HIOKI

INSTRUCTION MANUAL

3403, 3404

TACHO HiTESTER

HIOKI E. E. CORPORATION

Contents

Introduction

Thank you for purchasing the HIOKI "Model 3403,3404 TACHO HiTESTER". To obtain maximum performance from the instrument, please read this manual first, and keep it handy for future reference.

Inspection

When you receive the instrument, inspect it carefully to ensure that no damage occurred during shipping. If damage is evident, or if it fails to operate according to the specifications, contact your dealer or Hioki representative.

Safety Notes

⚠ DANGER

This instrument is designed to comply with IEC 61010 Safety Standards, and has been thoroughly tested for safety prior to shipment. However, mishandling during use could result in injury or death, as well as damage to the instrument. Be certain that you understand the instructions and precautions in the manual before use. We disclaim any responsibility for accidents or injuries not resulting directly from instrument defects.

This manual contains information and warnings essential for safe operation of the instrument and for maintaining it in safe operating condition. Before using it, be sure to carefully read the following safety precautions.

Safety symbols

- The ⚠ symbol printed on the instrument indicates that the user should refer to a corresponding topic in the manual (marked with the ⚠ symbol) before using the relevant function.
- In the manual, the ⚠ symbol indicates particularly important information that the user should read before using the instrument.

The following symbols in this manual indicate the relative importance of cautions and warnings.

DANGER	Indicates that incorrect operation presents an extreme hazard that could result in serious injury or death to the user.
WARNING	Indicates that incorrect operation presents a significant hazard that could result in serious injury or death to the user.
CAUTION	Indicates that incorrect operation presents a possibility of injury to the user or damage to the instrument.
NOTE	Advisory items related to performance or correct operation of the instrument.

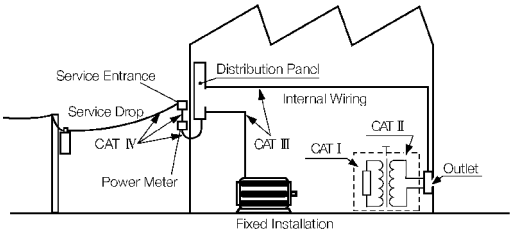
Overvoltage Categories

This instrument complies with CAT I safety requirements.

To ensure safe operation of measurement instruments, IEC 60664 establishes safety standards for various electrical environments, categorized as CAT I to CAT IV, and called overvoltage categories. These are defined as follows.

CAT I:	Secondary electrical circuits connected to an AC electrical outlet through a transformer or similar device.
CAT II:	Primary electrical circuits in equipment connected to an AC electrical outlet by a power cord (portable tools, household appliances, etc.)
CAT III:	Primary electrical circuits of heavy equipment (fixed installations) connected directly to the distribution panel, and feeders from the distribution panel to outlets.
CAT IV:	The circuit from the service drop to the service entrance, and to the power meter and primary overcurrent protection device (distribution panel).

Higher-numbered categories correspond to electrical environments with greater momentary energy, so a measurement device designed for CAT III environments can endure greater momentary energy than a device designed for CAT II. Using a measurement instrument in an environment designated with a higher-numbered category than that for which the instrument is rated could result in a severe accident, and must be carefully avoided.



Accuracy

We define measurement tolerances in terms of f.s. (full scale), rdg. (reading) and dgt. (digit) values, with the following meanings:

f.s.	(maximum display value or scale length) The maximum displayable value or scale length. This is usually the name of the currently selected range.
rdg.	(reading or displayed value) The value currently being measured and indicated on the measuring instrument.
dgt.	(resolution) The smallest displayable unit on a digital measuring instrument, i.e., the input value that causes the digital display to show a "1" as the leastsignificant digit.

Notes on Use

Follow these precautions to ensure safe operation and to obtain the full benefits of the various functions.

