GS Series User's Manual

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Introduction

Thank you for choosing the Quantrol GS series instrument. With correct use and regular re-calibration it will give many years of accurate and reliable service.

The GS can measure tensile and compressive forces accurately, while being simple to use by the operator. It may be used handheld or mounted top a fixture or test stand.

Quantrol offers software and accessories to make your force gauge even more versatile. Ask your Quantrol distributor for additional information or visit our website at www.quantrol.com

Before Use

Upon receiving the unit please check that no physical damage has occurred to the packaging material, plastic case or the instrument itself. If any damage is evident please notify Quantrol immediately.

Operation Overview

The most commonly used features (such as displaying force, peak hold, zero and changing of displayed units) can all be done by pressing a single dedicated key identified on the font panel-see the *Basic Functions* section.

You can press a menu key to access the gauge configuration- see the *Main Menu* section.

Powering the first time

The GS is supplied with a set of 6 Nickel Metal Hydride AAA rechargeable batteries. For safety reasons during transportation the batteries are shipped discharged. To obtain maximum battery life we recommend that you charge them with the charger/adaptor supplied for at least 14-16 hours when you first receive the instrument.

Battery Indicator


Battery level > 7.2 V


7.2 V > Battery level > 7.0 V


7.0 V > Battery level > 6.55 V


6.55 V > Battery level > 6.1 V


Battery level < 6.1 V

If battery level is less than 6.0 V, The " battery empty" message will be displayed and the gauge will power down automatically.

Important: Only use the adaptor/charger supplied.

Using the GS

Fitting Accessories

Couple fittings directly to the load cell stem or use an extension rod. The threads are 10-32 in capacities up to 1000 N, and 5/16-18 in the 2500 N capacity.

Ensure that fixturing does nor contact the force gauge case.

Ensure that anything coupled to the gauge is screwed finger-tight only. Excessive torque can damage the load cell and is not covered by warranty.

Mounting to a Fixture or Test Stand

The two 10-32 threaded holes on the rear of the gauge can be used for mounting the gauge. The distance between the holes is 2.5 inch. A versatile stand mounting plate is available to couple the force gauge to many brands of test stands.

Powering up

As show in Figure 1 the control panel has eight keys.

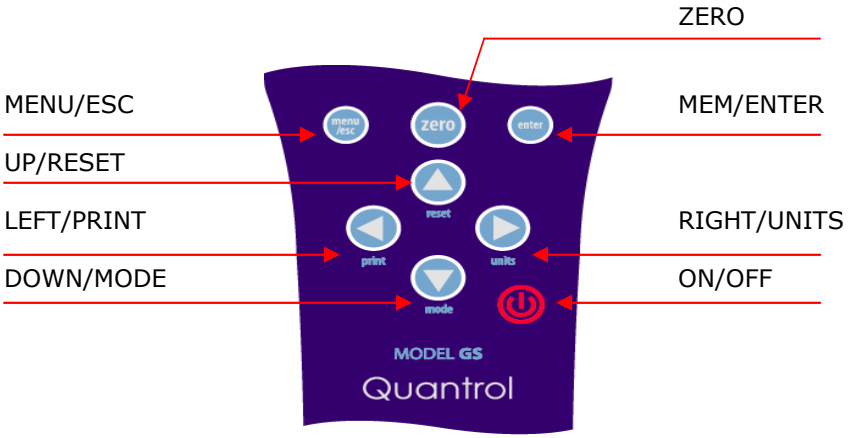

Figure 1 GS control panel

To power up the gauge press the ON/OFF key. A short self-test runs during which the display will show the capacity in Newton.

After the self test, providing no load has been applied to the instrument, the display will show all zeroes. This is because the gauge re-zeroes itself during the self-test routine.

**If a force is applied via the load cell probe (hole at bottom of GS), the reading on display will register the applied force.*

**Forces may not show zero if it is moved during the self test routine.Once it is properly mounted and zeroed the reading will be stable.*

***Do not overload** the load sensor. This will cause irreparable damage. Forces greater than 120% of full-scale will produce an audible beep and OL symbol will blink on the display until load is release and RESET key is pressed.

To power down the gauge press the ON/OFF key.

**All the current settings are saved when the gauge is turned off and the gauge will function in the same mode when powered up again.*

Basic Functions

Tensile forces are displayed on the GS and recognized by the symbol ⬍, Compressive forces are displayed on the GS and recognized by the symbol ⬍

Display of Tension/Compression

Figure 2 Tension and compression displays

A load indicator bar alerts the operator to how much load has been applied to the load sensor.

