields – green for «good», yellow for «re-work» and red for «scrap». Limits of size previously set can be summoned and, then, modified (see chap. 5.4).

### Measuring method «Differential measurement»

See sequence of functions, chap. 5.2

Whereas «Direct measurement» indicates the length size determined, which will be directly displayed again, differential measurement require a temporary zero-setting of display at the nominal size of the feature to be tested; each positive and negative deviation (actual deviation) is then displayed like a measured value.

### Classification of measured values in mode «Differential measurement»

See sequence of functions, chap. 5.3

Once nominal size as well as lower and upper limit deviations (tolerance limits) have been entered, the class to which a measured value belongs is indicated by colour LCD with green for «good», yellow for «re-work» and red for «scrap». Digital values previously set (nominal size and limit deviations) can be summoned and modified as described in chapter 5.4.

### Call-up and modify digital values stored; switch off and reactivate the function «Classification of measured values»

See sequence of functions, chap. 5.4

The function of «Classification of measured values» has to be switched off in order to permit the values stored (size limits, resp. nominal size and limit deviations) to be summoned. These digital values stored can never be lost; they are displayed one after the other once the function is reactivated. Each value can be either confirmed or modified.

### Unit system

See sequence of functions, chap. 5.5

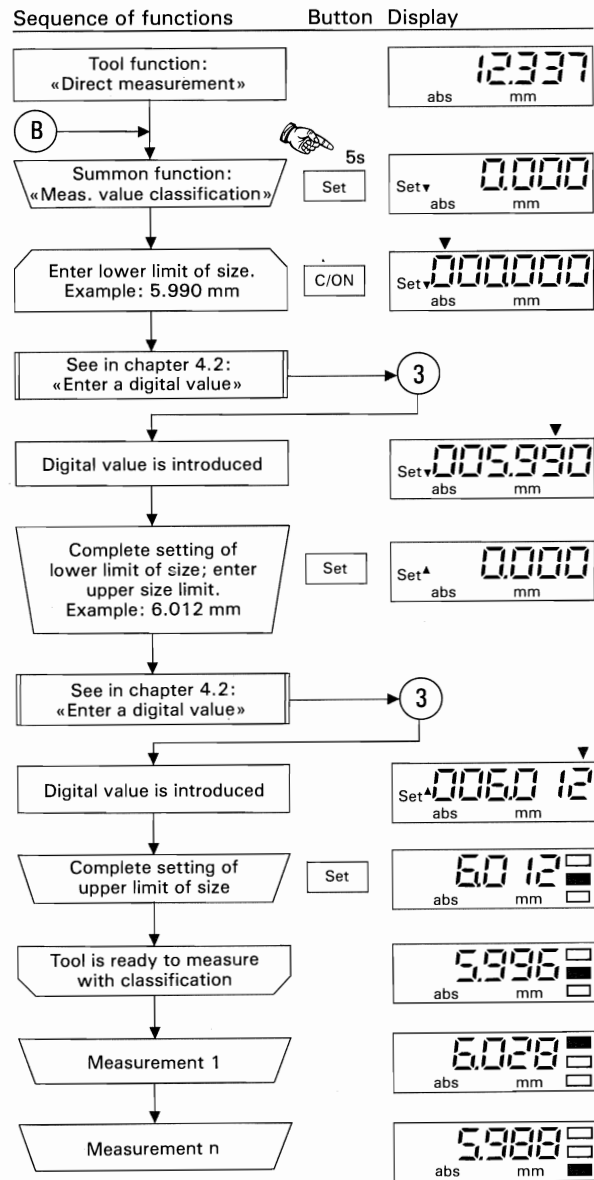
Both metric and inch systems can be alternately selected. The measured value is converted, and then automatically displayed in units of one or the other system.

