HIOKI

INSTRUCTION MANUAL

3640-20

LUX LOGGER

HIOKI E. E. CORPORATION

Contents

Introduction

Thank you for purchasing this HIOKI "3640-20 LUX LOGGER." To get the maximum performance from the unit, please read this manual first, and keep this at hand.

Inspection

When the unit is delivered, check and make sure that it has not been damaged in transit. If the unit is damaged, or fails to operate according to the specifications, contact your dealer or HIOKI representative.

Accessories

9662 LUX SENSOR
Instruction Manual
LR03 alkaline battery X 4 (built into this unit, for monitor)

Before using the product the first time, verify that it operates normally to ensure that the no damage occurred during storage or shipping. If you find any damage, contact your dealer or Hioki representative.

NOTE Testing monitor batteries installed in the unit may possibly be weak. Replace batteries before extended measurement usage.

Safety Notes


DANGER

This equipment is designed according to IEC 61010-1 Safety Standards, and has been tested for safety prior to shipment. Incorrect measurement procedures could result in injury or death, as well as damage to the equipment. Please read this manual carefully and be sure that you understand its contents before using the equipment. The manufacturer disclaims all responsibility for any accident or injury except that resulting due to defect in its product.

This Instruction Manual provides information and warnings essential for operating this equipment in a safe manner and for maintaining it in safe operating condition. Before using this equipment, be sure to carefully read the following safety notes.

Safety Symbols

- This symbol is affixed to locations on the equipment where the operator should consult corresponding topics in this manual (which are also marked with the ⚠ symbol) before using relevant functions of the equipment.
- In the manual, this mark indicates explanations which it is particularly important that the user read before using the equipment.

Indicates DC (Direct Current).

The following symbols are used in this Instruction Manual to indicate the relative importance of cautions and warnings.

DANGER	Indicates that incorrect operation presents extreme danger of accident resulting in death or serious injury to the user.
WARNING	Indicates that incorrect operation presents significant danger of accident resulting in death or serious injury to the user.
CAUTION	Indicates that incorrect operation presents possibility of injury to the user or damage to the equipment.
NOTE	Denotes items of advice related to performance of the equipment or to its correct operation.

Accuracy

The specifications in this manual include figures for "measurement accuracy" when referring to digital measuring instruments, and for "measurement tolerance" when referring to analog instruments.

f.s. (maximum display or scale value, or length of scale)
Signifies the maximum display (scale) value or the length of the scale (in cases where the scale consists of unequal increments or where the maximum value cannot be defined).
In general, this is the range value (the value written on the range selector or equivalent) currently in use.

rdg. (displayed or indicated value)
This signifies the value actually being measured, i.e., the value that is currently indicated or displayed by the measuring instrument.

dgt. (resolution)
Signifies the smallest display unit on a digital measuring instrument, i.e., the value displayed when the last digit on the digital display is "1".

