# DIAVITE DH-7

## INSTRUCTION MANUAL

# Manual

# Contents

## Technical data

### Measuring instrument

| | | |
|---|---|---|
| Parameters | ISO/DIN: | Ra, Rz (DIN), Rmax, R3z, Rt, Rq (RMS), Rk, Rpk, Rvk, MR1, MR2, Ppc, Rmr (printed) |
| | JIS: | Ra (JIS), Rz (JIS) |
| | ISO 12085: | R, AR, Rx |

| Cutoff lc | | 0.00 | 0.08 | 0.25 | 0.8 | 2.5 | | mm |
|---|---|---|---|---|---|---|---|---|

**A further traversing length between 0.5 and 15.0 mm may be selected.**

| Length of traverse Lt ISO/DIN | 0.48 | 1.5 | 4.8 | 15.0 | | mm |
|---|---|---|---|---|---|---|
| Lt CNOMO | 1 | 2 | 4 | 8 | 16 | mm |
| Total length of traverse lm | 0.40 | 1.25 | 4.0 | 12.5 | | mm |

| Measuring ranges | Ra, Rq | 19.99 µm / 800 µinch |
|---|---|---|

**Values below 0.1 µm will be indicated with three decimal digits!**

| | Rz, R3z, Rmax, Rt, R, AR, Rx | 199.9 µm / 2000 µinch |
|---|---|---|
| Memory of measuring prifiles | 25 roughness profiles | |
| Display | LCD-display with two lines of 20 characters each | |
| Key lock | for the buttons lt (length of traverse), lc (cutoff) and R (measuring values shown on display). | |
| Printer | incorporated, thermo sensitive, with graphics capability | |
| Printing speed | approx. 30 mm/sec., numerically and graphically | |
| Power supply | mains adapter, incorporated rechargeable batteries | |
| Ambient humidity | max. 80%, not condensing | |
| Range of ambient temperature | 10° – 40° C / 50° - 104° F | |
| Tracing system | Hall effect transducer | |
| Tracing speed | 0.5 mm/sec. | |
| Diamond stylus | radius 5 µm, 90° / 200 µinch, 90° | |
| Tracing skid | radius 25 mm / 1 inch | |
| | Special tracers: Radius different, according to measuring purpose | |
| Traverse unit | VH for tracers with skid only, VHV for tracers with and without skid | |
| Divers | clock time, date, battery survey | |

### Mains adapter

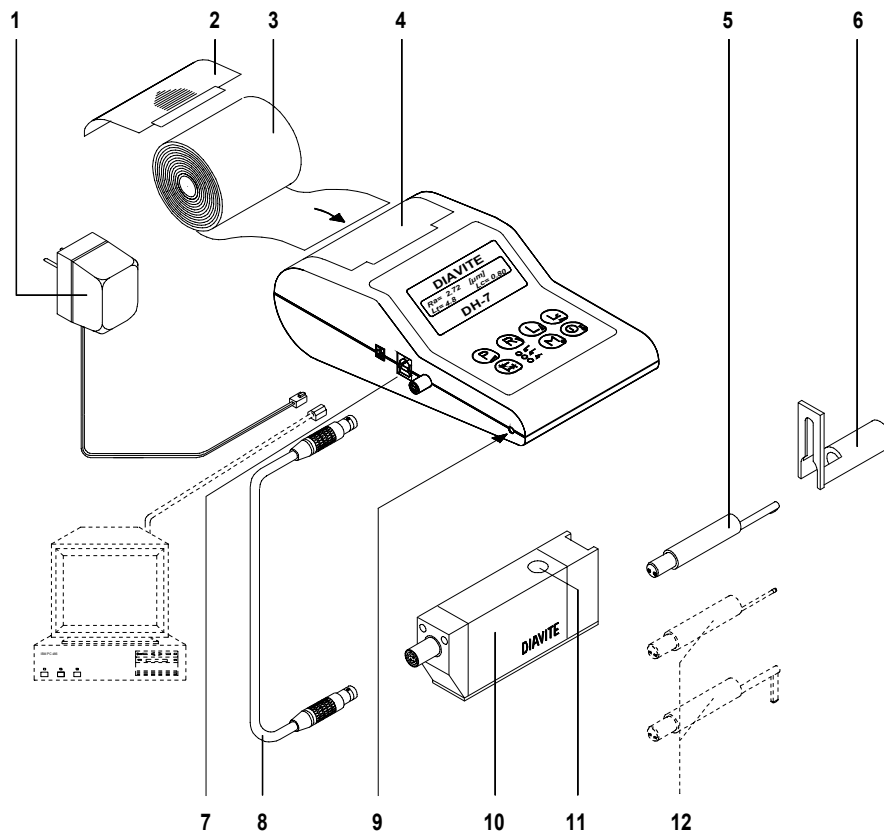| Entry: | Tension 90 to 264 V~ |
|---|---|
| Frequency | 47 to 63 cycles |
| Plug: | European Community, other national plug adapters are optional |
| Exit: | Tension 12 V= |
| Electrical currency | 900 mA |
| Protection | insulated IP40 |