DANGER

To avoid damage to the instruments and potentially life-threatening hazards, observe the following precautions:

- **Be careful when measuring with the contact adapter because rotation and vibration of the instrument can produce erratic results with either high or low rotation speeds. Hold the main body firmly against the rotator. Do not place the instrument on a tripod when making measurements.**
- **If the contact tip is not fully inserted over the contact adapter shaft, it could fall off the shaft by touching the rotator. Make sure the contact tip is firmly inserted over the adapter shaft before making measurements.**

⚠ WARNING

To avoid damage to the instruments and potentially life-threatening hazards, observe the following precautions:

- **Always use the screw to tighten the contact adapter to the main body. If it becomes loose, the instrument may vibrate or be dislocated and become a hazard.**
- **When using the contact adapter for measuring, the instrument is subject to vibration, so measurements should be made only below 20,000 r/min or 333 r/s.**
- **Use either the specified Hioki 9035 AC ADAPTER or another 300 mA/6 V adapter with 5-mm diameter and negative center contact that complies with IEC 60950 safety standards.**

⚠ CAUTION

- Do not store or use the instrument where it could be exposed to direct sunlight, high temperature or humidity, or condensation. Under such conditions, the instrument may be damaged and insulation may deteriorate so that it no longer meets specifications.
- To avoid electrical hazards and damage to the instrument, do not apply voltage exceeding the rated maximum to the output terminals.

NOTE

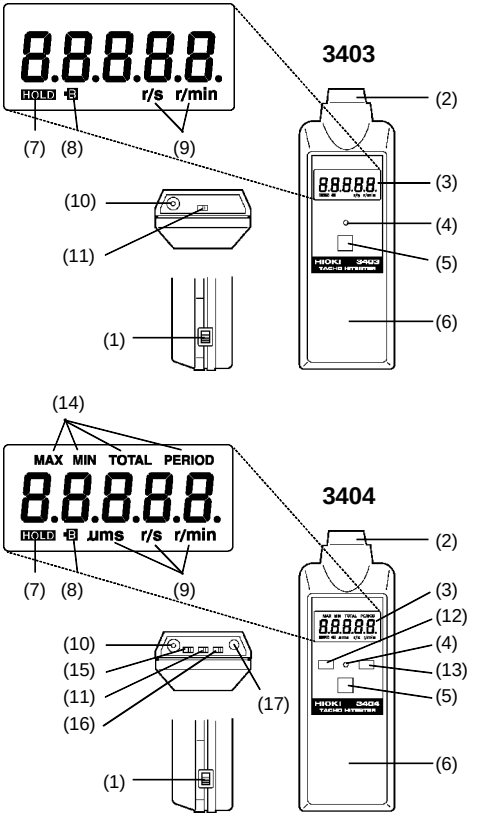
- Depending on the material of the object to be measured or method of touching the contact tip, the measurement error may occur.
- Do not perform measurements in locations with high humidity or where those are subject to intense ambient light.
- Avoid scratching or dirtying the two lenses inside the detector window.
- Do not switch between FAST and SLOW modes when the instrument is set to the MAX or MIN hold measurement mode. (3404 only)

Chapter 1 Overview

1.1 Product Overview

This instrument is a non-contact, highly portable tachometer that functions by measuring the visible light reflected from reflective tape attached to the object to be measured. It can also be used as a contact type tachometer by attaching the optional 9213 CONTACT ADAPTER, sold separately.

1.2 Names and Functions of Parts



(1) Power switch	Turn to ON for measurement.
(2) Photoelectric Detection Window	Contains the light emitter and receiver devices.
(3) Display	Displays digital values.
(4) Reflected light verification LED	Lights when the instrument is detecting reflected light.
(5) **HOLD** switch	Holds the current measured value.
(6) Buzzer	Sounds when reflected light is detected (can be set not to buzz).
(7) HOLD mark	Lights when in a HOLD condition.
(8) Battery low mark	Lights when battery replacement is needed.
(9) Unit symbols	Indicates unit symbols.
(10) AC adapter jack	Used to connect an AC adapter (300 mA/6 V, 5 mm dia)
(11) r/min,r/s switch	Used to select r/min (revolutions per minute) or r/s (revolutions per second).
(12) **RESET** switch	Resets (initializes) at the measurement mode.
(13) **MODE** switch	Used to select measurement mode.

