INSTRUCTIONS
VIBROGRAF VS 390

RENO S. A. **LA CHAUX-DE-FONDS** **SWITZERLAND**

Tel. (039) 2 42 67 Telegraphic address: RENO LACHAUXDEFONDS

CHECKING ON DELIVERY

Before being packed and forwarded, each machine is carefully examined and tested under normal working conditions. It should be unpacked with great care, and the packing-material should be checked. Keep the cardboard box: it will be useful if the machine has to be moved.

If any damage is discovered on delivery, or if the machine is not in perfect order, please advise the forwarding agent and the sender without delay.

Normal accessories:

10 rolls of paper

1 bottle of oil, with oiler

1 spindle for roll of paper, in position inside the machine

1 fuse

1 connecting-flex

1 dust-cover

1 book of instructions

IMPORTANT

Before starting up the machine, read the following instructions carefully.

You are also advised to read our booklet

" The Vibrograf and New Methods of Timing ».

The Vibrograf is manufactured by the Universal Escapement Ltd, at La Chaux-de-Fonds (Switzerland).

CONTENTS

TECHNICAL CHARACTERISTICS

Recording-paper:

width 30 mm., maximum diameter of roll 90 mm.
thickness 80 g/m² diameter of center-hole 10 mm.

It is preferable to use special Vibrograf paper, though other semi-mat papers of similar quality may be used.

Inker-ribbon:

width 25 mm., length 4 to 5 m. according to thickness.

The proper working of the automatic reverser depends on the diameter of the fully-wound spool of ribbon. The thickness of the ribbon is therefore a factor of great importance. The thinner it is, the greater must be its length. The diameter of the fully-wound spool is 24 mm.

Rate of paper-feed per minute:

The rate of feed varies according to the frequency selected.

Frequency-selector switch at	18,000:	rate of feed 62.7 mm. per minute.
	21,600	60.2
	19,800	62.1
	21,000	65.9
	21,306	54.4

On special order only, the machine can be supplied adjusted for a count of 21,306 instead of 21,000.

Reading:

The reading of the record is independent of the rate of paper-feed. The following formula holds good in all cases: the inclination of the graph, in per cent, equals the gain or loss of the movement under observation, in seconds per 24 hours.

Sensitivity of amplifier:

This varies according to the tubes used and their state of wear. At maximum amplification, the peak-value is about 30 μV, measured at a frequency of 10,000 p.s. The input-impedance is 0.5 megohm. Though it is designed for a crystal microphone, the input-circuit may also be used with microphones of other types. A condenser must be placed in the circuit, however, if there is a direct-current feed.

Mains-supply:

The machine will work on any of the following voltages: 110 - 125 - 150 - 200 - 225 - 250 volts, 50 to 60 cycles. On special order, a model can be supplied for 25 to 60 cycles. The power-consumption is about 70 watts. The machine will not work on direct current.

Limits of room-temperature and humidity:

The permanent room-temperature should not exceed 32° C. The maximum relative humidity is 90 per cent. In climates with a higher degree of humidity, the machine should be kept, when not actually running, in a place that is dehydrated artificially (air-conditioned, for example).

SPARE MATERIALS

The following materials, which are required for the maintenance of the machine or for special purposes, are supplied by RENO S. A. or its representatives. All other parts can be supplied on request (please quote the serial number of the machine; see page 6).

6291	roll of paper	4017	microphone-flex
6243	inker-ribbon		
4013	reading-lamp	6SJ7Gt	vacuum-tube
6392	oil	6SL7Gt	do
4014	fuse	6SN7Gt	do
6430	rubber foot	6F6 (6V6)	do
6509	spindle for paper roll	2050	thyratron
3103	microphone-plug	5Y3Gt	rectifier
3104	microphone-socket, with nuts.		

INSTALLATION

1) Verify and set out all the elements of the machine.

2) Adjust the machine according to the voltage of the mains-supply.

