Hypersen Technologies Co., Ltd.

ToF Sensor PC Software

USER MANUAL

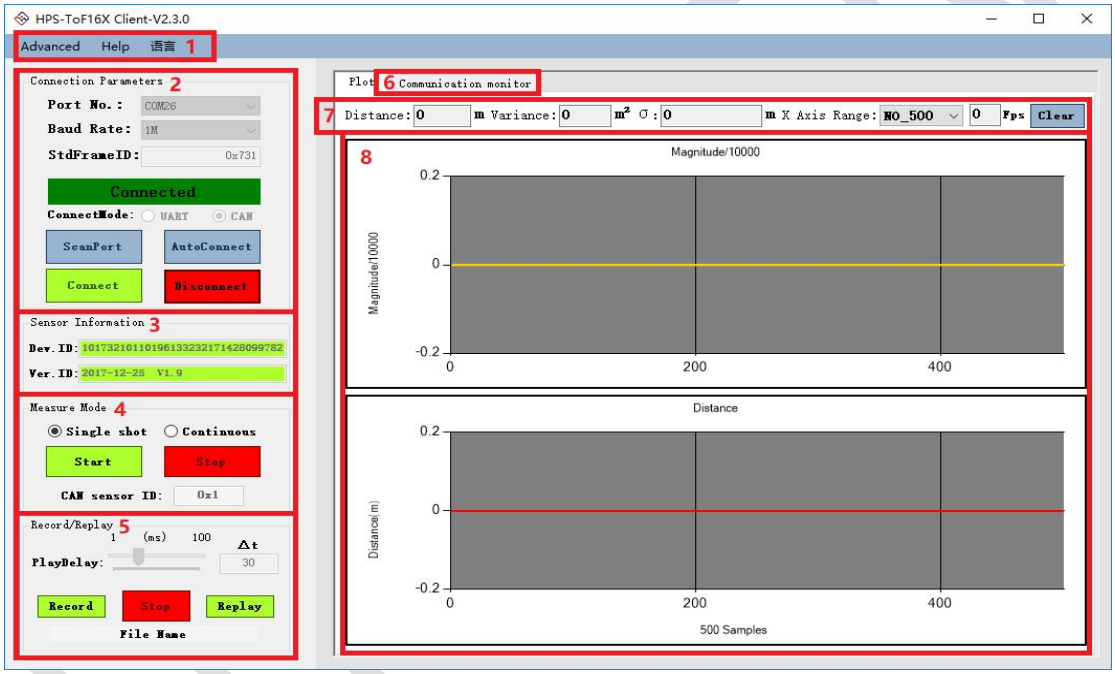
Contents

1 Software introduction

1.1 General

The PC software is used to test the HPS-16X Series ToF ranging sensor produced by Hypersen Technologies Co., Ltd. and set sensor parameters.

1.2 Main interface



（1）Menu

①Advanced: To configure advanced setting, such as settings for sensor and CAN board.

②Help: Basic information about the software.

③Language: To change the language between Chinese and English. After the configuration is completed, the setting is effective from next startup.

（2）Connection parameters

①Parameters: ScanPort to select connecting port, UART and CAN connect mode for option. Under CAN mode, select the baud rate corresponding to the sensor for connection (default 1M); the standard frame ID of the client to communicate with the sensor (default 0x731).

②Connection status: Green “Connected” indicates a successful connection, red “Disconnected” indicates a failure connection.

③Buttons: After parameter setting, click “connect” to connect. Under CAN mode, click the “Connect” button, the client will broadcast the sensor on the CAN bus and pop up all the sensors listed on the CAN bus, select a sensor to connect. For details, please refer to “3.2.2

CAN communication connection configuration". Under UART mode, click AutoConnect to auto connect without setting the parameters.

Note: AutoConnect is use only for one HPS ranging sensor. When testing more than one sensor, please configure parameters and then connect.

（3）Sensor information

①Device ID: Sensor device ID.

②Version ID: Version ID of the sensor.

（4）Measure Mode

①Measure mode: Single shot or Continuous for choice.

②Buttons: Start or Stop.

When measure mode is “Single shot”, “Start” is only for one-time measurement, get one distance value.

When measure mode is “Continuous”, “Start” means continuous measurement, get continuous distance values. Click “Stop” to stop the measurement.

③CAN Sensor ID：Sensor ID under CAN mode. For HPS-16xC Series.

（5）Record/Replay

①Data record: Data records only when the measurement is ongoing.

②Data format: CSV format file.

