

LINEEYE

CAN/LIN Data Logger

LE-270A

Instruction Manual

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

The 11th 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.

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.

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1. Copyright

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7. Support

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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-270A 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, Low-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. 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: 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(This book): 1
- Warranty Customer Registration Card:: 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 <http://www.lineeyecom>.

1.2 Outline

■ Functions

1). On-line Monitoring

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

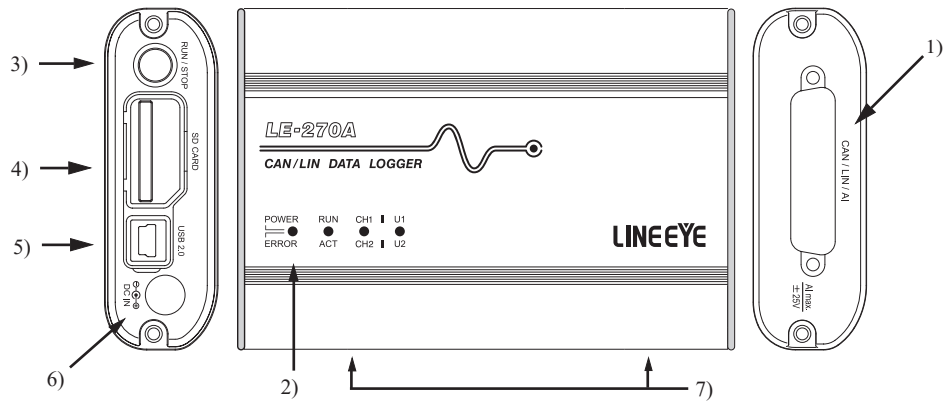
2). Data Logging

Record data in the SD card automatically without a PC.

■ Feature

- * Measure two channels of CAN/LIN in combination and four channels of Analog/Digital signals at the same time.
- * High speed(TJA1050) and Low speed(TJA1054) 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. (HDD: Max 8GB, SD card: Max 8GB).
- * 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°C - +60°C)
- * Compact size. Able to use the 35mm DIN rail.

1.3 Explanation of Each Part



1) Measurement Interface

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

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 ^(*) |
| | Orange light | | Measuring and Accessing to the SD card ^(*) |
| 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 ^(*) |
| | Orange light | | Measuring and Accessing to the SD card ^(*) |
| Light off | Green light | Firmware Update Mode | |
| Red blinking | - | Error | Self-check error, Unusual error ^(*) |

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

*2: Contact LINEEYE distributors or LINEEYE for support.

CH1/CH2: Indicate the logic status of CH1/CH2 Line.

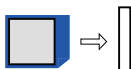
U1/U2: Able to light the U1 (green) /U2 (red) by trigger actions.

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.



5) 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 remove the SD card, open the cover as following.



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



6) 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.

7) M3 Screw Hole

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

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

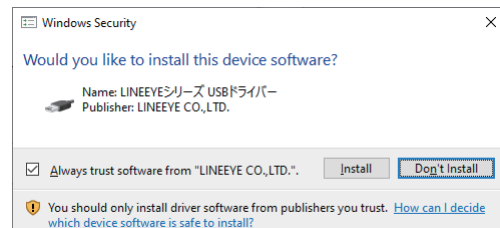
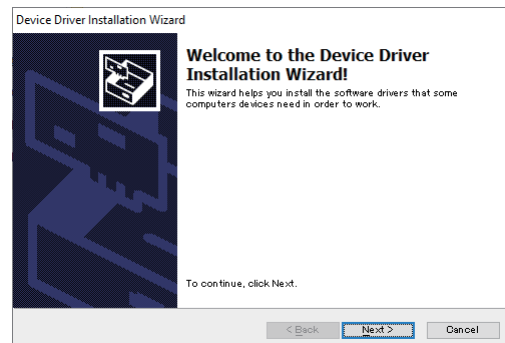
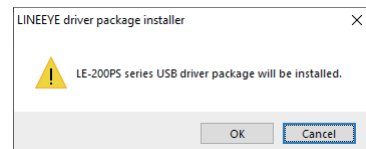
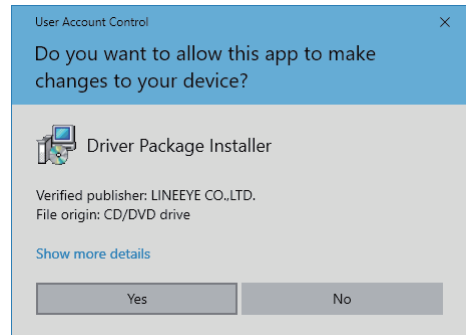
Port: USB port

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

2.2 USB Driver Installation

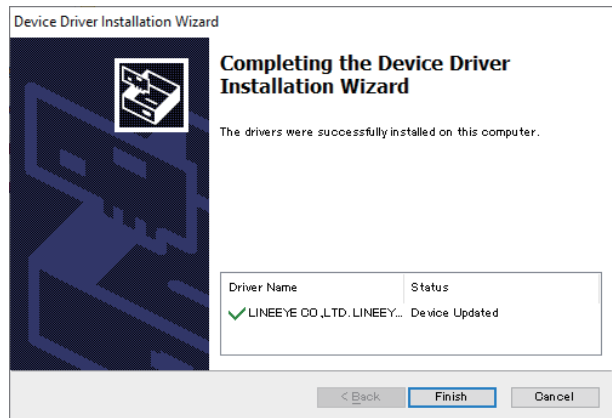
When using by USB connection, you need to install the USB driver on the PC.

1. Do not connect the analyzer to the USB port of PC before the driver installation.
2. Download the USB driver compatible with the analyzer from the LINEEYE website, Unzip to a proper folder. (The driver is also included in the CD attached to the product.) Supported OS are Windows 10/8.1/7
3. Execute setup.exe in the folder.
4. "User Account Control" appear in the display of the PC. Then click "Yes".
5. "LINEEYE driver package installer" appears. Then click "Yes".
6. "Device Driver Installation Wizard" appears. Then click "Next".
7. Windows security window appears. Then click "Install".
8. If the window says "Completing the Device Driver Installation Wizard", click "Finish".



9. Connect the analyzer device to the PC. The installation is completed.

Above is the installation for Windows
10. It will be almost same for other Windows OSs.

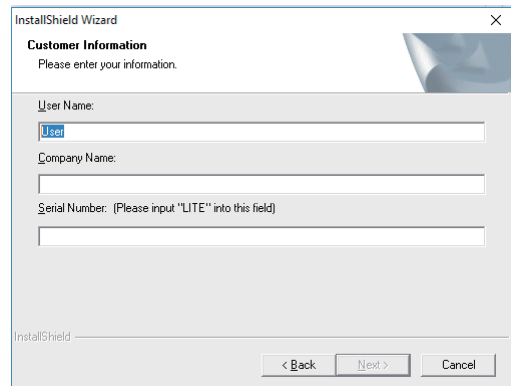


2.3 Installation Guide

■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".



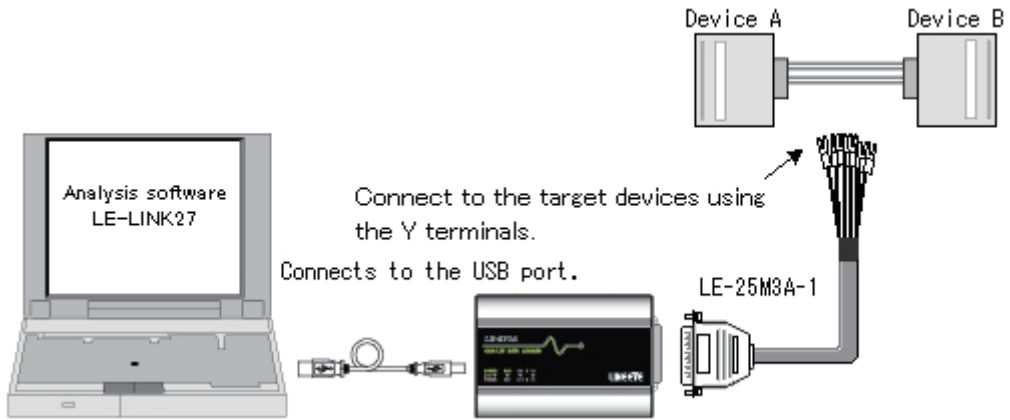
■UnInstall

1. Open "Uninstall or change a program" (or "Program and Features") from the control panel. (Or rightclick on "LE-LINK27" in the start menu and select "uninstall".)
2. Select "LE-LINK27" 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.

3.1 Connection

■ Protocol Analyzer Mode

- 1). Connect the USB cable to the analyzer
- 2). Connect USB A connector to the PC which installed the analysis software.
- 3). Connect the analyzer and target devices using the LE-25M3A-1.



● For CAN communication, connect following signals.

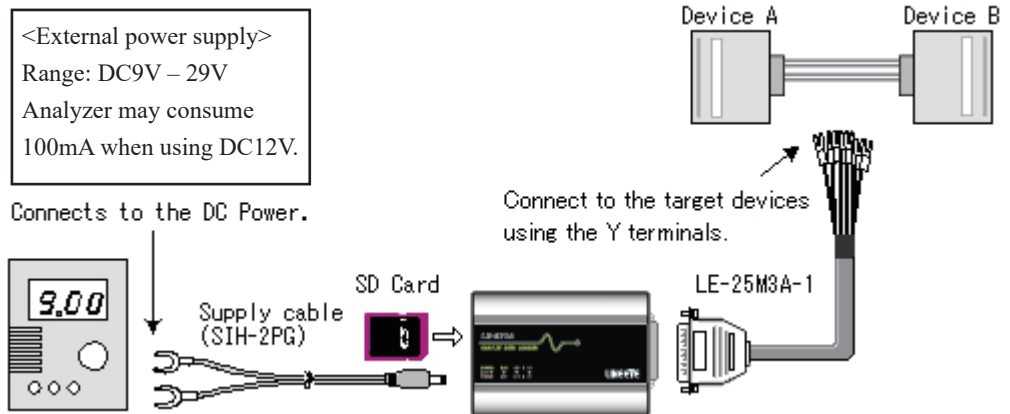
| Signal | Meaning |
|--------|----------------|
| CAN_H | CAN Bus signal |
| CAN_L | |
| GND | Signal Ground |

● 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.