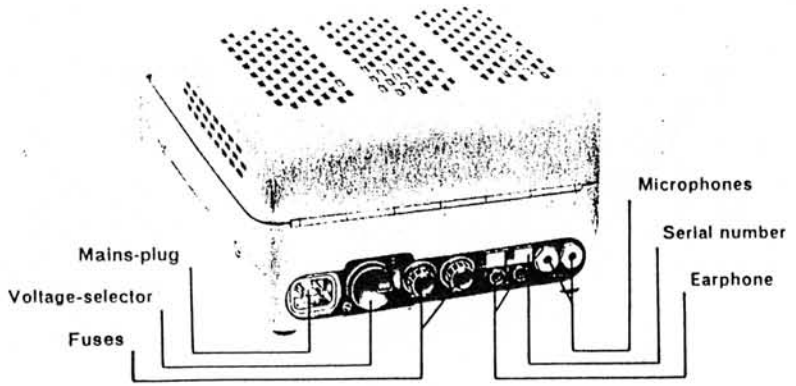
3) Insert a roll of paper (see page 8).

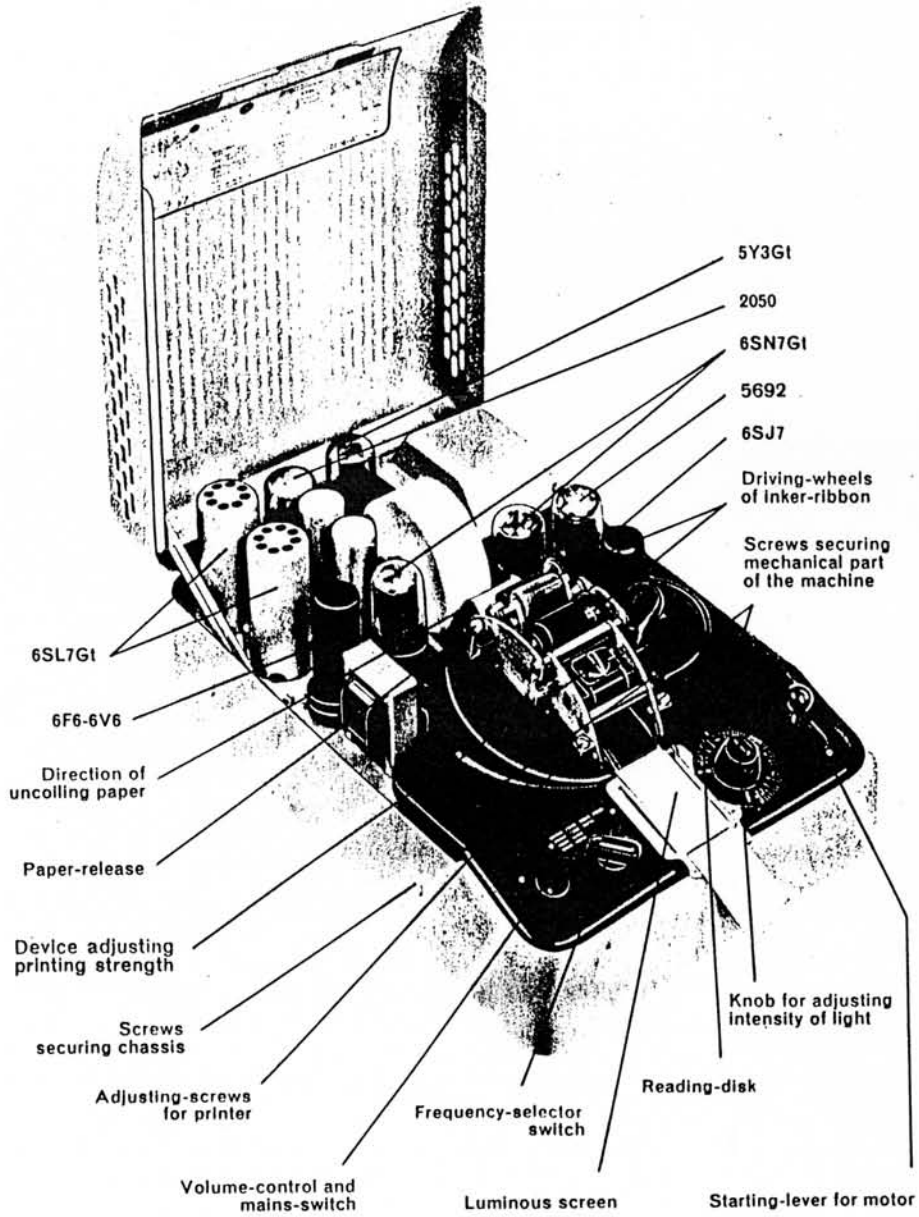
4) Connect the microphone. Two sockets are provided, and it is therefore possible to use two types of microphone (for example, the universal type and the type with a clip to hold the movement) without unplugging them. It is obvious that the two microphones cannot work simultaneously.

