HIOKI

9636-01

RS-232C PACKAGE

HIOKI E. E. CORPORATION

Contents

Introduction

Thank you for purchasing this HIOKI "9636-01 RS-232C PACKAGE." To get the maximum performance from the product, please read this manual first, and keep this at hand.

Request

We have tried to bring this manual as close to perfection as we could achieve. If perchance you find any unclear portions, mistakes, omissions, or the like, we would be most obliged if you could please notify us of them via any HIOKI agent, or directly.

Shipping Check

When the product is delivered, check and make sure that it has not been damaged in transit.

If the product is damaged, or fails to operate according to the specifications, contact your dealer or HIOKI representative.

Safety

<div>

⚠ DANGER

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.

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

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

⚠ 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.

Safety Symbols

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

Precautions for Using the RS-232C PACKAGE

⚠ **CAUTION**

- This product is designed for indoor use, and operates reliably from 0° to 40°.

Please be aware of the following items before use:
- The "RS-232C PACKAGE" is copyrighted by HIOKI E.E. Corporation. Reproducing, copying or modifying the product in whole or in part, except for the specific purpose of processing data for the 3286 (-20), is prohibited by law.
- The "RS-232C PACKAGE" may be subject to revision or upgraded for purposes of technological improvement without notification.
- Republishing portions of the "RS-232C PACKAGE" requires the prior consent of our company. The HIOKI trademark may not be used.
- In no case shall we accept responsibility for consequential effects resulting from use of the "RS-232C PACKAGE".

■ CD Handling Precautions
- Always hold the disc by the edges, so as not to makefingerprints on the disc or scratch the printing.
- Never touch the recorded side of the disc. Do not placethe disc directly on anything hard.
- Do not wet the disc with volatile alcohol or water,

asthere is a possibility of the label printing disappearing.

- To write on the disc label surface, use a spirit-based felt pen. Do not use a ball-point pen or hard-tipped pen, because there is a danger of scratching the surface and corrupting the data. Do not use adhesive labels.
- Do not expose the disc directly to the sun's rays, or keep it in conditions of high temperature or humidity, as there is a danger of warping, with consequent lossof data.
- To remove dirt, dust, or fingerprints from the disc, wipewith a dry cloth, or use a CD cleaner. Always wiperadially from the inside to the outside, and do no wipewith circular movements. Never use abrasives orsolvent cleaners.
- Hioki shall not be held liable for any problems with a computer system that arises from the use of this CD, or for any problem related to the purchase of a Hioki product.

■ Registered Trademarks

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- Other product names are the trademarks or registered trademarks of their respective companies.
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Precautions for Using the RS-232C PACKAGE

Chapter 1 RS-232C PACKAGE Overview

The "RS-232C PACKAGE" is a PC software program that processes data from the HIOKI Model 3286 (-20) CLAMP ON POWER HiTESTER.

Chapter 2 Specifications

2.1 General Specifications

Media:
   One CD (Exclusive PC application software)
Compatible Measuring Instrument:
   HIOKI Model 3286 (-20) CLAMP ON POWER
   HiTESTER

Operating Environment

OS	Microsoft Windows 95 (Note 1)/98 Microsoft Windows 2000 Microsoft Windows Me Microsoft Windows NT 4.0 Note 1: Microsoft Windows 95 must be OSR2 or later version.
PC	PC-AT compatible machine
Disp. Resolution	XGA (1024 x 768) or higher
Memory	32 MB or greater
Hard Disk	At least 20 MB free space

This software is not guaranteed to operate normally unless the operating environment is as specified. Even if the conditions are satisfied, this software may not operate normally or display data unless your hardware and software are configured appropriately.

