KEYENCE

LJ-X8000A LabVIEW measuring instrument drivers

Reference Manual

Contents

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2. Introduction

The LJ-X8000A LabVIEW measuring instrument drivers provides a communication interface for controlling the LJ-X8000A.

The drivers have been created based on the LabVIEW standard plug and play measuring instrument driver template, which allows selection of VI from the LabVIEW function pallet (instrument I/O), in a similar way to many other plug and play measuring instrument drivers.

3. Operating Environment

The following operating environment and National Instruments LabVIEW 2010 or later are required to use the LJ-X8000A LabVIEW measuring instrument drivers. In addition, LJ-X Navigator needs to be installed.

OS	Windows10 (Home/Pro/Enterprise)
	Windows 7 (SP1 or later) (Home Premium/Professional/Ultimate)
CPU	intel®CoreTM i3 or faster
Memory	8GB or more
Free drive space	10GB or more
Interface	A PC equipped with either of the interfaces below.
	Ethernet 1000BASE-T/100BASE-TX *1

*1 Operation is not guaranteed with connections to a LAN or via a router

4. Installation Steps

Follow the installation steps described below to install the LJ-X8000A LabVIEW measuring instrument driver.
 (1) Copy the entire folder containing "Keyence LJ-X8000" to the instr.lib folder of LabVIEW.
    Location of the instr.lib folder Example:
       32bit driver: C:¥Program Files (x86)¥National Instruments¥LabVIEW 2018¥instr.lib
       64bit driver: C:¥Program Files¥National Instruments¥LabVIEW 2018¥instr.lib

 (2) Click Tools > Advanced > Mass Compile in LabView.
 (3) Select the"Keyence LJ-X8000A" folder copied to instr.lib in "Select a directory to be compiled" and click the "Current folder".
 (4) Click "Mass compile".
    * Bad VI: When the warning message "Keyence LJ-8000A.lvlib: VI Tree.vi" occurs, click "Done".

This completes the installation. However, you need to restart LabVIEW in order to use it.
* To uninstall LabVIEW, delete the file copied to the instr.lib folder in step (2).

5. Instrument Drivers

Each of the VI instrument drivers is made from each of the DLLs. For details on how to use to the DLLs refer to "LJ-X8000A Communication Library Reference Manual" and help in VI instrument drivers. The following are the VI that can be used.

Select View > Functions Palette >Instrument I/O > Instr Drivers > "Keyence LJ-X8000A" to select driver VI or sample VI.

■Establish/disconnect communication with the controller

VI NAME	Overview
Initialize	Establish Ethernet communication
Close	Disconnect communication

■System control

VI NAME	Overview
Reboot Controller	Reboots the controller
Return to Factory Setting	Returns the controller to the factory settings
Control Laser	Controls the laser
Get System Error	Get the controller system error information
Clear System Error	Clear the controller system error information
Reset Trigger Error	Reset trigger error
Get Trigger and Pulse Count	Gets the trigger/pulse count
Get Head Temperature	Gets the head temperature
Get Serial Number	Gets the serial numbers
Get Attention Status	Gets the TRG_ERROR/MEM_FULL/TRG_PASS status

■Measurement control

VI NAME	Overview
Trigger	Issues a trigger
Start Measure	Starts batch measurement
Stop Measure	Stops batch measurement
Clear Memory	Clears the internal memory

■Functions related to modifying or reading settings

VI NAME	Overview
Set Setting	Sends a setting to the controller
Get Setting	Gets a setting from the controller
Initialize Setting	Initializes a controller setting
Reflect Setting	Reflects the contents of the write settings area in the running settings area and the save area
Update Write Setting Area	Overwrites the contents of the write settings area with the settings in the running settings area and the save area
Check Status of Saving to Save Area	Checks whether settings are being saved to the save area
Change Program	Changes the active program number
Get Active Program Number	Gets the active program number

■Acquiring measurement results

VI NAME	Overview
Read Profiles	Gets profiles
Read Profile Array	Gets profiles（Height data and luminance data are independently output）
Read Batch Profiles	Gets batch profiles
Read Batch Profiles All	Gets batch profiles（Height data and luminance data are independently output）

*Because these commands constantly send and receive commands in order to get profile data, it is not possible to continuously get profile data at high speed. If you want to continuously get profile data at high speed, use the commands written under "High-speed data communication related".

