LINEEYE

Communication Protocol Analyzer

LE-150PF
LE-200PF

Instruction Manual

The attached CD-ROM contains the latest instruction manual in a PDF format.

The 1th edition

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INTRODUCTION

Thank you for your purchase of LINEEYE's protocol analyzer. To use it correctly, you are advised to read and understand this instruction manual thoroughly. Keep this together with the warranty. If you encounter any problems, you will find helpful information in this manual.

NOTICE

- It is prohibited to reprint or duplicate any part or the whole of this instruction manual without prior permission from LINEEYE.
- The contents of this instruction manual and specifications of the products are subject to change without notice.
- This instruction manual has been designed and edited with great care to give you all necessary information. If you have any questions, feel free to direct your inquiries to LINEEYE CO., LTD.
- LINEEYE assumes no responsibility whatsoever for any damages resulting from the use of this product. Furthermore, LINEEYE makes no guarantee of data etc. when data disappears, or even when the recorded data has broken while using this product.

USER LIMITATION

This product has been developed for the purpose of using as an analyzer only, and has not been developed for the use that needs exclusively high reliability and safety; aerospace apparatus, trunk communication apparatus, nuclear control apparatus, medical apparatus related with life maintenance and etc. Also, this product does not warrant the use for those purposes. If you use for those purposes, please consider the safety measures against fail-safe etc. on your responsibility.

This product has Wi-Fi function (IEEE 802.11b/g/n) and emits radio wave when working. Please do not use near a medical device, microwave, high-level electronics, TV, radio, wireless station for mobile communications, or specified low power radio station. Where an administrator limits the use of radio devices, follow the instruction of the administrator.

SIMPLIFIED EU DECLARATION OF CONFORMITY

Hereby, LINEEYE declares that the communication protocol analyzer type LE-200PF / LE-150PF with radio remote-control function is in compliance with Directive 2014/53/EU.

The full text of the EU declaration of conformity is available at the following internet address:

http://www.lineeye.com/html/contactus.html

Wi-Fi AVAILABLE COUNTRIES

The Wi-Fi function of the analyzer is available only in Japan, USA, Canada, and the EU nations where the product needs to be conformable to RE directive (2014/53/EU) for use.

Safety Information

Read this first ! !

This Safety Information includes the important information in order to not only have you learn the right way to use the analyzer, but also prevent you from causing damage to people and property. Before using, please read the main contents after you understand the following contents (symbols and marks).

[Explanation of the symbols (The degree of the hazard factor)]

⚠ WARNING
The symbol denotes that improper handling poses a risk of causing death or serious injury.

⚠ CAUTION
The symbol denotes that improper handling poses a risk of causing injury[*1] or damage to the product and property[*2].

*1: "Injury" indicates injury, burn, an electric shock, or the like which does not require hospitalization or the extend over a long period of hospital visit.

*2: "Damage to the product and property" indicates damage expansion related to a house, a building, furniture, apparatus, livestock or a pet.

⚠ WARNING

- ■ Do not disassemble or modify.
  This may result in fire, an electric shock and/or unit malfunction.
- ■ Stop using the analyzer immediately when smells emanate from itself.
  Continuous use may result in an electric shock, a burn and/or fire.
- ■ Keep the products away from water.
  Failure to do so may result in the heat generation, an electric shock and/or unit malfunction.
- ■ Do not short-circuit the connector pins.
  This may result in the heat generation, an electric shock, unit malfunction and/or injury.
- ■ Do not use deteriorated cables (damage etc.).
  This may result in the heat generation and fire.
- ■ Do not use in the place which generates inflammable gas etc.
  This may result fire.

⚠ CAUTION

- ■ Do not use and keep this product in the following places:
  - The places exposed to the direct rays of the sun.
  - The places with the humidity and temperature exceeding the tolerance level, and with a rapid temperature change.
  - The places with much dust and moisture.
  - The places near the objects which generate heat (the heater etc.).
    Using in these places may result unit malfunction and /or injury.

Software License Agreement

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2. Grant of License
   LINEEYE grants for you to use this software on only one computer by getting the software and agreeing this license agreement. Therefore, you shall not rent, lease and loan to a third party.

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4. Upgrade
   This software may be upgraded without advance notice because of technical progress of hardware or software. LINEEYE provides software upgraded by payment specially. For upgrade, only licensed user can have upgrades.

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6. General
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7. Support
   LINEEYE supports functions, operation and only the problem on this software.

8. Notice
   Any matter not specified in this agreement will be governed by and constructed in accordance with copy right law and related laws.

LINEEYE CO., LTD.

LE-150PF/LE-200PF are the RS-232C/RS-422/RS-485 communication analyzers, which can be used as PC-connectable protocol analyzers and PC-less data logger. With PCs, these analyzers can be used as high performance protocol analyzers and have On-line monitoring function and Simulation function. Without a PC, they can be used as data loggers and record data in the SD cards.

🗎 Wi-Fi function is available only in Japan, USA, and Canada.

1.1 Composition

When you unpack the product, please make sure of the following

Protocol Analyzer	: 1
Utility CD (CD-ROM)	: 1
SD card (8GB)	: 1
Mini USB Cable	: 1
DSUB 25pin monitor cable (Model: LE-25M1)	: 1
External Signal I/O cable (Model: LE-4TG)	: 1
Instruction Manual	: 1 (This book)
Warranty	: 1

* Please contact LINEEYE distributor or us if you find any insufficient part or any damage to the product caused by transportation.
* Please keep the box carefully to use it when sending the product back to us for repair etc.

- Utility CD

  Contain the analysis software, driver and some instruction manuals for the analyzers and its options. You can download the update file of software of our products from https://www.lineeye.com.

1.2 Outline

■ Functions

1) On-line Monitoring

   Monitor the transmission / reception data on-line to check for existence of hindrance in the line or to analyze the communication.

2) Simulation

   Operate transmitting / receiving data as a communication partner for test devices.

3) Data Logging

   Record data in the SD card automatically without a PC.

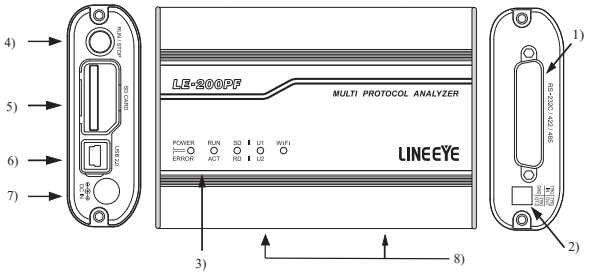
■ Feature

* PC-connectable protocol analyzer and PC-less data logger.
* Support arbitrary speed.

  ″→10-3 Specification of Analyzer”
* Support RS-232C/RS-422/RS-485 interface without any options.
* Measure transmission/reception data along with idle time, time stamp and line status.
* Record measured data continuously in the HDD of PC or SD card.
  (Max.32GB: HDD, Max.32GB: SDcard)
* Specify the recording time by Real Time Clock.
* Powerful trigger function controls the external signal output and user defined LED.
* Simulation function sends registered data with one press of a key.
* Timing waveform measurement function which is useful to find timing troubles in a bit unit.
* Compact size. Able to used the 35mm DIN rail.
* Remote monitoring is possible by Wi-Fi connection.
* It is possible to receive the logger files while measuring by Wi-Fi connection.

  " → 8-3 Receive the logger files by Wi-Fi connection.”

1.3 Explanation of Each Part



1) Measurement Interface

The measurement interface consists of a DSUB 25pin connector connectable over RS-232C or RS-422/485 target devices.

2) External Trigger I/O Terminal

This terminal is used for external I/O signals for the operation of the analyzers in synchronization with external devices, such as measuring instruments. Use the included trigger cable (LE-4TG) to connect.

3) LED

POWER/ERROR: Indicate the operating status of analyzer.

RUN/ACT: Indicate that analyzer is measuring or accessing to the SD card.

POWER/ ERROR	RUN/ACT	Status	
Light off	Light off	Power Off	
Green light	Light off	Protocol Analyzer Mode	Ready to operate
	Green light		Measuring
	Red light		Accessing to the SD card (*1)
	Orange light		Measuring and Accessing to the SD card (*1)
Orange light	Light off	Logger Mode	Ready to operate
	Green light		Measuring
	Green blinking		Ready to start measuring
	Red light		Accessing to the SD card (*1)
	Orange light		Measuring and Accessing to the SD card (*1)
Orange blinking	-		The built-in clock has been initialized and needs to be reset.(*2)
Light off	Green light	Firmware Update Mode	
Red blinking	-	Error	Self-check error, Unusual error (*3)

*1: Do not remove the SD card while lighting.

*2: By starting measurement in the analyzer mode, you can set the PC's time to the internal clock.

*3: Contact LINEEYE distributors or LINEEYE for support.

SD/RD: Indicate the status of SD line (green light) and RD line (red light).

Voltage level of signal line		LED
RS-232C	RS-422/485	
+3V ≤ VM	VA - VB > +0.2V	Light
VM < +3V	VA - VB < +0.2V	Light off

VM: Voltage level of RS-232C

VA: Voltage of RS-422/485 (A line)

VB: Voltage of RS-422/485 (B line)

U1/U2: Able to light the U1 (green) /U2 (red) by trigger actions.

Wi-Fi : It lights in green when the analyzer connects Wi-Fi.

4) RUN/STOP Switch

Press to start measuring. Press for a while to stop measuring.

5) SD Card Slot

Insert the SD card as the following figure.

To remove the SD card, press the SD card and it will come out from the analyzer.

6) USB Connector

Use the included USB cable to connect the host PC.

