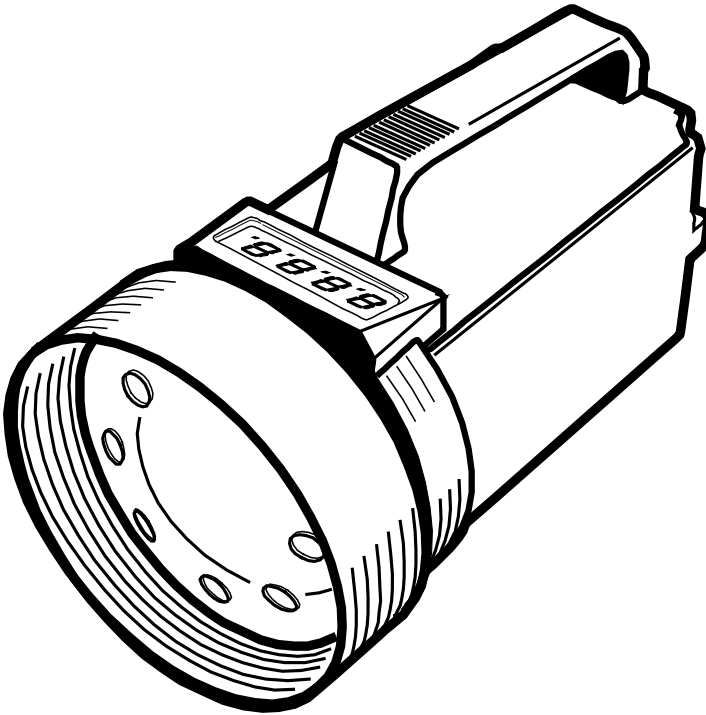


# ***EXTECH***<sup>®</sup>

## **USER MANUAL**

**Digital Stroboscope Tachometer**

**Models 461830 (110 V) and 461831 (220 V)**



## Introduction

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Congratulations on your purchase of the Extech Digital Stroboscope Tachometer. This device measures the speed of moving parts such as gears, fans, propellers, centrifuges, and pumps. The stop-motion action of this instrument permits the visual inspection of moving parts. Careful use of this instrument will provide years of reliable service.

## Safety

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This symbol, adjacent to another symbol or terminal, indicates the user must refer to the manual for further information.



This symbol, adjacent to a terminal indicates that, under normal use, hazardous voltages may be present

**WARNING:** Do not look directly at the strobe lamp or its reflector.

**WARNING:** This device causes moving objects to appear still. Take precautions against accidental contact with moving objects.

**CAUTION:** Do not touch the flash tube.

# Specifications

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## General Specifications

Circuit	Exclusive one-chip LSI circuit with crystal time base
Display	4-digit (10,000 count; 0 to 9999) LED display
Measurement unit	RPM (revolutions or rotations per minute) is the speed of the moving device under test which equals the FPM rate (strobe flashes per minute)
Operating temperature	32 to 122°F (0 to 50°C)
Operating humidity	< 80% RH
Power supply	110 V AC (461830); 220 V AC (461831); 50/60 Hz $\pm$ 10%
Power consumption	< 25 watts @ 115V
Weight	2.0 lbs. (900 g)
Dimensions	8.3 x 4.7 x 5.5 in. (21 x 12 x 14 cm)
Construction	Impact resistant plastic housing, plastic lens, mirrored reflectors

## Electrical Specifications

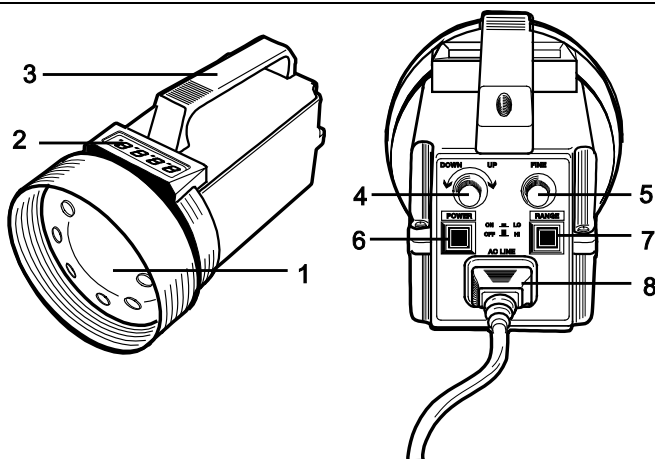
Measurement range	100 to 10,000 RPM/FPM
Resolution	0.1 (<1000 RPM/FPM) 1 (1000 to 9999 RPM/FPM) 10 (10,000 RPM/FPM)
Accuracy	$\pm$ (0.05% of reading + 1 digit)
Sampling time	1 second
Adjustment range	LOW: 100 to 1,000 RPM/FPM HIGH: 1000 to 10,000 RPM/FPM
Strobe flash tube type	Xenon lamp
Strobe flash duration	60 to 1000 microseconds
Strobe flash energy	4 Watt-Seconds (Joules)
Strobe beam angle	80°
Strobe flash color	White 6500°K

**Notes:** Replace the Xenon lamp when readings appear inaccurate or irregular. To prolong the lamp life and ensure safe operation, follow the safety requirements, below.