# 1. General about the instrument

## 1.1 Structure of instrument



| | |
|---|---|
| 1 Mains adapter | 7 Interface USB |
| 2 Paper roll cover | 8 Connection cable from instrument to traversing unit |
| 3 Registration paper | 9 Reset instrument |
| 4 Paper roll compartment | 10 Traversing unit VH (VHF) |
| 5 Standard tracer | 11 Remote control (switch-on/start) |
| 6 Supporting shoe | 12 Supplementary tracer (optional) |

## 1.2 First step: Setting of language

1. Press any key - the instrument will be ready for operation in a few seconds.

2. Press the key (**M.**) – a green LED blinks – you are now in the mode '**Menu**'.

3. Press the key (**R₁**) three times - the indication reads: '**Menu: Language**'.

4. Press the key (**⓪**) once – the indication reads: '**Language: English**'.

5. Press the key (**Lt**) once – the indication reads: '**Language: Deutsch**'.

   :

   more languages

   :

6. Press the key (**⓪**) once – the indication reads: '**Menue: Language**'.

7. Press the key (**M.**) – the green LED extinguishes – you are back in the measuring mode.

## 1.3    Connections

On one side of the instrument there are three connections, one for the power supply, one for the cable to the traverse unit, respectively to the tracer, and another one for the serial connection to a computer.



Mains adapter          Interface USB          Traverse unit
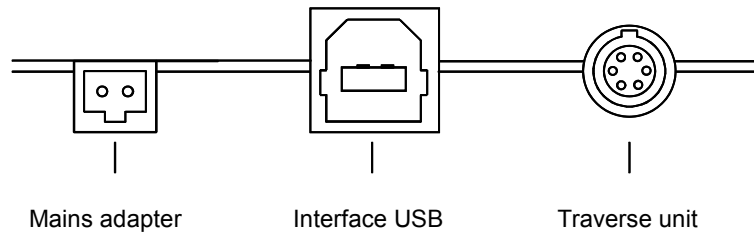
### 1.3.1 Mains adapter 90 – 264 VAC / 50 – 60 cycles

The mains adapter connection serves for the electric power supply of the instrument. If this adapter is connected, the instrument is provided with electric current during operation and simultaneously the batteries are being charged – if necessary.

Only the original mains adapter may be used for this purpose. It is specially designed for use with many international electric mains tensions (for admitted values refer to 1.4.2 'mains adapter').
Suitable plugs for corresponding national standards are available from the agent or from electro-technical stores.

### 1.3.2 Interface USB

The interface USB serves for the direct connection to a computer. This must be equipped with a suitable software (option) for receiving the data.

### 1.3.3 Connection of the traverse unit

The traverse unit is connected to the socket with the standard cable supplied. This serves for the supply of the electric current and also for the transmission of the measuring values.

## 1.4    Connection of the tracer

| Attention: No measuring is possible without Tracer and traverse unit |
| --- |

Remove the supporting shoe by using the enclosed hexagon key or by means of the knurled nut (type VHF).
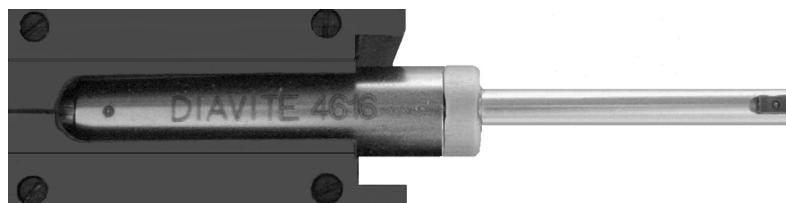


Insert the tracer into the traverse unit as shown in the picture.

If manual measurements are to be effected, remount the supporting shoe to the traverse unit once again.

| Warning:        By no means is the tracer be inserted forcefully; it must be held with the utmost care at its largest diameter! |
| --- |

The position of the supporting shoe is correctly reached when the work piece is supported on its whole length by the traversing unit with supporting shoe. If the measuring area is too small, the bottom surfaces of traversing unit and supporting shoe must be on the same level.

| Warning: | When measuring together with the support, please make sure that the tracer is not bent by lowering it to deeply onto the work piece. There is no guarantee for bent tracers. |
|---|---|
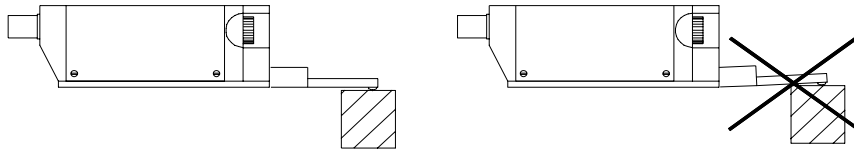


## 1.5  Traverse unit

Prior to the measurement start, connect the traverse unit to the measuring instrument with the 6-core connection cable. This cable provides the traverse unit with the necessary electric tension and sends the measuring signal.

