

VW Crackmeter

52636099

Copyright ©2003 Slope Indicator Company. All Rights Reserved.

This equipment should be installed, maintained, and operated by technically qualified personnel. Any errors or omissions in data, or the interpretation of data, are not the responsibility of Slope Indicator Company. The information herein is subject to change without notification.

This document contains information that is proprietary to Slope Indicator company and is subject to return upon request. It is transmitted for the sole purpose of aiding the transaction of business between Slope Indicator Company and the recipient. All information, data, designs, and drawings contained herein are proprietary to and the property of Slope Indicator Company, and may not be reproduced or copied in any form, by photocopy or any other means, including disclosure to outside parties, directly or indirectly, without permission in writing from Slope Indicator Company.

SLOPE INDICATOR

12123 Harbour Reach Drive
Mukilteo, Washington, USA, 98275
Tel: 425-493-6200 Fax: 425-493-6250
E-mail: solutions@slope.com
Website: www.slopeindicator.com

Contents

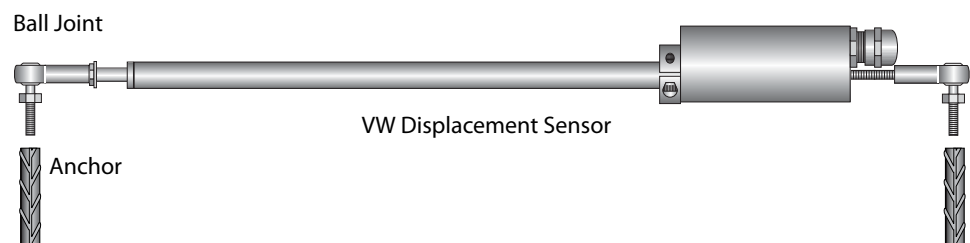
Introduction.....	1
Installation	2
Taking Readings.....	4
Data Reduction.....	7

Introduction

Applications The VW Crackmeter is suitable for surface monitoring of movement at joints and cracks in concrete structures. Typical applications include:

- Monitoring joints for unexpected movement to provide early warning of performance problems.
- Monitoring joints and cracks in structures that may be affected by nearby excavation and construction activities.
- Monitoring cracks in structures that have experienced seismic activity.

Components The VW crackmeter consists of a VW displacement sensor with signal cable, two ball joints, and two anchors, as shown below.



Installation

Overview The basic steps for installation are:

1. Determine position for anchors.
2. Drill holes and clean out debris.
3. Pack holes with epoxy grout or equivalent.
4. Insert anchors and allow grout to set.
5. Attach displacement sensor to anchors.
6. Obtain initial reading.

The drawing below shows an installed crackmeter. The shaft is partially extended so that the crackmeter can measure both closing or opening of the crack.

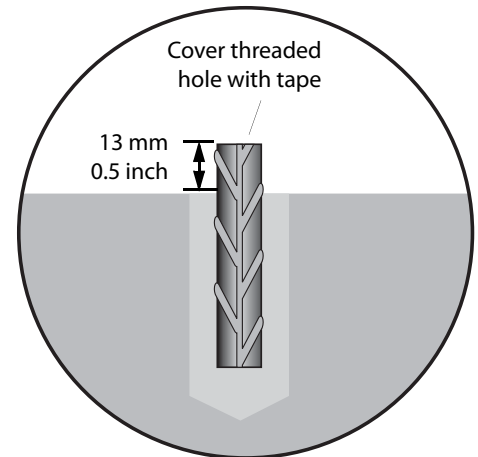


Install Anchors

1. Mark locations for anchors. Minimum and maximum spacing for anchor holes is listed below.

Crackmeter Range	Center to Center Spacing for Anchor Holes	
	Minimum	Maximum
60 mm	330 mm (13")	390 mm (14.36")
100 mm	435 mm (17.13")	535 mm (21")

2. Drill holes. Anchor dimensions are approximately 15 x 64 mm (0.6 x 2.5"). Hole depth and diameter should be at least 13 mm (0.25") larger than anchor diameter. Note that top of anchor should extend 13 mm (0.5") from surface.
3. Clean holes of debris. Then pack with epoxy grout or equivalent.
4. Cover threaded hole in anchor with tape.
5. Insert anchor into hole. Top of anchor should extend 13 mm (0.5 inch) from surface, as shown in the drawing.
6. Allow grout to set.
7. Clean top of anchor. Check that threaded hole is free from debris.



Install Displacement Sensor

Thread ball joints into anchors. Secure signal cable. Depending on where the crackmeter is installed, it may be necessary to insulate it from the direct heat of the sun.



Taking Readings

Introduction

These instructions explain how to read the sensors using Slope Indicator's portable readouts.

Instructions for reading VW sensors with a Campbell Scientific CR10 can be found at www.slopeindicator.com. Go to Support - Tech Notes and click on the link titled "CR10-VW Sensors."

Reading with a VW Data Recorder

1. Connect signal cable to the data recorder:

Binding Posts	Wire Colors	
VW	Orange	Red
VW	White & Orange	Black
TEMP	Blue	White
TEMP	White & Blue	Green
SHIELD	Shield	Shield

2. Choose Hz + RTD or Hz + Thermistor.
3. Select the range: 1400-3500 Hz.
4. The recorder displays sensor readings in Hz and temperature readings in degrees C.

Reading with the VWP Indicator

1. Connect signal cable to the VWP indicator as shown below.
2. Using the Sweep key, select 1.4-3.50 kHz.
3. Using the Data key, select Hz.
4. Read the RTD temp sensor: Select °C using the Data key.
Note that the VWP Indicator cannot read thermistors.

Standard Jumper 52611950



Connect alligator clips as shown:

Clips	Wire Colors		Function
Red	Orange	Red	VW
Red	White & Orange	Black	VW
Black	Blue	White	TEMP
Black	White & Blue	Green	TEMP

Reading with the DataMate MP

The DataMate MP allows you to choose engineering units for your readings. However, we recommend that you record raw units (Hz) and apply calibration factors later.

Manual Mode

1. Connect signal cable as shown in the table below.
2. Switch on. Press  (Manual Mode).
3. Scroll through the list to find “Vibrating Wire Hz.”
4. Press  to excite the sensor and display a reading in Hz and a temperature reading in degrees C.

Universal Jumper and Bare-Wire Adapter

The DataMate jumper cable has a universal connector that connects directly to a universal terminal box or to signal cables that are terminated with a universal connector. A bare-wire adapter (BWA) is also supplied with the DataMate. It allows connection to wires of the signal cable as shown below:

Terminals on BWA or Terminal Box	Wire Colors		Function
5	Blue	White	TEMP
6	White & Orange	Black	VW
7	White & Blue	Green	TEMP
8	Orange	Red	VW
10	Shield	Shield	Shield

Data Reduction

Find the Calibration Factors

1. Use the sensor serial number to match the sensor with its calibration sheet. Each sensor has unique calibration factors.
2. Find the A, B, and C coefficients for this sensor.

Convert Hz Readings to Engineering Units

1. Apply the coefficients as follows:

$$\text{Reading}_{\text{Engineering Units}} = AF^2 + BF + C$$

where F is the reading in Hz.

2. The resulting value is the position of the sensor shaft. Values increase as the shaft extends. The crackmeter is typically calibrated in mm. If you require inches, divide the result by 25.4.

Calculate Changes

Subtract the initial value from the current value. This is movement. Positive values indicate opening of the crack. Negative values indicate closing of the crack.

Temperature

We recommend that you record temperature. Temperature data can help you understand movement due to temperature changes. Currently, we do not apply a temperature correction to crackmeter readings.