5) Connect the machine to the mains. Use an earth-connection if this is required by the local electric company. Always use an earth-connection if there are metal objects close to the machine, or if the floor is not made of completely insulating material. Turn the combined volume-control and switch. Wait 15 seconds.

6) Place a movement or a complete watch on the microphone. Start the motor by means of the starting-lever. The correct method of adjusting the amplifier and of reading the record is outlined in our booklet " The Vibrograf and New Methods of Timing ". As a rule, sufficient amplification is obtained if the volume-control knob is half-open; the exact position will depend on the type of movement or case.

Note: The motor will not restart of its own accord if there has been an interruption in the current supplied by the mains. It is necessary to move the starting-lever to the " off " position (white), and then restart the motor in the ordinary way. Proceed in the same way if the motor has been slowed down, for instance when a length of paper has been torn off or when the count-selector switch has been turned.





OPERATION AND MAINTENANCE

Inserting paper:

Insert the spindle into the roll of paper. To make this easier, the spindle has a head at one end, which should be kept to the left. The illustration on page 7 shows the direction in which the paper should uncoil. **The free end must emerge from underneath the roll.**

Cut off the end evenly and at a slight angle. Slide the paper into the feed-guide. Release the roller by moving the lever (see page 7) in the direction of the arrow. Still holding the lever open, push down the paper until its end appears under the transparent plate.

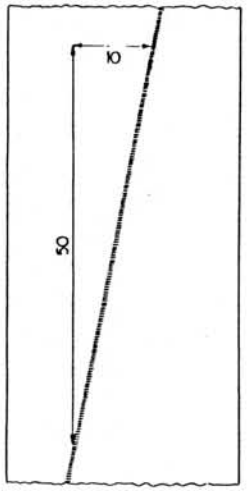
Adjusting printer:

The relative positions of the printer and the paper are exactly determined. Two screws (see page 7) are provided to adjust the height of the printer and to make it print equally dark on both sides of the paper. The dots may be made darker or lighter according to the intensity desired, or to allow for the wear of the inker-ribbon.

Reading of records:

The rate of the watch is determined by the slant of the diagram.

To make it possible to determine the value corresponding to a given slant, the paper, on leaving the printer, passes under a screen with luminous slits (see page 7). It is only necessary to turn the knob of the reading-disk (see page 7) so that the luminous lines are brought parallel to the diagram. The scale then shows the rate in 24 hours. The scale is double: one half shows a gaining, and the other a losing, rate.



It may be useful to read the diagram without using the reading-disk. All one need do is to express the slant as a percentage of the length of the diagram. A slant to the right indicates a gain, and one to the left a loss.

For instance, the diagram on the left has a slant of

$$\frac{10}{50} = 20 \text{ per cent.}$$

As the diagram slants towards the right, the rate is 20 seconds' gain.

