SD-6020

REED INSTRUMENTS

Data Logging Force Gauge

WARRANTY 1 YEAR WARRANTY

Instruction Manual

www.REEDInstruments.com

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Introduction

Thank you for purchasing your REED SD-6020 Data Logging Force Gauge. Please read the following instructions carefully before using your instrument. By following the steps outlined in this manual your meter will provide years of reliable service.

Product Quality

This product has been manufactured in an ISO9001 facility and has been calibrated during the manufacturing process to meet the stated product specifications. If a certificate of calibration is required please contact the nearest authorized REED distributor or authorized Service Center. Please note an additional fee for this service will apply.

Safety

Always confirm the force gauge's capacity before use and ensure it is not exceeded. Applying force beyond 150% of the gauge's capacity can damage the internal load cell, regardless of whether the gauge is powered on or off.
Never attempt to repair or modify your instrument. Dismantling your product, other than for the purpose of replacing batteries, may cause damage that will not be covered under the manufacturer's warranty. Servicing should only be provided by an authorized service center.

Features

- Measures tension and compression
- Records in Peak hold or Normal mode
- Fast/Slow response selection
- Full capacity tare (zero) capability
- Force is measured in kg, lb or Newtons
- Easy-to-read backlit display
- Reversible display ensures legible readings regardless of direction
- Real-time datalogger with integral SD memory card
- User selectable sampling rate from 1 to 3600 seconds
- Optional PC software features live tracking via USB connection
- Low battery indicator and auto shut off

Included

- 20kg Force Gauge Datalogger
- Flat Head, Cone Head, Chisel Head and Hook Adapters
- Extension Rod
- Hard Carrying Case
- Batteries

Specifications

Measuring Ranges:	20.00 kg 44.10 lb 196.12 N
Accuracy:	±(0.5% rdg + 2 dgt.)
Resolution:	0.01kg / 0.01lb / 0.02N
Response Time:	Less than 1 sec.
Full Scale Deflection:	0.4mm max.
Display:	4-digit LCD Display
Backlit Display:	Yes
Peak Hold Measurements:	Yes
Zero Adjustment:	Yes
Overrange Indicator:	Yes (Audible alarm at 20kg)
Datalogging Capabilities:	Yes
Real-Time Clock and Date Stamp:	Yes
Selectable Sampling Rate:	Yes (1, 2, 5, 10, 30, 60, 120, 300, 600, 1800, 3600 seconds)
External Memory:	Yes, expandable up to 16GB with SD card (optional)
SD Card Class Compatibility:	Class 4
Auto Shut-off:	Yes (after 10 minutes/off)
Low Battery Indicator:	Yes
Power Supply:	6 x AA batteries or AC Adapter (optional)
Output	Yes
Battery Life	Sampling Time Dependent
PC Connectivity	USB Cable (optional)
Software	SW-U801-WIN (optional)
Software OS Compatibility	Windows XP / Vista / 7
Product Certifications:	CE

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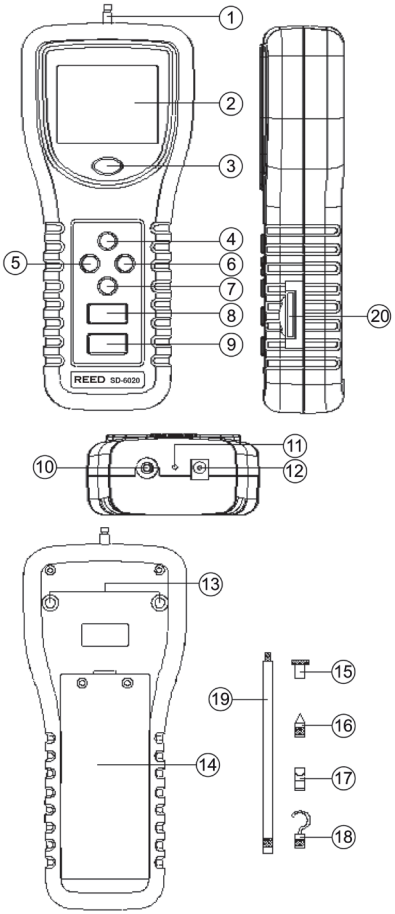
Operating Temperature:	0 to 122°F (0 to 50°C)
Storage Temperature:	14 to 140°F (-10 to 60°C)
Operating Humidity Range:	10 to 85%
Dimensions:	8.5 x 3.5 x 1.8" (215 x 90 x 45mm)
Weight:	1.43lb (650g)