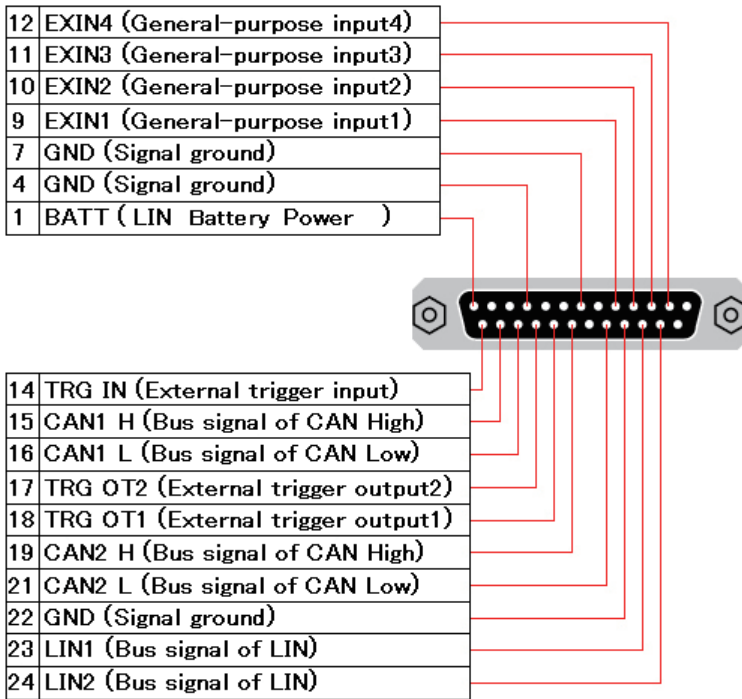


<SHI-2PG>

Connect the black/white cable to the positive electronic pole of DC power.

○ Measuring Port

* Dsub25 pin connector



○ CAN/LIN DSUB cable (LE-25M3A-1)

| Pin No. | Color | Signal | Meaning |
|---------|-----------------------|---------|-----------------------|
| 4 | Orange (black dot) | GND | Signal Ground |
| 15 | Gray (black dot) | CAN1_H | CAN Signal (channel1) |
| 16 | Gray (red dot) | CAN1_L | |
| 19 | White (black dot) | CAN2_H | CAN signal (channel2) |
| 21 | White (red dot) | CAN2_L | |
| 22 | Yellow (black dot) | GND | Signal Ground |
| 23 | Yellow (red dot) | LIN1 | LIN Signal (channel1) |
| 24 | Pink (red dot) | LIN2 | LIN Signal (channel2) |
| 18 | Orange (2 black dots) | TRG_OT1 | Trigger Output 1 |
| 17 | Orange (2 red dots) | TRG_OT2 | Trigger Output 2 |
| 1 | Gray (2 black dots) | BATT | LIN battery power |
| 14 | Gray (2 red dots) | TRG_IN | Trigger Input |
| 7 | White (2 black dots) | GND | Signal Ground |
| 9 | Yellow (2 black dots) | EXIN1 | External Input 1 |
| 10 | Yellow (2 red dots) | EXIN2 | External Input 2 |
| 11 | Pink (2 black dots) | EXIN3 | External Input 3 |
| 12 | Pink (2 red dots) | EXIN4 | External Input 4 |



3.2 Configuration of Analysis Software

■ Data Window

Execute the analysis software.

From [Start] menu of Windows, go to [All programs] -> [LINEEYE] -> [LE-LINK27]. Execute “LE-LINK27” and then following display will be appeared.

1) →

2) →

3) →

| Time | Ch | Break | Sync | ID | Type | DL | St | D0 | D1 | D2 | D3 | D4 | D5 | D6 | D7 | FC | I1234 | AI1 |
|-----------|----|-------|------|-----------|--------|----|----|----|----|----|----|----|----|----|----|-------|-------|-------|
| 39:53:189 | 1 | 13 | 55 | 11 [11] | FRAME | 2 | G | 00 | 00 | | | | | | | FF | 1000 | +11.6 |
| 39:54:052 | 1 | 13 | 55 | 35 [FS] | FRAME | 8 | G | 00 | 49 | 4E | 5F | 53 | 4C | 41 | 56 | D1 | 1000 | +11.6 |
| 40:15:999 | 2 | | | 555 | DATA | 8 | G | 55 | 44 | 00 | FF | 0F | F0 | 80 | 01 | 4D 34 | 1000 | +9.1 |
| 40:16:804 | 2 | | | 15555555 | DATA | 8 | G | 55 | AA | 00 | FF | F0 | 0F | 80 | 01 | 3B 32 | 1000 | +9.1 |
| 40:17:660 | 2 | | | 055 | REMOTE | 8 | G | | | | | | | | | 7D 35 | 1000 | +9.1 |
| 40:18:962 | 2 | | | 05555555 | REMOTE | 7 | G | | | | | | | | | 70 A7 | 1000 | +9.1 |
| 40:20:958 | 2 | | | 123 | DATA | 8 | G | 00 | 00 | 80 | 03 | 04 | 05 | 06 | 07 | 30 96 | 1000 | +9.1 |
| 40:20:959 | 2 | | | 123 | DATA | 8 | G | 00 | 01 | 80 | 03 | 04 | 05 | 06 | 07 | 46 E7 | 1000 | +9.1 |
| 40:20:960 | 2 | | | 123 | DATA | 8 | G | 00 | 02 | 80 | 03 | 04 | 05 | 06 | 07 | 19 ED | 1000 | +9.1 |
| 40:20:961 | 2 | | | 123 | DATA | 8 | G | 00 | 03 | 80 | 03 | 04 | 05 | 06 | 07 | 6F 9C | 1000 | +9.1 |
| 40:20:962 | 2 | | | 123 | DATA | 8 | G | 00 | 04 | 80 | 03 | 04 | 05 | 06 | 07 | 62 60 | 1000 | +9.1 |
| 40:20:963 | 2 | | | 123 | DATA | 8 | G | 00 | 05 | 80 | 03 | 04 | 05 | 06 | 07 | 14 11 | 1000 | +9.1 |
| 40:20:964 | 2 | | | 123 | DATA | 8 | G | 00 | 06 | 80 | 03 | 04 | 05 | 06 | 07 | 4B 1B | 1000 | +9.1 |
| 40:20:965 | 2 | | | 123 | DATA | 8 | G | 00 | 07 | 80 | 03 | 04 | 05 | 06 | 07 | 3D 6A | 1000 | +9.1 |
| 40:20:966 | 2 | | | 123 | DATA | 8 | G | 00 | 08 | 80 | 03 | 04 | 05 | 06 | 07 | 50 E3 | 1000 | +9.1 |
| 40:20:967 | 2 | | | 123 | DATA | 8 | G | 00 | 09 | 80 | 03 | 04 | 05 | 06 | 07 | 26 92 | 1000 | +9.1 |
| 40:20:968 | 2 | | | 123 | DATA | 8 | G | 00 | 0A | 80 | 03 | 04 | 05 | 06 | 07 | 79 98 | 1000 | +9.1 |
| 40:20:969 | 2 | | | 123 | DATA | 8 | G | 00 | 0B | 80 | 03 | 04 | 05 | 06 | 07 | 0F E9 | 1000 | +9.1 |
| 40:20:970 | 2 | | | 123 | DATA | 8 | G | 00 | 0C | 80 | 03 | 04 | 05 | 06 | 07 | 02 15 | 1000 | +9.1 |
| 40:20:971 | 2 | | | 123 | DATA | 8 | G | 00 | 0D | 80 | 03 | 04 | 05 | 06 | 07 | 74 64 | 1000 | +9.1 |
| 40:20:972 | 2 | | | 123 | DATA | 8 | G | 00 | 0E | 80 | 03 | 04 | 05 | 06 | 07 | 2B 6E | 1000 | +9.1 |
| 40:20:973 | 2 | | | 123 | DATA | 8 | G | 00 | 0F | 80 | 03 | 04 | 05 | 06 | 07 | 5D 1F | 1000 | +9.1 |
| 40:20:974 | 2 | | | 123 | DATA | 8 | G | 00 | 10 | 80 | 03 | 04 | 05 | 06 | 07 | 3C 5C | 1000 | +9.1 |

↑

4)

↑

5)

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 “” 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

Select the connection method and serial number of the analyzer. Serial number of selectable analyzers will be listed.

- Measurement Data

Select the saving folder and file size of measured data.

[A folder to save the monitor data]

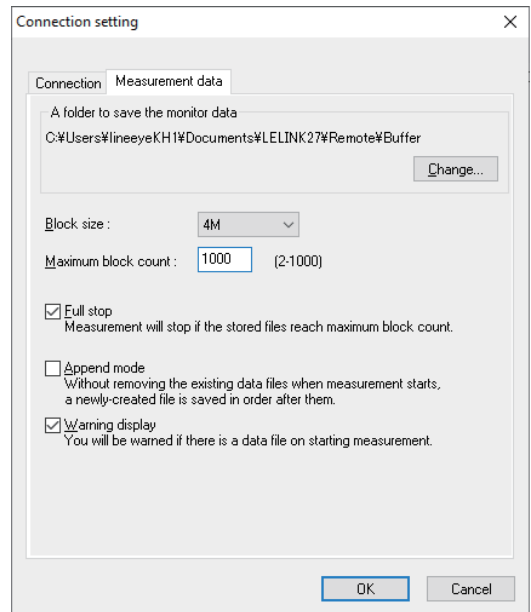
This folder is for saving the measured data. To change the settings, click “Change” button. Then the window to select a folder will be appeared. Select the proper folder and click “OK”. The file name of saving data is started from “00000000.DT” in numerical order.

* 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 1M/2M/4M/8M 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 measurement mode of monitor function.

[ONLINE] (Online mode)

Monitor CAN/LIN data.

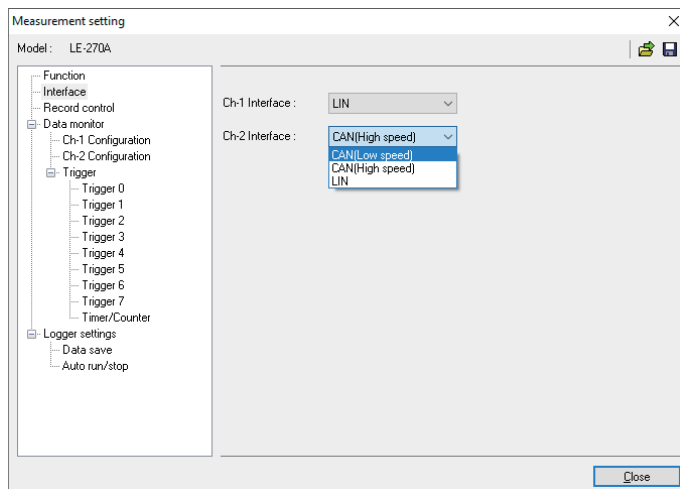
[ANALOG] (Analog mode)

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 “5.6 Analog Waveform Display”

● Interface

Select CAN(High), CAN(Low) or LIN for CH1/CH2 interface.



● Record Control

Select time stamp resolution from [Hr:Min:Sec], [Min:Sec:x1ms], [100us], [10us] or [1us].

For Analog mode, [Min:Sec:x1ms] will be selected automatically if selecting [100us], [10us] or [1us].

● Data Monitor

[Configuration] Set the speed of target devices.

[Trigger] Set the trigger conditions and actions.

