

VW Jointmeter

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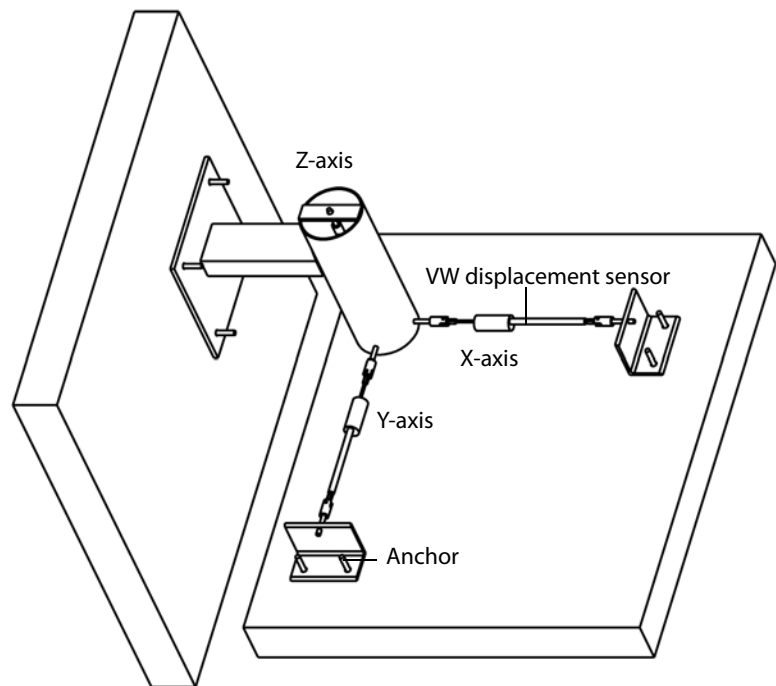
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Introduction

Applications The VW Jointmeter is used to monitor movement at joints and cracks in concrete structures.

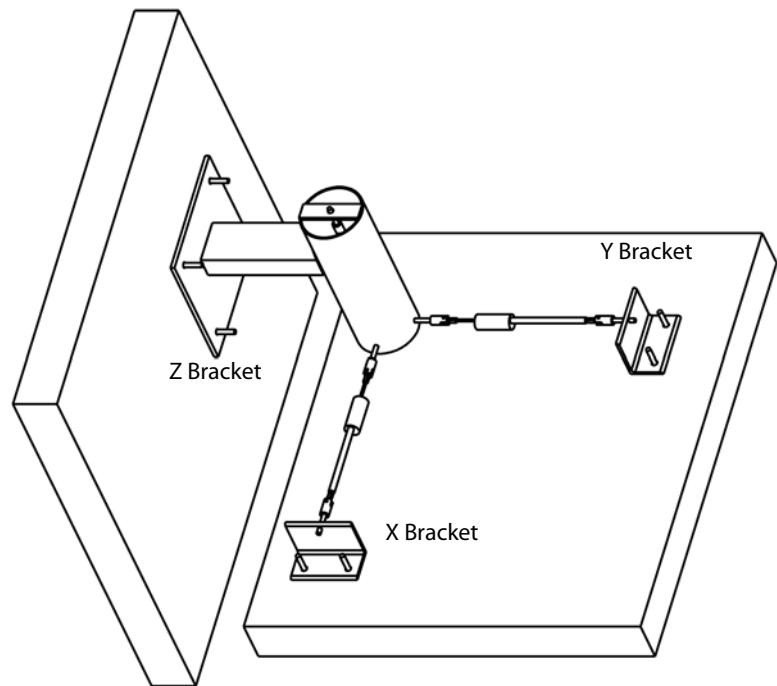
Basic Configuration The jointmeter consists of one or more VW displacement sensors, brackets, and anchors. The drawing below shows a 3-D Jointmeter. Note that the exact configuration of the brackets will vary according to the needs at the site:



Installation

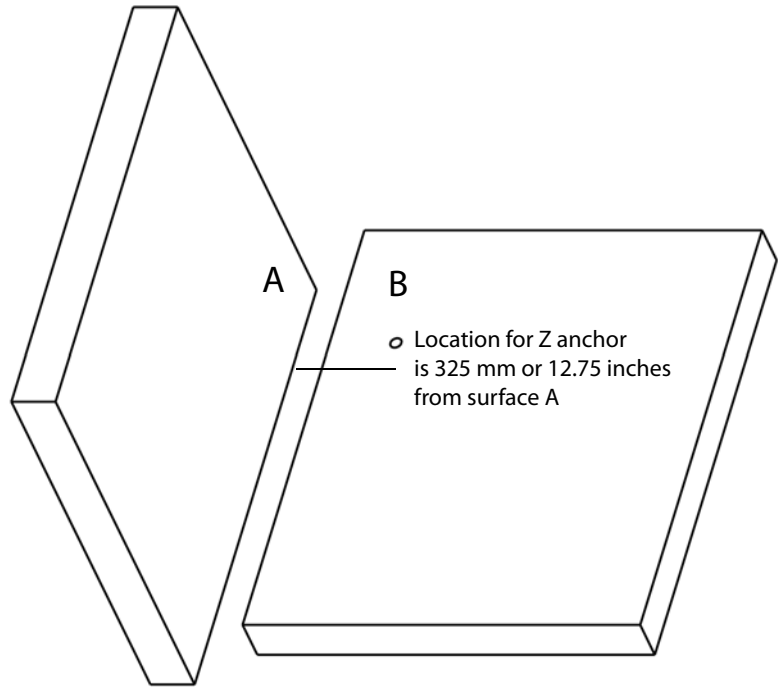
Overview The drawing below shows the completed installation. The basic steps for installation are as follows:

1. Choose location. Mark location of anchors holes using Z bracket and XY template as guide.
2. Drill anchor holes. For each bracket, it may be useful to drill one hole first, temporarily attach the bracket, and use holes in the bracket to place other holes.
3. Insert anchors into holes.
4. Attach Z-sensor to anchor, slide Z bracket over the sensor, and attach the bracket to its anchors.
5. Attach X and Y brackets to their anchors.
6. Install X and Y sensors.
7. Adjust all sensors to starting position.



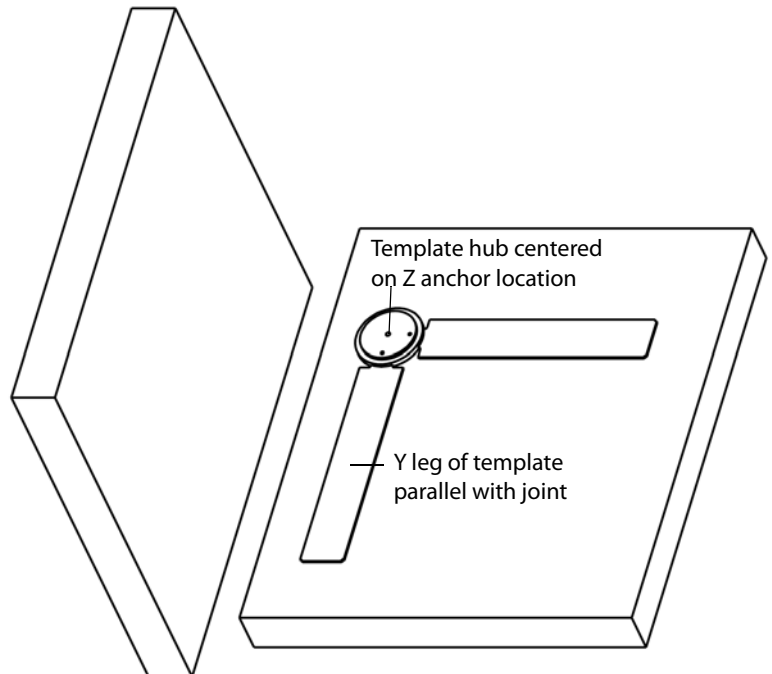
Choose Location

1. Choose the location for the jointmeter.
2. Measure 325 mm (12.75 inches) from surface A.
3. Mark location for Z anchor on surface B