Instrument Description

1. Sensor
2. Display
3. Power & Backlight Button
4. Up & ZERO Button
5. Fast, Slow, & ESC Button
6. Peak & Enter Button
7. Display Reverse & Down Button
8. Time & Set Button
9. Logger & Sampling Check Button
10. USB/RS232 Output
11. Reset Button
12. AC/DC 9V Power Adapter Input Socket
13. Mounting Holes
14. Battery Compartment/Cover
15. Flat-head Adapter
16. Cone Adapter
17. Chisel Adapter
18. Hook Adapter
19. 120 mm Extension Rod
20. SD card slot



Operating Instructions

Power ON/OFF

Turn the meter on by pressing the POWER button. To turn the meter off, press and hold the POWER button for 2 seconds.

Note: This meter can be powered by either six (6) "AA" batteries or AC adapter (sold separately).

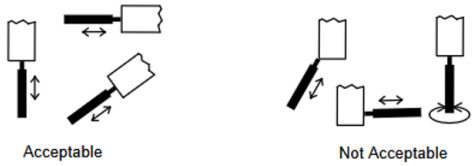
Normal Measurement Mode

When measuring compression, the meter will display a "-" symbol. Ensure the sensor is aligned with the object being measured. Do not measure at an angle, as this may damage the sensor and produce inaccurate readings.

1. Power on the meter.
2. Choose the desired measuring unit. Refer to the Setup Mode section for detailed instructions.
3. Attach the adapter and the object to the sensor. Ensure the object is aligned in a straight line. Do not apply force while in Standby Mode.
4. Press the **ZERO** button before each measurement to reset the meter.
5. Apply force (push or pull) to the sensor. The screen will show the average reading. To change the display direction, press the **REVERSE** button.
6. The meter has two sampling modes: Fast and Slow. The screen will display "FAST" for Fast Sampling and "SLOW" for Slow Sampling. Use the **FAST/SLOW** button to toggle between these modes.

Note: If the tension or compression exceeds the meter's range, the screen will display "----".

Correct and Incorrect Angles of Measurement



Acceptable

Not Acceptable

Peak Hold Measurement

The meter can record the peak force value for both tension and compression measurements. To activate Peak Hold Mode during measurement, press the **PEAK** Button. The display will show the "PEAK" indicator, and the screen will freeze at the peak value detected.

Alarm Beeper

The internal buzzer will activate if the measured value exceeds 20.00 kg, providing an audible alert.

Backlight

After powering the meter ON, the LCD Backlight will turn on automatically. Press the **BACKLIGHT** button to turn the LCD Backlight on or off.

Setup Mode

1. Press and hold the **SET** button for 2 seconds to enter Setup Mode.
2. Press the **SET** button continuously to scroll through the following parameters.

Parameter	Description
Sd F	Format the SD memory card
dAtE	Set the time and date
SP-T	Set the data logging sampling rate
HSPt	Set the data logging sampling rate for peak mode
PoFF	Enable or disable the auto-power off function
bEEP	Turn the beeper on or off
unit	Set the unit of measure
dEC	Set the decimal format (USA (20.00) or European (20.00))
ESC	Exit Setup mode

3. Once the appropriate parameter has been selected, follow the instructions below.

Note: The meter will automatically exit out of the Setup mode if no key is pressed within 7 seconds.

SD Memory Card Format (Sd F)

Note: Formatting the SD card erases all its data.

Follow steps 1 through 4 when "Sd F" appears on the LCD.

1. Press the ▲ and ▼ buttons to select "YES" to format the card. Select "NO" to abort.
2. Press the **ENTER** button to confirm selection
3. Press the **ENTER** button again to re-confirm.
4. The meter will format the SD card and resume normal operation when formatting is complete.

Note: It is recommended that new SD cards be formatted prior to first use.
Note: At any time, you can press the **ESC** button to exit the Setup mode and resume normal operation.

