

Trig-Tek™

61R

Vibration Monitor

User Manual

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FOR YOUR SAFETY

Before undertaking any troubleshooting, maintenance or exploratory procedure, read carefully the **WARNINGS** and **CAUTION** notices.



This equipment contains voltage hazardous to human life and safety, and is capable of inflicting personal injury.



If this instrument is to be powered from the AC line (mains) through an autotransformer, ensure the common connector is connected to the neutral (earth pole) of the power supply.



Before operating the unit, ensure the conductor (green wire) is connected to the ground (earth) conductor of the power outlet. Do not use a two-conductor extension cord or a three-prong/two-prong adapter. This will defeat the protective feature of the third conductor in the power cord.



Maintenance and calibration procedures sometimes call for operation of the unit with power applied and protective covers removed. Read the procedures and heed warnings to avoid “live” circuit points.

Before operating this instrument:

1. Ensure the proper fuse is in place for the power source to operate.
2. Ensure all other devices connected to or in proximity to this instrument are properly grounded or connected to the protective third-wire earth ground.

If the instrument:

- fails to operate satisfactorily
- shows visible damage
- has been stored under unfavorable conditions
- has sustained stress

Do not operate until performance is checked by qualified personnel.

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DOCUMENT CHANGE HISTORY

Revision	Date	Description of Change
A	01/11/11	Document Control release
B	02/05/13	Revised per ECN02346. Revised Accuracy Accel value in Chapter 1 (pg 1-3).

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Chapter 1

Introduction

The 61R Portable Vibration Monitor (**Figure 1-1** and **Figure 1-2**) is intended for use in situations where a portable instrument is convenient or required. This unit will provide indication of acceleration using the input from an accelerometer, or millivolts with the current off. The unit is supplied with a charger pack that operates from 115 VAC line to recharge the battery.



Figure 1-1, 61-Series Portable Vibration Monitor (61F Shown)

The unit is designed to operate with a sensor that has either 5 or 10 mV/g, or without the current of 1 or 10 mV/g sensitivity. It has full scale ranges of 10, 100, or 1000 g's RMS. It has sensor OPEN or SHORT LED indicators, and also an OVERLOAD LED. Overload is indicated by the LED. The BATT LOW LED alerts the operator when the battery needs recharging.

A filter switch selects a 2, 5, 10, or 20 position to provide selectable high pass and low pass filtering. These are nominally as listed. Special cutoffs can be set on special orders:

Position 2:	3 Hz HP, 2000 Hz LP
Position 5:	3 Hz HP, 5000 Hz LP
Position 10:	3 Hz HP, 10000 Hz LP
Position 20:	3 Hz HP, 20000 Hz LP