Notes on Use

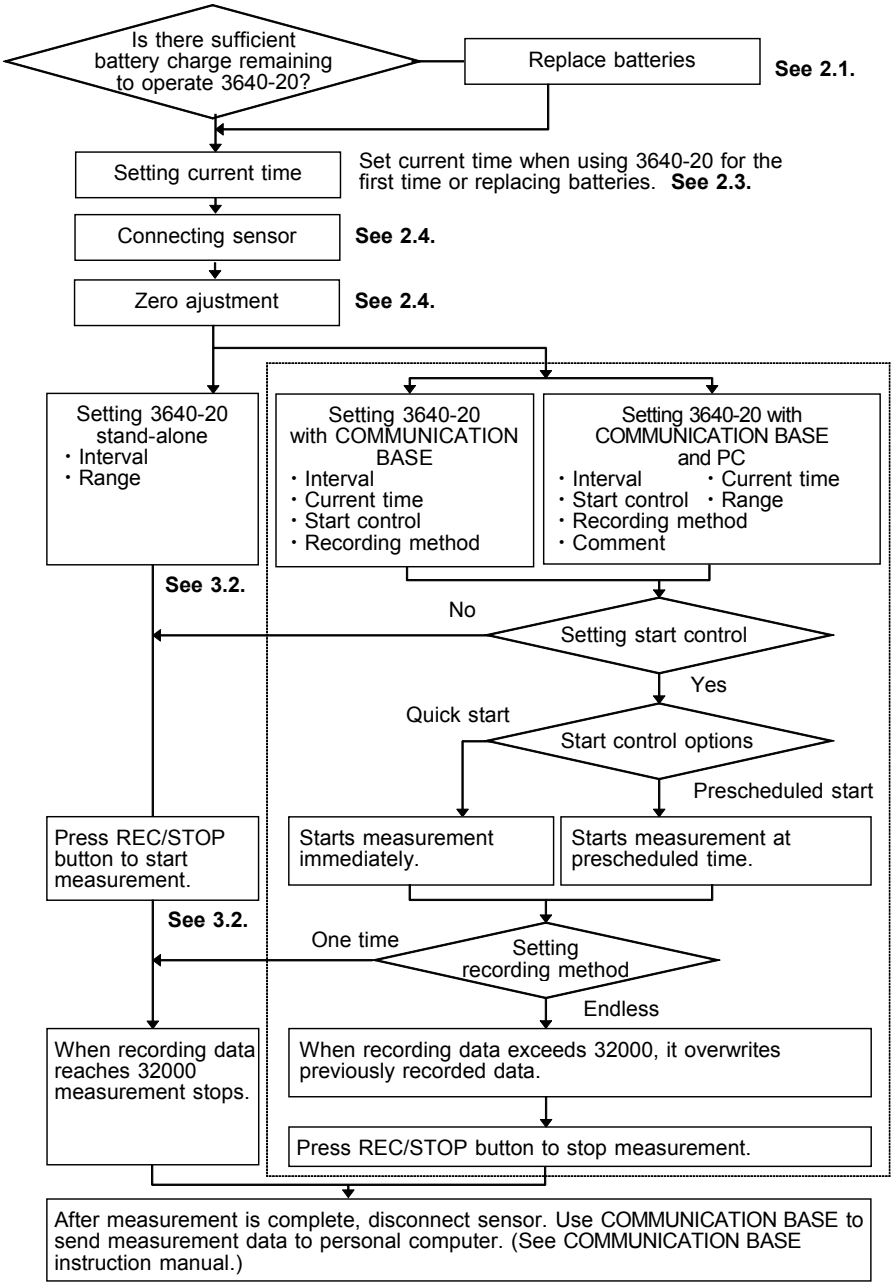
In order to ensure safe operation and to obtain maximum performance from the unit, observe the cautions listed below.

⚠CAUTION Do not store or use the product where it could be exposed to high temperature or humidity, or condensation. Under such conditions, the product may be damaged and insulation may deteriorate so that it no longer meets specifications.

NOTE

- Attach the supplied light sensor cap to the detector and then perform zero ajustment before measurement.
- Do not store or use the tester where it will be exposed to direct sunlight, high temperature, high humidity, or condensation. If exposed to such conditions, the tester may be damaged, the insulation may deteriorate, and the tester may no longer satisfy its specifications.
- The reference level as marked on the faceplate is the tip of the light sensor.

Measurement Flow Chart and Reference Guide



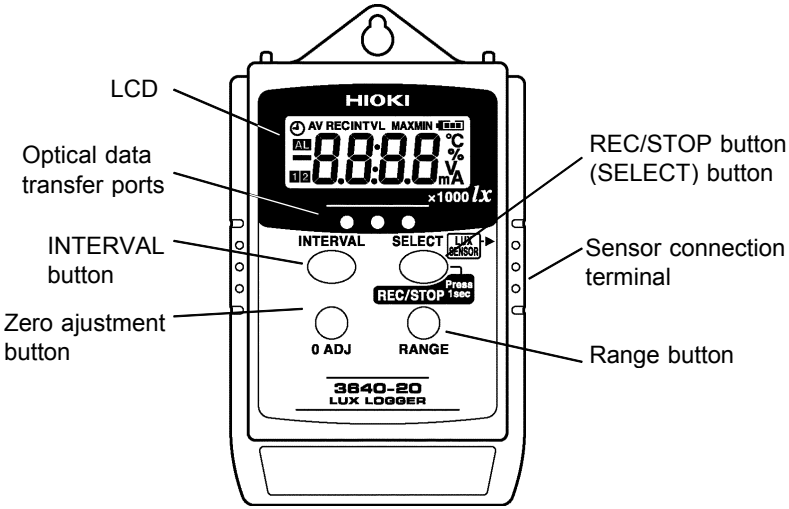
Chapter 1
Product Overview

3640-20 LUX LOGGER with 9662 LUX SONSOR records 1 channel of data at illuminance.
Data is saved in nonvolatile memory when batteries are weak or removed for replacement.