The cable plugs for the connection cable have an integrated locking. The cable must therefore be held at the plugs only when being inserted or removed, as otherwise the connection between cable and plug could become damaged.

## 1.6  Switch-on/off of the instrument ⏻

$<$
of approximately 2 seconds.

The instrument can be operated with the incorporated rechargeable batteries or by means of the electric mains adapter (see 2.7 electric power supply).

If for some time no key of the instrument is pressed, the instrument will switch itself off automatically. The time for the automatic switch off can be set (see 3.7.2 'automatic Switch off').

## 1.7  Calibration

The DIAVITE DH-7 has an automatic calibration, which is at disposal in the menu 'configuration' (page 12). In order to avoid faulty measurements, it is absolutely indispensable to check the perfect function of the instrument before starting the first daily application, as well as in regular periods of time. This can be effected the easiest way by measuring the surface of a roughness specimen. The measured roughness value is compared then with the nominal value indicated on it and – if necessary – a new calibration of the instrument.

If a tracer is exchanged, the instrument has to be recalibrated. The deviations between the various tracers should be rather small normally, but could anyhow cause faulty measuring results. The instrument can be recalibrated automatically. The settings must be correctly.

1.  Press any button, after some seconds, the instrument is ready for operation

2.  Press the button **M** a green LED lights up. You are in the mode '**Menu**'

3.  Press the button **R** until the indication '**Config**' appears

4.  Press the button ⏻ once and the key **Lt** two times, on the indication appears '**Calibration**'

5.  Press the button $\circledcirc$ once again, the indication '**2.95**' appears'

| **For calibration, the cutoff 0.8 mm will be set automatically!** |

6.  Press the button $\boxed{Lt}$ or $\boxed{R}$ and put in the **roughness value Ra** of the calibration piece, if you do not employ the original roughness standard

7.  Press the button $\circledcirc$ once to confirm the correct setting of the **roughness value Ra**

8.  Press the button $\circledcirc$ once again, the calibration procedure lasts approximately 2 minutes

9.  At the end of the calibration procedure, the current measuring value Ra and the pre-determined calibration value appears on the display.

10. Press the button $\boxed{M}$ the green LED disappears, you are back in the measuring mode.


## 1.8  Keyboard

The DIAVITE DH-7 is a surface roughness meter, which is easy and safe to operate after a short introduction.
The instrument can be set according to the operator's needs using the menu functions.
The keys are provided with pictographs for the following functions:

| **Measuring mode** | | **Menu mode** |
|---|---|---|
| $\circledcirc$ | Switch-on/off instrument | Confirmation of selected menu setting |
| $\boxed{M}$ | Menu for instrument configuration | Switch-on/off menu |
| $\boxed{Lc}$ | Selection of Cutoff with standard length of traverse | Cursor to right |
| $\boxed{Lt}$ | Selection of length of traverse | Cursor to left |
| $\boxed{\rightarrow}$ | Start of measuring operation | Reverse travel after emergency stop |
| $\boxed{R}$ | Interrogation of measuring values | Menu selection previous menu option |
| $\boxed{P}$ | Printout  measuring values, profile, Rmr | Menu selection next menu option |

| **The emergency stop after release of the measurement can be effected with any key (2.4.1)** |


## 1.9  Reset of the instrument

The instrument may be reset if any malfunction occurs. Use for the purpose a pointed object (e.g. a paper-clip) to actuate the incorporated switch (see 1.1 point 9). All settings will be reset to the preset works standard (table 3.1 page 12).

| **Attention: All data in the memory will be erased immediately!** |

## 2. Operation

### 2.1 Measuring

### 2.1.1 Start measuring operation

**The area to be measured on the work piece must be properly cleaned** in order to avoid that the tracer getting dirty. If the roughness is measured manually, the tracer is laid onto the work piece and held steadily. The green indicator LED on the instrument must be on, confirming that the tracer and the instrument are in condition ready to measure. After pressing the start key, the measuring procedure is effected automatically. Shortly after, the measuring values can be read on the LCD-display and printed out.

