

# Compact 900

User manual

English



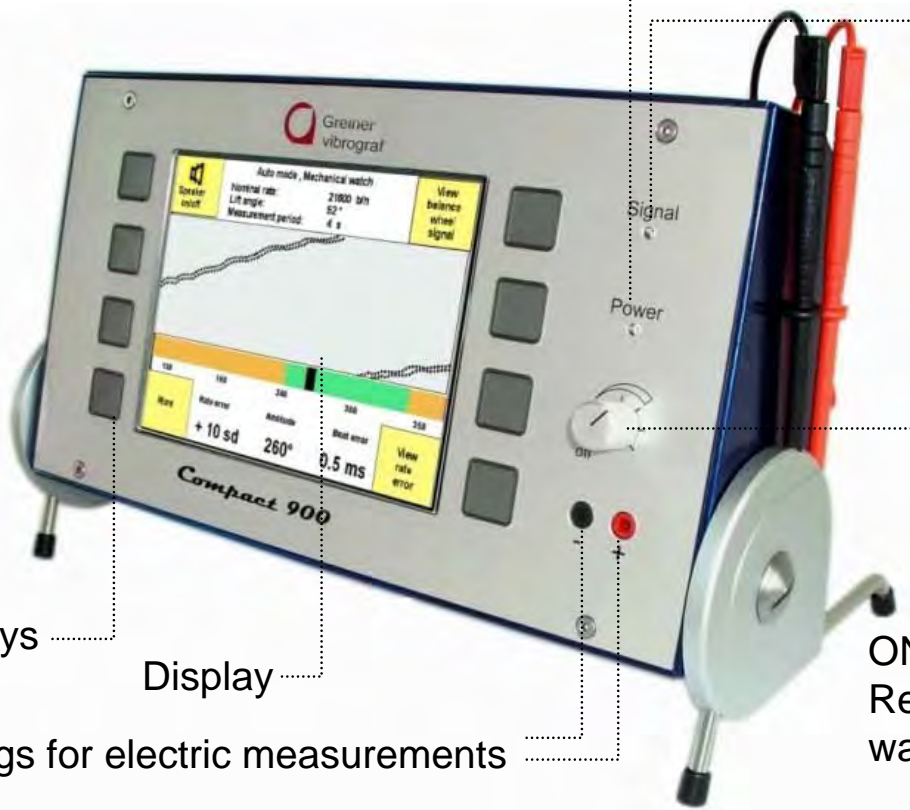
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# View of the Compact 900

Control light ON/OFF

Watch signal



Touch Keys

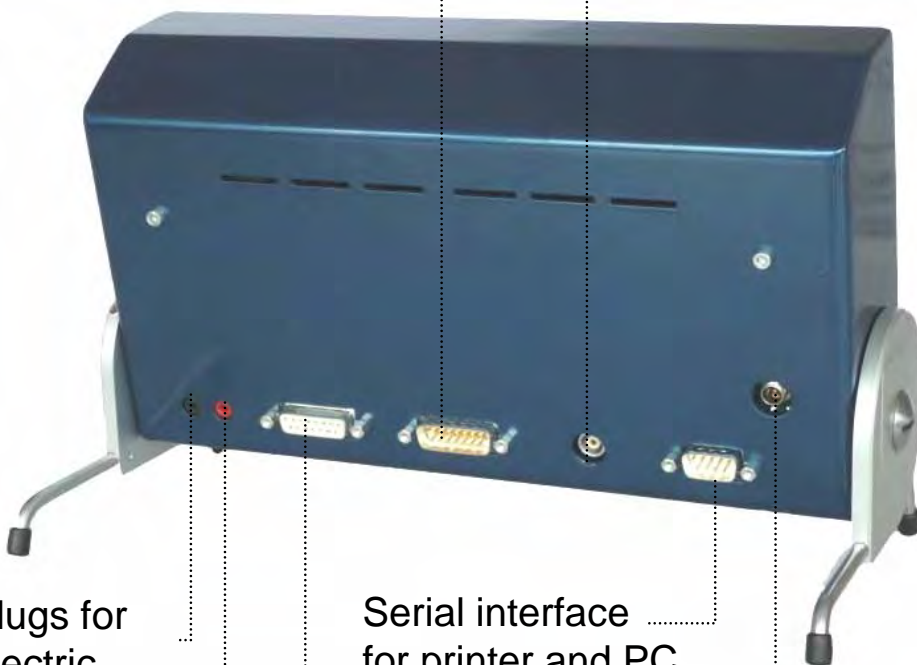
Display

Plugs for electric measurements

ON/OFF  
Regulator for  
watch signal

Plug for CM06

Plug for MP86M



Plugs for electric  
measurements

Serial interface  
for printer and PC

Plug for 12 Volt  
adaptor

Plug for QM06, OPTO06 and  
AM10 (Automatic Microphone)

## **The Compact 900 presents itself !**

The Compact 900 is an all purpose watch timing instrument for testing of mechanical watches, quartz watches, pendulum clocks as well as pocket watches.

Equipped with: Display 256 Colour, 12 x 9 cm

8 buttons for easily and quick handling of different functions

Automatic Standby (low current) while not measuring a watch signal

**Mechanical Watches (special program for Co-Axial-escapement):**

Graphical and alphanumerical indication of:

Rate error, amplitude, out of beat in milliseconds.

Oscillographical noise-meter.

**Quartz watch:**

Graphical and alphanumerical indication of:

Rate error, motor impulse (inductive), quartz frequency (acoustic).

Automatic calculation and indication of inhibition.

Consumption of electricity: operational current, quiescent current.

Supply Voltage for watches is adjustable from 0.5 to 3.3 Volt.

Checking of Battery as well as stepper motor ohms.

**Pendulum clocks:**

Graphical and alphanumeric indication of:

Measuring of rate error with light barrier « OPTO 06 »

or with acoustical clamp microphone « CM06 ».

Automatic calculation and indication of beat rate (if unknown).

**Printing results:**

The results can be printed alphanumerically with a serial printer or transferred to your computer « PC(result) ».

Your company data (if given) are printed on the printout header.

**Transform Parameters to the PC:**

The measured data can be transferred automatically every (x) seconds to your « PC(grafic) » and can be indicated as a long term graphic.

**Following microphones (adapters) can be used:**

**MP86** Microphone for mechanical watches, fixable in all positions.

**QM06** Microphone for mechanical and quartz watches.

**CM 06** Clamp microphone for pocket watches, large watches, pendulum clocks.

**EM06** Watch holder with mirror for measuring electrical values of quartz watches.

**Opto06** Light barrier for optical measuring of pendulum clocks.

## Start up

Connect the unit with the power transformer to the power supply line and switch on with the turning knob. Put the mark of the knob on 12 o'clock.

After switching on you can see the following:

The green control lamp «Power» lights up if the unit is connected with the power supply and switched on.



If your data as your name, address, tel., etc. have been programmed, they will appear instead of the Greiner logo (printout header).

## Standby

If the Compact 900 is on and during 10 minutes is no watch signal incoming or any key pressed, then the display switches off automatically (black screen) and the unit is on standby.

The green control lamp «Power» still lights up, and indicates that the unit is still on hand and can be activated by pressing any button.

# Menu selection

## Menu after startup

**Menu**

P 1  
18000  
52°

P 2  
19800  
52°

P 3  
21600  
52°

P 4  
28800  
52°

P 5  
36000  
52°

Co-Axial

Auto mode

More...

Press this key for automatic operation. >>>>>

10.06.2009 18:37

**Press key  
to switch between this 2 menus**

**Menu**

P7  
Quartz  
32 kHz

P8  
Quartz  
Motor

P9  
Pende  
I  
auto

Setting  
s

Auto,  
MP8  
6  
only

Auto,  
QM0  
6  
only

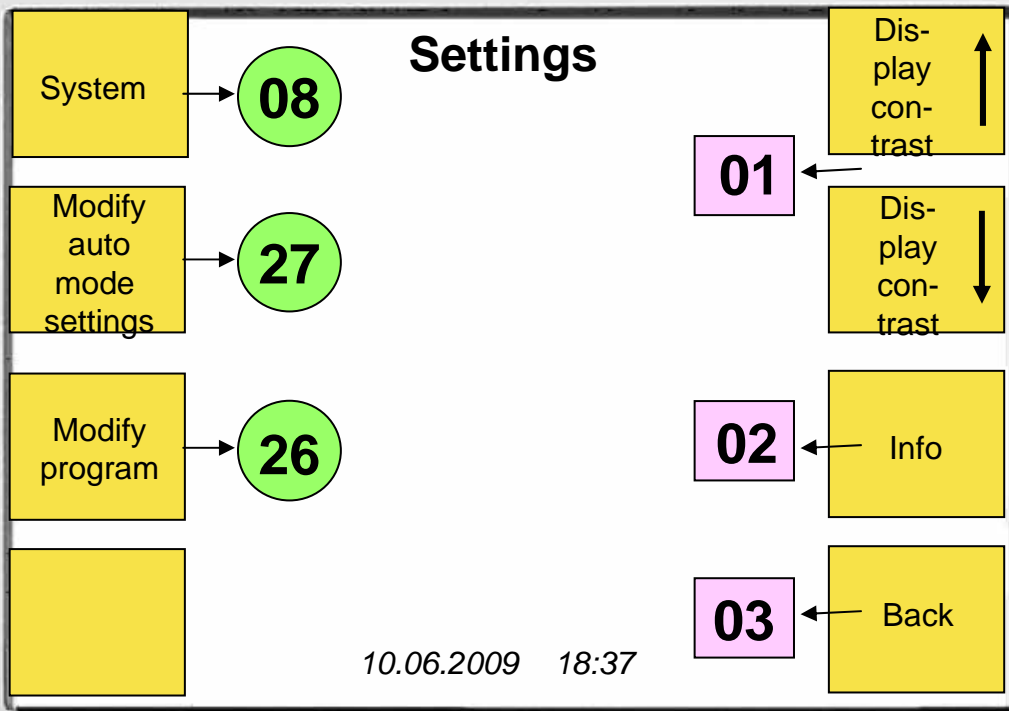
EM0  
6

More  
...

10.06.2009 18:37

**Press this key to change  
various settings.**

# Adjustment contrast



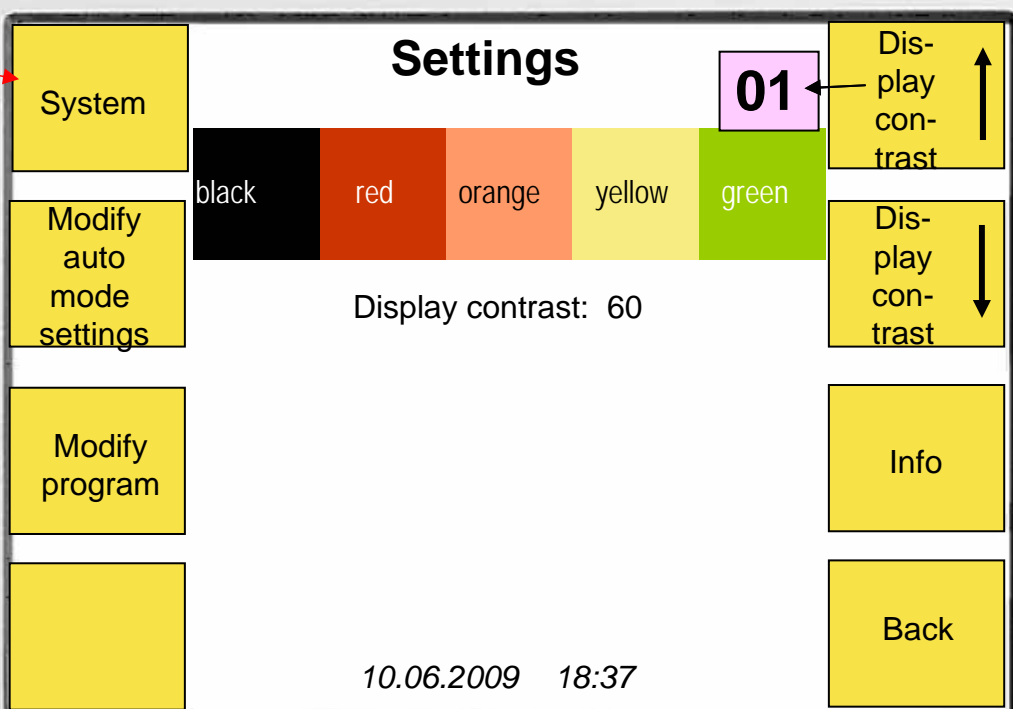
**01** Press button up or down for adjusting contrast.