NOTE

3640-20 LUX LOGGER are not able to set up it to 3910-20 COMMUNICATION BASE.
Use 3911-20, 3912-20 COMMUNICATION BASE to set 3640-20.

1.1 Name and Functions of Parts



LCD	Displays measurement value and settings.
Optical data transfer ports	Enables optical data transfer to COMMUNICATION BASE.
INTERVAL button	Calls up interval setting display to set interval.
Zero ajustment button	Performs zero adjustment for the Lux Sensor.
REC/STOP button	Pressing more than 1 second initiates or stops recording.
(SELECT) button	Interval is selected in interval setting display.
Sensor connection terminal	Connects 9662 LUX SENSOR.
Range button	Changes measurement range from 2000 lx/20000 lx/2000000 lx.

1.2 Interval and Maximum Recording Time

Interval and maximum recording time (when power save function is valid) are as follows.
Maximum recordable data is 32000 per unit.

INTVL	Maximum Recording Time
1 s	8 h 53 min 20 s
2 s	17 h 46 min 40 s
5 s	1 day 20 h 26 min 40 s
10 s	3 day 16 h 26 min 40 s
15 s	5 day 13 h 20 min
20 s	7 day 9 h 46 min 40 s
30 s	11 day 2 h 40 min
1 min	22 day 5 h 20 min
2 min	44 day 10 h 40 min
5 min	111 day 2 h 20 min
10 min	222 day 5 h 20 min
15 min	333 day 8 h
20 min	444 day 10 h 40 min
30 min	666 day 6 h
60 min	1333 day 8 h

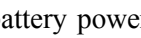
Chapter 2
Set Up

2.1 Replacing the Battery

WARNING

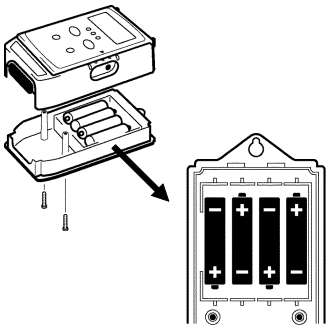
- **During battery replacement, use caution not to put any foreign materials such as a metal object into the unit to avoid damage to the unit.**
- **Before using the product after replacing the batteries, replace the cover and screw.**
- **Do not mix old and new batteries, or different types of batteries. Also, be careful to observe battery polarity during installation. Otherwise, poor performance or damage from battery leakage could result.**
- **Handle and dispose of batteries in accordance with local regulations.**

⚠CAUTION When exchanging the batteries, the circuit may sometimes short circuit due to static electricity. As far as possible, do not touch the base board with bare hands.

Installing new batteries ensures about 1 year of recording. (reference value with interval setting set to 1 minute or more, power save setting set to valid and at 20℃) Remaining battery power indicator () indicates remaining battery life reducing incrementally from right. Empty battery power indicator () indicates time to replace batteries.

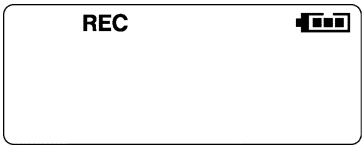
1. Remove back cover screw to remove cover. Verify polarity and install four new LR03 alkaline batteries.

2. Fit cover properly and tighten screw.



2.2 Power Save Function

Display window is automatically turned off in approximately 15 seconds after last key entry. (Sleep) However, while recording, **REC**/▪▪▪/◴ mark shows each conditions.



Sleeping.....

Press any button to turn display on to display measurement value or to set settings.
Note when interval setting display is on, sleep does not engage with no button press.

Initially, power save function is on. To turn off power save function, follow the instructions below.
When power save function is off, maximum continuous duration is approximately 10 days.

1. Connect logger, COMMUNICATION BASE and personal computer.
2. Start up application software packaged with COMMUNICATION BASE.
3. Go to Communications on the menu bar and select Power Save Options. Choose Off to turn off power save function.

NOTE See COMMUNICATION BASE instruction manual to connect logger and to install application software. To use application software, see operation guide.

