[1] SAFETY PRECAUTIONS
– Before use, read the following safety precautions.–

This instruction manual explains how to safely use your new USB communication unit LCR-USB. Before use, please read this manual thoroughly. After reading it, keep it together with the product so you can refer to it when necessary.

⚠ WARNING

- Read through the instruction manual of LCR700 too, and use the instrument correctly and safely.
- The product and this manual are subject to change a part of the appearance and/or specifications without prior notice.
- This product works with a PC (Personal Computer).
- Please note that we are not responsible for any outcome of the operation of the product.

1-1 LCR-USB Disc
The disc (CD-ROM) includes an installer of the LCR software and a device driver for the USB communication.

Contents	Folder and file names	Description
Installer application	\App\setup.exe	
Device driver	\Driver\Vista_7 32 bit 64 bit	For Windows7 32 bit / 64 bit and Vista 32 bit
	\Driver\XP 32bit	For Windows XP

1-2 System Requirements
CPU: 1.6 GHz or faster RAM: 1 GB or more
Supported OS : Windows XP*
Confirmed OS : Windows Vista 32 bit,
Windows 7 32 bit/64 bit
* In the case of Windows XP, Microsoft .NET Framework2.0 or above has to be installed in advance. Otherwise, visit Microsoft Download Center to install the .NET Framework.

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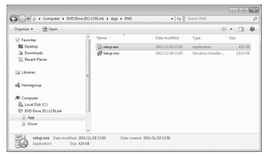
1-3 Contents
LCR-USB Disc (Installer application for LCRLink software and Device driver for LCR-USB), LCR-USB, and Instruction manual

[2] APPLICATIONS AND FEATURES
2-1 Applications
This application allows you to record the measurements and date/time information to your PC, connecting the handy LCR meter LCR700 to the PC.

2-2 Features
- Event recording available
- Possible to set acquisition intervals the shortest to 59 minutes
- Handling the saved data (CSV format) by a spread sheet application makes drawing graphs easy.

[3] INSTALLATION of LCRLink
3-1 Preparation for the installation
- Prepare the bundled installation disc with you.
- Make sure your PC (Personal Computer) meets following minimum hardware requirements.
  Minimal: CPU: 1.6 GHz RAM: 1 GB
- Make sure the Operating System on your PC is the English version of Windows XP, Windows Vista (32 bit), or Windows7 (32 bit/64 bit).
- In the case of Windows XP, Microsoft .NET Framework2.0 or above has to be installed in advance. Otherwise, visit Microsoft Download Center to install the .NET Framework.
- Make sure your user account on your PC is an administrator.
- Then insert the install disc into the CD-ROM drive.

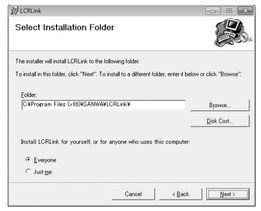
3-2 Launching the Installer
Double-click the application "setup.exe" in the folder of "App\ENG" for English.



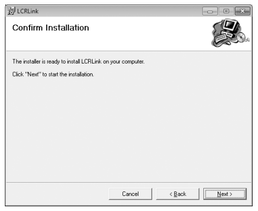
3-3 User Account Control
Make sure "Do you want to allow the following program to make changes to this computer?" is on the screen. Then click "Yes". When you use Windows XP, it does not show this message.

3-4 Welcome to the LCRLink Setup Wizard
Click "Next".

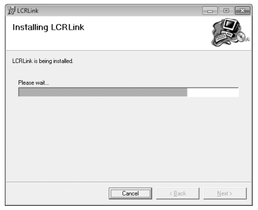
3-5 Selection of Installation Folder
Click "Next" to install in this folder.



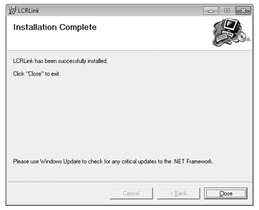
3-6 Confirmation for Starting Installation
Click "Next" to start the installation.



3-7 Under Installation
The installation status is being shown. Wait for a while.



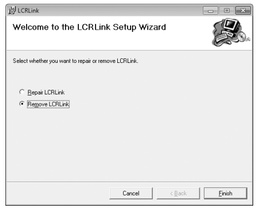
3-8 Completion of Installation
The installation has been completed.
Click "Finish" to close the window.



That is all of the installation.

3-9 Installation FAQ (Frequently Asked Questions)
Q1. Where the application is installed?
A1. If you do not select another folder in the step "**3-5 Selection of Installation Folder**", the application will be installed in the folder of "C:\Program Files\SANWA\LCRLink".

Q2. How can I uninstall the application?
A2. There are 2 ways to uninstall. One is to double-click the "setup.exe" that you used when installing. After the LCRLink Setup Wizard is shown, then select "Remove LCRLink" and click "Finish". Another one is to select "Start" (bottom left) --> "Control Panel", and click the "Add or Remove Programs" to remove the LCRLink from the list of programs.

