HIOKI

INSTRUCTION MANUAL

3637-20

AC VOLTAGE LOGGER

HIOKI E. E. CORPORATION

Contents

Introduction

Thank you for purchasing the HIOKI "3637-20 AC VOLTAGE LOGGER." To obtain maximum performance from the product, please read this manual first, and keep it handy for future reference.

Inspection

When you receive the product, 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.

Accessories

9639 CONNECTION CABLE
Instruction Manual
LR03 alkaline battery X 4
(built into this unit, for monitor)

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

- 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.
- Before using the product, make sure that the insulation on the cables is undamaged and that no bare conductors are improperly exposed. Using the product in such conditions could cause an electric shock, so contact your dealer or Hioki representative for repair.

Safety Notes

DANGER

This equipment is designed according to IEC 61010 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 a device which is double-insulated.

Indicates DC (Direct Current).

Indicates AC (Alternating 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.

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.

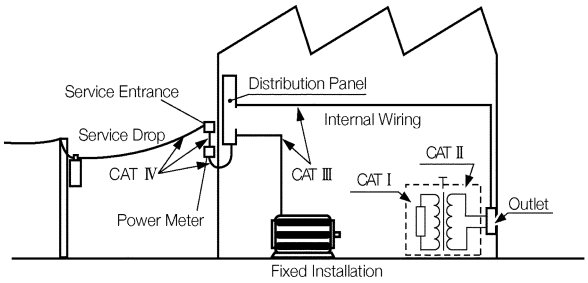
dgt. (resolution)
Signifies the smallest display unit on a digital measuring instrument, i.e., the value displayed when the last digit on the digital display is "1".

Measurement categories (Overvoltage categories)

This product complies with CAT III safety requirements. To ensure safe operation of measurement product, IEC 61010 establishes safety standards for various electrical environments, categorized as CAT I to CAT IV, and called measurement 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 product in an environment designated with a higher-numbered category than that for which the product is rated could result in a severe accident, and must be carefully avoided.
Never use a CAT I measuring product in CAT II, III, or IV environments. The measurement categories comply with the Overvoltage Categories of the IEC60664 Standards.



Notes on Use

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

DANGER

- **The maximum input voltage is AC600 Vrms. Attempting to measure voltage in excess of the maximum input could destroy the product and result in personal injury or death.**
- **Connection cable should only be connected to the secondary side of a breaker, so the breaker can prevent an accident if a short circuit occurs. Connections should never be made to the primary side of a breaker, because unrestricted current flow could cause a serious accident if a short circuit occurs.**

