



Model GK-502

Load Cell Readout

Instruction Manual



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1. INTRODUCTION

The GEOKON Model GK-502 Load Cell Readout is a portable battery powered instrument for reading full bridge resistance strain gauge type load cells, i.e., GEOKON Model 3000 Resistance Load Cells.

The GK-502 incorporates a 12 Volt, 1.4 Ahr Sealed Lead Acid (SLA) battery, 16x2 graphic liquid crystal display (LCD) with backlight, membrane keypad, and battery charger circuit. A side mounted 10-pin military style Bendix® connector provides connection to a load cell, and a second side mounted 10-pin military style Bendix® connector provides a USB connection (COM port) for communications and battery charging.

This unit supplies a precision 2.048 VDC excitation to the full bridge load cell and displays the output in basic engineering units (digits, mV, mV/V), updated at a 1 reading per second rate. It also includes the ability to enter and store a Gauge Factor and Zero Reading for the load cell, which allows for an additional set of engineering units to be displayed (lbs, Kg, Kips, Tons, Metric Tons, and kN). An internal Real-Time Clock/Calendar (RTCC) and non-volatile memory are provided which allows storage for up to 999 time-stamped readings. These stored readings may be displayed via the LCD display, or downloaded to a computer via the COM port for further analysis.

The readout is designed to read both 4-wire and 6-wire full bridge load cells. Internal circuitry senses which type (4 or 6 wire) is connected and provides configuration for the appropriate load cell automatically.

Power consumption of the readout is very low (300mW), and will allow continuous operation for up to 48 hours under normal conditions. Continuous battery monitoring is included that warns the user when the battery is getting low and requires recharging. To prevent damage to the internal battery due to over-discharge, the readout automatically shuts itself off should the battery voltage fall below 10.7 Volts.

2. BASIC OPERATION

2.1 POWER ON THE READOUT

1. Connect the load cell to the readout unit by means of the 10-pin load cell connector.
2. Press the **ON/OFF** switch. The readout display will turn on.

Note: If a load cell is not connected, or if there is a break in the cable between the readout and the load cell, the readout screen will display blinking dashes.

3. If a load cell is detected, the readout will begin taking readings. Cycle through the units by pressing **UNITS**. The available units are:
 - Digits (Dg), which is proportional to the load.
 - Millivolts (mV)
 - Millivolts per Volt (mV/V), which is the proportional reading of the load cell output voltage to the load cell excitation voltage.

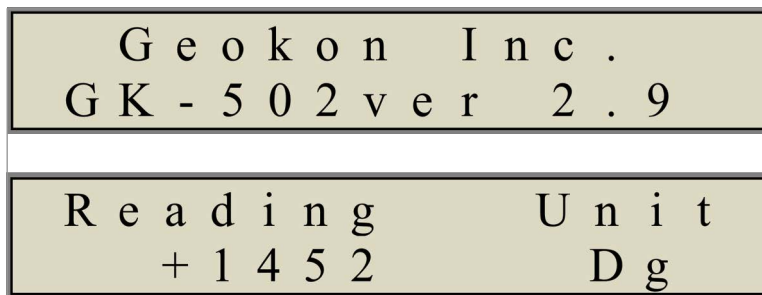


FIGURE 1: Startup Display Screens

2.2 STORE READINGS

To store the reading to memory:

- If storing a Zero Reading **press and hold STORE**.
- If storing subsequent readings press **briefly press STORE**.

Note: An "X" will briefly display while the reading is being stored. If a Zero Reading is stored to memory, *Unit* will be displayed. If a subsequent reading is stored to memory, *Reading* will be displayed. Stored readings, along with the reading number and the date and time that they were taken are displayed using the Configuration menu (refer to Section 3.2).

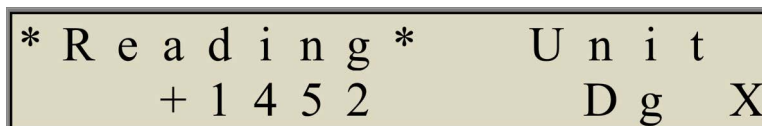


FIGURE 2: Reading Stored to Memory (Example of a Subsequent Reading)

2.3 POWER OFF THE READOUT

Power the unit off by pressing the **ON/OFF** switch. Alternately, the readout will automatically power off after 5 minutes of operation. If 5 minutes of operation is not enough, the power off timer may be changed to 15 minutes, 30 minutes or disabled via the Configuration Menu (see Section 4)

Note: Thirty seconds before the readout automatically powers off, the LCD will begin flashing and the readout will sound a warning that power off is approaching. Should additional operation time be desired, press any of the membrane keypad buttons to reset the power off timer.

2.4 BATTERY CHARGING

Battery charging is accomplished by plugging the provided AC adapter into the 10-pin USB connector on the side of the readout box and into the 120 VAC mains (230 VAC adaptor also available). The charger is automatic and can be left connected to the battery indefinitely. While charging, the LCD backlight will be lit. Once the battery is fully charged, the backlight will shut off indicating that the battery is fully charged.

2.5 LOADING DEFAULT SETTINGS

To restore the readout to its factory default settings, turn on the readout while pressing **UNITS** and **CFG** at the same time. The readout will display two screens (see Figure 3) in succession.

Note: Loading Default Settings will result in the stored Zero Reading being **erased** and the Gauge Factor set to **1.00000**.

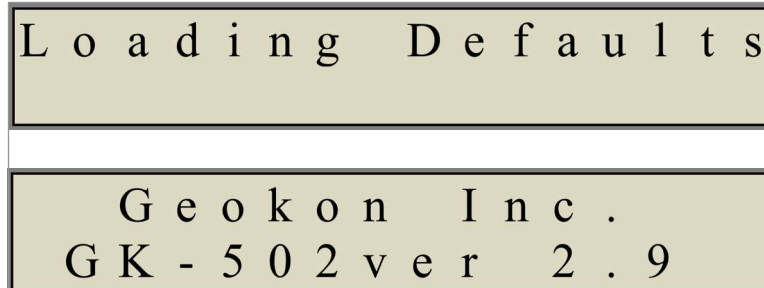


FIGURE 3: Default Setting Display Screens

3. ADVANCED OPERATION

3.1 ADDITIONAL ENGINEERING UNITS

The Model GK-502 is capable of displaying additional Engineering Units other than digits, mV or mV/V. Other available Engineering Units are Lbs, Kg, Kips, Tons, metric Tons and kN.

