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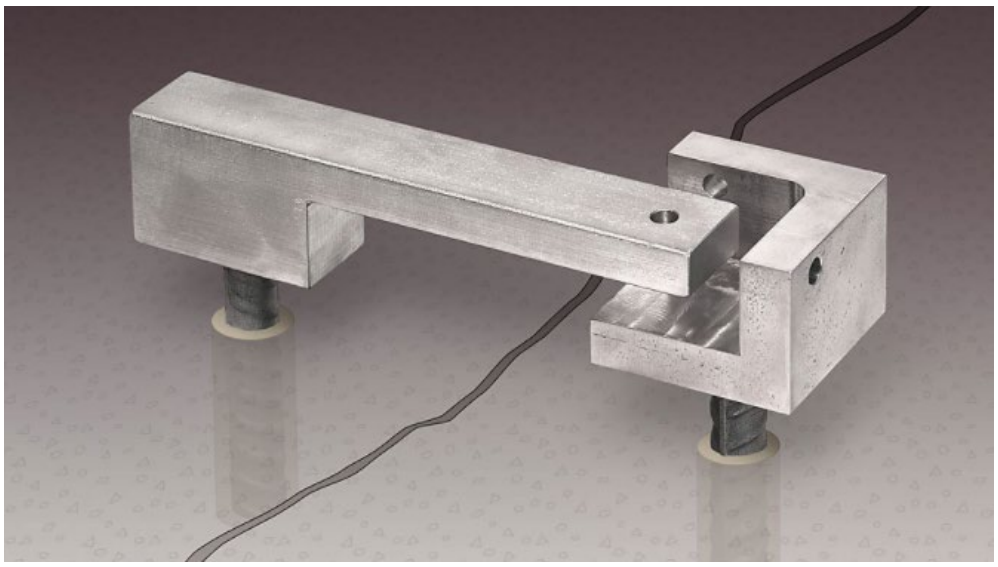
Instruction Manual

Model 4415

3D Mechanical Crackmeter



(Doc Rev C, 8/8/19)

Warranty Statement

Geokon warrants its products to be free of defects in materials and workmanship, under normal use and service for a period of 13 months from date of purchase. If the unit should malfunction, it must be returned to the factory for evaluation, freight prepaid. Upon examination by Geokon, if the unit is found to be defective, it will be repaired or replaced at no charge. However, the WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of being damaged as a result of excessive corrosion or current, heat, moisture or vibration, improper specification, misapplication, misuse or other operating conditions outside of Geokon's control. Components which wear or which are damaged by misuse are not warranted. This includes fuses and batteries.

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1. INTRODUCTION

The Geokon Model 4415 3D Mechanical Crackmeters is designed to measure movement across joints such as the construction joints in buildings, bridges, pipelines, dams, etc.; tension cracks in soils and joints in rock and concrete.

The crackmeter comprises a horizontal square bar that is anchored on one side of the crack and a three-sided box, in which the end of the square bar nests, anchored on the other side of the crack. The anchors are made from two lengths of #4 rebar, six inches long, grouted into boreholes drilled on either side of the crack. The crackmeter will measure any widening of the crack and the extent of any shearing movements in two directions.

A typical installation of the 3D Mechanical Crackmeter is shown in Figure 1.