### Blocking of a measured value

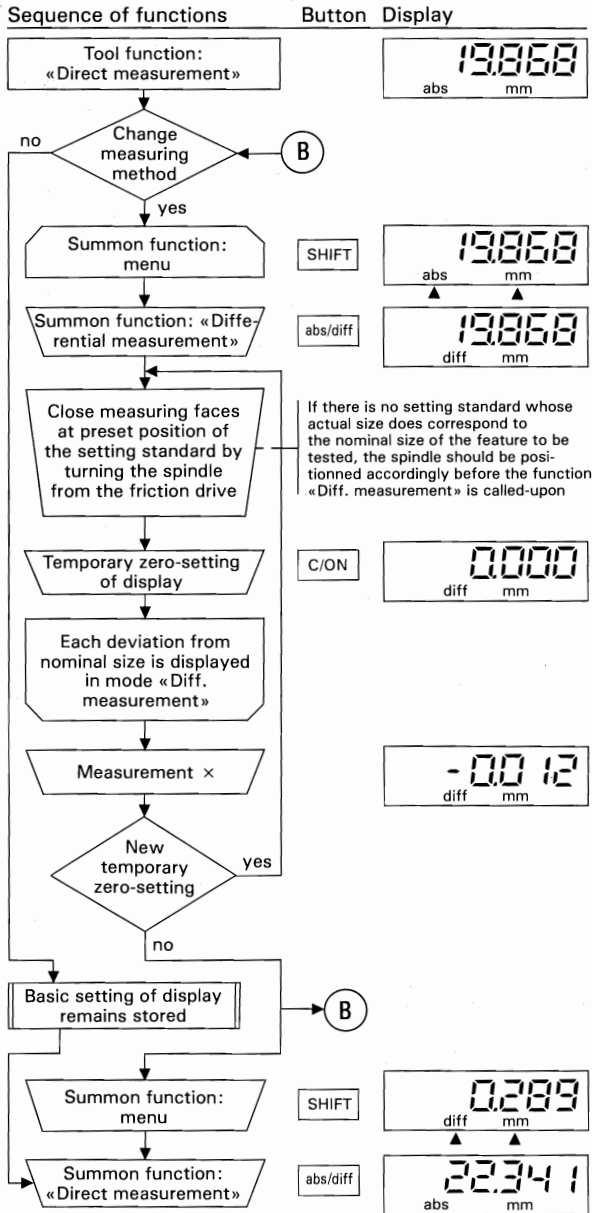
See sequence of functions, chap. 5.5

The value present when «M» button is activated is blocked on the display. While the spindle is turned with blocked display, the measuring system continuously registers the current measured value. However, this latter is displayed only when «M» button is activated again. Blocking of a measured value will be cancelled by pressing «C/ON» button.

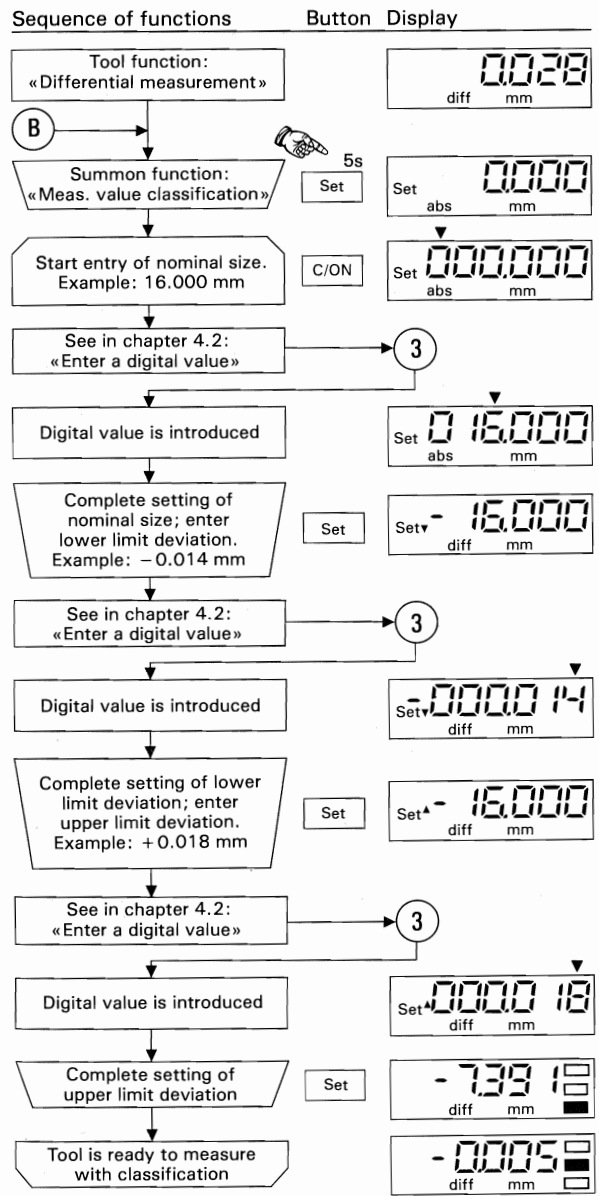
## 5.1 Setting of the function «Classification of measured values» in measuring method «Direct measurement»