In order to provide a display of these additional Engineering Units, a Zero Reading needs to be stored and the load cell's Linear Gauge Factor (K) (provided on the load cell calibration report) needs to be entered. Available gauge factor units are lbs/Dg, Kips/Dg, Tons/Dg, metric Tons/Dg and kN/Dg.

Note: The following figures are based off of a 100,000 lb. load cell with $K = 5.239$.

1. Connect the load cell (at zero load) to the readout box via the 10 pin load cell connector.
2. Press the **ON/OFF** switch. The readout will display two screens (see Figure 4) in succession.

Note: The -9 Dg reading will be stored as the Zero Reading of the load cell.

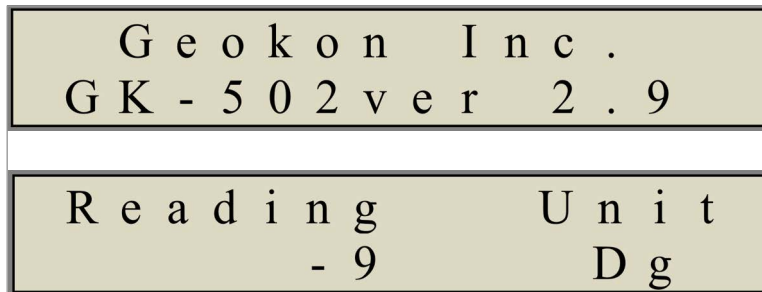


FIGURE 4: Startup Display Screens

3. Press and hold **STORE** to save this Zero Reading to memory. *Unit* will be displayed, signifying that a Zero Reading has been stored.

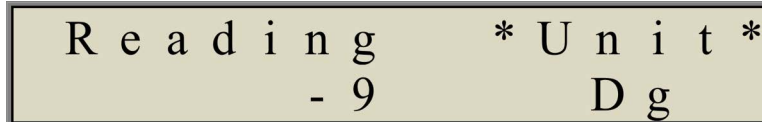


FIGURE 5: Reading Stored to Memory

4. Press **CFG** to enter the Configuration menu. The readout will display two screens (see Figure 4) in succession.

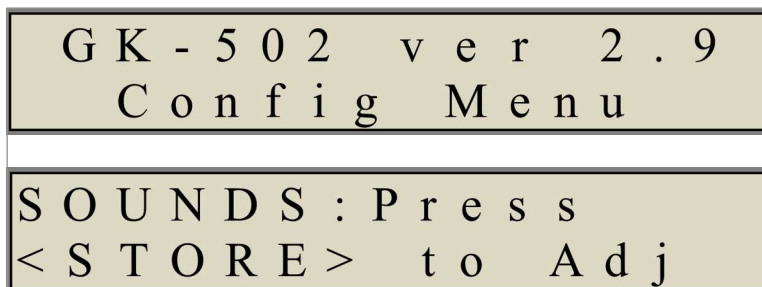


FIGURE 6: Configuration Menu Display Screens

5. Press **UNITS** then press **STORE** to enter the Linear Gauge Factor setup screen.

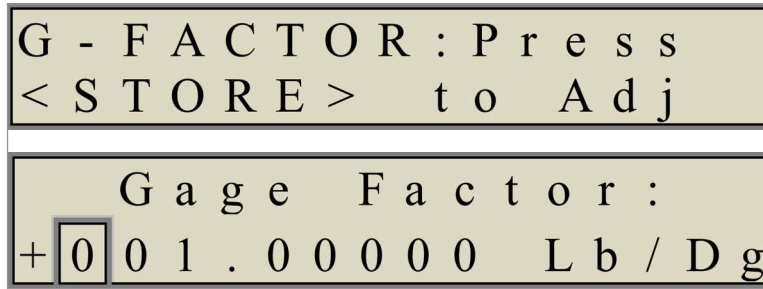


FIGURE 7: Linear Gauge Factor Setup Display Screens

6. The Linear Gauge Factor is always a positive number anywhere between 0 and 999.99999. The cursor will be flashing the HUNDREDS position. Press **UNITS** to move the cursor to the right, and **CFG** to increment the value at the cursor position.
7. **Briefly press STORE** to toggle through the Linear Gauge Factor entry Units (lb/Dg, Kp/Dg, Tn/Dg, mT/Dg, kN/Dg).
8. **Press and hold STORE** to save the Linear Gauge Factor

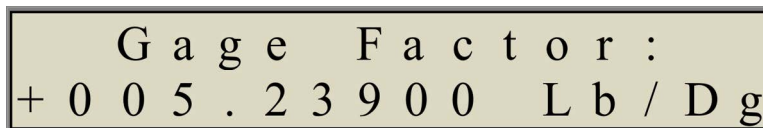


FIGURE 8: Linear Gauge Factor Saved

9. Press **CFG** to exit the Configuration menu and return to the readings screen.
10. The additional Engineering Units are now available for display. Press **UNITS** to scroll through the additional Engineering Units. (Lbs, Kg, Kips, Tons, metric Tons and kN)

3.2 READING STORAGE IN MEMORY VIEW

The Model GK-502 provides storage for up to 999 date and time-stamped readings. Readings are stored in non-volatile memory, and can be viewed via the Memory View screen in the Configuration menu. Stored readings may also be downloaded to a computer via the USB COM port for further analysis. Since the memory is non-volatile, readings will be retained even if the battery runs flat or is disconnected.

The Memory View screen can be viewed within the Configuration menu:

1. Press **CFG** to enter the Configuration menu. The readout will display two screens (see Figure 9) in succession.

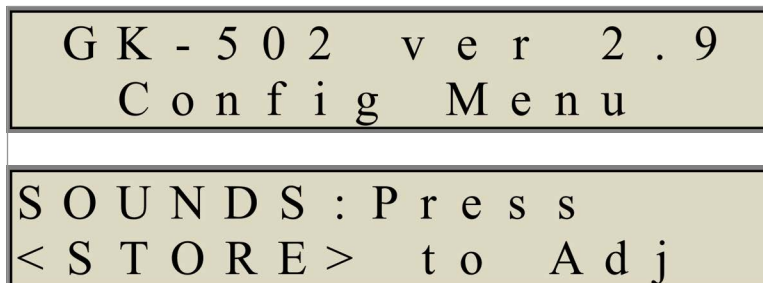


FIGURE 9: Configuration Menu Display Screens

2. Press **UNITS 8 times** to access the Memory View Screen.

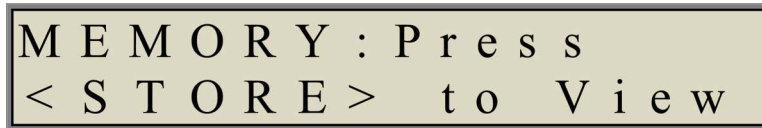


FIGURE 10: Memory View Screen

3. Press **STORE** to cycle through each stored reading. Press **CFG** to scroll backwards through each stored reading.

Note: The date of the stored reading is at the top left of the screen. The Units of the stored reading is at the top center of the screen. The reading number is at the top right of the screen (1 through 999). The time of the reading is at the bottom left of the screen. The reading is at the bottom right of the screen.

