ENGLISH

Operating instructions

Watch testing unit

profi-check rate

• english •

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Contents

1 Overview

Introduction

We congratulate you for choosing a product from Elma GmbH & Co KG.

profi-check rate is a quality product with high accuracy. These operating instructions contain much information that will help you to set up and use profi-check rate correctly.

Read the chapters carefully.

Spend also some time looking at the table of contents. You will see that all important instructions and tasks are easy to find and to carry out.

1.1 Application

profi-check rate allows the watchmaker to test rapidly and thoroughly all important functions of an analog quartz watch.

The test function “motor pulse display” records the electromagnetic impulses of the watch to test its operation and measure the accuracy of the rate.

The battery test analyzes the state of the battery.

The fast rotation of the gear-train dissolves gummy oil is and dirt in the bearings. This often allows restarting a blocked watch. It is sometimes the only possible way to repair watches that cannot be disassembled.

1.2 Extract from the EU Declaration of Conformity

The instrument complies with following directives of the EU guidelines:

89/336/EWG	EMV
Emissions	
EN 55022	Conduction
EN 55022	Radiation
EN 60555-2	Harmonics
EN 60555-3	Flicker

Immunity	
IEC 1000-4-2	ESD
IEC 1000-4-3	HF
IEC 1000-4-4	Burst
IEC 1000-4-5	Surge
IEC 1000-4-6	Cond. Immunity
IEC 1000-4-8	50Hz Magn. Puls
IEC 1000-4-11	Dips

2 Before using the instrument for the first time

NOTE

Please carefully read all the information given in this User's Guide. It provides you with important instructions about the use, safety and maintenance of your instrument.

Keep this manual in a safe place and if the occasion should arise, pass it on to subsequent users.

The instrument may be used only for the designed purpose in accordance with these Operating Instructions.

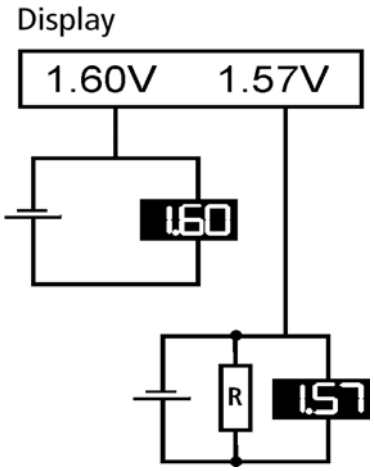
The manufacturer accepts absolutely no responsibility for possible damage to the test instrument, to watches or persons which results from improper operation!

3 Operating Principle

3.1 Battery Check

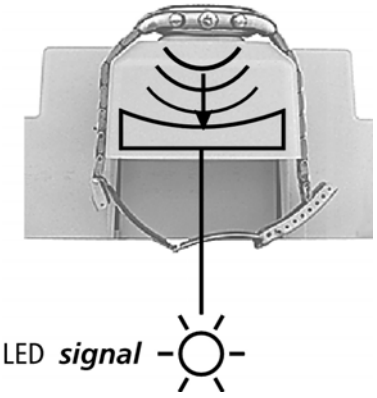
Test of Low Drain silver oxide batteries. The battery voltage is displayed on the left with a basic load of 2 MΩ (corresponds to the IC consumption) and on the right with a load of 2 kΩ (corresponds to the stepping-motor consumption).

Please keep in mind that only Low Drain batteries can be tested.



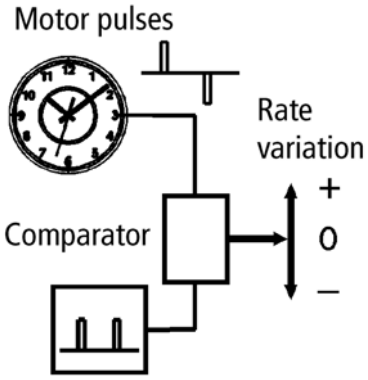
3.2 Motor Pulse Measurement

Sensor for the stray magnetic field from the stepping motor. Motor pulses displayed by an LED that flashes accordingly.