page No. **XX**

**02** Press button for indicating software version

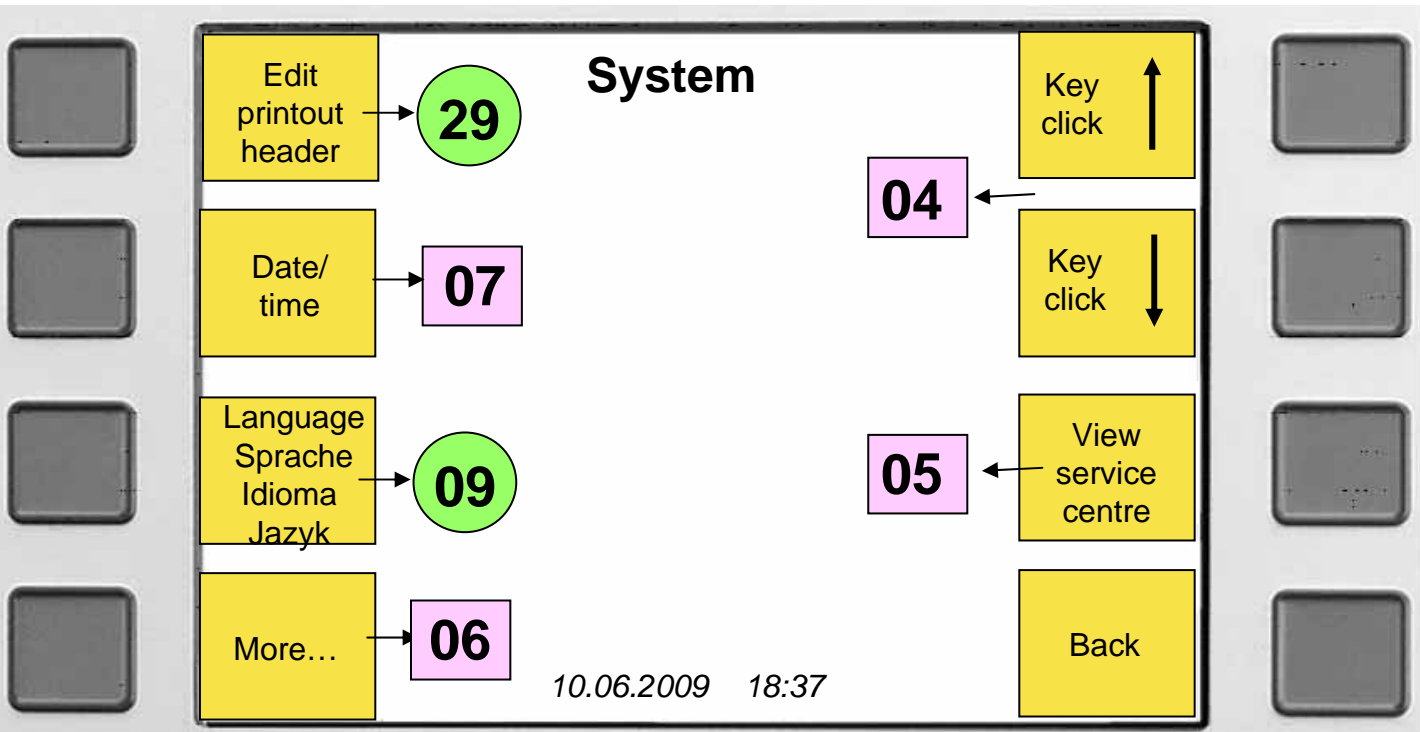
**03** Press button for changing to the last menu

Button for more system adjustments





# Adjustment of Date / Time



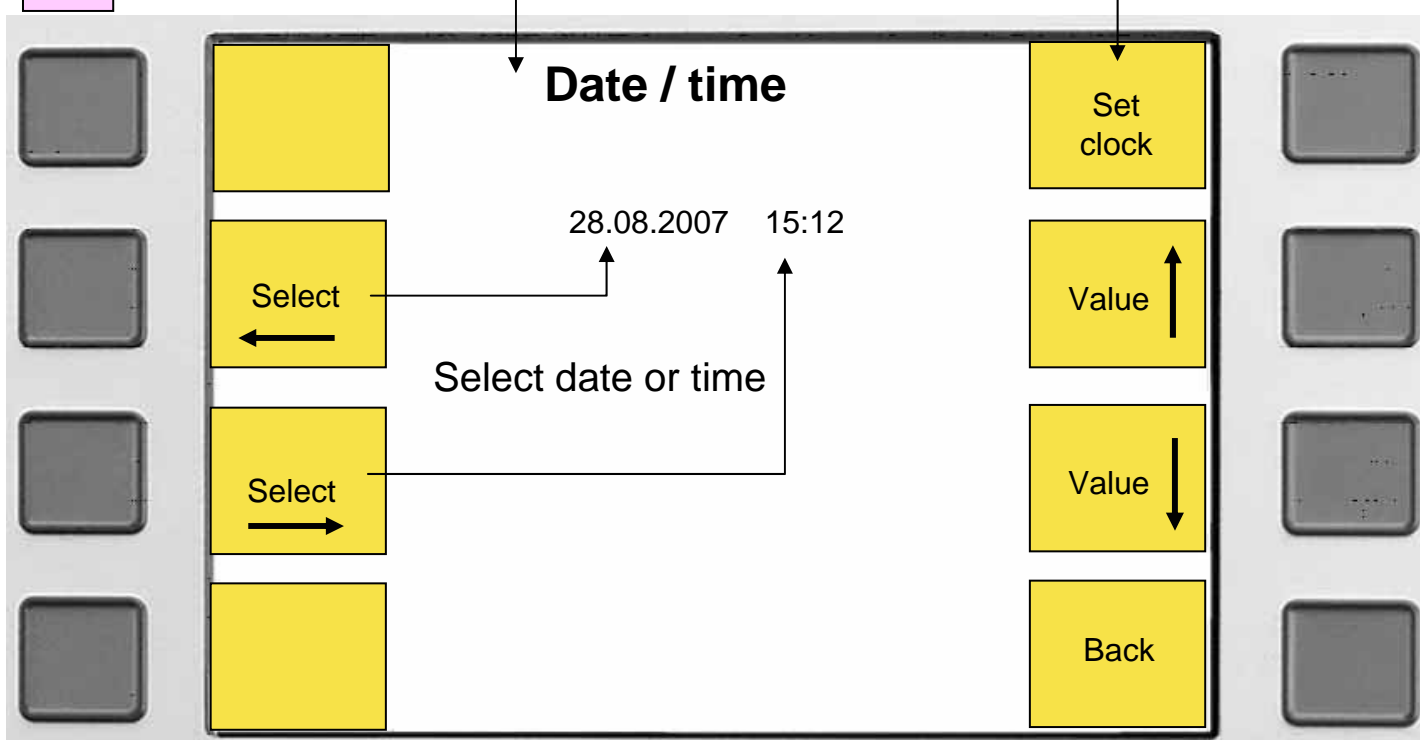
**04** Press button up or down for adjusting the sound of the click.

page No. **XX**

**05** Press button for the service center.

**06** Press button to select the printer.

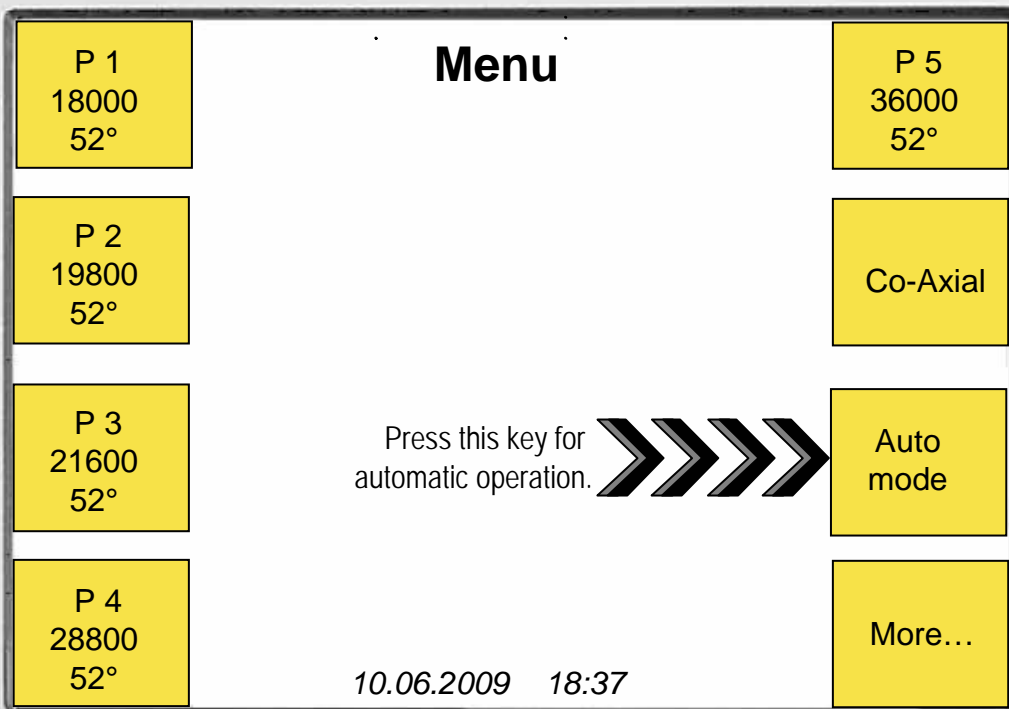
**07** Data takeover





# Language selection

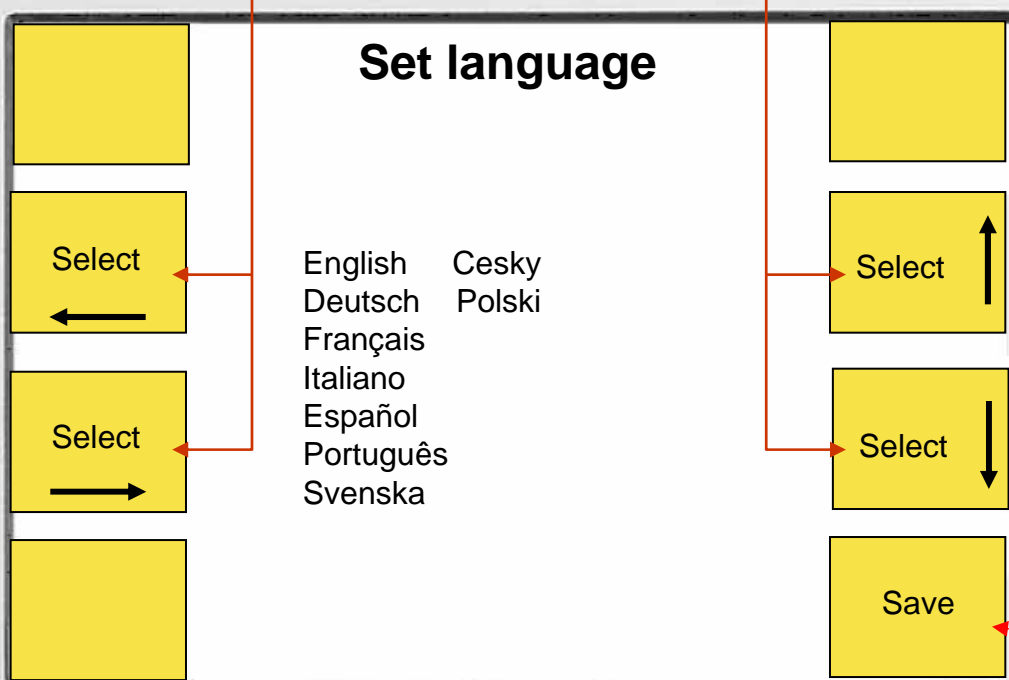
## Menu after start



Select language by pressing buttons in following sequence.

1. button ( More )
2. button ( Settings )
3. button ( System )
4. button ( Language ), the following menu appears

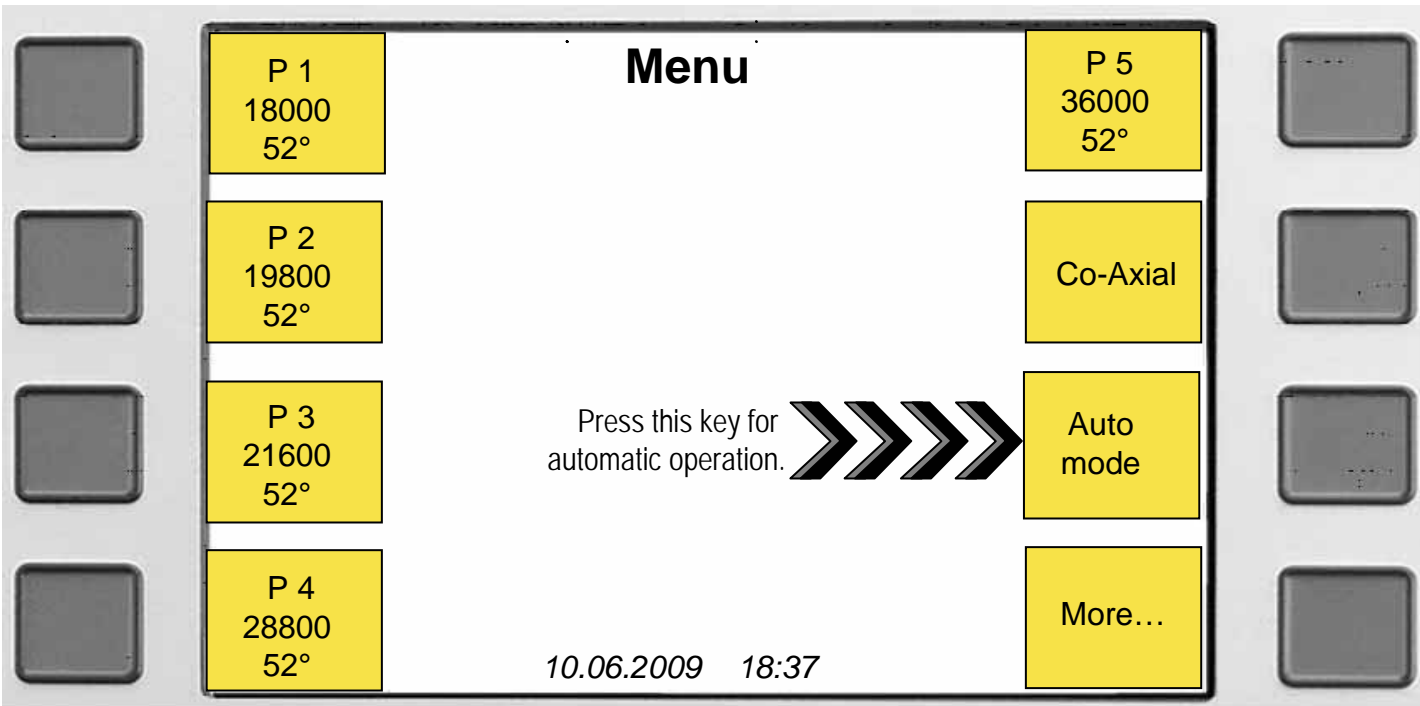
Select language with the following buttons.