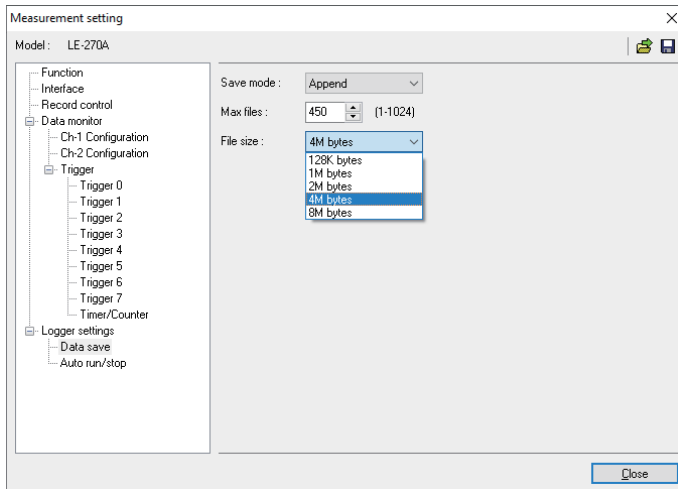
- **Logger Setting**

[Data Save]

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

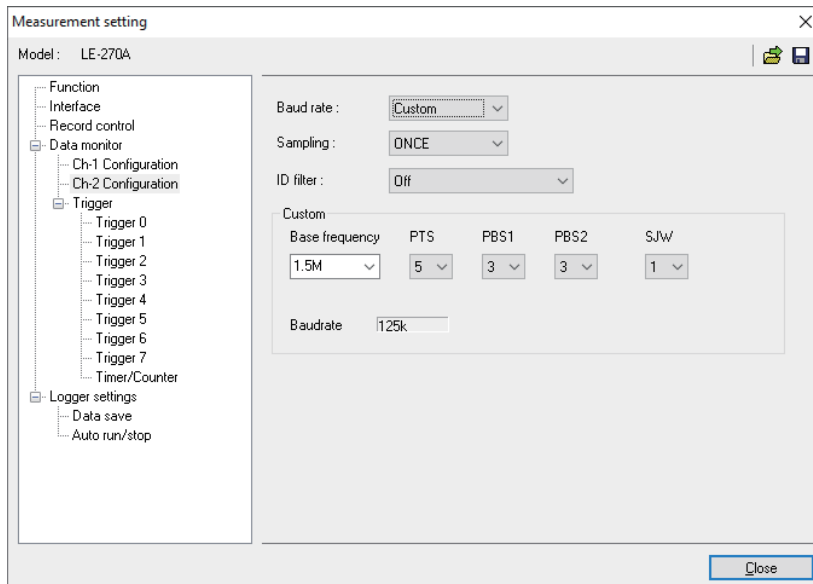
[Auto RUN/STOP]

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



Chapter 4 Interface Setup

Select a port for monitoring.



- **CH1 Interface/ CH2 Interface**

Select the interface port for channel 1 and channel 2.

[CAN (Low speed)]: ISO11519-2 conformed


[CAN (High speed)]: ISO11898 conformed

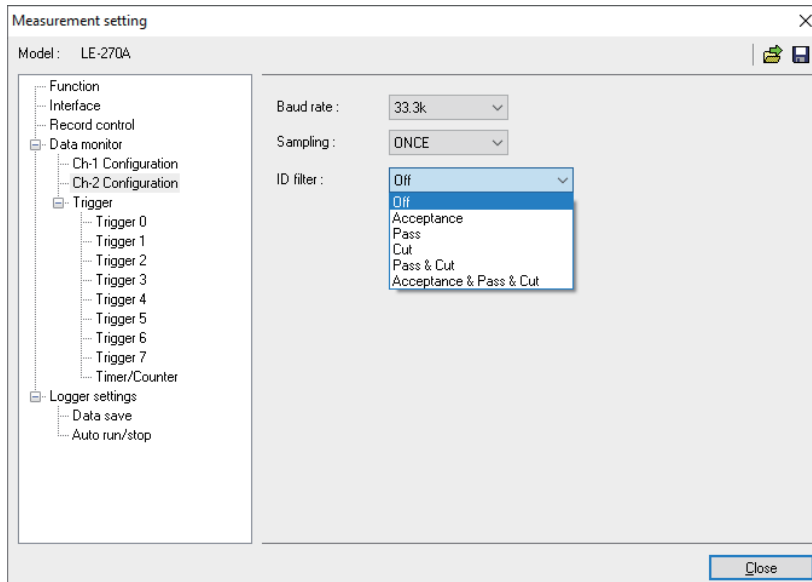
[LIN]: ISO91414 conformed

* Cannot measure both CAN (Low) and CAN (High) in the CH1 and CH2.

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. As a result, error time and conditions of external equipments are investigated. Moreover, the trigger function, which detects specific communication, can be set.

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.



<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 $PTS \leq 2$, “2-8” when $PTS > 2$)

PBS2: Phase Buffer Segment 2
 (“3-PBS1” when $PTS + PBS1 \leq 4$, “2-PBS1” when $PTS + PBS1 > 4$)

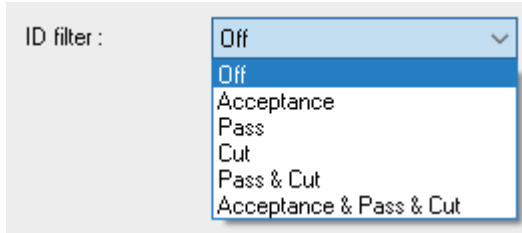
SJW: Synchronization Jump Width
 (“1-PBS2” when $PBS2 \leq 3$, “1-4” when $PBS2 > 3$)

- Sampling

Select the number of bit samplings. Select from “Once” or “3 Times”.

● ID Filter

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

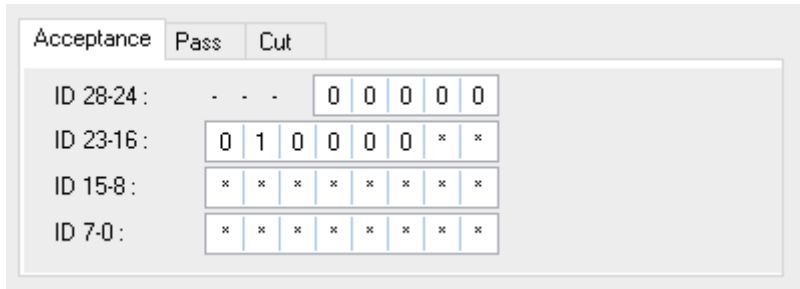


• Acceptance

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

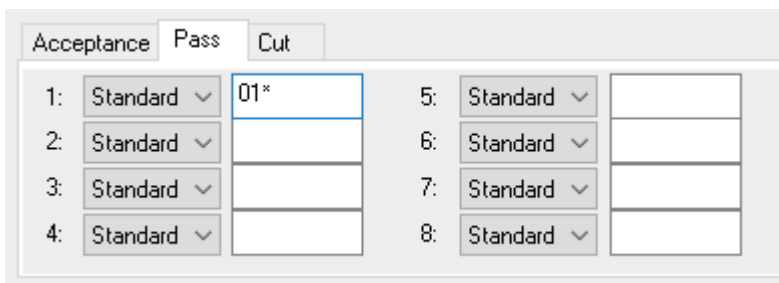
Captures the frames which have corresponding ID by a software filter.

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.

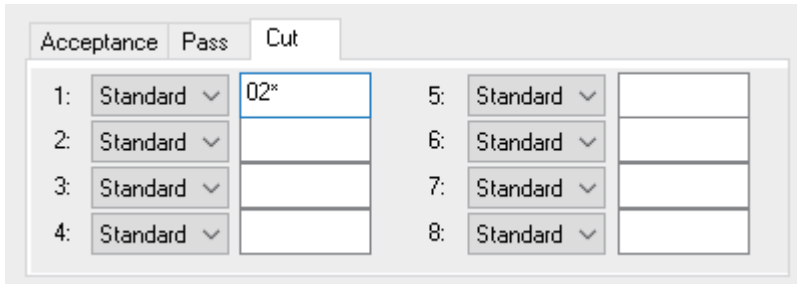
Select standard format of extended format at the cut configuration tab and set the ID by HEX (“0” - “F”, “*”, (Don’t care)). (You can set up to 8 items)

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

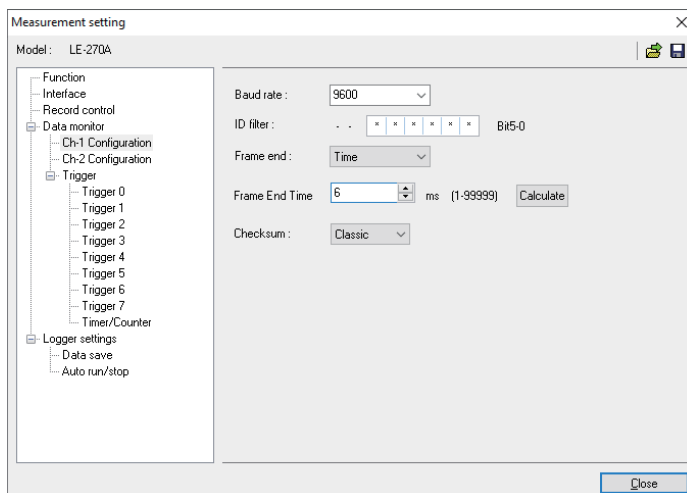
Set “0”, “1” or “*(don’t care)” in the ID5-ID0 (5bit – 0bit).

(Example)

ID Filter : - - - 0 0 0 0 0 => Display frames of ID “00”

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

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



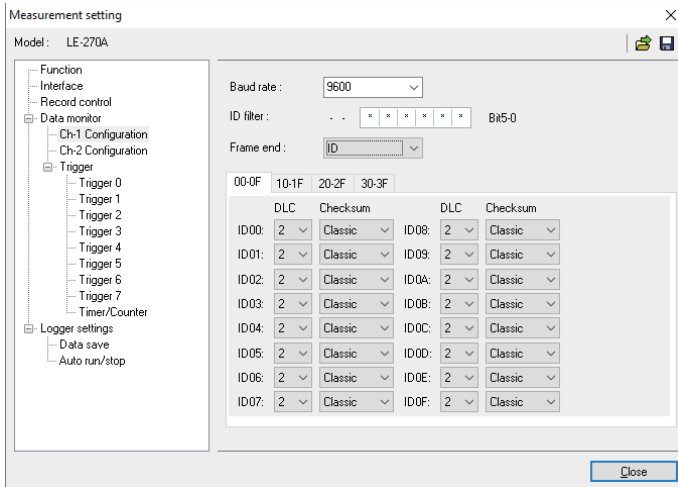
- Frame End

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

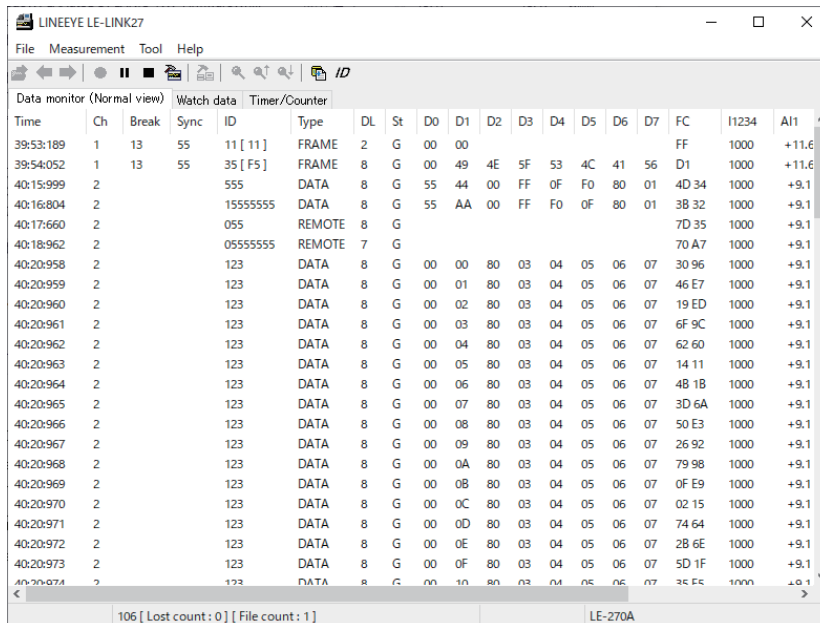
ID settings have to be set only when “ID” is selected in the “Frame End” setting. Set the data length (DLC=0-8 byte) and method of calculating checksum (“Classic” or “Enhanced”) for each frame in the ID 00h-3Fh.