For tensile force the indicator bar is move from right to left. For compressive forces the indicator bar is move from left to right.

Zeroing the gauge During the operation of the gauge it is often necessary to zero the display – e.g. when you wish to tare out the weight of a grip, so it does not become part of the measured reading. Press and release the ZERO key.

Changing the unit of measure You can choose from the following units of measure depending on the capacity of your gauge: milliNewtons, kiloNewtons, Newtons, gram-force, kilogram-force, ounce-force or pound-force.

To change the display units press the UNITS key. Each successive key press will select the next available units until the gauge returns to its original setting. The GS automatically converts readings as new unit of measure are selected.

*****Note*: All units may not be displayed depending on gauge capacity.*

Changing the mode of measure You can choose from the following modes of measure: Track, Peak-Tension, and Peak-Compression,

To change the display mode press MODE key. Each successive key press will select the next available modes until the gauge returns to its original setting.

Track mode Press MODE key until the TRACK appeared on the display. The display will now indicate forces applied in both directions as they are applied to the load sensor and maintain the live display. See Figure 3a

Figure 3a Track

Peak-Tension mode Press MODE key until the PEAK ⇕ appeared on the display. The display will show the maximum tensile force. See Figure 3b

Peak Tension symbol →

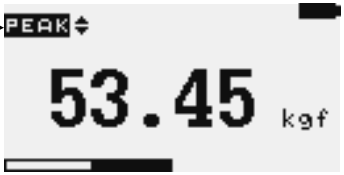

Figure 3b Peak Tension

Peak-Compression mode Press MODES key until PEAK ⧗ appeared on the display. The display will show the maximum compressive force. See Figure 3c

Peak Compression symbol →

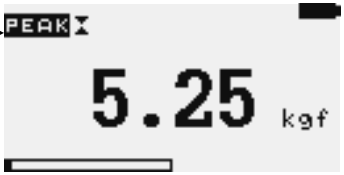

Figure 3c Peak Compression

Resetting the gauge Press RESET key to clear both maximum registers and prepare for detecting the next maximum readings.

Computer Control of Force Gauge A computer can control the force gauge by sending RS-232 commands.

RS-232 Command	Action
"m"	Changing measure mode.
"u"	Changing measure unit.
"z"	Zero the gauge.
"r"	Reset the gauge.

RS232 output signal The displayed reading may be transmitted to PC by pressing the PRINT key or sending request command from PC to the gauge

RS232 command	Action
"l"	Send live reading value with unit.
"p"	Send peak tension value with unit.
"c"	Send peak compression value with unit.
"x" or pressing PRINT key	Send live reading value with unit, if current mode is track mode. Send peak tension value with unit, If current mode is peak tension mode. Send peak compression value with unit. If current mode is peak compression mode.
"!"	Send information of gauge (model, capacity, serial number, firmware revision, original offset, current offset, overload count).

Main Menu

Press MENU/ESC key to access the main menu. To move between the option listed on the main menu page, press UP and DOWN arrow keys to move the cursor. Press ENTER to select the sub-menus, activate feature and enter values. Within sub-menus UP, DOWN, LEFT and RIGHT arrow keys will also change numerical values. Press ESC to return to the main menu page.

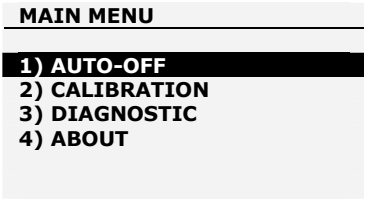

Figure 4 Main Menu

1) AUTO-OFF Press the MENU key, the display will show main menu page and use UP and DOWN to move the cursor point to *AUTO-OFF*. Press the ENTER key. The display will show the Auto-off menu page. Press ESC key to return to the main menu page.

An Auto-off feature can be enabled to conserve battery power where the gauge powers down after 5,10 and 15 minutes (depend on Auto-off time) since the last key press. The *AO* will appear in the main display if you activate this feature.

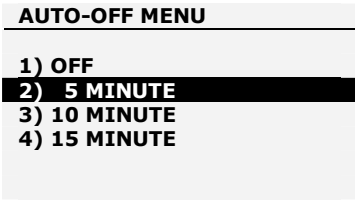

Figure 5 Auto-Off Menu

Use UP and DOWN key to move the cursor. Press the ENTER key to select auto-off option and return to main menu page.

2) CALIBRATION This is used by service technicians when calibrating the gauge. Contact your Quantrol distributor for details.

3) DIAGNOSTIC This is used to check status of the load cell. If you suspect that your load cell transducer has sustained an overload it is possible to check the status of the load cell immediately.

