LINEEYE

CAN/LIN Data Logger

LE-270AR

LE-270GR

Instruction Manual

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

The 9th Edition

Contents

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.

However, without the Wi-Fi setting file in the inserted SD card the Wi-Fi function is invalid and it does not emit radio.

SIMPLIFIED EU DECLARATION OF CONFORMITY

Hereby, LINEEYE declares that the communication protocol analyzer type LE-270GR / LE-270AR 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:

https://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.

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,

⚠ 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.

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8. Notice
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LINEEYE CO., LTD.

LE-270AR/LE-270GR is the CAN/LIN communication analyzer, which can be used as a PC-connectable protocol analyzer and PC-less Data logger. It has two High-speed CAN transceivers, and two LIN transceivers. It monitors two channels of CAN or LIN, or one CAN and one LIN channels. In addition, four channels of Analog/Digital signals can be recorded. LE-270GR has GPS receiver and acceleration sensor and can register positioning and acceleration information besides CAN/LIN communication data. Power failure protection, water-proofing and low power consumption widens the usage of analyzer such as in the automation factories and other production factories,

1.1 Composition

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

Protocol Analyzer	: 1
Utility CD (CD-ROM)	: 1
SDHC card (8GB)	: 1
Mini USB cable	: 1
CAN/LIN Dsub cable (Model: LE-25M3A-1)	: 1
Power plug cable (Model: SIH-2PG)	: 1
Instruction Manual	: 1 (This book)
Warranty	: 1

* Please contact LINEEYE distributor or us if you find any insufficient part of 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
Utility CD contains the analysis software, driver and some instruction manuals of analyzer and its options. You can download the update file of software from https://www.lineeye.com

1.2 Outline

■ Functions

1). On-line Monitoring
Monitor the transmission/reception data on-line to check the existence of hindrance and communication data in the line or to analyze the communication.

2). Simulation function
The product takes a role of a node of CAN/LIN and transmits the data frame or remote frame set by the user.

3). Analog measurement function
The product measures and records the voltage of the range from –15V to +15V with the specified interval(1ms to 10min).

■ Feature

* Measure two channels of CAN/LIN in combination and four channels of Analog/Digital signals at the same time.
* High speed(TJA1050) of CAN transceivers are selectable from the software.
* Powerful trigger function and ID filter for sufficient analysis.
* Record measured data continuously in the HDD of PC or SD card.
  (SD card: LE-270AR supports up to 16GB while LE-270GR supports up to 32GB).
* Specify the recording time by Real Time Clock. Turn On/Off the power automatically.
* Power failure protection and wide range of ambient temperature make it possible to use it in the severe conditions. (-20℃ - +60℃)
* Compact size. Able to use the 35mm DIN rail.
*You can receive the file of the measuring data in logger mode through Wi-Fi.

<div align="right">→ 6-3 Read the logger file via Wi-Fi</div>
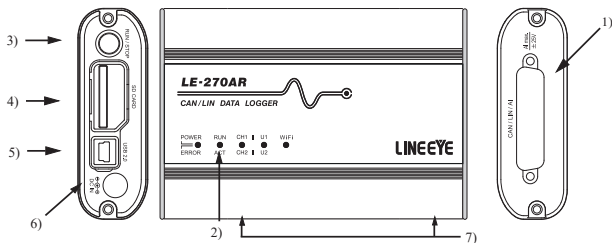
  (The Wi-Fi function is available only in Japan, USA, Canada, and EU nations where the product is needed to be compliant with RE directive (2014/53/EU).)
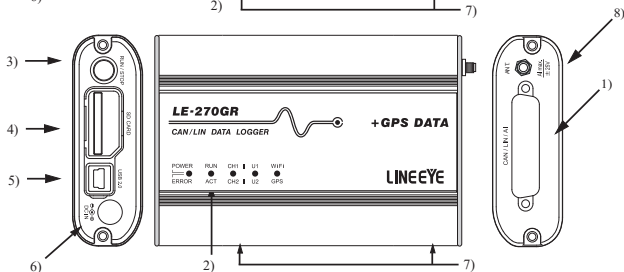*You can log the GPS positioning and acceleration data. [Supported only by LE-270GR]
*The measurement port is isolated from the USB port by the galvanic isolation [Only LE-270GR]

LE-270AR

LE-270GR

1) Measurement Interface

The measurement interface consists of a DSUB 25pin connector to connect to CAN/LIN target devices and external input signals.

Measurement port is isolated from USB port by galvanic isolation(1kV) (Only LE-270GR).

2) 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]
Light off	Green light	Firmware Update Mode	
Red blinking	-	Error	Self-check error, Unusual error [*2]

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

*2: Contact LINEEYE distributors or LINEEYE for support.

CH1/CH2 : It displays the logic status of CH1 line (green) and CH2 line (red).

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

WiFi/GPS : When you select "Station" in the Wi-Fi setting of "Wireless LAN configuration file", the LED lights in green (Wi-Fi) when it completes connecting with an external Wi-Fi access point.

When you select "Access point" in the Wi-Fi setting, it lights in green (Wi-Fi) when the access point in the analyzer runs.

For LE-270GR only, the LED lights in red (GPS) when the analyzer receives a GPS radio.

Note : The LED is two colors LED and it looks orange when both of them light.

3) RUN/STOP Switch

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

4) 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.

<Dust-proofing cover>

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

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

---

5) USB Connector

Use the included USB cable to connect the host PC.

6) DC Jack

Connect the power supply when using the analyzer as a Data Logger. Optional plug cable "SIH-2PG" is available.

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

7) M3 Screw Hole

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

8) Connector for GPS antenna (Only for LE-270GR)

SMA connector (female) for active GPS antenna

Connect a GPS antenna.

・Major differences between LE-270AR and LE-270GR

	LE-270AR	LE-270GR
Measurement port isolation	×	○
GPS measurement	×	○
Acceleration measurement	×	○
Supported SD	Up to 16GB	UP to 32GB

Install the analysis software"LE-LIK27R" 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 7/8.1/10

Port: USB 2.0 port

SD card drive: It is required for the Data Logger mode to save log files and to read configuration settings.

*When you use Wifi function, Wi-Fi access point which supports IEEE 802.11 b/g/n (2.4GHz) is needed.

The Wi-Fi function is available only in Japan, USA, Canada, and EU nations where the product is needed to be compliant with RE directive (2014/53/EU).

2.2 Installation of USB Driver (Windows7/8.1/10)

(A screen is an example of Windows10.)

1. Insert the included CD-ROM into the CD-ROM drive.

2. Open the folder or "/Drives" and click "setup.exe". Click "Yes" when following dialog is appeared.
   Click Yes when the "Do you want to allow the following program from an unknown publisher to make changes to this computer?" message appears.

3. Click "OK" to install the driver package.
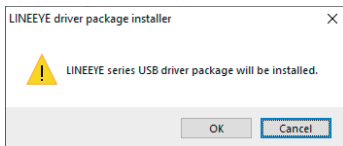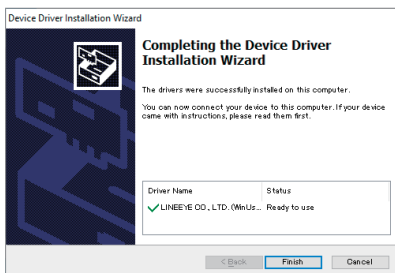

4. Click "Next"when starting the install wizard.
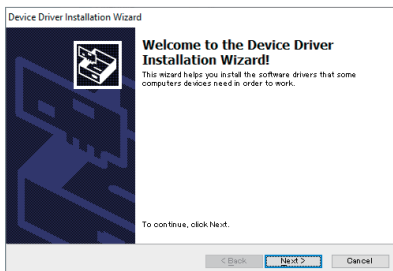
5. Click "Install" and start installing the driver package.
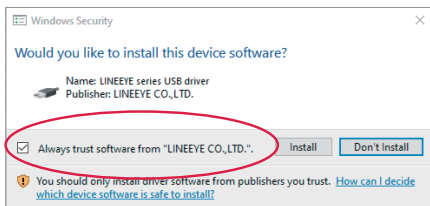
Mark on the check box and the same dialog will not be appeared again.

6. After installation has completed, click "Finish".

■ Install

1. Insert the included CD-ROM into the CD-ROM drive of the PC.

   Open the folder of "pcsoft" and click on "Setup.exe".

2. Click "Yes" if the user account dialog box appears.

3. Follow the Install Shield wizard.

4. Read the software license agreement and click "Yes".

5. Input the serial number of analyzer. (Check the back side of the analyzer)

6. After setup has completed, click "Finish".
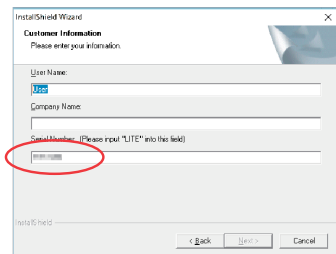
7. Protocol analysis software (LE-LINK27R) is installed.