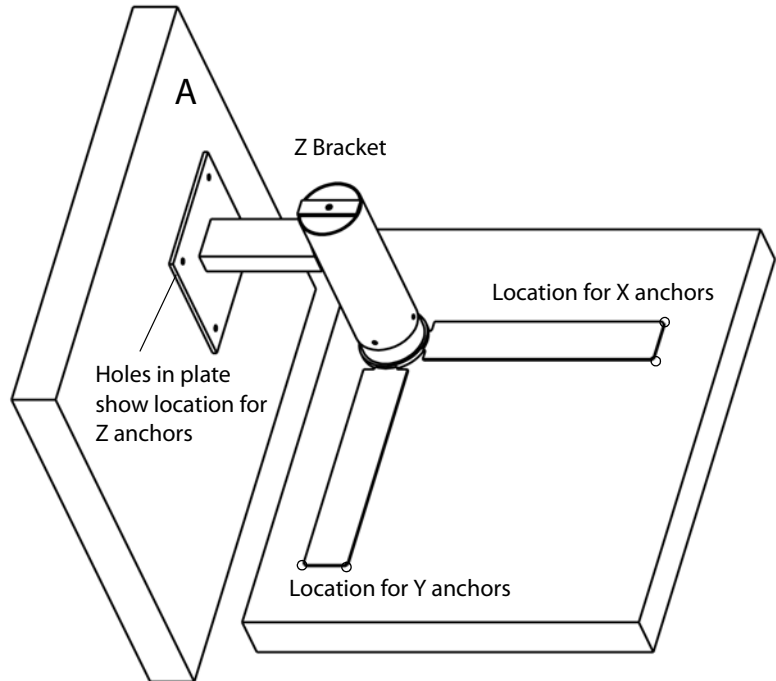
Place XY Template

1. Assemble template.
2. Center hub on Z anchor.
3. Place Y leg of template parallel to joint.



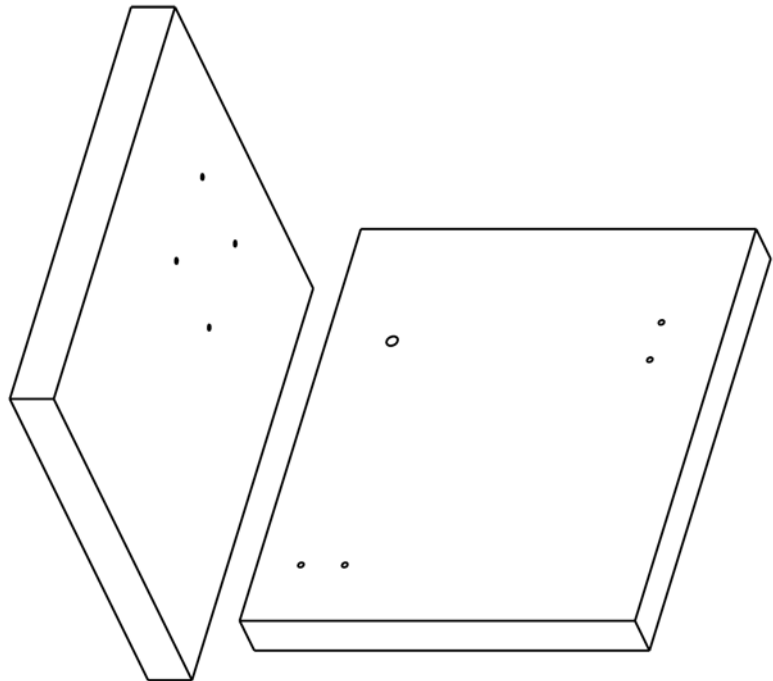
Mark Locations for Anchor Holes

1. Check that hub is centered on Z anchor location.
2. Place plate of Z bracket against surface A. Rest bracket on template hub. Mark anchor locations. Remove Z bracket.
3. Mark locations for X and Y anchors using corners of each leg.