For saving the language

# Printer selection

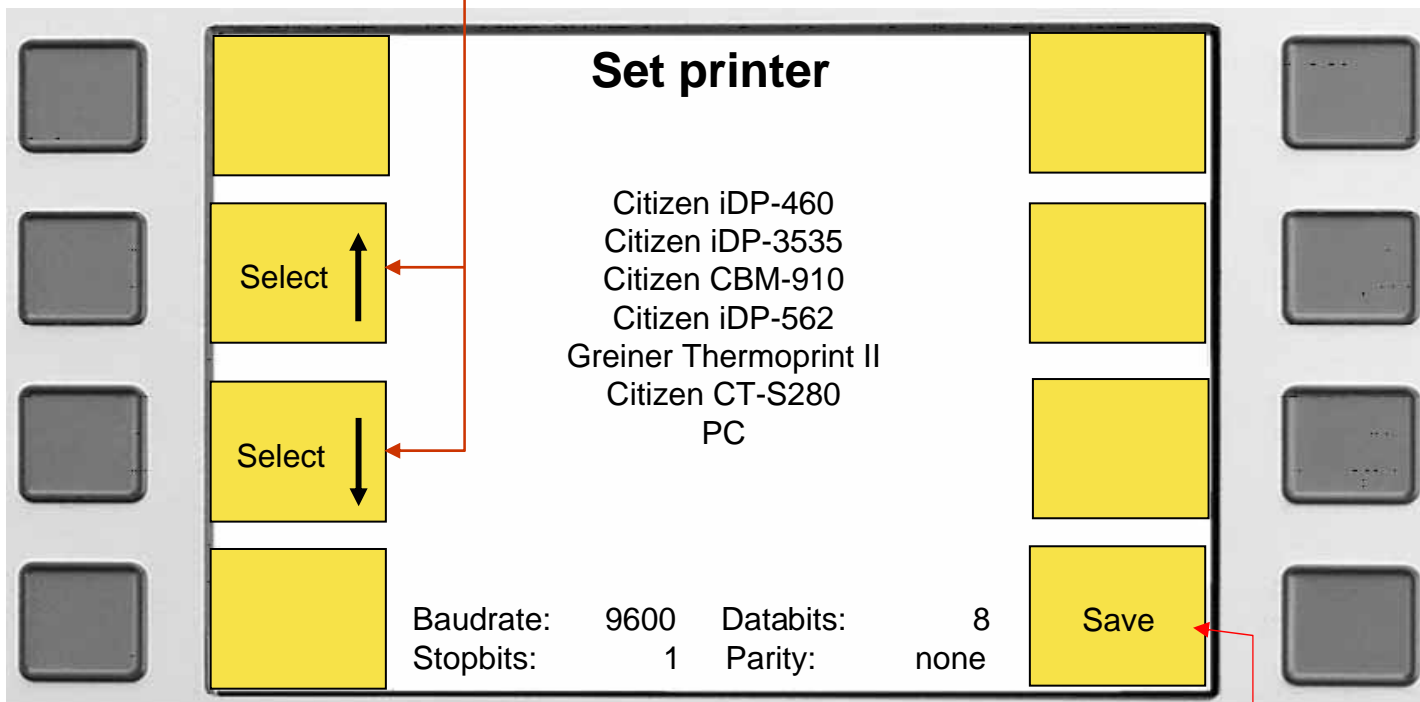
## Menu after start



Select printer by pressing buttons in following sequence.

1. button ( More )
2. button ( Settings )
3. button ( System )
4. button ( printer ), the following menu appears:

Select printer with these buttons



For saving the selected printer

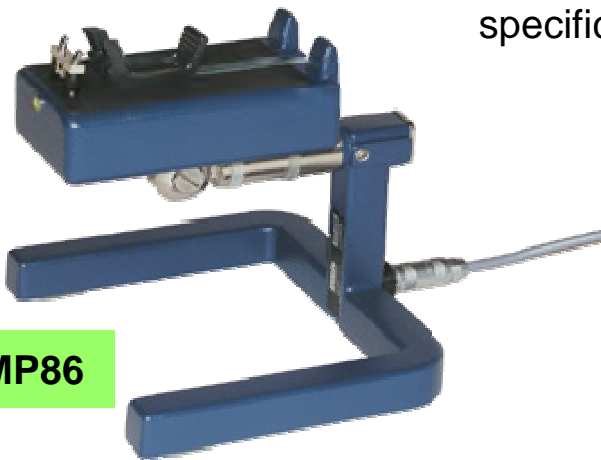
# Testing mechanical watches



QM06

1. **Put the watch** between the slider and the Pins (fork) of the microphones “QM06”, or “MP86”. For watches, for example pocket watches or alarm clocks, you can use the clamp microphone “CM06”.


2. **Press button “Auto Mode”** for starting the automatic measurement or choose button P1 to P6 for selecting a specific program, if the beat rate is known.



MP86



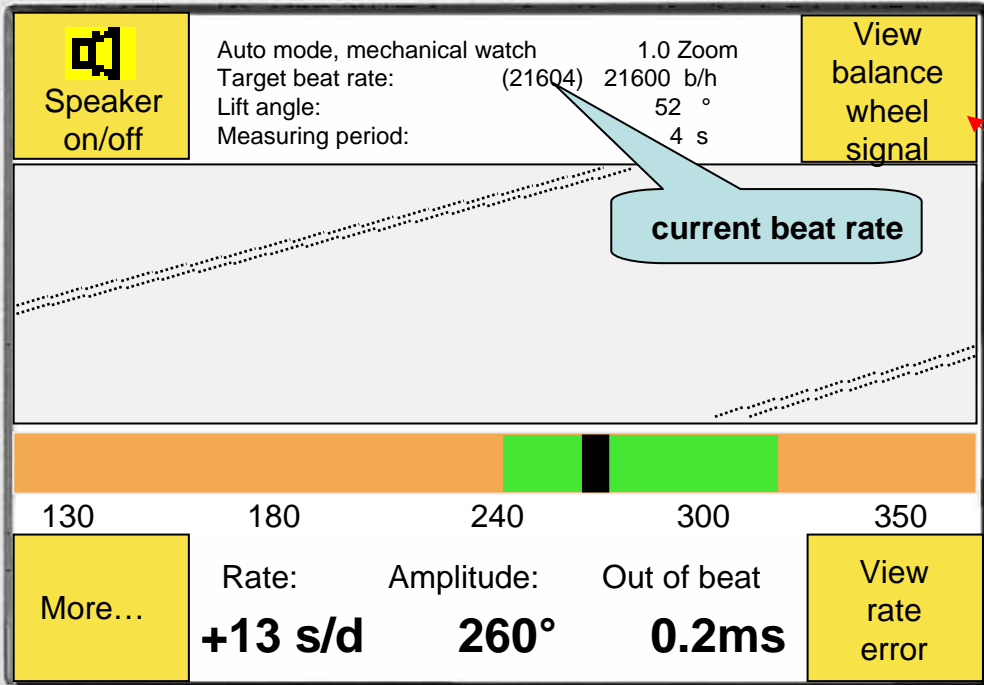
CM06

	<b>P 1</b> 18000 52°	<b>Menu</b>	<b>P 5</b> 36000 52°	
	<b>P 2</b> 19800 52°	<b>Info:</b> Special menu for Co-Axial watches see page 33	<b>Co-Axial</b>	
	<b>P 3</b> 21600 52°	For automatic operation: press this key 	<b>Auto Mode</b>	
	<b>P 4</b> 28800 52°	10.06.2009 18:37	<b>More...</b>	

# Display of mechanical watch

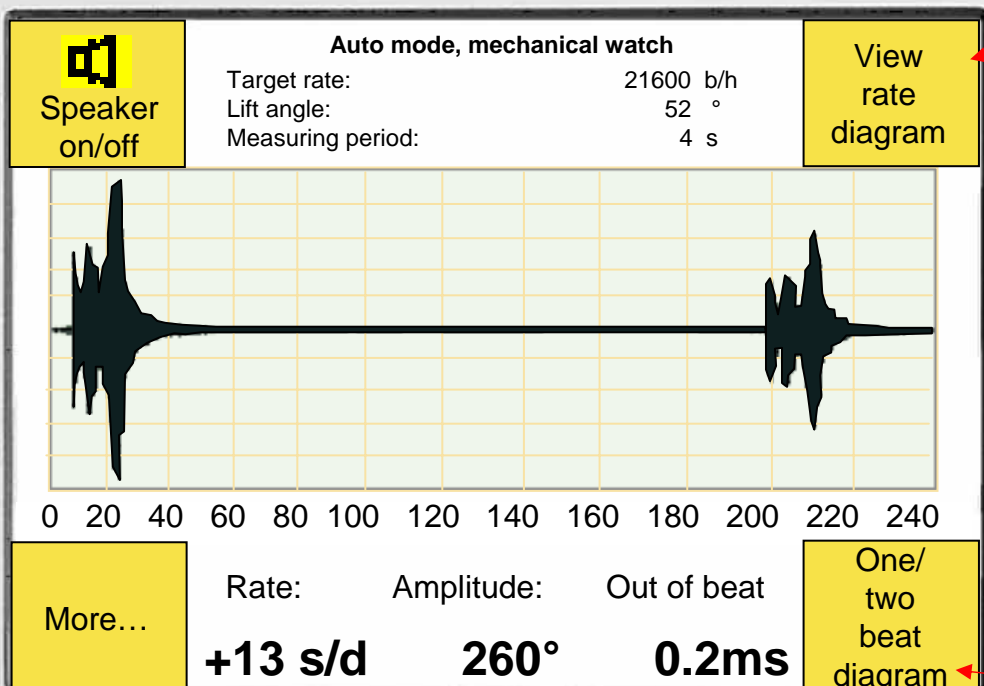
During measuring it is possible to choose between error rate, rate diagram or balance wheel signal. Standard is the rate diagram.