2.3 Setting Current Time

When replacing 3640-20 LUX LOGGER batteries or using 3640-20 stand-alone (with manual operation) for the first time, connect with COMMUNICATION BASE and set current time.

See how to set current time in COMMUNICATION BASE instruction manual.

2.4 Connecting 9662 LUX SENSOR

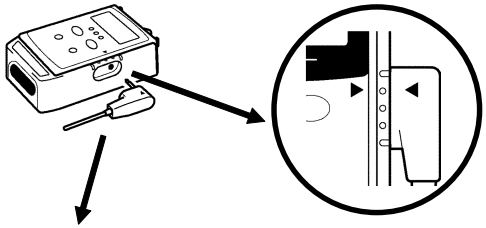
WARNING

To avoid damaging the unit, do not use any other sensors except 9662 LUX SENSOR as sensor connection terminal.

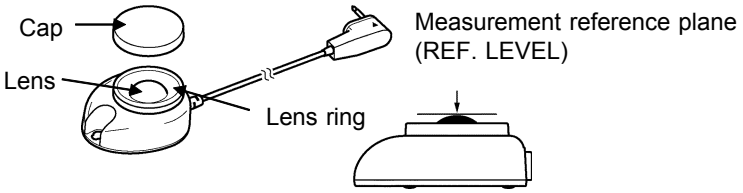
Connecting 9662 LUX SENSOR

Connecting 9662 LUX SENSOR to sensor connection terminal.When connecting sensor, securely insert connection cable to unit as designated by triangle mark ▲ on connection terminal.

Improper connection results in failure to output accurate signal. The unit cannot display the correct reading value unless the cable is inserted fully as illustrated.

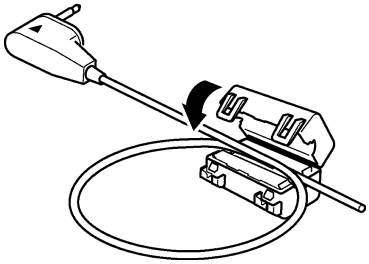


9662 LUX SENSOR



Cord length: 2000 mm

Electromagnetic noise may cause measurements to fluctuate if the instrument is used in the vicinity of an inverter-type power supply or radio transmitter. In such situations, make a loop in the Lux Sensor cable and clamp the provided ferrite core around the loop as shown in the illustration below.



Zero ajustment

With the measurement value displayed, place the cap provided over the lens. If you press the zero adjust button, "**0Adj**" appears on the LCD, and zero adjustment is performed for all ranges.
If the **REC** mark or "⏲" mark is displayed on the LCD, zero adjustment cannot be performed.
If the cap is not set (100 x1 or greater for the 2000 1x range), "**CAP**" appears on the LCD. Make sure the cap is set.
"**CAP**" goes out after a few seconds, and the measurement value reappears. If the cap is set while "**CAP**" is displayed, zero adjustment is performed automatically.

Chapter 3
Settings

3.1 Setting Items

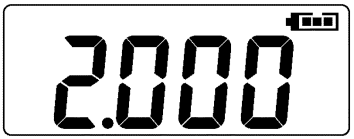
Logger stand-alone manual settings and settings in combination with COMMUNICATION BASE with measurement conditions stored in memory loaded from personal computer.

	3640-20	3640-20＋ COMMUNICATION BASE	3640-20＋ COMMUNICATION BASE＋PC
1. Start recording	Vaild	Vaild	Vaild
2. Stop recording	Vaild	---	---
3. Interval setting	Vaild	Vaild	Vaild
4. Current time setting	---	Vaild	Vaild
5. Start control	---	Vaild	Vaild
6. Recording method setting	---	Vaild	Vaild
7. Range setting	Vaild	---	Vaild
8. Comments	---	---	Vaild

NOTE Comment setting are available when personal computer is connected to both logger and COMMUNICATION BASE.

1. Start recording

Start manual recording by pressing logger REC/STOP button for 1 second or initiate by prescheduled start set using COMMUNICATION BASE.
When time scheduled start is engaged, clock icon appears in display. When batteries are weak, recording does not start. During recording, weak battery interrupts recording.



2. Stop recording

Stop recording by pressing logger REC/STOP button for 1 second.
Or recording stops automatically when data is full when set to recording method: one time.