■High-speed data communication related

VI NAME	Overview
Start High-Speed Data Communication	Starts high-speed data communication
Read Profiles (for High-Speed Data Communication)	Get profile data via high-speed data communication
Stop High-Speed Data Communication	Stops high-speed data communication

■Other

VI NAME	Overview
VI tree	Display all the user-callable Vis of the instrument drier in an organized table
Extract Profile Array	Height data and luminance data are independently output via Read Profiles, Read Batch Profiles, Read Profile(for High-Speed Data Communication)

6. Sample VI

Three types of sample VI are provided.

・**Driver Test vi**

-> A sample to check functions of each driver VI

・**Read Profile Data vi**

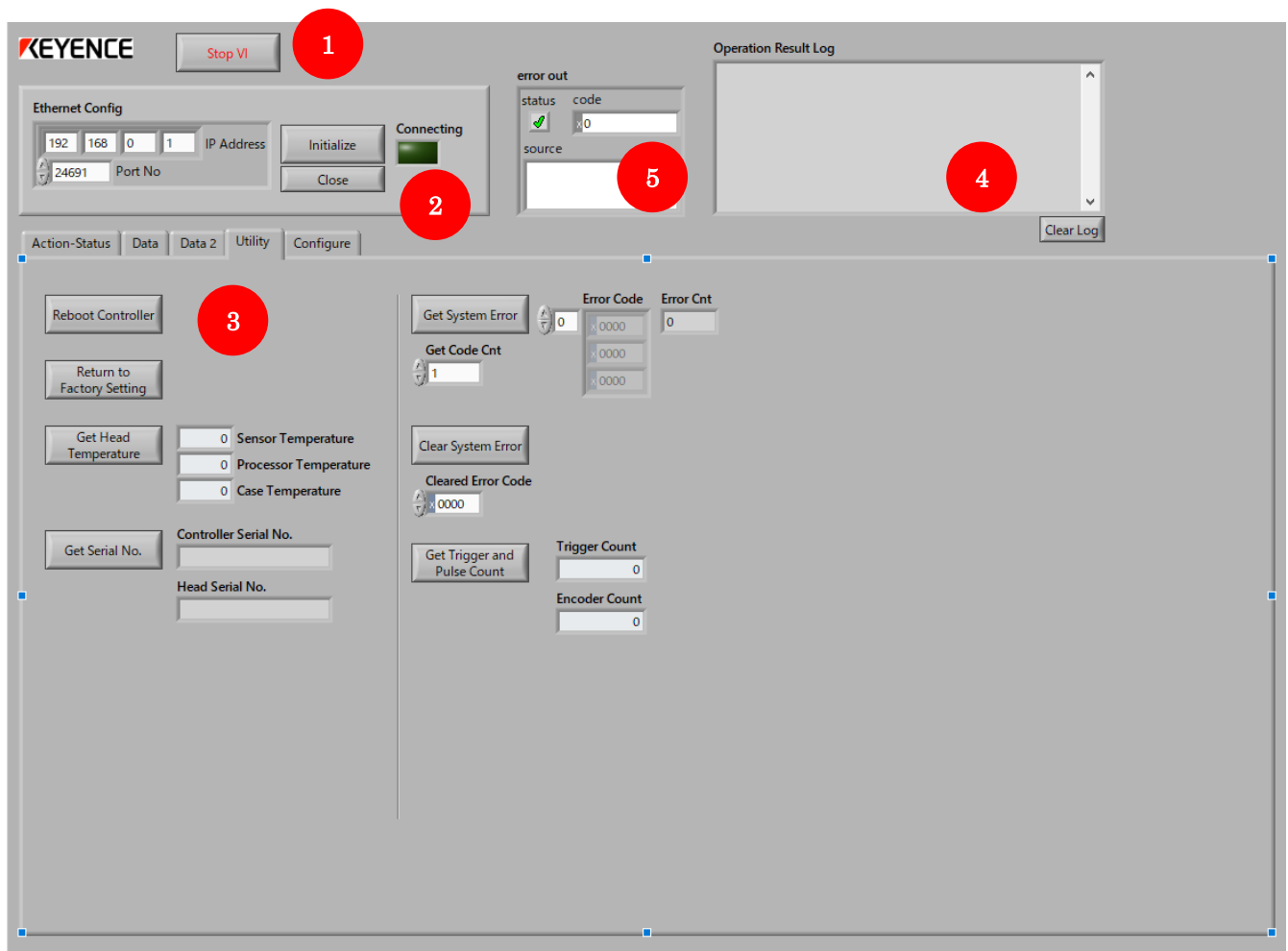-> A sample to show how to obtain profile data by using "Read Profile Array VI" and "Read Batch Profiles All VI"

・**Read Profiles (for High-Speed Data Communiation)**

-> A sample to show how to obtain profile data by using the high-speed communication

＜**Driver Test.vi**＞

It is a sample to check functions of each driver VI.