<Dust-proofing cover>

There is a dust-proofing cover on the SD card slot and USB connector. To change the SD card, open the cover as following.

Also, it is possible to open the cover for USB connector side only as following.

7) DC Jack

Connect the power supply when using the analyzer as a Data Logger.

Optional DC plug cable (SIH-2PG) is useful.

DC plug type: center-plus, outside diameter 5.5mm, inside diameter 2.1mm

8) M3 Screw Hole

This is for connecting the analyzer on the DIN rail. Pitch: 70mm. Depth: 3.5mm (max)

Chapter 2 Installation

Install the analysis software to the PC you are going to operate the analyzer.

2.1 System Requirement

PC/AT Compatible (DOS/V)
HDD: 20MB + capacity for recording communication log
OS: Windows 10/11
Port: USB port
SD card drive: It is required for the Logger Mode to save log files and configuration settings.

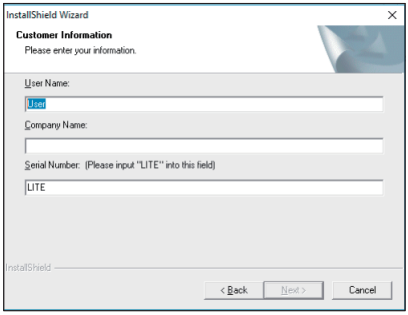
2.2 Installation Guide

■ Install

1. Execute “setup.exe” in the attached CD.

   🗎 If the PC (to which you want to install the software) does not have a CD-ROM drive, copy it to a storage device such as USB flash using another PC which has a CD-ROM drive to bring it to the PC and execute it.

2. First, click “Yes” in the “User Account Control” display.
3. When the Windows firewall displays a message such as “Windows protected your PC”, click “Detail”-“Run” to run the program.
4. Even if the virus security software displays a message that blocks this software, click the option to run the software such as “Run this program” to cancel the blocking.
5. When the installer starts up, proceed according to the instructions on the screen. You will be prompted for the serial number during installation. Please enter the serial number of this software written on the attached user registration card.



6. When the installation completion message is displayed, click “Finish”.

■ UnInstall

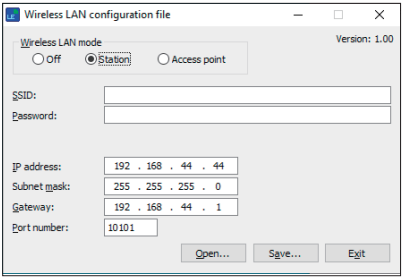
1. Open “Uninstall or change a program” (or “Program and Features”) from the control panel. (Or right-click on “LE-LINK20F” in the start menu and select “uninstall”.)
2. Select “LE-LINK20F” from the list and execute “Uninstall and change”.
3. First, click “Yes” in the “User Accounts” display.
4. Click “OK” at the deletion confirmation display.

2.3 Setting for Wi-Fi

To use Wi-Fi function of LE-150PF/ LE-200PF, you need to power the analyzer after inserting SD card in which Wi-Fi configuration file (WLANCFG.WL) is written.

< How to make a Wi-Fi setting file >

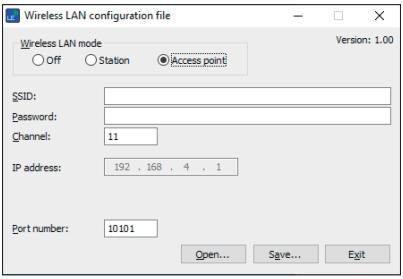
1. Click「LE Wireless LAN configuration」from the start menu.
2. Select Station or Access point and set the items to be required.



■ Station Mode

The analyzer connects with Wi-Fi via access point.

SSID	:	Set the SSID of the access point to be connected.
Password	:	Set the password of the access point.
IP address	:	Set the IP address of the analyzer.
Subnet mask	:	Set the subnet mask of the analyzer.
Gateway	:	Set the IP address of the gateway when you use it.
Port number	:	Set the data port of the analyzer.



■ Access Point Mode

The analyzer turns to be an access point and connects with Wi-Fi.

SSID	:	Set the SSID of the analyzer.
Password	:	Set the password of the analyzer.]
Channel	:	Set the channel to be used for Wi-Fi connection.
IP address	:	The IP address is fixed to 192.168.4.1
Port number	:	Set the data port to be connected.

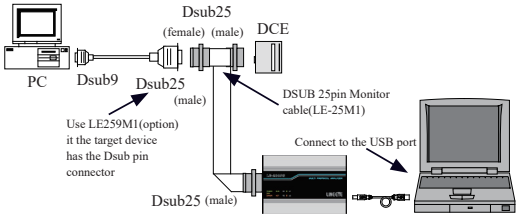
* DHCP server function is set to valid in the access point mode.
You can use "Automatically obtain IP address" in the network setting of PC.

3. Press Save.
4. Insert the SD card in which Wi-Fi setting file is written into the analyzer.
5. Power the analyzer.

3.1 Connection

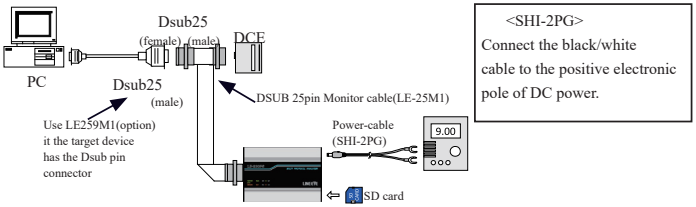
■ Protocol Analyzer Mode

1) Connect the analyzer with the PC in which the software is installed via USB or Wi-Fi.
2) Connect the analyzer with the target line by using LE-25M1 or LE-5TB.



■ Logger Mode

1) Connect the DC plug cable (SIH-2PG) or AC adapter (6A-181WP09) to the analyzer.
2) Insert the SD card, which saved the configuration settings of the analyzer.
3) Connect the analyzer and target devices using the LE-25M1 or LE-5TB.



<External power supply>

- External power supply range for DC IN is from DC7V to 34V.
- Consumption current of LE-150PF/LE-200PF is about 220 mA when Wi-Fi is used and about 160mA when Wi-Fi is not used.
- Suitable DC plug is center plus 5.5mm (outside) / 2.1mm (inside).

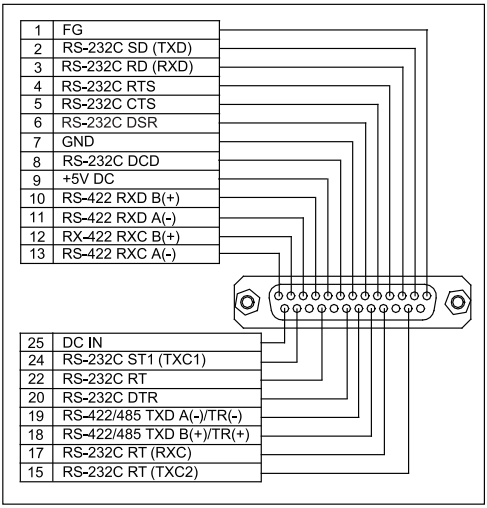
Connect to the target devices

* RS-232C

1) Target device has Dsub 25pin on RS-232C: Connect as above figure using the monitor cable (LE-25M1).

2) Target device has Dsub 9pin on RS-232C: Connect using the optional cable (LE-259M1).

Attention : Signal pins which are not used for RS-232C (Dsub 25pin) are used for RS-485 signal. Do not connect the target products which have more than 6V on the 9/10/11/12/13/18/19 of Dsub 25pin connecter. It will cause the product malfunction. To connect such products, remove the pins of the monitor cable which will be connected to the analyzer.



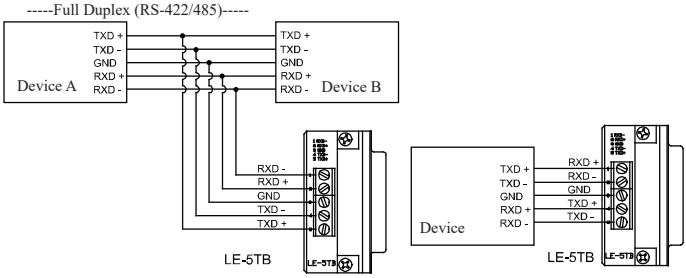
(12, 13, 15, 17th pins are only for LE-200PF.)

* RS-422/485

Connect to the RS-422/485 pin of the Dsub 25 connector.

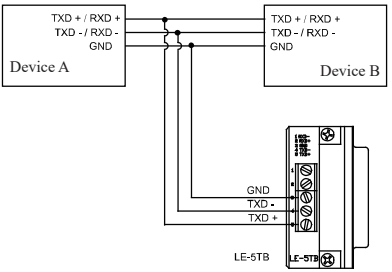
19 pin ------ TXD (-)
18 pin ------ TXD (+)
13 pin ------ RXC (-)
12 pin ------ RXC (+)
13 pin ------ RXD (-)
10 pin ------ RXD (+)
7 pin ------ GND

Terminal block adapter (LE-5TB) is useful to measure SYNC communications on RS-422/485 pin. To measure external clock ASYNC (using RXC), you need to modify the Dsub 25pin cable by yourself.