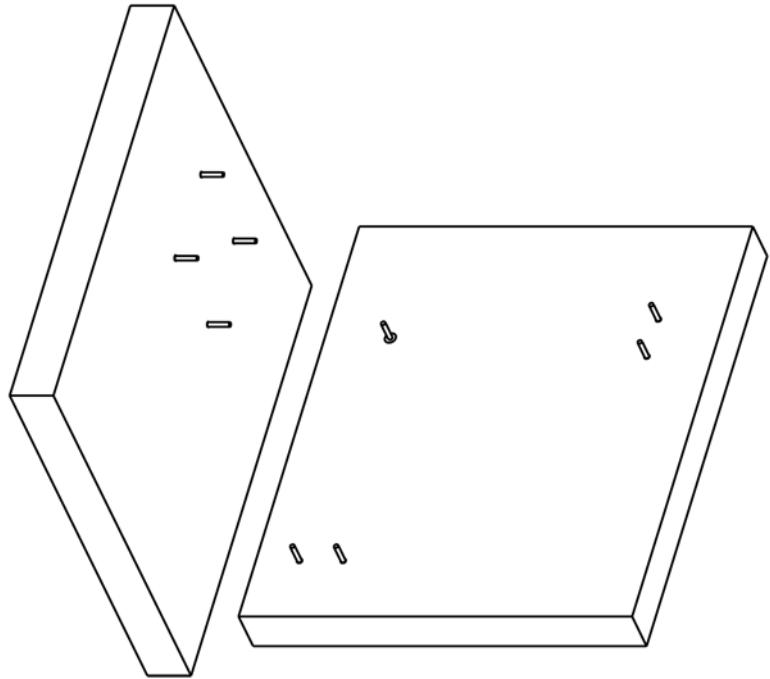


Drill Anchor Holes

For each bracket, it may be useful to drill one hole first, insert the anchor, temporarily attach the bracket, and then use remaining holes in the bracket to place other holes.

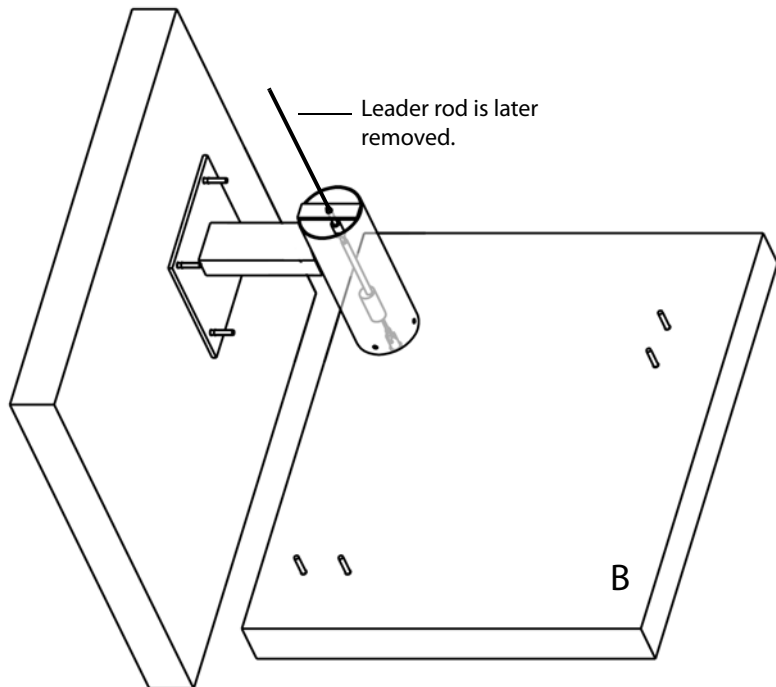


Install Anchors Anchors may be either groutable or expansion type anchors..