2.2 RS-232C PACKAGE Function Specifications

Maximum readings accepted	32700
File operations	Open file and save file
Printing	Data printing
Recording	CSV format
Communications	Acquires data via RS-232C

2.3 Screen Example
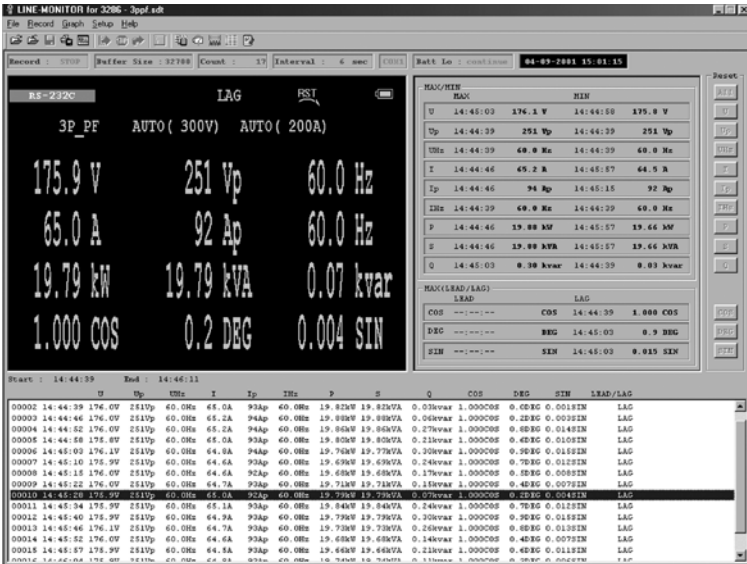
The screen of 3φPF Meter
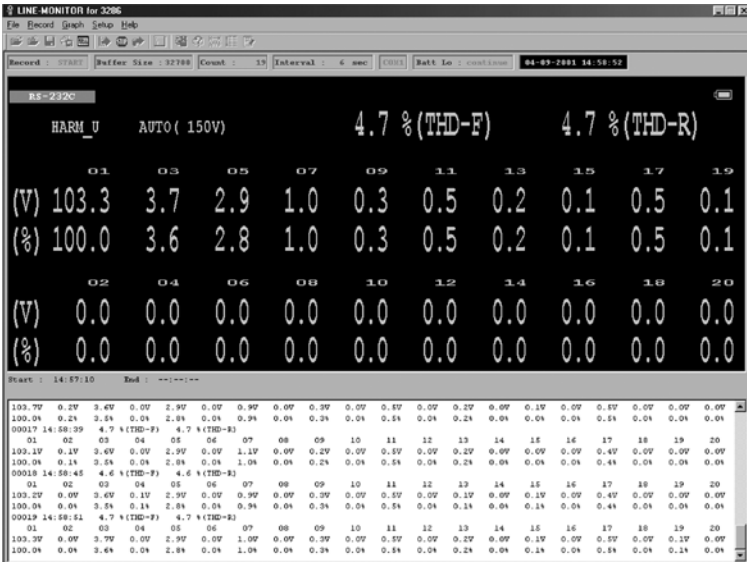
The screen of harmonics

1. Function Mode Indication

   This area shows the measurement function and
   mode.

1P_P	1φP Meter
1P_PF	1φPF Meter
3P_PF	3φPF Meter
HARM_I	Current harmonics
HARM_U	Voltage harmonics

2. Range Indication

   This area shows the current and voltage ranges.
   When auto-ranging is enabled, the auto-selected
   range is indicated within parenthesis, as in "AUTO
   (600V)"

3. Measured Value Display

   Each measurement value is shown.

4. Remaining Battery Indication

   The remaining battery charge in the 3286 (-20) is
   shown.

5. LEAD/LAG Indication

   Phase lead and lag of the current relative to voltage
   is shown.

6. RS-232C Indication

   Shows RS-232C communications.

NOTE
- It is on during the communication.
- It goes on and off while waiting for the
  communication.
- It is off when there is no vacancy in the COM port.