3.3 Rate Accuracy Measurement

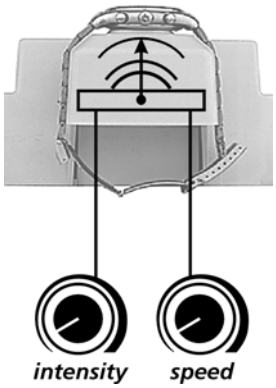
The duration of the period of the motor pulses is evaluated using the pre-aged temperature controlled high frequency quartz time base of the instrument. Automatic adaptation to the pulse period of the watch. Automatic recognition of watches with inhibition adjustment. Optional fixed measuring time of 60 s.



profi-check rate
Pulses

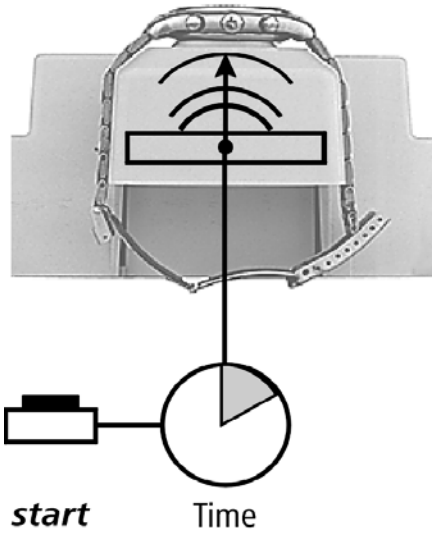
3.4 Magnetic Field Generator

profi-check rate generates a rotating magnetic field with adjustable intensity and rotation speed in the area of the watch support. (Both settings shown on the display.) When an analog quartz watch penetrates into the acting range of this rotating field, the rotor of the stepping motor also starts rotating. This allows rotating the gear-train in the watch at high speed without contact.

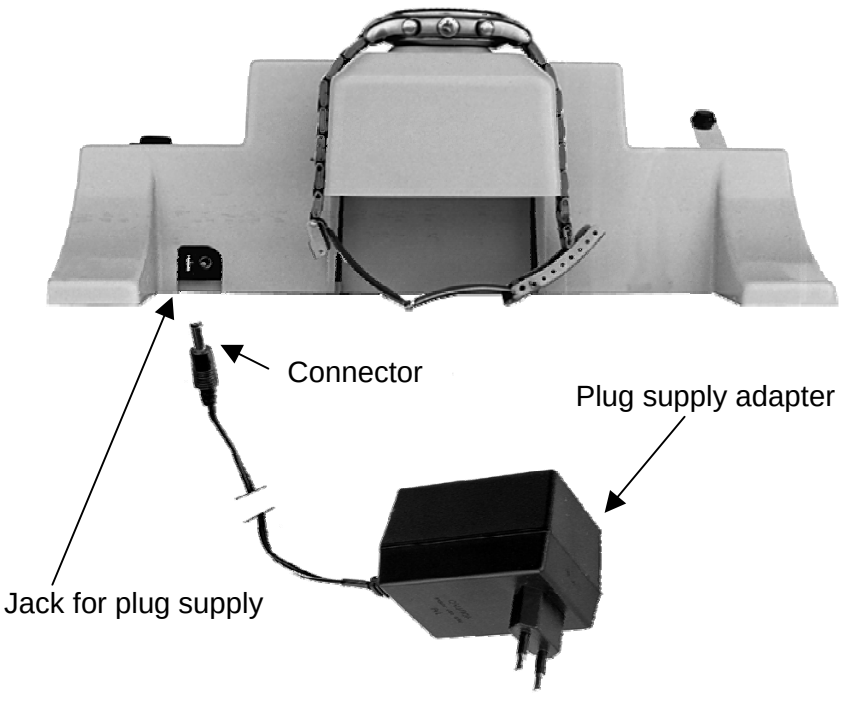


3.5 Demagnetization

The magnetic field generator described above can automatically demagnetize mechanical movements, tools, screws, etc. with a rotating magnetic field with the maximum speed and the decreasing intensity. The duration of the demagnetization can be adjusted from 3 to 20 s.



4 Operating Elements and mains supply



5 Commissioning

NOTE

To commission profi-check rate, strictly follow the commissioning instructions below. You are then protected against possible damages due to a wrong procedure.

Avoid direct proximity to very warm surfaces, e.g. heating radiator or similar, and direct exposure to the sun.

5.1 Material Control

Check the delivery for:

- Completeness. Compare with bill of delivery and/or your order.
- Damage.

Immediately report missing material and shipping damages to your superior. (The situation must be clarified and settled with the manufacturer or supplier, the shipping company and, if necessary, the transportation insurance.)

Extent of delivery of profi-check rate

- Packaging material
- Plug supply adapter for 230 V~ or 120 V~.
- Operating instructions.
- Accessories: According to list of delivery.

5.2 Mains Connection

Power is supplied to profi-check rate through a plug supply adapter with an output voltage of 9V~ and a current of 1.2 A. Plug supply adapters are available for a mains voltage of 230V~ (range 210 V~ ... 240 V~) or for a mains voltage of 120 V~ (range 110V~ ... 130V~).