3. Interval setting

Set interval with logger alone or using COMMUNICATION BASE.
(1/2/5/10/15/20/30 s, 1/2/5/10/15/20/30/60 min)

4. Current time setting

To set current time, see COMMUNICATION BASE instruction manual.

5. Start control

Set specific recording date and time using COMMUNICATION BASE to engage time scheduled start. When time scheduled start is engaged, clock icon appears in display.

6. Recording method setting

Set recording method using COMMUNICATION BASE.
Choose either one time or endless recording method.
Default setting is one time.
One time: Ends recording when data reaches 32000.
Endless : Overwrites previously recorded data when data exceeds 32000.

7. Range setting

With 3640-20 stand-alone, or connected with COMMUNICATION BASE and PC, range setting is available.
Two measurement range options are 2000 lx, 20000 lx and 2000000 lx.
Set the range comply with the maximum illuminance will be measured.

8. Comments

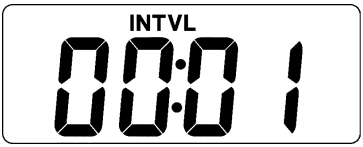
Set comments entered by personal computer to logger using COMMUNICATION BASE. When sorting collected recording data, comments are helpful.
Comment setting is available when personal computer is connected to both logger and COMMUNICATION BASE.

3.2 Manual Setting

3640-20 LUX LOGGER stand-alone manual operation settings are shown below.

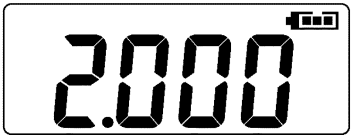
(1) Interval setting

Press INTERVAL button to switch measurement value display to interval setting display. ("**INTVL**" appears.)
Press SELECT button to designate interval.
Press INTERVAL button to complete setting.



(2) Setting range

Press RANGE button on monitor screen to select 2000 lx, 20000 lx or 2000000 lx.
When measurement range is reselected, decimal point moves its position.



2000 lx range

20000 lx range

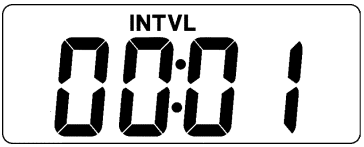
200000 lx range

(3) Starting and ending recording

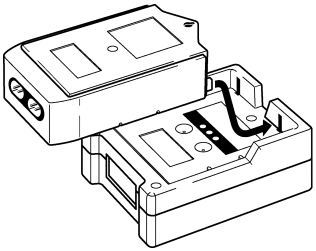
Press REC/STOP button for 1 second to clear last recorded data and start recording. ("**REC**" appears.)
Press REC/STOP button for 1 second to stop recording.
When memory is full, recording automatically stops when recording method: one time is selected.
When batteries are weak, recording does not start. During recording, weak batteries interrupt recording.

3.3 Setting by COMMUNICATION BASE

1. Press logger INTERVAL button lightly to display LCD.
2. When logger LCD shows "**REC**" mark or clock icon, press REC/STOP button for more than 1 second to stop recording.
   During recording or waiting time before recording start time, data transfer cannot be established with COMMUNICATION BASE.
3. Press logger INTERVAL button to display interval setting display. ("**INTVL**" appears.)



4. Connect COMMUNICATION BASE with logger.
5. Press COMMUNICATION BASE SEND button for more than 1 second to send data settings to logger.