■ Uninstall

1. Open "Add/Remove Application" in the "Control Panel."

   (It might be "Add/Remove Programs" for other OS.)

2. Select "LE-LINK27R" and execute "Remove".

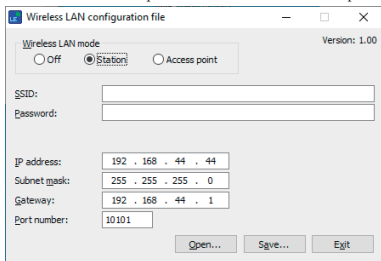## 2.4 Set up for the internal RTC (Clock IC)

The lithium secondary battery supplies back up power for the internal RTC (Clock IC). When you use the analyzer for the first time or when you have not used it for a long time, before using it in logger mode, connect the analyzer with a PC by USB cable and execute the measurement operation for once in protocol analyzer mode. When it starts the measurement the time and date in the PC will be set to the RTC in the analyzer. While this operation (for the minutes) lithium secondary battery will be charged and the RTC keeps the date and time for about two days in the power-off condition. When the analyzer is powered for hours, the battery will be fully charged and the date and time in the RTC will be kept for more than 6 months.

To use Wi-Fi function of LE-270AR/ LE-270GR, you need to power the analyzer after inserting SD card in which Wi-Fi configuration file (WLAN CFG.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.

Wireless LAN configuration file	— ☐ ✕

Version: 1.00

Wireless LAN mode
○ Off ◉ Station ○ Access point

SSID:
Password:

IP address: 192 . 168 . 44 . 44
Subnet mask: 255 . 255 . 255 . 0
Gateway: 192 . 168 . 44 . 1
Port number: 10101

Open...   Save...   Exit

■Station Mode

The analyzer connects with Wi-Fi via access point.

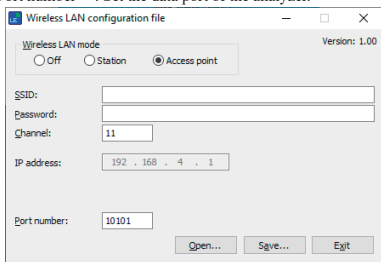SSID   : Set the SSID of the access point to be connected.

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.

Wireless LAN configuration file	— ☐ ✕

Version: 1.00

Wireless LAN mode
○ Off ○ Station ◉ Access point

SSID:
Password:
Channel: 11

IP address: 192 . 168 . 4 . 1

Port number: 10101

Open...   Save...   Exit

■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.]

IP address   : The IP address is fixed to 192.168.4.1

Channel   : Set the channel to be used for Wi-Fi connection.

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" to save the setting file for Wi-Fi (WLAN CFG.WL) to a SD card.

4. Insert the SD card in which Wi-Fi setting file is written into the analyzer.

5. Power the analyzer.

Note : The firmware version of the analyzer needs to be Ver1.01 or later.

3.1 Connection

■ Protocol Analyzer Mode

1). Connect the USB cable to the analyzer

2).Connect LE-270AR/LE-270GR by USB or Wi-Fi with the PC to which the analysis software is installed.

3). Connect the analyzer and target devices using the LE-25M3A-1.
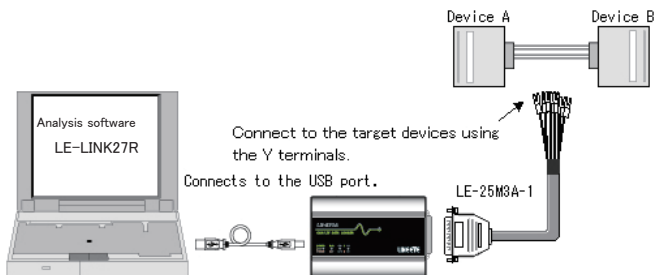
● For CAN communication, connect following signals.

Signal	Meaning
CAN_H	CAN Bus signal
CAN_L	
GND	Signal Ground

Note: Low Speed CAN is not supported.

● For LIN communication, connect following signals.

Signal	Meaning
BATT	Battery Power (9-18V)
LIN	LIN Bus signal
GND	Signal Ground

■ Data 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-25M3A-1.

<SHI-2PG>
Connect the black/white cable to the positive electronic pole of DC power.

<External power supply>
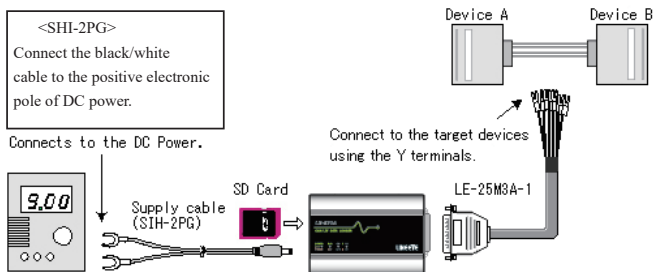
・ External power supply range for DC IN is from DC7V to 34V.

・ External power supply range for BATT of the Dsub25 is from DC9V to 34V.

・ Power consumption of LE-270AR is 145mA when DC is 9V. (215mA when using Wi-Fi)

・ Power consumption of LE-270GR is 185mA when DC is 9V. (250mA when using Wi-Fi)

・ Suitable DC plug is center plus 5.5mm (outside) / 2.1mm (inside).

■ Data Window

Execute the analysis software.

From [Start] menu of Windows, go to [All programs] -> [LINEEYE] -> [LE-LINK27R]. Execute
"LE-LINK27R" 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 file name and data position of Data display. The number of data loss will be displayed
while monitoring.

5). Model Name Display

Display the model name of analyzer.

■ Connection Settings

Click "⟨icon⟩" 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" and "Measurement data".

● "Connection" tab

"Connection method" are for the setting of connection.

<USB>

Connection setting   ✕

Connection | Measurement data

Connection method : USB

Serial number :

OK   Cancel
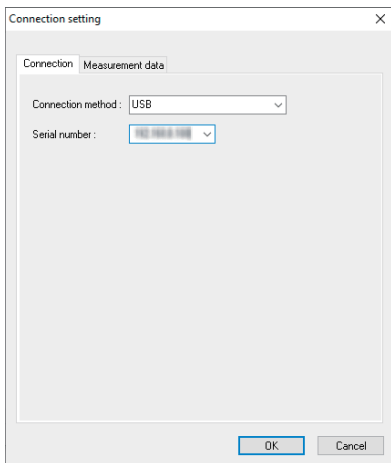
"Serial number" (USB)

Set the serial number of the analyzer to be controlled.

You can select it from the drop down list when the analyzer is connected.

<Wi-Fi>

Connection setting   ✕

Connection | Measurement data

Connection method : LAN/Wi-Fi(TCP/IP)

Host name :

Data port : 10101

OK   Cancel
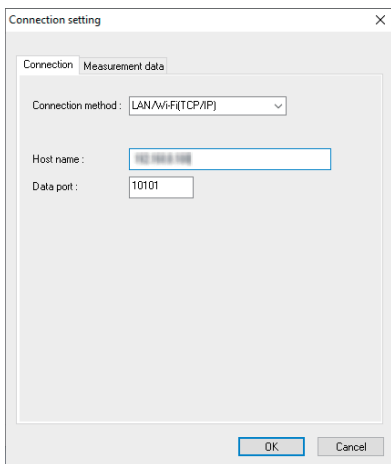
"Host name"

Set the IP address of the analyzer.

"Data Port"

Set the port number for the send/receive of the measured data. Set the same port number set to the analyzer.

● Measurement Tab

   Setting for the saving destination of the measured data, file size, and behavior in the protocol analyzer
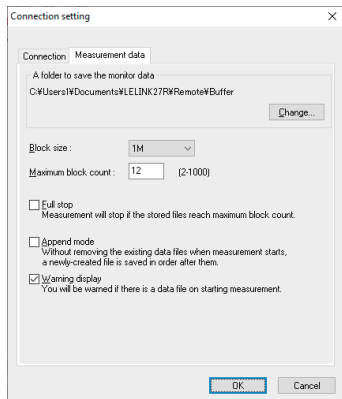
mode.

[A folder to save the monitor 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 "00000000.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 any folder in the place
you specified, a message dialog will be appeared.

[Block Size]
   Set the data capacity per a file. You can select from 128K/1M/2M/4M/8M/16M/32M byte.

[Maximum Block Count]
   Set the maximum file number to save. You can set from 2 to 1000. When the number of the data file
   exceeds this number, 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 exceed 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 "00000000.
   DT".

