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On / Off switch and volume adjust for internal speaker

MECHANIC | NFIXED : 21600 | LA: 52 | MT: 2

+

+/ | 26 s/d | 218° | 0,2 ms

Vibrograf B 600   Watch Tester   Greiner vibrograf

+ / - sign

time deviation

Amplitude value

out of beat value

Rear view

Speaker

Type label with serial number

parallel interface (female) 25 pin   to connect a printer EPSON or HP /PCL compatible

GREINER vibrograf AG
CH - 4900 Langenthal

15 pin plug (male) to connect the *microphone MP86 M* for mechanical watches or *microphone QM4* for mechanical watches and quartz watches.

CE

Fuse box with integrated mini fuse: 630 mA for 230 Volt. 1.25 A for 115 Volt

Calibration of the instrument. See page 15

Main connection 230 V/ 50 Hz optional 115V / 50-60 Hz

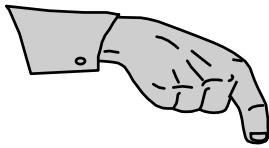## CONTROL BUTTONS
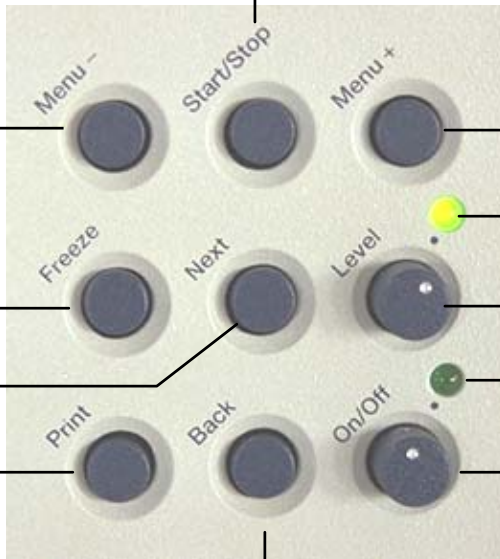
Start / Stop button starts and stops the measuring cycle

1.Selects the preceding MENU - point.
2. Decreas of a value.

1.Stores the display datas for printout.
2. Switches to the double beat.

Goas to the next MENU - point.

1. Starts the printout.
2. Switches to the single beat..
3. Shows the menu for system changements.

Goas to the preceding MENU - point.

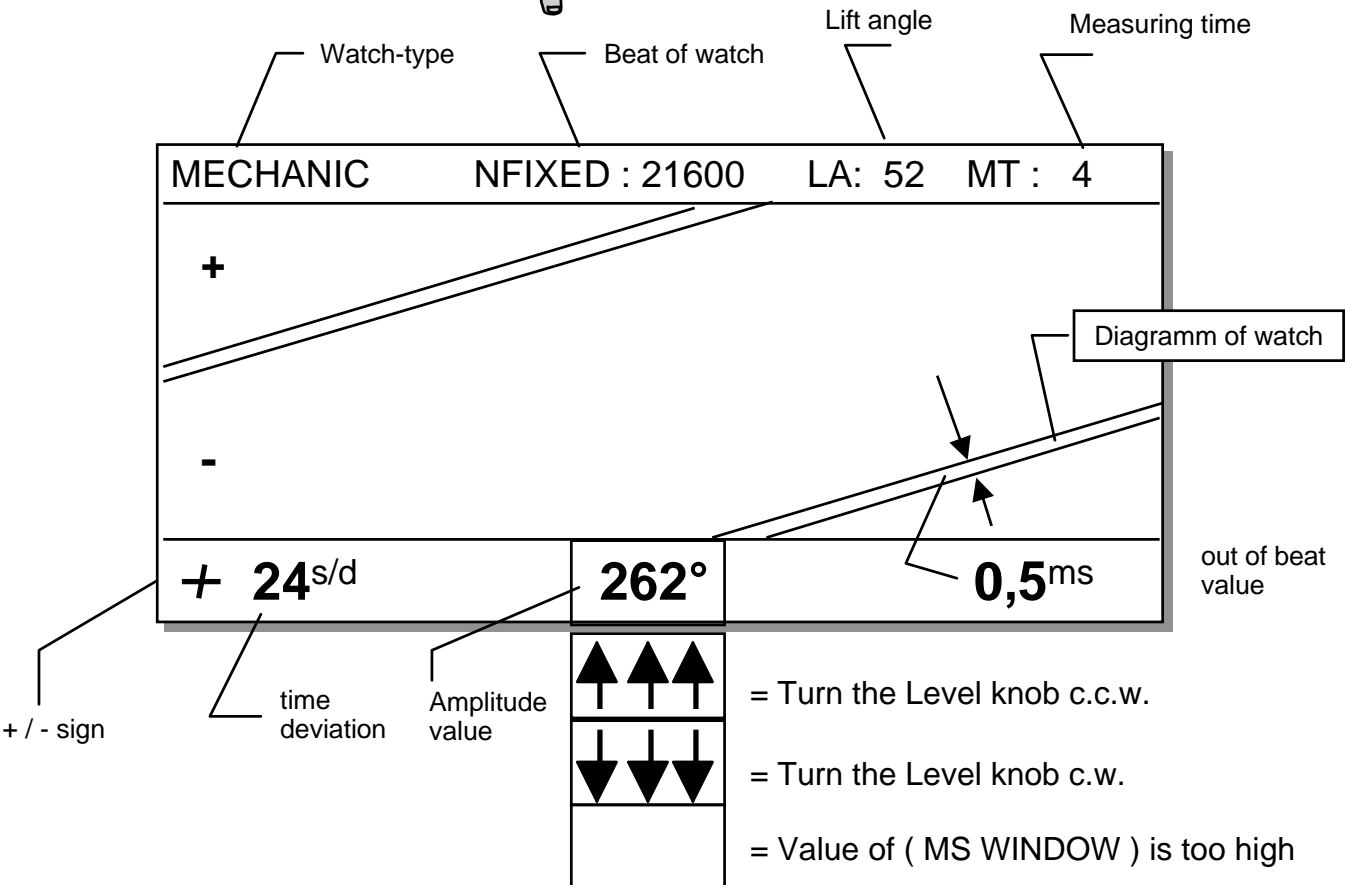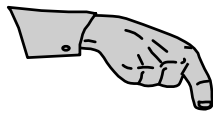Selects the next MENU - point. -or- increases the value.

level indicator lamp lights, if a measuring cycle is started.

volume knob for incoming watch -signal

Control lamp lights if the screen datas have been stored for printout.