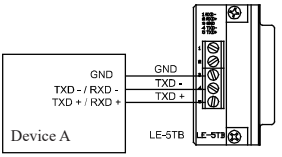


[Connection for Monitoring] [Connection for Simulation]

-----Half Duplex (RS-485)-----



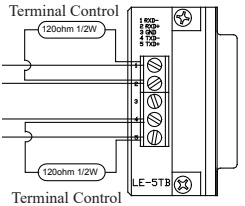
[Connection for Monitoring]



[Connection for Simulation]

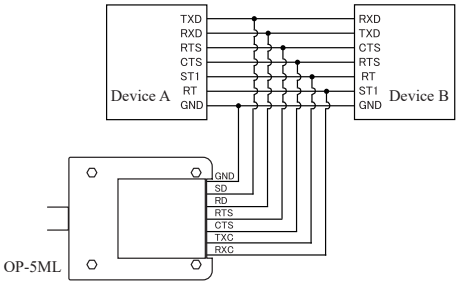
Terminal Control

LE-150PF/LE-200PF does not have the terminal control. To connect terminal controls on the analyzer, use the external controls (120Ω 1/2W) and put together with the signal lines.



* TTL

The option “OP-5ML” is needed.



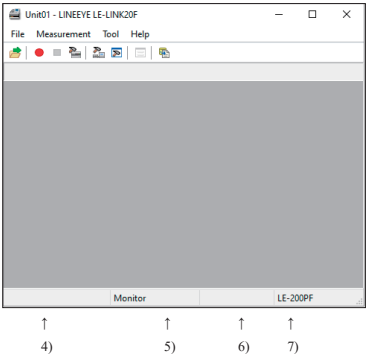
When using asynchronous communication, there is no need to connect TXC (transmit clock) and RXC (receive clock).

For more information, please see the instruction manual for TTL Monitor Probe Pod OP-5ML.

■ Data Window

Execute the analysis software

From [Start] menu of Windows, go to [LINEEYE] -> [LE-LINK20F]. Execute “LE-LINK20F” and then following display will be appeared.



1) Menu
   Perform various operations
2) Tool Bar
   Perform various operations
3) Data Display
   Display the measured data
4) Data Position Display
   Display the data name and data position of data in the Data display. The number of data loss will be displayed while monitoring.
5) Function Display
   Display selected function.
   (Monitor or Simulation)
6) Status Display
   Display the status of measurement.
7) Model Name Display
   Display the model name of the analyzer.

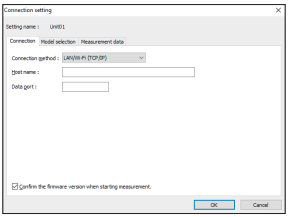
■ Connection Settings

Click “” on the tool bar of the data window (or “Measurement” -> “Connection setting”) and set the connection settings and data saving settings.

The Connection settings consist of “Connection”, “ Model selection” and “Measurement data”.

*“Connection” page

Setting for connection



“How to connect”

Select the connection method with the analyzer from USB or LAN/Wi-Fi(TCP/IP).

Wi-Fi function is available only in Japan, USA, and Canada.

“Serial number”

This is the number to distinguish multiple units of the analyzer. The list shows the analyzer which is connected with the PC but not used.

“Host name”

Setting for the IP address of the analyzer to be connected via Wi-Fi.

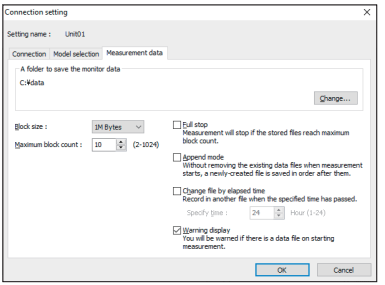
“Data port”

Setting for the port number to be used for data sending/receiving

* Model Selection

Select the model to be connected.

* Measurement Data
  Select the saving folder and file size of measured data.



[A folder to save the measured data]
This folder is for saving the measured data. To change the settings, click “Change” button. Then the window to select a folder will be appeared. Select the proper folder and click “OK”. The file name of saving data is started from “0000000.DT” in numerical order.

* Recommend specifying an exclusive folder.
* Specify a drive, which has enough capacity. (When it does not have enough capacity, the PC may not operate correctly.)

Attention: If there is not the folder in the place you specified, a message dialog will be appeared.

[Block Size]
Set the data capacity per file. You can select from 1M/2M/4M/8M/16M byte.
* Analyzer consumes 4byte per one sampling.

[Max Block Count]
Set the maximum block number of a file to save. You can set from 2 to 1024.
When the number of the data file is over than that, the data file with the lower number will be deleted.

[Full Stop]
If the stored files reach to the maximum block number, it will stop measurement automatically.
If you do not select it, the analyzer records data continuously as a ring buffer.

[Append Mode]
When measurement starts, a newly-created file is saved in the order after the existing files. If the number of the whole data files are over the maximum block number, a data file with the lower number (includes data files which were saved on the former measurement) will be deleted even in the append mode. If you do not select it, the former data will be deleted and start the file name from “0000000.DT”.

[Change file by elapsed time]
Change the recording file when the specified time has passed even though it does not reach the specified block size. If there is not any data in the file, it will not change the file.

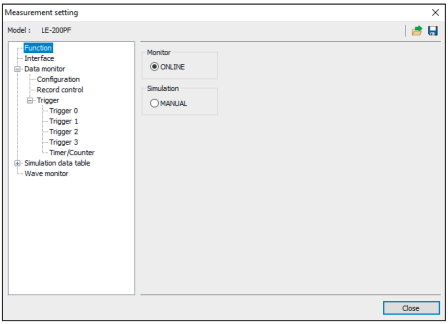
[Warning Display]
It warns that there is the former data in the file you specified as saving file.

■ nalyzer Settings

Click “ ” on the tool bar of the data window (or click “Measurement” -> “Measurement setting”) to set the protocol, speed and so on. On the measurement setting window, every time you change the setting on the left side of the window, the contents of the setting (on the right) will be different. Click “ ” to save the configuration as a “.SU” file. Click “ ” to read the configuration file.

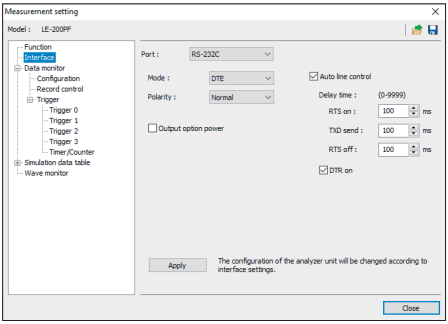
* Function

MONITOR “ONLINE” Select when monitoring. SIMULATION “MANUAL” Select when simulating.



* Interface

Select “RS-232C” or “RS-422/RS-485”. Select “DTE” or “DCE”mode on the RS-232C port for simulation.



Attention: Set the port setting to “RS-232C” in the case of using TTL monitor probe pod.

* Data Monitor

[Configuration] : Set the protocol and speed of target devices.

[Record Control] : Add the information recorded along with transmission/reception data.

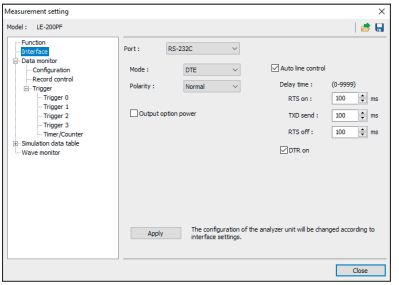
[Trigger] : Set the trigger conditions and actions.

* Simulation Data Table

Register the transmission data in HEX.

Select a port for monitoring. And, select output specifications for simulation.
Click “ Apply ” after setting.

■ Port
Select from RS-232C or RS-422/485.



* Mode
Select DTE or DCE mode for simulation.

* Polarity
Select the signal polarity of data. Normally selects “NORMAL”. “INVERT”will invert all the signal polarity.

* Driver Control
Select when using RS-422/485 port.

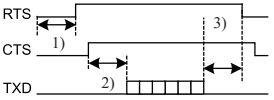
[OFF] : Driver is always active.
[Manual] : Driver becomes active while ER signal is active.
(Set “ ER/CD ” from the “operation panel”)
[Auto] : Driver becomes non-active right after it starts simulating and then becomes active while transmitting data. (Driver becomes active right before it starts simulating and becomes nonactive after transmission.)

■ Output Option Power
Set when using the optional TTL monitor probe pod (OP-5ML). It supplies DC 5V for TTL monitor probe pod from Dsub 9pin connector.

Attention : Do not set for simulation.

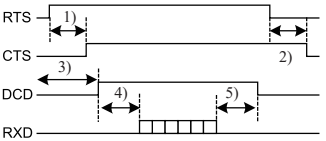
■ Auto Line Control
Control line status of signals on RS-232C port.

* DTE



	Meaning
1) RTS ON	Time between it starts sending and RS becomes ON.
2) TXD Send	Time between CS becomes ON and it sends data to SD.
3) RTS OFF	Time between SD ends sending data and RS becomes OFF.
DTR ON	Fix status of ER signal. ON: "High". None: "Low".

* DCE

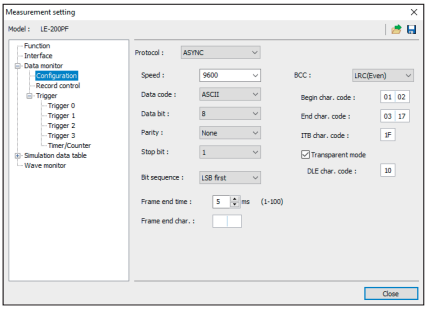


	Meaning
1) CTS ON	Time between RS becomes ON and CS becomes ON.
2) CTS OFF	Time between RS becomes OFF and CS becomes OFF.
3) DCD ON	Time between it starts sending and CD becomes ON.
4) RXD Send	Time between CD becomes ON and it sends data to RD.
5) DCD OFF	Time between RD ends sending data and CD becomes OFF.