③ Data replay: Refresh rate and speed can be modified. Continuous is invalid when replaying.

④ File name: The file selected/named when recording the file (.CSV) or the file selected when playing back the file (.CSV)

（6）Communication monitor

To monitor data packets between software and sensor communication.

（7）Distance/variance/standard deviation (Repeatability) / X-axis range (sample points) / frame rate Fps display

①Distance: The distance value measured by the current time sensor.

②Variance: Details in 4.1.2 variance value reference

③Standard deviation (Repeatability): The sampling point is the X-axis range. The data is all the values on the X-axis of the distance waveform on the main interface. The invalid value of 65.535 is not involved in the calculation.

④ X-axis range (sample points): Displays the X-axis range of the distance/magnitude waveform.

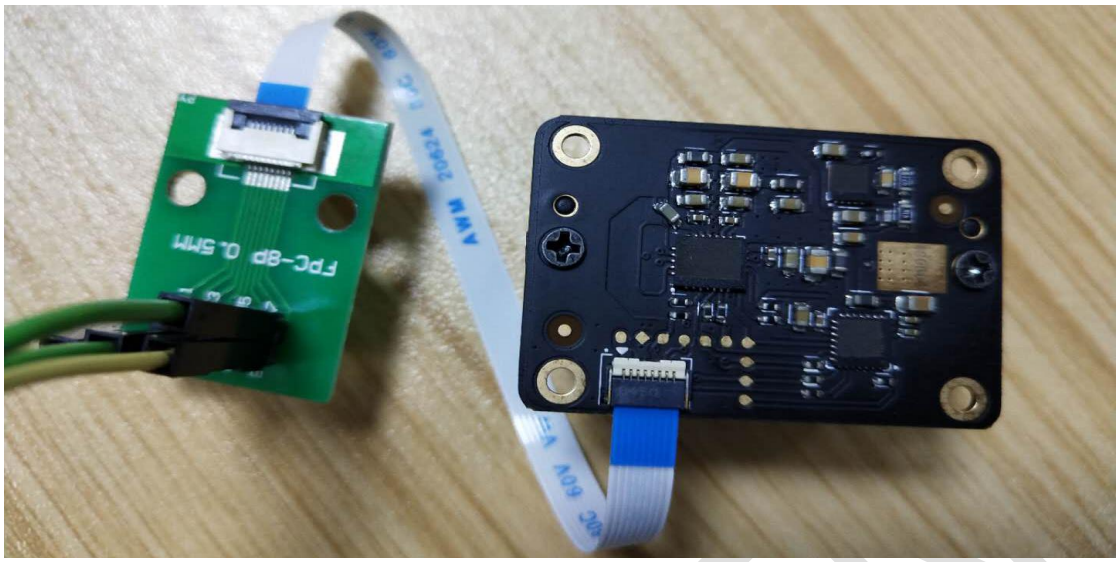
⑤Frame rate (Fps): Frame rate is stable after 1 second.

（8）Distance and magnitude waveform.