5.2 Start and Stop Measurement.

- Start Measuring





Click “” on the tool bar of data window (or click “Measurement” -> “Run measurement”). The latest frame of the ID specified in Watch data settings can also be displayed during measurement.

 Refer to “5.3 Watch Data Display”

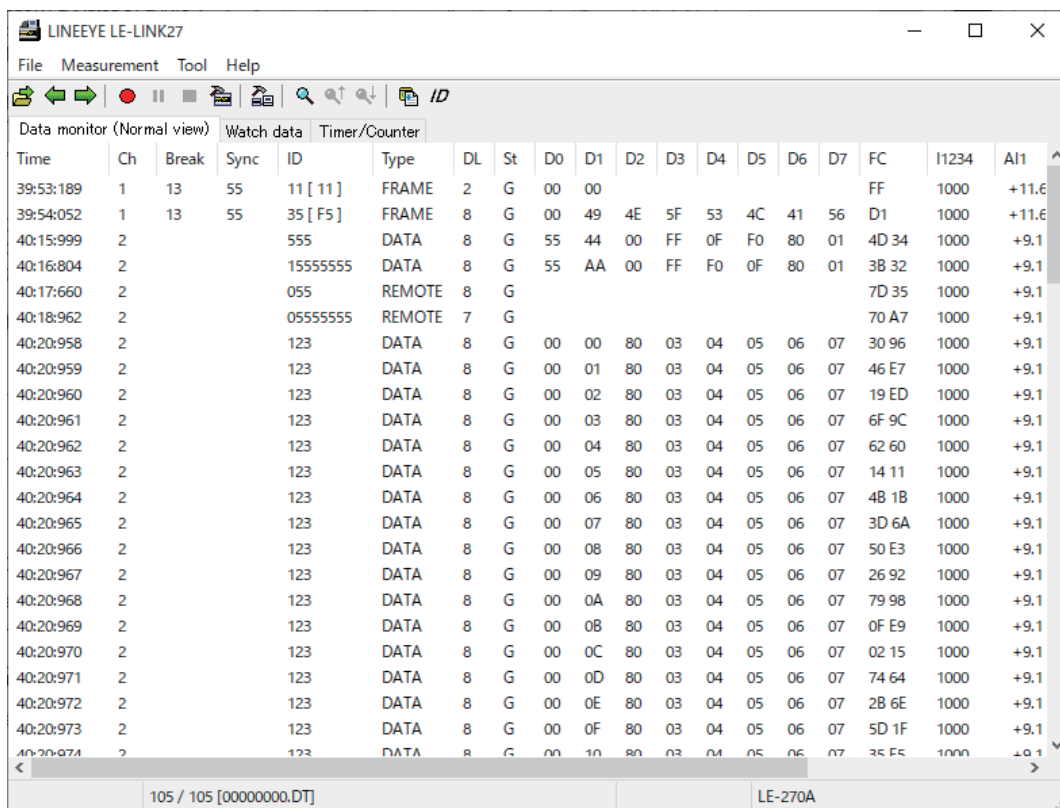


* If starting measurement at Analog mode, analog waveform will be displayed.

- 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.



| Time | Ch | Break | Sync | ID | Type | DL | St | D0 | D1 | D2 | D3 | D4 | D5 | D6 | D7 | FC | I1234 | AI1 |
|-----------|----|-------|------|-----------|--------|----|----|----|----|----|----|----|----|----|----|-------|-------|-------|
| 39:53:189 | 1 | 13 | 55 | 11 [11] | FRAME | 2 | G | 00 | 00 | | | | | | | FF | 1000 | +11.6 |
| 39:54:052 | 1 | 13 | 55 | 35 [F5] | FRAME | 8 | G | 00 | 49 | 4E | 5F | 53 | 4C | 41 | 56 | D1 | 1000 | +11.6 |
| 40:15:999 | 2 | | | 555 | DATA | 8 | G | 55 | 44 | 00 | FF | 0F | F0 | 80 | 01 | 4D 34 | 1000 | +9.1 |
| 40:16:804 | 2 | | | 15555555 | DATA | 8 | G | 55 | AA | 00 | FF | F0 | 0F | 80 | 01 | 3B 32 | 1000 | +9.1 |
| 40:17:660 | 2 | | | 055 | REMOTE | 8 | G | | | | | | | | | 7D 35 | 1000 | +9.1 |
| 40:18:962 | 2 | | | 05555555 | REMOTE | 7 | G | | | | | | | | | 70 A7 | 1000 | +9.1 |
| 40:20:958 | 2 | | | 123 | DATA | 8 | G | 00 | 00 | 80 | 03 | 04 | 05 | 06 | 07 | 30 96 | 1000 | +9.1 |
| 40:20:959 | 2 | | | 123 | DATA | 8 | G | 00 | 01 | 80 | 03 | 04 | 05 | 06 | 07 | 46 E7 | 1000 | +9.1 |
| 40:20:960 | 2 | | | 123 | DATA | 8 | G | 00 | 02 | 80 | 03 | 04 | 05 | 06 | 07 | 19 ED | 1000 | +9.1 |
| 40:20:961 | 2 | | | 123 | DATA | 8 | G | 00 | 03 | 80 | 03 | 04 | 05 | 06 | 07 | 6F 9C | 1000 | +9.1 |
| 40:20:962 | 2 | | | 123 | DATA | 8 | G | 00 | 04 | 80 | 03 | 04 | 05 | 06 | 07 | 62 60 | 1000 | +9.1 |
| 40:20:963 | 2 | | | 123 | DATA | 8 | G | 00 | 05 | 80 | 03 | 04 | 05 | 06 | 07 | 14 11 | 1000 | +9.1 |
| 40:20:964 | 2 | | | 123 | DATA | 8 | G | 00 | 06 | 80 | 03 | 04 | 05 | 06 | 07 | 4B 1B | 1000 | +9.1 |
| 40:20:965 | 2 | | | 123 | DATA | 8 | G | 00 | 07 | 80 | 03 | 04 | 05 | 06 | 07 | 3D 6A | 1000 | +9.1 |
| 40:20:966 | 2 | | | 123 | DATA | 8 | G | 00 | 08 | 80 | 03 | 04 | 05 | 06 | 07 | 50 E3 | 1000 | +9.1 |
| 40:20:967 | 2 | | | 123 | DATA | 8 | G | 00 | 09 | 80 | 03 | 04 | 05 | 06 | 07 | 26 92 | 1000 | +9.1 |
| 40:20:968 | 2 | | | 123 | DATA | 8 | G | 00 | 0A | 80 | 03 | 04 | 05 | 06 | 07 | 79 98 | 1000 | +9.1 |
| 40:20:969 | 2 | | | 123 | DATA | 8 | G | 00 | 0B | 80 | 03 | 04 | 05 | 06 | 07 | 0F E9 | 1000 | +9.1 |
| 40:20:970 | 2 | | | 123 | DATA | 8 | G | 00 | 0C | 80 | 03 | 04 | 05 | 06 | 07 | 02 15 | 1000 | +9.1 |
| 40:20:971 | 2 | | | 123 | DATA | 8 | G | 00 | 0D | 80 | 03 | 04 | 05 | 06 | 07 | 74 64 | 1000 | +9.1 |
| 40:20:972 | 2 | | | 123 | DATA | 8 | G | 00 | 0E | 80 | 03 | 04 | 05 | 06 | 07 | 2B 6E | 1000 | +9.1 |
| 40:20:973 | 2 | | | 123 | DATA | 8 | G | 00 | 0F | 80 | 03 | 04 | 05 | 06 | 07 | 5D 1F | 1000 | +9.1 |
| 40:20:974 | 2 | | | 123 | DATA | 8 | G | 00 | 10 | 80 | 03 | 04 | 05 | 06 | 07 | 35 F5 | 1000 | +9.1 |

- Data Window

| Display | Meaning |
|-----------|--|
| Time | Displays the time when the frame is received. (time stamp) |
| 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 excepting the upper two bit. And displays the Identifier with parity in []. (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: Displays the contents of data length code in decimal. LIN: Displays the data length which is set by Configuration in decimal. |
| St | Displays whether the condition of the frame is normal or abnormal. |
| D0-D7 | Displays the contents of the data field in HEX. |
| FC | CAN: Displays the 2 byte of CRC in HEX. LIN: Displays the contents of checksum in HEX. |
| I1234 | Displays the digital value of external input IN1/IN2/IN3/IN4. |
| A11 - A14 | Displays the analog value of external input IN1/IN2/IN3/IN4. |
| TRG | Displays the frames which satisfied the trigger conditions. |

- Error Data and Special Character

| St | Meaning |
|----|--|
| G | Normal Frame |
| B | Sync Break error of LIN (When Dominant is 10bit) |
| S | Sync Field 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) |

- Other Display

| Display | Meaning |
|---------|--|
| () | Framing error (When the stop bit is Dominant.) e.g. (01) |

- Data Position

It displays the 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.

- * When selecting Analog mode, only data of “Time”, “I1234”, “A11 - 4” will be displayed if there is not CAN/LIN data.