## Indication of the frequency of the watch



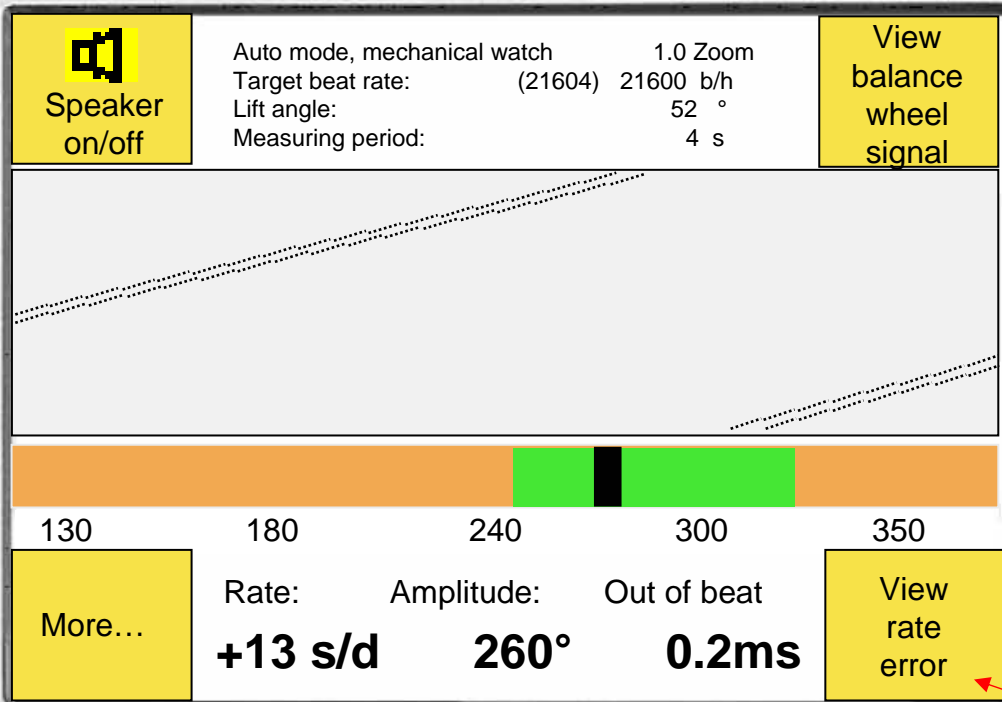
Press button for next display

Press button for the previous display



Press button to change between one or two beat diagrams

# Display of mechanical watch



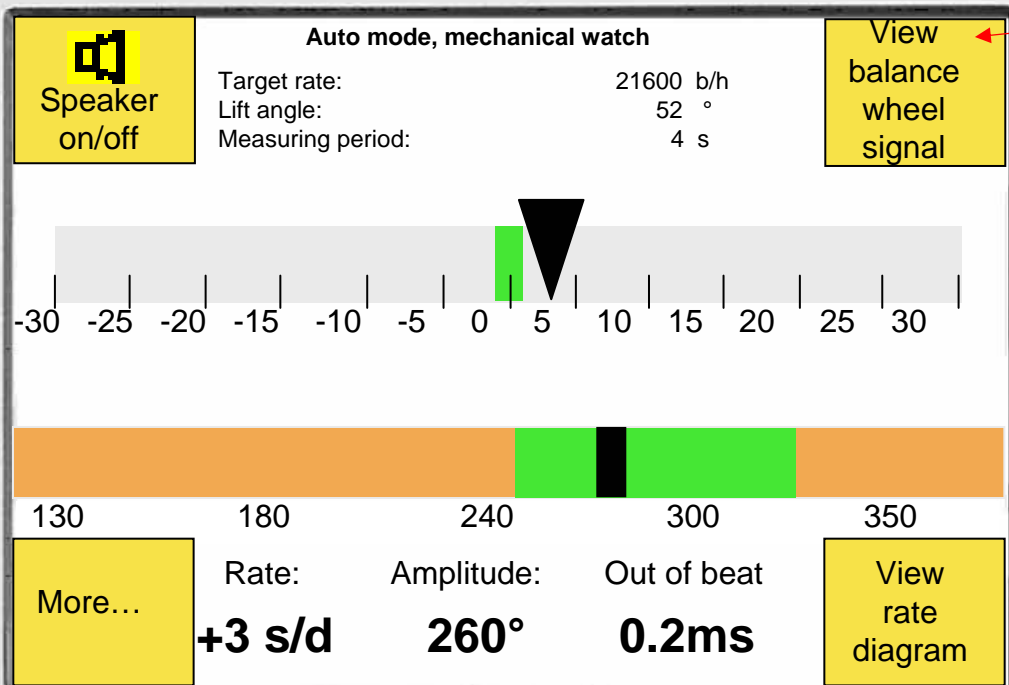
Remark :

An amplitude value lower than 130° is displayed ( $< 130^\circ$ )

An amplitude value higher than 350° is displayed ( $> 350^\circ$ )

*Press button for next display*

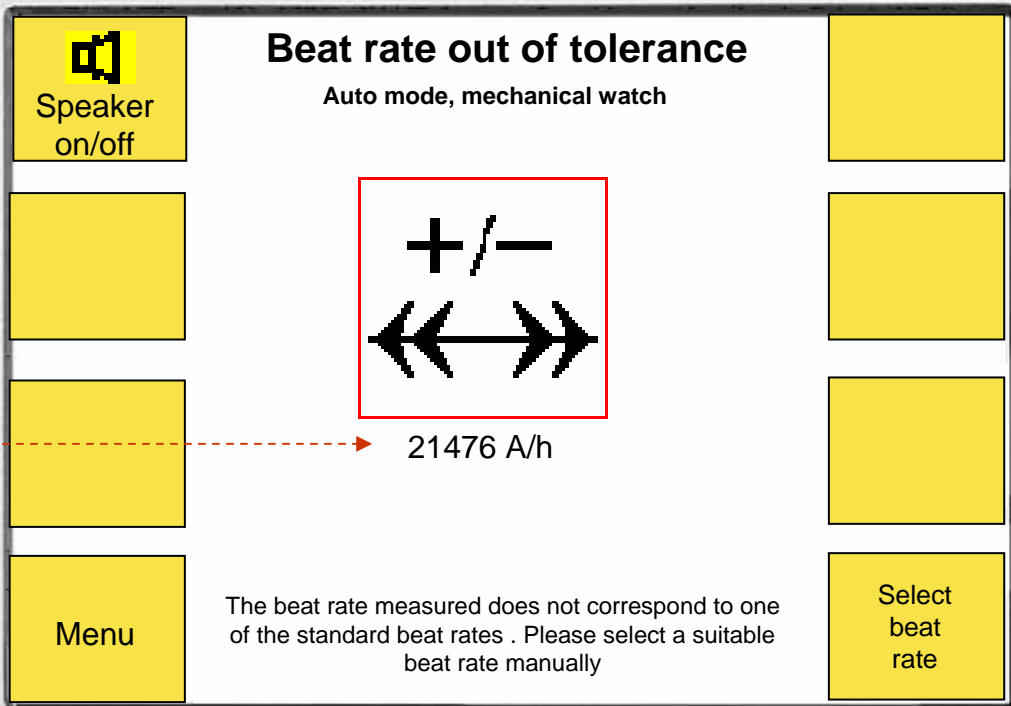
*Press button for balance wheel signal*



*Press button for previous display*

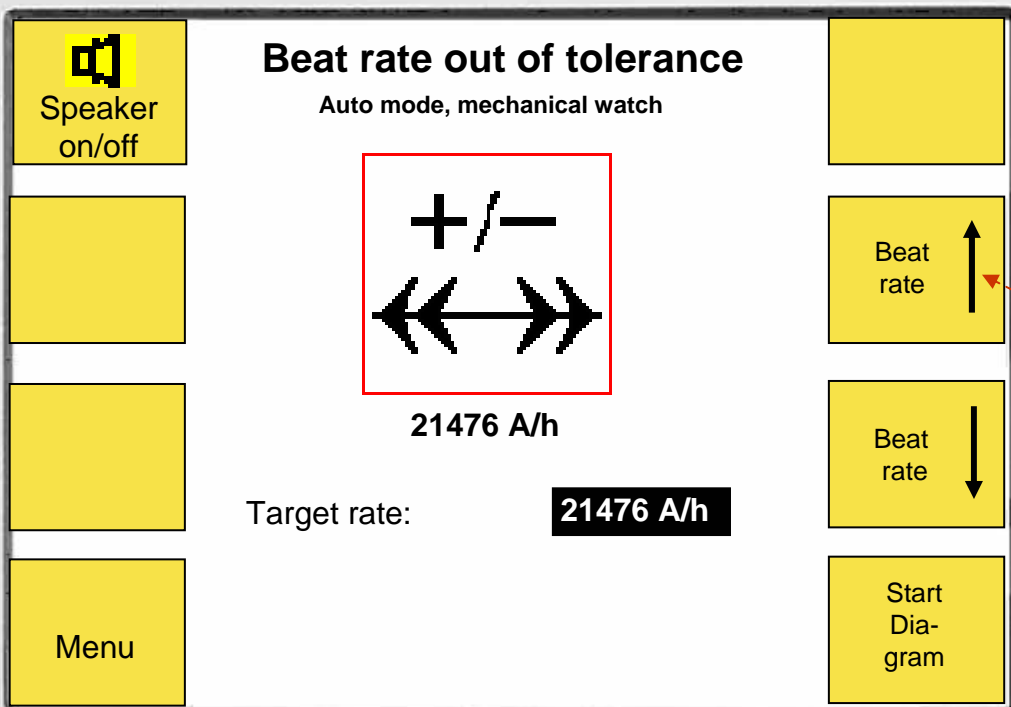
# Testing watches with no standard beat rate

If a watch has no standard beat rate (p.32) or the rate error is higher than 300s/d, the following display appears.



*Indication of measured beat rate*

*Press button for next display*



*Press button to indicate rate diagram*

*Press button to change the beat rate*

# Testing quartz watches with „QM06“



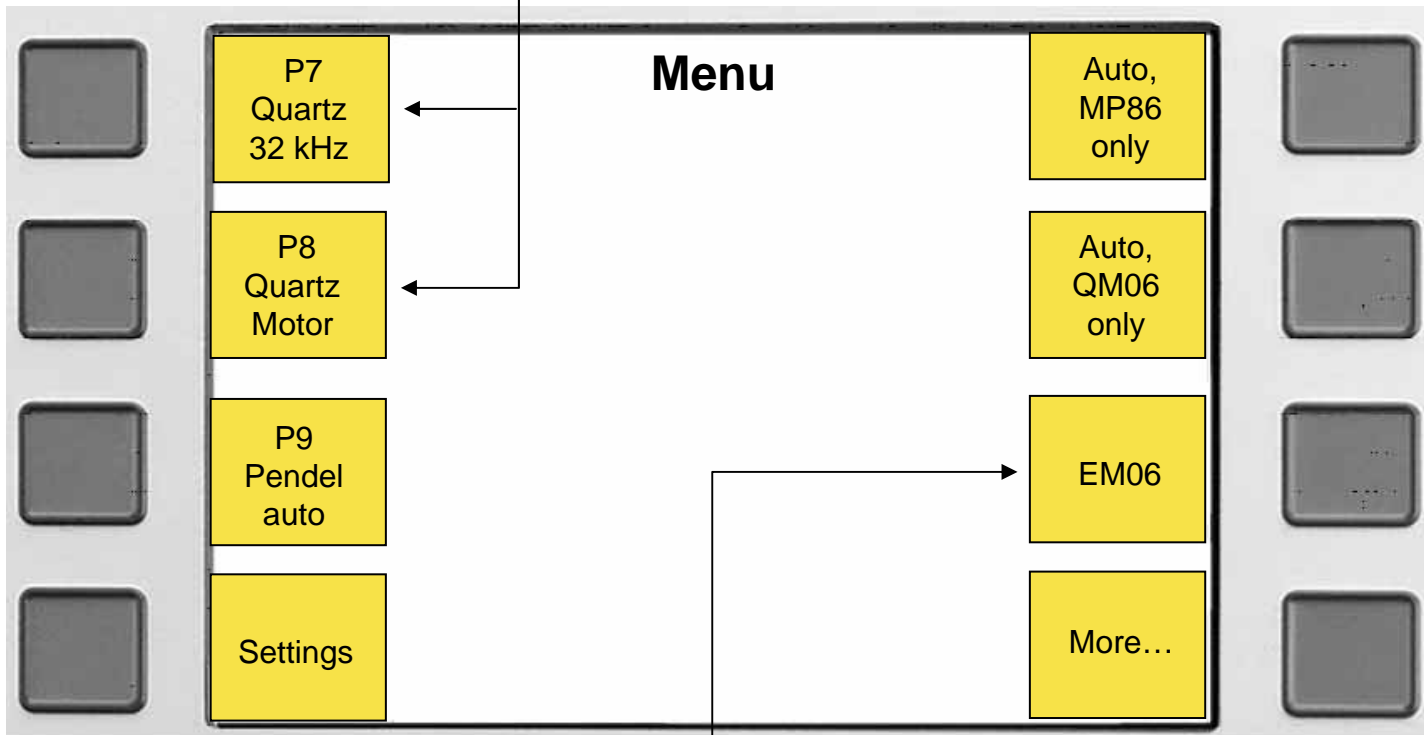
QM06

Put the watch between the slider and the pins (fork) of the microphone “QM06”. Press button “Auto QM06 only” to start automatic measurement of the motor impulses.

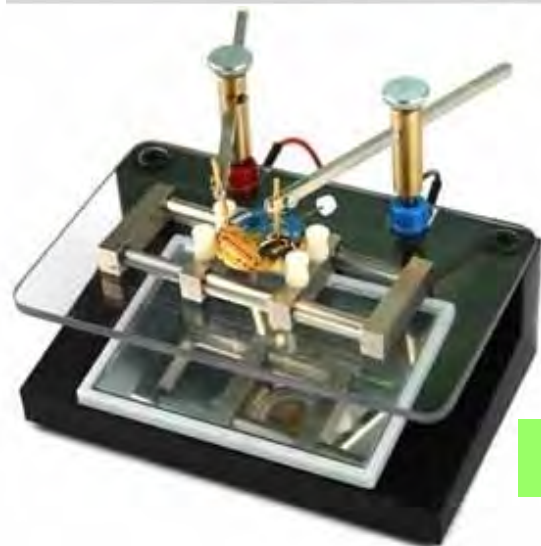
For manual measurement of the quartz frequency or motor impulses, press first button “More” then button “P7” or “P8”.

The pins (fork) receive acoustically the 32 kHz frequency of the quartz if the vibrations are sufficiently transmitted to the watchcase. The motor impulses are measured by an inductive receiver inside the microphone.