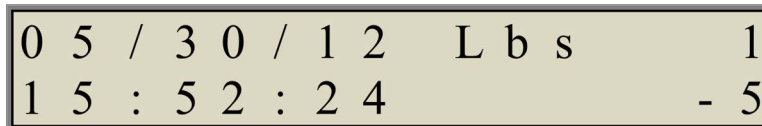


FIGURE 11: Memory View Screen, Example of the First Stored Reading

4. CONFIGURATION MENU

The Model GK-502 includes a Configuration Menu for adjustment of internal settings. The Configuration Menu is accessed from the Readings Screen by pressing the **CFG** button.

Note: While in the Configuration Menu, the Power-Off timer is disabled.

Once inside the Configuration Menu:

- The **UNITS** button is used to advance through the various setting screens.
- In some screens the **UNITS** button is used to decrement settings.
- The **CFG** button is used to increment settings as well as exit back to the Readings Screen.
- The **STORE** button is used to store the settings to non-volatile memory.
- Some settings are updated and stored as each setting is selected.
- Some settings require pressing the **STORE** button to update and store.

A description of each Setting Screen is as follows:

4.1 SOUNDS SETTING SCREEN

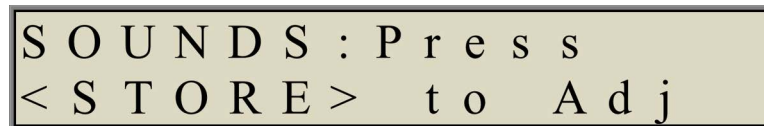


FIGURE 12: Sounds Setting Screen

When entering the Configuration Menu the first setting that displays is the Sounds screen. Cycle through the settings by pressing **STORE**. The setting will be updated and stored as it is viewed on the display. The available settings are:

- All Sounds Enabled (default). This includes KeyClick sounds, Confirmation sounds and Notification sounds.
- KeyClick sounds only
- Disable all sounds

4.2 GAUGE FACTOR SETTING SCREEN

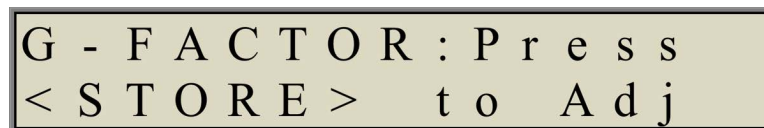


FIGURE 13: Gauge Factor Setting Screen

Refer to Section 3.1 for a complete description of Gauge Factor entry.

4.3 ZERO READING SETTING SCREEN

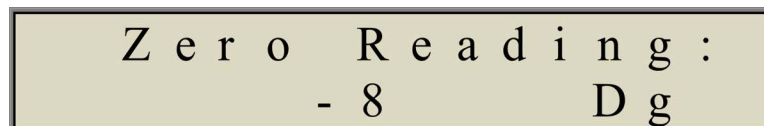


FIGURE 14: Zero Reading Setting Screen

Use this screen to observe the stored Zero Reading. Refer to Section 3.1 for a complete description of storing the Zero Reading.

4.4 BACKLIGHT SETTING SCREEN



FIGURE 15: Backlight Setting Screen

Use this screen to turn the LCD backlight on (default) or off. Turning the backlight off will reduce the power consumption by 3 mA, helping to extend the battery life. Cycle through the settings by pressing **STORE**.

4.5 BATTERY CHECK DISPLAY SCREEN



FIGURE 16: Battery Check Display Screen

Use this screen to check the status of the internal 12V SLA battery voltage. Each bar graph segment represents about 100 mV, with the range being from 11 V (Empty, **E**) to ≥ 12.3 V (Full, **F**).

Once the battery voltage drops to 11.7 V, the display status will change to “LOW”. At this point, the battery charger should be connected to recharge the battery. The battery charger will charge the battery whether the readout is on or off.

The battery voltage is continuously monitored while in the Readings Screen. If the battery voltage drops to 11.7 V while taking readings, a low battery (LOW-BAT) warning message will flash on the screen every 30 seconds.

In both the Configuration Menu and Readings Screen, if the battery voltage continues to drop and reaches 10.7 V, “CHARGE BATTERY” will appear on the screen. At this point, the readout will automatically shut itself off.

4.6 CONTRAST SETTING SCREEN

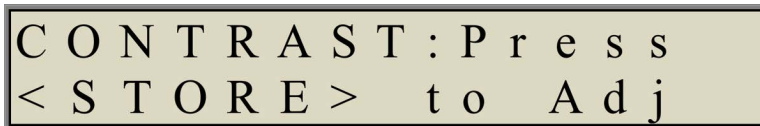
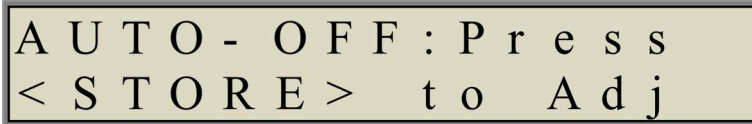


FIGURE 17: Contrast Setting Screen

Use this screen to adjust the LCD Contrast setting to the desired level.

Press **STORE** to enter the Contrast Adjust Setting Screen, and then cycle through the settings by pressing **STORE**. The setting will be updated and stored as it is viewed on the display.