The purpose of the monitor function is to record communication data into files without affecting the communication lines. Also, it is to display data clearly following each communications protocol. Not only communication data but also time stamp for data frame and idle time are recorded. As a result, error time and time out conditions are investigated. Moreover, the trigger function, which detects specific communication, is included.

5.1 Communication Condition

Click "" on the tool bar of the data window (or click "Measurement" -> "Measurement setting"). Set the communication condition for target devices.



* Protocol
  Select from ASYNC*/SYNC*/HDLC/PPP(ASYNC).
  * Supported only by LE-200PF.
* Speed
  Set any speed (Any 4 digit number).

* Data Code
  Set the data code.

* Parity
  Select from parity bit or multi-processor bit.

* Stop bit
  Set a stop bit length. Set only for simulation.

* Bit Sequence
  Set the order of bit transmission. In order to check normal protocols, selects "LSB First".

* Frame End Time
  Set the time of non-communication state of ASYNC, which judged as a frame end. Set when adding the time stamp.

* Frame End Character
  Set the frame end character of ASYNC, which judged as a frame end. Set when adding the time stamp.

* Clock
  Select a synchronism clock for SYNC and HDLC from ST1/ST2/RT/AR. If selecting "AR", it adjusts the clock for monitored data.

<Protocols and setting items>

		ASYNC	SYNC	HDLC	PPP
Speed		●	●	●	●
Data Code		○	○	○	○
Data bit		●	●		
Parity		●	●		
Stop Bit		○			
Bit Sequence		○	○		
Frame End Time		○			
Frame End Character		○			
Clock			●	●	
SYNC Code			●		
Reset Code			●		
Suppress			○		
BCC		○	○		
Begin Code		○	○		
End Code		○	○		
ITB Character Code			○		
Address Filter	SD Address			○	
	RD Address			○	
Format			○	○	
FCS				○	○
Transparent		○	○		
DLE Code		○	○		
Idle Mode				○	
Leading Flag				○	
Translation Protocol	Frame			○	
	Packet			○	
Flag Suppress					○

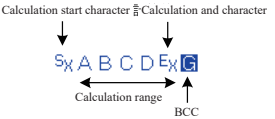
●: Necessary settings. ○: Need to set for special measurement.

* SYNC code
  Set a synchronism settle data for SYNC.

* Reset Code
  Set a synchronism reset code for SYNC. Set “FF”for normal operation.

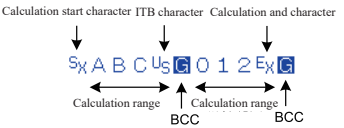
* Suppress Code
  When codes set in this section are monitored continuously, the second code and after ones are not stocked in the memory.

* BCC
  Set a block check code for ASYNC and SYNC.



* Begin Code
  Set a calculation start code for block check.

* End Code
  Set a calculation end code for block check.



* ITB Code
  Set an ITB (intermediate-text-block) code.

* Address Filter
  Set a frame address (8 bits right after a flag) on the SD/RD side through HDLC. To receive all frames, sets “don’t care (*)”.

* Format
  Set a transmission code for SYNC/HDLC.

* FCS
  Set a frame check sequence for HDLC/PPP.

* Transparent
  Set on/off of transparent mode when calculating block check.

* DLE Code
  Set a DLE (Data Link Escape) code for transparent mode.

* Idle Mode
  Select an idle state between frames through HDLC simulation.

* Leading Flag
  Set the number of leading flags through HDLC simulation.

* Packet
  Set translation specifications of frame level for HDLC. Select frame level or packet level.

* Flag Suppress
  When flags are monitored continuously through PPP, the second flag and after ones are not recorded in the memory.

5.2 Start and Stop measuring

■ Start Measuring

Click “●” on the tool bar of data window (or click “Measurement” -> “Run measurement ”). “Measuring” is displayed in the status display, and display data from the analyzer on the screen. Click “A↕” to change the font size, and “16” to change display in HEX while measuring. Also, it can pause the display by clicking “❚❚”.

■ Stop Measuring

Click “■” on the tool bar of data window (or click “Measurement” -> “Stop measurement”). It is possible to scroll data after the measurement. Data will be save into the specified folder set in the configuration settings. To open the previous files, click “” (or “File” -> “Open data file”) and specify the file. When opening more than one files, it will display as sequential data.

■ Display

“TXD”: Transmission data

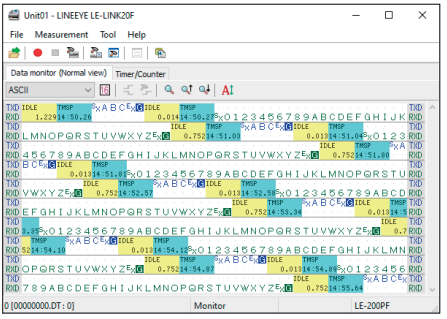
(SD/TXD+-/TR+- of interface).

“RXD”: Reception data

(RD/RXD+- of interface)

If there is data on TXD and RXD at the same time, data will be displayed in the same column.

“▮” indicates the position of latest data and only displays while measuring.



“IDLE 034.4” indicates the idle time (non-communication time). For example, if you set the idle time resolution as “10ms”, it indicates that there is 34.4 seconds of non-communication time.

“TMSP 10:13.73” indicates the time stamp (frame reception time). For example, if you set the time stamp resolution as “Min/Sec/10ms”, it indicates the frame was received at 10 minutes 13.73 seconds.

=> [7.3 Record Control]

■ Error Data and Special Character

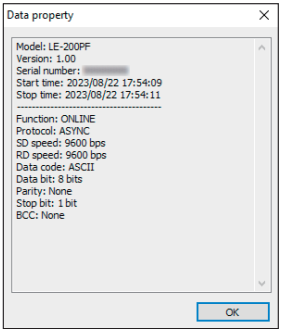
Code	Name	Meaning
PE	Parity Error	Displayed when parity is incompatible
FE	Framing Error	Displayed when stop bit is "0".
PF	Parity & Framing Error	Parity error and framing error are generated at the same time.
B	Break	Displayed when all of start bit, character bit, (parity bit), stop bit are "0".
A	Abort	7bits or more of “1” is continuously detected for HDLC.
G	Block Check Code (Normal)	Displayed when BCC or FCS is normal.
E	Block Check Code (Abnormal)	Displayed when BCC or FCS is abnormal.
33	Multi-processor Bit	Displayed when multi-processor bit is “1”. (*1)
LD	Loss Data	Displayed when there is loss data because of the ability of PC/SD card, or speed/amount of data.
RD	Recording disable	Displayed if not recording in the capture buffer by the capture control function.
RE	Recording enable	Displayed if starting the record in the capture buffer by the capture control function

*1: Data will be displayed in red. Character data excepting multi-processor bit will be displayed in HEX. If multi-processor is “0”, it will be the normal character data.

* Click “16” (HEX display) to check the actual data of special codes.

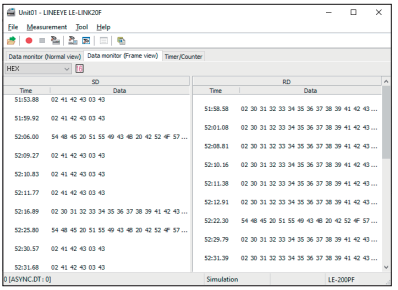
■ Display data property

Click [File] -> [Show data property] to display the start/stop time of measured data, firmware version, configuration and so on.



■ Display each frame in different line

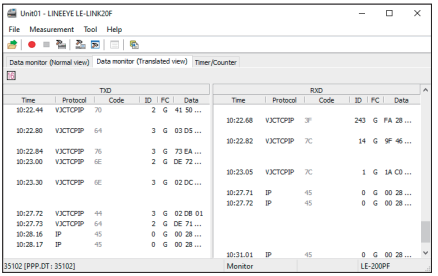
Click [Data monitor (Frame view)] tab to display frame divided by time stamp for ASYNC/SYNC communication.



■ Translation Display

For HDLC/PPP measurement, “Data Monitor (translation view)” tab will be added.

[PPP Translation]



Item	Meaning
Time	Shows the frame receiving time.
Protocol	Translates and displayes the protocol.
Code	Translates and displayes the code field value.
ID	Displays the value of identifier field in decimal.
FC	Displays the frame check.
Data	Displays data.

● The analyzer translates all bits of ACCM as “0”.

(Example) All bits of ACCM are ON (1) between communications equipment.

Terminal Device (DTE)

Transmitted data over a circuit

7F FF 03 21 31 32 11 33 7E

→

Terminal Device (DCE)

Recognizable data in reception

7F FF 03 21 31 32 33 7E

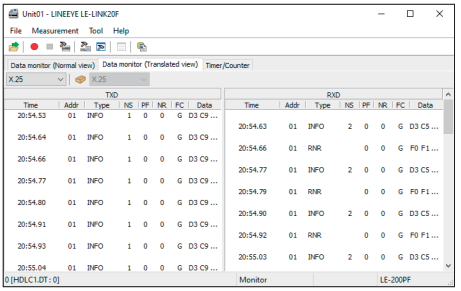
“11” is not processed as recognizable data.