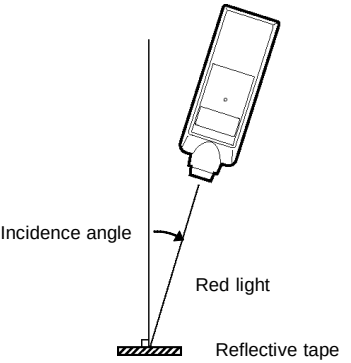
(14) MODE symbols MAX MIN TOTAL PERIOD	 Holds maximum reading Holds minimum reading Total amount of rotations Period of rotation measurement
(15) FAST/SLOW mode switch	Selects the sampling period.
(16) Analog output range switch	Selects between x 0.1 (mV) and x 0.01 (mV) for r/min measurement and selects between x 10 (mV) and x 1 (mV) for r/s measurement.
(17) OUTPUT terminal	Used to connect a recorder or other equipment with a 9094 OUTPUT CORD.

Chapter 2
Measurement Method

2.1 Measurement Preparations

1. If this is the first time the instrument will be used, insert the batteries.
2. Attach the reflective tape to the rotating object.
   • Before attaching the tape, make sure that the surface of the object is free of dirt, grease or dust.
3. Turn on the power switch, and check that all segments of the display light for about one second.
   • If the ▪B mark lights, replace the batteries.
4. Turn the detector window so that the red emitted light faces the reflective tape on the rotating object. If the reflected light is being detected, the buzzer sounds and the LED lights.
   • If the reflectivity of the rotating object itself is high and light is reflected from portions other than the reflective tape, tilt the instrument to restrict the incident light and obtain a more accurate reading.

NOTE The red light from the instrument shall strike the reflective tape at an incidence angle of 45 degrees or less. If the incidence angle exceeds 45 degrees, the instrument may not be able to detect the reflected light and may not be able to do measurement.



2.2 Normal Measurement

1. When the power is turned on, the instrument will automatically enter the normal measurement mode.
2. The speed of rotation of the object will be measured and displayed.

- The speed of rotation range can be switched between r/min and r/s during measurement. The 3404 can also be switched between FAST and SLOW sampling period.
- On the 3403, the last digit of the display will be fixed to 0 for counts over 20,000.
- Analog output on the 3404 will match the displayed value.
- For speed of rotation measurement under 30 r/min in the 3404 SLOW mode or on the 3403 or for measurement under 120 r/min in the 3404 FAST mode, the display will appear as indicated right.

- The display will appear as "**-----**" for measurement over 100,000 r/min.

NOTE
- When the count exceeds 20,000 on the 3404 in the SLOW mode, the last digit will be fixed to zero, and, in the FAST mode the last two digits will be fixed to zero. This is the same for MIN and MAX hold modes as well.
- During r/s measurements, accuracy of values greater than 1600 r/s is not assured.

2.3 MAX Hold Measurement (3404 only)

Press the **MODE** switch to enter the MAX mode.

- In this mode, like the normal measurement, the speed of rotation is measured and the maximum detected value is displayed where there is variation in the speed of rotation.
- Measurement may be freely switched between r/min and r/s.
- Pressing the **RESET** switch in this mode will clear the displayed maximum value.

2.4 MIN Hold Measurement (3404 only)

Press the **MODE** switch to enter the MIN mode.

NOTE In MIN hold measurement, verify that the detection LED is lit, and then press **RESET** switch and begin measurement.

- In this mode, like the normal measurement, the speed of rotation is measured, and the minimum detected value is displayed where there is variation in the speed of rotation.
- Pressing the **RESET** switch in this mode will clear the displayed minimum value.
- Measurement may be freely switched between r/min and r/s.

Cautions in MAX and MIN hold measurement

- Do not switch between FAST and SLOW measurement modes during measurement of MAX or MIN hold. If the instrument is switched between FAST and SLOW modes, press the **RESET** switch and begin measurement again.

- The analog output during MAX and MIN hold measurement is independent of the displayed values, and always represents the normal measurement value.
- The displayed maximum and minimum values will be cleared with the **RESET** switch only. The maximum and minimum values won't be cleared by changing the mode with the **MODE** switch.
- The maximum and minimum values will continue to be updated even after moving to another mode.

2.5 TOTAL Measurement (3404 only)

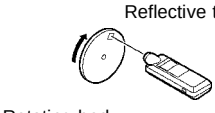
Measurement in this mode is different from normal mode measurement in that pulses are simply counted, and the total displayed.

