GENERAL®

LT2234C
USER'S MANUAL

NON-CONTACT
TACHOMETER

Please read this manual carefully and thoroughly before using this product.

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INTRODUCTION

Thank you for purchasing General Tools & Instruments' Model LT2234C Non-Contact Tachometer. Please read this user's manual carefully and thoroughly before using the instrument.

The LT2234C is a general-purpose handheld instrument that can measure the rotational speed of a motor's or generator's spinning shaft. It does so by bouncing a laser beam off a piece of reflective tape affixed to the shaft and using an integrated photocell to count the number of reflections produced per minute. Measurements are displayed in real time on a 0.7-in. (18mm) high backlit liquid-crystal display and stored in memory. Up to 96 measurements of rpm can be stored, indexed and recalled, along with the last value, the minimum value and the maximum value of a series. Thanks to its five-digit display and the use of a non-contact measurement technique, the tachometer can measure the speeds of shafts spinning at up to 99,999 rpm.

The LT2234C is powered by three "AAA" batteries (included).

KEY FEATURES

- Uses non-contact measurement technique and autoranging
- Wide measurement range and high resolution
- Backlit 0.7-in. high display supports work in low light
- Stores and indexes up to 96 measurements
- Memorizes the last, minimum and maximum values of a series of measurements
- One-handed operation
- Automatically powers off when not measuring, extending battery life
- Durable ABS plastic housing

SAFETY INSTRUCTIONS

Spinning shafts and fast-moving belts can be dangerous. When using the tachometer, take care not to let your fingers, hands, hair or clothing make contact with moving parts.

WHAT'S IN THE CASE

The LT2234C comes fully assembled in a hard carrying case along with fresh batteries, two 24 in. (600mm) long strips of 1/2 in. (12mm) wide adhesive reflective tape and this user's manual.

PRODUCT OVERVIEW

Figure 1 shows all of the controls and indicators and other physical features of the LT2234C. Familiarize yourself with their positions before moving on to the setup procedure.
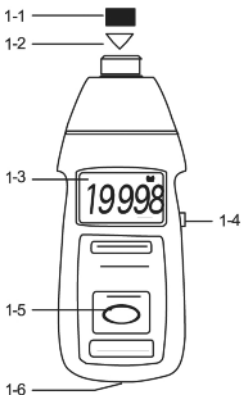

Fig. 1. The LT2234C's controls and indicators and other physical features

   1-1 Reflective tape (on spinning shaft)
   1-2 Reflected laser light (to internal photosensor)
   1-3 Five-digit liquid-crystal display
   1-4 Measure button
   1-5 MEM button
   1-6 Battery compartment cover (on back)

SETUP INSTRUCTIONS
INSTALL BATTERIES
Install the three "AAA" batteries that came with the instrument in its battery compartment. To open the compartment, remove the Phillips head screw holding its cover (callout 1-6) in place and slide it away. When installing the batteries, use the + and – marks stenciled inside the battery compartment to position them correctly.

OPERATING INSTRUCTIONS
MAKING RPM MEASUREMENTS
To measure the rotational speed of a motor/generator shaft:
1. **Identify the target**. Determine whether there is a larger surface to measure than the shaft itself. If something with a larger diameter (for example, a fan or a wheel of any type) is attached to the shaft, use any flat part of its surface as the measurement target instead.
2. **Prepare the target**. Either unplug the generator/motor or make sure that it cannot be turned on remotely or turn on automatically. Scrape the target area clean enough so a piece of tape will stick to it. If the target area is naturally reflective, cover it with black tape or paint.
3. **Attach reflective tape to the target**. Cut a 1/2 in. square piece of reflective tape, remove its backing, and apply it to the target area.

4. Make the measurement. Turn on the motor or generator. Cradling the tachometer in your right hand, move it as close to the shaft as possible, but no closer than 2 inches away. Position the instrument so its main axis is aligned with the end of the shaft. Using your right thumb, press the Measure button (callout 1-4) while shining the red laser beam on the reflective tape. Confirm that the tachometer is receiving a signal by checking that the (( )) Monitor Indicator icon flashes on the display each time the beam hits the moving tape. When the display reading stabilizes, release the Measure button.

TWO MEASUREMENT TIPS

1. If your motor/generator's shaft spins slowly (i.e., at less than 50 rpm), getting an accurate reading may require placing one or more additional squares of reflective tape on the target. Begin by adding a second square of tape on the circumference of the target 180º from the first square (at 6 o'clock relative to 12 o'clock). Then perform Step 4 above, but divide the display reading by two to account for the presence of the second square. If the result is still unsatisfactory, add another two pieces of tape at 3 o'clock and 9 o'clock and perform Step 4, but now divide the display reading by four.

2. If bright ambient light is preventing the LT2234C from receiving the reflected beam, try shading the target.

STORING AND RECALLING MEASUREMENTS

The LT2234C can store up to 96 measurements of rpm and recall them in the order in which they were made and stored.

Individual measurements or series of measurements can only be stored while the Measure button is pressed and held. When the Measure button is released, the contents of the instrument's memory are frozen. When the Measure button is pressed again, the memory's contents are erased.

To store an individual measurement, press the MEM button (callout 1-5) before releasing the Measure button.