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

■ Analyzer Settings

Click " 🎬 " on the tool bar of the data window (or click "Measurement" -> "Measurement setting") to set the target bus, 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 side of the window) will be changed. Click " 💾 " to save the configuration as a ".SU" file. Click " 📂 " to read the configuration file.

● Function
  Select the mode of the analyzer.
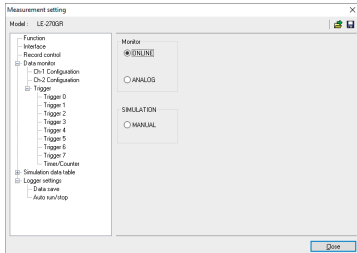
[ONLINE] (Online mode)
  Monitor CAN/LIN data.
[ANALOG] (Analog mode)
  Record 4 external signal (voltage) at specified sampling (1ms - 10min). Analog mode records not only the voltage data but also the latest communication data captured between each sampling cycles.
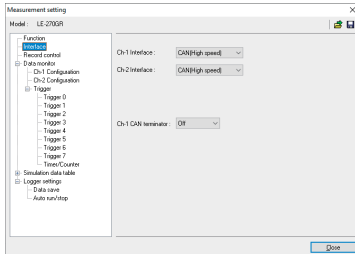 And, the relationship between external signals and communication data is easily found out.
  📖 Refer to "4-4 Analog waveform display"

  "MANUAL" (Simulation mode)
  It outputs the data which already set to the simulation data table from CH1(CAN1/LIN1).
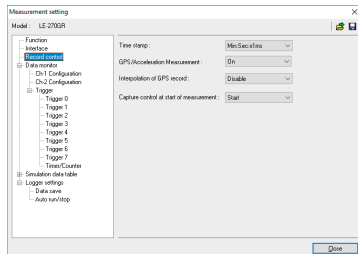 "Schedule" Schedule setting for the analyzer when it is LIN master

● Interface

Ch-1 interface/Ch-2 interface
  Select the interfaces of CH1 and CH2 from CAN or LIN.
Ch-1 CAN terminator
  You can connect the terminal end (120Ω) to the CAN port side of the Ch-1 in the analyzer.

● Record Control

Set the resolution of timestamp, ON/OFF of GPS/ Acceleration [*1] function, interpolation function for GPS data [*1][*2], and capture control at staring the measurement [*2].
*1: GPS function is available only in LE-270GR. It is able to set GPS/Acceleration function in LE-270AR, however, it cannot be performed.
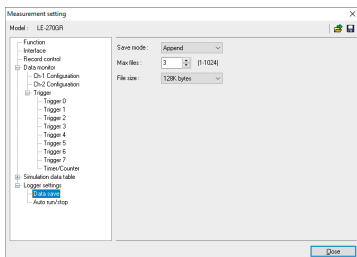*2: Firmware version 1.02 or above is required.

- Data Monitor

  [Configuration]　Set the speed of target devices.

  [Trigger]　Set the trigger conditions and actions.

- Simulation data table

  [Table 0 to F]　Set the frame to be sent.

Note: When it is LIN master simulation, you can set the schedule setting from function selection display.

- Logger Setting

  [Data Save]

　　　Set the file size and number of files to save for a Data Logger Mode.

　[Auto RUN/STOP]

　　　Set the starting time and ending time of the auto-measurement.

The purpose of the monitor function is to record communication data into files without affecting the communication lines. The results will be displayed as CAN/LIN frames. Not only communication data but also time stamp and external signals are recorded. Besides, LE-270GR can register positioning by GPS receiver and acceleration information by acceleration sensor. As a result, error time and conditions of external equipments are investigated. Moreover, the trigger function, which detects specific communication, can be set.

4.1 Communication Condition

Click " " on the tool bar of the data window (or click "Measurement" -> "Measurement setting"). Set the communication condition for target devices.
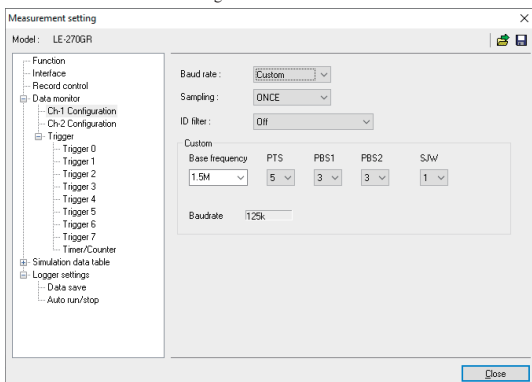
<CAN setting>
● Baud Rate
    The analyzer measures data at the preset Bit-timing. Bit-timing is set as 75% of the bit. To change the Bit-timing, press [Custom].

SS	PTS	PBS1	PBS2
1TQ	5TQ	3TQ ▲	3TQ

|	
Base Frequency:	Frequency of Time Quantum
PTS:	Propagation Time Segment
PBS1:	Phase Buffer Segment 1
	("3-8" when PTS ≤ 2, "2-8" when PTS>2)
PBS2:	Phase Buffer Segment 2
	("3-PBS1" when PTS+PBS1 ≤ 4, "2-PBS1" when PTS2+PBS2>4)
SJW:	Synchronization Jump Width
	("1-PBS2" when PBS2 ≤ 3, "1-4" when PTS2>3)

● Sampling
    Select the number of bit samplings. Select from "Once" or "3 Times".

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● ID Filter

Select the ID filter from "OFF"(invalid), "Acceptance", "Pass", "Cut", "Pass & Cut", or "Acceptance & Pass & Cut".
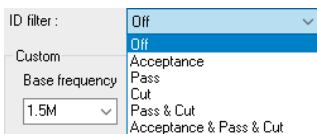
・Acceptance

Captures the frames which have corresponding ID by a hardware filter.

You can set bit-by-bit ("0", "1", "*", (Don't care)) from high-order bit by acceptance configuration tab. Configure values for ID28 - ID18 (values for ID17 - ID0 should be "Don't care") when it is standard format, and configure values for ID28 – ID0 when it is extended format.

(Example) When it is standard format and captures the frames with ID "010h"(HEX).

Note: When extended format are mixed with standard format, 00400000h - 0043FFFFh also will be captured.

・PASS

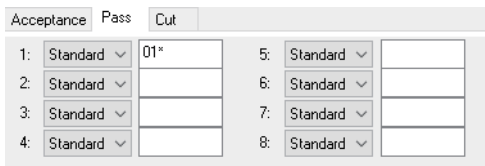Captures the frames which have corresponding ID by a software filter.

Select standard format of extended format at the pass configuration tab and set the ID by HEX ("0" - "F", "*", (Don't care)). (You can set up to 8 items)

Configure values within the scope of ID:0 – 7FFh when it is standard format,

and configure values within the scope of ID:0 – 1FFFFFFFh when it is extended format.

Note: If there is no entry for the blanks when the pass filter is valid, no ID frame will be captured.

(Example) Monitoring of the IDs of 010h – 01Fh when it is standard format and the ID is configured for 01*h (HEX).

・Cut

NOT capture the frames which have corresponding ID by a software filter.

Select standard format of extended format at the cut configuration tab and set the ID by HEX

("0" - "F", "*", (Don't care)). (You can set up to 8 items)

Configure values within the scope of ID:0 – 7FFh when it is standard format,

and configure values within the scope of ID:0 – 1FFFFFFFh when it is extended format.

Note: If there is no entry for the blanks when the cut filter is valid, all the ID frame will be captured.

(Example) Cuts the IDs of 020h – 02Fh from the monitoring target when it is standard format and the
ID is configured for 02*h (HEX).

・Pass & Cut

The pass filter and the cut filter will be valid.

・Acceptance & Pass & Cut

The acceptance filter, the pass filter, and the cut filter will be valid.

<LIN setting>

● Baud Rate

Select from "2400bps", "9600bps" or "19200bps". Also, it is possible to set an arbitrary speed.

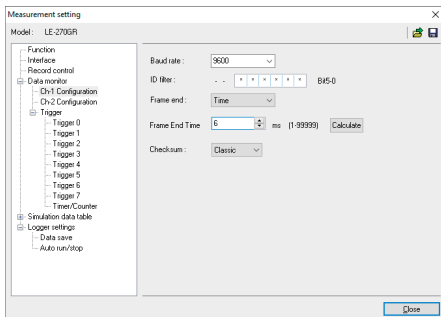(Any four digits between 400bps to 26000bps.)

● ID Filter

Set "0", "1" or "*(don't care)" in the ID5-ID0 (5bit – 0bit).

(Example)

ID Filter : - - - 0 0 0 0 0 0 => Display frames of ID "00"

ID Filter : - - - 0 0 0 0 0 1 => Display frames of ID "01"

ID Filter : - - - 0 0 0 0 0 * => Display frames of ID "00" or "01"

● Frame End

Select the frame end from "Time" (non-communication time exceeds the value set in "Frame End Time") or "ID" (value of DLC field). Select "ID" for normal operation. If selecting "ID", select DLC and method of calculating checksum for each ID.