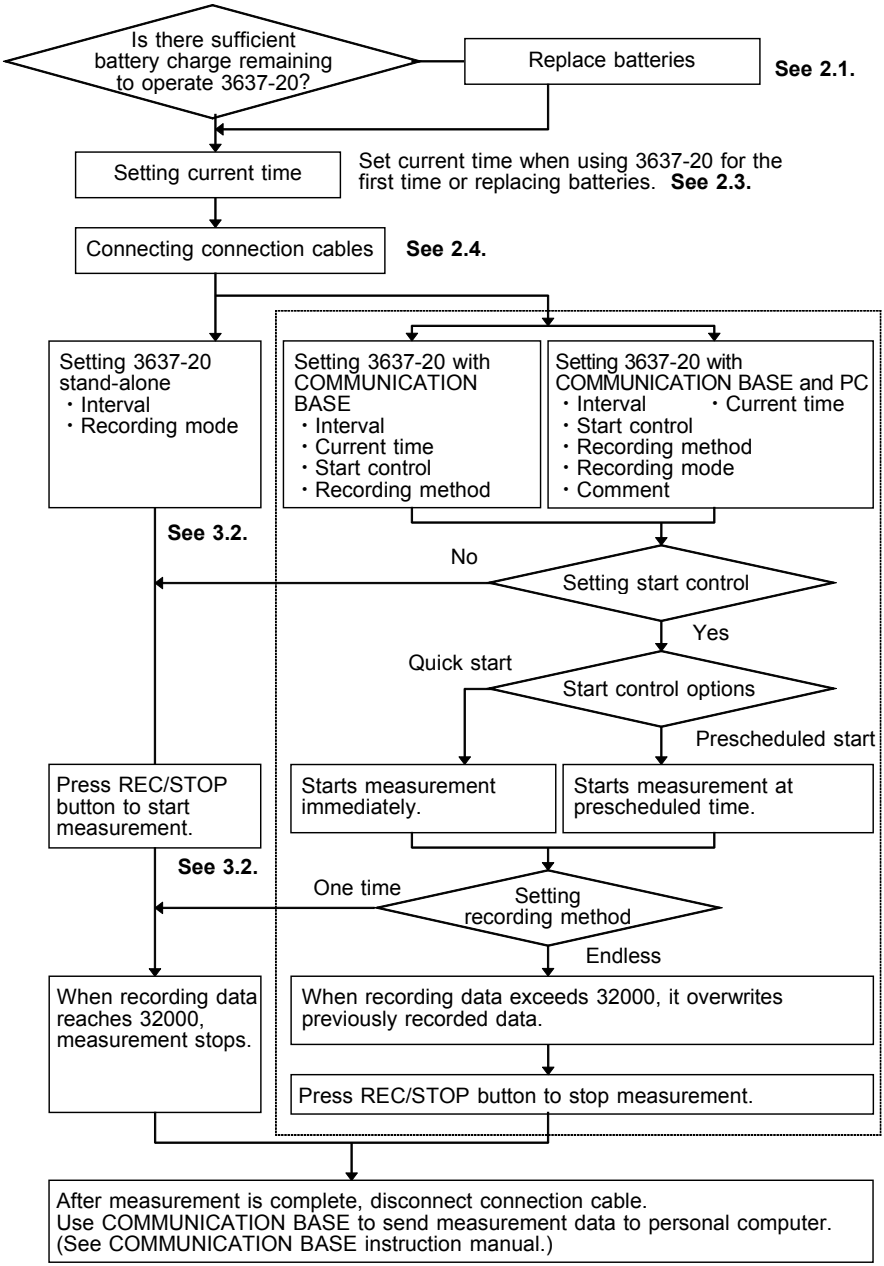
WARNING

- **To avoid electric shock, do not allow the product to get wet, and do not use it when your hands are wet.**
- **In order to prevent electric shock and short-circuit accidents, shut off the power to the line to be measured before connecting the connection cable.**

⚠CAUTION

- To prevent electrical shock, before replacing the connection cable, remove the all connection cable from the device to be measured.
- To avoid damaging the connection cables, do not bend or pull the connection cables.
- To avoid electric shock when measuring live lines, wear appropriate protective gear, such as insulated rubber gloves, boots and a safety helmet.
- This product is designed for indoor use, and operates reliably from 0℃ to 50℃.
- Do not store or use the product where it could be exposed to direct sunlight, 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.
- This product is not designed to be entirely water- or dust-proof. To avoid damage, do not use it in a wet or dusty environment.

Measurement Flow Chart and Reference Guide

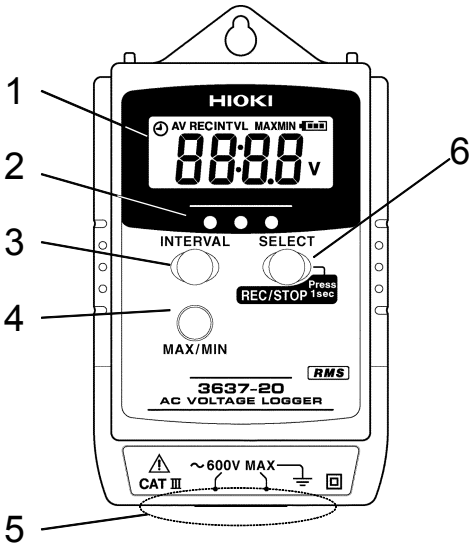


Chapter 1
Product Outline

3637-20 AC VOLTAGE LOGGER enables effective value measurement with intervals and recording up to AC600 Vrms.
With two optional recording modes; recording instantaneous value and recording average value, extended duration of current recording is possible with battery operation.
Data is saved in nonvolatile memory when batteries are weak or removed for replacement.

3637-20 cannot be set with 3910-20 COMMUNICATION BASE.

1.1 Name and Functions of Parts



1. LCD	Displays measurement value and settings.
2. Optical data transfer ports	Enables optical data transfer to COMMUNICATION BASE.
3. INTERVAL button	Calls up interval setting display to set interval, recording mode.
4. MAX./MIN. button	Displays maximum value or minimum value of recorded data.
5. Connection terminal	Connects 9639 CONNECTION CABLE.
6. REC/STOP button	Pressing more than 1 second initiates or stops recording.
(SELECT) button	Interval is selected in interval setting display.