1. Stop VI button: Stop the execution of the sample VI. Also, connection with the controller is terminated.
2. Communication with a controller

   Click the "Initialize/Close" button to start/stop the connection. "Initialize.vi/Close.vi" is invoked.

   When the connection with a controller is successfully finished by clicking "Initialize", the "Connecting" indicator lights. When the connection is closed, the light turns OFF.
3. It is to check functions of each driver VI. Each button has VI NAME, and when you click the one of them, the VI is executed.
4. The executed drivers and the results are shown. The "Clear Log" button deletes the results.
5. If the execution of a driver VI is resulted in an error, the error is shown here.

＜**Read Profile Data.vi**＞

It is a sample to show how to obtain profile data by using "Read Profile Array VI" and "Read Batch Profiles All VI".
Set an IP address and a port number of a controller from the "Ethernet Config" tab before use.

・For Read Profile Array VI (1.Read Profile (Batch Off) tub)
1. Monitoring Start/Stop buttons for the profile
    When you click the "Start Monitoring", communication with the controller starts. The "Read Profile Array.vi" repeatedly reads the profiles and displays the graph with the cycle of 100ms (monitoring). The "Monitoring" keeps lighting during monitoring. When the "Stop" is clicked, the monitoring stops, and the connection with the controller is terminated.
2. Input parameters for the "Read Profile Array.vi".
3. Top: Graph of Height profile & Bottom: Graph of luminance profile
4. Two types of "Read Profile Array.vi" outputs are shown as the indicators.
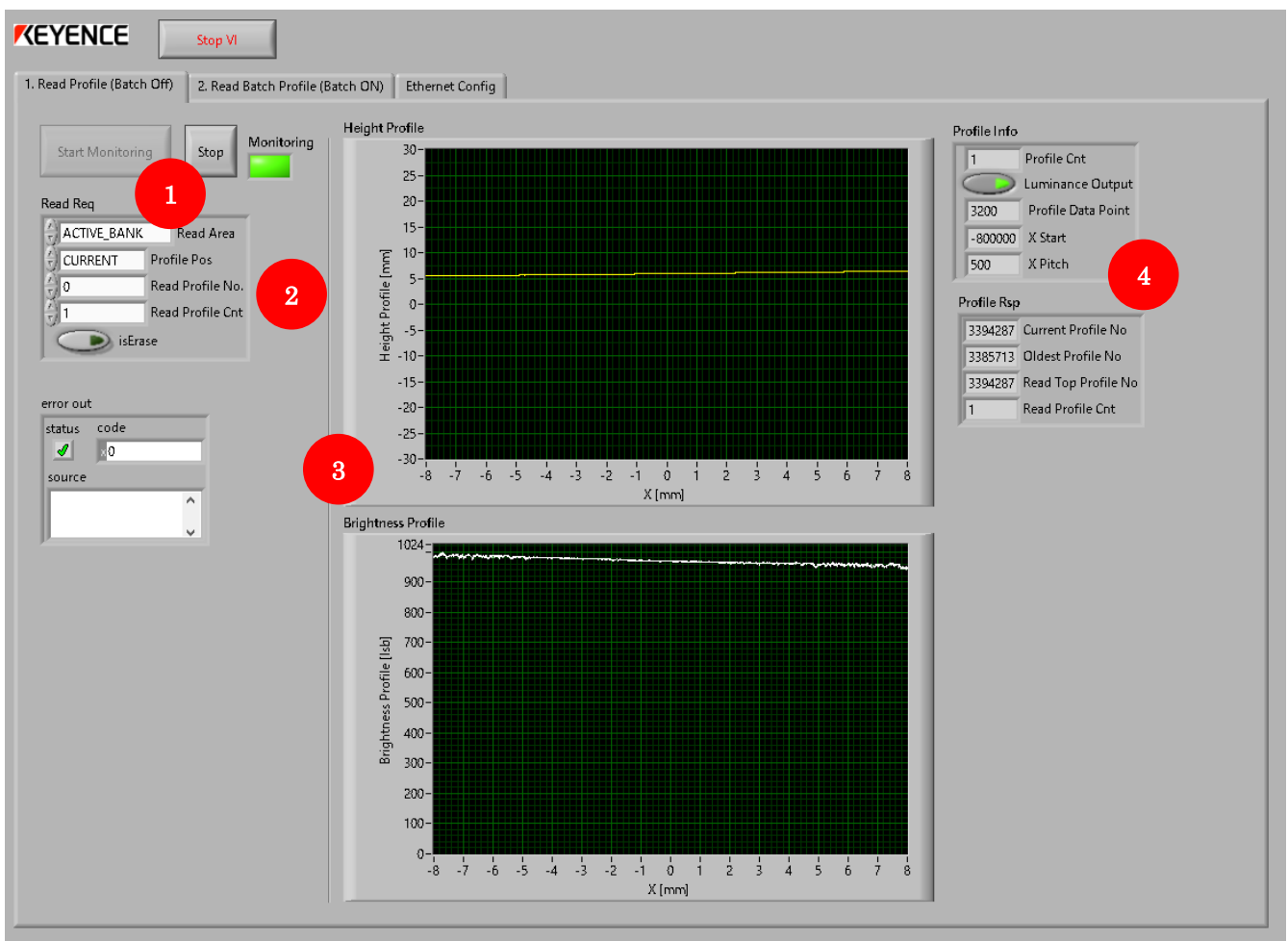
・For "Read Batch Profiles All VI" (2.Read Batch Profile (Batch ON) tub)
1. "Batch Start" / "Batch Stop" buttons.
2. "Read Batch Profiles" button
   When the button is clicked, the "Read Batch Profiles All.vi" and the batch profile are evoked by instructions from the controller (3)
3. Input parameters for the "Read Batch Profiles All".
   Timeout (ms): The "Timeout" indicator lights if the "Read Batch Profiles All.vi" cannot finish reading all specified profiles within a specified time.
4. The read batch profile is shown as a graph of the height image.
5. Three types of the "Read Profile Array.vi" outputs are shown as indicators.