1. Press the **MODE** switch to enter the TOTAL mode.
2. It will be 5 digit display. Displays of measurement values of 100,000 and higher use a decimal point code system, where the actual value = (number of decimal points) x 100,000 + displayed value.

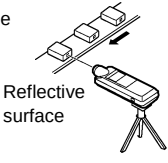
<For example>
3 x 100,000 + 83201 = 383201

NOTE
- When the count exceeds 600,000, the display shows "**-----**" and the instrument stops counting.
- The counting will continue inside the instrument, even after the **HOLD** switch is pressed.
- The measurement value is cleared by pressing the **RESET** switch.

Application example



Total rotations of the object in a certain period of time

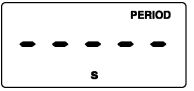


Counting cartons passing on a belt conveyer

2.6 PERIOD Measurement (3404 only)

In this mode the time of the rotation pulse (period) is measured.

1. Press the **MODE** switch to start PERIOD measurement.
2. For measurement of 2 s and longer, the display will appear as shown below.



NOTE
- During PERIOD measurements, accuracy of values less than 600 μs is not assured.
- For the PERIOD measurement, two sampling modes; FAST and SLOW are available. In the FAST mode, the last digit of the display will be fixed to zero.

Cautions in TOTAL and PERIOD measurement

- In TOTAL and PERIOD measurement the measurement value is displayed regardless of changes to r/min/r/s.
- During the TOTAL and PERIOD measurement, the analog output will be based on results of the NORMAL measurement, regardless of the current display.
- The TOTAL measurement counting will continue even after moving to another mode.

2.7 FAST/SLOW Mode Measurement (3404 only)

The FAST/SLOW mode, switch selects different sampling periods for measurement and display. The sampling period of the analog output is also changed.

NOTE

- Do not switch between FAST and SLOW modes during measurement in the MAX and MIN measurement mode. If the mode is switched, press the **RESET** switch and restart measurement.
- The display for TOTAL is not affected by the FAST/SLOW mode switch operation.
- During the PERIOD measurement, the last digit of the display will be fixed to zero in the FAST mode.

FAST/SLOW mode display

Number of rotating (r/min)	SLOW display (r/min)	Accuracy (r/min)	FAST display (r/min)	Accuracy (r/min)
625.4	625.4	±0.1	625.0	±2
1234.5	1234.5	±0.2	1234.0	±4
5421	5421	±1	5420	±20
15432	15432	±2	15430	±40
65878	65870	±10	65800	±200

0: indicates digits fixed to 0.

2.8 Data Hold

This is used to freeze (hold) a displayed value when it is difficult to read the display.
When the **HOLD** switch is pressed, the display will be held, and also be suspended. Pressing it for a second time will release the hold.

NOTE Data hold is valid in all measurement modes.

2.9 Buzzer Off Set

Turn on the power while holding the **HOLD** switch down.

NOTE Keep the HOLD switch depressed until all the LCD indications light up and then go out (about one second).

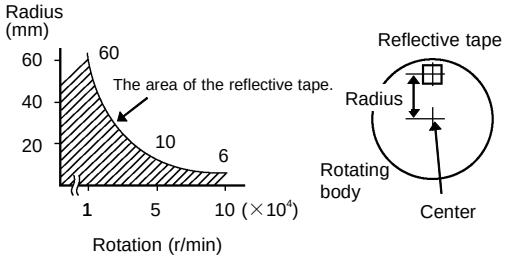
Chapter 3
Precautions

Precautions in Measurement of High-Rotation Objects

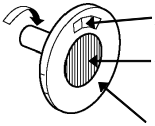
Detection of reflected light uses modulated light to minimize the effects of incident light. When this modulated light is input for a fixed period of time (about 0.2 ms) or longer, a single pulse is detected. For this reason, if the light pulse generated by the passing reflective tape is less than 0.2 ms detection is not possible.

The range that can be detected with a 12 mm square target of reflective tape is indicated below.

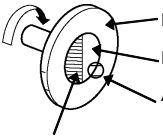
Radius is the distance between the center of the rotating object and the center of the tape.



If the reflective tape cannot be attached within this detection range, increase the area of the reflective tape so that the generated pulse is 0.2 ms or higher.