4.7 AUTO-OFF SETTING SCREEN



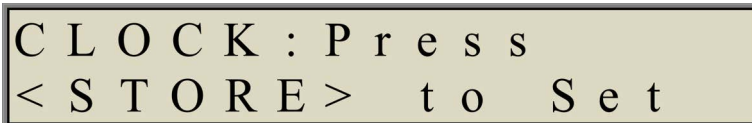
A U T O - O F F : P r e s s
< S T O R E > t o A d j

FIGURE 18: Auto-Off Setting Screen

Press **STORE** to enter the Auto-Off Setting screen, and then cycle through the settings by pressing **STORE**. The setting will be updated and stored as it is viewed on the display. The available settings are:

- 5 Minutes (default)
- 15 Minutes
- 30 Minutes
- DISABLED

4.8 CLOCK SETTING SCREEN

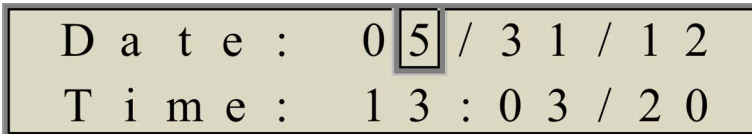


C L O C K : P r e s s
< S T O R E > t o S e t

FIGURE 19: Clock Setting Screen

Press **STORE** to enter the Clock Setting screen. The current date and time is frozen and displayed when entering the Clock Setting Screen, with the cursor blinking at the months digit.

Press **UNITS** to scroll through the date and time settings. Press **CFG** to increment each setting.

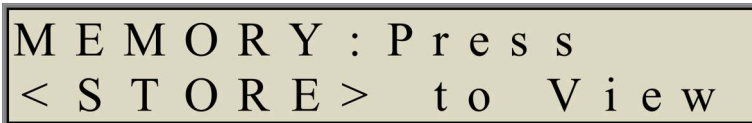


D a t e : 0 5 / 3 1 / 1 2
T i m e : 1 3 : 0 3 / 2 0

FIGURE 20: Setting the Clock

When complete, press **STORE** to load the Clock with the displayed setting.

4.9 MEMORY VIEW SCREEN



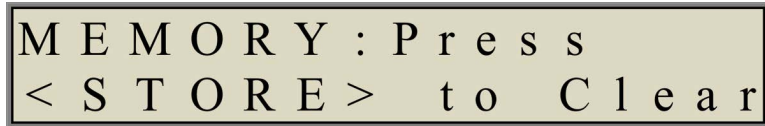
M E M O R Y : P r e s s
< S T O R E > t o V i e w

FIGURE 21: Memory View Screen

Use this screen to observe the stored readings.

Refer to Section 3.2 for a complete description of displaying the stored readings.

4.10 MEMORY CLEAR SCREEN



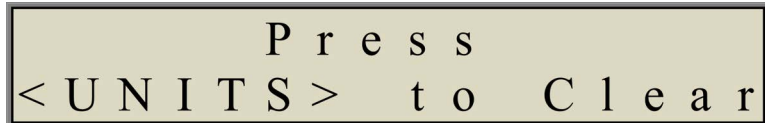
MEMORY : P r e s s
< S T O R E > t o C l e a r

FIGURE 22: Memory Clear Screen

When memory becomes full or otherwise needs to be cleared, Use this screen to clear the memory.

- Press **UNITS** to skip the Memory Clear Screen
- Press **STORE** to enter the Memory Clear screen. The readout will prompt you to confirm.

Important! ALL STORED READINGS WILL BE ERASED!



P r e s s
< U N I T S > t o C l e a r

FIGURE 23: Prompt to Clear

- Press **CFG** or **STORE** to exit without clearing the memory
- Press **UNITS** to clear the memory

5. COMMUNICATIONS

The Model GK-502 includes a USB port to provide communications for monitoring of readings and adjustment of internal settings.

Turn on the readout and connect the supplied USB Communications cable (COM-109) to the readout's USB port. The protective cap on the readout USB connector is removed by pushing in and turning. Plug the USB-A end of the USB cable into an available USB-2.0 port on the host computer.

Note: If the USB cable is connected first and then the readout is turned on, the readout will enter its bootloader function. The segments of the top row of the LCD screen will be dimly lit and nothing will happen for approximately ten seconds. At the end of 10 seconds, the readout will turn on normally. See Section 7 for more information.

Note: On certain PCs with operating systems older than XP, Service Pack 3, the readout may require the installation of a driver to properly communicate with the PC. If the PC does not recognize the readout's internal USB to serial converter when the connection above is performed then the driver should be installed by executing the program CDM20600 on the readout Install CD.

5.1 COMMUNICATION SETTINGS

The Model GK-502 will appear to the PC as a virtual COM port. To communicate with the readout, set up this COM port as follows:

Setting	Required Value
Baud Rate (Bits Per Second)	115,200
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	None

TABLE 1: Communication Parameters

6. COMMANDS

The commands listed here are to be used if communications between the Model GK-502 and the host computer are established via a terminal emulator (i.e. Windows Hyper Terminal).

As soon as communications are established, the readout will begin transmitting readings in real time to the host computer:

2012,06,04,08,27,52,+19082,Dg,1

2012,06,04,08,27,53,+19082,Dg,1

2012,06,04,08,27,54,+19082,Dg,1

2012,06,04,08,27,55,+19082,Dg,1

Readings are transmitted in ASCII comma- delimited format. Readings are updated once each second, and each reading string contains nine (9) fields:

YYYY,MM,DD,hh,mm,ss, reading,units,battery check

YYYY: Year

MM: Month

DD: Day

hh: Hour (24 hour format)

mm: minute

ss: second

reading: current displayed reading

units: current displayed units

battery check: 1=battery ok, 0=battery low

Commands are entered while readings are being taken and displayed.

Pressing ? <ENTER> while in communications displays a list of commands:

All of these commands are executed by typing the command and pressing <ENTER>. If the command was not entered correctly, the readout will ignore what was entered.

The purpose and syntax of each of these commands are indicated in Table 2.