● Checksum

Checksum has to be set only when "Time" is selected in the "Frame End" setting. Select the method of calculating checksum from "Classic" or "Enhanced".

* ID 3Ch-3Fh have to be calculated by "Classic".
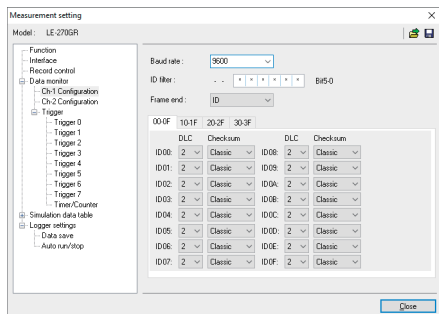
● ID settings

ID settings have to be set only when "ID" is selected in the "Frame End" setting. Set the data length (DLC=0-8 byte) and method of calculating checksum ("Classic" or "Enhanced") for each frame in the ID 00h-3Fh.

4.2 Start and Stop Measurement.

■ Start Measuring

Click "●" on the tool bar of data window (or click "Measurement" -> "Run measurement").

Received data can be displayed on the Data monitor display (normal view) at real time while monitoring.[*1] Only specified ID frames can be displayed at Watch Data display.
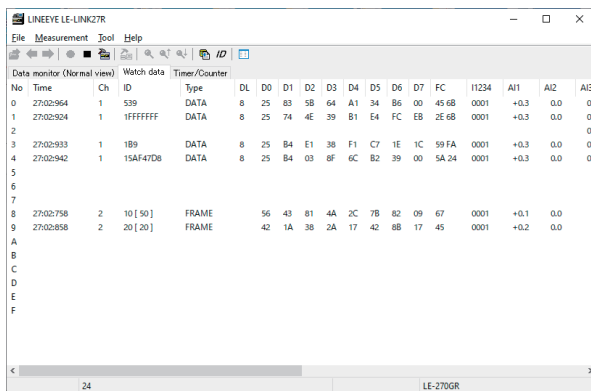
*1: PC software LE-LINK27R Ver1.05 later.

* If starting measurement at Analog mode, analog waveform will be displayed.

📖 Refer to "4-3 Watch Data Display"

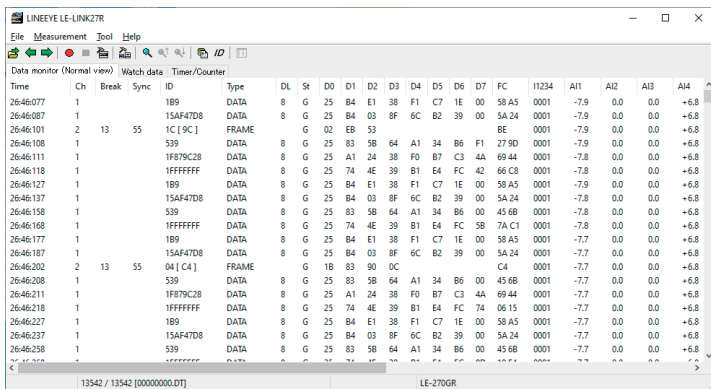📖 Refer to "4-4 Analog waveform display"

- Stop updating the display (PC software LE-LINK27R Ver1.05 later)

  Click " ∎∎ " on the tool bar in the data window, or press "space" key to stop updating the display. Latest data can be displayed on the Data monitor (normal view) display.
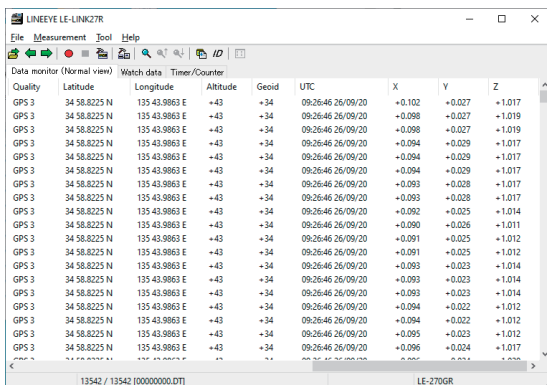
- Stop Measuring

  Click "∎" on the tool bar of data window (or click "Measurement" -> "Stop measurement"). It is able to scroll data after the measurement in the Data Monitor display. Data will be saved into the specified folder set in the configuration settings. To open the previous files, click " 🗁 " (or "File" -> "Data file") and specify the file. To open the sequential order files, click " ⬅ " or " ➡ ".

> * Please make sure that power saving mode of the PC does not cut
> USB connection. It will end the measurement of analyzer.

Display	Meaning
Time	The time when it received the frame (timestamp)
deltaT	Displays the difference of time stamps compared to the previous time stamp. (refer to "5.4 Difference of Time Stamp")
Ch	Displays the channel received. (1: CH1, 2: CH2)
Break	Displays the number of bit for Sync Break width for LIN.
Sync	Displays the Sync Field for LIN
ID	CAN: Displays the received frame ID in HEX. LIN: Displays the identifier whose parity is removed and the identifier which has parity in [] in HEX. (e.g. 11110101b => 35 [F5])
Type	Displays the type of received frame. DATA: Data frame of CAN REMOTE: Remote frame of CAN ERROR: Error frame of CAN FRAME: Frame of LIN ILLEGAL: Illegal frame of LIN
DL	CAN: Data length code (data byte number) in decimal LIN: Data length (DLC) in decimal set in the ID setting in configuration (It does not appear when the frame end of configuration is set to TIME.)
St	If the frame is normal or not G: Normal frame B: SynchBreak error of LIN (Dominat is 10 bit) S: SynchField error of LIN (When it is not 55h) P: Parity error of LIN L: Data length error of LIN "When "FRAMEEND" setting is "ID"" R: There is less than 1byte response data of LIN. C: Checksum error of LIN or CRC error of CAN A: ACK error of CAN E: Error frame of CAN F: Form error of CAN (When CRC or ACK delimiter is 0.)
D0-D7	Displays the contents of the data field in HEX.
FC	CAN: 2 byte CRC, LIN: Checksum in HEX
I1234	From left to right, digital value of EXIN1, EXIN2, EXIN3, EXIN4 in binary. (0=Low, 1=High) Measured voltage value of the timing when it received the frame (0: 1.0V or less, 1: 2.3V or more)
AI1 - AI4	Analog value of EXIN1 - EXIN4 (-15V - +15V) Voltage value of the timing when it received a frame (unit: V)
TRG	Frame which triggered by trigger function
Quality[*1]	Precision of GPS Invalid : Invalid data received from GPS module (Displayed content of Latitude, Longitude, Altitude, Geoid is invalid) GPS : The data received from GPS module is GPS positioning data (valid data). The number on the right means used satellites (max. 9). Blank : When it did not receive data from GPS module (Latitude, Longitude, Altitude, Geoid, UTC also will be blank.)
Latitude[*1]	Latitude of GPS (degree, minute, N/S)
Longitude[*1]	Longitude of GPS (degree, minute, E/W)
Altitude[*1]	Antenna altitude above sea level of GPS (m)
Geoid[*1]	Geoid altitude of GPS (m)
UTC[*1]	Coordinate Universal Time of GPS (Hour: Minute: Second: Day/ Month/ Year) Year is displayed in two lower digits.
X[*1]	X axis (g) from the acceleration sensor module (±8G)
Y[*1]	Y axis (g) from the acceleration sensor module (±8G)
Z[*1]	Z axis (g) from the acceleration sensor module (±8G)

*1: Nothing will be displayed in LE-270AR. If selecting OFF for GPS/Acceleration function, nothing will be displayed in LE-270GR. If selecting ON for GPS/Acceleration function, this item will be displayed, even though nothing is received from GPS module.

● Error Data and Special Character

St	Meaning
G	Normal Frame
B	SynchBreak error of LIN (When Dominant is 10bit)
S	SynchField error of LIN (At the time other than 0x55)
P	Parity error of LIN
L	Data length error of LIN ("ID"is set in "Frame End" setting)
R	When the data of the Response of LIN is less than 1byte
C	CRC error of CAN / Checksum error of LIN
A	ACK error of CAN
E	Error frame of CAN
F	Form Error of CAN(When CRC or ACK delimiter is 0)

Display	Meaning
( )	Framing error (When the stop bit is Dominant.) e.g. (01)
LOSTDATA	Displayed in "Ch" field. It means there is lost of data while transmitting into PC.
CAPTURESTOP	Displayed in "Ch" field. It means capturing function is not running.
OVERRUN	Displayed in "Ch" field. It means the buffer in the analyzer becomes full while measuring.

