Digital Force Gauge with RS232 Output

840060
Instruction Manual
CONTENTS

FEATURES .................................................................................................................. 3
FRONT PANEL DESCRIPTIONS ................................................................................. 4
MEASUREMENT PROCEDURES .................................................................................. 5
  Preparations for Measurements ............................................................................ 5
  Average Reading Measurements .......................................................................... 6
  Peak Load Measurements ...................................................................................... 7
MOUNTING HOLES & OPTIONAL TEST STAND ...................................................... 7
APPLICATIONS ........................................................................................................... 8
  Electronics .............................................................................................................. 8
  Business Equipment ............................................................................................... 8
  Chemical & Plastics .............................................................................................. 8
  Machinery & Manufacturing ............................................................................... 9
  Automotive ........................................................................................................... 9
  Other Industries ................................................................................................... 9
BATTERY REPLACEMENT ....................................................................................... 10
SPECIFICATIONS ...................................................................................................... 10
WARRANTY .................................................................................................................. 12
FEATURES

• 5000 gram wide capacity, high resolution, high accuracy, and high repeatability
• 3 display units: grams, Newton, or ounces
• Tension and compression capabilities
• Peak hold (max. load) can be displayed while measuring tension or compression
• The “Zero” button works during normal measuring and “peak hold” operations
• Full capacity zero (tare) control
• Fast/Slow response time button
• Positive or reverse display selection
• Full line of adapters are included
• Hand held or stand-mounted gauges are available
• Low power consumption for extended battery life
• Low battery indicator
• Microprocessor circuit and exclusive load cell transducer
• Overload protection
1 Universal Sensing Head
2 LCD Display
3 Fast Indicator
4 FAST/SLOW Button
5 LCD Reverse Display Button
6 Zero Button
7 g/oz/Newton Unit Switch
8 Power Off/On/Peak Hold
   0 = Off, 1 = On
9 Mounting Holes/ Fixing Screws
10 Battery Cover/ Compartment
11 Flat-Head Adapter
12 Cone Adapter
13 Chisel Adapter
14 Hook Adapter
15 120 mm Extension Rod
MEASUREMENT PROCEDURES

Measuring Consideration
The Tension & Compression measuring function is executed automatically.

When making the compression measurement, the display will show the “-” mark automatically.

When making the measurement, the SENSING HEAD along with the adapter has to be on a line with the measuring object. (ref. Fig. 2)

Do not rotate the SENSING HEAD. Some certain angles between the SENSING HEAD and the measuring object are not allowed (ref. Fig. 3).
Normal Measurement

- Slide the “PowerOff/On/Peak Hold Switch” (3-8, Fig. 1) to the “On” position.
- Determine display unit of g, oz or Newton by selecting “g/oz/newton Unit Switch” (3-7, Fig. 1).
- Connect “Sensing Head” (3-1, Fig. 1) with proper “Adapter” (3-11 to 3-14, Fig. 1) and the “Measuring Object” should be in a straight line. Don’t give any force in standby mode.
- “Zero Adjust” by pushing “Zero Button” (3-6, Fig 1) before every measurement.
- Start measurement by using force (push or pull), the LCD will display the Average reading value.

Note...
To change the display direction during measurement, push the “Reverse” button one time (3-5, Fig. 1)

* There are two time sampling displays, FAST and SLOW
  Push the “FAST/SLOW Button” once (3-4, Fig. 1), if the upper left corner of LCD displays ([(oJJ). “(Fast Indicator, 3-3, Fig. 1), then the display reading is under the operation of fast sampling time.
* If the upper left corner of LCD does not show the “Fast Indicator” (3-3, Fig. 1), the display reading is under the slow sampling time.
* Over range display of tension function, LCD will show , ----,,
* Over range display of compression function, LCD will show ,”_ - - -_,”
Peak Hold Measurement

The meter can measure the peak value of force both of tension & compression operation. The operation procedures of Peak Hold Measurement are the same as above “Normal Measurement” but slide the “Power Off/On/Peak Hold Switch” (3-8, Fig. 1) to the “PEAK H” position.

Sliding the “Power Off/On/Peak Hold Switch” (3-8, Fig. 1) to the “On” position will cancel the peak hold function.

MOUNTING HOLES

Because the FORCE GAUGE is a precise instrument, best results are obtained when the gauge is fitted to a test stand. Mounting holes are provided on the back of the gauge for easy stand mounting.
APPLICATIONS

Electronics
• Test strength of solder points and spot welds on circuit boards.
• Pull test external leads bonded to ceramic substances.
• Test wire wraps on clip connections.
• Test pull strength of modified wire wrap connection on posts.
• Test spring clip insertion and withdrawal forces.
• Pull test welds in micro-electronic devices.
• Measure torque, timing belt tension, sliding friction, etc., on computer peripheral equipment.
• Test P.C. board insertion force.
• Test insertion and withdrawal forces of various circuit components such as transistors and integrated circuits.
• Test actuating force of snap action switches.

Business Equipment
• Measure force required to perforate cards.
• Measure load on slitter knives.
• Measure actuating requirements of typewriters.
• Test clutch release force.
• Measure torque, timing belt tension (by deflection), sliding friction, etc., on computer peripheral equipment.
• Test adhesion strength of labels and stickers.
• Test load on paper thickness gages.
• Measure tension of pencils.
• Test actuating requirements on push buttons and flip switches.

Chemical & Plastics
• Test film bond strengths.
• Tensile test rubber, fibers and filaments.
• Measure firmness of polyurethane foam.
• Test crush strength of pills (medicine).
• Test peel strength of adhesives.
• Measure compression of ceramic compounds.
• Test vacuum take-down pressure on process machines.