For measurement of 30,000 r/min or higher, use the following method:

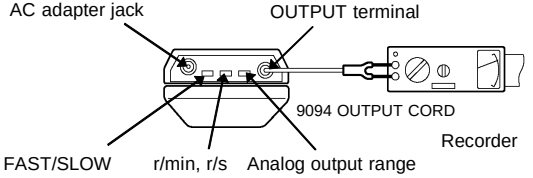


NOTE The red light from the instrument should be adjusted slightly off center as shown, not to the center of the rotating body.

Chapter 4
Analog Output (3404 only)

⚠ CAUTION

Do not input an external voltage to the analog output terminal.



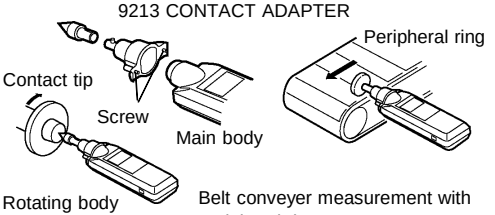
1. Attach reflective tape to the rotating body.
2. Connect the recorder and OUTPUT terminal with the 9094 OUTPUT CORD (comes with instrument).
3. Set sampling speed to FAST or SLOW, and range to r/min or r/s.
4. Select the analog output magnification to suit maximum r/min and recorder range conditions.
5. Turn on power switch.
6. Check that the output is O where there is no rotation being detected.
7. Output the red light from the instrument detector window toward the reflective tape on the rotating object.

	Analog output magnification	Measurement range→ output range
r/min	X 0.1 (mV) X 0.01 (mV)	30 to 10000 r/min → 3 to 1000 mV 100 to 100000 r/min → 1 to 1000 mV
r/s	X 10 (mV) X 1 (mV)	0.5 to 100 r/s → 5 to 1000 (mV) 1 to 1000 r/s → 1 to 1000 (mV)

- Analog output is the conversion of the displayed rotation speed to mV, multiplied by the selected magnification.
  Minimum resolution for analog output is 1 mV, regardless of range. In other words, in the x 0.1 mV magnification analog output is in 10 r/min steps; and in the x 0.01 mV magnification, it is in 100 r/min steps. in the x 10 mV magnification, analog output is in 0.1 r/s; and in the x 1 mV magnification, it is in 1 r/s steps.
- Analog output will convert measured results for each sample (D/A) for stable output even at low rotation speeds. The sampling rate will be changed when the measurement is switched between FAST and SLOW modes, allowing the optimum mode for specific applications to be selected.
- Sampling is 0.7 to 2.0 s in the SLOW mode, and 0.12 to 0.5 s in the FAST mode.
- In r/s measurement, maximum output is 1000 r/s, as even in the x 1 mV range full scale output is 1 V.

- The analog output is sent out during the NORMAL, MAX HOLD and MIN HOLD measurement. During the TOTAL and PERIOD measurement, the analog output will be based on results of the NORMAL measurement. When using the MAX, MIN and **HOLD** measuring features, the output level is not held constant, but remains the same as during normal measuring.
- The analog output uses the current measurement, not the held data, during the DATA HOLD.

Chapter 5 Measurement with 9213 CONTACT ADAPTER



1. Attach the contact adapter over the detector window with the "up" mark facing up. Tighten it with a screwdriver on both sides.
2. Turn on the power, and rotate the contact tip manually. Check that the buzzer sounds and the LED lights.
3. For rotation speed measurement, insert the shaft of the 9033 RUBBER CONTACT TIP or 9032 METAL CONTACT TIP (used with soft rotating objects).
4. Lightly press the contact tip against the center of the rotating body.

5. Insert the 9212 PERIPHERAL RING onto the adapter for measurement of period, such as for a belt conveyer.

- For r/min mode measurement, the display reading is multiplied by 0.1, read in m/min.
- For r/s mode measurement, the display reading is multiplied by 0.1, read in m/s.

NOTE Do not use with rotating bodies that do not have dent in the center.