● Data Position

It displays the number of data loss (Analyzer cannot save data in the SD card or HDD of PC because of the baud rate and large amount of data) while measuring. "LOSTDATA" will be displayed in the monitor display.

After the measurement, it will display the position of top of data displayed in the monitor display.

If the Capture Control Trigger stops capturing, "Capture stopping ..." will be displayed.

* When selecting Analog mode, only data of "Time", "I1234", "AI1 - 4" will be displayed if there is not CAN/LIN data. It will be blank when there is no GPS/Acceleration data.

* The direction of the acceleration censor is as in the picture below. The upper side gives plus value. For example, when the side of the Dsub25 port is the upper side (in other words, when RUN/STOP button side is the bottom side), Y value will be plus and the X and Z values will be 0.
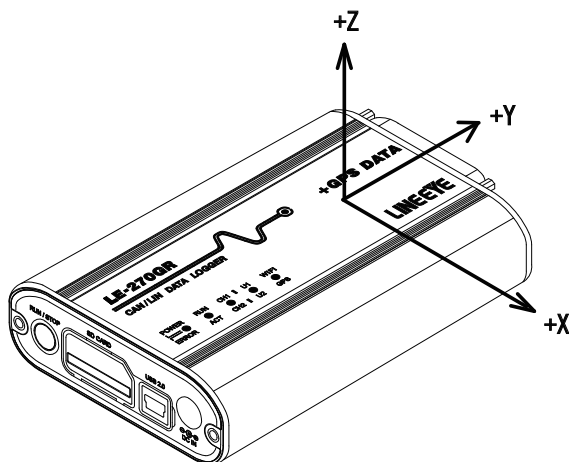
At the Watch Data display, only specific ID frames can be displayed. Only the latest data will be displayed and it is updated every one second.
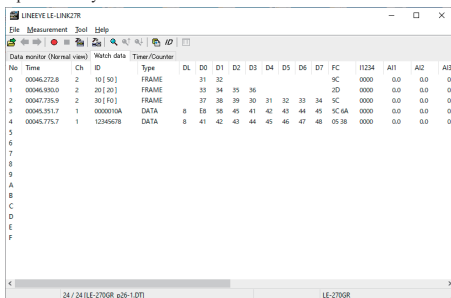
- Setting of Watch Data Display

Click " ID " on the tool bar of the data window (or "tool" -> "Watch Data settings"). Set the target channels and ID.
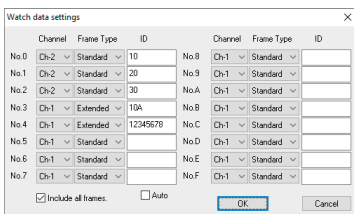
- Channel

Select the measurement port from "Ch-1" or "Ch-2".

- Frame type

Select the frame type from "Standard" (CAN standard format, LIN) or "Extended" (CAN expansion format).

- ID

Set the frame ID in HEX. The one set in here will be displayed in the Watch Data display.

CAN standard format: 0-7FFh
CAN expansion format: 0-1FFFFFFFh
LIN: 0-3Fh

- Include all frames

Uncheck : It displays normal CAN data frames that matched with ID setting (No.1 to F), or frames with LIN response data.

Check : It displays all frames that matches with ID setting including remotes and errors. (It cannot find the error status in the Watch Data Display.)

- Auto

Uncheck : It displays frames that matched with the ID setting (No.0 to F) on the Watch Data Display. Column number (No.) of Watch Data Display turns to be 0 to F.

Check : It displays frames in the order of monitoring on the Watch Data Display. (Setting on No.0 to F will be ignored.) Column number (No.) of Watch Data Display turns to be the monitor ordering number (0 to 99).

Note: It clears by pushing "OK" after changing it.

---

*Cannot edit or print the watch data display.
*Watch Data display will be erased when starting the measurement.

Display the analog waveform at the specified sampling cycle.

■ Analog mode setting

Select "ANALOG" (Analog mode) at Function, then select sampling cycle (min.1ms, max.10min).
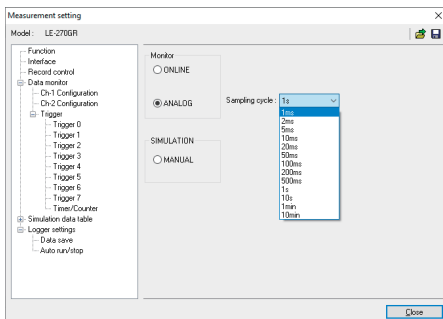
* When selecting Analog mode, time stamp resolution can be selected from [Hr:Min:Sec] or [Min:Sec:x1ms].

📖 Refer to "3.2 Configuration of Analysis Software ■ Analyzer Settings"

<Analog Waveform Display>

Analog waveform will be displayed only monitoring at Analog mode or displayed data measured by Analog mode.
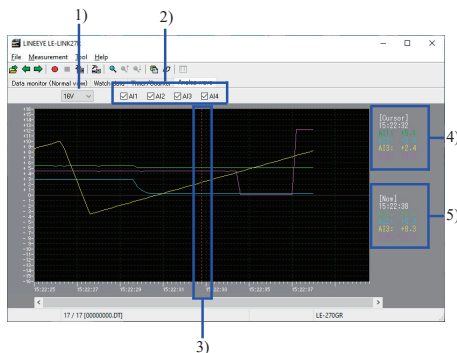
1). Maximum display voltage

Maximum display voltage can be selected from 1V, 2V, 5V, 10V or 16V.

2). Display/Undisplay the graph of AI1 - 4

The graph of checked AI is displayed.

3). Cursor

The cursor (red dotted line) on a graph can be moved to right and left by the mouse or a Shift + arrow key.

4). The voltage value of the cursor position

The voltage value of the cursor position on the graph (AI1 - 4) would be displayed on the upper right ([Cursor]) of a graph.

5). Display the present voltage value

During Analog mode, the latest value would be displayed on the right ([Now]) of a graph and be updated every 1 second.

* When displaying the stored data, a scroll bar is appeared and it enables scrolling back to the past data.

Chapter 5 Simulation Function

The simulation function performs a transmission/reception test according to the protocol as a communication partner of the device to be tested when the other device is not prepared at the initial stage of development. The data registered in the simulation data tables 0 to F can be sent with one touch on the operation panel. For CAN, you can test the response transmission in combination with the trigger function.

* Only Ch-1 is available for the simulation function of this unit.

* For the details, refer to the online help of the menu bar "Help" "Contents" of the PC software "LE-LINK27R".

5.1 Simulation Table Setting

Click "Measurement"-> "Measurement setting" on the menu bar, and set the data to be sent to each table 0 to F of the simulation data table.

- ■ Simulation data table
  A simple list of the settings of each table 0 to F is displayed.
- ■ Table 0 ~ F
  Set the data to be sent to 0 to F (maximum 16) in each table. The data format to be set differs depending on the protocol (CAN or LIN) set for the Ch-1 interface.

5.2 CAN Table Setting

- ■ Type
  Select the frame type.

Type	Description
DATA	Standard format data frame
EX-DATA	Extended format data frame
REMOTE	Standard format remote frame
EX-REMOTE	Extended format remote frame

- ■ ID
  Set 11 bits (000h to 7FFh) for the standard format and 29 bits (00000000h to 1FFFFFFFh) for the extended format in HEX.
- ■ Data(when data frame is selected)
  It is displayed when "DATA" or "EX-DATA" is selected. Set up to 8 bytes of data in HEX.
- ■ DLC(when remote frame is selected)
  It is displayed when "REMOTE" or "EX-DATA" is selected. Set the number of bytes of data to request in decimal in the range 0-8.
- ■ Repeat
  Set the number of times the frame is sent repeatedly in decimal (0 to 99999). If "0" is set, the transmission will continue repeatedly.
- ■ Interval
  Set the time interval (in milliseconds) for repeated transmissions in decimal (1 to 99999).
- ■ Sweep(when data frame is selected)
  It is displayed when "DATA" or "EX-DATA" is selected. Select whether to sweep (change continuously) the transmission data (ON or OFF).

■ Sweep Setting (when data frame is selected)
When Sweep is ON, set the following.

◆ Endian
Select the storage order (LITTLE, BIG) of the data to be swept.
For example, if 0123h is set, each byte order will be as follows.

| BIG: | 01h | 23h | | LITTLE: | 23h | 01h |

◆ Size
Select the size of the data to be swept from 8 bits and 16 bits.
Overflowed bits are ignored. For example, when 8-bit is selected and the data to be swept is 256(100h), it is set to 00h.

◆ Position
Sets the position of the data field where you want to insert the data to be swept.
For example, if the size is 16bit and the position is 2, the gray part will change (sweep).

Data Field

The data set in the data item (up to 8 bytes) is sent except for the set position.