2 Device connection

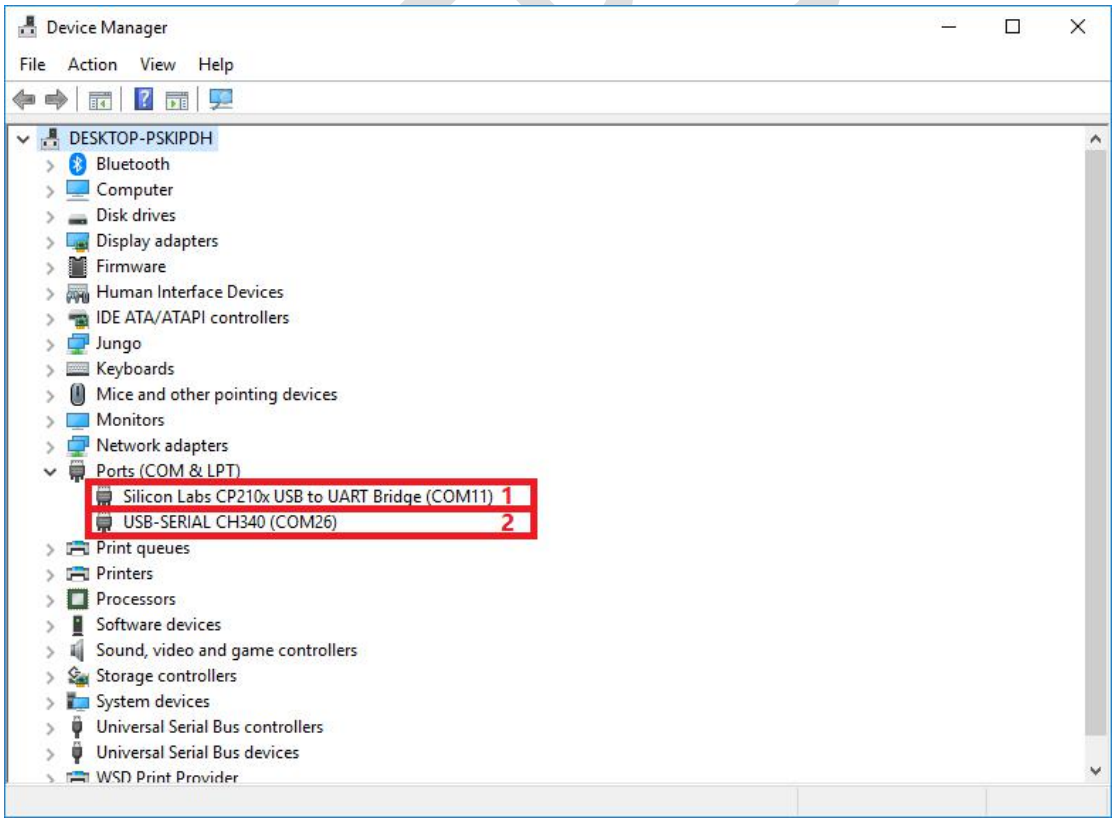
2.1 Connection between sensor and adapter board.

Insert the 8-pin FPC cable into the slot and fasten it as below pic shows.



2.2 Connection between adapter board and PC.

Insert the USB to serial port plug into the USB slot of the PC and wait for the driver to be installed. Open the device manager and confirm that the driver is installed. As shown in the figure below, the installation is successful. (Red box 1 is UART, red box 2 is CAN)



Note: If the driver is not found in device manager or there is a yellow exclamation point, install the CP210x USB serial drive and CH340 USB serial drive, or unzip "Driver.rar" to select the appropriate driver installation.

3 Software installation and startup

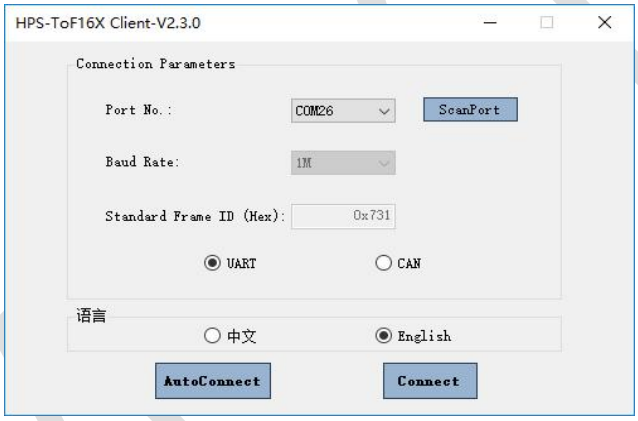
3.1 Software installation

Unzip "Release.rar" to any directory, and run the client software after the driver installation is complete (HPS_ToF16X_Client.exe in the Release directory)

3.2 Software startup

3.2.1 Software connection configuration

The software currently supports UART and CAN communication interfaces. After running the software, you need to configure the connection parameters first, and then click the connection, as shown in the figure below.



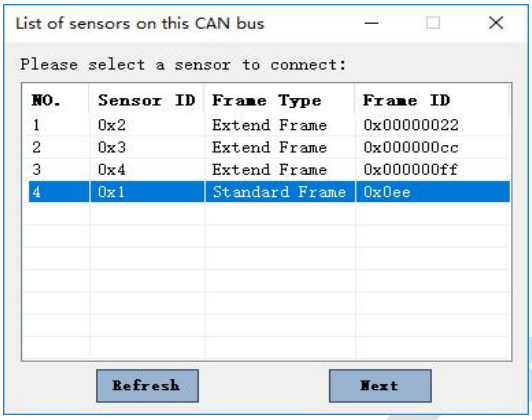
3.2.2 Can connection configuration

This configuration is valid only for sensors of the CAN interface. When choosing CAN mode, click the “Connect” button, the client will broadcast the sensor on the CAN bus and pop up all the sensors listed on the CAN bus, select a sensor to connect. At this point the client has sent a command to have all sensors stop measuring continuously.