On / Off switch and volume adjust for internal speaker

Buttons: Menu -, Start/Stop, Menu +, Freeze, Next, Level, Print, Back, On/Off

Display, screen

Watch-type   Beat of watch   Lift angle   Measuring time

MECHANIC   NFIXED : 21600   LA: 52   MT : 4

+

-

+ **24**s/d   **262°**   **0,5**ms   out of beat value

Diagramm of watch

+ / - sign   time deviation   Amplitude value

▲▲▲ = Turn the Level knob c.c.w.

▼▼▼ = Turn the Level knob c.w.

= Value of (MS WINDOW) is too high

Microphone MP86M for mechanical watches

The MP86M is a active microphone equipped with a high sensitiv cristal
and electronic components.
Connect the microphonecable to the 15 pin male plug on the rear of the B 600.
See also page x

The watchcase or the crown must touch correctly
the activ front pins.
This pins, or so called fork , transmitts the
watch sound (noise) to the cristal inside the
microphone.
The cristal converts the noise in electrical signals.
Through the built in electronic and the cable,
the signals reaches the B 600.
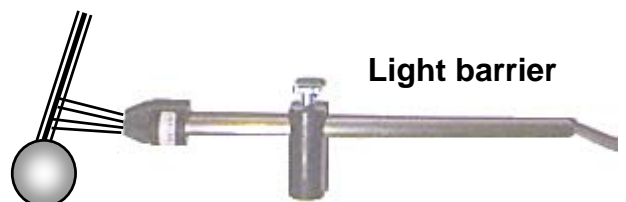The signals are converted in digital values and
in a diagramm.

Clamp - microphone for pocket-watches and clocks.

The clamp-microphone may be connected to the 15 pin male plug on the rear of the B 600
instead of the MP86M.

Light barrier for clocks.

The light barrier may be connected to the 15 pin male plug on the rear of the B 600
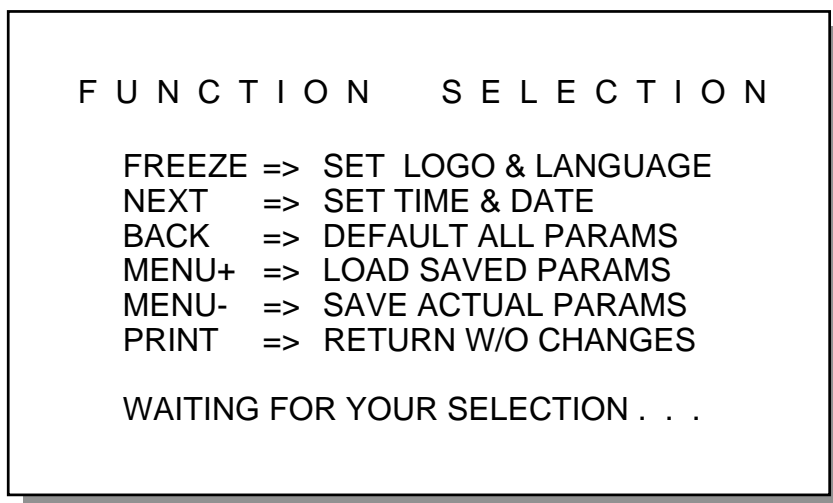instead of the MP86M.

Light barrier

1.1   The following parameters can be set in your   (B 600)

a. Your prefered language   :   English , Dutch , French , Italian , German
b. Your Name and Adress   :   for printout together with results.
c. Printer type   :   EPSON (FX 80) or compatible or, HP PCL or compatible
d. Date & Time   :   Set the actual date and time of your country.
e. Your prefered presettings after switching on the B 600.
   For example : Watch type, measuring time, automatic or fixed beat selection, etc.

1.2   How to display the Configuration screen ? (picture 10)

a. Switch on the B 600 .   Wait until the main menu is displayed.
b. Press - PRINT-   The following MENU is displayed in one of the 5 languages.

picture 10

```
   F U N C T I O N     S E L E C T I O N

      FREEZE => SET  LOGO & LANGUAGE
      NEXT    => SET TIME & DATE
      BACK    => DEFAULT ALL PARAMS
      MENU+  => LOAD SAVED PARAMS
      MENU-   => SAVE ACTUAL PARAMS
      PRINT   => RETURN W/O CHANGES

      WAITING FOR YOUR SELECTION . . .
```

1.3   Change the language

a. Execute step 1.2
b. Press - FREEZE   The corresponding Menu is displayed.
c. Press - BACK / BACK /   The language field is active.
d. Press - MENU +   press it until the desired language appears.
e. Press - PRINT / PRINT / MENU - The selection will be stored.

From this moment, the   B 600 works with the selected language.

1.4   Enter your Name and Adress

a. Execute step 1.2
b. Press - FREEZE   The curser stays on the left side of the 2. line.
c. Press - NEXT ......   Until the curser stays on the position for the 1. sign.
d. Press - MENU + or MENU -   Until the desired sign appears.
e. Press   - NEXT ......   Until the curser stays on the position for the 2. sign.
f. Press - MENU + or MENU -   Until the desired sign appears.
g. Go on this way until the text looks as you wish.
h. Press - PRINT / PRINT / MENU - The selection will be stored.

1.5 Set Time & Date

a. Execute step 1.2
b. Press - NEXT   Programmed Time and Date is displayed.
                                          Cursor stays on hour.
c. Press - MENU + or MENU -   Until the desired hour appears.
d. Press - NEXT   Cursor stays on minute.
e. Press - MENU + or MENU -   Until the desired minute appears.
 f. Press - NEXT   Cursor stays on second.
g. Press - MENU + or MENU -   Until the desired second appears.
h. Press - NEXT   Cursor stays on day.
 i. Press - MENU + or MENU -   Until the desired day appears.
k. Press - NEXT   Cursor stays on month.
 l. Press - MENU + or MENU -   Until the desired month appears.
m. Press - NEXT   Cursor stays on year.
n. Press - MENU + or MENU -   Until the desired year appears.
o. Press - PRINT / PRINT / (MENU -)   The selection will be stored.