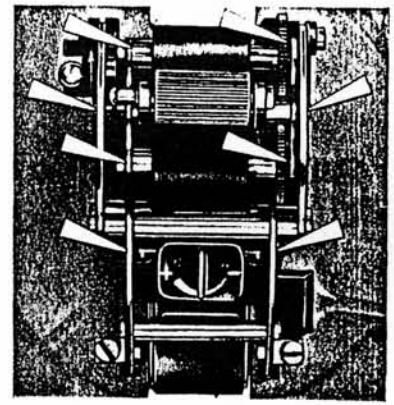
Various frequencies:

The Vibrograf type 390 is designed for testing all kinds of movements used in watches and miniature clocks, apart from a few rare or obsolete ones.

For movements with exceptional counts and for clocks with a slow beat, the Vibrograf type VS 32 must be used.

Oiling:

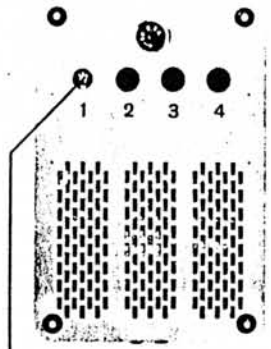
After every 500 hours' working, oil the points indicated by the arrows. A small drop of oil is enough. Use the bottle and oiler supplied with the machine. Also oil the paper-driving roller, as shown on page 10. Take advantage of the fact that the mechanism is raised to clean the paper-groove.



Replacement of reading-lamp; trimmers:

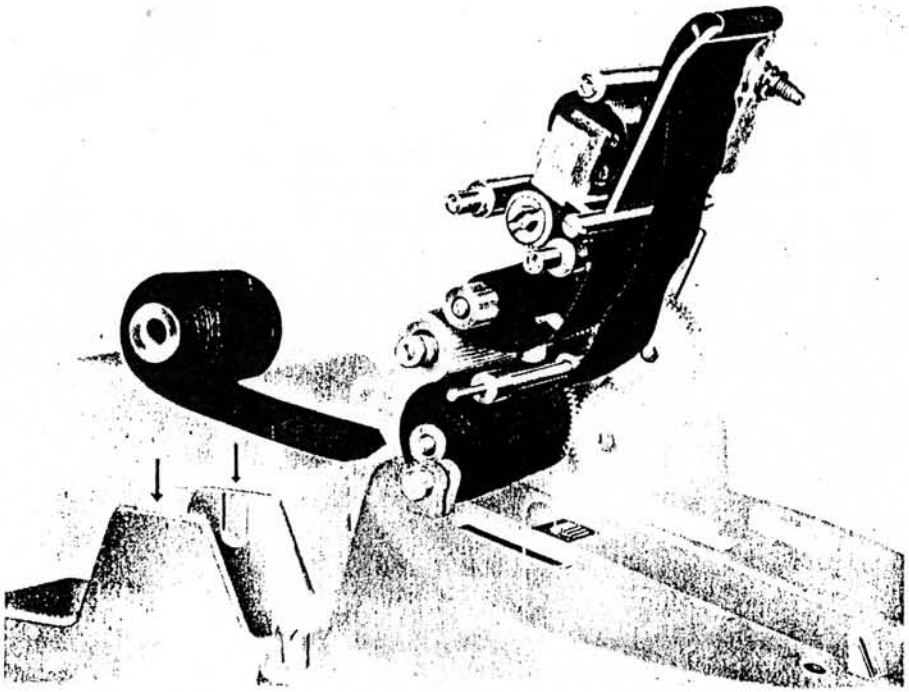
Turn the machine up on end. Unscrew the knob of synthetic material ¼ turn, and pull out the entire socket. Replace the bulb (6-8 volts, 0.5 ampère, ordinary fitting, Edison E 10).

The trimmers for final adjustments of frequencies are accessible through the holes shown in the illustration (their numbers correspond to the positions of the frequency-selector switch). The machine leaves the factory perfectly adjusted, and if no accident occurs it should remain so for several years.



Trimmer for final adjustment of quartz crystals

Replacement of inker-ribbon:



Oil

Also see illustration on page 7

1) Take out the two adjusting-screws of the printer.
2) The whole mechanism can now be swung back. Unwind the worn-out ribbon and discard it.
3) Place the new ribbon in the position normally occupied by the roll of paper. Fix the end of it to the rear spindle and wind it on completely by turning the gear-wheel with the hand. Make sure that the ribbon is wound in the right direction.
4) Thread the ribbon correctly, as shown in the illustration, and carefully fix its free end to the front spindle. Wind it on a few turns, making sure that it is wound in the right direction.
5) Put everything back into position, and adjust the printer.