↓

Translation

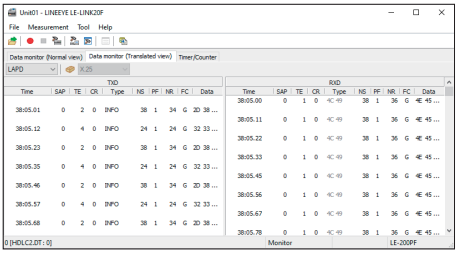
7F FF 03 21 31 32 11 33 7E

[SDLC/SDLCE/X.25/X.25E Frame Translation](LE-200PF)



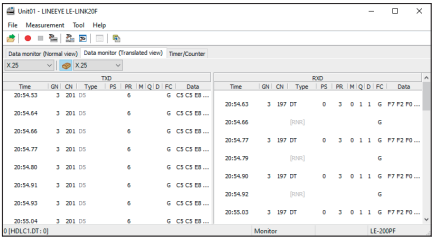
Item	Meaning
Time	Shows the frame receiving time.
Addr	Displays the contents of address field in HEX.
Type	Displays the frame type in the form of mnemonic.
NS	Displays the frame sequence number in decimal.
PF	Displays the logical value of P/F bit.
NR	Displays the frame sequence number in decimal.
FC	Displays the results of frame check.
Data	Displays the data in the information field.

[LAPD Frame Translation] (LE-200PF)



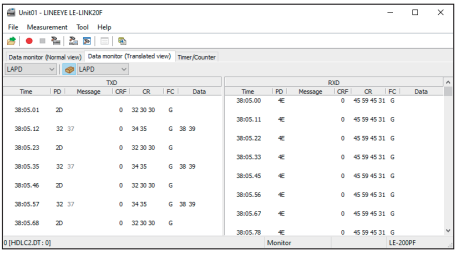
Item	Meaning
Time	Shows the frame receiving time.
SAP	Displays the value of service access point identifier in decimal.
TE	Displays the value of termination point identifier of terminal in decimal.
CR	Displays the value of Command Response display bit.
Type	Displays the frame type in the form of mnemonic.
NS	Displays the frame sequence number in decimal.
PF	Displays the logical value of P/F bit.
NR	Displays the frame sequence number in decimal.
FC	Displays the results of frame check.
Data	Displays the data in the information field.

[X.25 Packet Translation] (LE-200PF)



CN	Meaning
Time	Shows the frame receiving time.
GN	Indicates the logic channel group number in decimal.
CN	Indicates the logic channel number in decimal.
Type	Displays the packet type in the form of mnemonic.
PS	Displays the packet sequence number in decimal.
NR	Displays the packet sequence number in decimal.
M	Indicates the logical values of more data bit.
Q	Indicates the logical values of qualifier bit.
D	Indicates the logical values of transmission verification bit.
FC	Displays the results of frame check.
Data	Displays the data.

[LAPD Packet Translation](LE-200PF)

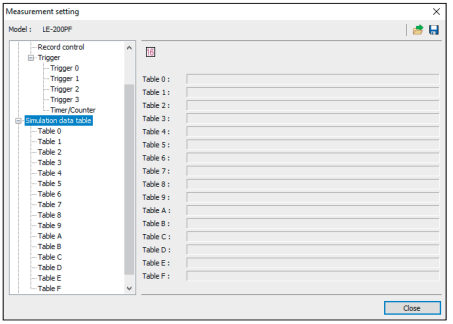


CN	Meaning
Time	Shows the frame receiving time.
PD	Displays the protocol identifier in HEX.
Message	Displays the contents of message type in the form of mnemonic.
CRF	Displays the value of nominal number flag.
CR	Displays the value of nominal number in HEX. (Max 2 octet)
FC	Displays the results of frame check.
Data	Displays the data.

The simulation function is the tool that makes the analyzer operates as a counterpart to the test devices even if the target devices are not prepared, and that executes a test for transmission and reception following protocols. A margin can be evaluated at staggered communication speed on purpose because appointed communication speed can be set. Moreover, error-processing response can be checked with tested data, which includes parity error data. Also, RS/CS (ER/CD) control lines can be added (ON/OFF), and there is a powerful trigger function to have the response test. Click “ “ to save the configuration in “*.SU” format, and click “ “ to read the configuration file.

6.1 Preparation for Simulation

“Click “ “ on the tool bar of data window (or “Measurement” -> “Measurement setting”). Register the transmission data in the data tables.



There are 16 data tables (0-F tables) and total of 16KB data can be registered.

● <Registration Data>

The character, which are inputted and displayed, can be set in the configuration menu. The character of registering transmission data cannot be changed by SHIFT IN and SHIFT OUT.

* Parity bit will be transmitted automatically and it is not necessary to register it in the data table.
* The effective data entered is only bit which is set in the character bit length. Others at higher positions will be ignored.

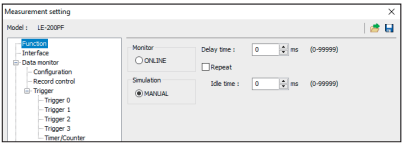
● <Method of Registration>

1) Registered data will be displayed on the screen. A cursor position is where “__“ is blinking. On the upper right of the screen, it will show the position and rest of buffer of transmission data.

2) Input data in HEX (“16”) or character (“A”). Move a cursor where you wish to enter data using a cursor key. To modify or add entered data, move the cursor to the position and enter the characters.
To delete it, move the cursor where you wish to delete it, and press [Delete] key. Then, it will be deleted, and the characters after the deleted character will be moved forward.
To set the parity error or multiprocessor bit, move “__” to the place where you wish to have them and click “PE MP”. To cut or copy into the clipboard, select data and click “ ” or “ ”. To past from the clipboard, move the cursor to the place you wish to insert the data and click “ ”.

6.2 Data Transmission

Click “ “ on tool bar of data window (or “Measurement” -> “Measurement setting”) and select “Simulation (Manual)”.



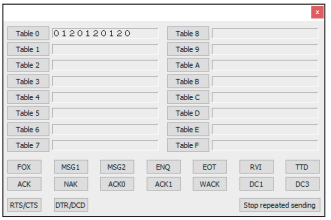
Item	Description
Delay Time	Space between characters
Repeat	Repeat transmission of frame
Idle Time	Interval of repeat transmission

1) Click “ “ on the tool bar of the data window (or “Measurement” -> “Measurement setting”). It will make the following control lines active, and will be in a wait state till the key corresponding to the transmission data table number is entered.

   DTE setting: RS, ER / DCE setting: CS, DR, CD

2) Select a data table.

   Click “ “ on the tool bar of the data window. Click a data table number makes to transmit the registered data.



When “Repeat” function is ON, data corresponding to the data table will be transmitted continuously spacing for idle time.

- In the case of RS-232C simulation, control lines can be set as following.

  RS/CS : RS/CS: ON/OFF of RS (CS) line.

  ER/CD : ER/CD: ON/OFF of ER (CD) line.

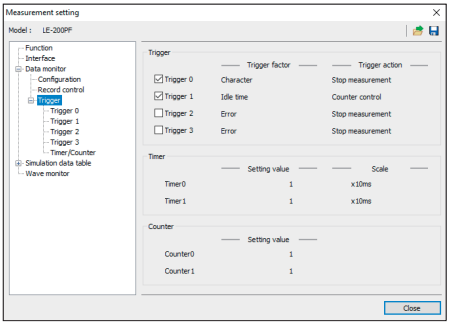
  Data transmission will not be affected by controlling the control lines.

- To stop the repeat transmission function, click “ Stop repeated sending ”.

  * If there is nothing registered in the data table, it cannot start transmission.
  * If “Table 2” is selected to send while “Table 1” is sending, transmission of “Table 2” will start after finishing transmission of “Table 1”.
  * Even you select the idle time to “0” and select repeat transmission function, it will take some time for processing.
  * If the analyzer is set as the DTE setting and “Auto Line Control” is ON, CS of target device has to be ON.

7.1 Trigger Function

Trigger function is to start a specific action upon occurrence of a specific event as the trigger. A perplexing flow of data, which is not easy to be analyzed in the normal monitor operation, is analyzed on the basis of occurrence of the specific event. Click “ “ on the tool bar of the data window (or “Measurement” -> “Measurement setting”). And then open the trigger setting.

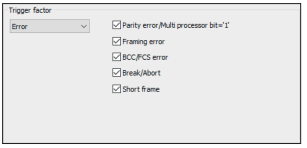


Up to four triggers can be set. Trigger factor and action can be set for each trigger independently. Each trigger can be set either to be enable or disable.

* Trigger Factor

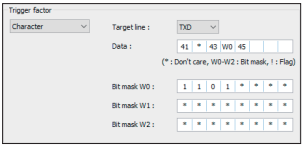
Four kinds of trigger factors can be set.

1) Error



Trigger action will take place by the generation of an error.

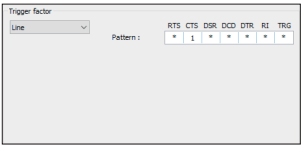
2) Character



Trigger action will take place by the generation of specific characters. Up to 8 characters can be set for either of SD/RD sides. “*”(don’t care) and bit mask (3 kinds) can be set.

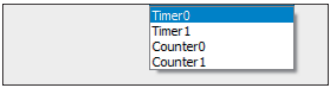
* In the screen setting example, when the data flow to the SD line in order of 41h (ASCII code ‘A’), ‘Arbitrary data’, 43h (ASCII code ‘C’), any one of D0h to DFh, and 45h (ASCII code ‘E’) the trigger condition is satisfied.
The fourth comparison data uses W0 with the bitmask (* bits which are not compared) specified for the lower 4 bits.

3) Line



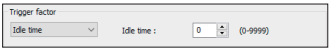
Trigger action will take place by a status (1(High), 0(Low) or *(don’t care)) of each signal line. There are RS, CS, DR, CD, ER, CI and EX (trigger in) signal lines.

4) Timer/Counter



Trigger action will take place when the timer or the counter reaches a preset value.

5) Idle Time



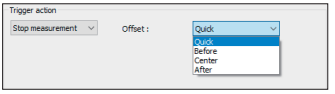
Trigger action will take place when the idle time reaches a preset value.

