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1. FEATURES

- * Tension & compression capability
- * Max. load can be held in tension or compression.
- * The zero is set by a single push button.
- * Full capacity zero (tare) control capability.
- * Both hand held & stand mounted gauges are available.
- * Low power consumption gives long battery life.
- * Wide capacity, high resolution, high accuracy, high repeatability.
- * Exclusive microprocessor circuit & exclusive load cell transducer.
- * Fast/Slow response time push button.
- * Build in low battery indicator.
- * Unit (G. oz & Newton) selecting by slide switch.
- * Over load protection.
- * Positive or reverse display direction selecting automatically.
- * Hand held & stand mounted gauges are available.

2. SPECIFICATIONS

Display	5 digits, 10 mm/0.4" LCD (Liquid Crystal Display).
Function	Tension & Compression (Push & Pull). Average & peak load (Max. load) reading.
Measure Capacity	5000 g/176.40 oz/49.03 Newton.
Resolution	1 g/0.05 oz/0.01 Newton.
Min. Display	3 g/0.10 oz/0.03 Newton.
Accuracy	$\pm (0.25 \% + 1 \text{ digits})$, within $23 \pm 5^{\circ}\text{C}$ and under the test weight on 3000 g & 5000 g.

Unit select	g, oz, Newton.	
Update time	Fast	Approx. 0.2 second.
	Slow	Approx. 0.6 second.
Over range Indicator	Display show " - - - - " when in over range status.	
Overload Capacity	Max. 10 kg.	
Zero/tare Control	Max. full capacity. <i>*Zero button can be operated both for "normal force" or "peak hold" operation.</i>	
Full Scale Deflection	Approx. 0.25 mm max.	
Peak hold	Will freeze the display value of the Peak load (Max. load).	
Power Supply	6 x 1.5 V AA (UM-3) size battery or DC 9V adapter (not included).	
Power Consumption	Approx. DC 24 mA.	
Transducer	Exclusive LOAD CELL.	
Circuit	Exclusive microprocessor LSI-circuit.	
Operating Temp. & Humidity	0°C to 50°C (32°F to 122°F). Less than 80% RH.	
Dimension	227 x 83 x 39 mm (8.9 x 3.3 x 1.5 inch).	

Weight	551 g (1.2 LB)/with batteries.
Mounting Holes	Mounting holes are provided on the back of the case for easy stand mounting.
Standard Accessories	Operating manual 1 PC. Flat-head adapter.....1 PC. Hook adapter 1 PC. Cone head adapter1 PC. Chisel head adapter1 PC. 120 mm extension rod.....1 PC. Carrying case1 PC.

