

VIBREC500 Recorders

Advanced Recorders To Measure Conductor Motions



VIBREC500 Vibration Measurements

Aeolian Vibration

Aeolian vibrations of overhead line conductors and their detrimental effects are well known. These unavoidable vibrations are generated by wind flow on any type of overhead transmission line and may cause fatigue failure of the conductor strands and other line components.

To verify the conductor vibration severity, transmission line engineers, all over the world, measure the vibration intensity of transmission line conductors by using dedicated vibration recorders.



Sub Span Oscillation

Sub span oscillation is a major wind-induced conductor motion recognized as significant problem in transmission lines, after Aeolian vibrations and galloping. It can be mitigated by an appropriate distribution of spacers along the conductor bundles. However, if not suitably controlled, it can induce fatigue accumulation on spacer articulations and loosening of fitting clamps, especially spacer or spacer damper clamps.



Wireless

It is possible, at any time, to establish a wireless connection between the VR500 recorders and a ground receiver connected to a computer. With this new feature, it is possible to check, whenever deemed necessary, the set up and correct functioning of the recorder as well as read out and refresh the data stored in the memory without the retrieval of the instrument from the line. The long autonomy of the recorders (about one year) allows long term recording and easily programmable installation and removal of the instruments.

VR500 WT

The VR500 WT recorder has been developed to measure the Aeolian vibration of the overhead line conductors and shield wires. It contains a displacement transducer, an anemometer and a temperature sensor.

VR500 EXT

The VR500 EXT is a special version of the VR500 WT recorder with separate displacement transducer, connected via cable to the recorder main frame. It is available for application on shield wires, small phase conductors and especially to measure on compression dead end clamps.

VR500 PT

The VR500 PT sub span oscillation recorder measures and records low frequency and high amplitude oscillations. A temperature sensor and a propeller anemometer supply additional input for the analysis of the phenomenon.

The recorder can perform the field measurements often required by major utilities as an acceptance test for new lines and can be used for research on sub span oscillation on lines in operation.

VIBREC500)))



Sensors

Displacement

The displacement transducer used in the VR500 WT and VR500 EXT is a contacting sensor of a LVDT (Linear Variable Differential Transformer) type. It has a high sensitivity and resolution as its task is to measure micrometric displacements. Its strong body has been fully sealed and made resistant to external agents (e.a. moisture).

Wind Sensor

The wind sensor is a high precision propeller anemometer oriented for the measurement of the wind component perpendicular to the line. The measurement, taken at the beginning of each sample period, corresponds to the average wind velocity in one second.

Internal Temperature Sensor

A temperature sensor is incorporated into the recorder to provide approximate information about the ambient temperature variation during the measurement session. It can be useful to detect possible ice deposit on the conductor.

PT1 Sensor

For sub span oscillation measurements, a cable-extension transducer is used. It provides an output signal proportional to the conductor's relative displacement by means of a high precision plastic-hybrid potentiometer, coaxial with a spring loaded spool, on which the flexible steel cable is wound.

VIBREC500 Recorder Box

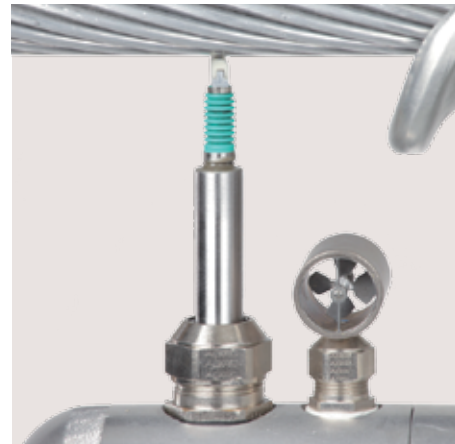
For easy and safe transportation, each recorder is supplied in a high quality aluminum suitcase containing:

- VIBREC500 Recorder
- LVDT, PT1 (incl. 30 m cable)
- Wireless receiver dongle
- Installation gauge
- Lithium battery
- USB Cable
- LIFE500 software
- User's manuals

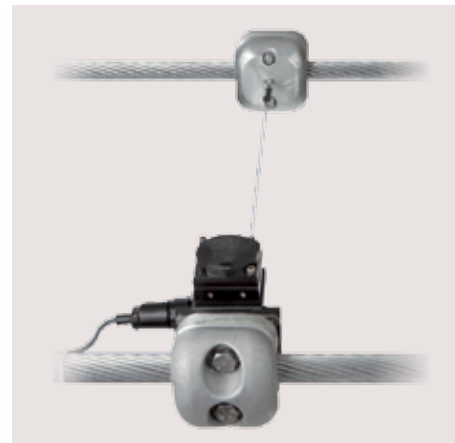
Training

Training courses and personal trainings of field engineers, as well as initial installation support can be provided by PFISTERER experts.

LVDT and wind sensor



PT1 sensor for Sub span oscillation measurement



VIBREC500 Recorder Box



LIFE500 Software

LIFE500 is an easy to use software that contains all functions needed to operate the VR500 recorders and to display the measurement data in the form of tables and diagrams.

Vibration measurement and evaluation are made according to the latest IEEE and CIGRE guidelines.