Command	Description	Syntax and Details	The Readout Screen will Display:
BL	BackLight status	View the current B ackLight status	If the backlight is ON: BackLight ON If the backlight is OFF: BackLight OFF
BL0	turn BackLight OFF	Turn the B ackLight OFF (0)	BackLight OFF
BL1	turn BackLight ON	Turn the B ackLight ON (1)	BackLight ON
C	view current Clock	View the current C lock settings	Example: Date: 06/04/12 Time: 10:43:08
CSmm/dd/yy/ hh:mm:ss	Clock Set	Set the internal clock (C lock S et). mm = month dd = day of the month yy = year hh = hours mm = minutes ss = seconds Leading zeros are not needed except on the minutes and seconds entries. Illegal combinations will be ignored (i.e. CS02/30/12 or CS///12:60). Fields can be left blank to avoid changing (i.e. CS//12 to just change the year).	For example, if entering CS///10:45:00 the readout displays: Date: 06/04/12 Time: 10:45:00
D	Display stored readings	D isplay the stored readings. The date and time that the reading was taken (timestamp) is displayed, along with the reading, the units of the reading, and the reading number.	All readings stored in memory will be displayed, example: 2012,6,4,09,30,22,+19082,Dg,1 2012,6,4,09,30,26,+100019,lbs,2 2012,6,4,09,30,30,+45359,Kg,3 2012,6,4,09,30,39,+100.02,Kips,4 2012,6,4,09,30,42,+50.01,Tns,5 If there are no stored readings: Memory Empty - No Readings Stored
DEFAULT	Load factory DEFAULT settings	Load the factory default settings. Loading Default Settings will result in the stored Zero Reading being erased and the Gauge Factor set to 1.00000 . The readout will ask to verify before executing. Press Y to continue, any other key to abort. <u>Factory Default Settings</u> Gauge Factor: 1 lb/Dg Zero Reading: NONE Backlight: ON Contrast: 50% Auto-Off: 5 minutes Sounds: All Sounds Enabled	DEFAULT This will load the factory default settings! Are you sure(Y/N) ?Y Restored to factory default settings.
E	Turn-off GK-502	Turn off the readout. Note: If the readout is shut-off by using the "E" command, the USB cable will need to be unplugged in order to turn on normally from the keypad.	OFF
G	view Gage factor	View the stored G auge factor. The readout will display 1.00000 as the default gauge factor.	Example: 1.00000

Command	Description	Syntax and Details	The Readout Screen will Display:
GU	view Gage factor Units	View the stored G auge F actor units	Depending on the units of the stored Gauge factor, the readout will display: Lbs/Dg Kips/Dg Tns/Dg mTns/Dg kN/Dg
GF#/nnn.nnn	Gage Factor set	Use this command to enter the linear G auge F actor number (#) and gauge factor units for the load cell. All gauge factor values are positive from 0.00000 to 999.99999.	For example, if entering a gauge factor of 10.4651 with a gauge factor unit of kN/Dg: GF4/10.4651 The readout will display: 10.46510 Entering GU will display: kN/Dg
OFF	Auto-OFF Status	Display the current auto-shut off status	The readout will display 5 Minute Auto-OFF as the default status.
OFF0	Disable Auto-OFF	The auto- off function disabled (0). The readout will only shutoff if the front panel ON/OFF button is pressed, or if the battery voltage falls below 10.7 V	Auto-OFF Disabled
OFF5	5 Minute Auto-OFF	Set the readout to turn off automatically after 5 minutes of operation. Note: Any front-panel keypress will reset the auto-off timer.	5 Minute Auto-OFF
OFF15	15 Minute Auto-OFF	Set the readout to turn off automatically after 15 minutes of operation. Note: Any front-panel keypress will reset the auto-off timer.	15 Minute Auto-OFF
OFF30	30 Minute Auto-OFF	Set the readout to turn off automatically after 30 minutes of operation. Note: Any front-panel keypress will reset the auto-off timer.	30 Minute Auto-OFF
R	Reset memory	e Rase the readings stored in memory. Gauge Factor settings, as well as the real-time clock settings, are not affected by this command. User will be asked to verify before executing. Press Y to continue, any other key to abort.	R Are you sure (Y/N) ?Y Memory Cleared.
RESET	RESET processor	RESET (re-boot) the readout microprocessor. All stored readings, settings and clock settings will be retained. Note: It takes approximately 10 seconds for RESET to complete. The readout opening screen will appear when reset is complete. Important: It is a good idea to reload the default settings of the readout immediately after a RESET by using the "DEFAULT" command, or by loading default settings on Power-Up (refer to Section 2.5). Not doing so may cause the readout to stall and not take readings. Loading Default Settings will result in the stored Zero Reading being erased and the Gauge Factor set to 1.00000.	RESET Resetting... RESET COMPLETE
S	Store Reading	S Store the current reading to memory.	*

Command	Description	Syntax and Details	The Readout Screen will Display:
SND	Sound Status	Display the current SOUND settings	The readout will display All Sounds Enabled as the default setting.
SND0	All Sounds	Enable all (0) of the SOUNDS . These include KeyClicks, Confirmation and Notification sounds	All Sounds Enabled.
SND1	Keyclicks Only	Enable the SOUNDS of KeyClicks (1) only and disable Confirmation and Notification sounds	KeyClicks Only.
SND2	No Sounds	Disable all (2) of the SOUNDS . These include KeyClicks, Confirmation and Notification sounds	No Sounds Enabled.
SV	Software Version	Display the S oftware (firmware) V ersion (revision) of the readout	Example: SV Software version: 2.9
U	display Units	Display the current U nits of the reading	Example: Dg
U0	mV	Change the readings' current U nits to millivolts (0)	mV
U1	mV/V	Change the readings' current U nits to millivolts per Volt (1)	mV/V
U2	Dg	Change the readings' current U nits to digits (2)	Dg
U3	lbs	Change the readings' current U nits to pounds (3)	lbs
U4	Kg	Change the readings' current U nits to kilograms (4)	Kg
U5	Kips	Change the readings' current U nits to kilopounds (5)	Kips
U6	Tons	Change the readings' current U nits to tons (6)	Tns
U7	metric Tons	Change the readings' current U nits to metric tons (7)	mTns
U8	kN	Change the readings' current U nits to kilo Newtons (8)	kN
UF	Update Firmware	Causes the readout to enter U ppdate F irmware mode. See Section 7 for further information.	See Section 7
V12	display 12V battery voltage	Display the 12 V battery voltage	Example: 12V Battery Voltage = 12.93V
ZR	display Zero Reading	Display the stored Z ero R eadng	The zero reading stored in memory will be displayed. Example: Zero Reading = -5.6 Dg If there are no stored readings: Zero Reading not Stored.
ZR1	store Zero Reading	Store (1) the current reading as the Z ero R eadng	Zero Reading = -7.1 Dg
ZR0	clear Zero Reading	Clear (1) the Z ero R eadng from memory	Zero Reading not Stored.

TABLE 2: List of Commands

7. FIRMWARE UPDATE



Model GK-502



Software Resources

The Model GK-502 provides the capability of updating its firmware while in the field. There is no need to return the readout to the factory in order to have its firmware updated.

Firmware updates are required as new features are added, or bug fixes are incorporated. The current revision is available on the Model GK-502 product page: geokon.com/GK-502 or the software downloads page: geokon.com/Software.

Firmware updates may be accomplished via the readout's communications (COM) port. The firmware update application (tinybldWIN.exe) is a third party application written by Claudiu Chiculita of the University of Galati, Romania.

7.1 UPDATE FIRMWARE

The following example describes the procedure for updating a Model GK-502.