Pressing any key can interrupt a current measuring operation and bring the tracer to a halt. **The measuring operation must be started again, to bring the tracer to its starting position again.**

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**If the red LED flashes, the measuring procedure can be released nevertheless!**
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### 2.1.2 Maximum measuring value

The maximum amplitude of the diamond stylus is 200 μm. **If this is exceeded, there will be no signal of faulty measurement.** However, such high measuring values will always be indicated by the red LED signal light, which means that **the measuring results could be faulty**.

### 2.1.3 Special tracers (probes)

Complementary to the standard tracer, there are a number of special tracers at disposal. These are constructed to solve specific measuring problems and can be used only together with the measuring stand (see cover pages).

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**Tracers without skid can be used only with the traverse unit VHF**
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**The traverse unit must be set parallel to the measured surface.**
**When lowering the tracer onto the work piece, the three LED (red-green-red) signalised the tracer position. As long as the upper LED (red) is flashing, the diamond point does not lay on the work piece correctly. If the lower LED (red) is flashing, the lowering of the tracer must immediately be stopped, as otherwise the tracer could become mechanically damaged!**
**In order to set free tracers exactly, the zero point can be adjusted with the support of the menu. The arrow indicates the direction, in which the tracer must be moved:**
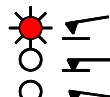
| | |
|---|---|
| Tracer ↓ | **Press the key (M) and (0). On the display, 'sensor' appears underneath.** |
| Tracer ↓ | **Carefully lower the tracer, until the pointer moves from the left margin towards the centre.** |
| Tracer →← | **If the correct zero point is reached, two arrows appear in the middle of the indicator screen. Push the key 'M' and start the measuring operation.** |
| Tracer ↑ | **If the sensor is set too deep, the arrow appears on sensor on the right half of the display**. ATTENTION, the tracer might be damaged! |
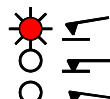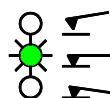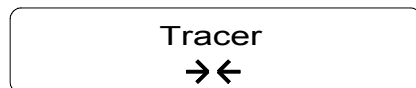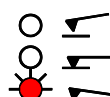
### 2.1.4 Calibration

The DIAVITE DH-7 has an automatic calibration, which is at disposal in the menu 'configuration' (page 12). In order to avoid faulty measurements, it is absolutely indispensable to check the perfect function of the instrument before starting the first daily application, as well as in regular periods of time. This can be effected the easiest way by measuring the surface of a roughness specimen. The measured roughness value is compared then with the nominal value indicated on it and – if necessary – a new calibration of the instrument.

If a tracer is exchanged, the instrument has to be recalibrated. The deviations between the various tracers should be rather small normally, but could anyhow cause faulty measuring results. The instrument can be recalibrated automatically. The settings must be correctly.

**You will find a detailed description of calibration on page 5 (point 1.7)**

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**The calibration is effected automatically with cutoff 0.8 mm (lt=4.8 mm)**
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### 2.1.5 Remote control

The traverse unit is equipped with a multifunctional blue remote control button to switch the instrument on, or – if already switched on – to release the measuring operation. When employing the DIAVITE measuring stand, this button is inactive. Prior to starting the measuring operation make sure that the tracer is applied/resting correctly on the work piece (see 2.1 connection of the tracers).

## 2.2 Selection of the traversing length $\left(\text{Lt}_{\text{/}}\right)$

The cutoff filters serve to eliminate the long wavy parts of the roughness (waviness). They correspond to the usual standards (BSI, ASA, DIN) and are coupled with the traversing length.

| Measuring length Lt mm | Traversing length lm mm | Cutoff Lc mm |
|---|---|---|
| 0.48 | 0.4 | 0.08 |
| 1.5 | 1.25 | 0.25 |
| 4.8 | 4.0 | 0.8 |
| 15.0 | 12.5 | 2.5 |

The cutoff should be selected according to the standards valid in your country. If no indications are given in drawings, the cutoff 0.8 mm is normally used.

## 2.3 Selection of cutoff filters $\left(\text{Lc}\right)$

With the key 'Lc', a smaller cutoff can be selected. For the chosen length of traverse 'Lt', there are the following possibilities:

| Length of traverse Lt mm | Total measuring length mm | Cutoff Lc mm | | | | |
|---|---|---|---|---|---|---|
| 0.48 | 0.4 | 2.5 | 0.8 | 0.25 | 0.08 | 0.00* |
| 1.5 | 1.25 | 2.5 | 0.8 | 0.25 | 0.08 | 0.00* |
| 4.8 | 4 | 2.5 | 0.8 | 0.25 | 0.08 | 0.00* |
| 15.0 | 12.5 | 2.5 | 0.8 | 0.25 | 0.08 | 0.00* |

**\* 0.00 signifies that the measuring is effected without cutoff!**

## 2.4 Printer functions

### 2.4.1 Printing operation (P)

The instrument can be pre-set in a way that either all measuring values or only the value appearing on the screen will be printed out (see 3.4.3 selection of the printed measuring values).