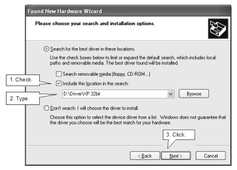


Q3. What can I do if it is impossible to install.
A3. Windows XP, Windows Vista, and Windows 7 are supported to install. In the case of Windows XP, Microsoft .NET Framework2.0 or above has to be installed in advance. And the logged-in account must be an administrator to install. See the step "**3-1 Preparation for the installation**" again.

[4] INSTALLATION OF THE DEVICE DRIVER
Do not connect the LCR-USB to the LCR700 when you install the device driver.

4-1 Installation to Windows XP
1) Start the computer.
2) Put the install disc into the CD-ROM drive. It is assumed that the CD-ROM drive is assigned as drive E.
3) Inserting LCR-USB to an USB port automatically shows the Found New Hardware Wizard. Select "Install from a list or specific location" and click "Next".

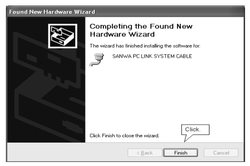
4) A window for specifying a location to search will be shown. Put a check on "Include this location in the search", and type "E:\Driver\XP 32bit" (Different location may need to be typed depending on the user's PC.), then click "Next". Installation of the driver will start.



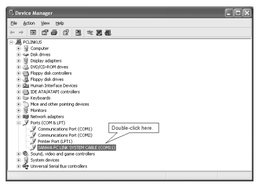
***Note:**
One of the device drivers is for Windows XP (\Driver\XP 32bit) and the other one is for Windows Vista/Windows 7 (Vista_7 32bit 64bit). Inappropriate drivers cannot be installed properly. Make sure the OS you use, before specifying a location to search.

5) "The software you are installing for this hardware: SANWA PC LINK SYSTEM CABLE has not passed Windows Logo testing to verify its compatibility with Windows XP." will be shown.
Click "Continue Anyway".

6) Click "Finish" to close the installation.

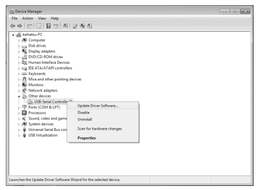


7) Confirmation of the installation Clock "Start" --> "Control Panel", and open "System". Click the tab "Device Manager". Open the ports (COM & LPT), and double-click "SANWA PC LINK SYSTEM CABLE". Make sure that "This device is working properly." is shown on the property window.

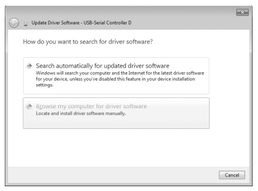


4-2 Installation to Windows 7
1) Start the computer.
2) Put the install disc into the CD-ROM drive. It is assumed that the CD-ROM drive is assigned as drive E.
3) Connect LCR-USB to an USB port on your PC. The PC will automatically try to install a driver and the installation will not be done successfully, then go to the step 4.
4) Open "Control Panel" --> "Hardware and Sound", and "Device Manager".

5) Open "Other devices" on the Device Manager window, and you see [USB-Serial Controller] with mark [!], then right-click to update the driver software.

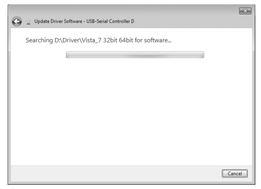


6) The PC will ask you whether you want to search for driver software automatically or manually, and select "manually".



7) Specify [E: \Driver\Vista_7 32bit 64bit] which is the location to search for driver software in the install disc, and click "Next". (The location may be different depending on your PC.) Installation of the driver will start.

8) Installation process of the driver software will be shown.



6-3 Data structure
The measured data transferred from the LCR700 consist of 16 data blocks. One block of the data has 8 bits.

1	Start code	00H
2	Data length	0DH
3	STATUS0	Optional
4	STATUS1	Optional
5	STATUS2	Optional
6	MMOD	Optional
7	MREADH	4-digit number of the main display
8	MREADL	
9	MSCOPE	Optional
10	MSTATUS	Optional
11	SMOD	Optional
12	SREADH	4-digit number of the sub display
13	SREADL	
14	SSCOPE	Optional
15	SSTATUS	Optional
16	CR	0DH
17	LF	0AH

• Description of STATUS0 (Block3)

Bit	Name	Description
0	HOLD	"1" means the Data Hold (HOLD) mode is active.
1	RELRF	"1" means the reference value display of the relative measurement is active.
2	REL	"1" means the relative measurement (△) is active.
3	CAL	"1" means the calibration mode is active.
4	SORT	"1" means the sorting mode is active.
5	AUTO LCR	"1" means the auto LCR mode is active.
6	AMOD	"1" means the automatic measurement mode is active.
7	MOD	"0" : Series measurement "1" : Parallel measurement