1. Make sure that your readout is **not** connected to the host computer's USB port at this time.
2. Open **GK-502.zip**. Use an unzip program (e.g. WinZip) to unzip and install the following files within the folder:
 - **tinybldWin.exe**: The application that installs the firmware
 - **piccodes.ini**: Configuration information used by tinybldWin.exe
 - **tinybld.ini**: Configuration information used by tinybldWin.exe
 - **GK502ver2_7.hex**: GK-502 firmware that will be downloaded to the readout. Version 2.7 is shown as an example here.
 - **Model GK-502 Firmware Upgrade Procedure**: PDF file of this procedure

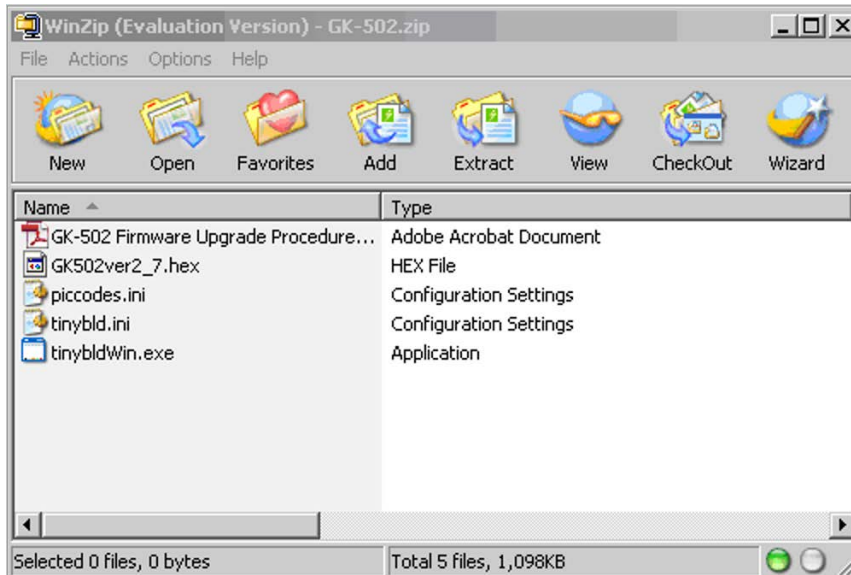


FIGURE 24: GK-502.zip Files

3. Extract these five files to a folder (e.g. C:\Temp) located on the host computer:

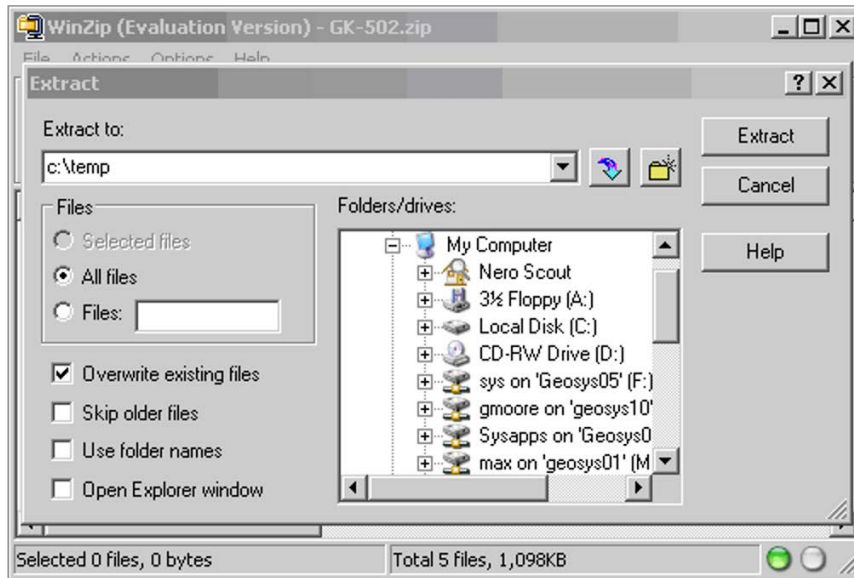


FIGURE 25: Extract Onto Host Computer

4. Double click on tinybldWin.exe to run the firmware update (bootloader) process. The program displays the **M**essages screen along with the COM port (COM5) selected and the default baud rate (115200) that will be used. Note that all available COM ports are displayed in the Comm list box. Select the applicable COM port for the readout.



FIGURE 26: Run tinybldWin.exe

5. Select the firmware file (.hex) that the readout will be updated to (see Figure 26). Clicking **B**rowse displays the file open window. Click the .hex file that you wish to use (in this case GK502ver2_7.hex) and then click **O**pen.

6. Clicking the **T**erminal tab displays the **T**erminal screen. This screen is used to communicate with the readout and set it up for firmware update.
 - a. Turn on the readout and allow it to start taking readings.
 - b. Connect one end of the COM port cable to the readout and the other end to the computers' USB port.
 - c. Click **O**pen to open the selected COM port and allow communications with the readout.

Note: If unable to establish communications with the readout, skip to Section 7.2.

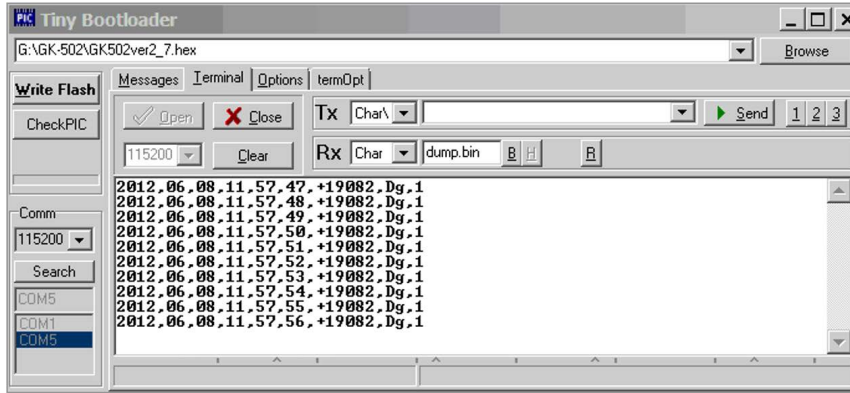


FIGURE 27: Communicate with the Readout

7. If not already set, select **115200** in the drop-down list for the baud rate (next to the **C**lear button). Then click in the large white area of the **T**erminal screen and press **<Enter>**. The readout will respond by displaying current readings in real time.

The readout is now in communications and ready to receive commands.