Pressing the key 'P' effects the manually released standard printouts:

- Once: The measuring values and the parameters
- Twice: The profile
- Three times The bearing portion curve

The printing procedure can be interrupted anytime with the same key; a row of arrows ↓↓↓↓↓↓↓↓↓↓↓ appearing on the registration paper confirms the interruption.

By continuously pressing the key 'P', the paper feed will be released. The feed is effected as long as the key is pressed down.

The menu settings are described under '3.4 Settings of printer'.

### 2.4.2 Replacement of the registration paper

Only thermo-sensitive special registration paper, supplied in rolls of approx. 28 mm x 30 m is to be used. Use only original paper, as the printer is matched for this paper.

After retracting the cover of the housing's upper part, the locking hoop of the printer opens (pull upwards) and the paper roll can be removed. The new roll is to be inserted as shown on the photo. The paper end is inserted into the paper guidance of the printer, until the paper strip appears at the upper printing unit. Make sure that the paper strip is guided straight. Then, the locking hoop must be closed (push downwards).
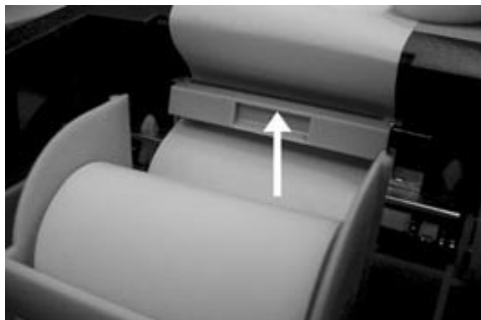


Locking hoop open



Locking hoop closed

## 2.5 Tolerance

In the menu, a tolerance can be set for Ra-, Rt- or Rz-values. The maximum value can be selected at choice. If this value is exceeded in a measurement, the indication of the measuring value begins to blink.

## 2.6 Memory functions

The measuring instrument incorporates a memory function which can be switched-on and off in the menu. By means of this function it is possible to storage up to 25 measuring profiles in the memory of the instrument and to transmit it later on over the interface USB to a PC, or to release it over the printer. The measured roughness values are taken over in the memory only after confirmation.
If the memory function is active, a 'M' appears in the display.

### 2.6.1 Printout of the memory contents

The complete contents of the memory can be printed out. The printout is effected by means of the menu function (see chapter 3.5 'Setting of the memory functions and printout of the memory contents). The measuring results will be printed from the first to last measurement.

The printout can be stopped with key (P).

## 2.7 Electric power supply

At the left side of the DH-7 there is a two-core socket for the power supply, serving to charge the batteries for operation independent from the electric mains. The DH-7 should be operated only with the specially adapted original charger/mains adapter. If another charger is used, the instrument might get damaged. To charge the batteries, connect the mains adapter with the DH-7 and switch-on the instrument.

The instrument switches to the charging mode only if the capacity of the rechargeable battery falls below 50%. The symbol 'Low Bat' on the display indicates, that the batteries must be recharged. The indication will extinguish as soon as the batteries are completely recharged. **Charging takes approximately ten hours.**

The DH-7 may be simultaneously charged and kept in operation to effect measurements. However, when effecting measurements, the 'charge mode indication' in the display is interrupted.

**The batteries may be charged over menu if there is still more than 50% battery capacity left.**

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**The charging procedure must not be interrupted!**

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**Important remarks:**

The incorporated accumulators (Lithium-Mangan rechargeable batteries) are designed for a long live if treated correctly:

The control of the batteries can be checked when switching the instrument on and anytime by actuating the key (O).

If the instrument is not in use for a longer time, the accumulators must be charged at least once a month.

If the capacity of the batteries is exhausted, the display indicates 'Low Bat'. No more measuring operations can be effected, nor printouts. The batteries must be recharged **without delay**.