Machinery & Manufacturing

• Test load on wire reel.
• Test force to open cabinet doors.
• Test sprocket chin tension.
• Test pull-out force of drive shaft.
• Rate testing of springs in systems.
• Calibrate a cantilever beam-type Apparatus to obtain a force/deflection relationship.

Automotive

• Measure force of seat belt retraction.
• Measure arm pressure of windshield wipers.
• Measure flip force in mechanical snap action switches.
• Test effort to operate hand tool.
• Test forces required to move linkages and tension cables.
• Measure force of odometer pull.
• Test peel strength of vinyl insert bonded to body side moldings.
• Evaluate physical efforts (door, look, hood, glove compartment, brake pedal, etc.)

Other Industries

• Measure pedal depression force in aircraft.
• Test hardness of gypsum wallboard.
• Test keyboard and pedal contact force of organs and pianos.
• Test force to remove caps of aerosol cans.
• Measure trigger pulling forces on firearms, hand tools etc.
• Test firmness of sausages in casings.
• Test integrity of seals on blister packages and plastic bags.
• Test pressure of surgical instruments (forceps, scissors)
• Test fruit removal force and fruit firmness.
• Measure force on spindles of photographic equipment.

Battery Replacement

• When it is necessary to replace the battery (battery voltage less than approx. 6.8 V), “Lo” will appear on the display.
• Remove battery cover (3-10, Fig. 1) to expose batteries.
• Install the batteries correctly into the case. Permanent damage to the circuit may result from incorrect installation.

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display</td>
<td>LCD (Liquid crystal display) 5 digits, 10 mm (0.4”) digit size</td>
</tr>
<tr>
<td>Display Direction</td>
<td>Positive or reverse direction, select by the push button on the front panel</td>
</tr>
<tr>
<td>Function</td>
<td>Tension &amp; Compression (Push &amp; Pull) Normal force, Peak hold (Max. load)</td>
</tr>
<tr>
<td>Peak hold</td>
<td>Will freeze the display value of the peak load (Max., load)</td>
</tr>
<tr>
<td>Zero</td>
<td>Zero button can be operated both for “normal force” or “peak hold” operation</td>
</tr>
<tr>
<td>Measure Capacity</td>
<td>5000 g/176.40 oz/49.03 Newton</td>
</tr>
<tr>
<td>Resolution</td>
<td>1 g/0.05 oz/0.01 Newton</td>
</tr>
<tr>
<td>Min. display</td>
<td>3 g/0.10 oz/0.03 Newton</td>
</tr>
<tr>
<td>Accuracy</td>
<td>± (0.4% + 1 d), within 23 ± 5°C and under the test weight on 3000 g &amp; 5000 g</td>
</tr>
<tr>
<td>Unit select</td>
<td>g/oz/Newton</td>
</tr>
<tr>
<td>Update time</td>
<td>Fast - Approx. 0.2 second</td>
</tr>
<tr>
<td></td>
<td>Slow - Approx. 0.6 second</td>
</tr>
<tr>
<td>Over range indicator</td>
<td>Display shows “- - - - “ when over range</td>
</tr>
<tr>
<td>Specification</td>
<td>Details</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Overload Capacity</td>
<td>Max. 7 kg.</td>
</tr>
<tr>
<td>Zero Control</td>
<td>Max. full capacity</td>
</tr>
<tr>
<td>Circuit</td>
<td>Exclusive microprocessor LSI-circuit</td>
</tr>
<tr>
<td>Full Scale Deflection</td>
<td>Approx. 2.0 mm max.</td>
</tr>
<tr>
<td>Power Supply</td>
<td>6 x 1.5 V AA (UM-3) size battery or DC 9V adapter (not included)</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>Approx. DC 24 mA</td>
</tr>
<tr>
<td>Transducer</td>
<td>Exclusive load cell</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>0°C to 50°C (32°F to 122°F)</td>
</tr>
<tr>
<td>Operating Humidity</td>
<td>Less than 80% RH</td>
</tr>
<tr>
<td>Dimension</td>
<td>227 x 83 x 39 mm (8.9 x 3.3 x 1.5 inch)</td>
</tr>
<tr>
<td>Weight</td>
<td>551 g (1.2 lb) /with batteries</td>
</tr>
<tr>
<td>Mounting of Holes</td>
<td>Mounting holes are provided on the back case, for easy stand mounting</td>
</tr>
</tbody>
</table>
| Accessories Included           | Operating manual ................. 1 PC.  
                                | Flat-head adapter ................. 1 PC.  
                                | Hook adapter ..................... 1 PC.  
                                | Cone head adapter ............... 1 PC.  
                                | Chisel head adapter ............ 1 PC.  
                                | 120 mm extension rod ........... 1 PC.  
                                | Carrying case ................... 1 PC.  |
WARRANTY

Sper Scientific warrants this product against defects in materials and workmanship for a period of five (5) year from the date of purchase, and agrees to repair or replace any defective unit without charge. If your model has since been discontinued, an equivalent Sper Scientific product will be substituted if available. This warranty does not cover probes, batteries, battery leakage, or damage resulting from accident, tampering, misuse, or abuse of the product. Opening the meter to expose its electronics will break the waterproof seal and void the warranty. To obtain warranty service, ship the unit postage prepaid to:

SPER SCIENTIFIC LTD.
8281 E. Evans Rd., Suite #103
Scottsdale, AZ 85260
(480) 948-4448

The defective unit must be accompanied by a description of the problem and your return address. Register your product online at www.sperwarranty.com within 10 days of purchase.