“P7” o “P8”



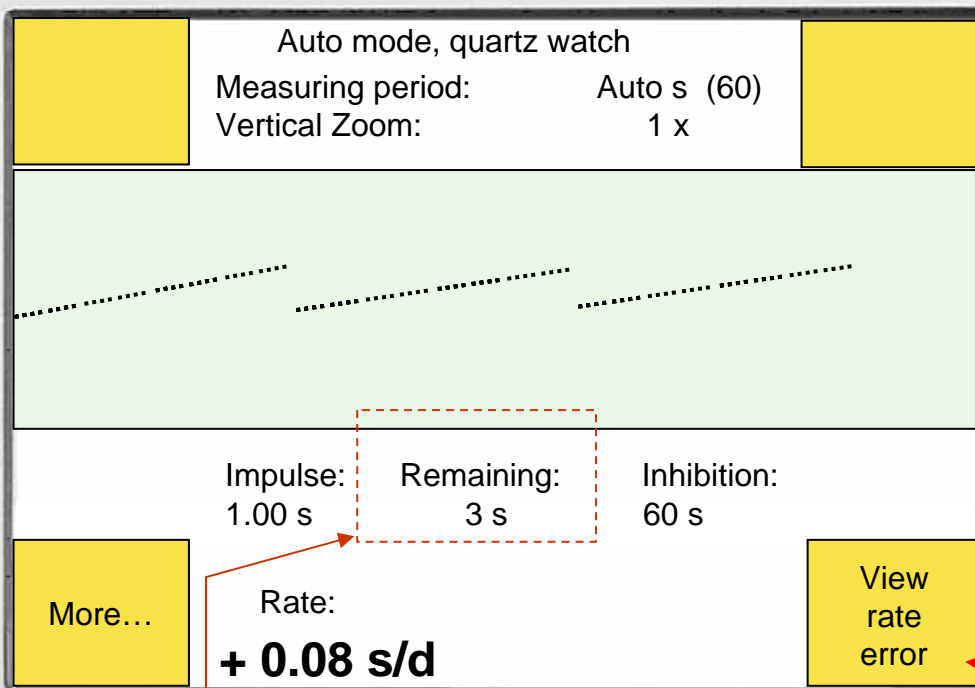
Press button “EM06” for measuring: rate of the quartz watch, consumption of electricity (operational current, quiescent current), ohms of the stepper motor and the voltage of the battery.



EM06

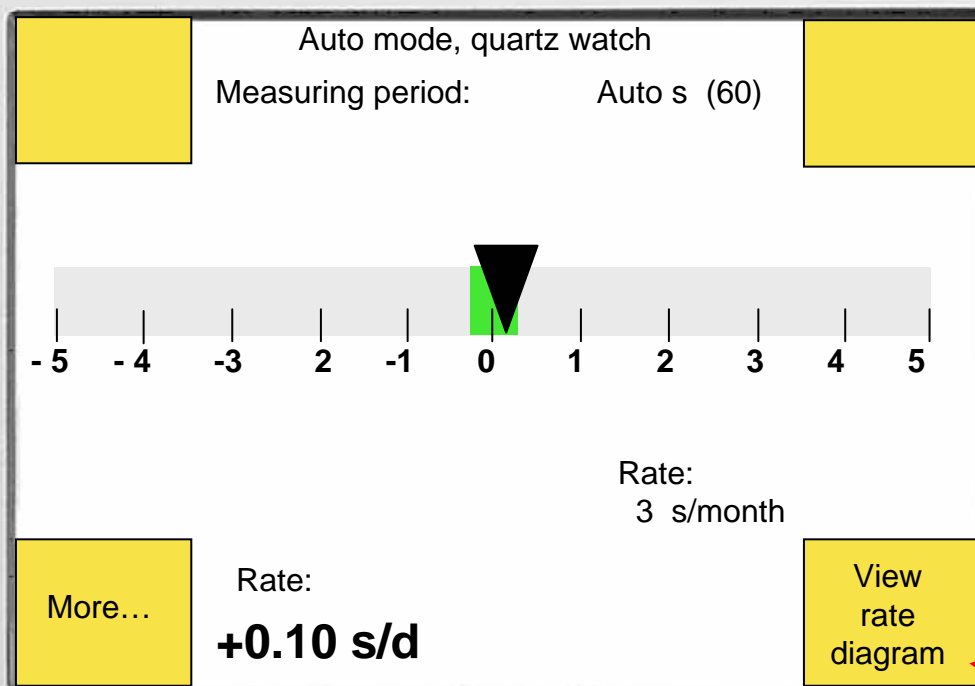


# Testing quartz watches with „QM06“



Indication for watches with pulse sequence higher than 1 sec. for example (5,10,20,60)

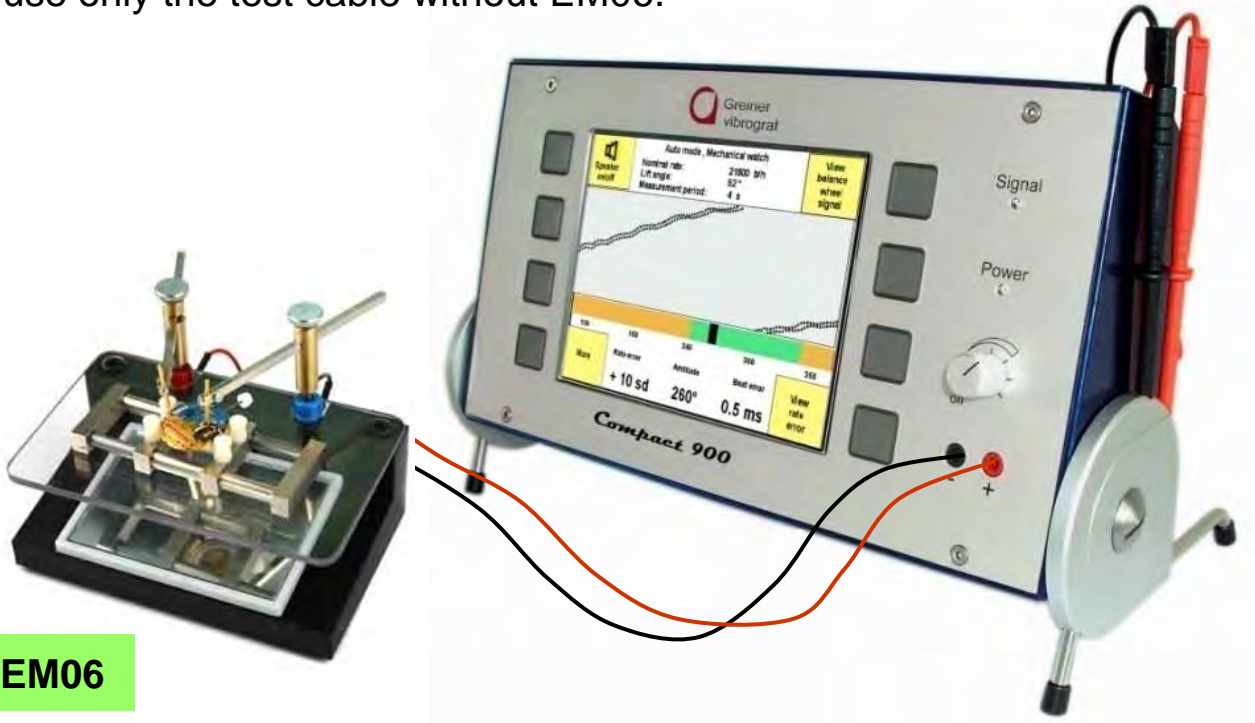
Press button for the next menu



Press button to return to menu above

# Testing quartz watches with „EM06“

Connect watch adapter “EM06” with the jacks ( + ) ( - ) of the Compact 900, put quartz watch without Battery on the “EM06”. Contact red bow with plus (+) and black bow with ground (-) of the watch. It is also possible to use only the test cable without EM06.



**EM06**

For the following menu, press button “EM06” in the main menu. Choose then button for measuring consumption of electricity, rate accuracy, stepper motor ohms or voltage.

**Press this button to start diagram**

**Menu**

Source voltage: 1.55 V

↑ Voltage

Battery voltage

Stepper Motor ohms

Menu

start diagram

Voltage on

Motor QM06 only

10.06.2009 18:37

# Testing quartz watches with „EM06“

Voltage higher

Voltage lower

Auto mode, quartz watch

Measuring period:	Auto s (60)
Vertical Zoom:	1 x
Source voltage:	1.55 V

Quiescent current: 0.27  $\mu$ A    Impulse: 18.92  $\mu$ A    Remaining: 3 s    Inhibition: 60 s

Rate:	Impulse:	Supply current:
<b>+0.08 s/d</b>	<b>5 s</b>	<b>1.73 <math>\mu</math>A</b>

More...    View rate error

The screen displays a dotted line graph on a light green background, showing a series of three upward-sloping segments.

Press this button for the following menu

Voltage higher

Voltage lower

Auto mode, quartz watch

Measuring period:	Auto s (60)
Source voltage:	1.55 V

Remaining: 3 s    Rate: + 3 s/month

Rate:	Impulse:	Supply current:
<b>+0.10 s/d</b>	<b>1 s</b>	<b>0.27 <math>\mu</math>A</b>

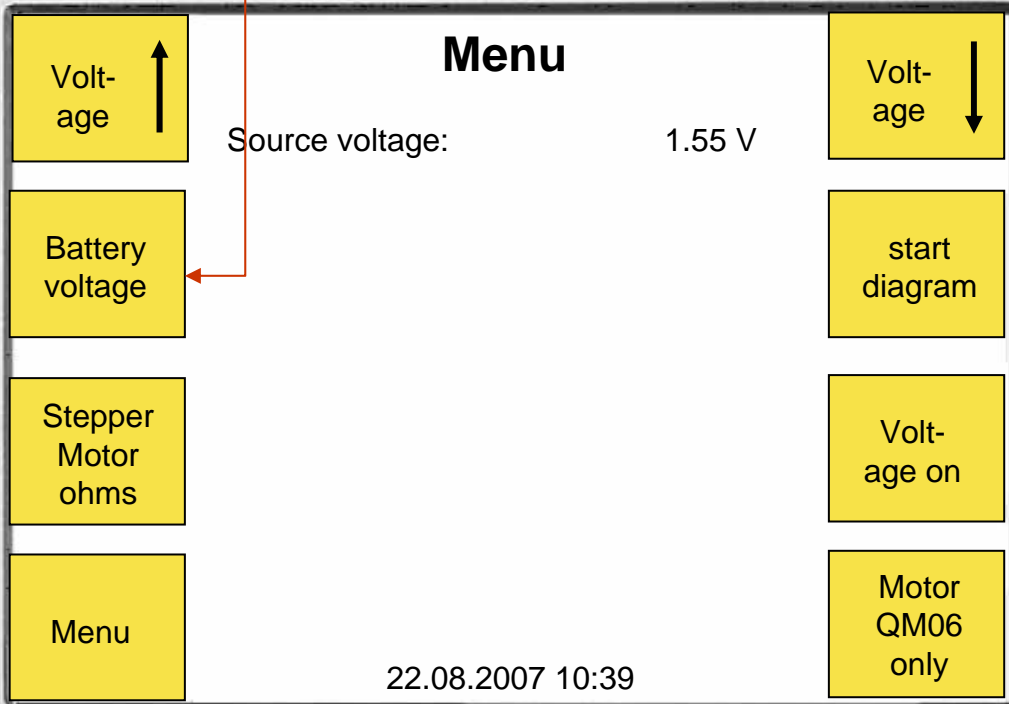
More...    View rate diagram

The screen features a horizontal bar with a scale from -5 to 5. A green triangle points to the 0 mark, and a black triangle points to the 1 mark.

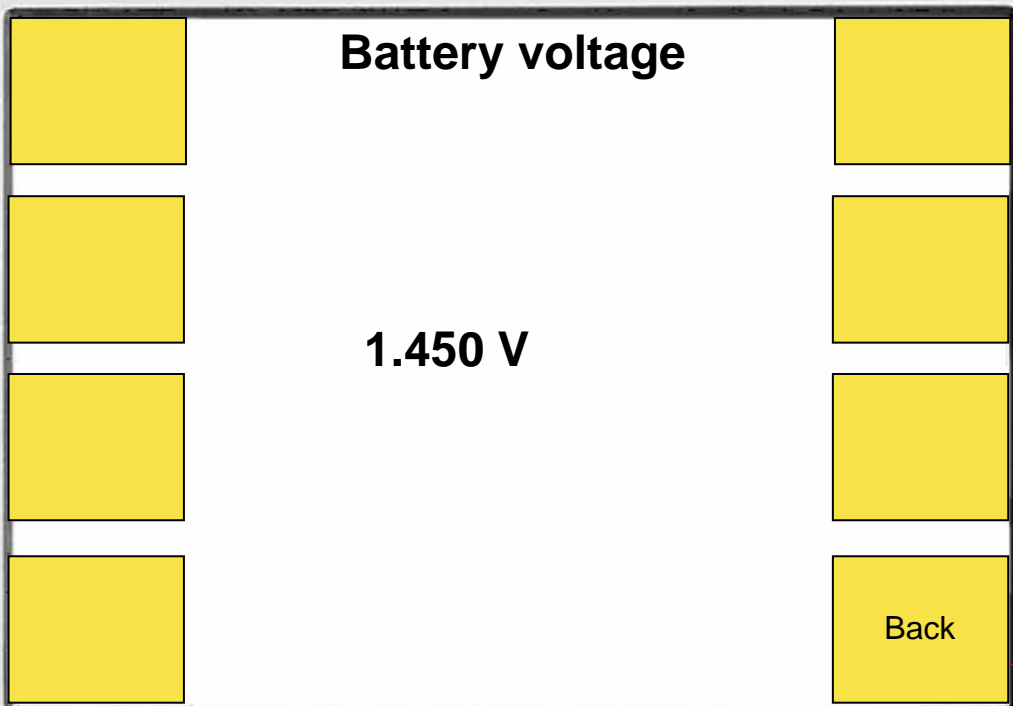
Press button to return to display above

# Checking battery voltage

For the following menu press button “EM06” in the main menu. Press then button “Battery voltage” for measuring the battery voltage.