From new or perfectly treated, completely charged batteries, the following measuring- and printing capacities may be expected:

| | | |
|---|---|---|
| Measurements without printout | > | 500 |
| Measurements with printout | > | 150 |
| Measurements with printout of all measuring values | > | 80 |
| Measurements with printout of all measuring values, Profile and bearing length ratio Rmr | > | 40 |

## 2.8 Maintenance

**The DIAVITE DH-7 does not need any maintenance except the charging of the rechargeable batteries.**
**Under no circumstances, must the traversing unit and the tracers be treated with oil or detergent.**
**If the housing of the instrument is dirty, it can be cleaned with a mild cleaning liquid or with soap.**
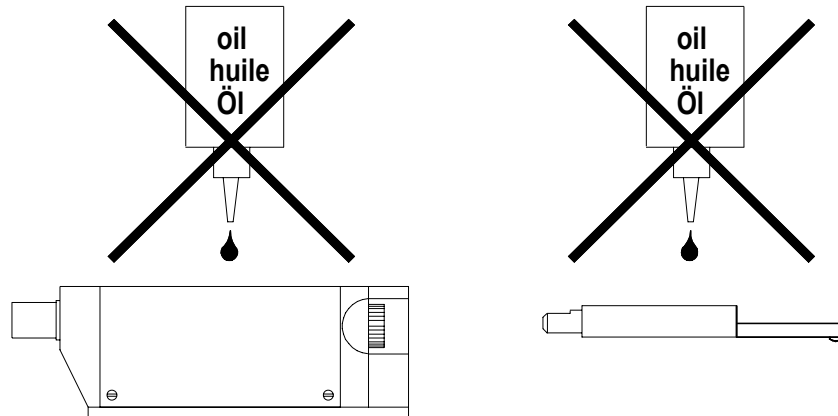
## 2.9 Key lock

The instrument is equipped with a key lock preventing any settings being changed by mistake during measuring procedure. It is effective for the buttons lt (length of traverse), lc (cutoff) and R (measuring values shown on display).

After having set the measuring parameters, push the button (M) and then the button during four seconds. In course, the buttons (Lc), (Lt) and (R) are locked. This prevents changing the measuring parameters set and obtaining incorrect measuring results.

In order to suspend the key lock, repeat the described procedure.

# 3. Settings

## 3.1 Menu

| Main menu | Sub menu | Action | Standard |
|---|---|---|---|
| Tracer | - | Graphical (2.1.3) | |
| Configuration | lt var | Setting of variable length of traverse | 5.0 mm |
| | calibration | Predetermined factory standard (Ra) | 2.95 µm |
| | standard | Select standard DIN/ISO, JIS, ISO 12085 | DIN/ISO |
| | unit | Selector switch µm<->µinch | µm |
| | Nx | Indication of roughness classes on/off | off |
| | amplification | Self adjusting, V=1, V=10 | automatially |
| | USB | Baud rate USB (4800, 9600, 19200, 38400, 57600, 115200) | 115200 |
| | fab | Reset all parameters to factory standard | |
| Printer | auto | Automatical printout after each measurement on/off | off |
| | R-values | Print only value indicated in display or print all values | |
| | mode | manually, R, R+profile, print Rmr(Rmr) | manually |
| | Rmr (Rmr) | graph, list, individual value | graph |
| Memory | off | Memory function off | off |
| | on | Memory function on | |
| | clear | Clear memory and reset counter to zero | |
| | print | Printout of memorised R-values | |
| | USB | Transfer of memorised R-values to USB | |
| Tolerance | --- | No tolerance | --- |
| | Ra | Admissible tolerance for Ra | |
| | Rt | Admissible tolerance for Rt | |
| | Rz | Admissible tolerance for Rz | |
| | C (RPc) | c-value for calculation of RPc | |
| Accu | Switch off | Switch off period for battery operation | 2 minutes |
| | charge | Start manual charging | |
| | discharge | Start manual discharging | |
| | Stop charging | Manual stop of charging/discharging procedure | |
| Language | english | Switch to the preferred language | German |
| | Deutsch | | |
| | Français | | |
| | Espanol | | |
| | Italiano | | |
| Date/time | show | Indication of date and time | |
| | set | Set time and date | |
| Version | - | Indication of hard- and software versions | |
| | | | |

| **Further functions and messages:** | | | |
|---|---|---|---|
| Key lock | - | Lock/unlock the keys lt, lc and R | |
| ✱ | Lt* | Variable mearuring length Lt | |
| M | On display | Memory function active | |
| ↓ | On display | Tolerance function active | |
| < | On display | Reverse tracer | |
| Lc=0.00 | On display | Cutoff filter off | |

| **Malfunctions message** | |
|---|---|
| No Taster | No tracer connected |
| Battery defect | Battery is defektive |
| Memory completel | Memory for profile points complete (full) |

| **Warnings** | |
|---|---|
| Remote control | Instrument ist controlled from PC |

| **Notifications** | |
|---|---|
| DH-7 protected | Key lock active (to unlock: Menu, then push Start key some seconds) |
| Battery empty | Battery fully discharged |
| Switch off | Push Start key two seconds |

Press key (M•) for menu, keep pushed down, press key (Lt↓) or (R↑) until the requested menu appears, confirm selection with key (O↓), or search the needed menu in a second sub-menu with keys (Lt↓) or (R↑) and confirm with (O↓).