1.6 Set the desired test parameters

a. Switch on the B 600 and wait until
the screen 1 is displayed :

1.7 Set the desired test parameters for mechanical watches.

a. Press (Menu +) to select the watchtype:
MECHANIC

```
          B 600  M

      WATCHTYPE :
  1
      PENDULUM

      MECHANIC

  SELECT  ACTUAL  RUN  PARAMETERS
```
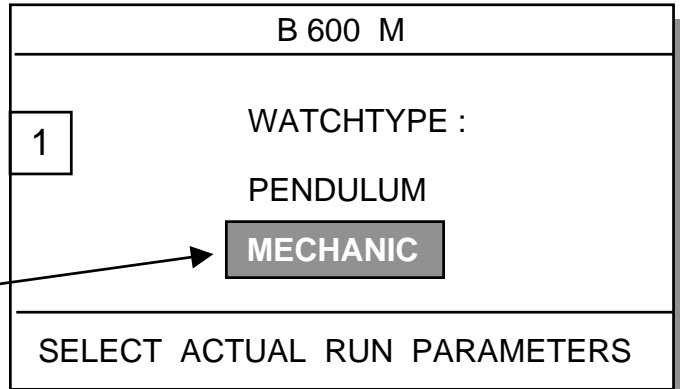
b. Press (NEXT) screen 2 is displayed
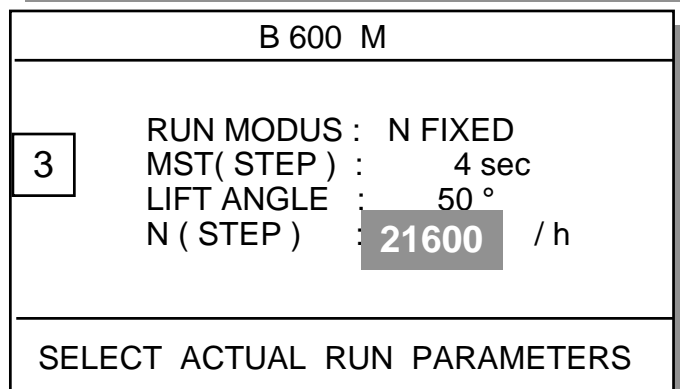By pressing (MENU +) you may select
AUTOMATCL beat selection or N FIXED
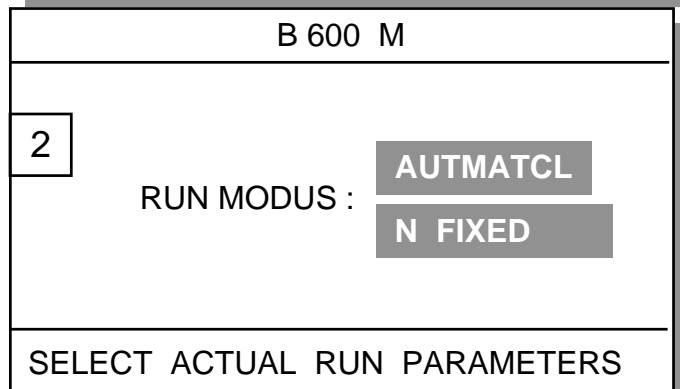
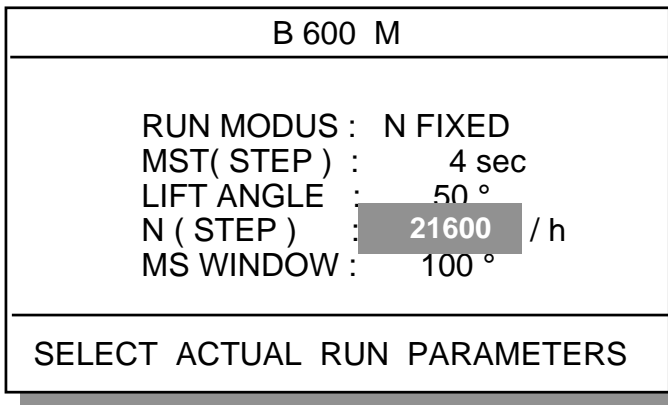**AUTMATCL**   The B 600 detects automatically the beat of the watch.

```
          B 600  M

                      AUTMATCL
  2
      RUN MODUS :
                      N  FIXED

  SELECT  ACTUAL  RUN  PARAMETERS
```

N FIXED   The beat can be set manually from : 3600 to 36000 by steps.

1.8 Set the desired MST LIFT ANGLE and BEAT FREQUENCY

See next page for explanations !

```
          B 600  M

      RUN MODUS :  N FIXED
  3   MST( STEP ) :      4 sec
      LIFT ANGLE  :     50 °
      N ( STEP )  :  21600   / h

  SELECT  ACTUAL  RUN  PARAMETERS
```

```
           B 600  M

   RUN MODUS :   N FIXED
   MST( STEP ) :     4 sec
   LIFT ANGLE   :    50 °
   N ( STEP )   :   [21600]  / h
   MS WINDOW :    100 °

 SELECT  ACTUAL  RUN  PARAMETERS
```
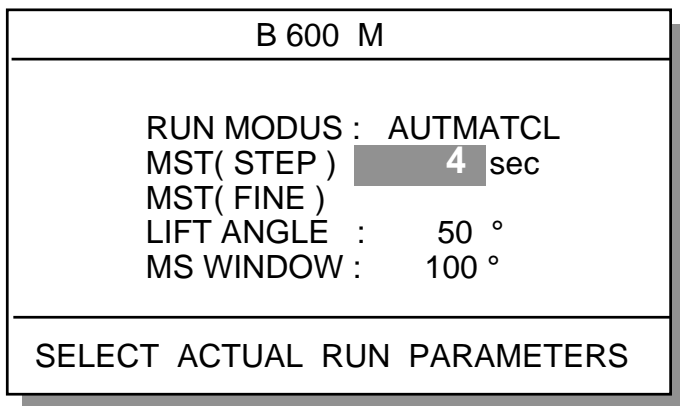
Press (Next)
to move down in this menu.

Press (Back)
to move up in this menu.

Press (Menu +) or (Menu -)
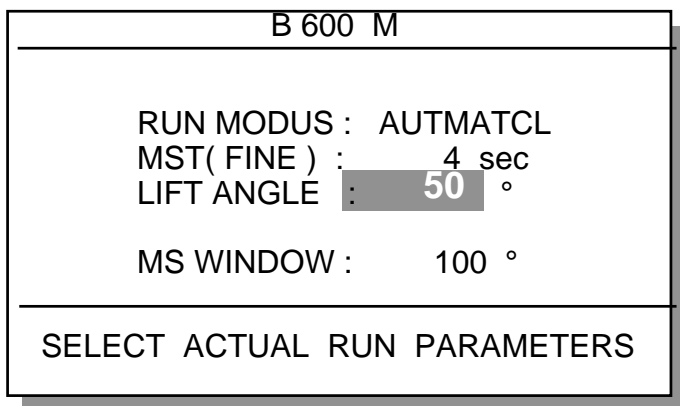to change a value in the marked line.