5.3 Watch Data Display

It is able to display only specific ID frames while measuring. Only the latest data will be displayed and update it every one second.

| No. | Time | Ch | ID | Type | DL | D0 | D1 | D2 | D3 | D4 | D5 | D6 | D7 | FC | I1234 | A11 | A12 | A13 | A14 | |
|-----|-----------|----|----------|-------|----|----|----|----|----|----|----|----|----|----|-------|------|------|------|------|------|
| 0 | 29:00:972 | 1 | 539 | DATA | | 8 | 25 | 83 | 5B | 64 | A1 | 34 | B6 | 00 | 45 6B | 0001 | -1.6 | 0.0 | +6.9 | |
| 1 | 29:00:982 | 1 | 1FFFFFFF | DATA | | 8 | 25 | 74 | 4E | 39 | B1 | E4 | FC | 92 | 1A 89 | 0001 | -1.6 | 0.0 | +6.9 | |
| 2 | | | | | | | | | | | | | | | | | | | | |
| 3 | 29:00:991 | 1 | 1B9 | DATA | | 8 | 25 | B4 | E1 | 38 | F1 | C7 | 1E | 00 | 58 A5 | 0001 | -1.6 | 0.0 | +6.9 | |
| 4 | 29:01:001 | 1 | 15AF47D8 | DATA | | 8 | 25 | B4 | 03 | 8F | 6C | B2 | 39 | 00 | 5A 24 | 0001 | -1.6 | 0.0 | +6.9 | |
| 5 | 28:55:442 | 1 | 1F879C28 | DATA | | 8 | 25 | A1 | 24 | 38 | F0 | B7 | C3 | 4A | 69 44 | 0001 | -8.2 | 0.0 | +6.9 | |
| 6 | 29:00:999 | 1 | 1B438A2D | DATA | | 8 | 25 | A0 | 34 | 8B | 7D | 2F | 1C | 44 | 43 E1 | 0001 | -1.6 | 0.0 | +6.9 | |
| 7 | | | | | | | | | | | | | | | | | | | | |
| 8 | 29:00:917 | 2 | 10 [50] | FRAME | | 56 | 43 | 81 | 4A | 2C | 7B | 82 | 09 | 67 | | 0001 | -1.7 | 0.0 | +6.9 | |
| 9 | 29:01:016 | 2 | 20 [20] | FRAME | | 42 | 1A | 38 | 2A | 17 | 42 | 8B | 17 | 45 | | 0001 | -1.6 | 0.0 | +6.9 | |
| A | 29:01:016 | 2 | 20 [20] | FRAME | | 42 | 1A | 38 | 2A | 17 | 42 | 8B | 17 | 45 | | 0001 | -1.6 | 0.0 | +6.9 | |
| B | 29:00:716 | 2 | 1C [9C] | FRAME | | 02 | EB | 53 | | | | | | | | BE | 0001 | -1.9 | 0.0 | +6.9 |
| C | 29:00:817 | 2 | 04 [C4] | FRAME | | 1B | 83 | 90 | 0C | | | | | | C4 | 0001 | -1.8 | 0.0 | +6.9 | |
| D | | | | | | | | | | | | | | | | | | | | |
| E | | | | | | | | | | | | | | | | | | | | |
| F | | | | | | | | | | | | | | | | | | | | |

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 | Frame Type | ID | Channel | Frame Type | ID |
|---------|---------------|----------|---------|---------------|----|
| No.0 | Ch-1 Standard | 10 | No.8 | Ch-1 Standard | |
| No.1 | Ch-1 Standard | 20 | No.9 | Ch-1 Standard | |
| No.2 | Ch-1 Standard | 30 | No.A | Ch-1 Standard | |
| No.3 | Ch-1 Extended | 10A | No.B | Ch-1 Standard | |
| No.4 | Ch-1 Extended | 12345678 | No.C | Ch-1 Standard | |
| No.5 | Ch-1 Standard | | No.D | Ch-1 Standard | |
| No.6 | Ch-1 Standard | | No.E | Ch-1 Standard | |
| No.7 | Ch-1 Standard | | No.F | Ch-1 Standard | |

Include all frames.

OK Cancel

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 (LE-LINK27 software Ver1.06 or above)

If not selecting it (default), it displays normal CAN data frames, that matches with ID, or frames with LIN response data. (specification of last version)

If selecting it, it displays all frames including remotes and errors, that matches with ID.

(It cannot find the error status in the Watch Data Display.)

*Data of watch data display will not be saved.

*Cannot edit or print the watch data display.

*Only the latest data will be displayed.

*Watch Data display will be erased when starting the measurement.

5.4 Difference of Time Stamp

<Standard Time Stamp>

| Time | Ch | Break | Sync | ID | Type | DL | St | D0 | D1 | D2 | D3 | D4 | D5 | D6 | D7 | FC | I1234 | Alt |
|-----------|----|-------|------|-----------|--------|----|----|----|----|----|----|----|----|----|----|-------|-------|-------|
| 39:53:189 | 1 | 13 | 55 | 11 [11] | FRAME | 2 | G | 00 | 00 | | | | | | | FF | 1000 | +11.6 |
| 39:54:052 | 1 | 13 | 55 | 35 [F5] | FRAME | 8 | G | 00 | 49 | 4E | 5F | 53 | 4C | 41 | 56 | D1 | 1000 | +11.6 |
| 40:15:999 | 2 | | | 555 | DATA | 8 | G | 55 | 44 | 00 | FF | 0F | F0 | 80 | 01 | 4D 34 | 1000 | +9.1 |
| 40:16:804 | 2 | | | 15555555 | DATA | 8 | G | 55 | AA | 00 | FF | F0 | 0F | 80 | 01 | 3B 32 | 1000 | +9.1 |
| 40:17:660 | 2 | | | 055 | REMOTE | 8 | G | | | | | | | | | 7D 35 | 1000 | +9.1 |
| 40:18:962 | 2 | | | 05555555 | REMOTE | 7 | G | | | | | | | | | 70 A7 | 1000 | +9.1 |
| 40:20:958 | 2 | | | 123 | DATA | 8 | G | 00 | 00 | 80 | 03 | 04 | 05 | 06 | 07 | 30 96 | 1000 | +9.1 |
| 40:20:959 | 2 | | | 123 | DATA | 8 | G | 00 | 01 | 80 | 03 | 04 | 05 | 06 | 07 | 46 E7 | 1000 | +9.1 |
| 40:20:960 | 2 | | | 123 | DATA | 8 | G | 00 | 02 | 80 | 03 | 04 | 05 | 06 | 07 | 19 ED | 1000 | +9.1 |
| 40:20:961 | 2 | | | 123 | DATA | 8 | G | 00 | 03 | 80 | 03 | 04 | 05 | 06 | 07 | 6F 9C | 1000 | +9.1 |
| 40:20:962 | 2 | | | 123 | DATA | 8 | G | 00 | 04 | 80 | 03 | 04 | 05 | 06 | 07 | 62 60 | 1000 | +9.1 |
| 40:20:963 | 2 | | | 123 | DATA | 8 | G | 00 | 05 | 80 | 03 | 04 | 05 | 06 | 07 | 14 11 | 1000 | +9.1 |
| 40:20:964 | 2 | | | 123 | DATA | 8 | G | 00 | 06 | 80 | 03 | 04 | 05 | 06 | 07 | 4B 1B | 1000 | +9.1 |
| 40:20:965 | 2 | | | 123 | DATA | 8 | G | 00 | 07 | 80 | 03 | 04 | 05 | 06 | 07 | 3D 6A | 1000 | +9.1 |
| 40:20:966 | 2 | | | 123 | DATA | 8 | G | 00 | 08 | 80 | 03 | 04 | 05 | 06 | 07 | 50 E3 | 1000 | +9.1 |
| 40:20:967 | 2 | | | 123 | DATA | 8 | G | 00 | 09 | 80 | 03 | 04 | 05 | 06 | 07 | 26 92 | 1000 | +9.1 |
| 40:20:968 | 2 | | | 123 | DATA | 8 | G | 00 | 0A | 80 | 03 | 04 | 05 | 06 | 07 | 79 98 | 1000 | +9.1 |
| 40:20:969 | 2 | | | 123 | DATA | 8 | G | 00 | 0B | 80 | 03 | 04 | 05 | 06 | 07 | 0F E9 | 1000 | +9.1 |
| 40:20:970 | 2 | | | 123 | DATA | 8 | G | 00 | 0C | 80 | 03 | 04 | 05 | 06 | 07 | 02 15 | 1000 | +9.1 |
| 40:20:971 | 2 | | | 123 | DATA | 8 | G | 00 | 0D | 80 | 03 | 04 | 05 | 06 | 07 | 74 64 | 1000 | +9.1 |
| 40:20:972 | 2 | | | 123 | DATA | 8 | G | 00 | 0E | 80 | 03 | 04 | 05 | 06 | 07 | 28 6E | 1000 | +9.1 |
| 40:20:973 | 2 | | | 123 | DATA | 8 | G | 00 | 0F | 80 | 03 | 04 | 05 | 06 | 07 | 5D 1F | 1000 | +9.1 |
| 40:20:974 | 2 | | | 123 | DATA | 8 | G | 00 | 10 | 80 | 03 | 04 | 05 | 06 | 07 | 3C 5E | 1000 | +9.1 |

<Difference of Time Stamp>

| deltaT | Ch | Break | Sync | ID | Type | DL | St |
|-----------|----|-------|------|-----------|--------|----|----|
| --- | 1 | | | 020 | REMOTE | 11 | F |
| 00:00:011 | 1 | | | 1F879C28 | DATA | 8 | G |
| 00:00:011 | 1 | | | 539 | DATA | 8 | G |
| 00:00:004 | 1 | | | 1B438A2D | DATA | 8 | G |
| 00:00:006 | 1 | | | 1FFFFFFF | DATA | 8 | G |
| 00:00:009 | 1 | | | 1B9 | DATA | 8 | G |
| 00:00:010 | 1 | | | 15AF47D8 | DATA | 8 | G |
| 00:00:014 | 2 | 13 | 55 | 1C [9C] | FRAME | | G |
| 00:00:007 | 1 | | | 539 | DATA | 8 | G |
| 00:00:010 | 1 | | | 1FFFFFFF | DATA | 8 | G |
| 00:00:009 | 1 | | | 1B9 | DATA | 8 | G |
| 00:00:010 | 1 | | | 15AF47D8 | DATA | 8 | G |
| 00:00:010 | 1 | | | 1F879C28 | DATA | 8 | G |
| 00:00:011 | 1 | | | 539 | DATA | 8 | G |
| 00:00:004 | 1 | | | 1B438A2D | DATA | 8 | G |
| 00:00:006 | 1 | | | 1FFFFFFF | DATA | 8 | G |
| 00:00:009 | 1 | | | 1B9 | DATA | 8 | G |
| 00:00:010 | 1 | | | 15AF47D8 | DATA | 8 | G |
| 00:00:015 | 2 | 13 | 55 | 04 [C4] | FRAME | | G |

There are two kinds of time stamp. One is the arrival time of frame. And, the other is the elapsed time from the previous frame.

From top menu, go to “Tool” -> “Deference Timestamp”.

5.5 Timer/Counter

It is able to check the timer/counter satisfied by the trigger conditions.

<Timer/Counter display>

| Timer/Counter | Setting | Current |
|---------------|---------|-------------|
| Timer 0 : | 50 | 0 x10ms |
| Timer 1 : | 100 | 37632 x10ms |
| Timer 2 : | 300 | 0 x10ms |
| Timer 3 : | 1000 | 0 x10ms |
| Counter 0 : | 16 | 9 |
| Counter 1 : | 1000 | 1305 |
| Counter 2 : | 256 | 0 |
| Counter 3 : | 10 | 54 |
| Counter CH-1 | | 5010 |
| Counter CH-2 | | 27754 |

Timer 0 – Timer 3: Timer for general purpose

Counter 0 – Counter 3: Counter for general purpose

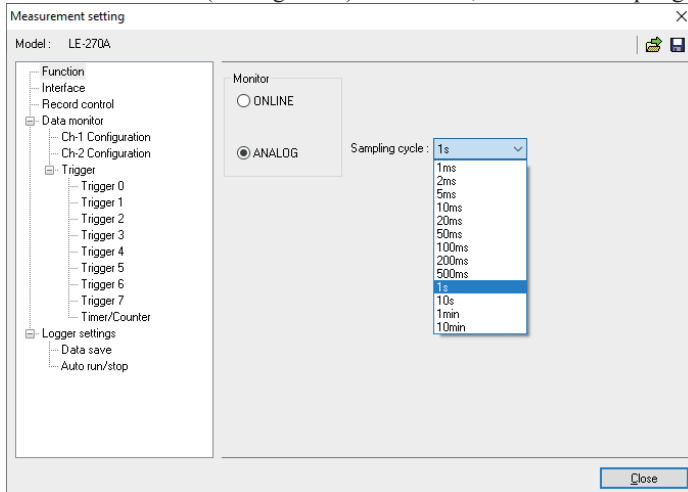
Counter CH1/CH2: Display the received frames for channel 1 and channel 2.