Idle time has to be set in the “Record control” and the resolution of idle time should be the same as the one in the “Record control”

* Trigger Action

Four kinds of trigger actions can be set.

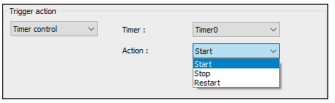
1) Stop



Measurement will be stopped automatically. Delay time from the occurrence of the trigger to the stop of measurement can be set.

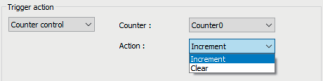
Quick : Stops the measurement immediately as trigger occurs.
Before : Stops the measurement after capturing 6K characters after satisfaction of trigger.
Center : Stops the measurement after capturing 128K characters after satisfaction of trigger.
After : Stops the measurement after capturing 250K characters after satisfaction of trigger.

2) Timer



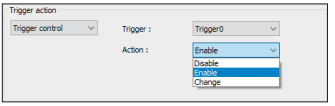
Specify the timer number to be controlled and the type of control (start, stop, restart).

3) Counter control



Specify the counter number to be controlled and the type of control (increment, clear).

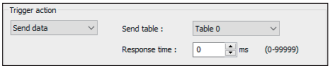
4) Trigger control



The status of other trigger is set when trigger event is occurred. Sequential trigger action can be set.

* “Change” makes “Disable” to be “Enable”, or “Enable” to be “Disable”.

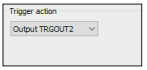
5) Send data



Send the data table, which you registered. Select the table number.

Delay (response time) from the occurrence of a trigger before the start of data transmission can be set in the range of 0 to 99.999sec.

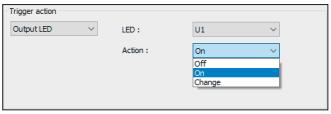
6) Trigger Output



Approx. 1ms Low pulse is outputted from the TRIGGER_OT2

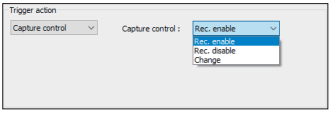
Approx. 1ms Low pulse is outputted from the TRIGGER_OT1 after satisfaction of all triggers. (not related to Trigger Output setting.)

7) LED Out



Light ON/OFF the specific LEDs. It is useful to check the measurement in visual during the data logger function.

8) Capture control

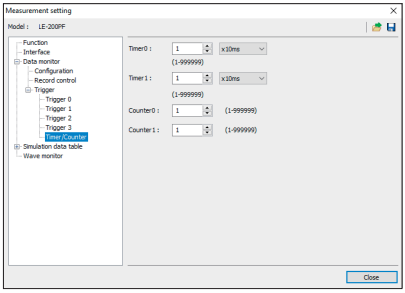


Select “Enable (recording)”, “Disable (not recording)”, or “Change the state (Enable<->Disable). If selecting “Disable”, monitored data will not be recorded as log data.

7.2 Timer/Counter

The Timer/Counter function, in conjunction with the trigger function, measures the elapsed time since a spe cific factor occurred, and counts the number of occurrences of a specific factor.

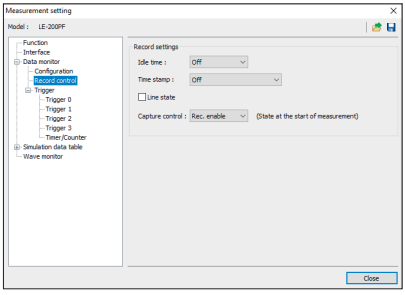
Clicks “ “ on the tool bar of the data window (or “Measurement” -> “Measurement setting”). Sets the Timer/ Counter setting.



7.3 Record Control

Additional information along with the data can be transmitted and received during the measurement.

Clicks “ “ on the tool bar of the data window (or “Measurement” -> “Measurement setting”).
Set the Record Control settings.



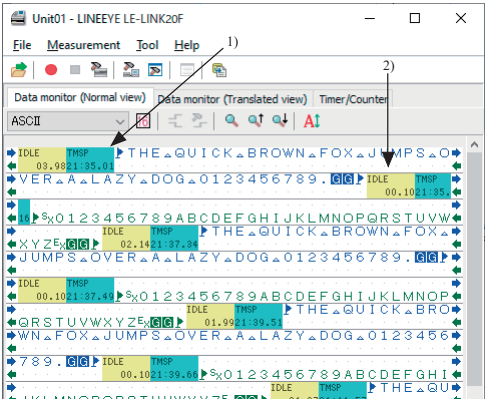
* Idle Time

Idle time which is in mark state (no communication time) can be measured. In ASYNC, idle time between frames indicate that the time between the last stop bit and next start bit.

* Time Stamp

This function can record the time when the top character of each frame transmitted through on the communication line. The analysis software will read the time of PC at the beginning of the measurement and record the time stamp. For example, "Min/Sec/10ms"is selected at the configuration. "35:23:08" indicates the frame was received at 35 minutes 23.08 seconds.

> Time stamp will be recorded in the analyzer based on the calendar clock of the PC. Please make sure your clock of the PC is correct before starting the measurement.



Example)

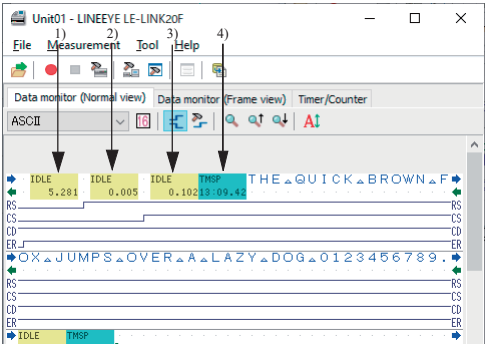
Idle Time: 10ms

Time Stamp: Min/Sec/10ms

1) The arrival time of the HDLC frame on the SD line is 21 minutes 35.01 seconds
2) Time between the last SD line data "F"and top RD line data "F" is 100ms.
   The decimal point is based on the resolution of time stamp setting.

* Line State

When the voltage level is more than 3V, it is displayed as "H". And the voltage level is less than 3V, it is displayed as "L".



Example)

Idle Time: 1ms

Time Stamp: Min/Sec/10ms

1) Time between the beginning of measurement and RS becomes active is 5.281seconds.
2) Time between the RS becomes active and CS becomes active is 5ms.
3) Time between the CS becomes active and the top of frame "T" is 102ms.
4) The top of frame "T" is arrived at 13 minutes 09.42 seconds.

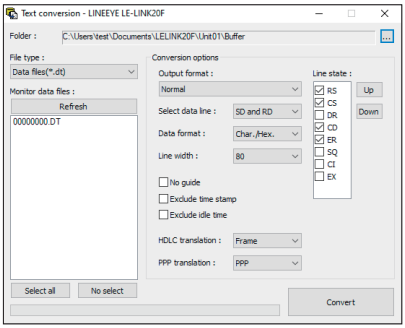
* Capture control (State at the start of measurement)

Select the recording state to the capture buffer at the start of measurement.This setting is used with "capture control" function in the trigger action. For normal use, please select "Rec. enable".

7.4 Text Conversion

Measured data can be converted into text file or CSV file.

Clicks “ “ on the tool bar of the data window (or “Tool” -> “Text Conversion”).



* Format

Select from “Normal”, “with line state”, “Translated”, “CSV format (data)” or “CSV format (frame)”.

* Signal Line

Select from “SD/RD”,”SD only ”, or “RD only”.

* Data Format

Select the data format from “Character/HEX”, “Character” and “HEX”.

* Line width

Select the number of characters per line. Select from “40”, “80”, “136” or “Max”.

* No Guide

If selecting this, configuration will not be recorded. (Data only)

* Exclude Time Stamp

If selecting this, time stamp will not be recorded.

* Exclude Idle Time

If selecting this, idle time will not be recorded.

* PPP Translation

If measuring PPP, select from “PPP” or “Dump”.

* HDLC Translation

If measuring HDLC, select from “frame” or “packet”.

* Control Line

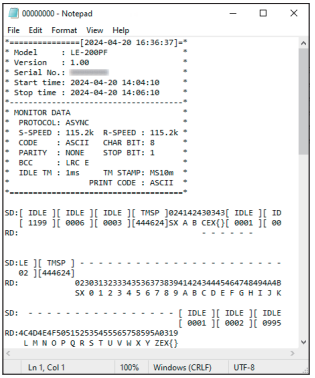
Select the control lines to display along with data when selecting “with line state”.

The order of recording control lines can be set by [Forward]/[Backward] key.

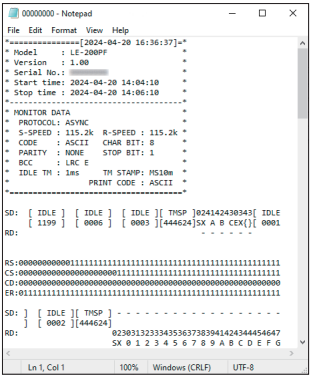
■ Execute Conversion

Select the monitor data files and click “ Convert ” button. Converted file will be save in the selected folder.