Press and hold (MENU +) to encrease
Press and hold (MENU -) to decrease
the value continously

```
           B 600  M

   RUN MODUS :   AUTMATCL
   MST( STEP )    [ 4 ] sec
   MST( FINE )
   LIFT ANGLE  :    50  °
   MS WINDOW :    100 °

 SELECT  ACTUAL  RUN  PARAMETERS
```

Measuring time : (MST)

The result of time deviation will be
desplayed after the set value of (MST)
and will be the meanvalue of the (MST)
values in MST (STEP) are:
4, 8, 12, 30, 60, sec.
values in MST (FINE) are:
2, up to 960 sec. in steps of 2

Lift angle: (50 - 52°)

```
           B 600  M

   RUN MODUS :   AUTMATCL
   MST( FINE ) :     4  sec
   LIFT ANGLE   [ 50 ]  °

   MS WINDOW :     100  °

 SELECT  ACTUAL  RUN  PARAMETERS
```

The value of lift angle depends on
the construction of the watch. It is used
in the B 600 to calculate the amplitude.
Most watches have a lift angle of 50°-52°.
It can be set from 30° up to 70°.
If the value of lift angle is set lower than
the value of the measured watch, the
result of amplitude will be lower than
it should be. If it is set higher the result of
amplitude will be higher.

Beat frequency N (STEP) or N (FINE)
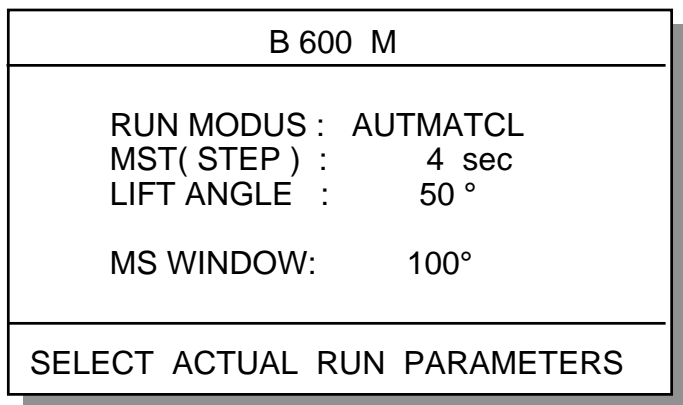
In RUN MODUS : **AUTMATCL**
the beat frequency is automatically
detected and set from the B 600 to a
standard beat.   Standard beats are :

```
           B 600  M

   RUN MODUS :   AUTMATCL
   MST( STEP ) :     4  sec
   LIFT ANGLE   :    50 °

   MS WINDOW:       100°

 SELECT  ACTUAL  RUN  PARAMETERS
```

3600,   4800,   7200,   7920,   8100,
8640. 9360,   9440,   9720,   9760,
14400, 16200, 18000, 19800, 21600,
28800, 36000,

In RUN MODUS **(N FIXED)**
The beat can be set manually from
3240 up to 39600 in N (FINE)

## 1.9   Display and view of the watch escapment signal (noise) double or single beat

B 600 M

WATCHTYPE :

PENDULUM

MECHANIC

SELECT ACTUAL RUN PARAMETERS
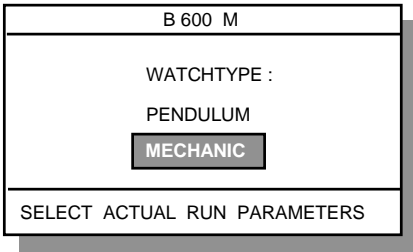
In this menu
press FREEZE

to display
the double beat.

press START/STOP
to return to the main menu

DIAGRAM DOUBLE BEAT

PRESS START/STOP KEY TO COMPLETE . . .

DIAGRAM SINGLE BEAT

PRESS START/STOP KEY TO COMPLETE . . .
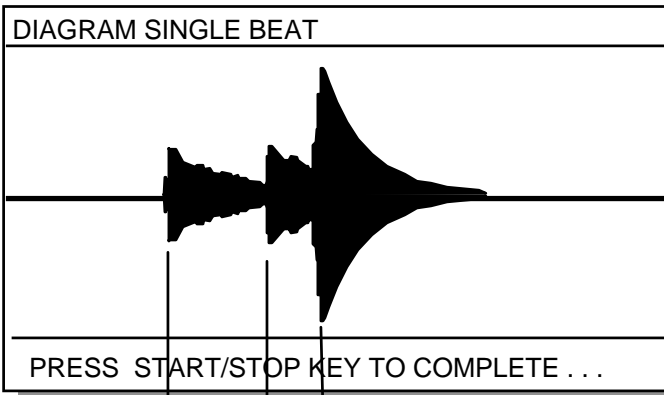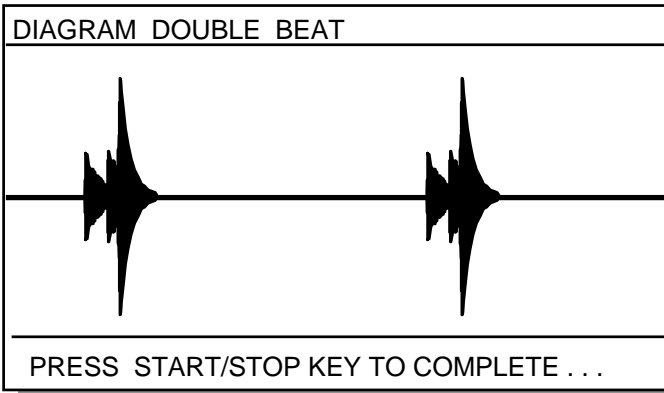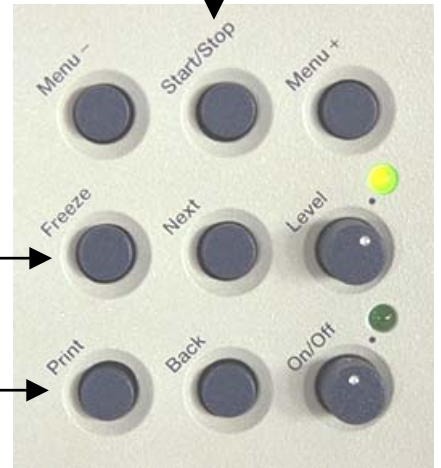
For more ditails.

press PRINT

to display the single beat.