Chapter 6
Specifications

Measurement method	Visible light reflection
Display	LCD 4 1/2 digits (5 digits with the last digit fixed at 0 for 20, 000 r/min and higher) TOTAL measurement: 5 digits (3404 only)
Display marks	**HOLD**, r/min, r/s, and ▪B marks (MAX, MIN, TOTAL, PERIOD, µs, ms, s (3404 only))
Range select	Automatic
Sampling period	0.5 to 2.0 s (SLOW mode and on the 3403) 0.1 to 0.5 s (on the 3404 FAST mode)
Data hold	Fixes the display when the hold switch is used.
Over range display	Displays "-----"
MAX, MIN hold	Holds maximum or minimum value display (3404 only)
Detection distance	50 to 200 mm (1.97" to 7.87")
Reflected light detection confirmation	Buzzer and LED

Accuracy	Display	3403, 3404 (SLOW)	3404 (FAST)
	4 digits	±1 dgt.	±20 dgt.
	4 1/2 digits	±2 dgt.	±40 dgt.
	20,000 and over.	±10 dgt.	±200 dgt.
Tripod mounting	Tripod mounting bolt provided on body		
Operating temperature/ humidity	0 to 40℃ (32 to 104℉), 80% RH or less (no condensation)		
Storage temperature/ humidity	-10 to 50℃ (14 to 122℉), 80% RH or less (no condensation)		
Power supply	Rated supply voltage: 6.0 VDC Regulated power supply range: 6.0 V or later (until the B mark lights up) Four R6P manganese batteries		
Continuous measurement time	3403: approx. 17 h 3404: approx. 16 h		
AC adapter	6 V / 300 mA : 5 mm dia		
Maximum rated power	0.4 VA		
Dimensions and mass	Approx. 62W x 182H x 38D mm (2.44"W x 7.17"H x 1.50"D) Approx. 260 g (9.2 oz.)		

Standards Safety EMC	 EN61010 Pollution Degree 2, Overvoltage Category I (anticipated transient overvoltage 330 V) EN61326
Accessories	9211 REFLECTIVE TAPE (1 sheet) 9094 OUTPUT CORD (3404 only) Carrying case Four R6P manganese batteries Instruction manual
Option	9211 REFLECTIVE TAPE (10 sheets) 9035 AC ADAPTER (no CE marking) 9094 OUTPUT CORD 9213 CONTACT ADAPTER (includes the 9032, the 9033 (two), the 9212, screwdriver)  9213 9032 9033 9212

Analog output (3404 only):
DC, Max. 1 V, Min. resolution 1 mV

	Analog output magnification	Measurement range→ output range
r/min	X 0.1 (mV) X 0.01 (mV)	30 to 10000 r/min → 3 to 1000 mV 100 to 100000 r/min → 1 to 1000 mV
r/s	X 10 (mV) X 1 (mV)	0.5 to 100 r/s → 5 to 1000 mV 1 to 1000 r/s → 1 to 1000 mV

(Accuracy ±1%rdg. ±1 mV,
Output resistance: 1 kΩ)

Measurement range:
<Non-contact type>
NORMAL, MAX, MIN
(In SLOW mode and on the 3403)
30 to 99990 r/min, 0.5 to 1600 r/s

	r/min	r/s
Range	30.00 to 199.99	0.5000 to 1.9999
	200.0 to 1999.9	2.000 to 19.999
	2000 to 19999	20.00 to 199.99
	2000[0] to 9999[0]	200.0 to 1600.0

[0]: indicates digits fixed to 0.

(In FAST mode on the 3404 only)
120 to 99900 r/min, 2 to 1600 r/s

	r/min	r/s
Range	120.0[0] to1999.9[0]	
	200.[0] to 1999.[0]	2.00[0] to 19.99[0]
	200[0] to 1999[0]	20.0[0] to 199.9[0]
	200[0][0] to 999[0][0]	200.0[0] to 160.0[0]

[0]: indicates digits fixed to 0.