NOTE

Check before connecting that the voltage of the power supplies corresponds to your mains voltage. Always use only the original Elma power supply. Connect the power supply to the rear panel socket of

6 Main Repair Operations

We show here how to examine the most important functions of an analog quartz watch, the conclusions that can be reached and what to do to eliminate malfunctions.

Optical Hand Control

Before you begin using profi-check rate, examine the general condition of the watch and whether the hands turn freely.

Test of Motor Pulses

This test shows if the watch generates driving pulses.

Test of Rate Accuracy

This test shows the exact gain or loss of the movement.

Test of Battery State

This test provides information on the state of the battery and whether it must be replaced.

Moving the Movement with an External Rotating Magnetic Field

This function sets a “stuck” analog quartz watch running again and tests the truth in the round of the hands.

Demagnetization

This function demagnetizes small parts and tools made of steel as well as mechanical movements.

NOTE

Caution!:
do not try to demagnetize analog quartz watches.

7 Switching profi-check rate on / off

profi-check rate is equipped with a toggle switch for switching it on and off. The power consumption is negligible.
It is < 1 W when the pulse generator is switched off.

Switching on: Toggle the switch to “I”. The display briefly shows “ profi-check rate” vD”, then “WARMING UP”. The time in seconds remaining before the instrument is switched on appears in a counter on the right of the display. The instrument is operative after 90 sec.

Display after switching on (without setup of the of the measuring units) :

profi-check rate vD

ΘWARMING UPΘ 90

Switching off Toggle the switch to “0”. We recommend that you disconnect the power supply from the mains during longer idle periods.

8 Test of Motor Pulses

This test shows if the analog quartz watch generates driving pulses.

Procedure

- Switch on profi-check rate.
- The pulse generator must be switched off:
  (Button “on/off”)
- Put the watch or movement (with its battery) on the support of the instrument.
- Check if the yellow “signal” LED briefly lights up during each motor pulse period.

Results Possible origins of fault if the “signal” LED does not light up:

- The battery is defective and must be replaced.
- The electronic module or the motor coil is defective:
- The watch must be repaired.

Possible origins of fault If the “signal” LED lights up during each motor pulse although the watch does not run, i.e. the hands aren’t moving:

- Battery voltage too low: replace battery.

- The motor or the gear-train is blocked: try unblocking the movement according to “11. How to activate the movement with an external rotating magnetic field”.
- The hands are caught: free by unbending them.

9 Test of Rate Accuracy

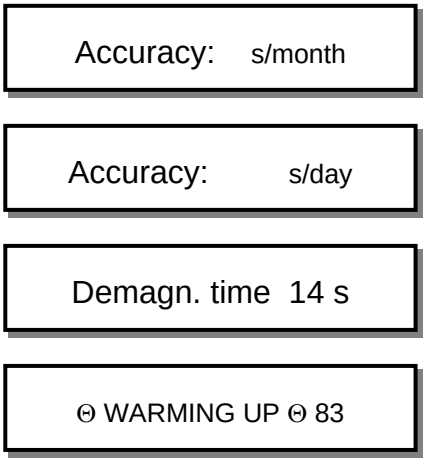
This check indicates the rate accuracy of the watch or movement. Watches without stepping motor (digital watches) cannot be tested.

Setting up the Measuring Unit

The accuracy of the rate can be displayed in [s/day] (seconds per day) or [s/month] (seconds per month):

- Switch off profi-check rate with toggle switch.
- Keeping “meas. time” button pressed, switch on profi-check rate with toggle switch.
- The display shows “accuracy: s/day” or “accuracy: s/month”. The button “on/off” toggles between both measurement units.
- Press “meas. time” button 2x.
- The display shows “WARMING UP”. The instrument is operative after 90 sec. The time in seconds remaining before the instrument is switched on appears in a counter on the right of the display.

Display after switching on (without setup of the of the measuring units) :



Procedure

- Switch on profi-check rate if necessary.
- The pulse generator must be switched off (“on/off” button)
- Place the watch or movement (hands pointing upward) with inserted battery on the support of the instrument.
- Select short-term measurement with “meas. time” (press button and keep it pressed):

- ”Aut Start” = Automatic measuring time:

The display occurs at the end of a motor pulse period, after 2 sec. min. If the variation in rate exceeds 1 s/d, he instrument assumes that it is dealing with a watch with inhibition and automatically switches to a measuring time of 60 sec.

Select long-term measurement (60 sec.) with “meas. time”: “60s Start”: (The measuring time is fixed to 60 sec.)