1.2 Interval and Maximum Recording Time

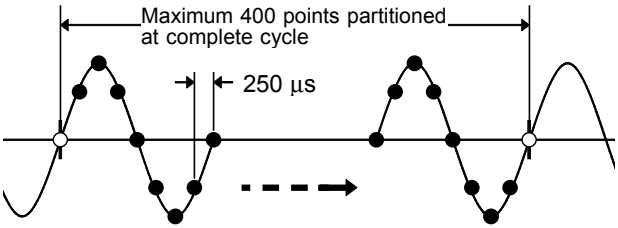
The table below shows the record interval and the maximum recording time (when instantaneous values are recorded with the power save function enabled).
The maximum recording time varies depending on the remaining power level of the battery.
When average values are recorded with the power save function enabled, the recording time will be approximately one month.
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

1.3 Measurement Value Recording Modes

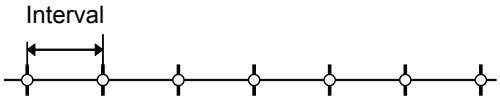
Effective value calculation

To calculate effective value, measurement signal is sampled every 250 μs and operation is carried out from data with maximum 400 points to seek effective value.



Recording instantaneous value

To record instantaneous value, calculate effective value only once per set interval and record in memory.

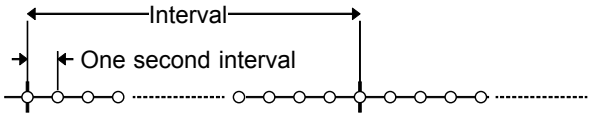


Records instantaneous value

Recording average value

To record average value, calculate effective value only once per second and record average value of all data within interval in memory.

After recording starts, average value within interval is recorded, so the initial data is not recorded immediately after recording starts but is recorded from the following interval.



Recording starts Records average value

Chapter 2
Set Up

2.1 Installing or Replacing the Batteries

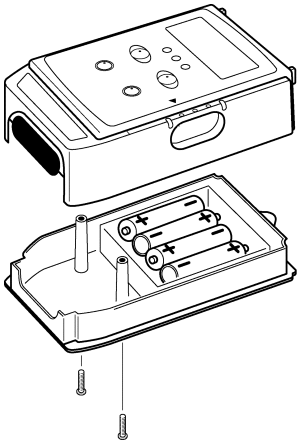
WARNING

- **To avoid electric shock when replacing the batteries, first disconnect the connection cables from the object to be measured.**
- **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.**
- **After replacing the batteries, replace the cover and screws before using the product.**
- **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.

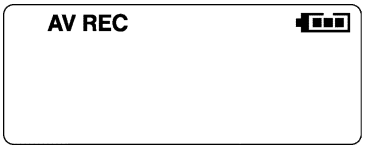
Installing new batteries ensures about 1 year of instantaneous value recording (when interval is set at more than 1 minute) and about 1 month of average value recording. (reference value with power save setting set to valid and at 20℃)
Remaining battery power indicator (▮▮▮) indicates remaining battery 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**/**AV**/ ▭/ ◷/ 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 15 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.

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 3637-20 AC VOLTAGE LOGGER batteries or using 3637-20 stand-alone (with manual operation) for the first time, connect with COMMUNICATION BASE and set current time.

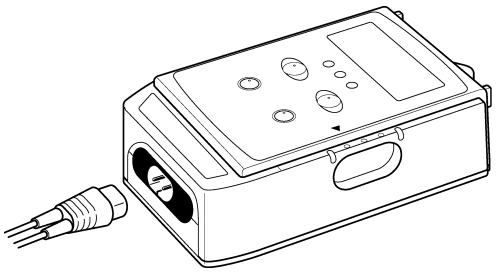
See how to set current time in COMMUNICATION BASE instruction manual.

2.4 Connecting 9639 CONNECTION CABLE

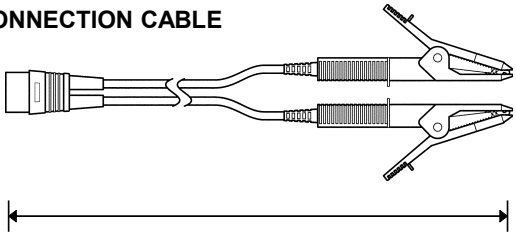
WARNING

- **To avoid electrical shock, be careful to avoid shorting live lines with the 9639 CONNECTION CABLE.**
- **The maximum input voltage is AC600 Vrms. Attempting to measure voltage in excess of the maximum input could destroy the product and result in personal injury or death.**
- **The maximum rated voltage between input terminals and ground is 600 Vrms. Attempting to measure voltages exceeding 600 Vrms with respect to ground could damage the product and result in personal injury.**

Connect 9639 CONNECTION CABLE to 3637-20.
Because it measures alternating current voltage, there is no required polarity for connecting 9639 CONNECTION CABLE tip clip.