Place the gauge horizontally on the flat level surface and go to main menu page. Use UP and DOWN key to move the cursor point to *DIAGNOSTIC* and press ENTER key the display will show Diagnostic menu page. Press ESC to return to main menu page.

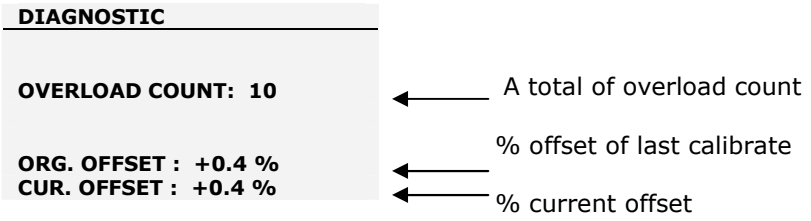

Figure 6 Diagnostic Menu

If the % offset is between 5% - 10 % please contact your supplier to arrange a recalibration of your gauge.

If the % offset is greater than 10% please contact your supplier to arrange for load cell replacement.

These values are given as an indicator only – the need for calibration/repair may vary according to the individual characteristics of the load cell.

6) ABOUT This shows the information of your gauge (Firmware revision, Model, Capacity, Serial number). To access *ABOUT* menu, go to main menu page and press UP and DOWN to move the cursor point to *ABOUT* and press ENTER key the display will show About menu page. Press ESC key to return to main menu page.

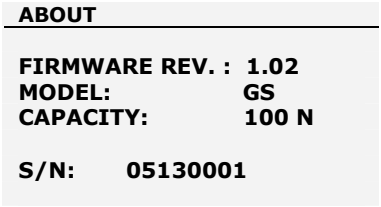

Figure 7 About Menu

Measurement practice

For best measurement accuracy keep the compression/tension forces in line with the force gauge. Alleviate bending loads and torque loads applied to the load cell as these can adversely affect measurement performance.

Always keep the gauge below the capacity limit shown on the front of the gauge. If gauge is used above this capacity in either tension or compression, even for a short time, permanent load cell damage can result. Overload damage is not covered by warranty.

GS Specifications

Capacity and Divisions

Model No:	mN	N	kN	g-f	kg-f	oz-f	lb-f
GS 5	5000 x 2	5 x 0.002	-	500 x 0.2	0.5 x 0.0002	17.5 x 0.010	1.1 x 0.0005
GS 10	10000 x 5	10 x 0.005	-	1000 x 0.5	1 x 0.0005	35 x 0.02	2.2 x 0.0010
GS 25	25000 x 10	25 x 0.010	-	2500 x 1.0	2.5 x 0.0010	87.5 x 0.05	5.5 x 0.002
GS 50	50000 x 20	50 x 0.02	-	5000 x 2	5 x 0.002	175 x 0.10	11 x 0.005
GS 100	-	100 x 0.05	-	10000 x 5	10 x 0.005	350 x 0.2	22 x 0.010
GS 250	-	250 x 0.10	-	25000 x 10	25 x 0.010	875 x 0.5	55 x 0.02
GS 500	-	500 x 0.2	-	50000 x 20	50 x 0.02	1750 x 1.0	110 x 0.05
GS 1000	-	1000 x 0.5	1 x 0.0005	-	100 x 0.05	-	220 x 0.10
GS 2500	-	2500 x 1.0	2.5 x 0.0010	-	250 x 0.10	-	550 x 0.2

Accuracy: ± 0.25 % of rated capacity
Operating temperature: 60 ºF - 95 ºF (15 ºC - 35 ºC)
Temperature shift at zero load: ± 0.04 % of full-scale/ºC

Output

RS-232: 8 data bits, 1 Start bit, 1 Stop bit, no parity
Baud rate: 38400
Peak Capture Rate : 0.100 mS
ADC Sampling Rate : 1,000 Hz

Conversion Factor

Unit	mN	N	kN	g-f	kg-f	oz-f	lb-f
mN	1	0.001	1e-6	101.97e-3	101.97e-6	3.597e-3	224.81e-6
N	1000	1	0.001	101.97	101.97e-3	3.597	224.81e-3
kN	1e6	1000	1	101.97e3	101.97	3597	224.81
g-f	9.807	9.807e-3	9.807e-6	1	0.001	35.28e-3	2.205e-3
Kg-f	9807	9.807	9.807e-3	1000	1	35.28	2.205
oz-f	278.01	0.27801	278.01e-6	28.345	28.345e-3	1	0.0625
lb-f	4448.2	4.4482	4.4482e-3	453.5	0.4535	16	1