5.6 Analog Waveform Display

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).

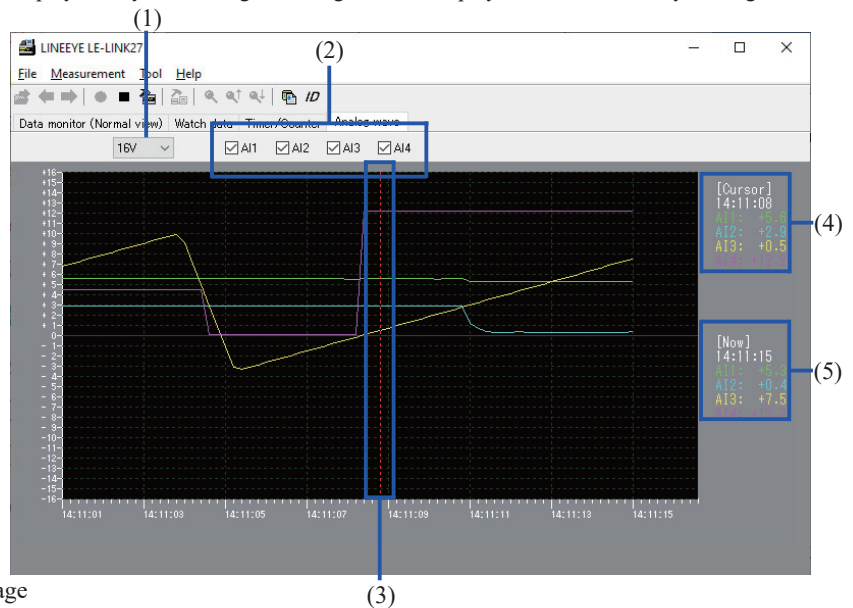


* When selecting Analog mode, time stamp resolution can be selected from [Hr:Min:Sec] or [Min:Sec:x1ms].

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.

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.

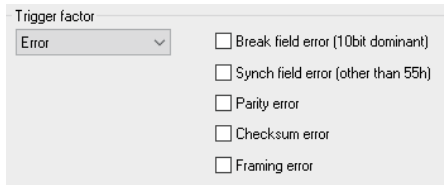
Click “

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

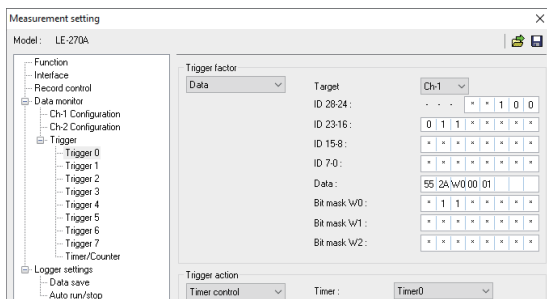
Eight sets of trigger factors can be set.

1). Error



Trigger action will take place by the generation of an error on Channel1/2. Select the type of error from Break Field error (LIN), Synch Field error (LIN), Parity error (LIN), Checksum error (LIN/CAN) and Framing error (LIN).

2). Data



Trigger action will take place by the generation of specific characters on the selected channel. Up to 8 characters and ID can be set. And, also “*” (don’t care) and bit mask (3 kinds) can be set.

[Target]: Select the target channel.

[ID-28-0]: Select the target ID in bit.

CAN: Expansion format: Set in ID28-ID0.

Standard format: Set in ID28-ID18 (ID17-ID0 have to be “don’t care”).

LIN: Set in ID26-ID21 (ID20-ID0 have to be “don’t care”).

(It is possible to set the parity bit on ID28 (P1) and ID27 (P0).)

<Example of ID setting>

CAN expansion format it “ID00000023”.

```
ID28-24 : - - - 0 0 0 0 0
ID23-16 : 0 0 0 0 0 0 0 0
ID16-8  : 0 0 0 0 0 0 0 0
ID7-0   : 0 0 1 0 0 0 1 1
```

CAN standard format is “ID023”.

```
ID28-24 : - - - 0 0 0 0 0
ID23-16 : 1 0 0 0 1 1 * *
ID16-8  : * * * * * * * *
ID7-0   : * * * * * * * *
```

LIN is “ID23”.

```
ID28-24 : - - - * * 1 0 0
ID23-16 : 0 1 1 * * * * *
ID16-8  : * * * * * * * *
ID7-0   : * * * * * * * *
```

[Data]: Input data in hexadecimal.

[Bit Mask]: Set the bit masks (W0/W1/W2) for each byte of data. To set the bit masks, input data in “Bit mask W0/W1/W2” in binary, and input “W0/W1/W2” in “Data”.

```
Data :      W0 42
Bit mask W : * * * * 0 0 0 1
```

In this setting, the target data is 01h-F1h in the first byte, and 42h frame in the second byte.

3). Remote

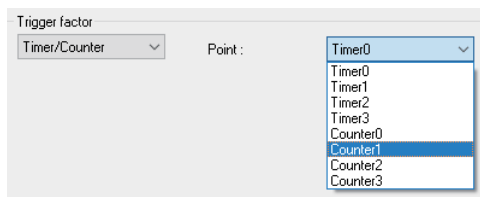


Trigger action will take place by the generation of CAN remote frame on the specific ID and channel.

[Target]: Select the target channel.

[ID-28-0]: Set the target ID in bit.

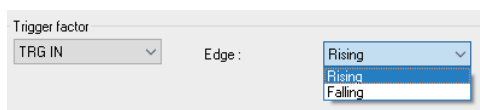
4). Timer/Counter



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

(-> 6-2 Timer/Counter)

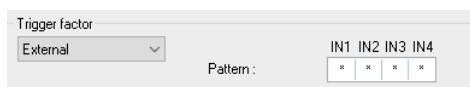
5). TRG IN



Trigger action will take place by the trigger inputting signal.

Select from rising edge or falling edge.

6). External Input



Trigger action will take place by the status of the external inputting signal.

Select from the 1 (H), 0 (L), or “*” (don't care) for IN1/IN2/IN3/IN4.

- Trigger Action

Eight sets of trigger actions can be set.

1). Stop



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

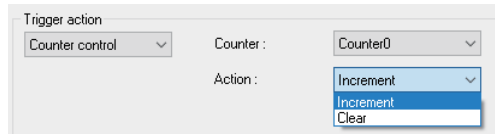
- Quick: Stop the measurement immediately as trigger occurs.
- Before: Stop the measurement after capturing 6K characters after satisfaction of trigger.
- Center: Stop the measurement after capturing 30K characters after satisfaction of trigger.
- After: Stop the measurement after capturing 58K characters after satisfaction of trigger.

2). Timer



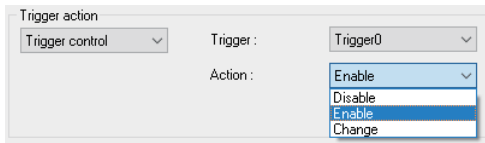
Specify the timer number to be controlled and the type of control (start, stop, restart).

3). Counter



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

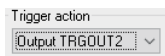
4). Trigger Switch



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). Output Trigger2



Approx. 1ms Low pulse is outputted from the TRIGGER_OT2 (17pin of interface).

* Approx. 1ms Low pulse is outputted from the TRIGGER_OT1 (18pin of interface) after satisfaction of all triggers. (Not related to Output Trigger2 setting.)


6). Output LED



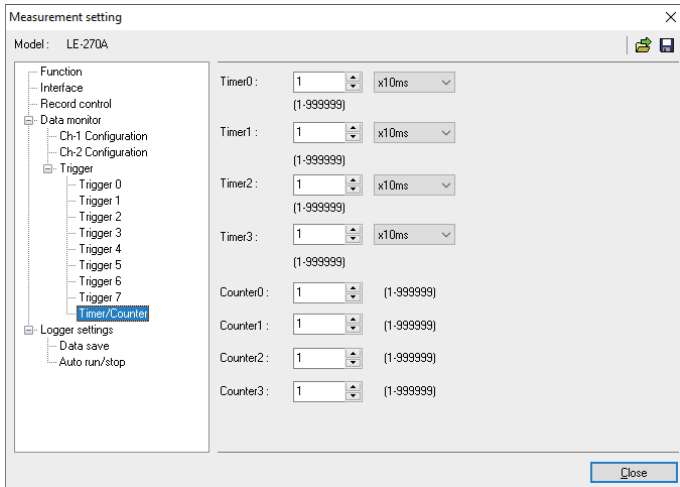
Light ON/OFF the specific LEDs. It is useful to check the measurement in visual during the data logger function.

6.2 Timer/Counter

The Timer/Counter function, in conjunction with the trigger function, measures the elapsed time since a specific factor occurred, and counts the number of occurrences of a specific factor (set timer/counter as a trigger action). Also, it is able to set the timer/counter as a trigger condition. (refer to “5-5 Timer/Counter” and “6.1 Trigger Function”)


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

Set the Timer/Counter setting.

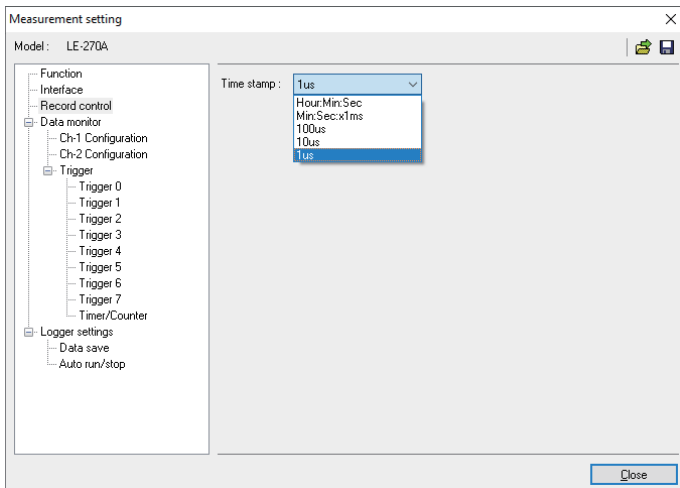


6.3 Record Control

Additional information (time stamp) 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.




- Time Stamp

This function can record the time of receiving the each frame transmitted through on the communication line.

