DATA DIGGER EQUIPMENT

DATA SHEET

STRAIN GAUGE

MODEL DDE-5500 A.W
MODEL DDE-5500 E.B

Introduction

Data Digger's Equipment models DDE-5500AW and models DDE-5500AW A strain gauge is a sensor used to measure the strain (deformation) of an object when it is subjected to stress. It operates on the principle that the electrical resistance of a material changes when it is stretched or compressed. Typically, strain gauges consist of a thin metal foil or wire arranged in a grid pattern and bonded to the surface of the object being measured. As the object deforms, the strain gauge deforms as well, causing a change in its resistance, which is proportional to the amount of strain. The change in resistance is measured and converted into a strain value using a Wheatstone bridge circuit. Strain gauges are widely used in industries such as aerospace, automotive, civil engineering, and materials testing. They are critical in monitoring structural health, stress analysis, and load testing. Strain gauges offer high sensitivity and accuracy, making them ideal for measuring small deformations. They are often integrated into testing and monitoring systems for real-time feedback.

Features

- Strain gauge sensors can detect very small changes in strain, providing precise measurements of deformation.
- They can be applied to various materials and structures, including metals, plastics, and composites, in different industries.
- Strain gauges are compact and can be applied to objects without significantly altering their properties or dimensions.
- These sensors provide continuous, real-time data, enabling ongoing monitoring of stress and strain in structures or equipment.

Application

- Strain gauge sensors are used in load cells to measure weight and force in industrial and commercial applications.
- They monitor the deformation of structures like bridges, buildings, and dams to ensure safety and detect damage.
- They are used in pressure sensors to detect the strain caused by pressure changes in systems such as hydraulics or fluid management.
- Strain gauge sensors are used to measure stress and strain on aircraft and spacecraft components during testing and operation.

Description

Arc Weldable Type

Arc weldable strain gauges are specifically designed to be used in applications where welding is required. These sensors have a unique feature that allows them to be directly welded onto the surface of a metal structure without damaging the strain gauge or affecting its performance. They are typically used in heavy-duty applications like structural monitoring of steel structures, pressure vessels, and pipelines. The strain gauge is often bonded with a protective layer to withstand the high heat generated during the welding process, ensuring reliable performance under harsh conditions.

Embedment Type Strain Gauge

Embedment type strain gauges are designed to be embedded within materials such as concrete, composites, or other structural elements during their fabrication or installation. These sensors measure the internal strain or stress within a material, providing valuable data on how the material is responding to external forces. Embedment strain gauges are often used in the construction industry for monitoring concrete structures, tunnels, and foundations, as they provide long-term, real-time monitoring without the need for external contact. They are highly durable and can be integrated into structures during their formation for continuous monitoring over time.

Operating Principle

The Vibrating Wire strain gauges/meter basically consists of magnetic, high tensile strength stretched wire, one end of which is anchored and the other end is displaced proportionally to the variation in strain. Any change in strain, directly effects the tension of the wire, resulting in a corresponding change in frequency of vibration of wire.

The wire is plucked by a coil magnet, proportionate to the tension in the wire, it resonates at a frequency. To summarize, any variation in strain causes the strain gauges to deflect, this change in tension in the wire thus affecting the frequency of vibration of the wire when it is a vibrating at its natural frequency. The Readout Unit is capable to display the strain in µé (Micro Strain) which is proportional to the square of the frequency.
Embedment Strain Gauge is designed for measuring concrete curing strains and is commonly used for strain measurement in foundations, Piles, Bridges, dams, tunnel linings etc. The Strain has a 150, 250 mm gage lengths making it particularly suitable for use in large aggregate concrete. The gage has a 3000µé (Micro Strain) range and a sensitivity of 1 micro strain.

TECHINAL SPECIFICATIONS

STRAIN GAUGE (ARC WELDABLE)

Model	DDE-5500AW
Standard Range	15000/30000 μ strain
Sensitivity	1 μ strain
Active Gage Length	160mm
Operating Temperature	-20°C to +80°C
Accuracy	±0.1% F.S
Sensor material	Stainless Steel

STRAIN GAUGE (EMBEDMENT WELDABLE)

Model	DDE-5500EB
Standard Range	15000/30000 μ strain
Sensitivity	1 μ strain
Active Gage Length	160mm
Operating Temperature	-20°C to +80°C
Accuracy	±0.1% F.S
Sensor material	Stainless Steel