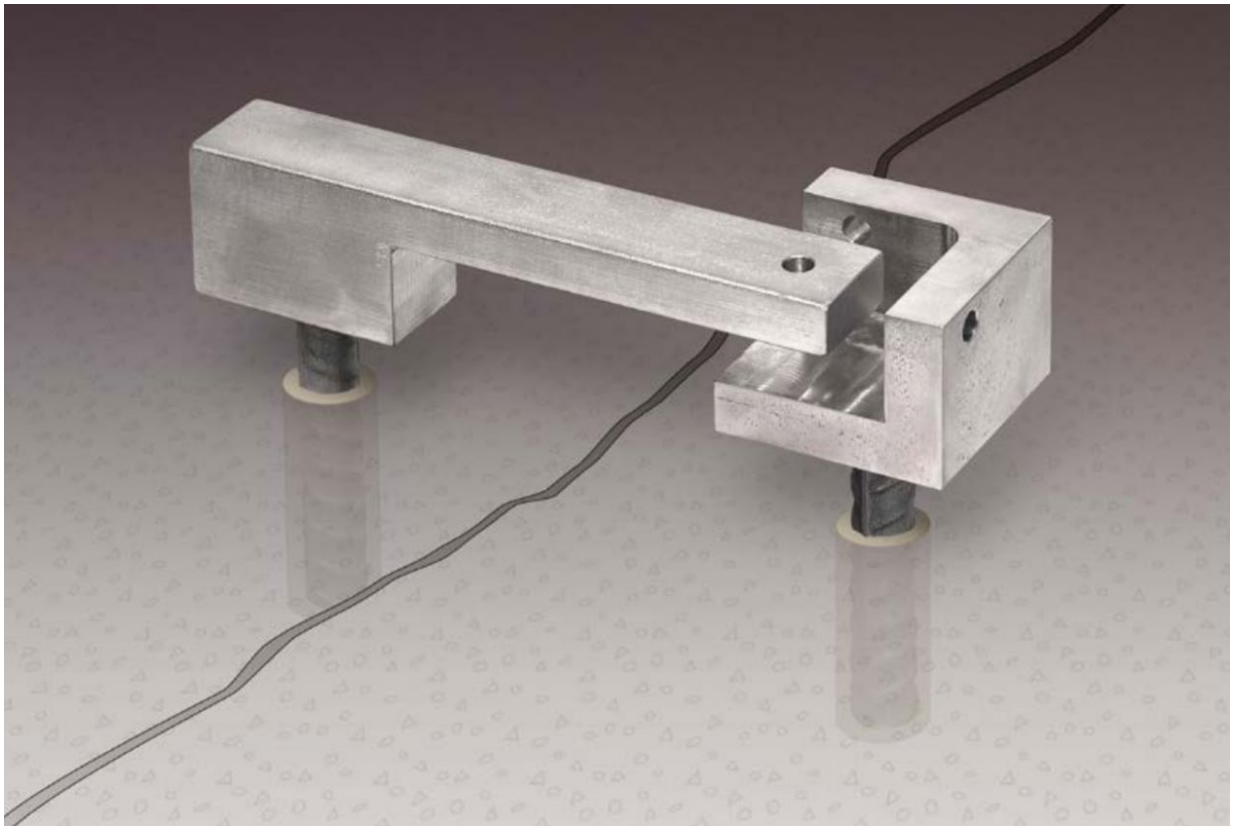

Figure 1 – Typical Installation

Once installed, measurements are made using a depth micrometer or dial gauge that is inserted into each of the three access holes. Displacements (direction and magnitude) are determined by comparing the base readings with the current readings.

2. INSTALLATION INSTRUCTIONS

2.1.1 Assembling the Spacer Block into the Crackmeter

NOTE: This section is required for 50 mm range crackmeters only (model 4415-5). For the 12.5 mm and 25 mm range crackmeters (models 4415-1 & 4415-3) the spacer block is installed at the factory.

Referring to Figure 1, install the spacer block between the two pieces of the crack meter as follows:

1) With the inside of the three-sided cube facing you, slide the right side of the cube into the gap between the spacer block and the metal bar attached to it until the edge of the cube is pressed against the spacer block.

2) Next, slide the spacer block downward until it is resting flat against the bottom of the cube,

3) Hand tighten the two cap screws that do not have washers installed, until they are in firm contact with the back side of the cube.

4) Mount the rectangular bar portion of the crack meter on the spacer block using a cap screw and washer as shown in Figure 1.

5) Continue the installation by following the steps in Section 2.1.2

Figure 1 - 4415-5 Crackmeter with Spacer Block Installed

2.1.2 Mounting the Crackmeter

1) Position the crackmeter so that it spans across the crack, using the rebar lengths mark the position of holes that need to be drilled.

2) Drill two, 5/8 inch to 3/4 inch boreholes, to the depth necessary to leave the crack meter at the desire height above the surface.

3) Fill both holes with quick-setting grout and push the rebars into the grout-filled holes.

4) Wait for the grout to set up.

5) Remove the cap screws holding the Delrin spacer block(s) in place, then use a screwdriver or other appropriate tool to remove the spacers from the crackmeter.

6) Initial readings **must be carefully taken and accurately recorded** at the time of installation. These readings serve as a reference point against which all subsequent readings will be compared. To take a reading, follow the instructions in Section 3.

3. TAKING READINGS

The X-axis, as shown in the figures below, measures parallel motion along the axis of the crack. The Y-axis monitors any movement perpendicular to the break. The Z-axis measures vertical movement along the crack.