8. Type **UF** (Update Firmware) and press **<Enter>** to start the firmware update process. Type **Y** **<Enter>**. The readout now waits for the firmware (GK502ver2_7.hex) to be transmitted.

Note: If no file is transmitted within 30 seconds, the readout “times-out” and returns to taking readings. If this should happen, press **<Enter>** and repeat the Update Firmware command.

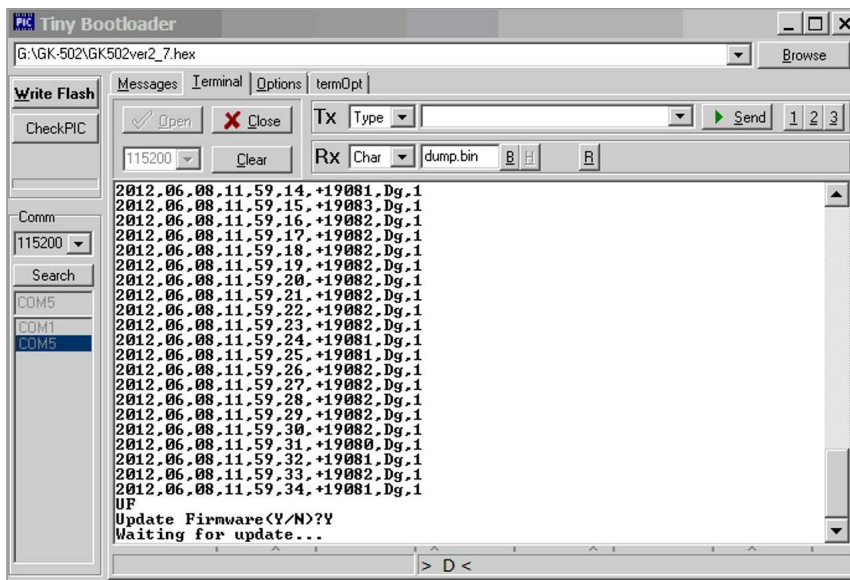


FIGURE 28: Start the Firmware Update Process

- From the **T**erminal screen, after typing **UF, Y** and **<Enter>**, click **C**lose and then click **W**rite **F**lash.

The **M**essage screen appears and displays “Searching for PIC...”. Once the software detects the readout’s microprocessor, the message “Found ds6014/6012” is displayed. At this stage the progress bar located beneath the Abort Search button becomes active and the transmission of file GK502ver2_7.hex to the readout begins.

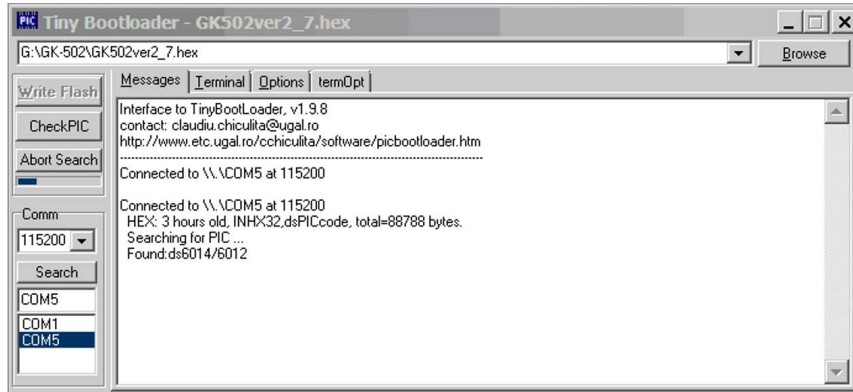


FIGURE 29: Update Firmware

7.2 UPDATE FIRMWARE (ALTERNATE):

In cases where the readout has lost the ability to communicate with the host computer, firmware may be updated by allowing the readout to “power-up” into the bootloader.

Follow Step 1 through 4 in Section 7.1, then proceed through the steps below.

- Prepare the **M**essages screen with the correct COM port and .hex file that you want to load to the readout.
- Connect the USB cable to the readout COM port and the host computers’ USB COM port.
- Turn on the readout. Note that the top row of LCD segments are dimly lit.



FIGURE 30: Display is Dimly Lit

- Click **W**rite **F**lash. The **M**essage screen again appears and displays “Searching for PIC...”. Once the software detects the readout’s microprocessor, the message “Found ds6014/6012” is displayed. At this stage the progress bar located beneath the Abort Search button becomes active and the transmission of file GK502ver2_7.hex to the readout begins.

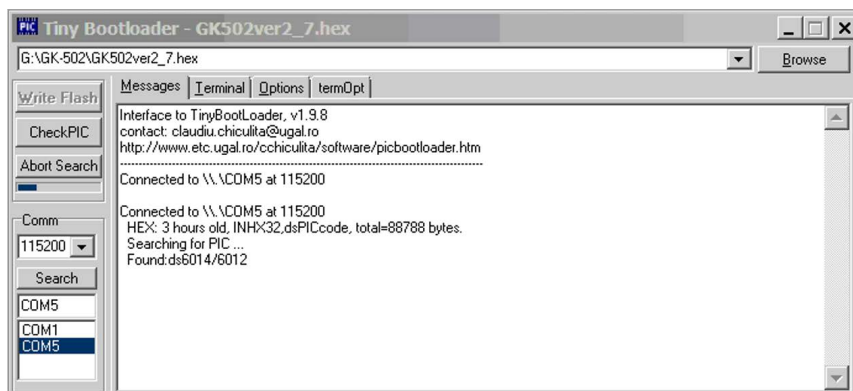


FIGURE 31: Update Firmware

- At the conclusion of the firmware update process, the Terminal screen reappears and the message "Firmware Update Complete" is displayed, along with the version of firmware that was loaded. At this point, the firmware update process is complete.