◆ Initial
Set the initial value of the data to be swept in decimal (-32768 to 65535).
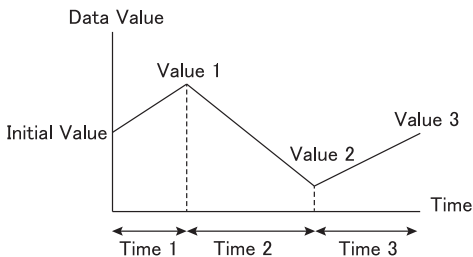
◆ Time 1 ～ 3
Set the time to change to the target value (values 1 to 3) in decimal (0 to 999999msec).
For example, it changes to the target value (value 1) during the time 1.

◆ Value 1 ～ 3
Set the target value in decimal (-32768 to 65535).

The relationship between the target value (values 1 to 3) and time (time 1 to 3) is as follows.

By the CAN simulation, the data registered in the simulation data table can be transmitted with one touch on the operation panel.

■ Preparation for Simulation
Click "Measurement"-> "Measurement setting" on the menu bar to open the measurement setting screen and make the following settings.

◆ Selection of the Simulation Function
Select "MANUAL" in "Function".

◆ Interface Setting
Set "CAN(High speed)" to the Ch-1 interface in "Interface".

◆ Registration of the Transmission Data
Select each table (0 to F) in "Simulation data table".
In the settings for each table, select the frame type and set the ID, data, data length, number of repeats, interval, sweep, etc.

■ Start the Simulation
1. Click "Run measurement" to open the operation panel.
   * The operation panel does not open when measurement is stopped or in the online mode or analog mode.
   * Please use the simulation by the trigger because this cannot be used in the communication logger mode.
2. Click the button of the table number to be transmitted.
3. If you want to stop the data transmission for which the repeat is set during transmission, click the "Stop repeated sending" toggle button, and then click the table number button for which you want to cancel transmission in succession. After that, click the "Stop repeated sending" toggle button to return the button to the original state.

■ Stop the Simulation
1. Close the operation panel.
2. Execute "Stop measurement". (If you press Stop measurement without closing the operation panel, the operation panel will be closed automatically.).

＜ Caution ＞

When there is no ACK response from other nodes on the CAN bus or when there is a frame transmission, the data cannot always be transmitted exactly as the button is clicked.

In addition, the data may not be sent due to factors such as overlapping time of multiple table settings.

When there is no ACK response, the same data will continue to be sent regardless of the repeat setting, and in this state the transmission cannot be stopped unless the measurement is stopped.

■ Simulation by a Trigger
In the simulation preparation, set the trigger setting to "Send data" for triggers 0 to 7 in the "Trigger" setting. When measurement is started and the trigger conditions are met, the data transmission control can be performed automatically. As no operation is required from the operation panel, it can also be used in communication logger mode.

■ Type

Select whether to send the header part or response part of the frame.

The operation will be as shown in the table below depending on the combination of the mode and type to be simulated.

Type	Master Mode	Slave Mode
Header	Transmits only the header part (Only reception for the response part)	No Transmission
Response	Transmits both the header and response part	Transmits only the response part

The setting for master and slave modes are to be made in "MANUALMode" of the function selection.

■ ID

Set the ID to be transmitted (excluding parity) during master simulation and the ID to respond (excluding parity) during slave simulation by HEX in the range of 00h to 3Fh.

> ＜ Caution ＞
>
> During slave simulation, if the IDs of simulation data tables 0 to F are set in duplicate, data with a small table number will be sent.

■ Data (When response is selected)

Set the data to be sent within 8 bytes by HEX.

■ Checksum (When response is selected)

Set in HEX.

When not entered, it will be automatically calculated and sent using the checksum calculation method set in the Ch-1 configuration at the time of transmission. Also, by pressing the "Calculate" button, you can set the value calculated by the checksum calculation method set in the Ch-1 configuration.

■ Sweep (When response is selected)

It is displayed when the response is selected at "Type".

Select whether or not to sweep (change continuously) the data (ON or OFF).

Make settings in the same way as the sweep function for CAN table settings.

5.5 LIN Simulation

LIN master simulation or slave simulation is available.

In the master simulation, one-touch transmission from the operation panel or automatic transmission are available.

In LIN simulation, data transmission by the trigger function is not available.

■ Preparation for Simulation

Click "Measurement"-> "Measurement setting" on the menu bar to open the measurement setting screen and make the following settings.

◆ Interface Setting

Set "LIN" to the Ch-1 interface in "Interface".

◆ Selection of the Simulation Function

Select "MANUAL" at "Function".

Select master or slave in the mode and set each item.

For the master, set the simulation data table number to be sent to the schedule table. When the schedule is OFF, by using the table (0 to F) on the operation panel it sends the frame of the schedule table number (No).

When the schedule is ON, at the start of measurement the data are automatically sent in in order from the smallest schedule table number.

* For the detail, refer to "Function" in the online help.

■ Registration of the Transmission Data

◆ Master Simulation

Select each table (0 to F) in "Simulation data table".

When sending data to the slave node, in the settings for each table set the frame type to "Response", set the slave ID to "ID", and set the data to be sent to "Data". When receiving data from a slave node, set the frame type to "Header" and the slave ID to "ID".

When it is the master, register the simulation data table numbers 0 to F set here to the schedule table numbers No. 0 to F.

◆ Slave Simulation

Select each table (0 to F) in the "Simulation data table".

In the settings in each table, set the frame type to "Response", set the ID which responds to "ID", and set the data to be sent to "Data".

When it is the master, register the simulation data table numbers 0 to F set here to the schedule table numbers No. 0 to F.

■ Start the Simulation

◆ Master Simulation (When the schedule is OFF)

1. Execute "Run measurement".

2. Click the button of the table number to be transmitted.

* The operation panel is displayed in the order of simulation data table numbers, not in the order of scheduled tables.

* The operation panel does not open when measurement is stopped or in the online mode or analog mode.

* "Wake Up (80h)" can transmit 80h as a Wake-up signal, and "Wake Up" can transmit a dominant of 0.25μsec or more.

* Dominant time is the time when 1 bit time of the set communication speed is 0.25 μsec or more in total.

* "Stop repeated sending" cannot be used.

◆ Master Simulation (When the schedule is ON)

1. Execute "Run measurement".

2. Data will be sent automatically in the order set in the schedule table.

* In the protocol analyzer mode, only "WakeUp (80h)" and "WakeUp" can be sent from the operation panel, but each table number button and "Stop repeated sending" cannot be used.

* Master simulation (when the schedule is ON) is also available in communication logger mode.

◆ Slave Simulation

1. Execute "Run measurement".

2. If there is a send request from the master and it matches the ID set in tables 0 to F, the data in that table will be sent automatically.

* Data will not be transmitted unless there is a transmission request from the master.

* In protocol analyzer mode, only "WakeUp (80h)" and "WakeUp" can be sent from the operation panel, but each table number button and "Stop repeated sending" cannot be used.

* The slave simulation is also available in the communication logger mode.

■ Stop the Simulation

1. Close the "operation panel".

2. Execute "Stop measurement".

(If you press the stop measurement without closing the operation panel, the operation panel will be closed automatically.)

＜ Caution ＞

The operation panel cannot be used in the communication logger mode.

Transmission cannot be stopped unless the measurement is stopped.

6.1 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.
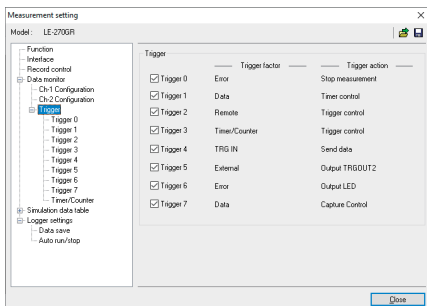
Up to eight triggers can be set. Trigger factor and action can be set for each trigger independently. Each trigger can be set either to be enable or disable.

Trigger condition	Description
Error	When a communication error occurs
Character	Detection of specific character
ID	Detection of specific ID
Remote	Detection of specific remote frame
Timer, Counter	Timer or counter corresponds with the set value

Trigger action	Description
Stop measurement	Stop measurement
Timer control	Start, stop, and restart of timer
Counter control	Clear and count up of counter
Trigger 2 output	It outputs about 1ms Low pulse to TRG OT2.
Data transmission	Transmission control of CAN data
LED output	ON/OFF of the specified LED.
Capture Control	Start/Stop capturing. [1]

*1: Firmware Ver1.02 or above is required.

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

Click " " on the tool bar of the data window (or "Tool" -> "Text Conversion").
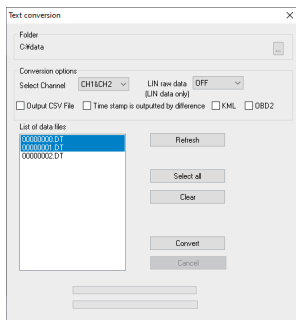
■ Text Conversion

[Folder]

Select the file to convert into text.