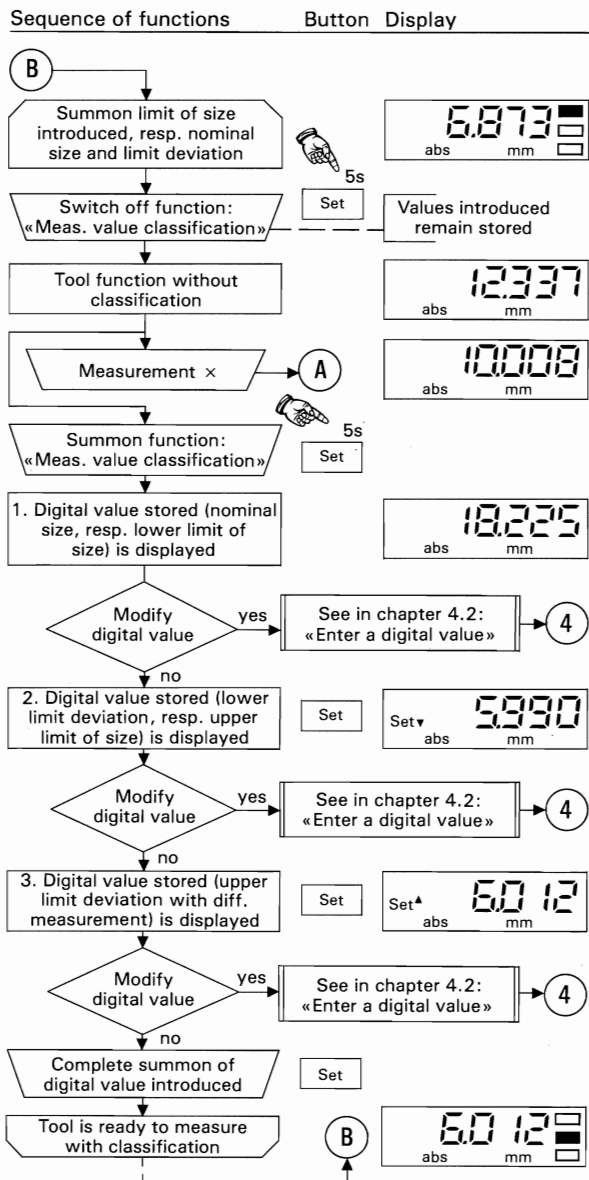
## 5.2 Change in measuring method «Differential measurement»



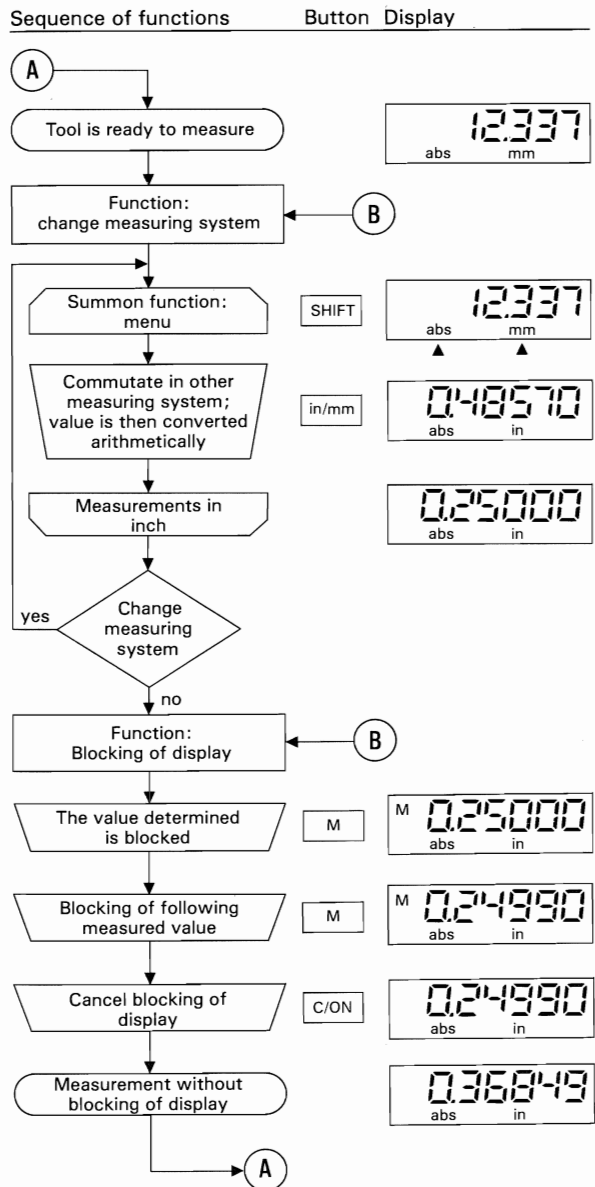
## 5.3 Setting function «Classification of measured values» in measuring method «Differential measurement»