press START/STOP
to return to the main menu

A   B   C
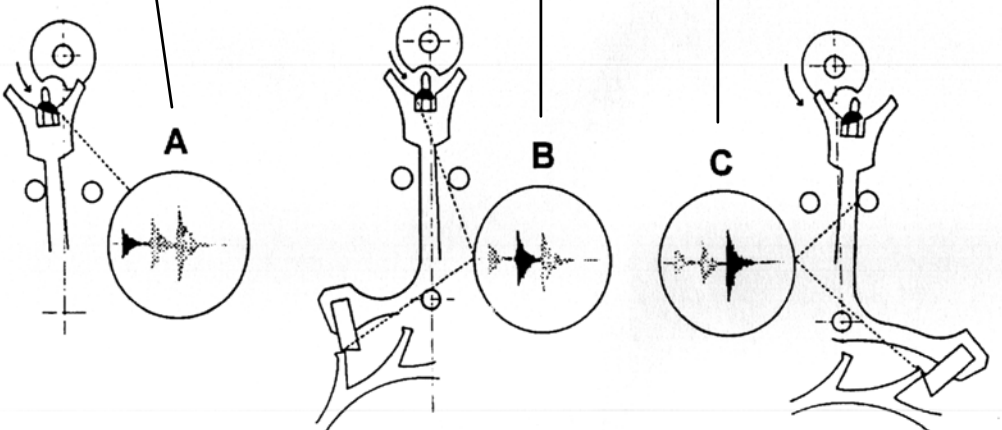
Escape system
of the watch.

2.0 CALCULATION OF AMPLITUDE

The Amplitude depends on the following :

1.   Beat per hour of the watch
2.   Lift angle in degrees
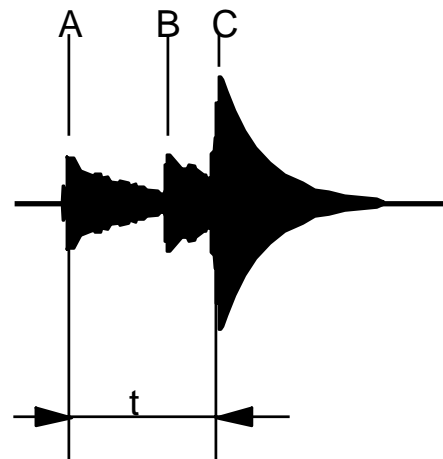3.   Time between **A** and **C** in seconds

Terms :

Amp = Amplitude of balance wheel in °

∡ = Lift angle in ° (most watches have 52 °)

t   = Time between A and C (in seconds)

n   = Beat of the watch (per hour)

**Example :**

lift angle = 52°
n   = 28800 beats / h
t   = 0.009 s

**Formula :**   **Amp = $\dfrac{(3600 * \angle)}{(t * pi * n)}$**

(3600 * 52)	= 187200
(0.009 * 3.14 * 28800)	= 813.89
Amplitude	= 230 °

Remark :   The value of the time (t) depends on the mechanical datas
                of escapment from the watch. This value is always measured
                by the B 600 and the amplitude is calculated.
                As you may see in the calculation example, this value is directly
                responsible for the result of amplitude.

Conclusion : The B 600 can calculate and display the amplitude of a watch
                very exact and stable, if the escapment noise is clear and stable.
                as it is in figure (1)
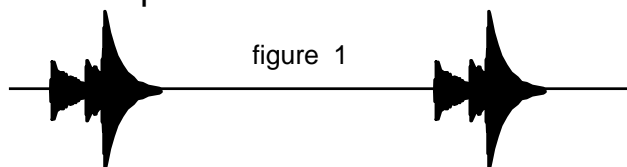
figure 1

But it's impossible with a escapment noise as you can see in
figure (2)

figure 2
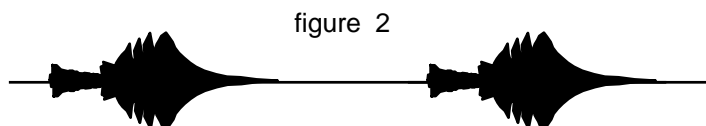
2.1 *MS WINDOW* *(Measuring window)*

The measuring window has a factory setting
value of 100 ° .

This means, the B 600 can display an amplitude
value higher than 100 °.

You may change this setting, if you have
problems with the amplitude of certain watches.

```
         B 600  M

RUN MODUS :  N FIXWERT
MST( STEP ) :      4  sec
LIFT ANGLE   :      52  °
MST (STEP)  :  21600 / h
MS WINDOW :        100 °

SELECT  ACTUAL  RUN  PARAMETERS
```

If the escapment noise is not clear
(because of mechanical problems of the watch,
the noise signal may look as in figure 5 .

The value (t) is not always identically.

The B 600 may display a rong Amplitude ,
e.g   170 ° instead of 250°.

In this case you have the possibility to change
the value called (MS WINDOW).

The value (MS WINDOW) is the minimum amplitude
the B 600 can display.

If you increase the value to 220°, a real lower value
will not be displayed. The place where amplitude
normally is displayed, remains empty.
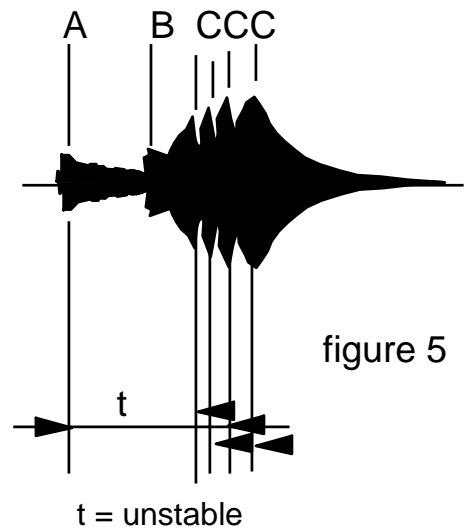
The MS WINDOW cuts a part of the escapment
noise signal.

figure 5

t = unstable

```
         B 600  M

RUN MODUS :  AUTMATCL
MST( STEP ) :      4  sec
LIFT ANGLE   :      52  °
N ( STEP )    :  21600  / h
MS WINDOW :        180 °

SELECT  ACTUAL  RUN  PARAMETERS
```
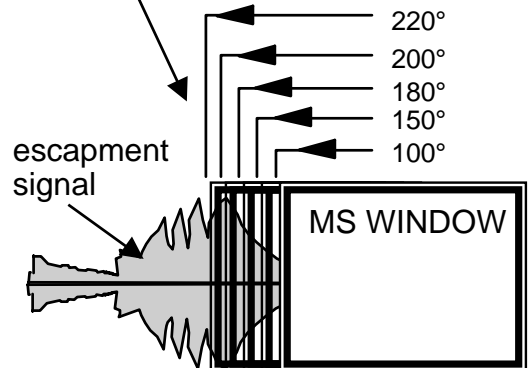

figure 6

To save the new value of MS WINDOW when in the above menu,
Press (PRINT) first and then (MENU -)