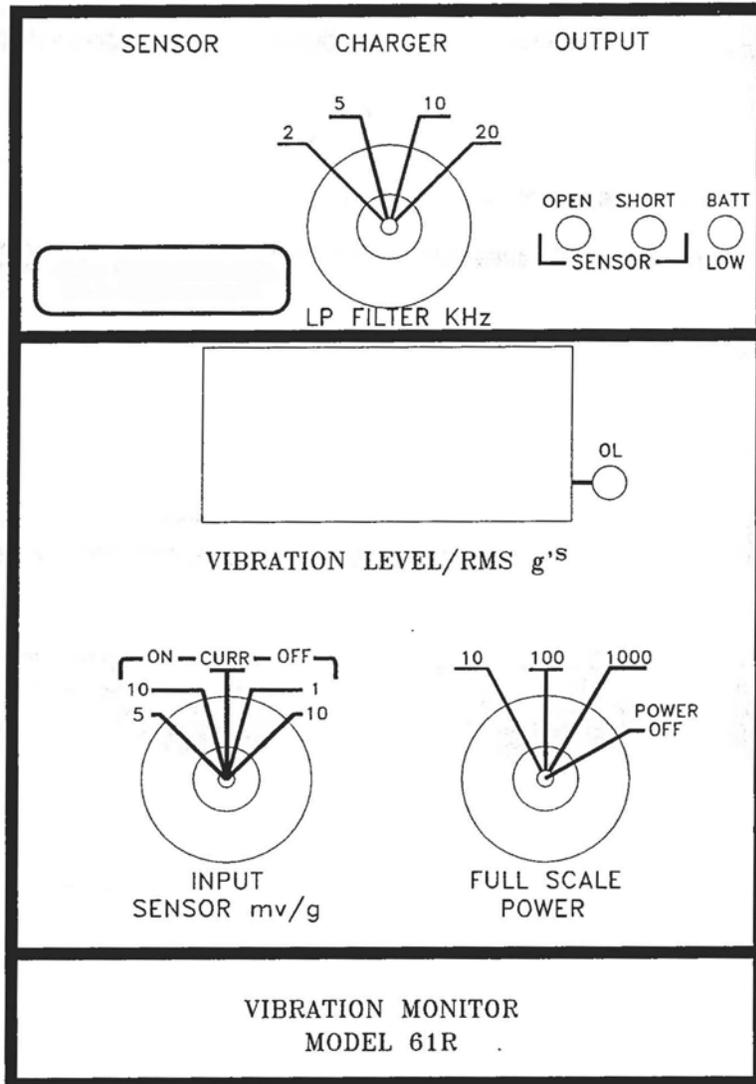


Figure 1-2, Detailed View of 61R Faceplate

Specifications

ACCEL Input

Impedance	100 k or greater
Sensitivity	5 or 10 mV/g (Current On) 1 or 10 mV/g (Current Off)
MAX Input	1000 g's

Accuracy

Accel (at 100 Hz REF)	10, 100, or 1000 range $\pm 2\%$
Frequency Response (from REF)	ACCEL 3 Hz-20 kHz $\pm 3\%$ Output is 3 dB down at selected filter cutoff.
Current	3.5 ± 1 mA
Connector	BNC

AC Output

Impedance	Less than 100 Ohms
Sensitivity	5 Volts RMS for full scale
Frequency Response	3 Hz to 20kHz
Connector	BNC

Controls/Switches

INPUT SENSOR mV/g (Meter sensor)	The four-position switch selects 5 or 10 mV/g with the current on, and 1 or 10 mV/g with the current off.
FULL SCALE POWER	Selects 10, 100, or 1000 full scale range, or POWER OFF
LP FILTER KHz (3 dB cutoff 10%).	Switch positions: 2 3 Hz HP, 2000 Hz LP 5 3 Hz HP, 5000 Hz LP 10 3 Hz HP, 10000 Hz LP 20 3 Hz HP, 20000 Hz LP

Indicators

Note: For best battery life the battery should be completely discharged before charging.

Vibration Meter	3-1/2 digit DVM with LCD displays.
Sensor OPEN LED	Illuminates if the sensor is open.
Sensor SHORT LED	Illuminates if the input sensor is shorted.
BATT LOW LED	Illuminates when battery needs to be charged.
OL LED	Illuminates if the input or any Full Scale range is overloaded.

Dimensions

2-1/2" x 6" x 7" (including knobs and connectors).

Power

Internally-connected, 6-volt battery pack with a nominal 8 hour operation before recharging is needed.

Chapter 2

Operation

The 61R Vibration Monitor is a portable battery-operated unit designed to measure vibration using an accelerometer-type sensor or an mV/g input. The monitor will display acceleration in RMS g's. The unit also has an AC signal proportional to the full scale output.

The batteries used are rechargeable. A charger is supplied with the unit. The charger plugs into a 115 VAC outlet to supply the charge current to the battery. (A special 230 VAC charger can be ordered upon request.)

Battery Charging

Plug the charger into 115 VAC (or 230 VAC with special charger) power and connect to the CHARGER connector at the top of the monitor. For longest battery life completely discharge the battery before recharging.

