Product Manual
MNX10027 Rev B
MODEL VRS2007

Operating Instructions
Vibration Reference Shaker
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Introduction

By choosing this CTC vibration reference shaker you have decided in favor of an instrument which is distinguished by its precision, long life and simple operation. It is suitable primarily for fast and reliable checking of vibration measuring, recording and monitoring instruments.

Please study these operating instructions carefully before first use. CTC offers an extensive range of Industrial Vibration Analysis Hardware.

- Accelerometers for general purpose and specialty industrial vibration measurements
- Cables and Connectors with accessories
- Mounting Hardware
- Junction Boxes
- Proximity Probes, Cables, and Drivers
- Signal Conditioners
- Vibration Protection & Relay Systems

Important Notes

To ensure your personal safety, please comply with the safety guidelines in this Manual.

For your Own Safety

Take particular care to comply with the installation instructions in Chapter 4 and the instructions for operation in Chapter 5. Do not drop the instrument. Keep the instrument in a clean, dry environment. Please comply with those parts of the instructions, concerning the power supply in Chapters 5 and 6.

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Precautionary Measures

Compliance with the following precautionary measures is extremely important to ensure safe and reliable operation.

- Keep cables coming from the sensor, when installed in the equipment, along with any power pack, away from power cables and open machinery.
- On no account operate or store the instrument outside the specified temperature range.
- On no account exceed the maximum stated voltage. Whenever it is necessary to change the battery ensure that no short-circuit occurs. Danger of injury and fire! Comply with the installation instructions. Never exceed the specified tightening torque.
- Do not expose the instrument to excessive shocks, i.e. hammer blows or allow it to drop.

Description

- Rechargeable battery-powered instrument for portable application
- Load-independent vibration level of $10 \text{ m/s}^2$, 10 mm/s and 10 $\mu$m rms. value
- Quartz-accurate vibration frequency of 159, 15 Hz (angular frequency 1000 rad/s)
- Suitable for measuring objects up to a mass of 400 g at 10 m/s$^2$
- Fast and simple checking of vibration measuring, recording and monitoring instruments
- Regular testing of similar instruments and systems
- Trouble-shooting

In many branches of industry and research, mechanical vibrations must be checked and measured or recorded in order to discover signs of wear promptly and to prevent damage. Examples in this respect are machine diagnosis and roller bearing monitoring, the occurrence of unbalance or pipeline vibrations, and occupational protection in press tool or vehicle seats.

All these instruments must be adjusted and their function checked regularly. The VRS2007 is used in this respect as the vibration generator. It supplies a mechanical vibration with quartz accuracy and a highly stable signal level to the vibration measuring instrument to be tested. The latter can be checked in acceleration, velocity and displacement units. The rms value of vibration acceleration, velocity and displacement is independent of the mass of the coupled vibration sensor, thanks to an internal reference sensor and a control circuit. Adherence to the exact value is monitored visually and audibly by means of a level monitoring system.
The VRS2007 is most suitable for portable use since the power supply is provided by a built-in rechargeable battery. It is provided with an automatic cut-out to prevent accidental discharge. An external power pack is included in the parts supplied. This allows battery trickle-charging power-line operation as well as fast battery charging. A two-color LED indicates charging or discharging status.
Section II
Installation

Installation Procedure:

After the On/Off push button switch is switched on, the Battery LED must light up green. If this LED flashes red, the battery is almost discharged. In this case, charge the battery or use the battery in trickle-charge mode, see “Charging the Battery”.

No further preparations are necessary.

Figure 1. Front and Back
Section III
Operation

Measurement

The instrument’s four rubber feet uncouple it from the base. Measurement is made by attaching the sensor to be tested to the coupling surface of the VRS2007 using a magnet or with one of the mounting studs supplied for the ¼-28 threaded coupling surface. The mounting surface of the sensor to be tested should be flat and clean. A damaged mounting surface can have an unfavorable effect on the measurement and damage the coupling surface of the VRS2007. In this case, the mounting surface of the sensor to be tested must be remachined before the measurement. For optimum coupling, a thin film of grease or oil should be applied to the mounting surface of the test specimen.

Caution! The limit values stated on the product data sheet for shear force and tightening torque must not even briefly be exceeded, as the vibration component can be damaged.

After the On/Off push button switch is switched on, the Battery LED must flash green as a sign that the battery is adequately charged. The audible level control beeps until the set value is reached after a few seconds. As soon as the green LED lights, the measuring chain can be tested.

At the end of the measurement, the On/Off switch should be disengaged. If this is not done, the instrument switches off automatically after 10 minutes. After the On/Off switch has been disengaged and then pressed again, another measurement can be carried out.

If the Battery LED starts to flash red, the battery is almost discharged. However, as long as the level control is still lit and there is no audible signal, measurement can be continued, but an additional error in the rms value of -3 % is possible, and the distortion factor may increase.

The same also applies to measured objects which exceed the maximum mass stated in the technical data. As long as the level control is lit and gives out no warning tone, an additional error of -3 % of the rms value will not be exceeded.

If a corresponding connection is provided, the battery can be trickle-charged during the measurement from a 12 V supply. The Battery LED then lights up red to indicate charging, and is superimposed by the green flashing light of the battery indication to give a color mixing between red and orange.

At the end of the measurements, it is advisable to recharge the battery as soon as possible; trickle charging is permissible and recommended.
Section IV
Maintenance

Charging the Battery

To charge the battery, connect the CHARGE 12 V socket on the rear panel of the instrument to the table-mounted power pack supplied.

However, any other power source from approximately 12 V to 15 VDC, such as a car battery can be used. This is connected to the instrument via a hollow connector 5,5/2, 1 mm.

When the polarity of the charging voltage is correct, the Battery LED lights red. With clearly reduced brightness, the battery has reached about 90% of its capacity. As the charge increases, the color changes gradually through orange to green. Flickering brightness is caused by the current noise caused by the trickle charging of the battery.

For a full charge, the battery should be charged for one to two days. Constant trickle charging from the table mounted power pack supplied is advantageous for the life of the battery; The voltage with which VRS2007 charges its gas-tight lead accumulator is temperature-compensated in the range of -10 °C to 55 °C. This means that trickle charging can take place in this temperature range. However, in the interests of long battery life, temperatures should be kept as far as possible between 15 °C and 25 °C during charging.

General

If trickle charging is not possible and if the instrument is not being used, the battery should be charged for one day once or twice a year.

The battery can also be changed by the user. Do this by undoing the two upper recessed-head screws on the front panel and the four recessed-head screws on the rear panel. It is essential to note the polarity when fitting a new battery. The plus terminal is red and the minus terminal natural color or blue. A short-circuit must be avoided in all cases. Danger of injury and fire!
However, it is advisable to have CTC change the battery and to combine this with a check on the charging voltage and vibration magnitudes.

**Trouble-shooting**

With the exception of changing the battery as described in the “Changing the battery” section, the user cannot carry out repairs on the reference shaker VRS2007. In such cases, the instrument must be returned to the factory for repair.

**Warranty**

If any PRO product should ever fail, we will repair or replace it at no charge, as long as the product was not subjected to misuse, natural disasters, improper installation or modification which caused the defect.