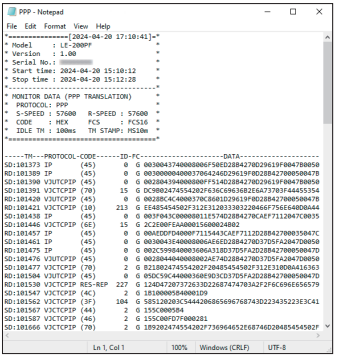
[Normal printing]



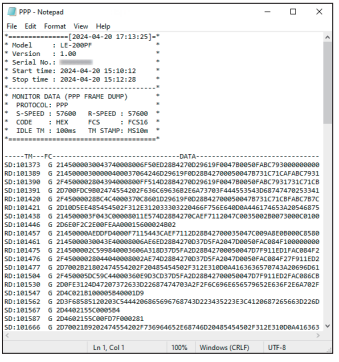
[Normal printing with line state]



[Translation printing (PPP)]



[Dump printing (PPP)]

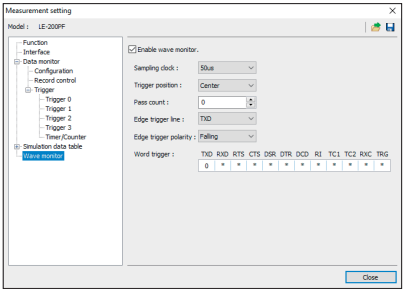


7.5 Wave Monitor Setting

It is possible to measure the timing of change of the communication line with a time resolution of up to 50nsec and display it as a waveform like a logic analyzer do so.

Clicks “ “ on the tool bar of the data window (or select menu [Measurement] [Measurement setting]), Sets the Wave Monitor setting.

* This function is only for Protocol Analyzer Mode. It cannot be used at Data Logger Mode.



* TXC1 and TXC2 are abbreviated to TC1 and TC2.

* Enable wave monitor

  Check when using the wave monitor function.

* Sampling clock

  Select the sampling clock cycle.

* Trigger position

  Select the trigger position of the wave monitor.

  BEFORE : Captures some data from the trigger point and then stops.

  CENTER : Stops at the point where before and after parts of the trigger have the same amount of data.

  AFTER : Captures a lot of data from the trigger point and stops.

* Pass count

  Set the number of times (0 to 9999) to ignore the trigger pattern match.

* Edge trigger line

  An edge is required for a trigger condition. Selects which signal edge to condition.

* Edge trigger polarity

  Select whether the condition is a rising edge or a falling edge.

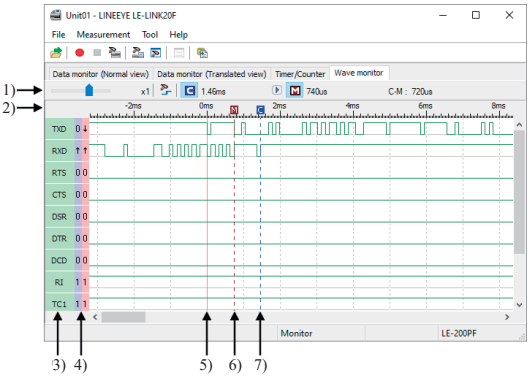
* Word trigger

  Sets the logic of other signals to be combined with the edge trigger.

■ Wave Monitor Data Display

When wave monitor is enabled, a [Wave monitor] tab is added to the data window after measurement is stopped.

(Wave monitor results cannot be displayed during measurement)



1) Toolbar for wave monitor

It is used to perform each operation of the wave monitor data display.

2) Time scale display

Indicates the relative time with the trigger position set to 0.

3) Signal name display

The name of each signal line is displayed.

4) Signal logical value display

The left side shows each signal logic for the cursor position and the right side shows each signal logic for the marker position.

5) Trigger position display

A trigger position is shown. It is not displayed as data without a trigger position.

6) Marker

Displays the marker. You can move it by dragging.

7) Cursor

Displays the cursor. You can move it by dragging.

Following operations are possible on the toolbar for wave monitor.

* Zooming rate change

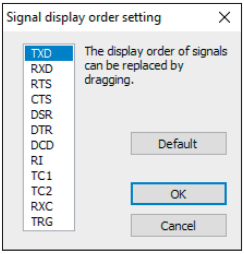
  By moving the slider on the left end of the toolbar, the display magnification on the time axis can be changed.

  The zooming rate is displayed at the right side of the slider.

* Signal ordering set

  Clicking [ ] button displays a window for settings.

  After changing in desired order by dragging each signal name, click the OK button to reflect them in the wave monitor data display.



* Cursor display switch

  By clicking [ ] button, The cursor can be displayed or hidden.

  A time of the cursor position is displayed at the right side of the button.

  The cursor position does not change by this operation. To move the cursor outside the display area into the display area, double-click on the display area.

* Marker position set

  By clicking [ ] button, the marker can be moved to the current cursor position.

* Marker display switch

  By clicking [ ] button, The marker can be displayed or hidden.

  A time of the cursor position is displayed at the right side of the button.

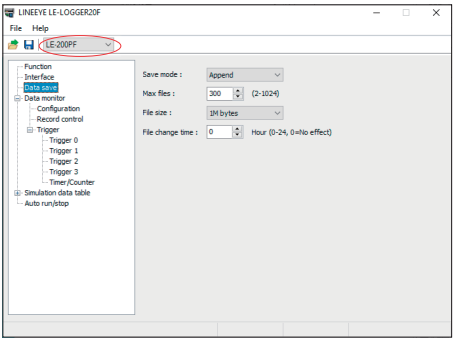
* Difference time display

  A time difference (C-M) of the cursor position and the marker position is displayed.

According to the configuration settings in the SD card, analyzer can record data for long hours without a PC.

8.1 Preparation of Logger Mode

Execute the “LE-LOGGER20F” from start menu -> “LINEEYE” -> “LE-LOGGER20F”.



■ elect the model type

■ elect the configuration for Data logger mode.

1) Select the interface.
2) Select the configurations according to the target devices.
3) Select the trigger conditions if necessary.
4) Select how to save the data.

* Saving Mode

“Restart” : Delete the existing files first, and then start measuring from the file name of “#0000000. DT”. Record data as a ring mode. (Delete the oldest file when the number of files reaches to the “Max Files”.)

“Max-stop” : Delete the existing files first, and then start measuring. Stop measuring when the number of files reaches to the “Max Files”.

“Append” : Existing files will not be deleted. Record data as a ring mode. The file name will be the sequence number after the existing files.

> Select “Append” for normal operation. Especially when you use Auto RUN/STOP function, or in the condition of [Run] key can be pressed accidentally, select “Append” mode.

* Max Files

> * For 2GB SD card, the max file number to save will be 512.

Set the max number of files to save.

* File Size

Select the file size to save.

“Max Files” x “File Size” will be the capacity of logging data.

Consider the actual memory capacity of the SD card.

For example). 2GB SD card: 1.8GB, 8GB SD card: 7.4GB.

Reference of Recording time (Max Files: 450, File Size: 4M byte)

Speed (bps)	Recording Time
9600	Approx. 120 Hrs
115.2K	Approx. 5 Hrs

In the case of 1KB data with 1ms interval is transmitted in full duplex.

* File change time

Change the recording file when the specified time has passed even though it does not reach the specified block size. If "0" is selected, it will not change the file.

115.2K	Approx.5 Hrs

5) Click “File” -> “Save”and save the configuration in the SD card. When you save the file, name it “LE150PF#.SU” for LE-150PF, and “LE200PF#.SU” for LE-200PF. Before starting the measurement as a data logger mode, read the configuration file to the analyzer.

Make sure the configuration file is set properly to measure data. It is recommended that you check the configuration by using “LE-LINK20F” first.

<Attention>

LE-150PF/LE-200PF supports 32GB SD card. The analyzer will not start operation if using above capacity of the SD card.

8.2 Start and End of the measurement

■ Start Measuring

1) Connect the analyzer to the target device.
2) Insert the SD card, which saves the configuration (LE150PF#.SU/ LE200PF#.SU) of the analyzer.
3) Supply the power to the analyzer using the power cable (SIH-2PG) etc. LED of POWER/ERROR will be lighting in orange.

* The analyzer will not record data if there is not the SD card with configuration data.

4) If Auto Run function is set, LED of RUN/ACT will be lighting in green. If setting the date of Auto Run, the power will be supplied at 1 minute before starting the measurement, and LED of RUN/ACT will be lighting.

If you do not use the Auto Run function, you need to press the RUN/STOP button.

* Make sure to check the light of LED of RUN/ACT after clicking the RUN/STOP button.

■ End Measuring

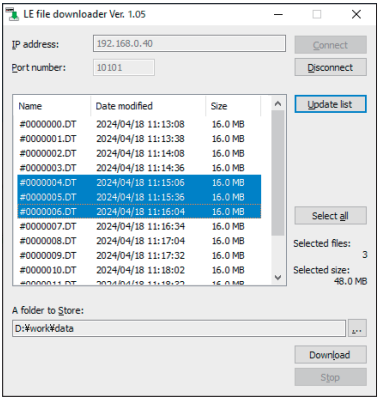
1) Click the RUN/STOP button if LED of RUN/ACT is lighting in green.
2) The last data will be recorded in the SD card of analyzer after stopping the measurement. If the analyzer is accessing to the SD card, the LED of RUN/ACT lights in red.

* Do not remove the SD card or power supply while analyzer is accessing to the SD card.

8.3 Receive the logger files by Wi-Fi connection.

In logger mode, log files in the SD card can be transmitted to PC via Wi-Fi using “LE file downloader” (ledatadownload.exe).

When you use this function, you need to make the Wi-Fi function valid by uploading the configuration file and Wi-Fi configuration file (WLANCFG.WL) made at “LE Wireless LAN configuration” into the SD card which is to be inserted to the analyzer.



1. Input the IP address and port number.

2. Click “Connect” and the list of log files appears. Click “Update list” and the latest ones are displayed on the list window.
3. Select the file on the list window.

   Note:
   You cannot download the file which is in logging. It will be error. Please note that the file with the biggest number maybe the file in logging.