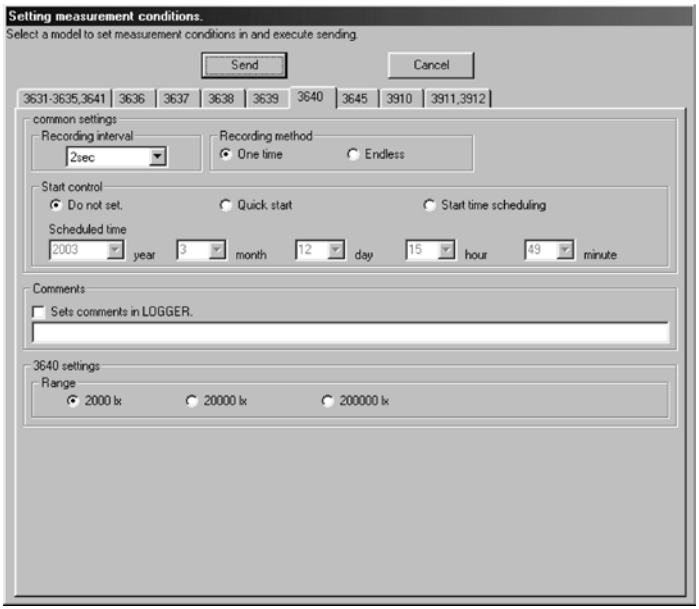


NOTE

- Previously recorded logger data is erased when recording is resumed. Be sure to load data to be saved to COMMUNICATION BASE or to personal computer before recording.
- At any other time even when interval setting display is not shown, except during recording and waiting for recording, communication with COMMUNICATION BASE is available. However communication is disabled when logger is set to sleep.

3640-20 settings in application software COMMUNICATION UTILITY packaged with COMMUNICATION BASE are as follows.

Go to 'Communication' on the menu bar in COMMUNICATION UTILITY and select 'Set measurement condition'. When measurement condition setting window is open, select '3640-20 setting items' to set settings.



NOTE

- Comment, recording mode, measurement channel, range and alarm setting are only available in 3640-20 setting items. Personal computer, COMMUNICATION BASE and 3640-20 must be connected during setting.
- Common settings are available to be set in '3911, 3912 setting items'. This enables 3640-20 and COMMUNICATION BASE settings.

Chapter 4
Specifications

Sensor types	9662 LUX SENSOR
Number of input	1 channel
Measurement range	0 to 200000 lx
Range structure	2000 lx/20000 lx/200000 lx
Measurement accuracy	±4% rdg.±5 dgt. (after zero ajustment) Temperature characteristics : Temperature properties: When measuring within the range 0 to 40℃, variance is within ±3% of the measurement at 23℃.
Effect of radiated radio-frequency electromagnetic field	±30 dgt. at 3 V/m
LCD display	Measurement value, Interval, Battery status (remaining battery power indicator: 4 phases) Unit (X1000 lx), recording (REC), prescheduled(◴)
Interval	1/2/5/10/15/20/30 s, 1/2/5/10/15/20/30/60 min
Recording capacity	32,000 data
Recording start	Manual start, Prescheduled start
Recording stop	Manual stop, Memory full
Recording method	One time, Endless
Displaying Max/Min value	Displays maximum value and minimum value.
Data backup	Available (Data not erased by weak batteries or battery replacement)
Interface	Infrared optical data transfer
Power supply	LR03 alkaline battery X 4 (1.5 VDC X 4)
Maximum rated power	0.1 VA
Battery life	Approx. 1 year (temperature at 20℃, power save function: valid, interval: 1 minute) Approx. 10 days (temperature at 20℃, power save function: valid, interval: 1 minute)

Dimensions	Approx. 57W X 86H X 30D mm (excluding projections) 2.24"W X 3.39"H X 1.18"D
Mass	Approx. 130 g (4.6 oz) (including batteries)
Location for use	Indoors, altitude up to 2000 m (6562 feet)
Operate temperature and humidity range	0 to 40℃, 80% RH or less (no condensation) (32 to 122°F)
Storage temperature and humidity range	-10 to 50℃, 80% RH or less (no condensation) (14 to 140°F)
Operating temperature and humidity for guaranteed accuracy	23℃±5℃ (73°F±9°F), 80%RH or less
Guaranteed accuracy period	1 year
Accessories	LR03 alkaline battery X 4 9662 LUX SENSOR Instruction Manual
Options	COMMUNICATION BASE
Standards Applying	EMC EN61326 Safety EN61010 Pollution Degree 2

Chapter 5
Reference

5.1 Recommended Levels of Illumination

Suitable levels of illuminance
(According to the JIS standard Z 9110-1979)

Offices

Level of illuminance (lx)	Place
1500 to 750	Offices, designing, and drawing rooms
750 to 300	Offices, conference rooms, and computer rooms
300 to 100	Workrooms, corridors, stairways, and restrooms
75 to 30	Indoor emergency stairways