Chapter 3 Connection Procedure

Use the supplied cable to connect the 3286 (-20) to the PC.
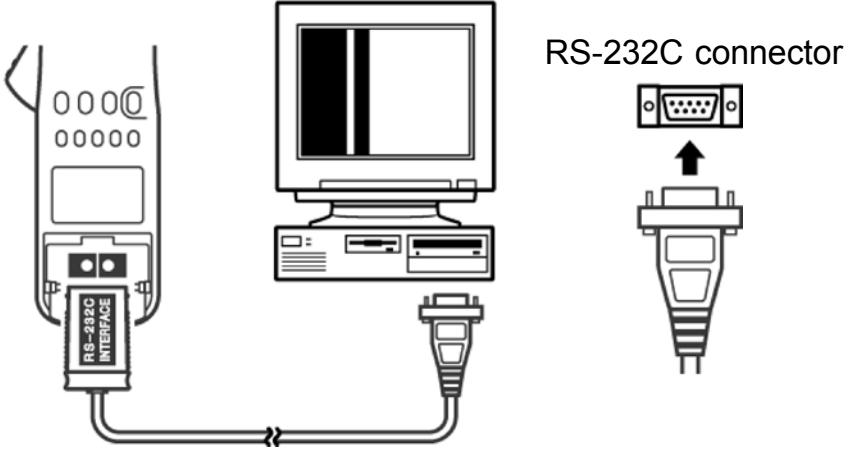
PC Connection

NOTE • Be careful of the cable direction when connecting it to the 3286 (-20).

Chapter 4 Program Installation

1. Confirm that the operating environment satisfies the requirements in "Chapter 2. Specifications" above, and insert the RS-232C PACKAGE diskette into the CD-ROM drive.
2. Open My Computer, and select the CD-ROM drive with the RS-232C PACKAGE diskette.
3. Copy all of the files from the CD to a folder on the hard disk.
4. Execute the lm3286.exe file included in the copied files.
5. Refer to the help file if you need help with the operating procedures.

Chapter 5 3286 (-20) Settings

To use the RS-232C PACKAGE, make settings at DATA OUTPUT SETUP and at OPTION mode on the 3286 (-20).

NOTE • If the RS-232C PACKAGE does not work after settings, initialize the setting (refer to "5.3 Default Settings") and retry the settings.

5.1 OPTION Mode

To use an option with the 3286 (-20), enable its OPTION mode.

1. OPTION Types

Model	Name	Input type	Function
9636-01	RS-232C PACKAGE	9636-01	PC Output

2. To activate the OPTION mode, hold the **U/▼** key while pressing **POWER** to turn the 3286 (-20) on.

3. The digit selected for changing the OPTION mode blinks. Pressing the **MODE** key moves the blinking selection to the right, and pressing the **MAX/MIN** key moves it the left.

4. Set the numerical value to ⁹⁶³⁶ ⁻⁰¹ by pressing the **U/▼** or **I/▲** keys to change the blinking digit.

5. After setting all digits appropriately, turn the power off: ⁵ᴴᵘᴱ (SAVE) is displayed as the settings are saved.

6. If you desire to revert the option to the default state, on the OPTION mode, press the **HOLD** key so that

9999 -99 is displayed, then turn the power off.
cLr is displayed, and the option setting reverts to
its default.

NOTE
• The digits may not flash, depending on the version
of software used for the 3286 (-20). When using a
version of software for which the digits do not flash,
use the | U/▼ | or | I/▲ | key to change the input type
setting.

5.2 DATA OUTPUT SETUP Mode

The DATA OUTPUT function must be enabled in
the DATA OUTPUT SETUP mode.
The DATA OUTPUT SETUP mode also allows
setting the output type, output items and
communications parameters.
The RS-232C communications speed (item 2-04),
RS-232C data length (item 2-05), RS-232C stop bits
(item 2-06) and RS-232C parity bit (item 2-07)
must be set to be the same as the RS-232C
PACKAGE.

1. To activate the DATA OUTPUT SETUP mode, hold
the | SET2 | key while pressing the **POWER** key to
turn the 3286 (-20) on.

2. Select the appropriate settings. Use the | MODE | and
| MAX/MIN | keys to increment and decrement the
item number, respectively. The communications
status display (item 2-03) is off by default. Items 2-
04 to 2-07 are displayed by setting the
communications status display to diSP.