If data has to be entered, the cursor can be removed with keys (Lc) or (P-) by one digit to the right or left

## 3.2 Key 'menu' (M.)

With the key 'menu', a menu structure is opened, with which various instrument parameters are set or with which the basic settings of the instrument can be reset. With support of the 'menu' key, various instrument settings can be effected, too. In the individual menus, the key functions are switched over temporarily. The meanings of the keys are indicated in a window on the display.

## 3.3 Configuration

### 3.3.1 Lt var

In that sub-menu, the setting for the variable length of traverse may be effected.

### 3.3.2 Calibration

Preset value for calibration ist Ra

### 3.3.3 Standard

selection of standard DIN/ISO, JIS or ISO 12085

### 3.3.4 Unit

This sub-menu serves to select the unit's metric (mm) or inch indication / measurement.

### 3.3.5 Nx

Indication of roughness classes on/off

### 3.3.6 Amplification

This sub-menu allows the selection of the amplification of the instrument. Normally, the setting 'auto' will be sufficient. The instrument itself will then select, whether the amplification for small or large roughness values is to be set. For very irregular surface or for surfaces with deep grooves, the amplification can be set at choice with factor 'x1' or 'x10'.

### 3.3.7 Interface USB

In this sub-menu, the Baud rate to the PC can be selected, from 4900 Bauds to 115200 Bauds.

### 3.3.8 Factory configuration

When selecting this menu point, the actual instrument setting will be reset to the original factory setting. The view of menu (page 12) shows the basic settings (Standard).

### 3.3.9 Key lock / Key unlock

If the instrument is in the menu mode, the keys may be locked and freed by a longer pressing of the Start key.

## 3.4 Print settings (see also 2.7 'printer functions').

### 3.4.1 Automatic printout of the measuring values

It is possible to select if the printout after the measuring operation should be effected automatically (on/off). The printout can be selected according to the following directions 3.4.2 – 3.4.4.

### 3.4.2 Selection of the roughness values to be printed out

It is possible to select whether only the actual measuring value appearing on the display or all measuring values should be printed out.

### 3.4.3 Selection of printout

The following options are at choice:
- R              only measuring values (dependent from 3.4.2)
- R&profile      the measuring values (independently from 3.4.2) and the profile
- R&profile&Rmr  the measuring values (independently from 3.4.2), the profile and the bearing portion Rmr.
- Manually       this option switches-off the preceding options.

### 3.4.4 Printout Rmr (Rmr)

The following options can be selected:

- Graph            Graphic curve Rmr
- List              List from 95% … 5%
- Single value     Single value, setting option from 95% - 5% in steps of 5%

## 3.5 Memory functions and printout of memorized values

- Select menu 'memory functions'. If the memory function is active, an '**M**' appears in the display.
  25 measuring profiles can be memorized. See 2.6, Memory function
- With 'on'/'off' the function is switched-on or –off. After each measurement effected the measuring value can be saved.
- With 'clear' the complete memory contents are cleared.
- With 'print' all measuring values are printed out. The printout can be stopped with key 'P'.

The data transfer to the PC is effected with a command from PC's end.

With "USB" the stored values are released to the Interface USB. The data may be taken over e.g. with Hyper Terminal(Windows). It's necessary to install the correct driver (on your CD)

## 3.6 Setting of tolerance

The roughness unit (Ra, Rt, Rz) for which a tolerance should be set, may be selected here. Set the maximum tolerance value. If this value is exceeded, the indication of this value will blink on the display.

## 3.7 Rechargeable battery

### 3.7.1 Manual start-command 'charge battery'

This serves to set the manual charging and discharging of the accumulator. Accumulators which are not yet discharged down to 20% may be already recharged. This is most suitable for correct treatment of the accumulator as described under 2.10 'Electrical power supply'.

### 3.7.2 Automatic switch-off - setting of clock-time

To allow the longest possible battery operation, the instrument is equipped with an automatic switch-off.
If no key has been pressed for the time period pre-selected, the instrument switches itself off automatically. This time period can be set.

In the menu 'battery' a time period from 1 to 10 minutes can be set. With 'on/off' the period set is applied. With **'M'**, it can be stopped, returning to the operation setting. From factory end, the switch-off time is set on 2 minutes.

## 3.8 Date and time

The DIAVITE DH-7 is equipped with an integrated clock and date.

The clock is integrated in the battery pack. If this has to be replaced or if it had been separated from the instrument, the time and date will have to be reset.

### 3.8.1 Indication of date and clock-time

In the first sub-menu, the actual time and the date can be indicated.