- Do not exceed the test time limits. 30-minute limit < 3000 rpm and 5-minute limit > 3000 rpm. Do not use the instrument for longer test periods; damage to the instrument may result.
- Allow a 10-minute cool-down between tests.
- Do not touch the Xenon flash tube.

## Meter Description

1. Xenon lamp
2. Display (LED)
3. Grip handle
4. COARSE adjustment knob
5. FINE adjustment knob
6. Power ON-OFF switch
7. Range select switch
8. AC power cord and jack



## Operation

### Powering the Instrument

1. Plug the supplied power cable into the instrument's power cable jack.
2. Plug the other end of the cable to the AC power source. The 461830 requires 110 V AC and the 461831 requires 220 V AC. Do not plug the device into the incorrect power source; damage to the instrument will result.
3. Use the ON/OFF switch to switch the instrument ON/OFF.

### Speed (RPM) Measurements

1. Remove power to the device under test so that it is stationary.
2. Affix a small piece of reflective tape (or otherwise create a mark) on the device under test.
3. Point the stroboscope's beam at the tape.
4. Use the 'FINE' and 'COARSE' adjustment knobs to synchronize or "stop" the motion of the mark (read the 'Display Notes' section below).
5. Read the RPM value on the display.

### Range Adjustments

1. While measuring, use the RANGE button to select the range.
2. The LOW range is used for measurements below 1,000 RPM. The HIGH range is used for measurements above 1,000 RPM.

### Visually Inspecting a Moving Object (stop-motion)

When the speed of the moving object matches the flash rate of the stroboscope, the moving object appears still (motionless). Measure the speed of a moving object, as described in the previous sections, to obtain stop-motion. Once stop-motion is achieved, the FINE adjust knob is used to vary the viewing perspective of the object under test.

Important Note on Test Durations

The Xenon lamp has test time restrictions. If the specified test durations and cool-down period are not observed, damage to the instrument can result and the life of the lamp can be shortened.

Range	Maximum Test Duration	Cool-Down Period
< 3000 RPM	Thirty (30) minutes	Ten (10) minutes
> 3000 RPM	Five (5) minutes	






Notes on Speed Measurements

Ensure that the mark, or reflective tape, is providing a 1:1 measurement. Check that there is only one stationary mark and not two, four, or more, on the object under test.

Two or more stopped marks indicate a ‘harmonic’ measurement (2:1, 3:1, 4:1 etc.) and the instrument will display double, triple, or quadruple the actual speed. A useful method of avoiding harmonic measurements is to adjust the FINE/COARSE knobs until two images (marks) appear and then lower the flash rate (via FINE/COARSE knobs) until a single, stationary image appears. This will be the actual speed.

In the example below, a rotating shaft is affixed with one piece of tape. The illustrations represent five possible scenarios.

If more than one mark appears, the image is showing a ‘harmonic’. The **bold** column (1000/1000 rpm), below, shows the actual speed of the shaft. The 1000/500 rpm column indicates a harmonic, whereby the actual speed is divided in half. To avoid this, adjust the ‘FINE’ and ‘COARSE’ knobs until you see the ‘doubled harmonic’ (1000/2000 rpm column), then the ‘halved harmonic’ (1000/500 rpm column), and then the actual speed (bold column 1000/1000 rpm).



Shaft speed	1000rpm	<b>1000rpm</b>	1000rpm	1000rpm	1000rpm
Strobe flash rate	500rpm	<b>1000rpm</b>	2000rpm	3000rpm	4000rpm
Visible marks	1	<b>1</b>	2	3	4

The display has an AUTO RANGE INDICATOR (flashing decimal at the far right) that appears when the readings are > 10,000 RPM. In these cases, multiply the displayed reading by 10.

## ***Two-year Warranty***

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**Teledyne FLIR warrants this Extech brand instrument** to be free of defects in parts and workmanship for **two years** from date of shipment. To view the full warranty text please visit:

<https://www.flir.com/support-center/warranty/instruments/extech-product-warranty/>

## ***Calibration and Repair Services***

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**Teledyne FLIR offers calibration and repair services** for the Extech brand products we sell. We offer NIST traceable calibration for most of our products.

## ***Customer Support***

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Local Telephone Support List: <https://support.flir.com/contact>

Return Material Authorization (RMA): <https://customer.flir.com/Home>

Customer Service: <https://support.flir.com/ContactService>

Technical Support: <https://support.flir.com>

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