Note: The working of the automatic reverser depends on the diameter of the fully-wound spool of ribbon. If a ribbon is damaged (cut), do not shorten it, as its length will be insufficient.

OPERATIONAL TROUBLES

First, make sure that the machine is receiving current from the mains. See that the printer is properly adjusted, that all leads in the mechanical part are in order, and that the contacts are clean.

To dismantle the machine, it is only necessary to unscrew the 4 screws on the right and left sides of the case. The whole assembly can then be lifted out. A wiring-diagram is fixed to the bottom of the case. However, the following tests should be made before dismantling the machine. Remember that any damage due to improper handling may involve the cancellation of the guarantee.

Electric part:

Symptom	The motor will not start, and the reading-lamp does not light up. The machine is receiving current from the mains.
Remedy	The fuse (in the voltage-selector at the back) has blown and must be replaced. Unless the fuse itself is defective, this normally occurs only when the machine is accidentally connected to too high a voltage. If either the 5Y3Gt or the 6F6 (6V6) tube is faulty, this may damage the fuse.
Symptom	It is difficult to start the motor, which does not always respond to the movement of the starting-lever, especially if there is a fall in the mains-voltage.
Remedy	Replace the 5Y3Gt tube. If this fails to correct the fault, the 6F6 (6V6) tube should also be replaced.
Symptom	The record does not correspond to the watch tested; it is blurred and uncertain, though the printer ticks evenly.
Remedy	The machine may be set to a wrong frequency. If this is not the case, replace the 6SJ7Gt or the 6SN7Gt tube. This trouble may also be caused by a bad contact in the frequency-selector.
Symptom	The motor runs, but the printer works irregularly or is out of action.
Remedy	Replace the 6SL7Gt or the 2050 tube. All tubes are not quite perfect, and only the best quality should be used.
Note:	The machine is sensitive to strong disturbances in the mains-supply. If the record is not clear, see that the machine is not too close to an electric typewriter or calculating-machine that is liable to cause static disturbance.

Mechanical part:

Symptom The starting-lever will not move.

Remedy Disconnect the machine from the mains. Wait a few seconds and then start the motor again.

Symptom The motor will not start. It will not even turn a few times.

Remedy The large wheel, part of the rim of which can be seen beneath the printer, has caught up the paper owing to incorrect manipulation. Turn the wheel by means of a wooden peg inserted through the opening of the printer, and then remove the paper. Do not apply pressure to the wheel, or it may get bent.

Symptom The printer can no longer be adjusted, and the striker does not move sufficiently.

Remedy An eccentric is fitted to enable the movement to be increased. The air-gap between the electromagnet and the striker should also be thoroughly cleaned out.

Note: The entire mechanical part of the machine can be taken out easily. Unscrew the 4 screws in the base-plate (see the illustration on page 7), and remove the volume-control and frequency-selector knobs. Take out the connecting-plugs (4 above and 4 below). No unsoldering of wires is necessary. **Always remove the mains-plug before dismantling the machine.**

GUARANTEE

The Vibrograf machine, model VS 390, is carefully tested before leaving the factory.

In case of operational troubles, these instructions should be carefully studied. This will usually enable the trouble to be diagnosed and put right.

Under the guarantee, the factory or authorized servicing-agency will repair or replace, free of charge, any part of the machine that proves to be of faulty manufacture. This guarantee is only valid on condition that the machine or the part in question is returned to the factory for verification or repair, and is not handled by an unauthorized third party. Carriage is for the customer's account.

After expiry of the guarantee, a reasonable charge will be made for all overhauls, adjustments and repairs carried out by the Vibrograf technical service, which can be trusted to put the machine in order with the least possible delay.