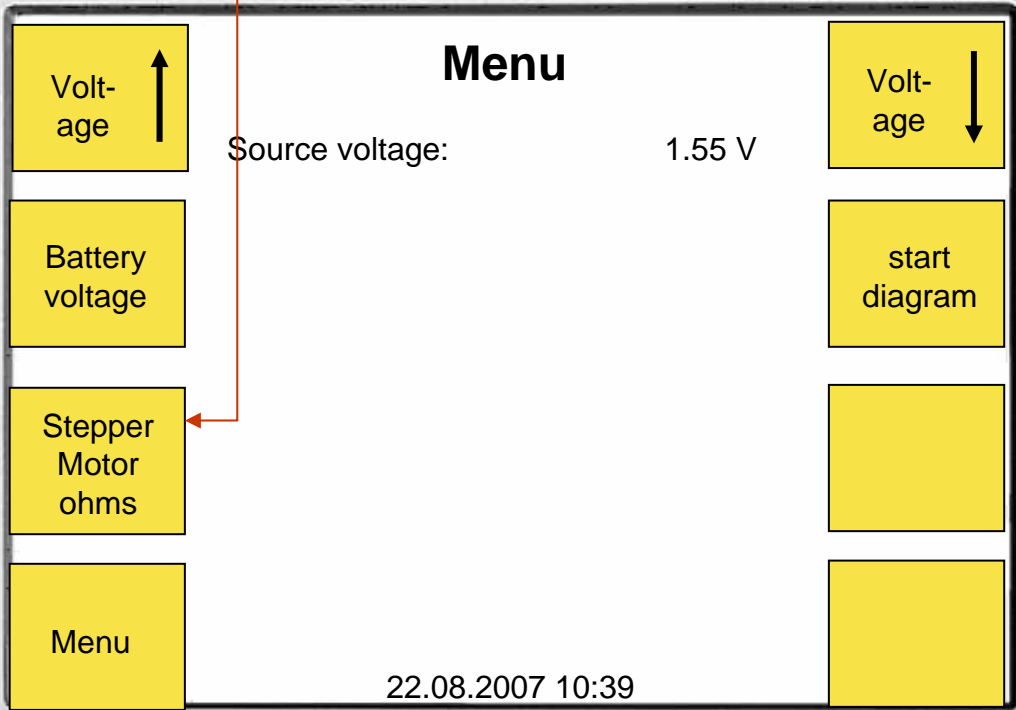
Connect test cable with the plugs ( + ) ( - ) of the Compact 900. Touch with red probe the positive side (+) and with the black probe the negative side (-) of the battery. The present battery voltage is indicated.



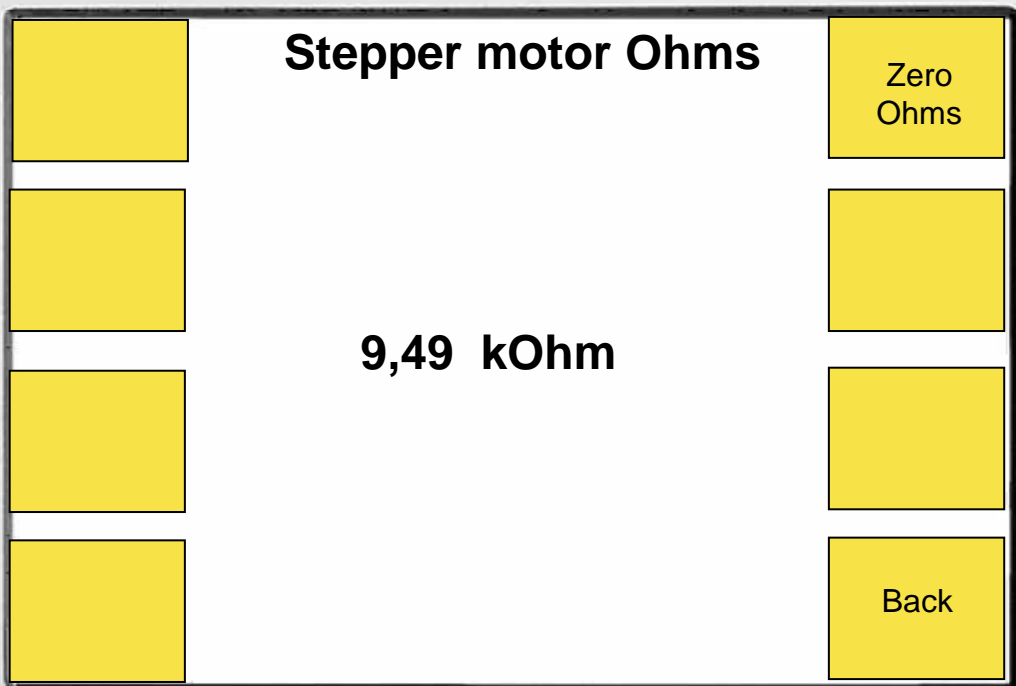
*Press button to return to display above*

# Measuring Stepper Motor ohms

In the main menu press button “EM06” for the following menu. Then press button “Stepper Motor ohms” for measuring the stepper motor ohms.



Connect test cable with the plugs ( + ) ( - ) of the Compact 900. Then connect the ends of the probes to a short circuit and press button “Zero Ohms”. Display indicates ( 0 Ohm). Then touch with the probes the ends of the stepper motor. The present number of ohms of the stepper motor is indicated.



*Press button to return to the menu above*

# Testing pendulum clocks with „OPTO6“ ( optical )

To start measuring:

Press this button to begin the automatic start of the measuring



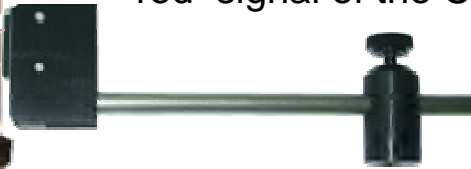
Auto mode

or button

Auto Opto06 only



Mount the light barrier “OPTO 06” on a tripod. Direct the light beam only on one side of the pendulum. Distance 5 - 50mm. The pendulum shall pass through the light beam only one sided. The correct adjustment can be checked by the red signal of the Compact 900.



After approx. 8 seconds appears following display (menu).

Press button to accept or to change the beat rate

**Menu pendulum clock**  
Auto mode, pendulum clock

Target rate: \*\*\*\*\*  
actual beat rate: 8965 A/h

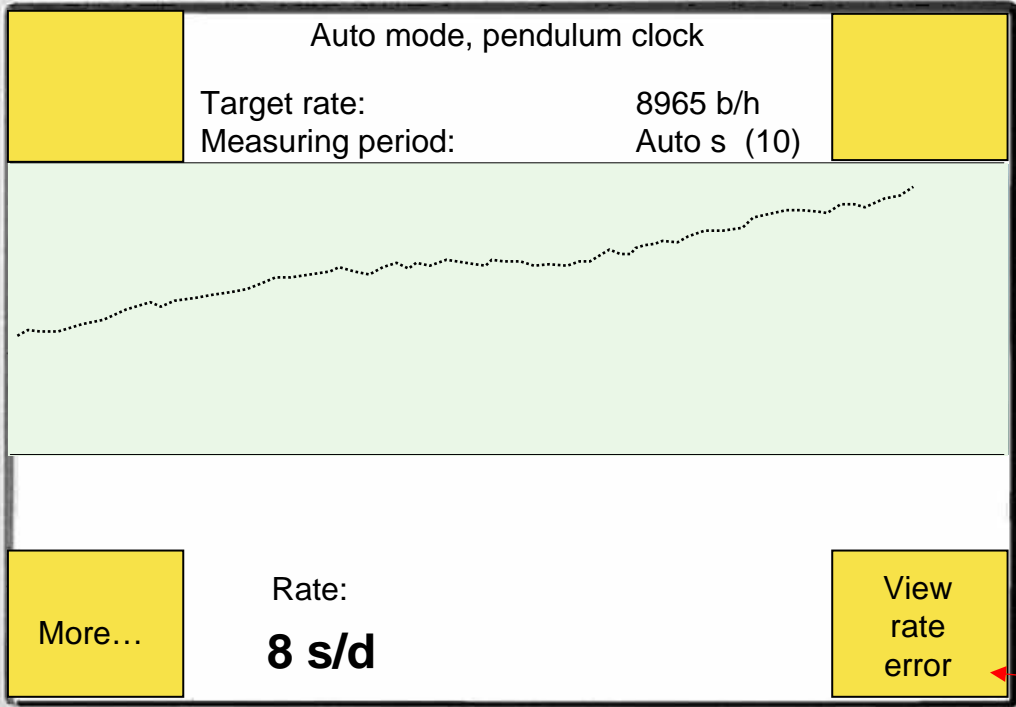
beat rate ↑  
beat rate ↓  
Menu  
start measure  
start diagram

Press button to start diagram for rate error.

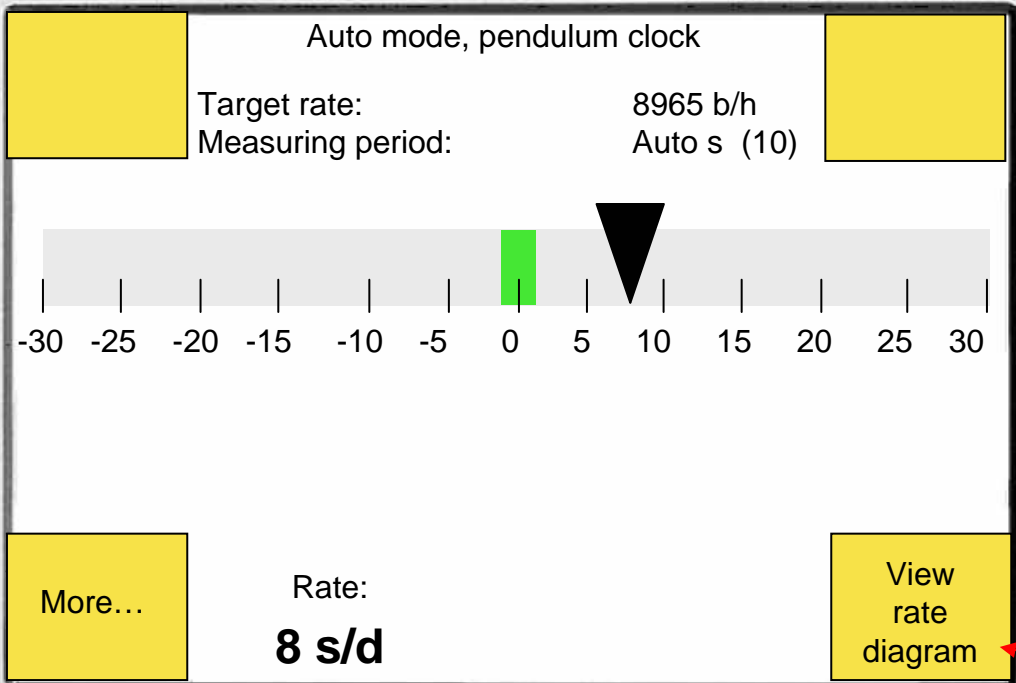
Press button to measure beat rate, page 25.

# Testing pendulum clocks with „OPTO6“ ( optical )

Graphic for rate error with „Opto06“ :



*Press button for next display*

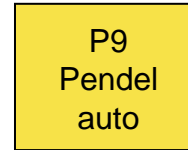


*Press button to return to display above*



# Testing pendulum clocks with „CM06“ ( acoustic )

Press this button to start >>



Contact clamp microphone “CM 06 “ with the clockwork of the pendulum clock, or at a place, where the acoustic signals are sufficiently receivable. The red signal on the Compact 900 indicates the noise of the frequency of the pendulum clock.



**CM06**

After approx. 8 sec. appears the next display.

If the beat rate is known, it can be programmed in the program (P9), page 26.

*Press button to accept or to change the beat rate.*

**Menu pendulum clock**  
P9 Pendel auto

Target rate: \*\*\*\*\*  
actual beat rate: 8965 A/h

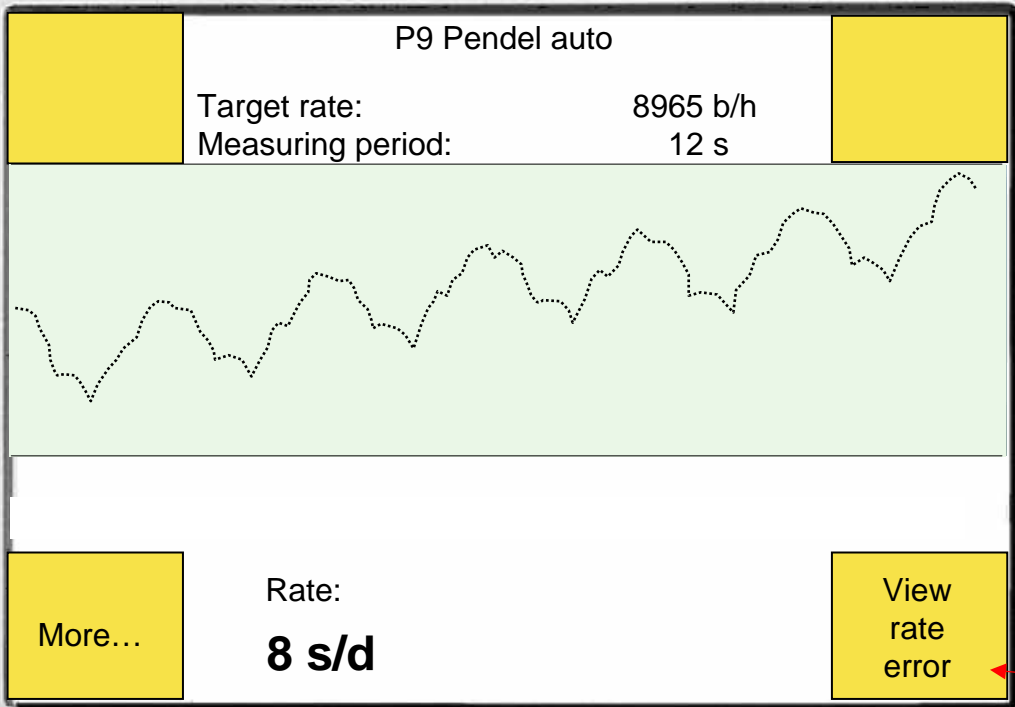
beat rate ↑  
beat rate ↓  
start measure  
start diagram  
Menu...