Setting the Time and Date (dAtE)

1. Press the **ENTER** button when "dAtE" appears on the LCD.
2. Press the ▲ and ▼ buttons to adjust the year as indicated by "YY".
3. Press the **ENTER** button to confirm selection.
4. Repeat steps 2 and 3 for month, day, hour, minute and seconds as indicated by (mm/dd/h/m/s).
5. After each value has been selected and confirmed, press the **SET** button to skip to the next parameter.

Note: At any time, you can press the **ESC** button to exit the Setup mode and resume normal operation. The internal clock will keep accurate time when the meter is powered off. When new batteries are installed the clock will have to be reset.

Setting the Data Logging Sampling Rate (SP-t)

Follow steps 1 through 3 when "SP-t" appears on the LCD.

1. Press the ▲ and ▼ buttons to adjust the displayed value. The adjustment process starts with the Hour value.
2. Once the desired value is set, press the **ENTER** button to confirm and move to the next value. For example, after setting the Hour, you will proceed to adjust the Minute and then the Second values.

Note: The value being adjusted will flash during this process.

3. After setting all sampling time values (Hour, Minute, and Second), press the **SET** button to save the settings and skip to the next parameter.

Setting the Data Logging Sampling Rate for Peak Mode (HSPt)

Follow steps 1 and 2 when "HSPt" appears on the LCD.

1. Press the ▲ and ▼ buttons to adjust the Sampling Time between 10mS and 500mS.
2. Press the **SET** button to save the setting and skip to the next parameter.

Note: At any time, you can press the **ESC** button to exit the Setup mode and resume normal operation.

Enabling/Disabling Auto Power Off (PoFF)

Follow steps 1 through 3 when "PoFF" appears on the LCD.

1. Press the ▲ and ▼ buttons to select between YES (enabled) or NO (disabled). With the Auto Power OFF feature enabled, the meter will automatically switch OFF after 10 minutes of inactivity to preserve battery life.
2. Press the **ENTER** button to confirm selection.
3. Press the **SET** button to save the setting and skip to the next parameter.

Note: At any time, you can press the **ESC** button to exit the Setup mode and resume normal operation.

Enabling/Disabling the Beeper (bEEP)

Follow steps 1 through 3 when "bEEP" appears on the LCD.

1. Press the ▲ and ▼ buttons to select between ON (enabled) or OFF (disabled).
2. Press the **ENTER** button to confirm selection.
3. Press the **SET** button to save the setting and skip to the next parameter.

Note: At any time, you can press the **ESC** button to exit the Setup mode and resume normal operation.

Selecting the Unit of Measure for Force (unit)

Follow steps 1 through 3 when “unit” appears on the LCD.

1. Press the ▲ and ▼ buttons to select to select the desired unit of measure: Kg, lb, or N.
2. Press the **ENTER** Button to confirm selection.
3. Press the **SET** Button to save the setting and skip to the next parameter.

Note: At any time, you can press the **ESC** Button to exit the Setup mode and resume normal operation

Setting Data Decimal Format (dEC)

Numeric formats vary in different countries. By default the meter is set to bASIC mode where a decimal point is used to separate units, (i.e. 20.00). The European format uses a comma (i.e. 20,00) to separate units. To change this setting, follow steps 1 through 3 when "dEC" appears on the LCD.

1. Press the ▲ and ▼ buttons to select between bASIC and Euro.
2. Press the **ENTER** button to confirm selection.
3. Press the **SET** button to save the setting and skip to the next parameter.

Note: At any time, you can press the **ESC** button to exit the Setup mode and resume normal operation.

ESC

Press the **ENTER** button when "ESC" appears on the LCD to exit the Setup mode and resume normal operation.
Note: At any time, you can press the **ESC** button to exit the Setup mode and resume normal operation.

Verify Set Time and Date

During normal operation, press the **TIME** button once to display the hour, minute, seconds. Press the button again to display the year, month and day.

Verify Sampling Rate

During normal operation, press the **SAMPLING CHECK** button to view the selected sampling rate.