### 5.4 Call-up and modify digital values stored; switch off and reactivate the function «Measured value classification»



### 5.5 Changing measuring system and blocking measured values

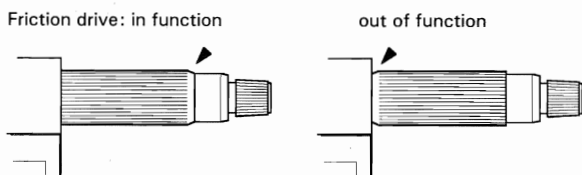




## 6 Further instructions

### 6.1 Blocking of the friction drive

Tighten the locking device of the spindle (para. 2). Unscrew the end-cap. Remove the sleeve of the friction drive with a rotation to the right; turn the sleeve over and mount it (rotation to the right) so as to place its chamfered extremity on the left side. Rescrew the end-cap.



**Note:** Use of the friction drive is highly recommended in order to ensure a reliable repeatability of the measured values.

### 6.2 Adjustment of the spindle play

Should the threaded spindle of your TESADIGIT require adjustment after a long period of service, proceed as follows: tighten the locking device. Unscrew the end-cap. Remove the sleeve of the friction drive by turning it to the right (about 10 mm). Turn the spindle until the blind hole of the setting nut can be seen through the sleeve groove. Tighten setting nut by means of the spanner-wrench (order No. 032241) supplied with the instrument, so that the spindle turns freely, but without play. Replace the end-cap. Adjust then basic setting of the display as described in chapter 4.1.

### 6.3 Replacement of worn-out batteries

- Press down upon the retainer plate using the small blade of the spanner-wrench; remove the sliding cover (see figure in para. 2).
  - Carefully remove worn-out batteries from their location by means of the spanner-wrench blade.
  - Insert new batteries with positive pole upwards, and press them down entirely; wear non-metallic gloves or use non-metallic tweezers. Replace the sliding cover and snap it into position.
  - Complete setting of display as described in chapter 4.1.
- Note:** Never recharge batteries nor throw them into a fire; please, handed in them at a collection centre.

### 6.4 «Error» messages

In case of functional irregularities of the instrument, an «Error» message is displayed. Messages «Error 1» to «Error 4» as well as «Error 6» indicate that the electronic measuring system does not work properly; in this case, the tool must be sent to TESA's after-sales service.

However, «Error 4» message can also appears when the spindle is displaced with inadmissible high-speed. Display of «Error 5» message indicates that a transfer of data has not succeeded (e.g. triggering of data transfer without link-up with a peripheral device; bad cable connection; non compatible interfaces).

- All the «Error» messages can be cancelled by pressing «C/ON» button. If a message subsists, the error is not erased.
- If «Error 4» message is displayed, remove one of both batteries for a short time (para. 6); a new basic setting of the display should be, then, performed (para. 4.1).

## 7 Digital output

The description hereafter refer to the interface such as the one included into the 25-pole connector (female) of the integrated cable No. 60.60001. This cable enables a direct connection of TESADIGIT, resp. TESA IMICRO SM measuring instrument with an IBM-XT and other compatible computers. See chap. 9 as well as the overview on page 60.