[Conversion Options]

Select the type of conversion.

● Conversion Channel

Select from "CH1&CH2", "CH1" or "CH2".

● LIN RAW data

Select only for LIN communication.

OFF : Do not include the parity bit on the ID. Framing error will be converted as "##". Others will be displayed in HEX.

ON : Include the parity bit on the ID. Framing error and all data will be displayed in HEX.

● [Output CSV file]:

Output data in CSV format.

●[Timestamp is output by difference]:

Output elapsed time stamp from the previous frame.

(If selecting CSV format, elapsed time stamp is always output.)

●[KML]:

It outputs the GPS data (latitude, longitude) as KML format file.

●[OBD2]:

Translate OBD (On-board diagnostics) messages included in the CAN communication data.

* Note : The version of the analysis software needs to be Ver1.03 or later.

●[Data file list]

Select the files to convert into text format. Click once to select, and click again to release the selection.

It is able to select more than one files.

●[Refresh]

Update the list of data files.

●[Select All]

Select all files in the data file list.

●[Release All]

Release all file in the data file list.

■   Execute Conversion

Select the monitor data files and click " Convert ".

Converted file will be saved in the selected folder.

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

7.1 Preparation of Data Logger Mode

Click " " on the tool bar of the data window (or click "Measurement" -> "Measurement setting") to open the setting display and set the items for data logger mode.
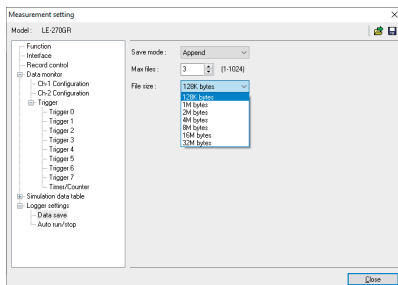
1). Select the interface.
2). Select the configurations according to the target devices.
3). Select the trigger conditions if necessary.
4). Select how to save the data.

● 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
Set the max number of files to save.

* For 2GB SD card, the max file number for saving data will be 512.

● 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.

(An example of SD card capacity) 2GB SD card: 1.8GB
　　　　　　　　　　　　　　　8GB SD card: 7.4GB

	Per 1 frame	
	Without GPS/ acceleration monitoring	With GPS/ acceleration monitoring
LE-270AR	About 32 Bytes	-
LE-270GR	About 32 Bytes	About 64 Bytes

Regardless of the communication speed, it saves about 32768 frames
(when without GPS/ acceleration monitoring) or about 16384 frames
(when with GPS/ acceleration monitoring) for 1 file which has 1M size.

Reference for how long it can record (When max. file number: 450, filesize: 4MByte (1.8GB in total))

In the case that it transmit a frame in the interval of 1m second

Frame number per 1 file (4M)	Record time per 1 file (4M)	Record time for 450 files
About 131072 frames	About 2 minutes and 10 second	About 16 hours

Click " "to save the configuration in the SD card. The file name will be "LE270R#.SU". Before starting the measurement as a data logger mode, read the configuration file ("LE270R#.SU") to the analyzer.

<Attention>

The analyzer does not log the data if you use a SD card which has more capacity than the one supported by the analyzer.

7.2 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 (LE270R#.SU) of the analyzer.

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

3). Supply the power to the analyzer using the AC adapter or power cable (SIH-2PG). LED of POWER/ ERROR will be lighting in orange.

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.

* The configuration will be sent to the analyzer when switching on the power of analyzer. Even you change the SD card after switching on the power, the measurement will start according to the configuration of SD card which was set when switching on the power of analyzer.

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

Click the RUN/STOP button if LED of RUN/ACT is lighting in green.

* Do not remove the SD card or power supply while LED of RUN/ACT is lighting in red.

By using "lefiledownload.exe" in the attached CD-ROM, via Wi-Fi you can obtain a log file in the SD card inserted into the analyzer without stopping logging into your PC.

For this function you need to copy the "lefiledownload.exe" to a folder in your PC and double click it, or when you use a PC in which the analysis software "LE-LIN27R" is installed click "LE file downloader" from the start menu.

When you use this function, the analyzer needs to be connected with the PC by Wi-Fi. Thus you need to make the Wi-Fi of the analyzer valid by saving a Wi-Fi setting file "WLAN CFG.WL" made by "Wireless LAN configuration file" to a SD card (which is used for the logger mode) besides the setting file for the logger mode.

→ 2.5 Setting for Wi-Fi
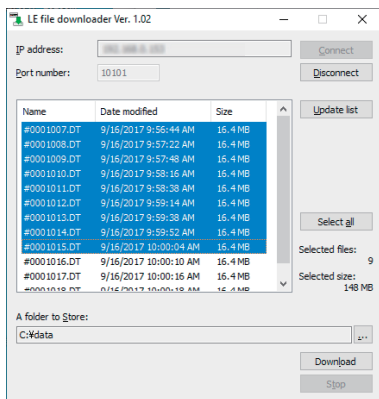
1   Input the IP address and port number.

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".

Note : The firmware version of the analyzer needs to be Ver1.01 or later.

7.4 Auto Run/Stop Function

By setting the specified start and stop time/date, the analyzer can automatically start and stop the measurement. Click " 📇 " on the tool bar of the data window (or click "Measurement" -> "Measurement setting") to open the setting display and set the items at "Auto run/stop".
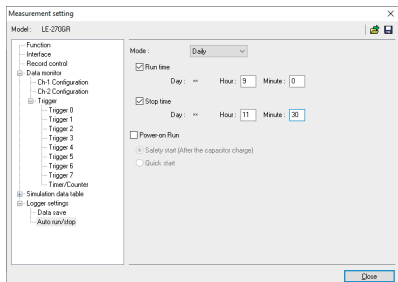
* Mode

[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 also when connecting it to the PC by protocol analyzer mode, RTC is set according to the time of the PC.

7.5 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-LINK27R".

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, which installed the USB driver. The latest firmware will be available from the LINEEYE website. Connect the analyzer to the PC and execute "LE8FIRM.EXE" and follow the instruction.

■ Check Firmware Version
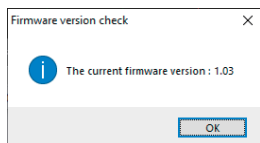
Click "Tool" -> "Check firmware"of the "LE-LINK27R".

If you need to update it to the latest firmware, execute "LE8FIRM.EXE" which is stored in the attached CD-ROM.

■ Update Firmware
Connect the analyzer to the PC.
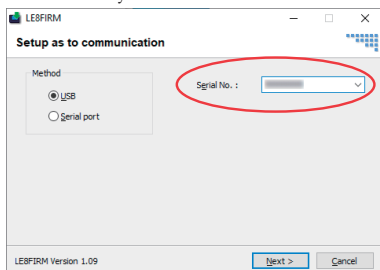
1). Double-click on "LE8FIRM.EXE".
2). Select the serial number of the analyzer
3). Click [Next].
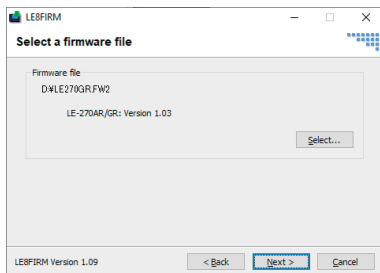
4). Select the downloaded firmware file
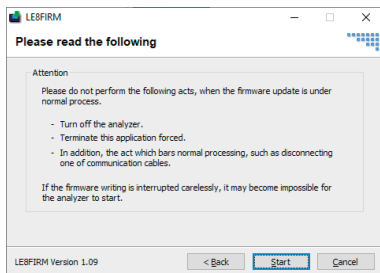
5). A note for updating firmware will be displayed. Read it carefully and click [Start].

The firmware loader will start operating. The LED of POWER/ERROR will be lighted Off and LED of RUN/ACT will be lighted On while the firmware loader is operating.

6). After a short time the firmware is updated and a message "Complete" appears.

9.1 Interface (CAN/LIN/External Input)

Dsub 25pin connector is for the port of CAN, LIN and external input signal.

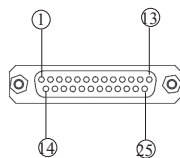| Pin NO	Signal name	Function
1	BATT	LIN Battery Power and Power for the analyzer
4	GND	Signal Ground
7	GND	Signal Ground
9	EXIN1	External Input 1
10	EXIN2	External Input 2
11	EXIN3	External Input 3
12	EXIN4	External Input 4
14	TRG_IN	Trigger Input
15	CAN_1H	CAN Signal (channel 1)
16	CAN_1L	
17	TRG_OT2	Trigger Output 2
18	TRG_OT1	Trigger Output 1
19	CAN2_H	CAN Signal (channel 2)
21	CAN2_L	
22	GND	Signal Ground
23	LIN1	LIN Signal (channel 1)
24	LIN2	LIN Signal (channel 2)

* No. 4, 7 and 22 are connected internally.