3. FRONT PANEL DESCRIPTION

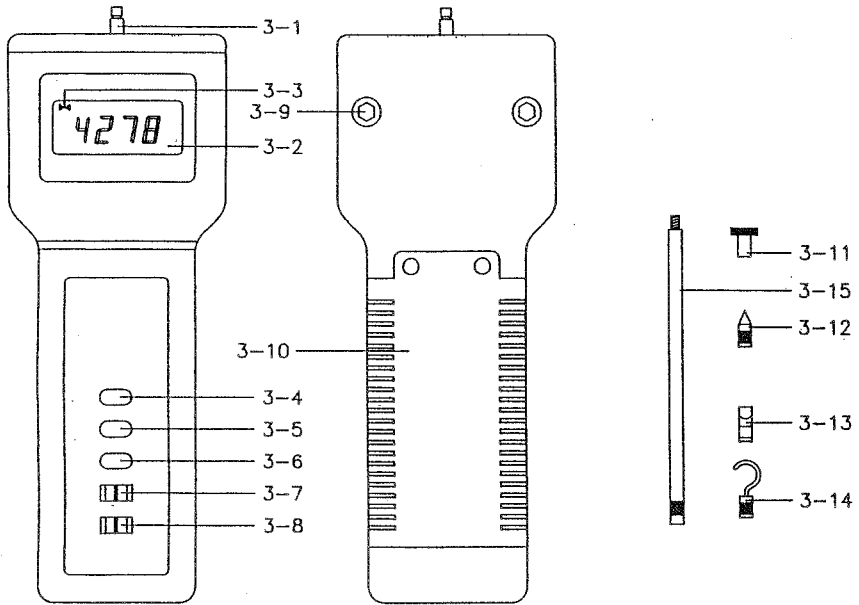


Fig. 1

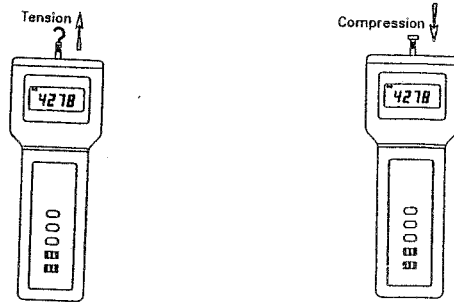
- | | |
|--------------------------------|--|
| 3-1 Universal Sensing Head | 3-8 Power Off/On/Peak Hold
<i>0 = Off, 1 = On</i> |
| 3-2 LCD Display | 3-9 Mounting Holes/fixing Screws |
| 3-3 Fast Indicator | 3-10 Battery Cover/Compartment |
| 3-4 FAST/SLOW Button | 3-11 Flate-head Adapter |
| 3-5 LCD Reverse Display Button | 3-12 Cone Adapter |
| 3-6 Zero Button | 3-13 Chisel Adapter |
| 3-7 g/oz/Newton Unit Switch | 3-14 Hook Adapter |
| | 3-15 120 mm Extension Rod |

4. MEASURING PROCEDURE

4-1 Preparations For Measurement

- 1) The Tension & Compression measuring function is executed automatically.

When make the compression measurement, the display will show the " - " mark automatically.



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

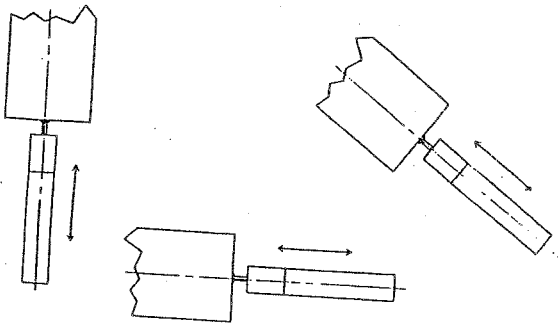


Fig. 2

- 3) Rotate the SENSING HEAD is prohibited. Some certain angles between SENSING HEAD & measuring object are not allowed (ref. Fig. 3).

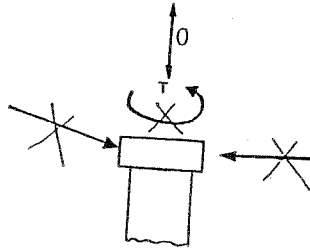


Fig. 3

4-2 Average Reading Measurement

- 1) Slide the " Power Off/On/Peak Hold Switch " (3-8, Fig. 1) to the " On " position.
 $0 = \text{Off}, 1 = \text{On}$
- 2) Determine display unit of g, oz or Newton by selecting " g/oz/Newton Unit Switch " (3-7, Fig. 1).
- 3) Connect " Sensing Head " (3-1, Fig. 1) with proper " Adapter " (3-11 to 3-14, Fig. 1) and the " Measuring Object " should be in straight line. Don't give any force in standby mode..
- 5) " Zero Adjust " by pushing " Zero Button " (3-6, Fig. 1) before every measurement.
- 6) Start measurement by giving force (push or pull), then the LCD will display the Average reading value.

Note :

* During the measurement, if intend to change the display direction, just push the " Reverse Button " (3-5, Fig. 1) once.

* There are two kind sampling time of display, FAST and SLOW. Push the "FAST/SLOW Button" once (3-4, Fig. 1), if the upper left corner of LCD show " (101) " (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 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 "-----"

4-3 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 same as above "4-2 Normal Measurement" but should slide the "Power Off/On/Peak Hold Switch" (3-8, Fig. 1) to the "PEAK H." position.

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

5. BATTERY REPLACEMENT

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

6. 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.

7. APPLICATIONS

7-1 Electronics

- * Test strength of solder points and spot welds on circuit boards.
- * Pull test external leads bonded to ceramic substrates.
- * Test wire wraps on clip connection.
- * 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.

7-2 Business Equipment

- * Measure force required to perforate cards.
- * Measure load on slitter knives.
- * Measure actuating requirements of typewriter.
- * 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.

7-3 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.

7-4 Machinery & Manufacturing

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

7-5 Automotive

- * Measure force of seat belt retractors.
- * 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, lock, hood, glove compartment, brake pedal, etc.).

7-6 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 cover tops 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