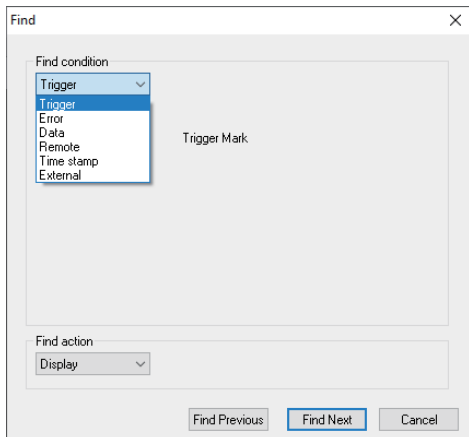
Select the unit from [Hr:Min:Sec], [Min:Sec:x1ms], [100us], [10us] and [1us].

6.4 Search Function

Click “” button on the tool bar of the data window.

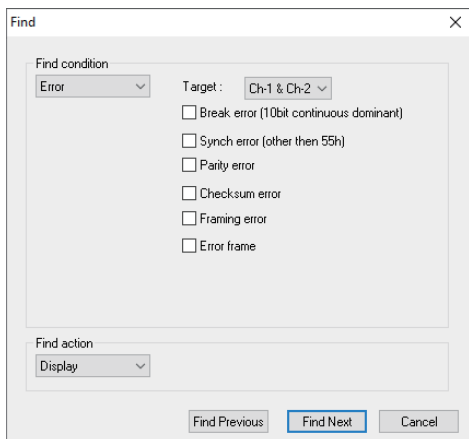
● Search Conditions

1). Trigger



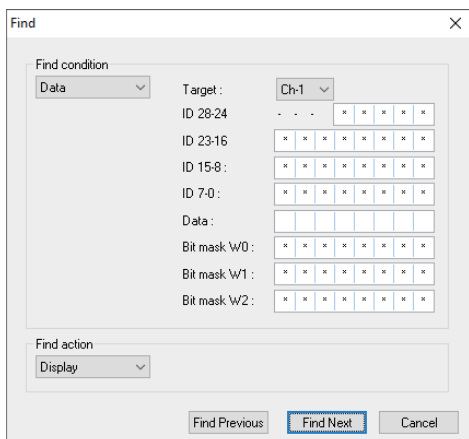
Search the frame, which satisfies the trigger condition

2). Error



Search Break error (LIN), Synch error (LIN), Parity error (LIN), Checksum error (LIN/CAN), Framing error (LIN) and Error frame (CAN).

3). Data



Search the specific data frame. Select the target channel, ID and Data. Also, it is possible to set the don't care (*) and bit masks (W0/W1/W2).

[Target]: Select the target channel.

[ID 28-0]: Select the target ID in bit.

<CAN>

Expansion format: ID28-ID0

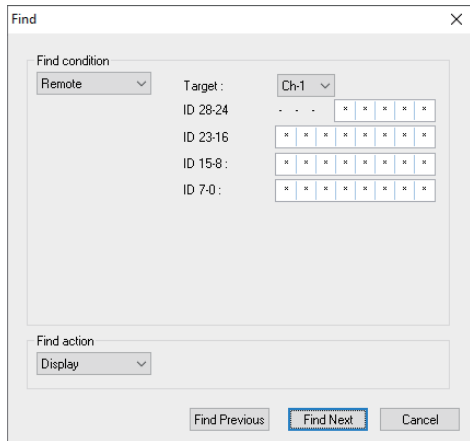
Standard format: ID28-ID18

(ID17-ID0 have to be “don't care”).

<LIN>

ID26-ID21 (ID20-ID0 have to be “don't care”). It is able to set the parity bit (ID28 (P1), ID27 (P0)).

4). Remote



Select the CAN remote frame for a specific channel.

[Target]: Select the target channel.

[ID 28-0]: Select the target ID in bit.

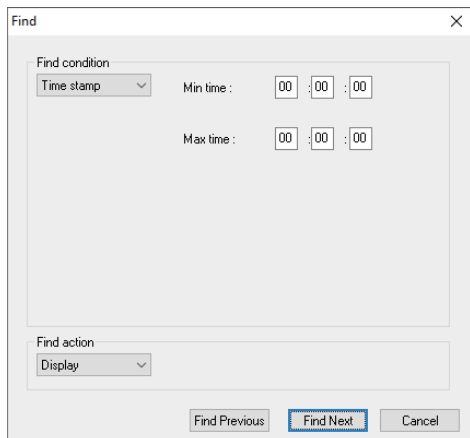
<CAN>

Expansion format: ID28-ID0

Standard format: ID28-ID18

(ID17-ID0 have to be “don’t care”.)

5). Time stamp



Search the time stamp of the designated time. This function is only available when setting the time stamp unit as [Hr:Min:Sec] or [Min:Sec:x1ms] in the “Record Control”.

(Example)

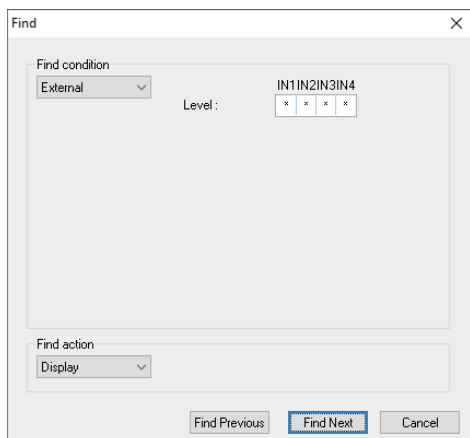
(If selection [Min:Sec:x1ms])

Min time: 52:27:50

Max time: 52:27:51

Search the data between the time of 52:27:500 and 52:27:519.

6) External Input




Search the status (0 (Low), 1 (High)) on External Inputs (IN1/IN2/IN3/IN4).

It is able to set the don’t care (*).

- Search action

[Display]: Display data, which satisfies the search condition.


[Count]: Display the number of times the search condition is satisfied.

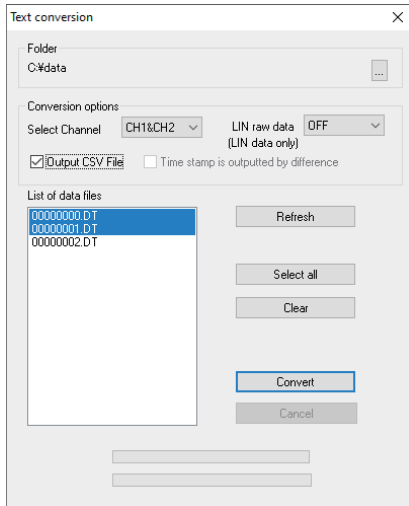
Click “

-29-

6.5 Text Conversion

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.)

[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.

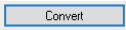
[Select All]

Select all files in the data file list.

[Release All]

Release all file in the data file list.


■ Execute Conversion

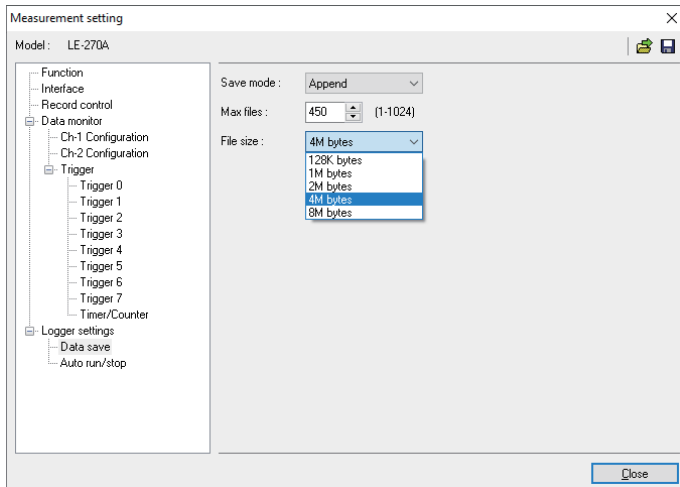
Select the monitor data files and click “”.

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”).



- Select 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

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.

For example). 2GB SD card: 1.8GB

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

| Speed (bps) | Recording Time |
|-------------|----------------|
| 125K | Approx. 14Hrs |
| 1M | Approx. 3Hrs |

In the case of 12 byte data per a frame with 1ms interval is transmitted.

Click “” to save the configuration in the SD card. The file name will be “LE270A#.SU”. Before starting the measurement as a data logger mode, read the configuration file (“LE270A#.SU”) to 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 (LE270A #.SU) of the analyzer.

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

<Attention>

LE-270A supports 8GB SD card. The analyzer will not start operation if using above capacity of the SD card.

- 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.

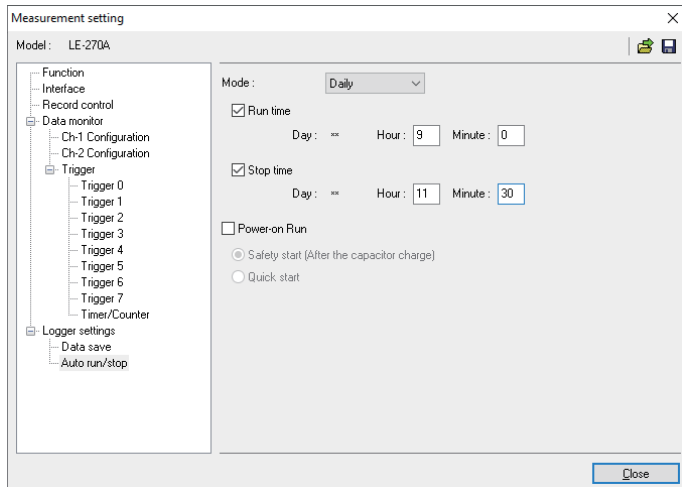
■ End Measuring

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.

7.3 Auto Run/Stop Function

The analyzer can start/end measuring at the specified date. Set “Auto RUN/STOP” using the “LE-LINK27”.



- 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 Remote mode, RTC is set according to the time of the PC.

7.4 Use of Log Files

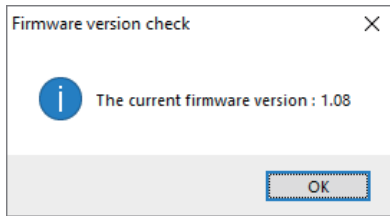
Log files will be named as “#xxxxxxx.DT” (“x” will be the sequential number). These files can be analyzed by “LE-LINK27”.

- 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.

* Do not remove the SD card while opening 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

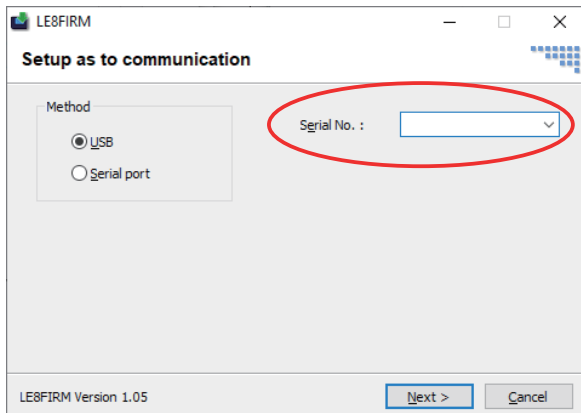


Click “Tool” -> “Check firmware” of the “LE-LINK27”.