• Description of STATUS1 (Block4)

Bit	Name	Description
0	N/A	Unused
1	N/A	Unused
2	N/A	Unused
3	BAT	Battery 00 : less than 5 %, 01 : less than 30 % 10 : less than 60 %, 11 : more than 60 %
4		
5	FREQ	Measuring frequency 000 : 100 Hz, 001 : 120 Hz, 010 : 1 kHz 011 : 10 kHz, 100 : 100 kHz
6		
7		

• Description of STATUS2 (Block5)

Bit	Name	Description
0	SORTP	0011 : ±0.25 %, 0100 : ±0.5 % 0101 : ±1.0 %, 0110 : ±2.0 % 0111 : ±5.0 %, 1000 : ±10.0 % 1001 : ±20.0 %, 1010 : +80 % / -20 %
1		
2		
3		
4	N/A	Unused
5	N/A	Unused
6	N/A	Unused
7	N/A	Unused

• Description of MMOD3 (Block6)

Bit	Name	Description
0	MMOD	Mode in the main display 000 : None, 001 : L (Inductance) mode 010 : C (Capacitance) mode 101 : R (Resistance) mode, 100 : DCR mode
1		
2		
3	N/A	Unused
4	N/A	Unused
5	N/A	Unused
6	N/A	Unused
7	N/A	Unused

• Description of MREADH (Block7) / MREADL (Block8)

Bit	Name	Description
0~7	MREADL	16-bit binary data in the main display
0~7	MREADH	Ex.) MREADH : 2EH, MREADL : E3H ==> 12,003

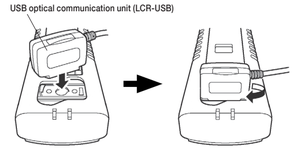
• Description of MSCOPE (Block9)

Bit	Name	Description
0	MDOT	Decimal point position (in the main display) 001 : 1999.9, 010 : 199.99 011 : 19.999, 100 : 1.9999
1		
2		
3	MUNIT	Unit of readings (in the main display) 00000 : None, 00001 : Ω, 00010 : kΩ 00011 : MΩ, 00100: None, 00101 : μH 00110 : mH, 00111 : H, 01000 : kH 01001 : pF, 01010 : nF, 01011 : μF, 01100 : mF
4		
5		
6		
7		

• Description of MSTATUS (Block10)

Bit	Name	Description
0	MDIS	Contents in the main display 00000 : Number, 00001 : Space, 00010 : Dash 00011 : OL, 00100 : OFF, 00101 : None 00110 : Err, 00111 : Pass, 01000 : Fail 01001 : Open, 01010 : Short (Srt)
1		
2		
3		
4		
5	MDASH	"1" means "----" is shown in the main display.
6	MOL	"1" means "OL" is shown in the main display.
7	MCNT	The number of counts in the main display 0 : 20000 counts, 1 : 2000 counts

[5] HOW TO CONNECT THE LCR-USB
Make sure that the LCR700 has neither input signal applied nor power when connecting the LCR-USB to the LCR700.



Attach firmly the LCR-USB on the back of the LCR700.
Connect the USB plug of the communication unit to your PC, then press the PC button to make it possible to communicate.
[PC] will be shown on the display.

[6] COMMUNICATION SPECIFICATION BETWEEN LCR700 AND LCR-USB
Users who use the attached communication software LCRLink do not need to read this section. This section describes the communication specification between LCR700 and LCR-USB for users who try to develop a communication software.

Note:
Please note that the correct operation in a software you developed referring to this manual cannot be guaranteed, and any inquiries cannot be responded.

6-1 Communication method
The LCR-USB is connected as a USB, and the communication is based on the RS232C specification.
The communication method is an asynchronous communication using a UART (Universal Asynchronous Receiver Transmitter). This unit is electrically isolated from the LCR700 using infrared LEDs.

The following shows the details of the port setting.

Baud rate	9600 bps
Data bit	8 bit
Stop bit	1 bit
Parity bit	None
Flow control	None
Terminal code	CR+LF (0DH+0AH)

6-2 Timing of data transfer
- Transmission timing from the LCR700:
  The LCR700 sends data as a reading on the LCD display is updated (2 times/sec.) when RTS is active.