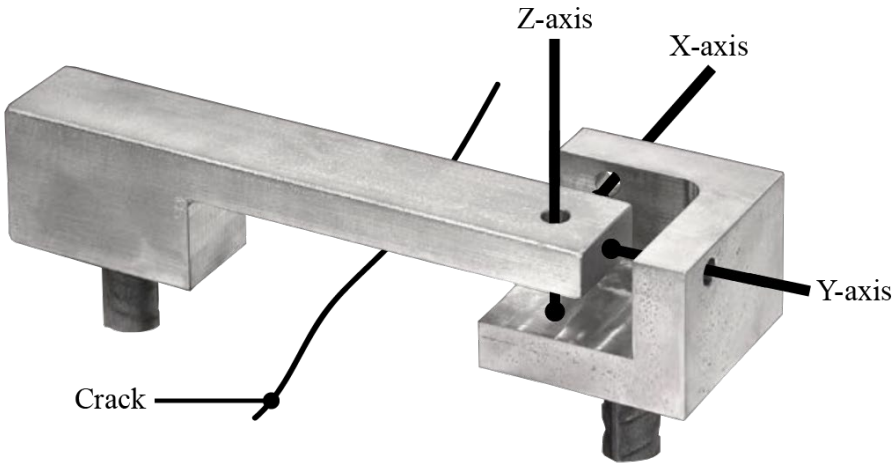

Figure 2 - Reading Locations for Models 4415-1 & 4415-3

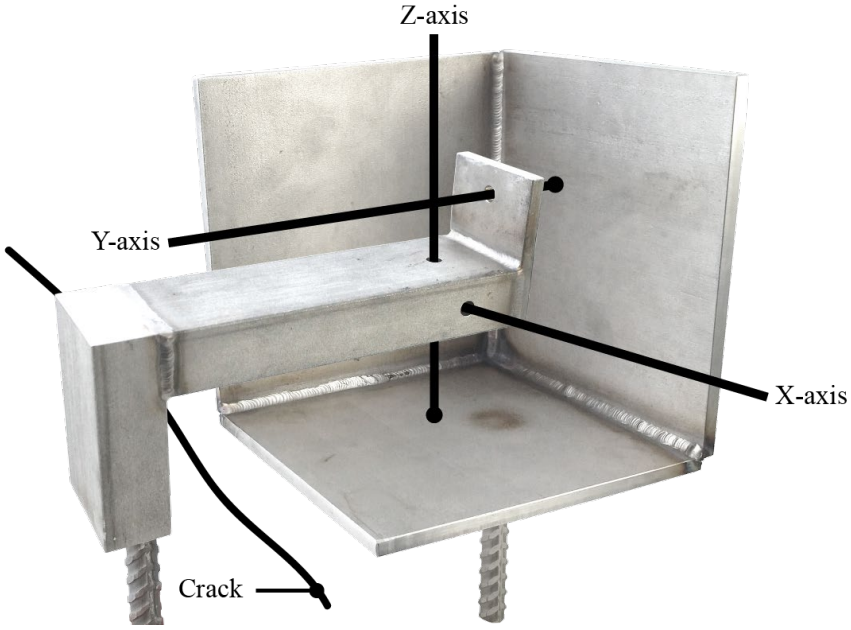

Figure 3 - Reading Locations for Model 4415-5

3.3.1 Taking Readings with a Dial Indicator

1) To read the Z-axis, slide the tip of the dial indicator through the hole in the rectangular bar of the crack meter until it is resting on the surface of the three-sided cube.

2) Press the collar of the indicator firmly against the surface of the square bar and record the Z-axis reading.

3) Take the X and Y axes readings through the two holes in the three-sided box in a similar manner as the for the Z-axis and record the results. (NOTE: For the 50 mm range crackmeter, model 4415-5, all three measurements are taken from the square bar to the three-sided cube as shown in Figure 3.)

4) The ambient temperature should be recorded each time readings are taken. Large changes in temperature could have an effect on the readings.

3.3.2 Taking Readings with a Depth Micrometer

1) To read the Z-axis, slide the tip of the depth micrometer through the hole in the rectangular bar of the crack meter.

2) Press the base of the micrometer firmly against the surface of the square bar and then adjust the depth of the micrometer until the tip is touching the surface of the three-sided cube. Record the measured depth as the Z-axis reading.

3) Take the X and Y axes readings through the two holes in the three-sided box in a similar manner as for the Z-axis and record the results. (NOTE: For the 50 mm range crackmeter, model 4415-5, all three of the measurements are taken from the square bar to the three-sided cube as shown in Figure 3.)

4) The ambient temperature should be recorded each time readings are taken. Large changes in temperature could have an effect on the readings.

APPENDIX A. SPECIFICATIONS

CRACKMETER	
Mechanical Range in each X,Y,Z axis	4415-1: 0-12.5 mm 4415-3: 0-25 mm 4415-5: 0-50 mm
Material	Stainless steel
Anchors	#4 rebar
Anchor Dimensions (Dia. × Length)	12 mm × 150 mm
TYPICAL DEPTH MICROMETER / DIAL GAUGE	
Range	50-150 mm
Resolution	0.01 mm
Accuracy	0.05 mm

Table 1 - Specifications