3. Change the settings as needed using the | U/▼ | or
| I/▲ | keys.

4. If needed, the settings can be returned to their default values by pressing the | HOLD | key twice.

5. When finished setting, turn the power off: ᔕᗩᑌᗴ ᗴᑎᗪ (SAVE END) is displayed as the settings are saved.

Display 1 Item No.	Display 2 Item Name	Display 3 Available Settings	Default Value
2-01	dАtА	oFF/Pc	oFF
2-02	ForΠ	ALL/dιSP	ALL
2-03	rSιF	oFF/dιSP	oFF
2-04	bАUd	2400/4800/9600	9600
2-05	LEn	8bιt/7bιt	8bιt
2-06	StoP	1bιt/2bιt	1bιt
2-07	PАrι	non/EuEn/odd	non

NOTE • Items 2-04 and later are not displayed unless item 2-03 (rSιF) is set to dιSP.

6. Setting Details

(1) DATA OUTPUT Function: Item 2-01   dАtА
  off   DATA OUTPUT Function disabled oFF
  PC   Select the RS-232C PACKAGE for output
                   Pc

(2) Output Format: Item 2-02   ForΠ (FORM)
  ALL Select all items for output   ALL
  DISP Select display items for output   dιSP

(3) RS-232C Communications Display: Item 2-03
                  rSιF (RS-IF)
  off No display   oFF
  DISP Display items 2-04 to 2-07   dιSP

(4) RS-232C Communications Speed: Item 2-04

$\boldsymbol{\sqcup} \boldsymbol{\Pi} \boldsymbol{\sqcup} \boldsymbol{d}$ (BAUD)

Select from 2400/4800 or 9600 bps

(5) RS-232C Data Length: Item 2-05 $\boldsymbol{L} \boldsymbol{E} \boldsymbol{\sqcap}$

     8 bits   Set data length to 8 bits $\boldsymbol{B} \boldsymbol{b} \boldsymbol{\iota} \boldsymbol{E}$

     7 bits   Set data length to 7 bits $\boldsymbol{\daleth} \boldsymbol{b} \boldsymbol{\iota} \boldsymbol{E}$

(6) RS-232C Stop Bits: Item 2-06 $\boldsymbol{5} \boldsymbol{E} \boldsymbol{\square} \boldsymbol{P}$

     1 bit   Select one stop bit $\boldsymbol{I} \boldsymbol{b} \boldsymbol{\iota} \boldsymbol{E}$

     2 bits   Select two stop bits $\boldsymbol{2} \boldsymbol{b} \boldsymbol{\iota} \boldsymbol{E}$

(7) RS-232C Parity Bit: Item 2-07 $\boldsymbol{P} \boldsymbol{\Pi} \boldsymbol{\sqcap} \boldsymbol{\iota}$ (PARI)

     none   Select no parity bit $\boldsymbol{\sqcap} \boldsymbol{\square} \boldsymbol{\sqcap}$

     EVEN   Select even parity bit $\boldsymbol{E} \boldsymbol{\sqcup} \boldsymbol{E} \boldsymbol{\sqcap}$

     ODD   Select odd parity bit $\boldsymbol{\square} \boldsymbol{d} \boldsymbol{d}$

5.3 Default Settings

This procedure returns the RS-232C settings to their factory defaults.

1. Hold the $\boxed{\textbf{SET2}}$ key while turning the power on.
2. Press the $\boxed{\textbf{HOLD}}$ key until $\boldsymbol{\sqsubset} \boldsymbol{L} \boldsymbol{\sqcap}$ is displayed.
3. Press the $\boxed{\textbf{HOLD}}$ key again to initialize the settings to their default values.

Default Values

DATA OUTPUT Function	OFF
Output Format	ALL (All items for output)
Communication Speed	9600 bps
Data Length	8 bits
Stop Bits	1 bit
Parity	none

NOTE
• Holding down the **RANGE** key, as turning power on, will display "ᕊᒪᒪ   ᒪᒪᖇ" and initialize all the saved settings (RS-232C settings, SETUP function and measurement status saving function).