Connect the ground of same electric potential to those pins.

9.2 External Input/Output Terminal

<External trigger input/output terminal>

Pin NO	Signal name	Function/Specification
14	TRG_IN	External trigger input TTL level input Range: -0.5V - 6.0V
17	TRG_OT2	External trigger output 2 Open drain output +5V, 10KΩ pull-up
18	TRG_OT1	External trigger output 1 Open drain output +5V, 10KΩ pull-up

<External input signal>

Pin NO	Signal name	Function/Specification
9	EXIN1	Input 1, 160K pull-down, Range: ±25V
10	EXIN2	Input 2, 160K pull-down, Range: ±25V
11	EXIN3	Input 3, 160K pull-down, Range: ±25V
12	EXIN4	Input 4, 160K pull-down, Range: ±25V

* EXIN1-EXIN4 are non-isolated (use same ground).

* Range of analog measurement is ±15V. Max. Input is ±32V.

Model		LE-270AR	LE-270GR
Interface		CAN: Comfort to ISO11898 standard. TJA1050LIN: Comfort to ISO9141 standard. TJA1021	
Isolation		—	1kV galvanic isolation between USB connector / SD card slot and measurement process section.
Connector		DSUB 25 pin male connector #4-40UNC	
Number of Channels		2 channels of CAN or LIN, or 1 CAN and 1 LIN	
Protocol		CAN, Device Net, LIN (Rev1.1, 1.2, 1.3, 2.0, 2.1)	
Baud Rate		CAN: 125Kbps-1Mbps LIN: 400bps-26Kbps (arbitrary)	
CAN Monitor		Standard/ Expansion format. Support bit timing settings.	
LIN Monitor		Frame breaking is possible according to the data length of each ID or specified idle time.	
Error Check		Break (LIN), Sync (LIN), Parity (LIN), Checksum (CAN/LIN), Framing (LIN)	
Memory		PC: Max 32G byte on the HDD, PC-less: Capacity of the SD card supported by the analyzer(Specify the file size from 128K /1M / 2M/ 4M / 8M / 16M / 32M byte	
Mode		Remote mode (with PC); Data Logger mode (PC-less)	
Measurement test mode		Online mode, Analog mode, Manual transmission mode	
Measurement start/stop		Control from PC, Start/Stop switch, Auto-Power run, Specify date and time.	
Time Stamp		"Hr:Min:Sec", "Min:Sec:x1ms", 9 digits: "100μs", "10μs", "1μs" (selectable) [1]	
Filter		Record specific frames using Bit-mask ID, Bus ID (up to 8), Cut ID (up to 8).	
Display on PC		Real-time display, Watch data display (display specified data of each ID), Analog data form display	
Trigger	Condition	Data string up to 8 characters, specified remote frame (CAN), frame error (LIN), timer and counter, logic status of external signal	
	Action	Stop measurement (offset can be set), validates/invalidates trigger condition, control timer/counter, turn on/off the light of user-defined LED, output external signals, transmit CAN data (if using Manual mode), start/stop capturing.	
Retrieval function on PC		Trigger matched data, Error (Break, Sync, Parity, Checksum, Framing), Data: Specified ID (don't care available), Data string (Up to 8 characters; don't care and bit mask available), CAN Remote Data: Specified ID (don't care available), Specified Time stamp, External signal	
Conversion		Convert data into Text, CSV or KML format and save. OBD2 translation.	
External Signal Input		Digital/Analog 4 channels Recording: At the time of receiving signals, or specified sampling cycle (1ms - 10min, 13steps)Digital VIH 2V (Min.), VIL 0.5V (Max.)Analog Range: -15V to +15V, Accuracy: ±0.5%FS, A/D Max: 50Ksps, Resolution: 10bit	
Acceleration data		—	Register and display the acceleration data of X/Y/Z axis. The sensor KX022-1020-FR or equivalent is built-in.
GPS positioning data		—	Register and display the latitude, longitude, above sea level. SMA (femal) connector for active GPS antenna is built-in.
LED		5 two-color LED: Power/Error, Test/Record, CH1/CH2, User-defined U1/U2, WiFi/GPS [2]	
Switch		One: RUN / STOP	
External Trigger Signal		1 Input, 2 Output (equipped in the measurement connector)	
SD/SDHC Card		2 – 16Gbyte SD/SDHC [3]	2 – 32Gbyte SD/SDHC [3]
USB2.0 Port		Mini-B connector. High speed supported.	
Wi-Fi Connection [4]		IEEE 802.11 b/g/n Frequency range : 2400MHz-2483.5MHz TX POWER: 802.11b: +20dBm 802.11g: +17dBm 802.11n: +14dBm	
Power		USB bus power, DC-IN, or 1 pin of battery terminal of measurement connectorExternal DC power (DC9-34V), AC adapter (6A-181WP09).	
Power consumption		About 1.3W (1.9W when using Wi-Fi) [5]	About 1.7W (2.3W when using Wi-Fi) [5]
Run time during power failure		Approx. 0.5sec	
Ambient Temperature, Humidity		In operation: -20-+60°C In storage: -20-+60°C, 20 - 85%RH (No condensation)	
Dimension, mass		86(W)×130(D)×30(H) mm approx. 240g	
Environment of PC		OS:Windows® 7/8.1/10 PC: PC/AT compatible	
Accessories		PC software, Mini-USB cable, CAN/LIN Dsub cable, Power plug cable, 8G byte SDHC card	

*1: Only "Hr:Min:Sec", "Min:Sec:x1ms"is available on Analog mode.

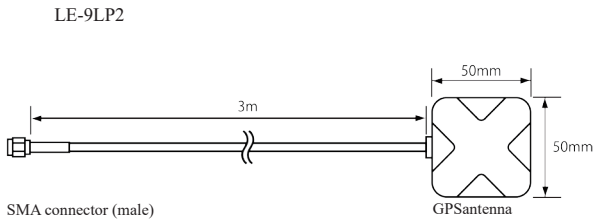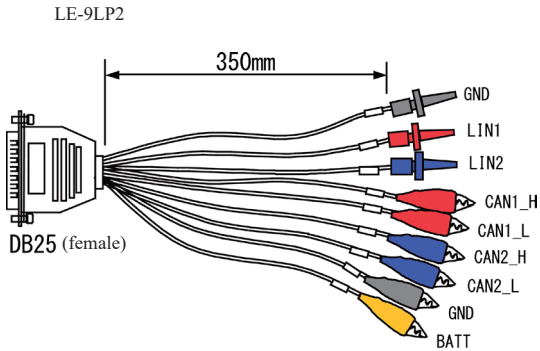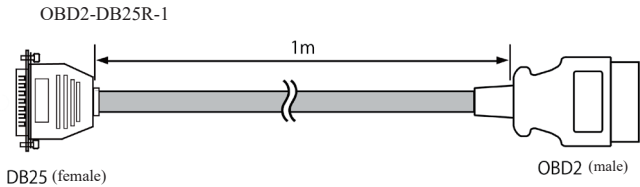*2: LE-270AR does not have GPS function.

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

*4: Wi-Fi function is available only in Japan, USA, Canada, and EU nations where the product is needed to be compliant with RE directive (2014/53/EU). The Wi-Fi function of this product is set to invalid depending on the country where it is shipped. Please contact LINEEYE for the detail.

*5: The maximum is 2.7W for about 10 seconds after turning on the power.

* Wide input AC adapter : 6A-181WP09 : Power supply for Data Logger mode, DC9V center (+)
* OBD2-DSUB25 cable : OBD2-DB25R-1 : CAN monitor cable for OBD2 connector (1m)
* Clip cable : LE-9LP2 : CAN/LIN clip monitor cable.
* GPS active antenna : EB-SL-AA170 : Supports Beidou, GPS, and GLONASS.Waterproof and
    dustproof (IP65)Available only with LE-270GR
* DIN rail mounting plate : LE-DIN13 : To connect analyzer on the 35mm DIN rail.

OBD2-DB25R-1

1m

DB25 (female)

OBD2 (male)

LE-9LP2

350mm

GND
LIN1
LIN2
CAN1_H
CAN1_L
CAN2_H
CAN2_L
GND
BATT

DB25 (female)

LE-9LP2

3m

50mm

50mm

SMA connector (male)

GPSantenna

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 your products from our website. We will provide you the update information and so on.

There is a registration page on our web site.

(https://www.lineeye.com)

Please register your product for further support.

We will provide you the firmware update

 information and sales information etc.

LINEEYE CO., LTD.