9639 CONNECTION CABLE



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Chapter 3
Settings

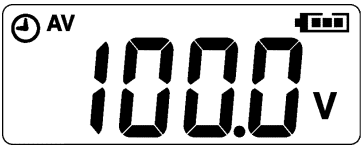
3.1 Setting Items

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

	3637-20	3637-20+ COMMUNICATION BASE	3637-20+ 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. Recording mode setting	Vaild	---	Vaild
8. Comments	---	---	Vaild
9. Minimum/Maximum value display	Vaild	---	---

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. Recording mode setting

With 3637-20 stand-alone, or connected together with COMMUNICATION BASE and PC, setting is available. Two recording mode options are instantaneous value recording and average value recording (**AV** displayed). At factory shipment setting, average value recording is selected.

Average value recording mode records average value within interval, so the initial data is not recorded immediately after recording starts but is recorded from the following interval.
For example, when measurement started at 12:00 at 1 minute intervals, the first data is data recorded when 1 minute has passed at 12:01.

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.

9. Maximum/Minimum value display

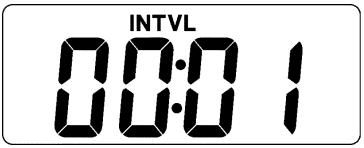
3637-20 stand-alone enables maximum/minimum value display settings. Maximum value or minimum value of recorded data is alternately displayed.

- Maximum value and minimum value are from data recorded in memory and may vary from each displayed value per second.
- When recording method is set as endless, maximum value and minimum value from the beginning of recording are displayed. When old data is overwritten after extended recording, data currently recorded may differ from displayed maximum value and minimum value.

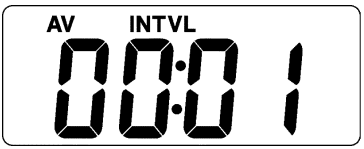
3.2 Manual Setting

3637-20 AC VOLTAGE LOGGER stand-alone manual operation settings are shown below.

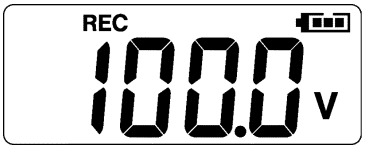
(1) Interval setting
Press INTERVAL button to switch measurement value display to interval setting display. (**INTVL** appears.)
Press SELECT button to designate interval.
Press INTERVAL button to complete setting.



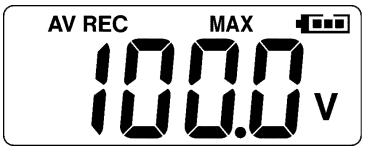
(2) Setting recording mode
Press INTERVAL button to display interval setting display.
Each MAX/MIN button press alternates and selects instantaneous value recording and average recording (**AV** displayed).
To set instantaneous value recording and average recording, see 1.3 Measurement Value Recording Modes.



(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.

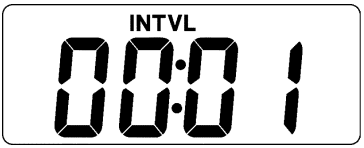


(4) Maximum/Minimum value display
Press MAX/MIN button to display maximum or minimum value from recorded data.
Each button press alternates display.

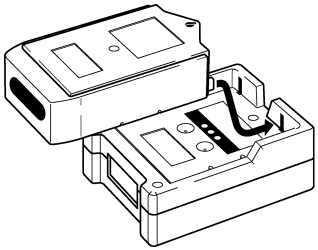


3.3 Setting by COMMUNICATION BASE

(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.)