Data Logging

Data Recording Modes

Manual Data Logging: Press the **LOGGER** button to manually log up to 99 readings on a SD memory card (see Manual Data Logging Mode for full setup instructions).
Automatic Data Logging: Setup the meter parameters in order to automatically log data on a SD memory card. The number of data points is limited by the size of the memory card.
Note: It is recommended to use a class 4 SDHC memory card between 1Gb and 16Gb. Insert the SD memory card in the slot at the bottom of the meter. The card must be inserted with the label side facing the rear of the meter.

Peak Hold Data Logging: Setup the meter parameters in order to automatically log data. The measurement value and sampling period will save to the internal memory circuit in sequence.

Manual Data Logging Mode

In manual mode, the **LOGGER** button is pressed to manually log a reading on the inserted SD card at any time.
In order to setup the meter for manual data logging, follow steps 1 through 8 below.

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1. Set the data logging sampling rate to "0" seconds (see Setting the Data Logging Sampling Rate section for details).
2. Press and hold the **LOGGER** button for more than 2 seconds.
3. The LCD will display "DATA RECORD" and P-X (X = memory position number between 1 and 99).
4. Press the ▲ and ▼ buttons to select one of the 99 data memory positions in which to record.
5. Press the **ENTER** button to confirm selection.
6. Press the **LOGGER** button again to save a reading to memory. "DATA RECORD" will flash briefly, and a beep will sound (if enabled) to confirm that the measurement data, along with the time information, has been saved to the memory.
7. Repeat steps 4-6 to log subsequent measurements at different memory positions.
8. To exit manual data logging mode, press and hold the **LOGGER** button 2 seconds to resume normal operation.

Automatic Data Logging Mode

In automatic mode the desired data logging sampling rate can be set between 1 second to 8 hours, 59 minutes and 59 seconds prior to recording. (See Setting the Data Logging Sampling Rate section for details). In order to setup the meter for automatic data logging, follow steps 1 through 5 below.

1. To begin a data logging session press and hold the **LOGGER** button for more than 2 seconds.
2. The meter will scan for an SD memory card. If no card is inserted or the card is defective, the meter will flash "EMPTY DATA RECORD" once and resume normal operation. To resolve this, power off the meter, insert a functional SD card, and try again.
3. Once data logging begins, the DATA RECORD icon will appear on the LCD.
4. The icon will flash each time a reading is stored at the configured sampling rate.

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5. To pause data logging, press the **LOGGER** button once. The DATA RECORD icon will stop flashing.
6. To resume, press the **LOGGER** button again. The icon will resume flashing.
7. To end the current data logging session, press and hold the **LOGGER** button for more than 2 seconds.

Peak Hold Data Logging Mode

In peak hold data logging the desired data logging sampling rate can be set between 10 and 500 ms. (See Setting the Data Logging Sampling Rate for Peak Mode section for details).
In order to setup the meter for peak hold data logging, follow steps 1 through 5 below.

1. Press the **PEAK** Button, and the display will show the indicators PEAK and FAST.
2. Press the **ZERO** Button to set the display to Zero Value.
3. Press the **LOGGER** Button once. The screen will display DATA RECORD, and the sampling time value (in milliseconds) will briefly appear at the bottom of the display.
4. The meter is now ready for Peak Hold Data logging. Apply a force greater than 0.2 kg (1% of full capacity). The measurement values and sampling period will be saved sequentially to the internal memory. To adjust the sampling time, see Setting the Data Logging Sampling Rate section for details.
5. When the peak value is obtained, the DATA RECORD indicator will disappear. The PEAK indicator and the peak value will remain on the display. The bottom of the screen will show the data record number and count down to zero as the data is saved to the SD card.
6. To end the current data logging session, press and hold the **LOGGER** button for more than 2 seconds.
7. Press the **PEAK** Button to exit Peak Hold Data Logging Mode.