Display when setup for inhibition watches

Display when setup for other watches

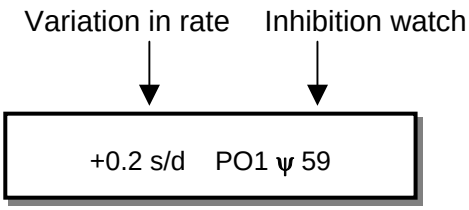
Results The following results are displayed at the end of the measuring time:

- Variation in rate (+0.2 s/d)
- Duration of the motor pulse period (PO1 = 1 s).

The **I** behind PO1 means that a watch with adjustment by inhibition is being tested.

- The remaining measuring time (59 s).

As long as the watch remains on the support, a new cycle is automatically started at the end of a measuring cycle. Pressing the “meas. time” button allows interrupting a running measurement and restarting at any time.

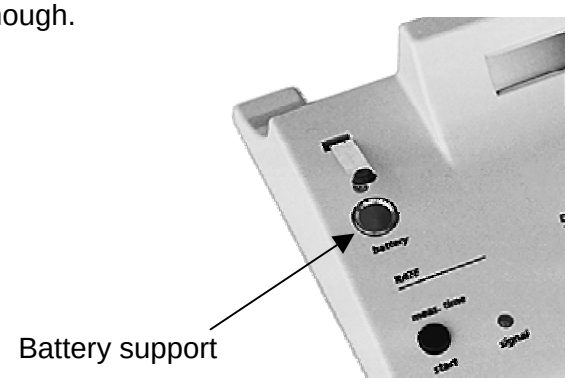


NOTE

Watches with inhibition must be measured automatically or with a fixed measuring time of 60 s.

10 Test of Battery State

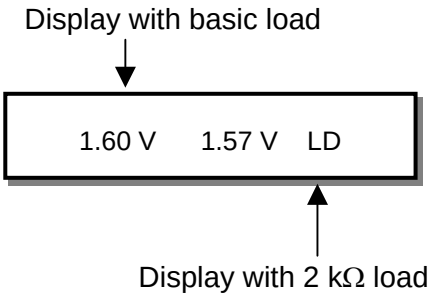
The voltage of watch batteries remains constant almost to the end of their service life and falls off first when the battery is completely exhausted.If salt crystals are present on the seal between case and cover, replace the battery, even if its voltage is still high enough.



Procedure

- Switch on profi-check rate.
- Put the battery to be examined with it + side on the contact surface (downward) of the “battery” holder.
- Press the contact spring on the battery. This puts a **2 kΩ** resistor load on the battery during 10 ms, which approximately corresponds to the peak current during a motor pulse.
- Observe the change in voltage.

Results The battery voltage is displayed on the top left of the LCD together with the basic load and right to it the voltage with load (LD = Low Drain).



Remark If the voltage value displayed on the right falls off during the measuring time, it is necessary to replace the battery. If the voltage remains constant, the battery can be used further.

10.1 Normal battery voltage

Silver oxide batteries, load 2 kΩ (low drain).

Battery OK : 1.50 ... 1.59 V Battery unusable : below 1.50 V

11 Activating the Movement with an External Rotating Magnetic Field

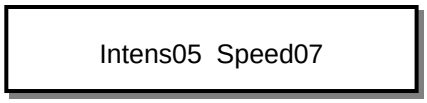
The presence of the pulse generator allows to:

- “resuscitate” a movement with stuck gear-train
- control the truth in the round of the gear-train
- improve the lubrication
- control the fitting of the hands.

Procedure

- Switch on profi-check rate.
- Put the watch or the movement on the support.
- Switch on the rotating magnetic field with the “on/off” button.
- Using both the “intensity” and “speed” rotary knobs, you can continuously adjust the strength of the magnetic field and the rotation speed from 01 to 15 to cause the movement to rotate smoothly.

Display when working with
the pulse generator



Result If the strength of the magnetic field and the speed are too small or too large:

- the movement does not rotate (the hands vibrate) or
- the movement rotates counterclockwise.

You might have to shift somewhat the watch around the support to find the best position. You can bring each of the several stepping motors of a chronograph movements into motion by shifting the position on the support.

You can ascertain the fitting of the hands by observing their truth in the round.

Remark After a movement has been unblocked, let it run with the highest rotation speed for 10 minutes at least.

12 Demagnetizing Small Tools and Mechanical Movements

Demagnetization Time The demagnetization time can be set from 3 to 20 seconds. We recommend a time of approx. 12 seconds for demagnetizing movements.