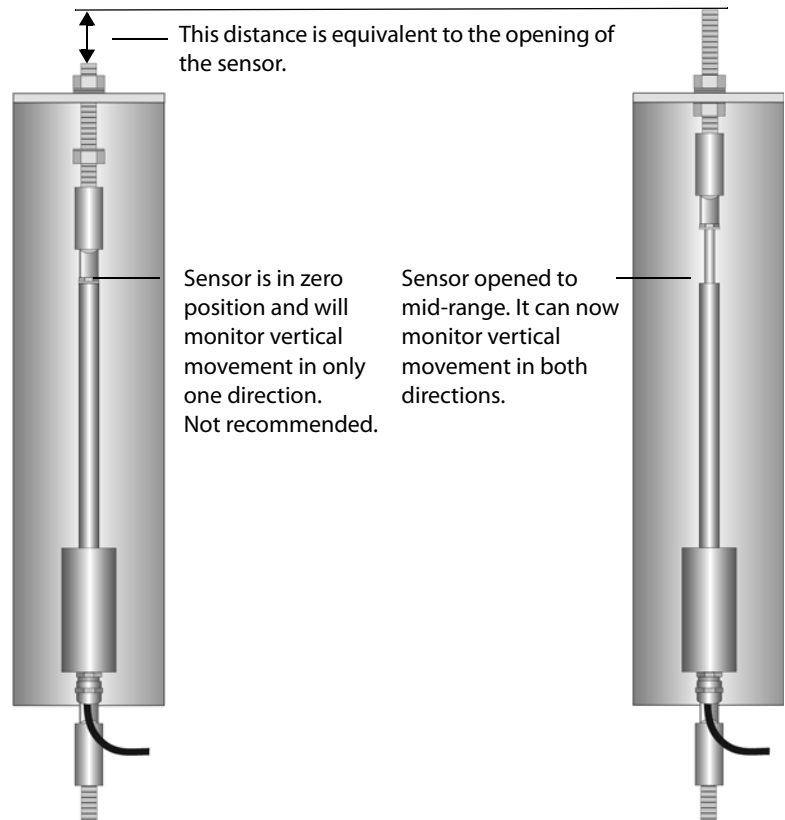
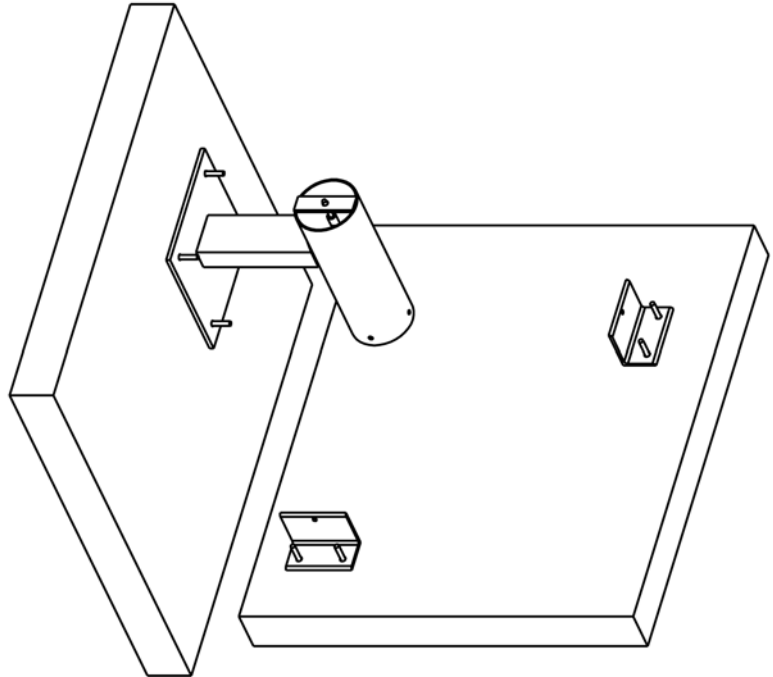
Install Z sensor and bracket

1. Look at the next page also. It will help you plan your steps.
2. Connect Z sensor to Z anchor. Take care that you turn only the connecting nut. Do not twist the sensor or the cable.
3. Insert Z sensor's leader rod through top of Z bracket. Then slide Z bracket over sensor and onto anchors on surface A.