<Read Profiles(for High Speed Data Communication).vi>
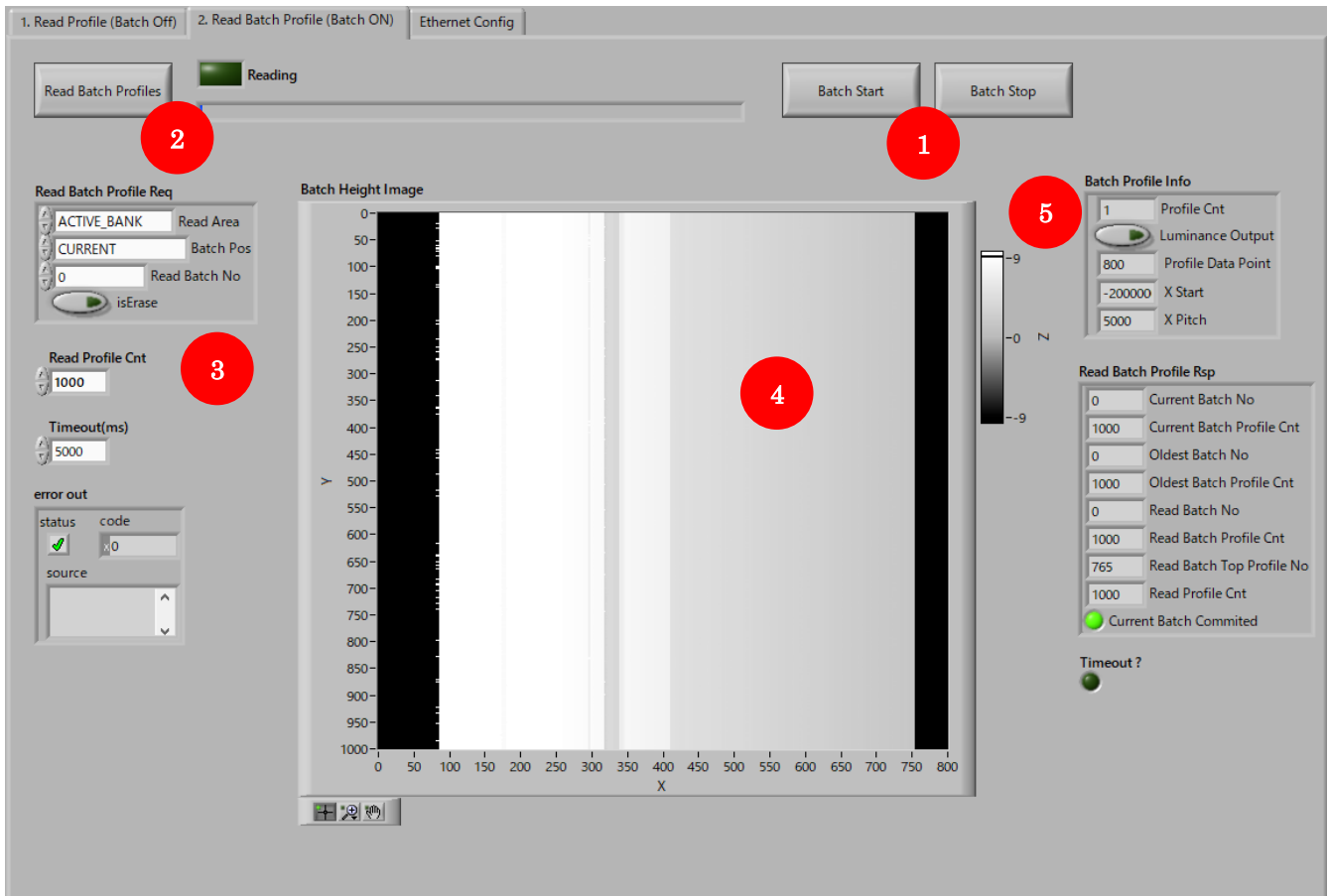
It is a sample to show how to obtain profile data by using the high-speed communication.