Caution **Only mechanical movements may be demagnetized.**

12.1 Setting the Demagnetization Time

- Switch off profi-check rate with the toggle switch.
- Press and hold the “meas. time” button and switch on profi-check rate with the toggle switch, hold the “meas. time” button for 3 sec.
- “accuracy: s/day” or “accuracy: s/month” appears on the display.
- Press “meas. time” button 1x.
- “demagn. time (a number between 3 and 20)“ appears on the display.

Display of the
demagnetization time

demagn.time 12 s

- Set the demagnetization time with the “on/off” button.
- Press “meas. time” button 1x.
- “WARMING UP” appears on the display.

The instrument is ready after 90 sec. A counter on the right-hand side of the display shows the time in seconds remaining until the instrument switches on.

Demagnetization of Mechanical Movement:

- Switch on profi-check rate.
- Place the movement to be demagnetized on the support.
- Press “start” button.
- Press the “start” button and wait for the preset time to elapse.

Demagnetization of Watchmaker’s Tools

- Put or hold the tool on the support of the pulse generator. To prevent small parts to fly away, put them on the support in a plastic or cardboard container.
- Press the “start” button and wait for the preset time to elapse.

13 Maintenance

General

The instrument does not requires any special maintenance:

Only use a soft cloth and mild detergents suitable for plastics to remove any dirt from the instrument. Never use aggressive detergents or solvents.

Disconnect the power supply from the mains during longer idle periods.

Calibration

To keep the measurements accurate, we recommend that you submit the instrument to an annual calibration and functional check.

Kindly contact the customer service at the headquarters of our company or at your agency.

14 Technical Specifications and Environmental Conditions

Technical Specifications

- Watch drive: Rotating magnetic field.
  Rotation speed:
  Adjustable in 15 steps from 5 – 200 rps
  (rotations per second).
  Intensity: Adjustable in 15 steps from 10 – 50 mT.
- Motor pulse display: Sensor detects the magnetic field from the stepping motor. Indication by LED which blinks in synchronism with the motor pulses.
- Rate measurement: Sensor detects the magnetic field from the stepping motor.

  Measuring times: Automatic adaptation of the pulse period of the watch. Automatic recognition of watches with inhibition adjustment. Optional fixed measuring time of 60 s.
  Display: selectable display mode in s/d or s/month.
  Resolution: 0.1 s/d or 1 s/month.
  Measuring range: ± 33.3 s/d or ± 999 s/month.
- Battery test: Measuring range 0 – 5 V.
  Automatic measuring cycle with with a load of 2 MΩ and 2 kΩ.
- Demagnetization: Alternating magnetic field with descending field strenth.
  Duration adjustable from 3 – 20 s.
- Time base: Pre-aged temperature controlled high frequency quartz time base.
  Stability: ± 0.03 s/d between 15º to 30ºC .
- Display: LCD-display; one line with 16 characters.
- Casing: Plastic casing.
  Color: Beige
  Dimensions: 207 x 70 x 185 (W x H x D).
  Weight: 0.8 kg.
- Mains connection: Plug supply adapter available for 230 V~ or 115 V~, power 11 VA.

Environmental Conditions

Transport and storing: -10 ... 60°C.

Operating: 15 ... 30°C.

Do not place the equipment beside a heater or similar, and also prevent from direct sunlight.

15 Accessories

Positioning unit for movements. Available sizes:
11 ½, 10 ½, 8 ¾,8 ¼,7 ¾, 6 ¾ x 8 and 5 ½ x 6

16 Glossary

Analog quartz watches profi-check rate is especially designed for controlling and repairing this type of watch.

Digital watches These watches work with batteries but do not contain any mechanically moving wheels and pointers. The display is usually based on liquid crystals. profi-check rate is not suitable for controlling and repairing such watches.

Mechanical watches These movements are driven by the elasticity of a spring. They do not require a battery. profi-check rate is **exclusively** able to demagnetize mechanical watches.

Battery types profi-check rate only allows testing Low Drain batteries with the process described above. This type of battery is used in analog quartz watches.

Mains connection The power supply provides profi-check rate with current from the outlet. There are plug supply adapter for a mains voltage of 230 V~ and 120 V~.

Rotating magnetic field profi-check rate produces a rotating magnetic field with adjustable intensity and rotation speed in the area of the watch support. The rotor of the stepping motor rotates when it is inside the acting range of this rotating field. This allows rotating the gear-train without accessing the watch.

Information: It is not a pulse generator!

17 Putting out of action and waste disposal

The unit can be taken to plastics and electronics recycling stations or returned to the manufacturer.

18 Manufacturer’s contact address

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