3.0 Clocks can be tested with a clamp microphone or a light barrier.

The clamp-microphone or the light barrier may be connected to the 15 pin male plug
on the rear of the B 600 instead of the MP86M. See also page 1

3.1 Testing Clocks with a light barrier.

a) place the light barrier max 5 mm from
    the arm (pendulum).

b) Switch the B 600 to PENDULUM
    pressing (MENU -)
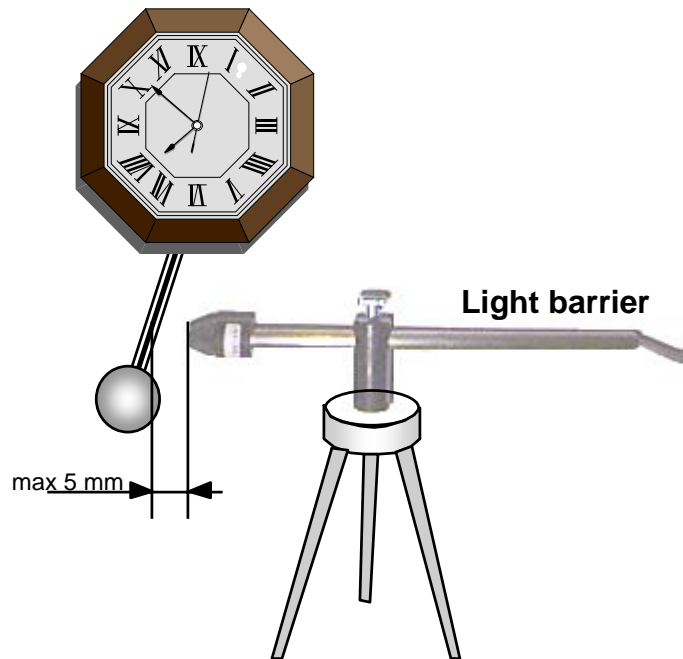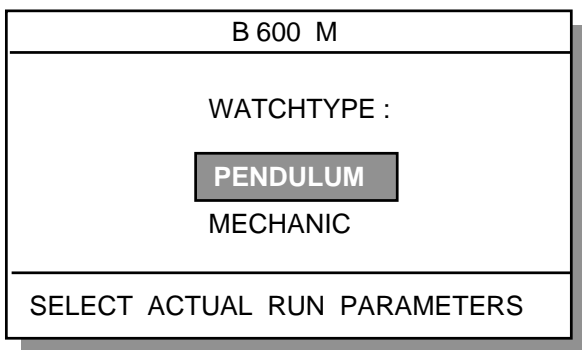
Light barrier

max 5 mm

B 600 M
WATCHTYPE :
PENDULUM
MECHANIC
SELECT ACTUAL RUN PARAMETERS

Clamp - microphone for pocket-watches and clocks.

The clamp-microphone may be connected to the 15 pin male plug on the rear of the B 600
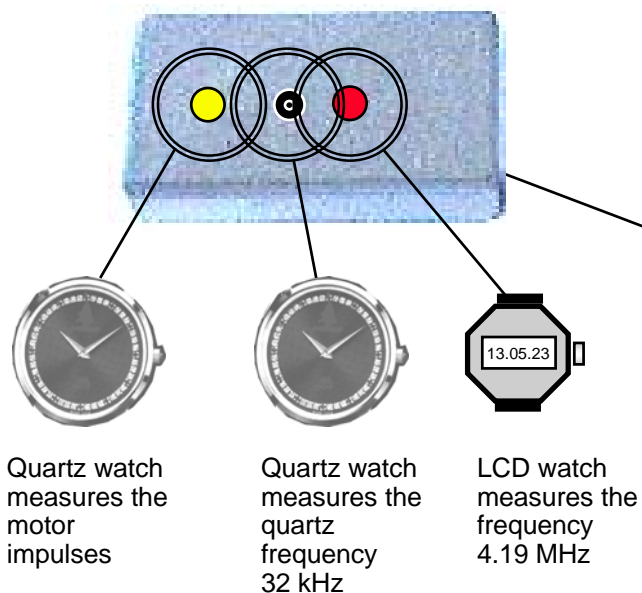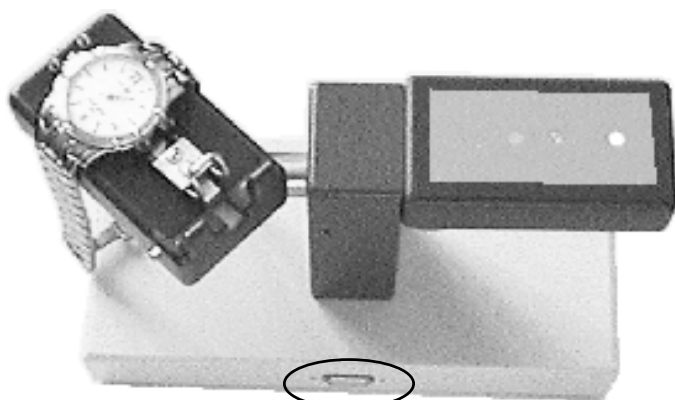instead of the MP86M.

Light barrier for clocks.

The light barrier may be connected to the 15 pin male plug on the rear of the B 600
instead of the MP86M.

MECHANIC N FIXED : 21600 LA: 52 MT: 2

26 s/d   218°   0,2 ms

Vibrograf B 600   Watch Tester

Microphone[QM

The QM4 has 2 microphones in one.
The shown left side has the same function
as the MP86M. For mechanical watches.
The shown right side is equipped with
3 capture systems:
red point   = capacitif LCD (quartz 4,19MHz)
metal pin   = microphone for quartz 32 KHz
yellow point=inductif capture of motor impulses

Connect here the cable between
B 600 and microphone.

Quartz watch
measures the
motor
impulses

Quartz watch
measures the
quartz
frequency
32 kHz

13.05.23

LCD watch
measures the
frequency
4.19 MHz

User Info about measuring of quartz watches On Vibrograf B600

Explication of PRECISION
(Float) or (/1 sec)   or   (/ 10 sec)   or   (/ 100 sec)

Float = The display of result on the left corner will be automatically
set depending of the precision of the watch.
e.g.   Result   is displayed **(+ 0.12 s/d)**

(/ 1 sec)	R esult is displayed	(+ 0 s/d)
(/ 10 sec)	Result is displayed	(+ 0.1 s/d)
(/ 100 sec)	Result is displayed	(+ 0.12 s/d)

Explication of (INDUCTIV) (DSPFRCY) (TUNIFORK)

Quartz Frequency measurement = measures the frequency of the quartz
inside the watch. Lay the watch on the metal Pin. The microphone will display the
deviation of the Quartz frequency of the watch.