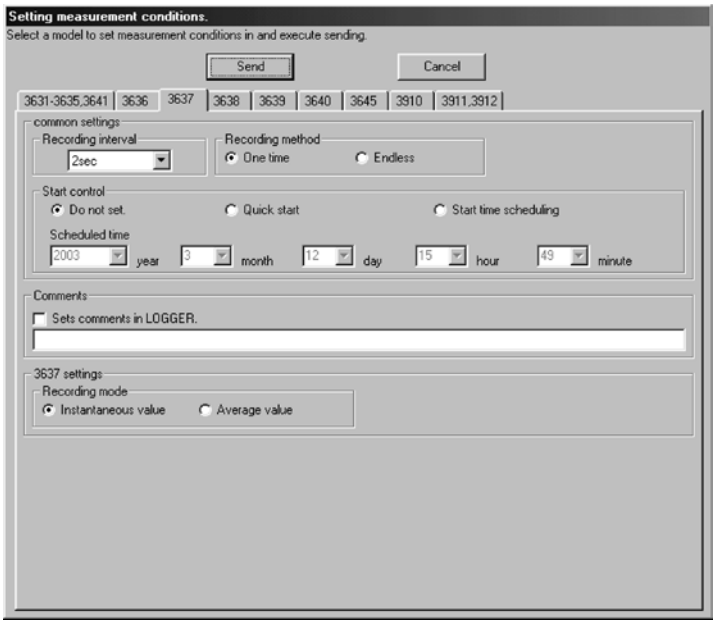
(4) Connect COMMUNICATION BASE with logger.
(5) Press COMMUNICATION BASE SEND button for more than 1 second to send data settings to logger.



- 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.

3637-20 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 '3637' setting items to set settings.



- Comment and recording mode are only available in 3637 setting items. Personal computer, COMMUNICATION BASE and 3637-20 must be connected during setting.
- Common settings are available to be set in '3911, 3912' setting items.

Chapter 4
Specifications

Input	AC voltage
Maximum input voltage	AC600 Vrms or 1000 V peak
Maximum rated voltage to earth	600 Vrms
Number of input	1 ch
Measurement range	0.0 to 600.0 V
Measurement method	True effective value calculation
Accracy	±1% rdg.±5 dgt.（50/60 Hz）
Operating temperature and humidity for guaranteed accuracy	23℃±5℃ (73°F ±9°F), 80%RH or less
Guaranteed accuracy period	1 year
Interval for effective value calculation	1 time per second
LCD display	Measurement value, Interval, Battery status (remaining battery power indicator: 4 phases) Unit (V), recording (REC), prescheduled(◴), average value recording (AV), maximum value (MAX), minimum value (MIN)
Recording mode	Recording instantaneous value Recording average value (records average value within interval)
Interval	1/2/5/10/15/20/30 s, 1/2/5/10/15/20/30/60 min
Recording capacity	32000 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	About one year (temperature at 20℃, power save function: valid, when instantaneous value recording at 1 minute intervals is selected) About one month (temperature at 20℃, power save function: valid, when average value recording is selected)
Dimensions	Approx. 57W X 86H X 30D mm (2.24"W X 3.39"H X 1.18"D) (excluding projections)
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 50℃, 80%RH or less (no condensation) (32 to 122˚F)
Storage temperature and humidity range	-10 to 60℃, 80%RH or less (no condensation) (14 to 140˚F)
Accessories	LR03 alkaline battery X 4 9639 CONNECTION CABLE Instruction Manual
Options	3911-20 COMMUNICATION BASE 3912-20 COMMUNICATION BASE
Standards Applying	EMC EN61326 Safety EN 61010 Measurement Category lll (anticipated transient overvoltage 6000 V), Pollution Degree 2

Chapter 5
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 gently with a soft, dry cloth.

Service

If the product seems to be malfunctioning, confirm that the batteries are not discharged, and that the probes are not open circuited before contacting your dealer or Hioki representative.

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.

HIOKI

DECLARATION OF CONFORMITY

Manufacturer's Name: HIOKI E.E. CORPORATION

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

Model Number and Product Name:

3636-20 CLAMP LOGGER
3637-20 AC VOLTAGE LOGGER

Accessories: 9639 CONNECTION CABLE

The above mentioned products conform to the following product specifications:

Safety: EN61010-1:2001
EN61010-031:2002

EMC: EN61326-2-2:2006
Class B equipment
Portable test, measuring and monitoring equipment used in low-voltage distribution systems

Supplementary Information:

The products herewith comply with the requirements of the Low Voltage Directive 2006/95/EC and the EMC Directive 2004/108/EC.

HIOKI E.E. CORPORATION

11 April 2008

Mitsuyoshi Tanaka

Director of Quality Assurance

3636A999-05

HIOKI 3637-20 AC VOLTAGE LOGGER

Instruction Manual

Publication date: June 2008 Revised edition 5

Edited and published by HIOKI E.E. CORPORATION

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Printed in Japan 3637A981-05

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3637A981-05 08-06H

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