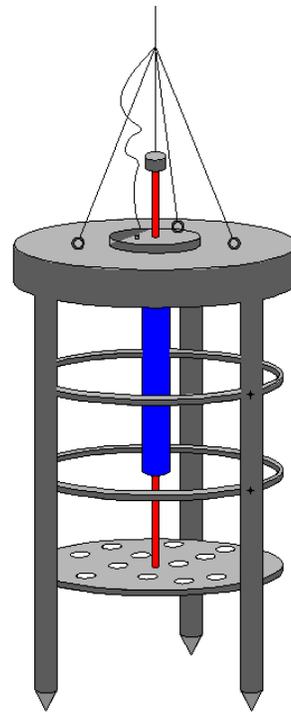


Ding Inspection Device

User's Manual

DID200Z



Safety Precautions

Before using this product, please ensure that you read the safety precautions described below. Always ensure that the product is used correctly.

- Always Store this equipment in a secured place
- Used only recommended power sources
- Do not attempt to disassemble, alter or apply heat to the product
- Avoid dropping or subjecting the product to severe impacts
- Stop using the product immediately if it emits smoke, a strange smell, or otherwise behaves abnormally.
- Do not use organic solvents such as alcohol, benzine, or thinner to clean the product.

Ding Inspection Device
DID200Z/DID300Z

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Introduction

About Ding Inspection Device

A Ding Inspection Device (DID) includes a measuring unit and control cable, a signal readout unit, and an optional pulley system. The measuring unit consists of a system of Linear Variable Deformation Transformer (LVDT), three legs, two middle rings, and a bottom plate.

DID200Z is used to measure the sediment thickness up to maximum 100 millimeters (4 inches) in a confined or remote space, such as a drilled shaft.

This Manual

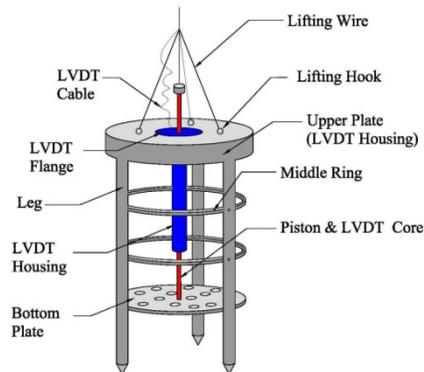
This manual addresses the use and maintenance of DID200Z. It also provides an overview of taking readings.

The Measuring Unit

Parts of the Unit

The measuring unit consists of a stainless steel upper plate, three legs, a LVDT housing embedded in the upper plate, a LVDT core piston, a bottom plate attached to the tip of the piston, three hanging wires attached to the cable.

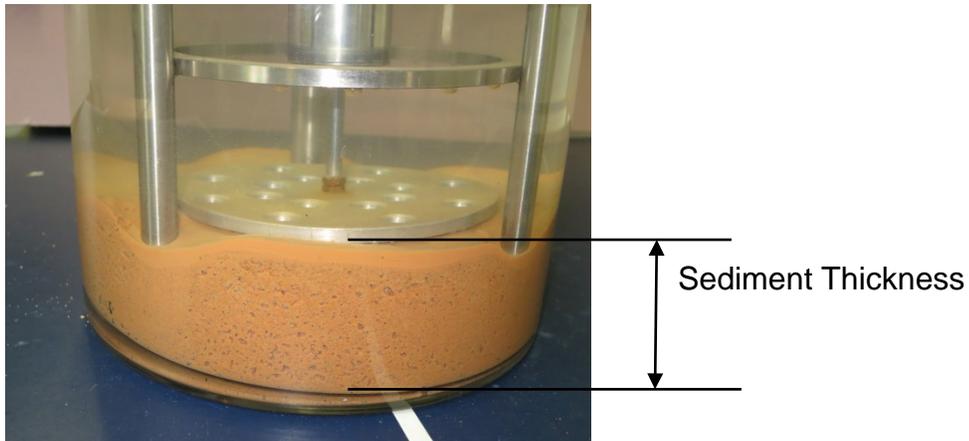
When properly connected, the whole system is waterproof.



Measurement

DID measuring unit employs LVDT for the measurement of the sediment thickness. The electronic signals generated from the LVDT are converted to the digital readings in the readout unit either in the Metric or English length units. When the bottom plate is at same level with the tips of the legs, the reading is "Zero". Once DID measuring unit reaches to the bottom of a shaft, the legs will penetrate through the sediments and touch the harder bottom. The bottom plate of the device will stay on top of the sediments. The distance between the

tips of the leg and the bottom plate is the thickness of the sediments. The digital readout shows the thickness to a millimeter (0.04 inches).



To take readings at different locations, lift the measuring unit to make sure that the penetration legs are out of the sediments. Lower down the measuring unit and take the readings on the readout unit.

Handling Measuring Unit

The device is a sensitive measuring instrument. Handle it with care.

Always transport the device in its carrying case. If you drive to a project site, carry the case in the passenger compartment, preferably on a passenger seat.

When you connect the cable to the device, avoid overtightening the nut, since this could flatten the thread and reduce its effectiveness.

Before you lower the device into the boring hole, turn the power on.

When you lower the probe into the borehole, try to slowly lower the device on to the bottom, not to strike the bottom.

Caring for the Unit

This is an overview. See the last chapter, Inspection and Maintenance, for additional information.

Cleaning the Device:

When you finish an inspection, wipe moisture off the measuring unit. If necessary, rinse the device in clean water or wash it with a laboratory grade detergent when you return to the office.

Storing the Device:

The measuring unit should always be stored in the provided case and in a dry place.