The interface of the 25-pole connector performs matching of both voltage and current levels; it also prevents electrical impulses from disturbing the electronics. All the other cables as well as relevant adaptors available fit with the interface of each apparatus selected.

The electronic components may be damaged in case of a direct connection of the tool with a peripheral device using another cable as the complete one specified in our catalogue.

Characteristics	Interface with serial data transfer
	Data rate: 1200 bauds
	ASCII code: 7 bits per character
	Start: 1 bite (state 0)
	Stop: 2 bites (state 1)
	Parity: even
	Logic of data: inverse

Characters used:

Digits from 0 to 9, minus signal, decimal point, SP (Space), CR (Carriage Return), LF (Line Feed)

Pins	Meaning	State	Level		RS 232 function	Description
			min.	max.		
1	Locking out				NC	Protective ground
2	Vn		-5V	+15V	TXD	Transmitted data
3	Data	0	Vpl - 3V	Vpl	RXD	Received data
		1	Vpl + 3V	Vn		
4	Output Control OC	active	+5V	Vpl	RTS	Request to send
		non active	-5V	Vn		
7	Masse		OV		GND	
20	Vp		+5V	+15V	DTR	Data set ready
			-5V	-15V		

Pins from 5, 6, 8 to 19 as well as 21 to 25 are not laid out.

V<sub>n</sub> negative voltage

V<sub>p</sub> positive voltage

|V<sub>p</sub>| absolute positive voltage

Power supply of the interface into the connector: V<sub>n</sub> = negative voltage, masse = 0 V reference, V<sub>p</sub> = positive voltage.

#### Format of the serial data transfer

Transmission sequences for characters

→	1	2	3	4	5	6	7	8	9	10
Metric value	S	N <sub>1</sub>	N <sub>1</sub>	N	.	N	N	N	CR	LF
Inch value	S	N	.	N	N	N	N	N <sub>2</sub>	CR	LF

S Minus signal or space (SP)

N Digits from 0 to 9

N<sub>1</sub> Digits from 0 to 9 or space (SP) and minus signal, resp.

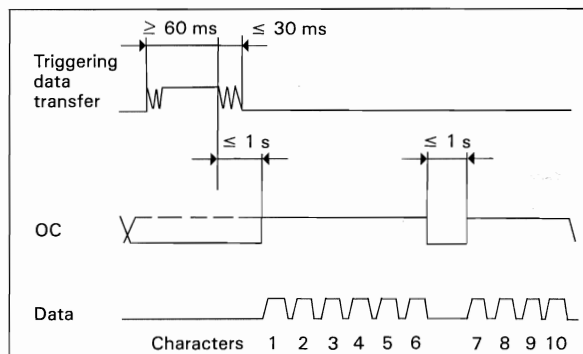
N<sub>2</sub> Digit 0 or 5

Each measured value transmitted corresponds to the «absolute» digital value of both metric and inch systems. This is also applicable for differential measurement.

A transfer of data can be triggered either by means of the «T» button on the micrometer or using the pedal No. 47.68001 or the pushbutton No. 47.68000, both being connected with the 25-pole connector of the cable No. 60.60001. Triggering of data transfer can also be executed through the peripheral device provided that it is equipped accordingly. «Error 5» message is displayed if OC signal is not activated within 1 s after the command.

*Note:* The OC signal is interrogated prior to the transmission of each character, which can be interrupted for max. 1 s. The «Error 5» message appears again after each interruption of > 1 s.

**Wave-form diagram** for transmission of a character with interruption after the 6th character (example).



## 8 Technical data

**Field of measurement:** 25 mm/1 in

**Measuring systems:** spindle with measuring thread M8×0,5 as well as electronic measuring system, rotary incremental, based on the use of the «electrical capacity» size (patent pending).

**Displays:** LCD (Liquid Crystal Display)

Numerical display with digital scale value: 0.001 mm/.00005 in. Height of digits: 5,1 mm; additional displays: see para. 3.

**Max. deviation range of display**  $f_{max}$  (repeatability of measured values included; does not depend on the measuring range): 5 μm.

**Repeatability of measured values:** 2,5 μm

**Measuring force:** > 5 N < 10 N

**Power consumption:**

110 μA

Operating time for 1 set = 2 non-rechargeable batteries: approx. 4300 h.