Place the FULL SCALE POWER switch to POWER OFF. The unit must charge for a minimum of 12 hours to completely charge the battery.

Sensor Check

Two SENSOR LEDs marked OPEN and SHORT will alert the operator if a pick-up is open or shorted. When a properly operating sensor is connected to the input, neither the OPEN or SHORT LED should illuminate.

INPUT SENSOR mV/g Switch

The INPUT SENSOR mV/g meter switch selects 5 or 10 mV/g sensitivity at the input with current ON, and 1 or 10 mV/g with the current Off. The current OFF positions are millivolt inputs to conveniently measure voltage.

FULL SCALE POWER Switch

The FULL SCALE POWER meter switch provides four positions: 10, 100, 1000, or POWER OFF.

OL (Overload) LED

The OL LED to the right of the display illuminates when the Input or any Full Scale is overloaded.

BATT LOW LED

The BATT LOW LED is positioned to the right of the SENSOR LEDs. The LED illuminates when the battery needs recharging.

Chapter 3

Performance Test

This procedure outlines a method of testing the 61R for compliance with the manufacturer's specifications.

In the event that a reading is out of tolerance the unit will require calibration. See Chapter 4, Calibration Procedure.

Test Equipment

Note: Equivalent equipment can be used.

Synthesized Calibrator	Trig-Tek 346B
AC-DC Digital Voltmeter	Keithley 179A.

Switch Settings

Place the FILTER switch to 20 (this sets the filter cutoff at 3 Hz-20 kHz), the FULL SCALE RANGE/POWER switch to 1000 and the INPUT SENSOR mV/g switch to 5 (CURR ON).

Performance Procedure

1. Connect a sinewave of 100 ± 1 Hz with a level of 5000 ± 25 millivolts RMS to the SENSOR input connector.
2. The Sensor LED should change from OPEN to SHORT.
3. Connect the AC voltmeter to the OUTPUT connector.
4. Observe 5000 ± 100 millivolts RMS on the AC voltmeter. The front panel should read 1000 ± 20 g's.
5. Reduce the input to 500 ± 2.5 millivolts RMS.
6. The front panel should indicate 100 ± 2 g's RMS, and the output 500 ± 10 millivolts RMS.
7. Change the FULL SCALE range switch to 100.
8. The front panel meter should indicate 100.0 ± 2 g's and the output 5000 ± 100 millivolts RMS.
9. Reduce the input to 50 ± 0.3 millivolts RMS.

10. The panel meter should indicate 10.0 ± 0.2 g's RMS, and the output 500 ± 10 millivolts RMS.
11. Change the FULL SCALE switch to 10.
12. The panel meter should indicate 10.00 ± 0.2 g's RMS, and the output 5000 ± 100 millivolts RMS.
13. Change the INPUT SENSOR switch to 10 mV/g CURR ON.
14. The panel meter should indicate 5.00 ± 0.1 g's RMS, and the output 2500 ± 50 millivolts RMS.
15. Change the INPUT SENSOR switch to 1 mV/g CURR OFF, and the FULL SCALE switch to 100 (same input level, 50 mV RMS).
16. The panel meter should indicate 50.0 millivolts RMS.
17. Change the INPUT SENSOR switch to 10 mV/g CURR OFF and change the Input level to 1000 ± 5.0 millivolts RMS.
18. The panel meter should indicate 100.00 ± 2.0 g's and the output 5000 ± 100 millivolts.
19. Change the INPUT FREQ to 20 kHz ± 100 Hz. The panel meter should indicate 70.7 ± 9.07 g's RMS.
20. Remove the input cable from the SENSOR connector, and change the INPUT SENSOR switch to 5 mV/g CURR ON.
21. Observe the SENSOR OPEN LED illuminates.
22. Connect the current meter to the SENSOR connector. Place the current meter to 0-20 mA scale first.
23. Observe the SENSOR SHORT LED illuminates and the current meter reads 3.5 ± 1 mA DC.
24. Disconnect the test equipment.