INDUCTIV =   Motor impulses measurement
Put the watch on the yellow point. Each motor impulse will be displayed with
A arrow in the lower part of the display.
For example quartz watches with 1 second impulses
Or quartz watches with inhibition of (10 sec. 20 sec. 60 sec. For example.)

DSPFRQCY = LCD Frequency signal
For the measurement of Display (LCD) Signal measuring.
Only possible with standard LCD Display watches with a display frequency of 64
Hz. Lay the watch on the red point with the display downwards and
If possible at the same time make contact with the metal case of the watch with the
metal pin in the middle of the microphone. (grounding)

TUNIFORK =   Tunifork watches (antique style watches)
For example (OMEGA electronic f 300Hz) Seamaster Chronometer
Put the watch on the yellow point.
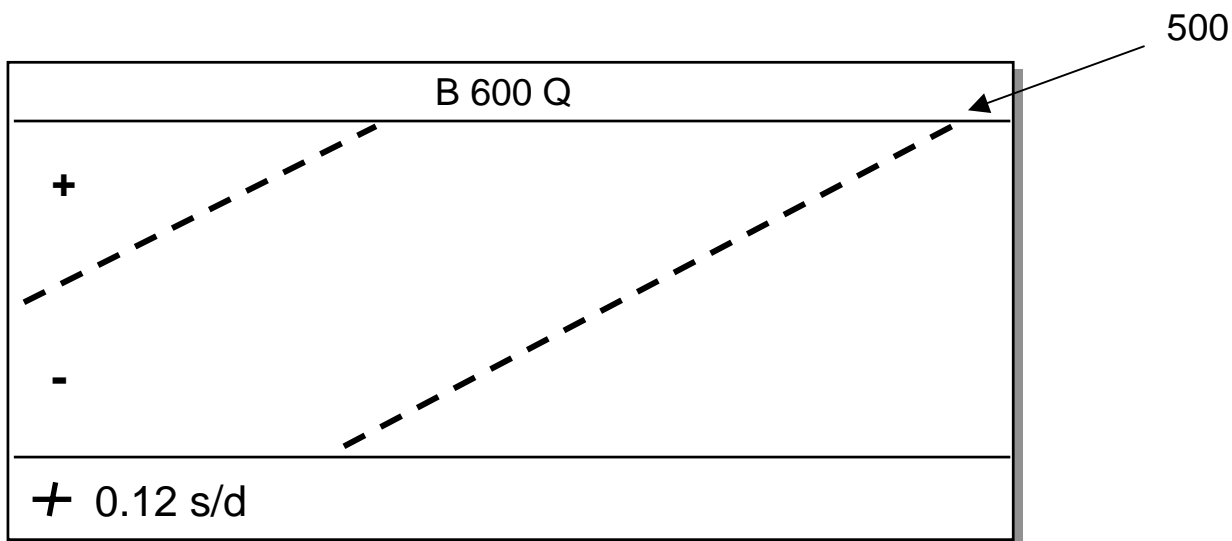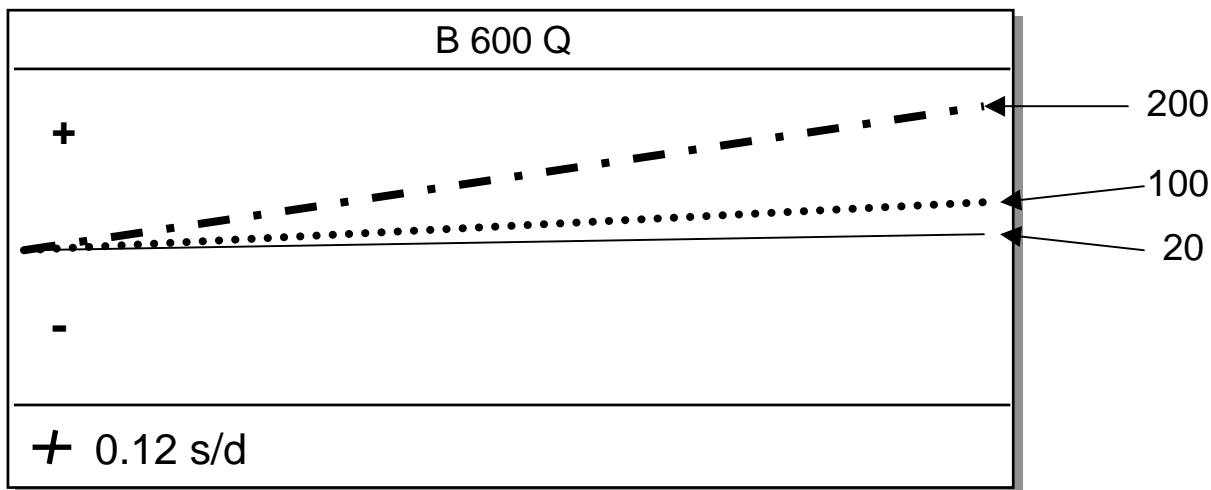Preferably choose a measuring time of min. 8 sec. (stability of result)
And the (DSP Y Gain to 20)
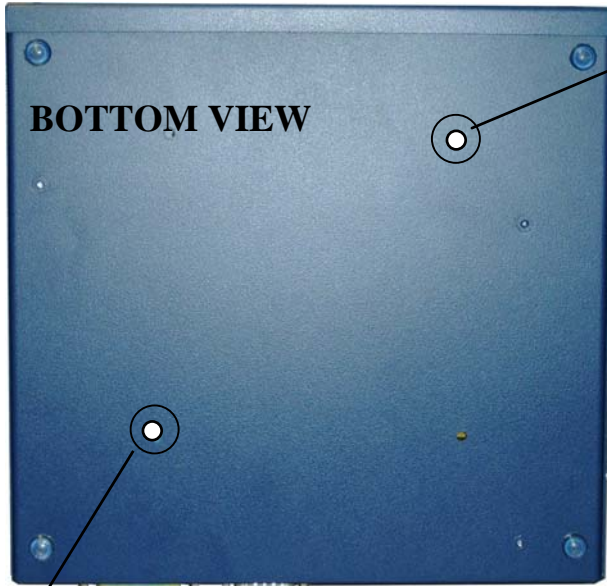By changing the (DSP Y GAIN) „Display gain „ the grafic line will change.
Please try once

EXAMPLE for (DSP Y GAIN) (1,2,5,10,20,50,100,200,500)
Same watch (+ 0.12 s/d)

The higher you set the (DSP Y GAIN) value ,
The higher is the resolution of the displayed grafic.