### 3.8.2 Setting of time and date

This menu option allows the setting of the time. With key 'Lc', the cursor can be removed to right, with key 'P' to left.

The keys 'R' and 'Lt' allow counting upwards and downwards the time values below the cursor, i.e. hour, minute and date.
With 'on/off' the values set are taken over; the key 'M' allows stopping the setting procedure.
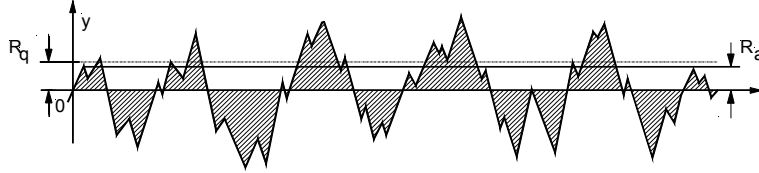
## 3.9 Indication of the version

In this option, the version of the hardware as well as the version of the software incorporated is indicated.

# 4. Divers

## 4.1 Definitions

Ra (CLA, AA), Rq (RMS)

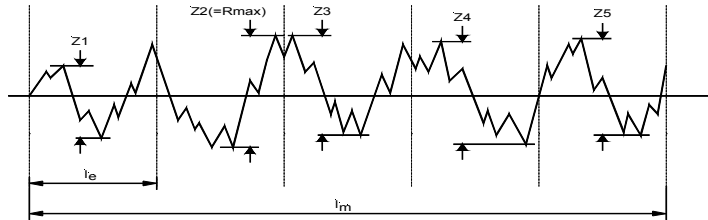$$Ra = \frac{1}{l} \int_0^l |y(x)|\, dx \qquad\qquad Rq = \sqrt{\frac{1}{l} \int_0^l |y^2(x)|\, dx}$$
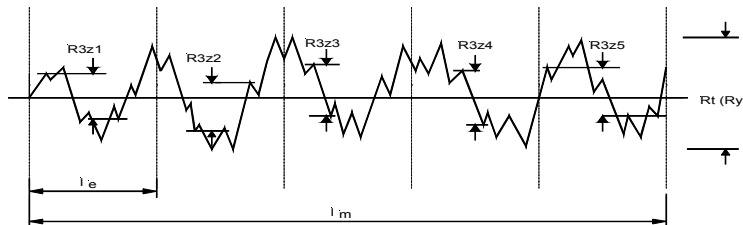
Rz (DIN 4768)
Rmax (DIN 4768)
R3z (standard DB N 31007)
Rt (corresponds to the definition (DIN 4762/1960-1978)

Rz (DIN) = (Z1+Z2+ ... + Z5)/5

R3z = (R3z1+R3z2+ ... + R3z5)/5

## 4.2 Malfunctions

The DH-7 has been constructed for workshop use. The tracers are, however, very delicate and suscepti-ble to damages. They should not be exposed to mechanical strain. If, when putting a tracer with skid onto a flat surface, the green control LED does not start to flash, the tracer could be damaged. If possible, check the instrument with a second tracer or send the complete instrument to the dealer for a check.

## 4.3 Repairs

**Repairs are to be effected by the manufacturer only.**

Upon written request, a repair cost estimate will be submitted. The necessary efforts for controlling, par-tially dismantling of parts, inspection time as well as an adequate share for administration effort, and transport costs, must be paid by the customer in any case, even if the estimate of cost is rejected by the customer.

80% of the repairs concern the standard tracer SH (dirt, oil, break of diamond point and suspension). It is recommended to buy a spare standard tracer.

## 4.4 Guarantee

The guarantee is valid for one year after factory dispatch and is applicable to damage caused by parts of proved insufficient quality. The guarantee does not cover damages of the diamond tip and the rechargeable batteries, nor malfunctions due to mechanical damages, such as break of suspension, bending or breaking of parts (which are delicate due to their nature of construction)

## 4.5 Referenced Documents

EN ISO 3274      Nenneigenschaften von Tastschnittgeräten (1998)

EN ISO 4287      Oberflächenbeschaffenheit: Tastschnittverfahren (1998)

EN ISO 4288      Regeln und Verfahren für die Beurteilung der Oberflächenbeschaffenheit (1997)

En ISO 11562      Oberflächenmesstechnik: Profilfilter zur Anwendung in elektrischen Tastschnittgeräten - Phasenkorrekte Filter (1998)

EN ISO 12085      Geometrische Produktspezifikationen (GPS) – Oberflächenbeschaffenheit: Tastschnittverfahren – Motifkenngrössen (1996)

EN ISO 13565-1      Filterung und allgemeine Messbedingungen (1998)

EN ISO 13565-2      Beschreibung der Höhe mittels linearer Darstellung der Materialanteilkurve (1998)