5.4 Data Format

The 3286 (-20) outputs measurement data at each interval of about six seconds. The end of each measurement data has by a CR + LF. Details of the output data and examples are shown below. When creating receiving software, make sure the receiving software must recognize the first data. The data after an interval become the first data.

NOTE
• For measurements of the 1φP meter, SINφ and φ are used only as reference data.
• For measurements of the 1φPF meter, P, S, and Q are used only as reference data.
• For phase detection data, reverse phase may be indicated with a minus sign (-).

Output contents

Data number	Power measurement	Harmonic measurement
0	Line	Line
1	Display data	Display data
2	Voltage range	Range
3	Current range	THD-R
4	U	THD-F
5	Upeak	I_1 or U_1
6	UHz	I_2 or U_2
7	I	I_3 or U_3

Data number	Power measurement	Harmonic measurement
8	Ipeak	I_4 or U_4
9	IHz	I_5 or U_5
10	P	I_6 or U_6
11	S	I_7 or U_7
12	Q	I_8 or U_8
13	COSϕ	I_9 or U_9
14	SINϕ	I_{10} or U_{10}
15	ϕ	I_{11} or U_{11}
16	LEAD/LAG	I_{12} or U_{12}
17	Phase detection	I_{13} or U_{13}
18	Battery capacity	I_{14} or U_{14}
19		I_{15} or U_{15}
20		I_{16} or U_{16}
21		I_{17} or U_{17}
22		I_{18} or U_{18}
23		I_{19} or U_{19}
24		I_{20} or U_{20}
25		I_1 or U_1 harmonic percentage
26		I_2 or U_2 harmonic percentage
27		I_3 or U_3 harmonic percentage
28		I_4 or U_4 harmonic percentage
29		I_5 or U_5 harmonic percentage
30		I_6 or U_6 harmonic percentage
31		I_7 or U_7 harmonic percentage
32		I_8 or U_8 harmonic percentage
33		I_9 or U_9 harmonic percentage
34		I_{10} or U_{10} harmonic percentage
35		I_{11} or U_{11} harmonic percentage
36		I_{12} or U_{12} harmonic percentage
37		I_{13} or U_{13} harmonic percentage
38		I_{14} or U_{14} harmonic percentage
39		I_{15} or U_{15} harmonic percentage
40		I_{16} or U_{16} harmonic percentage

Chapter 5 3286 (-20) Settings

Data number	Power measurement	Harmonic measurement
41		I_{17} or U_{17} harmonic percentage
42		I_{18} or U_{18} harmonic percentage
43		I_{19} or U_{19} harmonic percentage
44		I_{20} or U_{20} harmonic percentage
45		Display order
46		Battery capacity

Line

Line	Number
1φP Meter	0
1φPF Meter	1
3φPF Meter	2
Current hermonics	3
Voltage hermonics	4

Display data

LCD display (DSIP1,DISP2,DISP3)	Number
P,U,I	0
S,U,I	1
I,Ipeak,IHz	2
U,Upeak,UHz	3
P,-,Q	4
S,-,Q	5
COSϕ,U,I	6
ϕ,U,I	7
SINϕ,U,I	8
P instantaneous value,P maximum value,P minimum value	9*
S instantaneous value,S maximum value,S minimum value	10*
I instantaneous value,I maximum value,I minimum value	11*
Ipeak instantaneous value,Ipeak maximum value,Ipeak minimum value	12*
U instantaneous value,U maximum value,U minimum value	13*
Upeak instantaneous value,Upeak maximum value,Upeak minimum value	14*
I_k,k,THD-R	15
I_k,k,THD-F	16
I_k,k,harmonic percentage	17
	18
U_k,k,THD-R	19
U_k,k,THD-F	20
U_k,k,harmonic percentage	21
	22

(* is with the recording function activated.)