*Press button for display rate error*

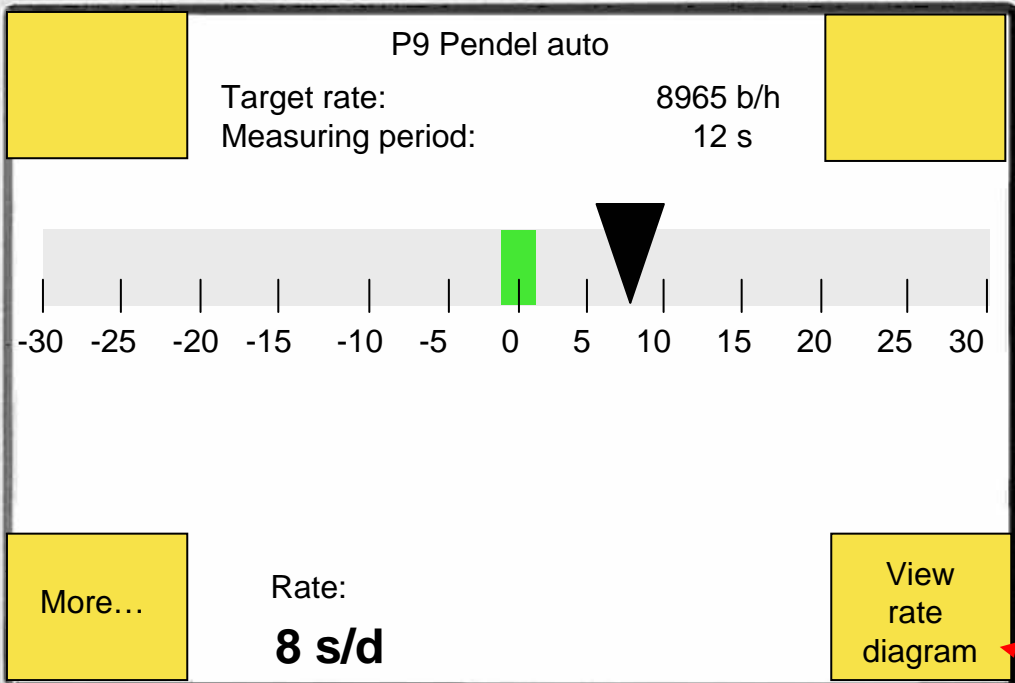
*Press button to calculate beat rate, page 25*

# Testing pendulum clock with „CM 06“ (acustically)

Graphic indication of rate error with the microphone „Opto06“ :



*Press button for next display*



*Press button to return to display above*

# Find unknown beat rate for pendulum clocks

**Menu pendulum clock**  
Auto mode, pendulum clock



Target rate: \*\*\*\*\*  
actual beat rate: 8965 b/h  
average beat rate: 8965 b/h  
measure time: 02:10:00

Menu

stop measure

To find out the correct beat rate of the pendulum clock:

1. Set pendulum clock e.g. on 6.00 o'clock. Press button « start measure »
2. Let the clock run for a certain time, for example 2 hours.
3. After a time xx , press button « stop measure ».

**Menu pendulum clock**  
Auto mode, pendulum clock



Target rate: \*\*\*\*\*  
actual beat rate: 8965 b/h  
average beat rate: 8965 b/h  
measure time: 02:10:00  
time of pendulum: 02:10:00

Menu

Value ↑

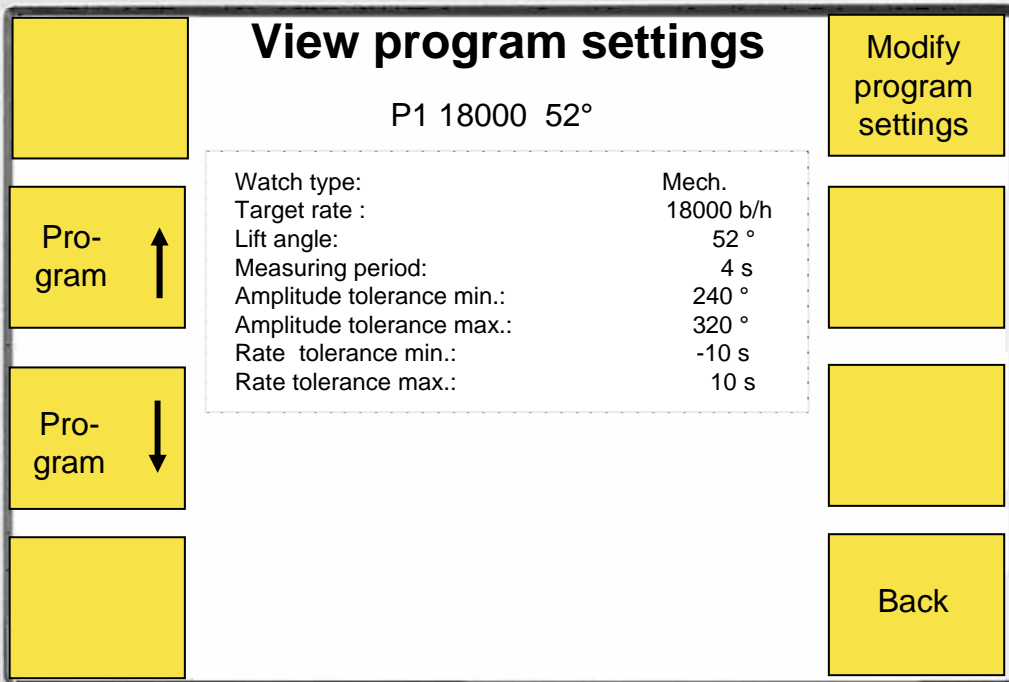
Value ↓

set target rate

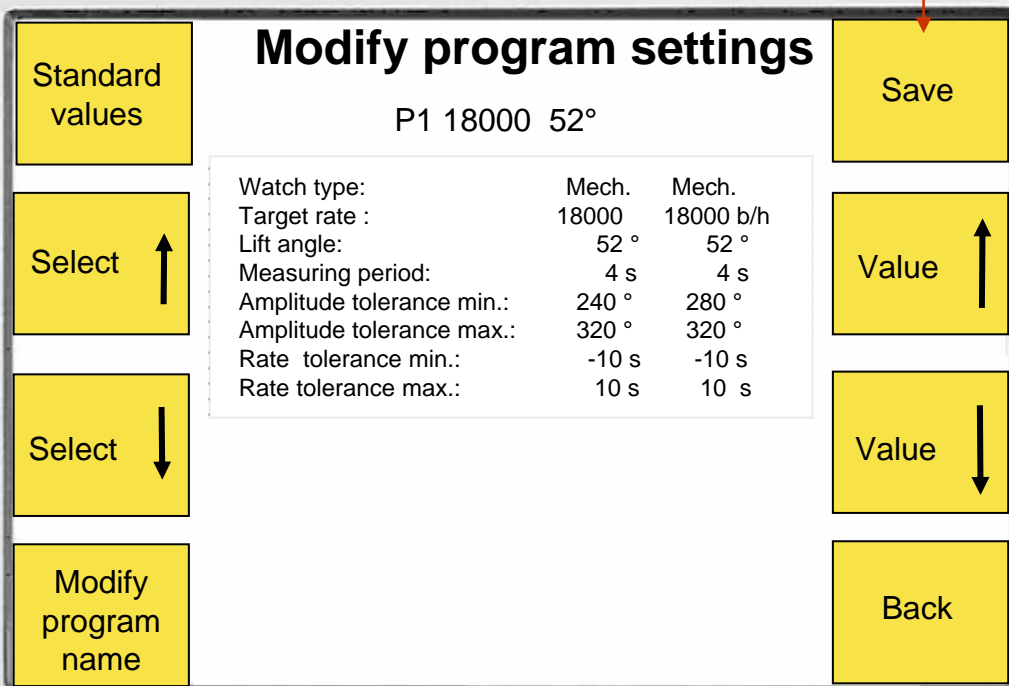
4. Press button „value“ in order to give in the passed time of the pendulum ( for example) 2 hours, 2 minutes, 0 seconds
5. Press button „set target rate “
6. Press button „ start diagram“. Now it is possible to adjust the pendulum.

# Programming of a button ( P1 bis P9 )

In the main menu press button “Settings” then button “Modify program settings”, then button “program” for selecting (P1 - P9). Now press button “Modify program settings”.



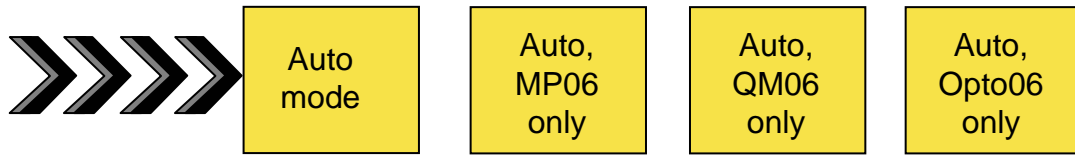
Press button “Save” to store the parameters.



1. Press (Select up /down arrow) to select a line.
2. Press (Value up /down arrow) to change the value.
3. Press ( Modify program name ) to change the name of this program
4. Press ( Standard values ) for factory setting

# Changing automatic adjustments

The parameters of Auto mode are always taken over if one of these buttons are pressed (if you work in auto modus).



To indicate the parameters, press the following buttons in the main menu: button “Settings” then button “Modify auto settings” .

For changing parameters:

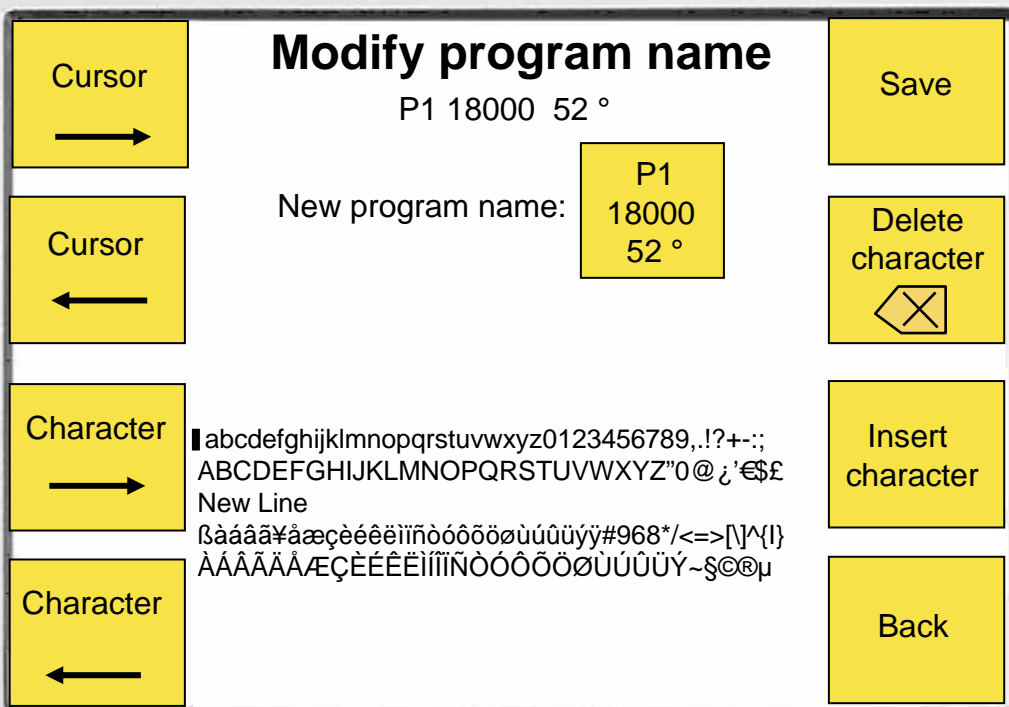
1. *Button ( Select ) to select a line.*
2. *Button ( Value ) to change the value.*
3. *Button (Modify program name) to change name of program*
4. *Button ( Standard values) for factory settings .*

*Press button “Save” to store the values.*

	Current	New
Mechanical watch		
Target rate (coarse):	Auto	Auto b/h
Lift angle:	52	52 °
Measuring period:	4	4 s
Amplitude tolerance min.:	240	240 °
Amplitude tolerance max.:	320	320 °
Quartz watch		
Signal source:	Auto	Auto
Measuring period:	Auto	Auto s
Vertical Zoom:	1	1 x
Battery voltage:	1.55	1.55 V
Pendulum clock		
Target rate:	Auto	Auto b/h
Measuring period:	Auto	Auto s

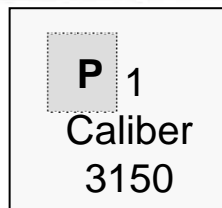
*Press button to return into main menu*

# Changing a program name.



How to proceed:

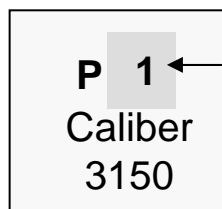
Use the « **Cursor** » to move to the desired position. Right or left.