Measurement Results

With one click, it is possible to get an overview of the recorded vibration amplitudes and frequencies as well as the wind velocities and temperature.

Time History

It contains the most significant vibration recordings stored in a dedicated memory section. It allows a detailed analysis of the conductor motion.

Wind/Temperature

This unique recorder feature allows the correlation between any vibration recordings and the relevant ambient temperature and wind velocity.

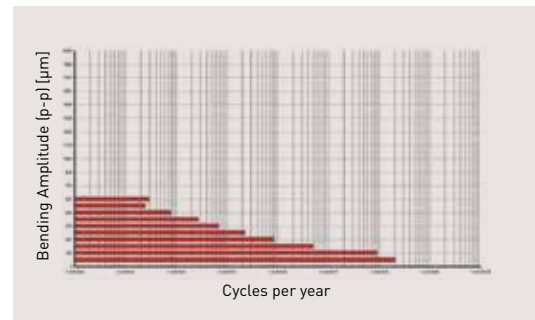
Installation Control

LIFE500 allows the verification of the correct placement of the vibration sensor from the ground and permits an overview of the battery consumption.

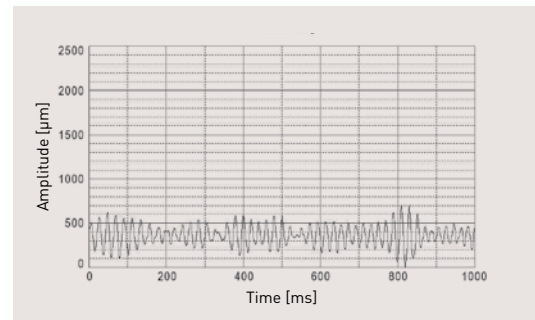
Report

An "Evaluation Summary" can be automatically generated by the software LIFE500 during the data read out and elaboration. The Evaluation Summary concisely reports the line data, the recorder set up parameters, the measurement results and their basic interpretation.

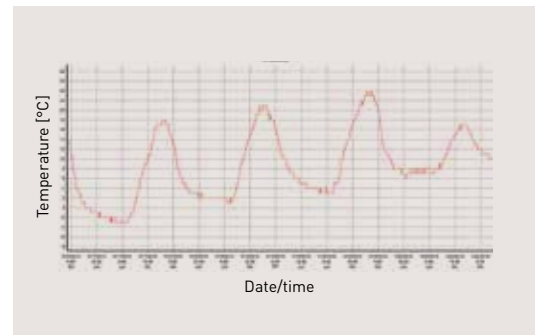
Measurements Results



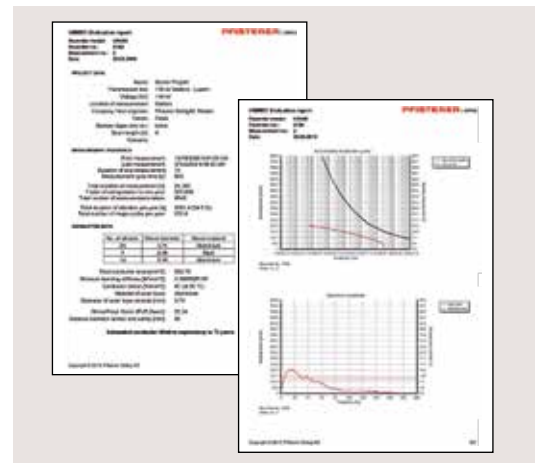
Time History



Temperature



Report



Specification

General

- Operating Temperature Range
-40 °C to +80 °C
- Ambient Temperature Measurement Range
-40 °C to +80 °C
- Degree of Protection
IP 66 (DIN)
- Dimensions
Aluminium Alloy tube, Diameter 73 mm, Length 263 mm
- Weight
Approx. 0.7 kg including battery
- Power Supply
1 Lithium battery (3.6 Volt) size C
- Autonomy
About 1 Year
(Depends on ambient temperature, reading interval and sample period)
- Filtering
Programmable amplitude filter (38 µm per default)
- Reading Interval
15 min default
(can be preset from 15 sec to 1 hour intervals)
- Sample Period
10 sec default
(Can be preset from 1 to 10 sec intervals)
- Real-time Clock
Built-in real-time clock allows the user's presetting of beginning and end of measurements.
- Utility Software
Utility program LIFE 500, for parameter set-up and data read out via PC, included. It allows evaluation and graphical presentation of data. Conductor lifetime estimation is available for VIBREC500 WT and VR500 EXT only.
- Communication
Built-in USB interface and Wireless connection
(Wireless connectivity distance up to 60 m)

VR500 WT

- LVDT Displacement
±5 mm Total displacement
±1 mm Measurement range
- Frequency
0.2 to 200 Hz
- Wind Velocity
0.0 to 30 m/s

VR500 PT

- PT1A Displacement
±381 mm / (±15 inches)
- Frequency
0.2 to 10 Hz
- Wind Velocity
0.0 to 30 m/s

Extensive Testing

The VIBREC500 has successfully passed extensive tests such as:

- Transducer calibration test
- Wind tunnel test on wind sensor
- Vibration test
- Shock test
- Power frequency and impulse voltage test
- Corona test
- High current test up to 1500 A
- Climatic test
- Functional test
- Sealing test

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