**Battery type:** 2 non-rechargeable batteries; type: silver oxide (Ag<sub>2</sub>O), SR44 as per IEC/CEI standard; rated voltage: 1,55 V; capacity: 155 to 190 mAh; dimensions: ∅ 11,6 mm × 5,3 mm.

Recommended batteries, for instance: Varta V357, Maxell SR 44W, Renata R357, Ucar 357, Mallory Duracell D357, National WL-14, Leclanché SR44.

**Digital output** on the micrometer: special; possibilities of a direct connection with systems for processing of measured values (computers, etc.). See para. 7.

**Operating temperature range:** + 10°C to + 40°C

**Storage temperature range:** - 20°C to + 60°C

**Relative humidity:** operating limit value: 80%; range within which max. deviation of the display will not be exceeded: 40% to 60%.

**Degree of protection:** IP 40 (IEC/CEI 529).

**Weight:** instrument (without case) with measuring range

0 to 25 mm: 280 g

25 to 50 mm: 310 g

50 to 75 mm: 420 g

75 to 100 mm: 580 g

## 9 Delivery program

**TESADIGIT micrometer**

Measuring range 0 to 25 mm/0 to 1 in

No. 60.30000

25 to 50 mm/1 to 2 in

No. 60.30001

50 to 75 mm/2 to 3 in

No. 60.30002

75 to 100 mm/3 to 4 in

No. 60.30003

**1 set = 2 non-rechargeable batteries:**

No. 05.60030

**TESA duo-set 5**  
consisting of:

No. 05.30025

1 TESA DIGIT-CAL SI with electronic digital display, resolution 0.01 mm No. 05.30017  
1 depth-measuring foot No. 05.60013  
1 TESADIGIT, measuring range 0 to 25 mm No. 60.30000  
1 plastic case No. 05.60083

**TESA duo-set 6** No. 05.30026

consisting of:

1 TESA DIGIT-CAL SM with electronic digital display, resolution 0.01 mm No. 05.30016  
1 depth-measuring foot No. 05.60013  
1 TESADIGIT, measuring range 0 to 25 mm No. 60.30000  
1 plastic case No. 05.60083

**TESA instrument stand**, lacquered; locking device can be tilted: No. 01.60201

① **TESA-STAT**, mini-computer with built-in printer for statistical process control (SPC).

English version: No. 47.67007  
French version: No. 47.67005  
German version: No. 47.67006

**TESA-BANK**, hand-held instrument with microprocessor for collecting and processing measured values in statistical production controls (SPC/SQC).

English version: No. 47.67014  
French version: No. 47.67012  
German version: No. 47.67013

**Cable** for connecting TESADIGIT, resp. TESA IMICRO SM to TESA-STAT or TESA-BANK: No. 60.60000

**Cable** for connecting TESA-BANK and TESA-STAT, resp. PC/IBM-XT computer or printer (RS 232): No. 47.61008

② **CRSM-01 cable** for connecting TESADIGIT, resp. IMICRO SM to PC/IBM-XT computer (RS 232, 25-pole): No. 60.60001

**ADP-01 adaptor** for connection of cable No. 60.60001 to PC/IBM-AT computer (RS 232, 9-pole): No. 47.61017

**Adaptor** for connection of cable No. 60.60001 to TESA SPC 2000 computer: see special leaflet.

**ADP-02 adaptor cable** for connection of cable No. 60.60001 to TESA CQC 50/200 (RS 232): No. 48.61007

**ADP-03 adaptor cable** for connection of cable No. 60.60001 to EPSON HX-20 computer: No. 47.61018

**ADP-04 adaptor** for connection of cable No. 60.60001 to a printer with input «RS 232» (25-pole connector): No. 47.61019

③ **CSI-02 cable** for connecting TESADIGIT, resp. IMICRO SM to a TESA SPC 100 computer: No. 60.60002

**Pedal** with cable and connector for triggering data transfer to interface: No. 47.68001

**Pushbutton:** as for pedal No. 47.68001: No. 47.68000

For all other TESA measuring instruments with digital output as well as for TESA systems for processing of measured values, please ask for our special leaflets or request appropriate advice from our specialists.