The sensor list contains the list number, sensor ID, data frame type, and the data frame ID. The sensor ID is an important information used by the client to connect and set the sensor, so when mounting multiple sensors to the same CAN bus, sensor ID (0x0~0xe, up to 15 sensors with different IDs; 0xf is for broadcast, not recommended) must be modified first by using client software. The data frame ID, data frame type, and sensor ID are important information for the client to receive the data packet returned by the sensor, and the client filters out the data frame ID, data frame type, and sensor ID packet which are different from the selected sensor, so when mounting multiple sensors to the same CAN bus, please modify the data frame type and data frame ID with the client before mounting.

Note: When an existing sensor is connected, if another sensor is connected, the received data

(display waveform) will be affected because the USB-CAN module has too much data accumulation and display delay; if the new connected sensor information is the same as the already connected one, the authenticity of the received data display will directly be affected. Therefore, it will directly cause the failure in setting sensor parameters.



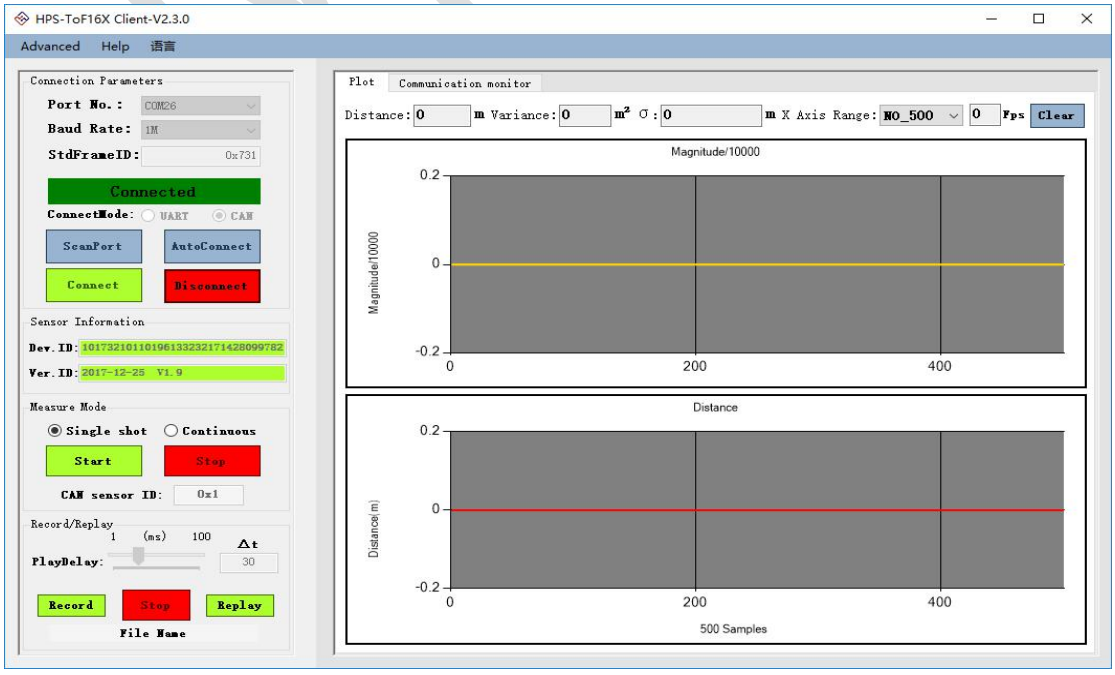
4 Functions introduction

This section describes the function of CAN communication. The operation of UART communication is similar to CAN communication.