Control Cable

Introduction

Control cable is used to estimate the depth of the device and conducts power to the LVDT of the measuring unit and returns signals to the readout unit.

The cables are graduated with yellow markers at 5-foot intervals and red marks at 10-foot intervals.

Cable Tips

Connecting Cable:

When you connect the cable to the measuring unit, avoid overtightening the nut, since this will flatten the thread and reduce its effectiveness.



Cleaning the Cable:

If necessary, rinse the cable in clean water or wash the cable in a laboratory-grade detergent, such as Liquinox. Do not use solvents to clean the cable. Be sure the protective cap is in place before immersing the end of the cable in water.

Cleaning Connectors:

If it is necessary to clean the connector, use a cotton swab moistened with a small amount of clean water. Do not use spray lubricants or electric contact cleaners. Solvents contained in such products will attack the inserts in the connectors.

Drying Connectors:

When you return to the office, remove protective caps from the control cable, probe, and readout unit. Allow connectors to air-dry well for a number of hours.

Storage:

Store cable on a cable reel when possible. The reel should have a minimum hub diameter of 150 mm (6 inches).

Digital Readout Unit

The digital readout unit is designed to convert the electronic signals generated from the measuring unit to digital readings in the unit of either inches or millimeters.



Digital Readout Unit (0.0 mm reading)

The digital unit should be connected to the control cable and a power source of 110/220 volts.

Store the digital readout unit in in the provided case and in a dry place.

Pulley Assembly(Optional)

The pulley assembly consists of a hanger and a pulley. The hanger is to assist the measuring unit to reach the center of a drilled shaft when the diameter of the hole is beyond the reachable distance of a human arm (greater than 4 feet diameter). The hanger is made up of several pieces of connected units for the location adjustment of the measuring unit. The pulley helps to lower DID into a shaft bottom and retrieve the measuring unit.



Hanger and Pulley Assembly (Optional, the design of the actual part could vary)



Pulley Reel (Optional)

Taking Readings

Setting Up

When you arrive at a project site, lay out a plastic sheet or tarp on a flat ground to set the equipment on. You should have the measuring unit, the readout unit, the cable, and the pulley assembly.

For the shaft diameter less than four (4) feet, no pulley assembly is needed. You can reach the center and the perimeter of a drilled shaft to measure the sediment thickness with your arm.

For the shaft diameter greater than four (4) feet, it is suggested to use a pulley assembly to reach the center of a drilled shaft. You should attach the pulley assembly and connect the cable through pulley first.

Align the key with the keyway in the connector and measuring unit. Then insert the connector and tighten the nut to secure the connection. Do not over-tighten the nut, since this will flatten the threads and reduce its effectiveness.

Connect the power source (110V/220V) to the readout unit and turn the power on.

There could be a background noise reading of less than 1.00 mm while the measuring unit stands on the ground and the bottom plate is flush with the tip of the legs.

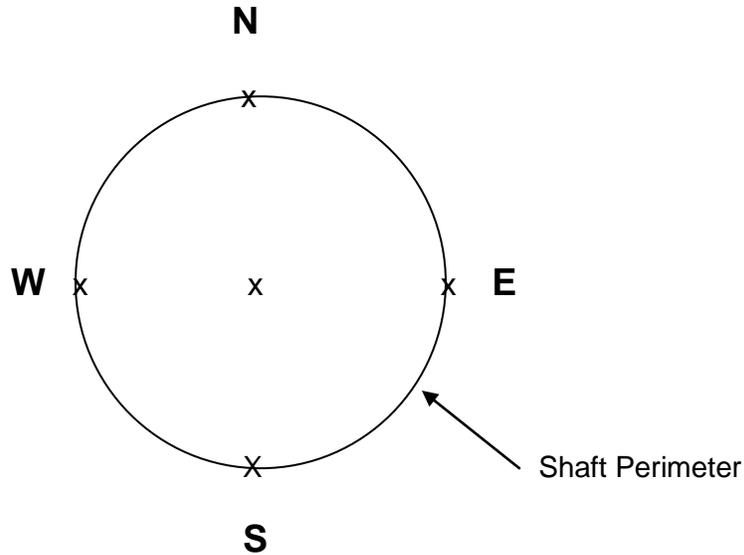
Positioning and Taking Readings

Locate the initial position you want to measure, lower the measuring unit slowly into the hole. This could take a minute or more for a thirty feet deep hole.

Once the measuring unit touches the bottom, take reading shown on the readout unit.

Raise the measuring unit at least a foot and place the unit at different locations. Record the readings on the readout unit accordingly.

For the inspection of a drilled shaft, it is recommended that a center reading and four additional readings at the perimeter be taken.



X – Recommended Positions for the Measurement and Readings

Field measurements should be recorded in a similar format in next page.

DID Field Test Records

Date:

Weather:

Project Name:

Project Location:

Drilled Shaft Contractor:

Field Technician:

Shaft Number:

Shaft Diameter:

Shaft Location:

Bottom Soil/Rock Classification:

Ground Elevation:

Top of Casing Elevation:

Design Depth:

Actual Depth:

Time of the measurement:

Field Measured Sediment Depth (mm)

Location	North	East	South	West	Center	Average
1 st Cleanout						
2 nd Cleanout						
3 rd Cleanout						

Specifications

F or DID200Z:

Height:	13 inches (34 cm)
Width:	7 inches (12cm)
Weight:	18 lbs. (8.2 kg)
Power Requirements:	110V ~ 240V
Maximum Measurement:	4 inches (100 mm)
Accuracy:	0.04 inches (1 mm)