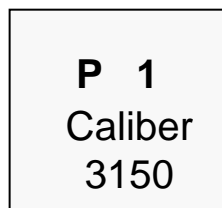
Use « **Character** »  
To move to the desired character.  
Right or left.

abcdefghijklmnopqrstuvwxyz0123456789,!?+  
:;ABCDEFGHIJKLMNPOQRSTUVWXYZ"()@\_!€\$£¥  
New line  
ßàáâãäåæçèéêëìíîñóôõöøùúûüýÿ#%&\*/<=>[\]^{|}  
ÀÁÂÃÄÅÆÇÈÉÊËÌÍÎÏÑÒÓÔÕÖØÙÚÛÜÝ~\$©®µ

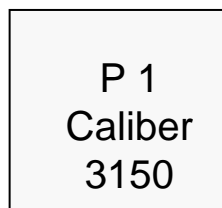
Use « **Delete character** » to delete the character to the left of the cursor. In this case, it is the **9**.



Use « **Insert character** » to free 1 place to the left of the cursor for a character. In this case, it is to the left of **n**.



Use « **Save** » to save the program name.



## Editing printout header

The printout header appears after switch on the Compact 900 and he is printed together with the results.

The printing of the results has following appearance

<pre> ***** <b>Compact 900</b> <b>mechanical watch</b> ***** ----- Name ----- ----- Company ----- ----- Adress ----- ----- Telephone ----- ----- fax ----- ----- a.s.on-----  23.09.2007  14.45 Nominal rate:      28800 A/h Rate error:        3 s/d Amplitude:         285 ° Out of beat:       0.3 ms                 </pre>	<p>} Device type, watch type (is always printed)</p> <p>} Printout header: (if programmed) max. 6 lines max. 42 characters / lines</p> <p>} Result printout</p>
---	---

### To program or modify the printout header :

Same procedure as modifying the name of the program, see page 28

Cursor  
→

Cursor  
←

Character  
→

Character  
←

### Edit printout header

```

----- Name -----
----- Firma -----
----- Adresse -----
----- Telefon -----
----- fax -----
----- u.s.W -----

abcdefghijklmnopqrstuvwxyz0123456789,!?+-.:;
ABCDEFGHIJKLMNOPQRSTUVWXYZ"0@'€$£
New Line
ßàáâãäåæçèéêëìíîñóôõöøùúûýÿ#968*/<=>[ ]^_{|}
ÀÁÂÃÄÅÆÇÈÉÊËÌÍÎÏÑÒÓÔÕÖØÙÚÛÜÝ~$%&'()*
                
```

Save

Delete character  
⏏

Insert character

Back



# Microphones ( adapters ) for Compact 900

## Microphone MP86

Suitable for testing Mechanical watches.  
Head is fixable in all positions.



## Microphone QM06

Is a combined microphone for testing mechanical and quartz watches.



## Clamp microphone „CM06“

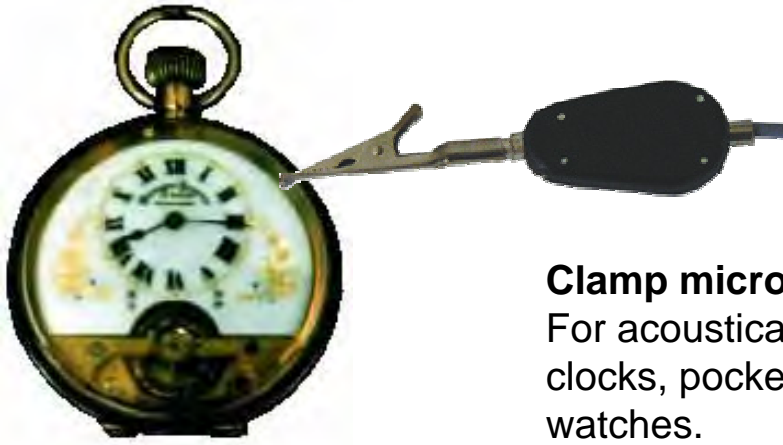
For acoustical testing of pendulum clocks, pocket watches and other big watches.



## Light barrier „ OPTO 06“

For testing of pendulum clocks.  
(optical measuring of the pendulousness)

## Microphones ( adapters ) for Compact 900



### Clamp microphone „CM06“

For acoustical testing of pendulum clocks, pocket watches and other big watches.



### Watch adapter „EM06“

( Electrical Measuring )

Watch adapter with mirror and 2 contact bows for measuring of electrical consumption and the rate error of quartz watches.

### Test cable

For manual measuring of consumption of electricity and rate error of quartz watches as well as testing of the Stepper Motor ohms and the battery voltage.



## Standard beat rate / Cleaning / CE - Conformity

Following beat rates are programmed as standard:

**3600**,,3960, 4320, 4680, 4800, 5040, 5400, 5760, 6120, 6480, 6840, 7200,  
**7560**, 7920, 8100, 8280, 8640, 9000, 9360, 9440, 9720, 9760, 10080,  
10440, **10800**, 11160, 11520, 11880, 12240, 12600, 12960, 13320, 13680,  
14040, **14400**, 14760, 15120, 15480, 15840, 16200, 16560, 16920, 17280,  
17640, **18000**, 18360, 18720, 19080, 19440, **19800**, 20160, 20520, 20880,  
21240, **21600**, 21960, 22320, 22680, 23040, 23400, 23760, 24120, 24480,  
24840, **25200**, 25560, 25920, 26280, 26640, 27000, 27360, 27720, 28080,  
28440, **28800**, 29160, 29520, 29880, 30240, 30600, 30960, 31320, 31680,  
32040, 32400, 32760, 33120, 33480, 33840, 34200, 34560, 34920, 35280,  
35640, **36000**, + **Auto**.

### Package contents :

- Compact 900 ( basic unit )
- Power transformer ( 100 – 240 ~ ) [ 12 V= ] .
- 1 Set of test cables
- The ordered microphones
- Manual instruction

### Cleaning:

Don't use aggressive cleaning supplies.

Wipe the keyboard and the display occasionally with a wet cloth.

### EG Conformity

- The Compact 900 corresponds with the following EG directives and rules.

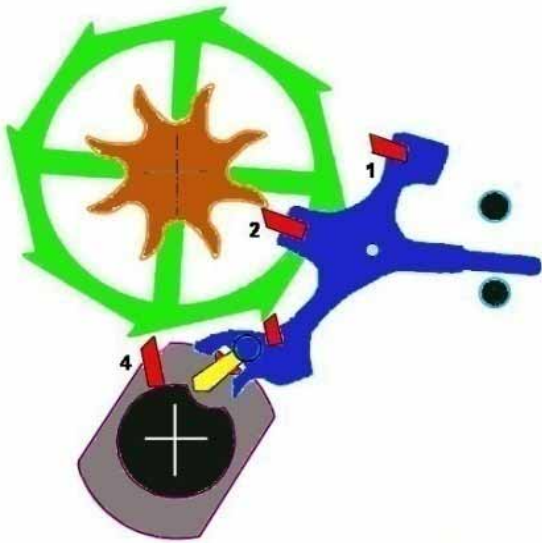
89/392/EWG	machinery
EN 292 – 1991	
89/336/EWG	EMV
EN 50082-2	disturbing security Industry
EN 55011-1991	disturbing emission
23/73/EWG	Low voltage directives
EN 61010 – 1993	Electrical security

# Co-Axial watch

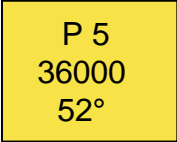
For the correct measurement and display of amplitude for Co-Axial escapement, select the key



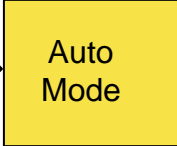
A special measuring procedure for Co-Axial escapement will be activated. (Different from the procedure for standard escapement.)



Info:  
Select key " Co-Axial" for Co-Axial escapement ( see menu on page 11)



For automatic operation: press this key >>>>>



## Menu for Co-Axial watch

Menu after having selected key „Co-Axial“

Co-Axial  
28800  
30°

Co-Axial  
25200  
38°

Menu

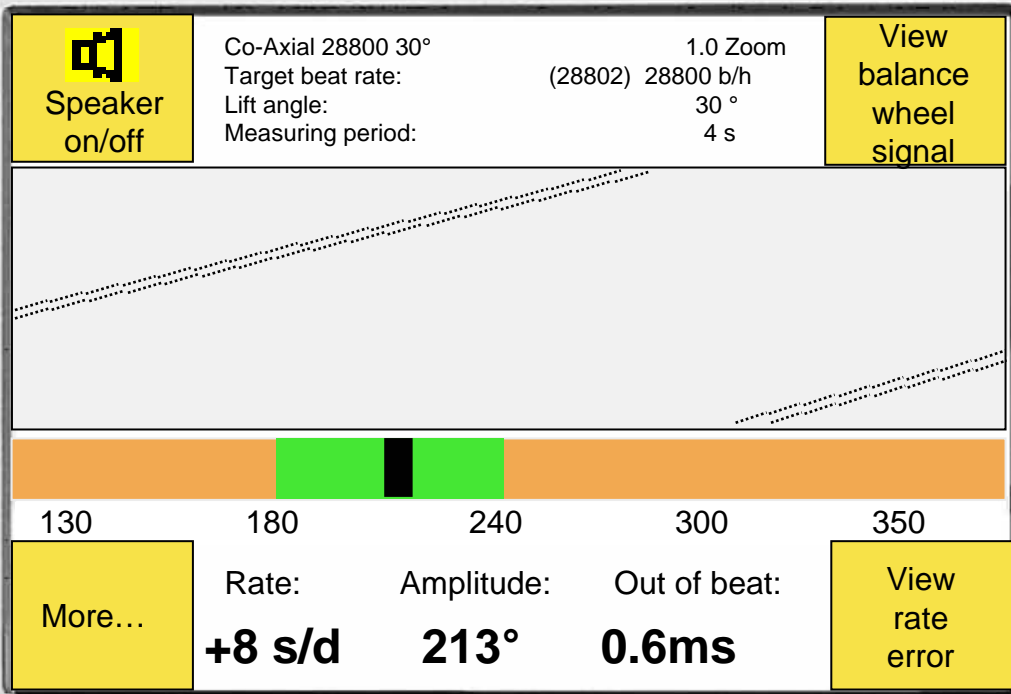
### Menu

Info:  
In this menu you may select:  
Co-Axial Auto , or  
Co-Axial 28800 30°,or  
Co-Axial 25200 38°,or  
Menu to return

31.08.2007

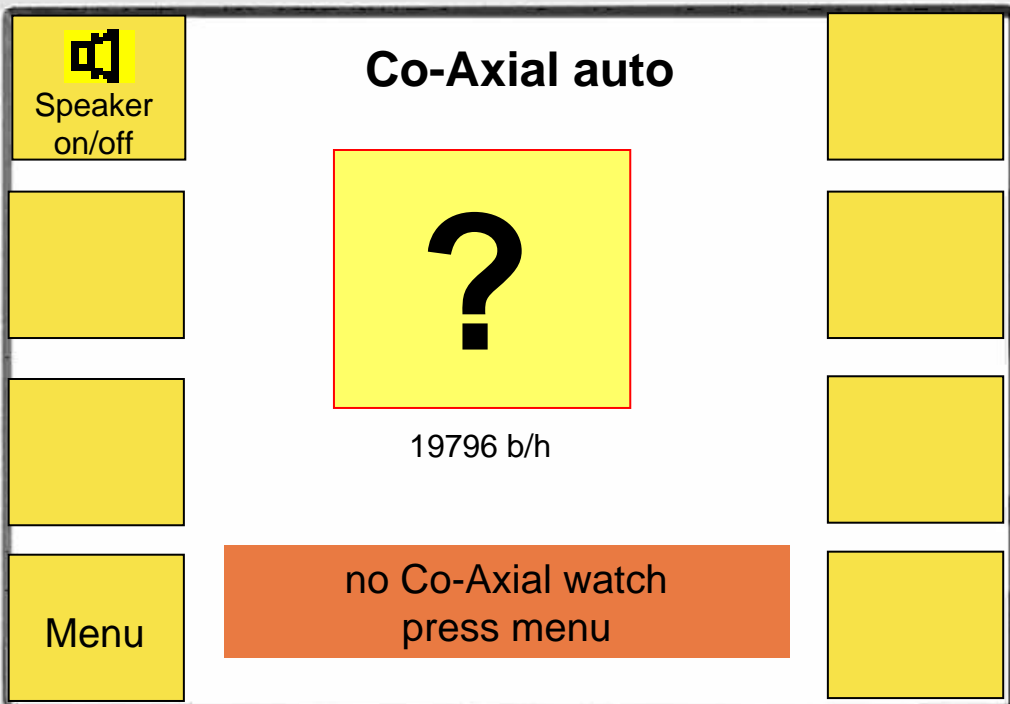
Co-Axial Auto

# Display if Co-Axial watch is in test



If the key  
 Co-Axial Auto  
 is elected,

The Compact 900 automatically tests, if the watch on the microphone has the characteristics of a real "Co-Axial" watch. If not, the following will be displayed.



Now press " Menu " to return to previous menu.