Factories

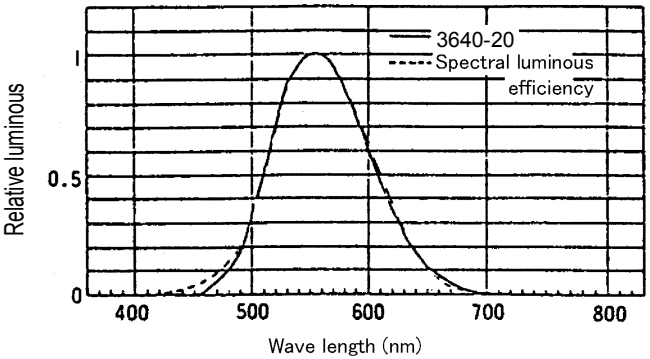
Level of illuminance (lx)	Place
3000 to 1500	Where such work as assembling, inspecting, testing, selecting and extremely precision visual work
1500 to 750	Assembling, inspecting, testing, selecting and precision visual work
750 to 300	Assembling, inspecting, testing, selecting and visual ordinary work
300 to 150	Wrapping and packing
75 to 30	Indoor emergency stairways

Schools

Level of illuminance (lx)	Place
1500 to 300	Precision drawing or drafting, precision experimenting, library reading rooms and precision handicraft
750 to 200	Classrooms, library reading rooms, experiment demonstration rooms, staff rooms and gymnasia
300 to 75	Lecture halls, assembly rooms, locker rooms, corridors, stairways and restrooms
75 to 30	Warehouses and emergency stairways
10 to 2	School passages (for night)

5.2 Relative Spectral Response Characteristics in the Visible Spectrum

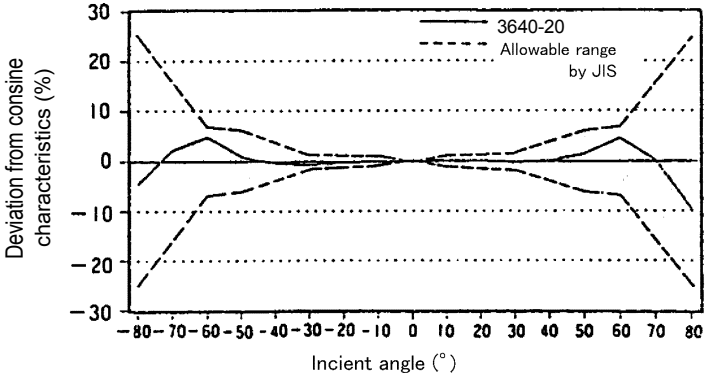
Human perception of brightness ranges from 360 nm to 830 nm in the wavelength and is the maximum at 555 nm.
The International Commission on Illumination (CIE) has established comparative standards for luminosity, setting the maximum perception for 1 and indicating the amount of perception of each wavelength by the relative value, and calculating the average of many people. In the 3640-20, the relative spectral response characteristics are close to the comparative standards for luminosity.
The deviation from the comparative standards for luminosity is determined by the fs value of JIS standard C 1609-1993.



Relative Spectral Responsivity

5.3 Angled Incident Light Characteristics

It is known that the luminance is proportional to the cosine of the incident angle of light (the cosine law).
In the 3640-20, the shape of the light sensor, hook etc. is so made that it can follow the cosine law closely.



Angled Incident Light Characteristics

Chapter 6
Maintenance and Service

Cleaning

To clean the product, 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.
Wipe the LCD or Lens ring gently with a soft, dry cloth.

Service

If the product seems to be malfunctioning, confirm that the batteries are not discharged, and that the sensor is not open circuited before contacting your dealer or Hioki representative.
Pack the product carefully so that it will not be damaged during shipment, and include a detailed written description of the problem. Hioki cannot be responsible for damage that occurs during shipment.

Error Messages

The following error may be displayed on the LCD of the main instrument as shown below.

Error message	Meaning
Err 1	ROM error
Err2	RAM error
Err9	Adjustment data error

When this occurs, repair or check the device. Contact your dealer or Hioki representative. Contact your dealer or Hioki representative.

HIOKI

DECLARATION OF CONFORMITY

Manufacturer's Name:	HIOKI E.E. CORPORATION
Manufacturer's Address:	81 Koizumi, Ueda, Nagano 386-1192, Japan
Product Name:	LUX LOGGER
Model Number:	3640-20
Accessory:	9662 LUX SENSOR

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 products herewith comply 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

11 April 2008

M. Tanaka

Mitsuyoshi Tanaka

Director of Quality Assurance

3640A999-03

HIOKI 3640-20 LUX LOGGER

Instruction Manual

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