1. Specify the port number for the high speed data communication of a controller.
2. Specify configurations for the high speed communication.
3. Start/Stop the high-speed data communication.
4. Start/Stop the profile reading. Acquire profiles in a PC in step 3, and start/stop displaying them in a Height Image.
5. Notify output: The "Notify" output of "Start High-Speed Data Communication VI" is used as a controller.
6. Read Cnt: Acquired profiles
7. Timeout Cnt: If no specified profile by the "Read Profile Cnt" is obtained within 1 sec. after a profiles request in step 4, a timeout error occurs. The number of the errors is counted.
   E.g. When the profiles are acquired in step 4 but a certain number of them are not updated (no trigger is input, etc.), a timeout error occurs.
8. Buf Usage Rate: The "Buf Usage Rate" output of the "Read Profiles (for High-Speed Data Communication) VI" is shown. The profiles are stored in the buffer prepared in a PC (in step 3) and the usage rate of the buffer (%) is shown. When the profiles are acquired in step 4, the acquired profiles in the buffer are deleted. When the buffer usage rate is 100%, # of the stored profile in step 3 is larger than that in step 4. Therefore, this shows that the profiles cannot be stored during the sampling cycle.
9. Profile info: "Profile Info" output of the "Read Profiles(for High-Speed Data Comminication) VI" is shown as an indicator.
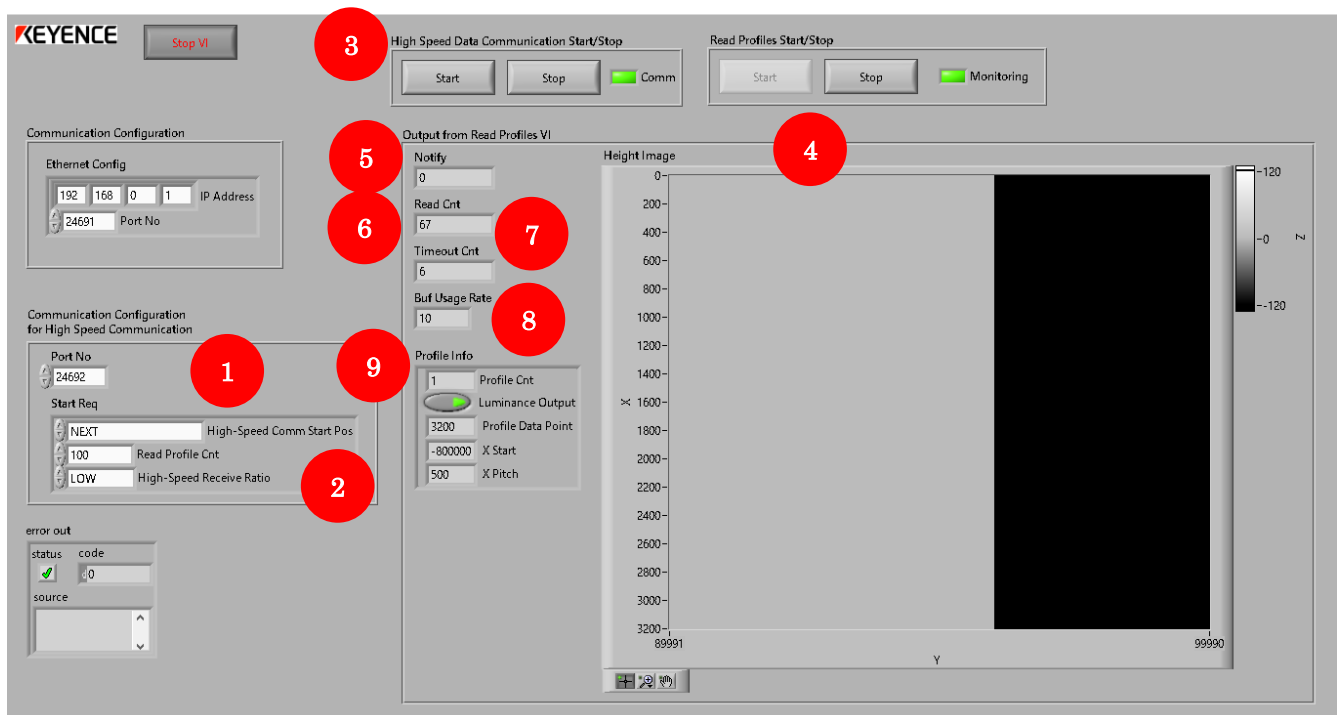
7. Error code