• Description of SMOD3 (Block11)

Bit	Name	Description
0	SMOD	Mode in the sub display 000 : None, 001 : D (Dissipation factor) 010 : Q (Quality factor) 101 : ESR or Rp (Equivalent resistance) 100 : θ (Phase angle)
1		
2		
3	N/A	Unused
4	N/A	Unused
5	N/A	Unused
6	N/A	Unused
7	N/A	Unused

• Description of SREADH (Block12) / SREADL (Block13)

Bit	Name	Description
0~7	SREADL	16-bit binary data in the sub display
0~7	SREADH	Ex.) SREADH :1AH, SREADL : B5H ==>6,837

• Description of SSCOPE (Block14)

Bit	Name	Description
0	SDOT	Decimal point position (in the sub display) 000 : 19999, 001 : 1999.9, 010 : 199.99 011 : 19.999, 100 : 1.9999
1		
2		
3	SUNIT	Unit of readings (in the sub display) 00000 : None, 00001 : Ω, 00010 : kΩ 00011 : MΩ, 00100 : None, 00101 : μH, 00110 : mH, 00111 : H, 01000 : kH, 01001 : pF, 01010 : nF, 01011 : μF, 01100 : mF, 01101 : %, 01110 : deg
4		
5		
6		
7		

• Description of SSTATUS (Block15)

Bit	Name	Description
0	SDIS	Contents in the sub display 00000 : Number, 00001 : Space, 00010 : Dash 00011 : OL, 00100 : OFF, 00101 : None 00110 : Err, 00111 : Pass, 01000 : Fail 01001 : Open, 01010 : Short (Srt)
1		
2		
3		
4		
5	SDASH	"1" means "----" is shown in the sub display.
6	SOL	"1" means "OL" is shown in the sub display.
7	SCNT	The number of counts in the sub display 0 : 20000 counts, 1 : 2000 counts

[7] HOW TO USE THE LCRLink
For more information on how to use the LCRLink, see the help of the software. Open the help as follows. Click [Help] in this software --> [Table of Contents], or click [Start] of the Windows --> [All Programs] --> [SANWA] --> [LCRLinkHelp].
In the Windows, the COM port number depends on the USB port you connect.

[8] TROUBLESHOOTING
- Make sure the connection between the LCR-USB and the LCR700.
- Make sure that the USB connector of the LCR-USB is properly connected to the USB port of your PC.
- Make sure that the port number which has been set in the LCRLink matches up with the port number (COMx) in the device driver.
- Check the device manager, and make sure that the device driver has been properly installed.
- A self-powered USB hub must be used if a USB hub is needed.
- Make sure that the PC connection function on the LCR700 is active.
- Make sure that the battery in the LCR700 is not worn out.

[9] SPECIFICATIONS

Interface specification	Compliant with the USB Specification Rev1.1
Source voltage	5 Vdc (from the USB line)
Operating conditions	Temperature: 0 ~ 40 ℃ Humidity: 0 ~ 80 % (No condensation)
Cable length	1.3 m

[10] AFTER-SALE SERVICE
10-1 Warranty and Provision
SANWA offers comprehensive warranty services to its end-users and to its product resellers. Under SANWA's general warranty policy, each instrument is warranted to be free from defects in workmanship or material under normal use for the period of one (1) year from the date of purchase.
This warranty policy is valid within the country of purchase only, and applied only to the product purchased from Sanwa authorized agent or distributor.
SANWA reserves the right to inspect all warranty claims to determine the extent to which the warranty policy shall apply. This warranty shall not apply to disposables batteries, or any product or parts, which have been subject to one of the following causes:
1. A failure due to improper handling or use that deviates from the instruction manual.
2. A failure due to inadequate repair or modification by people other than Sanwa service personnel.
3. A failure due to causes not attributable to this product such as fire, flood and other natural disaster.
4. Non-operation due to an external power source.
5. A failure or damage due to transportation, relocation or dropping after the purchase.

10-2 Repair
Customers are asked to provide the following information when requesting services:
1. Customer name, address, and contact information
2. Description of problem
3. Description of product configuration
4. Model Number
5. Product Serial Number
6. Proof of Date-of-Purchase
7. Where you purchased the product
Please contact SANWA authorized agent / distributor / service provider, listed in our website, in your country with above information. An instrument sent to Sanwa / agent / distributor without above information will be returned to the customer.

Note:
1) Repair during the warranty period:
   The failed unit will be repaired in accordance with the conditions stipulated in 10-1 Warranty and Provision.
2) Repair after the warranty period has expired:
   In some cases, repair and transportation cost may become higher than the price of the product. Please contact SANWA authorized agent / service provider in advance.
   The minimum retention period of service functional parts is 6 years after the discontinuation of manufacture. This retention period is the repair warranty period. Please note, however, if such functional parts become unavailable for reasons of discontinuation of manufacture, etc., the retention period may become shorter accordingly.
3) Precautions when sending the product to be repaired:
   To ensure the safety of the product during transportation, place the product in a box that is larger than the product 5 times or more in volume and fill cushion materials fully and then clearly mark "Repair Product Enclosed" on the box surface. The cost of sending and returning the product shall be borne by the customer.

10-3 SANWA web site
http://www.sanwa-meter.co.jp
E-mail: exp_sales@sanwa-meter.co.jp

— MEMO —