Chapter 4

Calibration Procedure

The 61R Vibration Monitor is packaged to be portable with a rechargeable battery. The circuit design uses all integrated circuitry providing very stable gain. The unit should not require any calibration unless a part fails.

When calibration is required, remove the rear cover (six screws). With the back cover removed, measure the battery voltage level. The voltage should be between 6.2 and 6.8 Volts before calibrating the unit. The 61R has only two adjustments to make.

Test Equipment

Note: Equivalent Equipment can be used.

Synthesized Calibrator	Trig-Tek 346B
AC-DC Digital Voltmeter	Keithley 179A.

Switch Settings

Place the METER FULL Switch to 1000. The POWER METER UNITS switch should be at POWER OFF.

Calibration Procedure

Note: Refer to Figure 4-1, Calibration Adjustment Location

1. Place the INPUT SENSOR mV/g Switch to 10 CURR OFF.
2. Place the FULL SCALE POWER Switch to 1000.
3. Connect the calibrator mV output BNC to the SENSOR input BNC.
4. Set the calibrator for a sinewave of 100 Hz and a level of 9999 millivolts RMS.
5. Connect the AC voltmeter to the output connector.
6. Set the ACCEL FS ADJ R1 for 5000 \pm 50 mV RMS on the AC voltmeter.
7. Set the ACCEL PANEL METER ADJ R2 for a 1000 \pm 1.0 g's.

NOTE: If panel meter ADJ R2 does not have sufficient range, the METER VERNIER ADJ thru the small hole may be adjusted to bring R2 into range

- 8. Disconnect all test equipment.

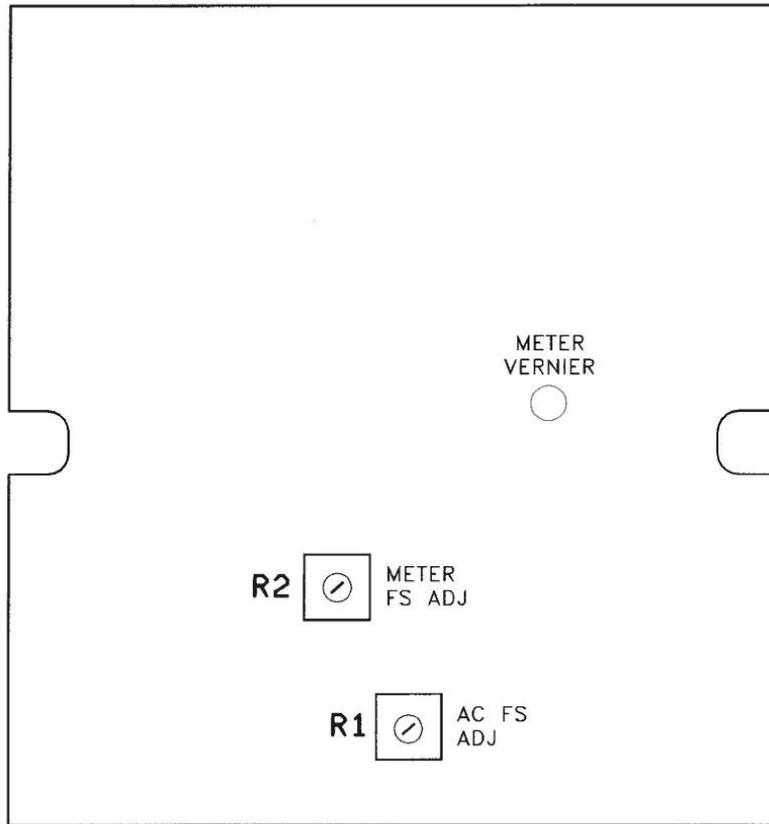


Figure 4-1, Calibration Adjustment Location