TOTAL (3404 only): 0 to 599999, 5 digit display (decimal point used for 100,000 counts and higher)

	Display	Measurement range
Range	00000 to 99999	(0 to 99999)
	00000. to 99999.	(100000 to 199999)
	0000.0. to 9999.9.	(200000 to 299999)
	000.0.0. to 999.9.9.	(300000 to 399999)
	00.0.0.0. to 99.9.9.9.	(400000 to 499999)
	0.0.0.0.0. to 9.9.9.9.9.	(500000 to 599999)

PERIOD (3404 only): 600 µs to 1.9999 s (SLOW), 600 µs to 500 ms (FAST)

	SLOW	FAST
Range	600.0 to 999.9 µs	600.[0] to 999.[0] µs
	1.0000 to 1.9999 ms	1.000[0] to 1.999[0] ms
	2.000 to 19.999 ms	2.00[0] to 19.99[0] ms
	20.00 to 199.99 ms	20.0[0] to 199.9[0] ms
	200.0 to 999.9 ms	200.[0] to 500.[0] ms
	1.0000 to 1.9999 s	

[0]: indicates digits fixed to 0.

<Contact type>
NORMAL, MAX, MIN
(in SLOW mode and on the 3403): 30 to 20000 r/min, 0.5 to 333 r/s
(in FAST mode on the 3404 only): 120 to 20000 r/min, 2 to 333 r/s

Chapter 7 Maintenance and Service

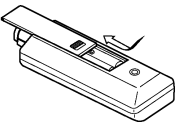
7.1 Battery Replacement

⚠ WARNING

- **To avoid electric shock when replacing the batteries, first disconnect the output cord and AC adapter.**
- **Do not mix old and new batteries, or different types of batteries. Also, be careful to observe battery polarity during installation. Otherwise, poor performance or damage from battery leakage could result.**
- **Battery may explode if mistreated. Do not short-circuit, recharge, disassemble or dispose of in fire.**
- **Handle and dispose of batteries in accordance with local regulations.**

NOTE To avoid corrosion from battery leakage, remove the batteries from the instrument if it is to be stored for a long time.

When the ⊟ lights on the display, slide open the cover and replace the batteries.



7.2 Maintenance

To clean the instrument, wipe it gently with a soft cloth moistened with water or mild detergent. Never use solvents such as benzene, alcohol, acetone, ether, ketones, thinners or gasoline, as they can deform and discolor the case.

7.3 Service

If the instrument seems to be malfunctioning, confirm that the batteries are not discharged before contacting your dealer or Hioki representative. Pack the instrument so that it will not sustain damage during shipping, and include a description of existing damage. We do not take any responsibility for damage incurred during shipping.

HIOKI

DECLARATION OF CONFORMITY

Manufacturer's Name: HIOKI E.E. CORPORATION

Manufacturer's Address: 81 Koizumi, Ueda, Nagano
386-1192, Japan

Product Name:	TACHO HiTESTER
Model Number:	3403, 3404
Accessory:	9094 CONNECTION CORD 9213 CONTACT ADAPTER SET

The above mentioned products conform to the following product specifications:

Safety: EN61010-1:2001

EMC: EN61326-1:2006
ClassB equipment
Portable test and measurement equipment.

Supplementary Information:

The product herewith complies with the requirements of the EMC Directive 2004/108/EC, but is not applicable to the Low Voltage Directive 2006/95/EC.

HIOKI E.E. CORPORATION

25 June 2008

M. Tanaka

Mitsuyoshi Tanaka
Director of Quality Assurance

3403B999-05

HIOKI 3403, 3404 TACHO HiTESTER

Instruction Manual

Publication date: July 2008 Revised edition 2

Edited and published by HIOKI E.E. CORPORATION
Technical Sales Support Section

All inquiries to International Sales and Marketing Department

81 Koizumi, Ueda, Nagano, 386-1192, Japan
TEL: +81-268-28-0562 / FAX: +81-268-28-0568
E-mail: os-com@hioki.co.jp
URL http://www.hioki.com/

Printed in Japan 3403A981-02

HIOKI

HIOKI E. E. CORPORATION

HEAD OFFICE
81 Koizumi, Ueda, Nagano 386-1192, Japan
TEL +81-268-28-0562 / FAX +81-268-28-0568
E-mail: os-com@hioki.co.jp/
URL http: //www.hioki.com/

HIOKI USA CORPORATION
6 Corporate Drive, Cranbury, NJ 08512, USA
TEL +1-609-409-9109 / FAX +1-609-409-9108

3403A981-02 08-07H

Printed on recycled paper