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Instruction Manual

Model GK-501

Load Cell Readout

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1. INTRODUCTION

The Geokon Model GK-501 Load Cell Readout Box is a portable battery powered instrument for reading full bridge resistance strain gage type load cells, i.e., Geokon Model 3000 series Load Cells.

2. DESCRIPTION

The Readout Box incorporates a 12 volt, 1.2 Ahr Lead acid battery, a 4½ digit liquid crystal display (LCD), a power on/off switch, a battery charger circuit, an AC adaptor connector, a load cell connector and a selector switch.

The GK-501 instrument supplies a precision 2.000 VDC excitation to the full bridge transducer and displays the output in mV/V which is proportional to the load.

The input connector is set up read a full bridge (Wheatstone) with remote sense. This requires a 6 conductor cable. Three shielded pair are preferable, with the shield drain wire(s) grounded appropriately.

Load cells without remote sense can be read by using a special adapter plugged into the load cell connection.

3. OPERATOR INSTRUCTIONS

3.1 Battery Test

It is important that the battery have a sufficient charge in order for the readings to be accurate. This can be checked in two ways.

- 1) Switch the power to the "ON" position then, move the selection control to "BAT". The display should show a reading of 12 volts or more. The Readout may be operated until the battery voltage reads approximately 8 volts, however, the internal lead acid battery can be damaged if discharged below 11.5 volts.
- 2) A second measure of the battery condition is obtained by moving the selection switch to "TEST". The display should then read 2.000 which is the excitation voltage to the bridge.
- 3) A test plug is provided as a reference standard and is mounted on the inside of the lid of the readout. It is used to check functionality of the readout. When plugged in to the readout it gives a reading and the reading should be close to the number engraved on the plug. If not then the box may need service

3.2 Load Measurement

Note the following steps;

- 1) Connect the load cell to the readout box by means of the 10 pin input connector.
- 2) Switch the power switch to the "ON" position.
- 3) Switch the selector switch to the "×1" position.
- 4) Read the display and record.
- 5) If the applied load is so high that the display recording goes above 19999 then move the selection switch to "×0.5" and read the display. When recording the data remember to multiply the reading by 2.
- 6) Power the unit off with the "OFF" switch or it will automatically power off after approximately 4½ minutes of operation.

Battery charging is accomplished by plugging the AC adapter provided into the 3 pin connector on the readout box face plate and into the 120 VAC mains (230 VAC adaptor also available). The charger is automatic and can be left connected to the battery indefinitely. This will preserve the maximum charge condition with no danger to the battery.

CAUTION: Lead acid batteries are good in that they do not have the memory effect of Ni-Cad batteries. However, they do suffer from the disadvantage that they do not always recover from a deep discharge if the battery is allowed to go absolutely flat or dead. So it is important, if the battery is not to be used for an extended period of time, that the charger be left plugged in. Also, one should avoid draining the battery completely.

4. DATA INTERPRETATION

Loads may be calculated from the observed display reading using the formula:

$$\text{Load} = \text{GF} \times (\mathbf{R}_1 - \mathbf{R}_0)$$

Where; GF is the Gage Factor supplied with each load cell (see calibration certificate).
 R_0 is the initial no load zero reading.
 R_1 is a subsequent reading while the load is applied.

As will be seen, it is important to read the load cell at zero load in order to get a value of R_0 . This simple procedure is often forgotten, in which case it is necessary to resort to the calibration sheet where a no load zero reading can be obtained. It is better to measure the no load zero in the field.

Alternatively, where the load cell data supplied includes a "regression zero" then this zero may be used. This will normally improve the accuracy at medium to high loads. However, at low loads it will usually be preferable to use the actual measured no load zero.

5. MAINTENANCE

5.1 General Maintenance

Keep the following points in mind when using the GK-501 Load Cell Readout to maximize reliability and accuracy of the unit.

- The readout box is splash proof, but it will not withstand complete immersion in water.
- The face plate should be kept clean and dry and the box should be stored in a warm dry area when not in use.
- The transducer connector is waterproof.
- The battery charger connector is not waterproof.
- In very wet or humid conditions, the connector should be kept sealed using the plug provided.
- **Do not spray oil or WD40 into the connections.** If they become wet, they must be dried prior to use or errors will likely result. Clean the connections with soap and water and dry thoroughly before use.
- A special test plug is included in the lid of the readout box. This test plug comprises a full bridge circuit of precision temperature matched resistors. When plugged into the load cell connectors it will give a reading on the display which is close to zero. This reading should not change by more than a few digits. If the reading does change a lot, this could be an indication that the internal calibration has altered. In this event the readout should be returned to the factory for inspection and calibration.

5.2 Calibration

The readout should be sent periodically (every 12 months) back to the manufacturer for inspection, cleaning, and calibration. A nominal fee will be charged for the service, but it is highly recommended.

6. SPECIFICATIONS

General

Range:	±19999 digits on ±39998 digits on "×.5"
Resolution:	1 digit on "×1" 2 digits on "×.5"
Accuracy:	0.125% FSR on "×1" 0.125% FSR on "×.5"
Power Requirements:	12 VDC @ 50 mA
Battery Type:	Lead acid 12 volt, 1.2 Ahr
Operating Time:	≈24 hours
AC Adaptor:	120 VAC: 50-60 Hz, 18 VDC, 533 mA 230 VAC: 50-60 Hz, 15 VDC, 800 mA
Dimensions:	6.5 × 4 × 8.5", 165 × 102 × 216mm
Weight:	5 lbs., 2.3 kg.
Materials:	Aluminum case and lid
Operating Temperature:	-20 to +120° F, -30 to +50° C
Display:	4½ digit LCD
Input connection:	Bulkhead: Bendix PTO2A-12-10S Mating: Bendix PY06A-12-10P(SR)
Charger connection:	Bulkhead: Lemo EGG OK 303 CNL(N&W) Mating: Lemo FGG OK 303 CNA C/3.7

Input Connections

Bendix Pin	Circuit Label	Description	Internal Load Cell Wiring	Geokon Purple Cable
A	S-	Bridge Output -	White	White's Black
B	P+	Bridge Excitation +	Red	Red
C	P-	Bridge Excitation -	Black ¹	Red's Black
D	S+	Bridge Output +	Green ¹	White
E	NC	No Connection		NC
F	G	Ground for shield		Shield
G	NC	No Connection		NC
H	NC	No Connection		NC
J	RS+	Remote Sense +	Red ²	Green
K	RS-	Remote Sense -	Black ²	Green's Black

Notes:

¹ Green and black wires switched on Geokon load cells prior to serial number 1190.

² Non-remote sense is optional and must be specified at the time of ordering.

Circuit Diagram