Error codes for the VI appear in the **error out** output terminal. Refer to the Return code written in "LJ-X8000A Communication Library Reference Manual" for troubleshooting and error explanations.
For LabVIEW VI errors, 0x81000 is added to each error code written in the Reference Manual.

Ex. 0x1000 => 0x81000

Other error codes are shown as below.

VI NAME	code	Cause
Start High-Speed Data Communication.vi	0x88081	The data specified as the send start position does not exist
	0x880A1	High-speed data communication is already in progress
Read Profiles(for High-Speed Data Communication).vi	0x8A000	Timeout
	0x8A001	Buffer size is insufficient
	0x8A002	High-speed data communication is not started yet
	0x8A003	Parameter error
	0x8A00F	System error

8. Troubleshooting

Q. The system does not work correctly when we exported an application to an ".exe" file.
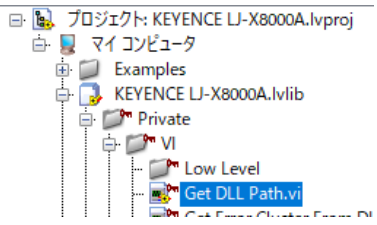
A. The LabVIEW driver calls the communication DLL internally. No special settings are required when the application works on the LabVIEW. When it is exported to an ".exe" file, the following settings are necessary to pass the path from the ".exe" file.

(1) Store all of the files below under the KEYENCE LJ-X8000 folder in any directory of the destination in the same hierarchy.

LJX8_IF.dll
LJX8_HighSpeedWrapper.dll
setting.ini

(2) Open "Get DLL Path.vi".

    *The location of "Get DLL Path.vi"

When opening from explorer	<KEYENCE LJ-X8000>¥Private¥vi¥Get DLL Path.vi
When opening from the project explorer (KEYENCE LJ-X8000A.lvproj)	

(3) Open the block diagram of the "Get DLL Path.vi" and replace the path in the picture with that of the storage folder of "LJX8_IF.dll / LJX8_HighSpeedWrapper.dll" (the folder used in (1)).