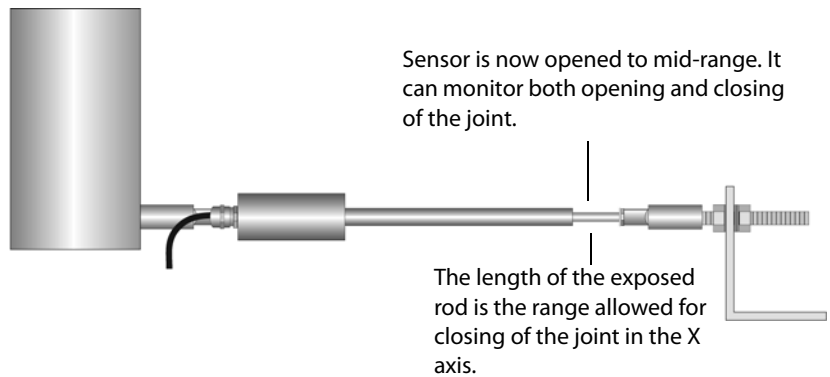
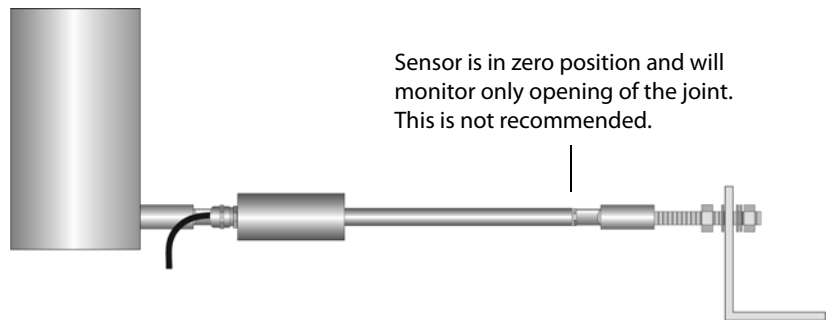
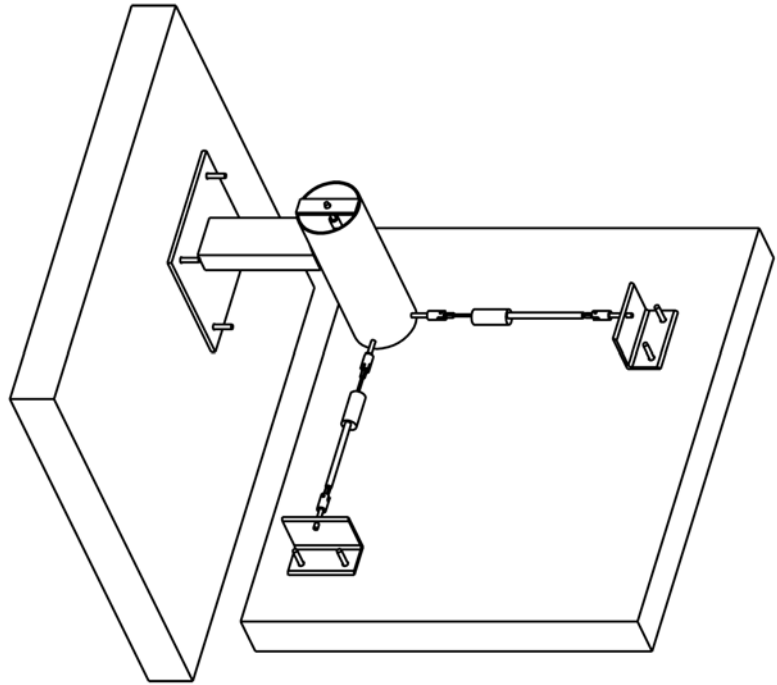
Adjust Z Sensor

1. Remove leader rod.
2. Pull up on bolt to adjust the starting position for sensor. Use a readout and adjust the sensor to obtain a mid-range reading or simply measure with a ruler.



Install X and Y Sensors

1. Install X and Y brackets and sensors.
2. Adjust starting position of sensor. Use a readout and adjust the sensor to obtain a mid-range reading or simply measure with a ruler.



Taking Readings

Test Readings

- You should take readings before the sensors are installed to check that they are working properly. Use the sensor calibration sheets to convert frequency readings to units of length.
- You should also take readings immediately after sensors are installed to check that they are still working.

Initial Readings

- You should take a set of initial readings to serve as the baseline readings. All subsequent readings will be compared to the baseline readings, so these initial readings are especially important.
- Note the time, temperature, weather conditions. These should be as close to typical as possible.
- If the sensors are underwater, allow at least four hours for full temperature equilibrium.
- If the sensors are not in water, take some measures to prevent heating by the direct sunlight. Then, when the sensors have cooled to the ambient air temperature, obtain the initial readings.

Using Portable Readouts

These instructions tell how to read Vibrating Wire (VW) sensors with Slope Indicator's portable readouts. Instructions for reading VW sensors with a Campbell Scientific loggers can be found in the support - technotes section of at www.slopeindicator.com.

Reading with the 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 + Thermistor.
3. Select the 1400-3500 Hz range.
4. The recorder displays sensor reading in Hz and a temperature reading in degrees C.

**Reading with the
VWP Indicator**

1. Connect signal cable to the VWP indicator as shown in the table below.
2. Select the 1.4-3.50 kHz range with the Sweep key.
3. Select Hz with the Data key.
4. Read the RTD: Select °C with 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

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 jointmeter is typically calibrated in mm. If you require inches, divide the mm value by 25.4.

Calculate Changes

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

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 jointmeter readings.