Range

	0	1	2	+10
Current range	200A	1000A	20A	AUTO
Voltage range	150V	300V	600V	AUTO

Phase Detection

Phase detection	Number
Missing phase	0
Normal phase	1
Reverse phase	-1
None	9

LEAD/LAG

LEAD/LAG	Number
LEAD	0
LAG	1
None	9

Format of easurement values

	Format of easurement values
Normal	▬ ▪ ▪ ▪ ▪ ▪ E▬ ▪ Mantissa: Max 4-digit numerial value + decimal point Exponent: 1-digit numerial value
Range over	▬9999+9
Frequency less than 30 Hz When there is not data	▬8888+9

Output example
[1φP Meter]

0	←Line
0	←Display data
10	←Voltage range
10	←Current range
+106.4E+0	←U
+151.8E+0	←Upeak
+055.0E+0	←UHz
+098.8E+0	←I
+145.6E+0	←Ipeak
+055.0E+0	←IHz
+03.55E+3	←P
+10.51E+3	←S
+09.90E+3	←Q
+0.338E+0	←COSφ
+0.941E+0	←SINφ
+070.3E+0	←φ
0	←LEAD/LAG
9	←Phase detection
100	←Battery capacity

[Harmonic measurement]

3	←Line
15	←Display data
10	←Range
+002.6E+0	←THD-R
+002.6E+0	←THD-F
+102.4E+0	←I_1
+002.5E+0	←I_2
+001.0E+0	←I_3
+000.1E+0	←I_4
+000.0E+0	←I_5
+000.1E+0	←I_6
+000.1E+0	←I_7

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+000.0E+0	←I_8
+000.0E+0	←I_9
+000.0E+0	←I_{10}
+000.0E+0	←I_{11}
+000.0E+0	←I_{12}
+000.1E+0	←I_{13}
+000.0E+0	←I_{14}
+000.0E+0	←I_{15}
+000.0E+0	←I_{16}
+000.0E+0	←I_{17}
+000.0E+0	←I_{18}
+000.0E+0	←I_{19}
+000.0E+0	←I_{20}
+100.0E+0	←I_1 harmonic percentage
+002.4E+0	←I_2 harmonic percentage
+000.9E+0	←I_3 harmonic percentage
+000.1E+0	←I_4 harmonic percentage
+000.0E+0	←I_5 harmonic percentage
+000.1E+0	←I_6 harmonic percentage
+000.1E+0	←I_7 harmonic percentage
+000.0E+0	←I_8 harmonic percentage
+000.0E+0	←I_9 harmonic percentage
+000.0E+0	←I_{10} harmonic percentage
+000.0E+0	←I_{11} harmonic percentage
+000.0E+0	←I_{12} harmonic percentage
+000.1E+0	←I_{13} harmonic percentage
+000.0E+0	←I_{14} harmonic percentage
+000.0E+0	←I_{15} harmonic percentage
+000.0E+0	←I_{16} harmonic percentage
+000.0E+0	←I_{17} harmonic percentage
+000.0E+0	←I_{18} harmonic percentage
+000.0E+0	←I_{19} harmonic percentage
+000.0E+0	←I_{20} harmonic percentage
1	←Display order
100	←Battery capacity

Chapter 6 Troubleshooting

Although the following problems might seem to be program malfunctions, they can result from other causes. So before seeking repair service, please confirm the indicated items.

Symptom	Confirmation item
Not able to display it	• Confirm that the RS-232C cable is properly connected to the 3286 (-20). • Confirm that the RS-232C cable is properly connected to the PC. • Confirm that the communication settings of the 3286 (-20) and the PC software program match each other.

If the problem is not solved after the troubleshooting, initialize the settings. To initialize, hold down the **RANGE** key as powering on. The entire LCD will go on, and "ꓘLL ⊂Lꭇ" will appear. This will reset all the saved contents to their initial values.

Check the following setup when the connection is not established.

Setup example

	Port	Baud Rate	Data Length	Stop Bit	Parity
3286 (-20) Settings	/	9800	8bit	1bit	None
lm3286.exe Set up Com Port	COM1	9800	8bit	1bit	None

Lower both Band Rates when RS-232C indication goes on and off.

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