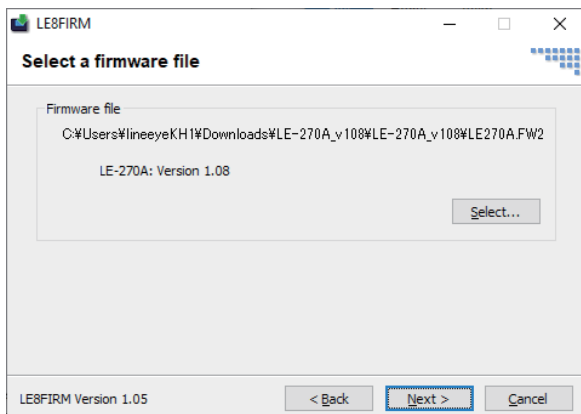
If you need to update it to the latest firmware, execute “LE8FIRM.exe” which is stored in the attached CD-ROM.

■ Update Firmware

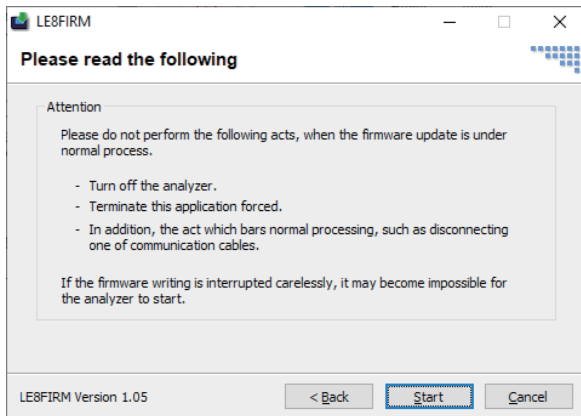
Connect LE-270A to the PC.



- 1). Double-click on “LE8FIRM.exe”.
- 2). Select the serial number of the analyzer
- 3). Click [Next].

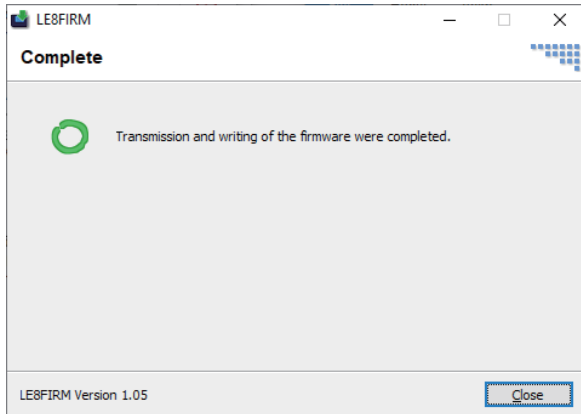


- 4). Select the downloaded firmware file (“LE270A.FW2”).



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

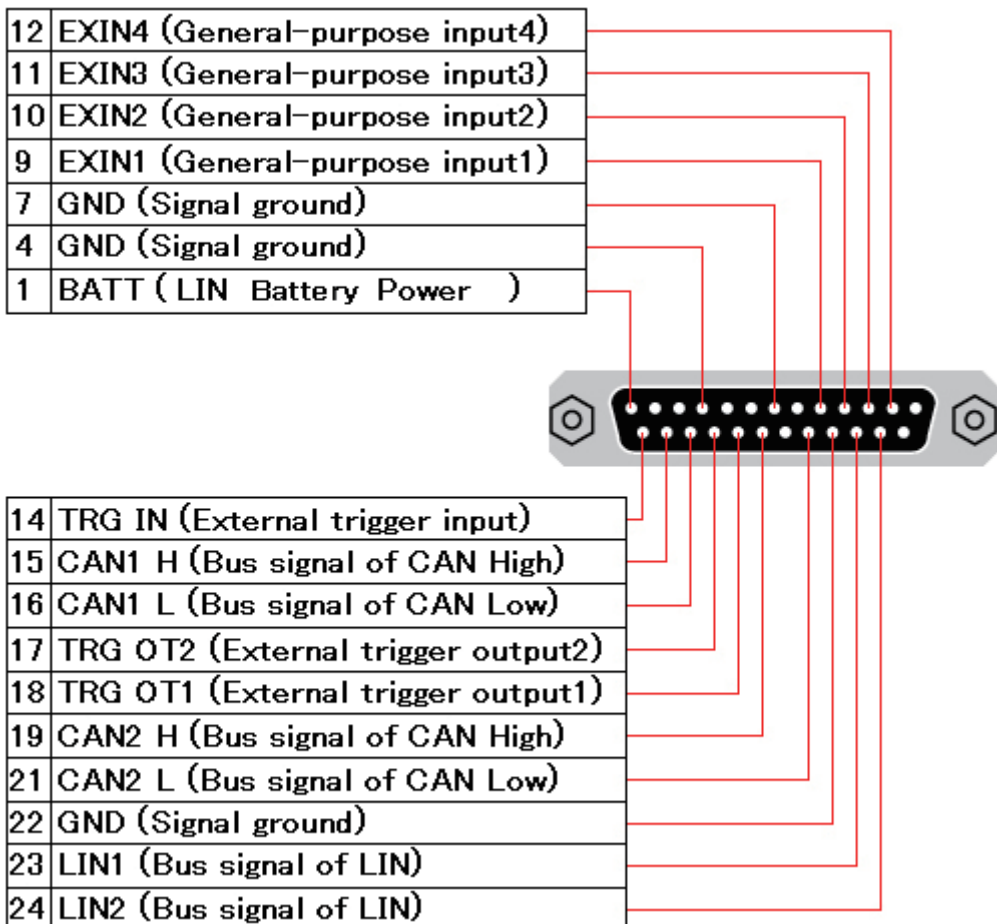
9.1 Interface (CAN/LIN/External Input)

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

| Pin NO | Signal name | Function |
|--------|-------------|------------------------|
| 1 | BATT | LIN Battery Power |
| 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, 10K Ω pull-up |
| 18 | TRG_OT1 | External trigger output 1 Open drain output +5V, 10K Ω pull-up |

<External input signal>

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

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

* Range of analog measurement is $\pm 15V$. Max. Input is $\pm 32V$.

9.3 Specifications

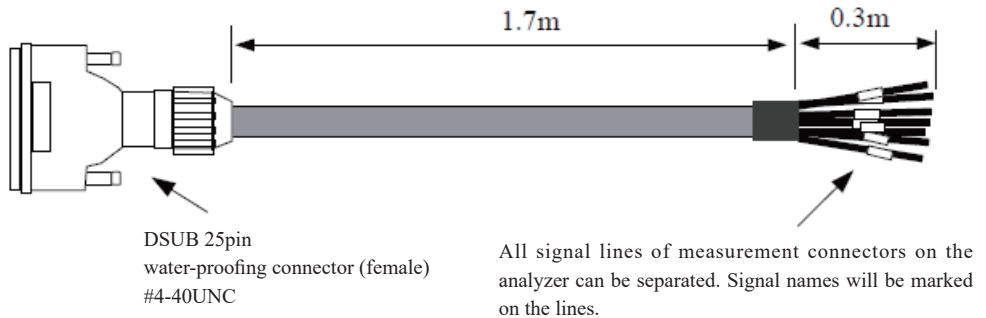
| | | |
|-------------------------------|---|---|
| Interface | CAN: Comfort to ISO11898 standard, TJA1050/ISO11519-2, TJA1054. (Switch by the built-in relay) LIN: Comfort to ISO9141 standard. TJA1021 | |
| Connector | DSUB 25 pin male connector #4-40UNC | |
| Number of Channels | 2 channels of CAN or 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: 20Kbps-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 8G byte on the HDD, PC-less: Capacity of the SD card (Specify the file size as 128K / 1M / 2M / 4M / 8M byte) | |
| Mode | Remote mode (with PC); Data Logger mode (PC-less) | |
| 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) ^(*) | |
| 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 waveform display | |
| Trigger | Condition | Data string up to 8 characters, specified remote frame (CAN), error (Break, Sync, Parity, Checksum, Framing), 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. |
| 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 | |
| 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: -16V to +16V, Accuracy: ±0.5%FS, A/D conversion: 15Ksps, Resolution: 10bit | |
| Conversion | Convert data into Text, CSV | |
| LED | 5 two-color LED: Power/Error, Test/Record, CH1/CH2, User-defined U1/U2 | |
| Switch | One: RUN / STOP | |
| External Trigger Signal | 1 Input, 2 Output (equipped in the measurement connector) | |
| SD/SDHC Card | 2 – 8G byte | |
| USB2.0 Port | Mini-B connector. High speed supported. | |
| Power | Powered from USB bus power, DC-IN, or 1pin BATTERY terminal When logger mode: External DC power (DC9-32V), AC adapter (6A-181WP09). Power consumption: 1.3W (Max. 2.1W for about 10sec after turning on the power). About 0.1W/DC12V while turning off the power. | |
| Run time during power failure | Approx. 0.5sec | |
| Ambient Temperature, Humidity | In operation: -20 to +60°C, In storage: -20 to +60°C, 20 to 85%RH (No condensation) | |
| Standard | CE (Class A) | |
| Dimension, mass | 86(W)×130(D)×30(H) mm approx. 240g | |
| Environment of PC | OS:Windows® 10/11 PC: PC/AT compatible | |

*:Only “Hr:Min:Sec” , “Min:Sec:x1ms” is available on Analog mode.

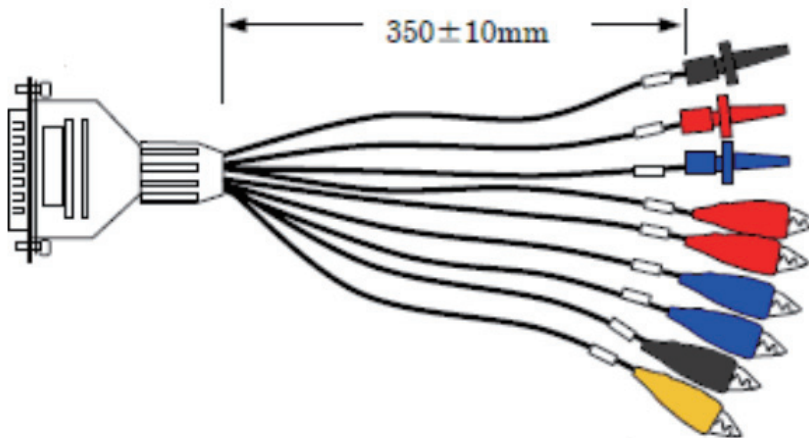
9.4 Options

- * Wide input AC adapter: 6A-181WP09: Power supply for Data Logger mode, DC9V center (+)
- * CAN/LIN water-proofing cable: LE-25M3WP-2: Water-proofing monitor cable (2m)
- * Clip cable: LE-9LP2: CAN/LIN clip monitor cable.
- * DIN rail mounting plate: LE-DIN13: To connect analyzer on the 35mm DIN rail.

LE-25M3WP-2



LE-9LP2



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 or a registration card packed with the products. 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.

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