Transferring Data from the SD Memory Card to a Computer

1. While the meter is powered off remove the SD memory card from the SD card slot.
2. Insert the SD memory card into the computer.
3. Open the file(s) with Excel. See sample below:

Place	Date	Time	Ch1_Value	Ch1_Unit
1	2010-08-26	10:12:13	0	Kg
2	2010-08-26	10:12:14	-0.01	Kg
3	2010-08-26	10:12:16	0.01	Kg
4	2010-08-26	10:12:18	-0.31	Kg
5	2010-08-26	10:12:20	-0.69	Kg
6	2010-08-26	10:12:22	-3.19	Kg
7	2010-08-26	10:12:24	-2.49	Kg
8	2010-08-26	10:12:26	-2.03	Kg
9	2010-08-26	10:12:28	0.03	Kg
10	2010-08-26	10:12:30	-1.43	Kg
11	2010-08-26	10:12:32	-4.29	Kg
12	2010-08-26	10:12:34	-4.18	Kg

Data Stream Output

Using Terminal application, a data stream can be viewed from the RS-232 output, connect RS-232/USB cable between the product and terminal/PC and use the following setting to view the data stream.
Terminal Settings:

- Bits per second: 9600
- Data bits: 8
- Parity: None
- Stop bits: 1

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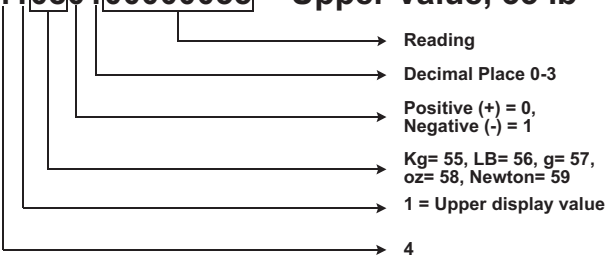
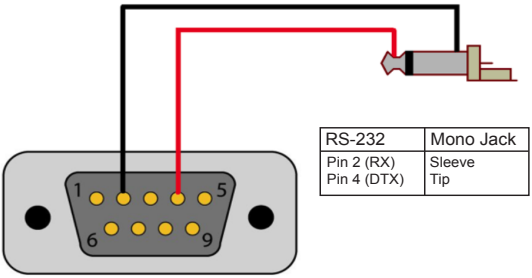
41080100000035 = Upper Value, 35 lb



3.5mm Terminal to RS-232 Serial Connection



RS-232	Mono Jack
Pin 2 (RX) Pin 4 (DTX)	Sleeve Tip

System Reset

If the meter becomes unresponsive or if the display freezes, the Reset pin can be used to reset the instrument.

1. Use a paper clip or any similar small object to press the Reset pin.
2. After pressing the Reset pin, power the meter back up by holding the POWER button for 2 seconds.
3. If resetting the meter does not resolve the issue, please return the meter to the nearest authorized REED distributor or authorized Service Center for repair.

Battery Replacement

When the low battery icon  appears on the LCD, the batteries must be replaced.

1. Remove the screws on the back of the meter.
2. Remove the battery cover.
3. Replace 6 x "AA" batteries.
4. Secure the battery cover back into place.

Applications

- HVAC/R and Refrigeration Servicing
- Detecting Filter Blockage
- Condensers and Chillers

Product Care

To keep your instrument in good working order we recommend the following:

- Store your product in a clean, dry place.
- Change the battery as needed.
- If your instrument isn't being used for a period of one month or longer please remove the battery.
- Clean your product and accessories with biodegradable cleaner. Do not spray the cleaner directly on the instrument. Use on external parts only.

Product Warranty

REED Instruments guarantees this instrument to be free of defects in material or workmanship for a period of one (1) year from date of shipment. During the warranty period, REED Instruments will repair or replace, at no charge, products or parts of a product that proves to be defective because of improper material or workmanship, under normal use and maintenance. REED Instruments total liability is limited to repair or replacement of the product. REED Instruments shall not be liable for damages to goods, property, or persons due to improper use or through attempts to utilize the instrument under conditions which exceed the designed capabilities. In order to begin the warranty service process, please contact us by phone at 1-877-849-2127 or by email at info@REEDInstruments.com to discuss the claim and determine the appropriate steps to process the warranty.

Product Disposal and Recycling

Please follow local laws and regulations when disposing or recycling your instrument. Your product contains electronic components and must be disposed of separately from standard waste products.

Product Support

If you have any questions on your product, please contact your authorized REED distributor or REED Instruments Customer Service by phone at 1-877-849-2127 or by email at info@REEDInstruments.com.

Please visit **www.REEDInstruments.com** for the most up-to-date manuals, datasheets, product guides and software.

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