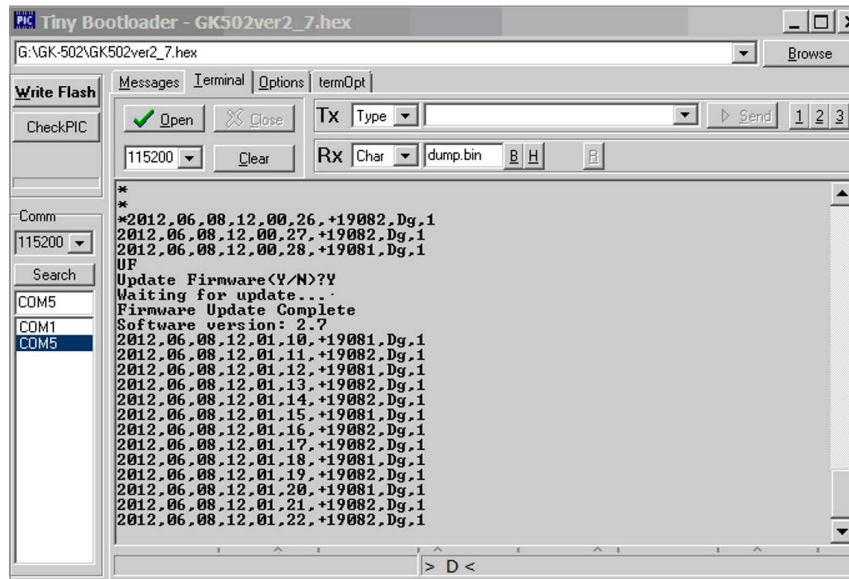


FIGURE 32: Firmware Update Complete

8. MAINTENANCE

8.1 GENERAL MAINTENANCE

Keep the following points in mind when using the Model GK-502 Load Cell Readout to maximize reliability and accuracy of the unit.

- It is a good practice to periodically check the GEOKON website for any GK-502 firmware releases, and to update the readout when new firmware releases are available.
- 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 LOAD CELL and COM connector connectors are waterproof.
- In very wet or humid conditions, the connectors 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.

8.2 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.

APPENDIX A. SPECIFICATIONS

A.1 MODEL GK-502 SPECIFICATIONS

Range (S+S-)	±16 mV (±31250 digits)
ADC	Differential 24bit Sigma Delta
ADC Resolution	1.9 nV
Display Resolution	1 uV (mV, mV/V) 1 digit (Dg) 1 lb (lbs) 1 kg (kg) 0.01 kip (kips) 0.01 ton (tons) 0.01 metric ton (metric tons) 0.01 kN (kilonewton)
Accuracy	± 0.1% (± 30 digits)
Excitation Voltage / ADC Reference	2.048 V (± 0.001 V) 3 ppm/°C
Power Requirements	Operation: 12 VDC @ 22 mA Off: 12 VDC @ 16 µA
Battery Type	Lead acid 12 Volt, 1.4 Ahr
Operating Time	≈48 hours
AC Adaptor	120/230 VAC: 50-60 Hz, 18 VDC, 1.66 A
Dimensions	165 × 102 × 216 mm (6.5 × 4 × 8.5")
Weight	2.3 kg (5 lbs)
Materials	Aluminum case and lid
Operating Temperature	-30 to +50 °C
Display	16 x 2 graphic LCD with backlight
Connectors	Bulkhead: Bendix PT02A-12-10S Mating: Bendix PY06A-12-10P(SR)

TABLE 3: Model GK-502 Load Cell Readout Specifications

APPENDIX B. RESISTANCE LOAD CELL WIRING

B.1 REMOTE SENSE WIRING CONNECTION (WITH GK-502 READOUT)

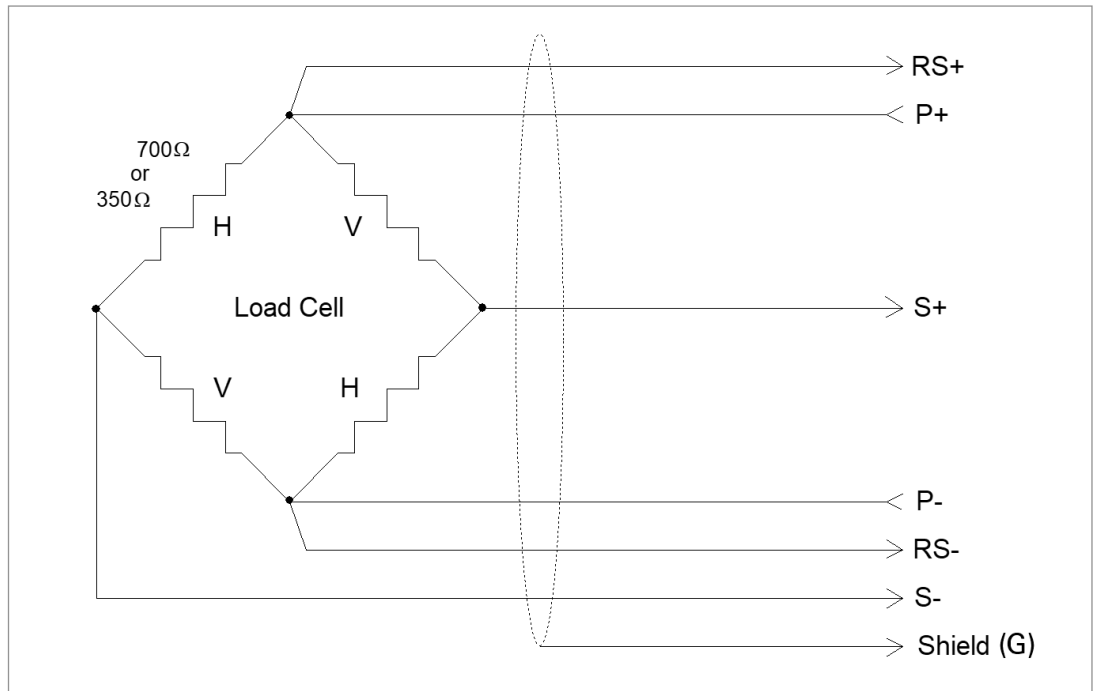


FIGURE 33: GK-502 Readout Wiring Diagram

Bulkhead (10-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	N/C	N/C
F	G	Ground for Shield	N/C	Shield
G	NC	No Connection	N/C	N/C
H	NC	No Connection	N/C	N/C
J	RS+	Remote Sense +	Red ²	Green
K	RS-	Remote Sense -	Black ²	Green's Black

TABLE 4: GK-502 Readout Wiring Table

Note:

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.

B.2 USB CONNECTOR

Bulkhead (10-Pin)	Circuit Label	Description	Internal Ribbon Cable Wiring
A	USB_VCC	USB +5V	Brown
B	USB_DM	USB Data -	Red
C	USB_DP	USB Data +	Orange
D	USB_GND	USB Ground	Yellow
E	NC	No Connection	N/C
F	NC	No Connection	N/C
G	CHG+	Charger +	N/C
H	CHG-	Charger -	N/C
J	NC	No Connection	N/C
K	NC	No Connection	N/C

TABLE 5: USB Connector Table

GEOKON®

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Phone: +1 (603) 448-1562
Email: info@geokon.com
Website: www.geokon.com

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