4. Click “Download” and the selected files are saved into the folder set at “A folder to Store”.

8.4 Auto Run/Stop Function

The analyzer can start/end measuring at the specified date. Set “Auto RUN/STOP” using the “LE-LOGGER20F”.

* Mode

[Monthly]:

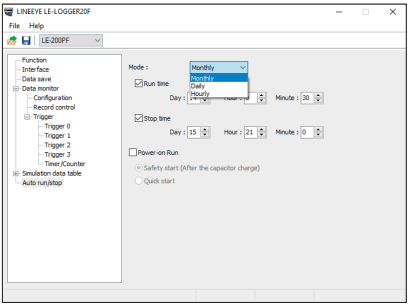
Start measuring at the specified time every month.

[Daily]:

Start measuring at the specified time every day.

[Hourly]:

Start measuring at the specified time every hour.



* Run time

Specify the starting time of the measurement. The power will be supplied at 1 minute before starting the measurement.

* Stop time

Specify the ending time of the measurement. The power will be turned off after the measurement automatically.

* Power On Run

Start measuring when powering on the analyzer. Select from “Safely start “ or “Quick start”. For normal operation, select “Safely start”. Safely start will start measuring approximately 40 seconds after powering on the analyzer for charging the capacitor for back-up data.

Time stamp information is based on the time of RTC (Real Time Clock) embedded in the analyzer. RTC is set when the product is released from the factory. And when starting measurement in analyzer mode, RTC is set according to the time of the PC.

8.5 Use of Log files

Log files will be named as “xxxxxxxx.DT”(“x” will be the sequential number).
These files can be analyzed by “LE-LINK20F”.

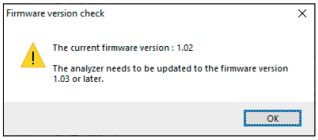
1) Insert the SD card to the SD card drive of the PC.
2) Click “ “ button, (or “File” -> “Open files”) and select the SD card drive. If you open more than one files, it will be displayed as sequential data.
3) After analyzing the log file, click “File” -> “Close”.

* Do not remove the SD card while opening more than one files,

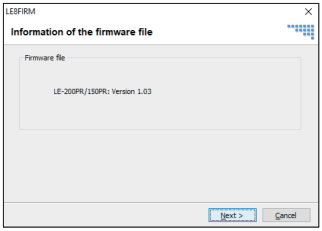
You can update to the latest firmware by the PC. Check the version of analysis software (LE-LINK20F) from “Help” menu. The latest firmware will be available from the LINEEYE website. Connect the analyzer to the PC and execute “LE-LINK20F” and follow the instruction.

■ Update Firmware

Click “Tool” -> “Check firmware”of the “LE-LINK20F”.

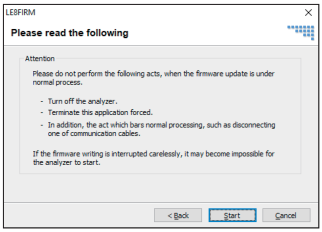


If you need to update it to the latest firmware, following dialog will be displayed.

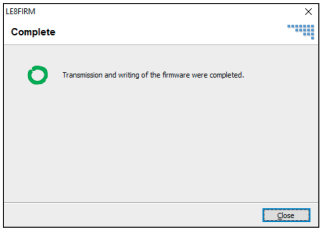


1) The version information of new firmware will be displayed.

2) Click [Next].



3) A note for updating firmware will be dis played.
Read it carefully and click [Start].
The firmware loader will start operating. The LED of POWER/ERROR will be lighted Off and LED or RUN/ACT will be lighted On while the firmware loader is operating.



4) If the updating process is completed, “Complete” will be displayed. And the firmware loader will end the operation automatically.

10.1 Interface (RS-232C/422/485)

Dsub 25pin connector is for RS-232C and RS-422/485 port.

Signal definition of RS-232C

Signal	RS-232C (V.24)		Signal Input/Output (*3)		
	DSUB25	Pin (*2)	MONITOR	SIM-DTE	SIM-DCE
Shield ground	FG	1	-	-	-
Signal ground	SG	7	-	-	-
Transmission data	SD	2	I	O	I
Receiving data	RD	3	I	I	O
Transmission request	RTS	4	I	O	I
Capable of transmission	CTS	5	I	I	O
Terminal ready	DTR	20	I	O	I
Data set ready	DSR	6	I	I	O
Data carrier detect	DCD	8	I	I	O
Call indicator (*1)	RI	22	I	-	-
Transmission clock 2 (*4)	ST2	15	I	I	O
Reception clock (*4)	RT	17	I	I	O
Transmission clock 1 (*4)	ST1	24	I	O	I

Signal definition of RS-422

Signal	RS-422		Signal Input/Output (*3)	
	DSUB25	Pin (*2)	MONITOR	SIM
Signal ground	SG	7	-	-
Receiving data	RXDB (+)	10	I	I
	RXDA (-)	11	I	I
Transmission data	TXDB (+)	18	I	O
	TXDA (-)	19	I	O
Reception clock (*4)	RXCB(+)	12	I	I
	RXCA(-)	13	I	I

Signal definition of RS-485

Signal	RS-485		Signal Input/Output (*3)	
	DSUB25	Pin (*2)	MONITOR	SIM
Signal ground	SG	7	-	-
Transmission / Reception	TR (+)	18	I	I / O
	TR (-)	19	I	I / O

*1: CI signal cannot be output form the analyzer

*2: Signal pins which are not defined here are not connected.

*3: “I” indicates an input to the analyzer. “O” indicates an output from the analyzer.

*4: LE-200PF only.

10.2 External Input/Output Terminal

(2) (1)
(4) (3)

Pin No.	Signal name	Function	Color of LE-4TG
1	TRIGGER OT1	Open drain output, +5V, 10K ohm pull up	Red
2	TRIGGER IN	TTL level input, range: -0.5V to 6.0V +5V, 10K ohm pull up	Brown
3	TRIGGER OT2	Open drain output, +5V, 10K ohm pull up	Orange
4	GND	Signal ground	Black

10.3 Specifications of Analyzers

Model		LE-150PF	LE-200PF
Interface	RS-232C(V.24)	◎	
	RS-422/RS-485	◎	
	TTL	○ Requires optional TTL probe pod (OP-5ML)	
Protocol	ASYNC	◎	
	ASYNC PPP	◎	
	Character SYNC (SYNC/BSC)	–	◎
	Bit SYNC (HDLC/ SDLC/X.25)	–	◎
Memory	HDD of the PC	32GB	
	SD card	32GB	
Baud Rate	Speed range	50bps - 1Mbps	50bps - 1.544Mbps
	Setting	Freely set to four effective digits (margin of error: +/- 0.01% or less)	
Online monitor function		Record data without affecting the communication lines.	
Simulation function		Transmit/receive the specific data in DTE/DCE mode.	
LED		5 of two colored LED: Power/Error, Test/Record, SD/RD, User defined U1/U2,Wi-Fi	
Switch		One: Run/Stop	
External trigger		One Input, Two Output, 2.54mm pin header connector	
SD Card interface		2 - 32Gbyte SD/SDHC card(*1)	
USB 2.0 Port		Mini-B connector, High speed supported	
Wi-Fi Connection(*2)		IEEE 802.11 b/g/n Frequency range : 2400MHz-2483.5MHz TX POWER: 802.11b: +20dBm 802.11g: +17dBm 802.11n: +14dBm	
Power (*3)		Remote mode: USB bus power Remote mode with Wi-Fi / Logger mode: External DC power (DC 7 to 34V, supplied from the DC jack or 25th pin of DSUB connector), AC adapter (6A-181WP09). Power consumption: 2.1W (1.5W when Wi-Fi is OFF, Max.2.3W for about 10sec after turning on). 0.15W/DC24V when turned off.	
Run time during power failure		0.5 sec	
Ambient temperature		In operation: -10 to +55℃ , In storage: -20 to +60℃	
Ambient humidity		20 - 85% RH (no condensation)	
Dimension, Mass		86(W) x 130(D) x 30(H) mm, Approx. 220g	
Environment of PC		OS: Windows 10/11, PC: PC/AT compatible	

*1: Only SD/SDHC cards sold or attached by LINEEYE are supported.

*2: The Wi-Fi function of the analyzer is available only in Japan, USA, Canada, and the EU nations where the product needs to be conformable to RE directive (2014/53/EU) for use.

*3: AC adapter is sold separately. In the Remote mode (with PC connected by USB), it runs by the USB bus power. In the Logger mode (PC-less) or Remote mode with Wi-Fi, you need to have the optional AC adapter (6A-181WP09) or use the optional Power Plug Cable (SIH-2PG) and external DC power.

10.4 Options

* Wide input AC adapter: 6A-181WP09: Power supply for Logger Mode, DC 9V center (+)
* Power plug cable: SIH-2PG: External power supply
* DSUB 9pin monitor cable: LE-259M1: To monitor through Dsub 9pin over RS-232C
* Terminal block adapter: LE-5TB: To connect to RS-422/485
* TTL monitor probe pod: OP-5ML: To monitor TTL level signal
* DIN rail mounting plate: LE-DIN13: To connect analyzer on the 35mm DIN rail.

Warranty

* This product package contains a warranty.
* Read the warranty and keep it in the safe place.

Repair

* LINEEYE will repair the product according to the warranty.
* After the warranty period, LINEEYE will repair the product for you to use the functions properly at your own expense. If your product needs to be repaired, please tell us the model name, serial number, purchased date, and the details of problems.

---User Registration---

Please register as a user using the user registration form on our website.

https://www.lineeye.co.jp

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