To store a series of measurements, press the MEM button after each measurement. Remember not to release the Measure button until you have completed storing the entire series of measurements.

To recall an individual measurement, press the MEM button once and hold it. The display will show the last measurement stored—unless the Measure button was pressed in the interim.

To recall a series of stored measurements, you have three options.

1. One is to press the MEM button once and hold it. Doing so will illuminate the display, which will show the highest of the measurements stored in memory, along with the word "UP". Note that if you continue holding the MEM button, the display will alternate be-

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tween showing the highest value and "UP". Also note that releasing the MEM button powers off the display and the instrument.

2. The second option is to press the MEM button twice and hold it. Doing so again illuminates the display, but now it shows the last reading you stored, indicated by and alternating with the letters "LA".

3. The third option is to press the MEM button three times and hold it. Doing so retrieves the slowest of the measurements you have stored. This value is shown alternating with the letters "dn", signifying the minimum speed.

To try out other memory-related features, first push the Measure button on the right side. Then press the MEM button once, twice and three times (holding it in each time) and note from the display that all of your stored measurements have been erased (indicated by "0.0" readings for UP, dn and LA). You can confirm this by pressing and holding the MEM button until the display begins counting down from 20. When the count reaches 0, the display immediately switches to showing the letters "AN" on the left side and a number (in this case, "0") on the right. (The letters "AN" are an abbreviation for the Ancient Greek word for "recall.")

To complete your understanding of the tachometer's memory function, make and store a set of five rpm measurements, remembering not to push the Measure button until you are finished. Then press and hold the MEM button as many times as needed to make the display go into countdown mode.

Note that because you have stored five measurements, the display will read "AN 5" once the countdown reaches zero. If you release the MEM button and then press and hold it again, the display will first read "1" and then the value of the first of the five measurements you stored. If you release the MEM button and then press and hold it again, the display will then show "2", followed by the value of your second measurement. Release, press and hold again, and the display will show "3", followed by the value of your third measurement. By repeating this sequence, you can retrieve up to 96 measurements in the order in which they were stored. Once all of the stored measurements have been displayed, the tachometer will return to the mode in which pushing the MEM button once, twice or three times calls up the minimum, maximum and last values of the set of measurements you have stored.

SPECIFICATIONS

Measurement range	2.5 to 99,999 rpm
Measurement resolution	0.1 rpm for readings below 999.9 rpm; 1 rpm for readings above 1,000 rpm
Measurement accuracy	$\pm0.05\%$ of reading plus one digit
Sampling time	0.8 seconds at speeds over 60 rpm
Memory capacity	96 measurements
Recallable measurements	Maximum, minimum, last values
Microcontroller	Single custom chip
Time base	Quartz crystal
Display type	5-digit yellow-green backlit liquid crystal
Display height	0.7 in. (18mm)
Instrument dimensions	7.24 x 2.99 x 1.18 in. (184 x 76 x 30mm)
Instrument weight	6.35 oz. (180g) (including batteries)
Power source	Three "AAA" batteries

Current consumption	45mADC for display; 35mADC for laser diode
Operating temperature range	32º to 122ºF (0º to 50ºC) @ up to 80% relative humidity

MAINTENANCE TIPS

The LT2234C requires no regular maintenance other than light cleaning of the plastic housing and display with a soft, dry cloth.

When the icon ⌷⧅⌷ appears on the display, it's time to change the instrument's three "AAA" batteries because their total potential has fallen below 4.0 volts. To do so, perform the procedure detailed in the Setup Instructions section on page 6. Remove the batteries whenever the tachometer is expected to sit idle for an extended period of time (six months or more).

WARRANTY INFORMATION

General Tools & Instruments' (General's) LT2234C Non-Contact Tachometer is warranted to the original purchaser to be free from defects in material and workmanship. Subject to certain restrictions, General will repair or replace this instrument if, after examination, the company determines it to be defective in material or workmanship for a period of one year.

This warranty does not apply to damages that General determines to be from an attempted repair by non-authorized personnel or misuse, alterations, normal wear and tear, or accidental damage. The defective unit must be returned to General Tools & Instruments or to a General-authorized service center, freight prepaid and insured.

Acceptance of the exclusive repair and replacement remedies described herein is a condition of the contract for purchase of this product. In no event shall General be liable for any incidental, special, consequential or punitive damages, or for any cost, attorneys' fees, expenses, or losses alleged to be a consequence of any damage due to failure of, or defect in any product including, but not limited to, any claims for loss of profits.

RETURN FOR REPAIR POLICY

Every effort has been made to provide you with a reliable product of superior quality. However, in the event your instrument requires repair, please contact our Customer Service to obtain an RGA (Return Goods Authorization) number before forwarding the unit via prepaid freight to the attention of our Service Center at this address:

> General Tools & Instruments
> 80 White Street
> New York, NY 10013
> 212-431-6100

Remember to include a copy of your proof of purchase, your return address, and your phone number and/or e-mail address.

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GENERAL®

Specialty Tools & Instruments

GENERAL TOOLS & INSTRUMENTS
80 White Street
New York, NY 10013-3567
PHONE (212) 431-6100
FAX (212) 431-6499
TOLL FREE (800) 697-8665
e-mail: sales@generaltools.com
www.generaltools.com
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Specifications subject to change without notice