B 600 Q

+

200

100

20

-

+ 0.12 s/d

500

B 600 Q

+

-

+ 0.12 s/d

Calibrating and adjustment on your B600

Front of B600

BOTTOM VIEW

Ajustment of brightness and contrast of B600 display.

When it needs adjustment?
Depending on where you put the B600 and from which angle you are looking in the display it may be necessary to adjust the contrast .
How to adjust?
Switch on the B600,.
Turn the potentiometer in either c.w. or c.c.w. direction while you watch the changement of the display brightness and contrast.

Rear of B600
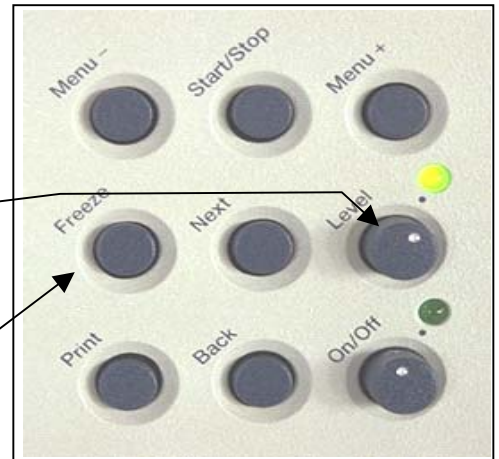
Amplifier for the signal of the microphone
When it needs adjustment?

If you have the impression that the watch signal is too weak and the grafic gives problems.
How to adjust?
Turn the Knob (Level) in front of the B600 in the position one o'clock (point to point)
Lay a good working watch correctly on the microphone.
On the B600 press the Freeze button and watch the Oscilloscope signal of the watch noise.
Turn the Pot meter on the bottom of the B600 slightly in one direction.
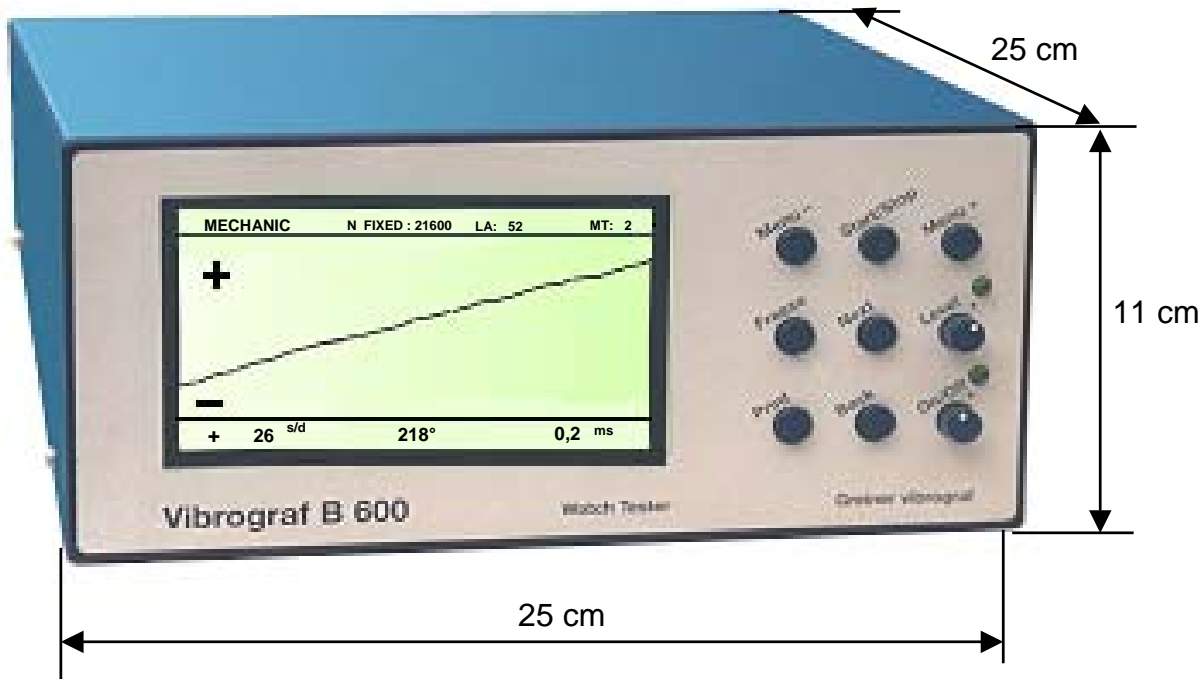The oscilloscope signal should touch the upper and lower line. O.K. that's all
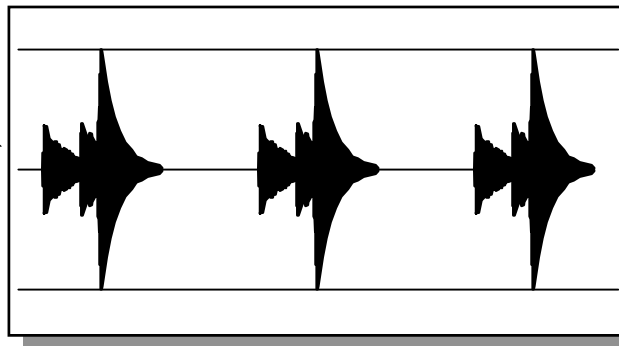
Adjustment of internal quarz frequency
The calibration is reserved for service only

With this potentiometer the B600 can be calibrated .
This means , the internal quarz frequency will be adjusted.
To calibrate the instrument correctly ,you neet a master signal , e.g. DCF77.
The calibration is reserved for service only

weight = 3.0 kg

25 cm

11 cm

| MECHANIC | N FIXED : 21600 | LA: 52 | MT: 2 |

+

—

| + | 26 s/d | 218° | 0,2 ms |

Vibrograf B 600   Watch Tester   Greiner vibrograf

25 cm

Power suply :	230 V , 50/ 60 Hz
	115 V , 50/ 60 Hz (adjustable inside)
Power consumption:	< 20 W
Time base:	TCXO - Reference-oscillator
Precision:	1 ppm (< 0.1 s/day)
Conections:	Power supply plug
	plug for microphone
	serrial plug (not active)
	paralell printer connector
Display:	1 LCD Display, adjustment of brightness
	with potentiometer on the rear
Functional sequence:	2 LED's, printing and measuring
Measuring possibilities:	mecanical watches:
	beat frequency (automatic and manual)
	out of beat value
	amplitude
	time deviation
	visualisation on display of beat noise
	electrical watches
	32 kHz quartz frequency
	4.19 MHz quartz frequency
	frequency of digital display
	motor impulses
Optional devices:	clamp microphone
	optical system for clocks