4.1 Main interface introduction

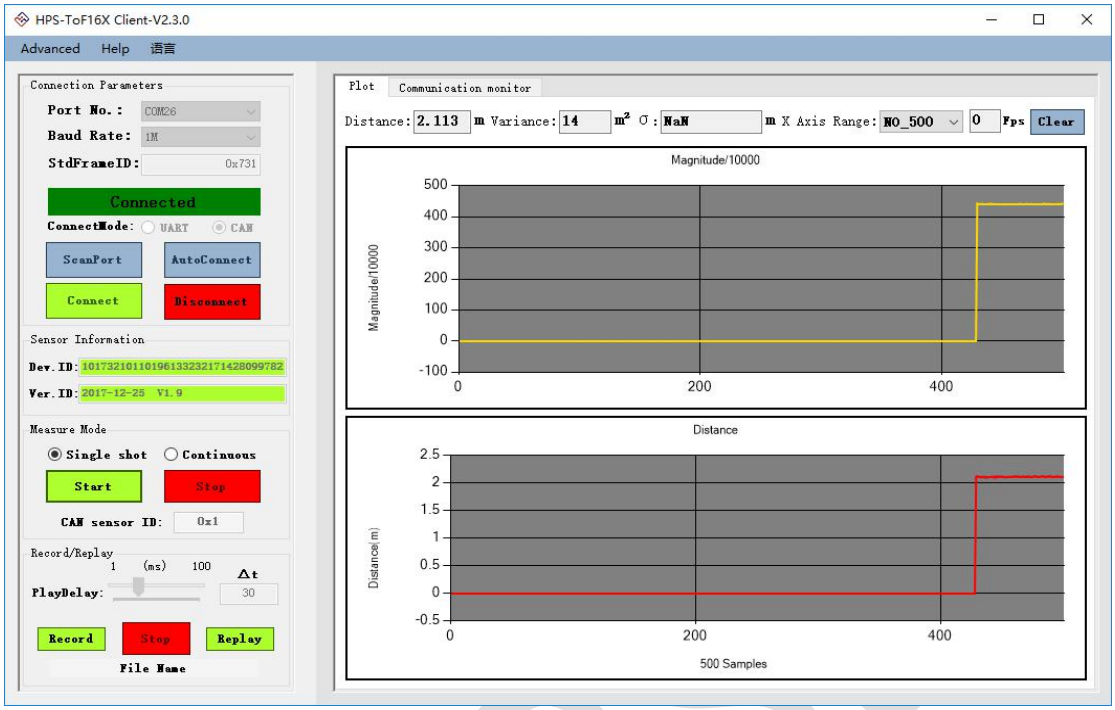
4.1.1 Measure mode

After the device is successfully connected, you can see that the connection status is "Connected" and the green and white flash alternately. As shown below:

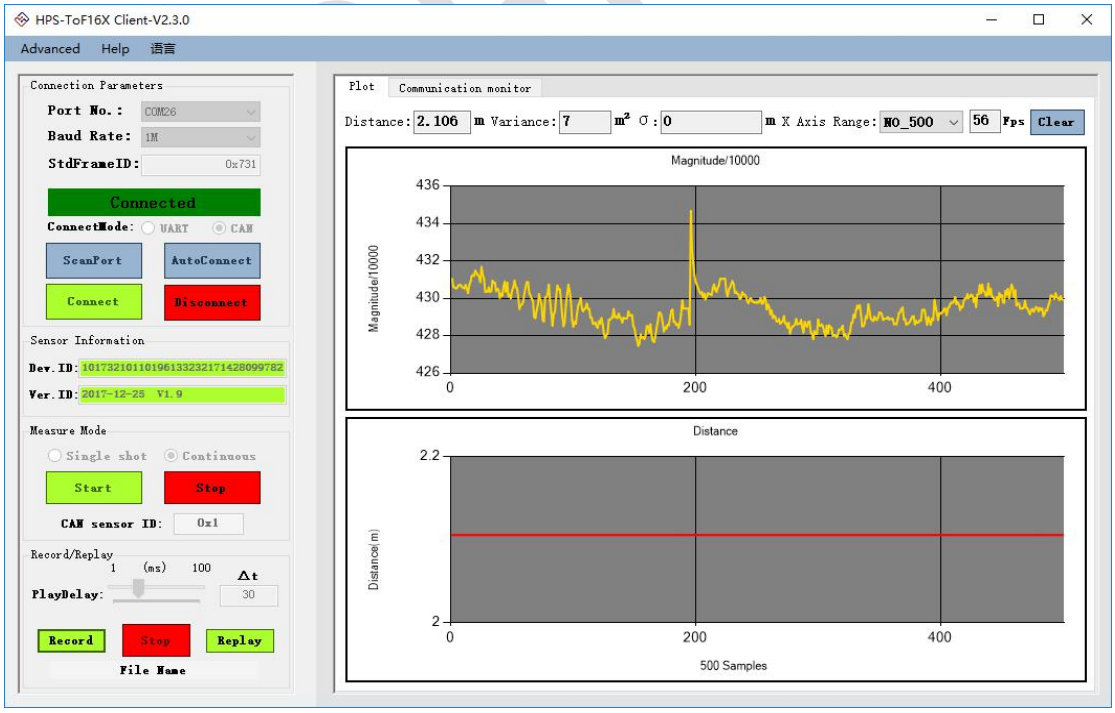


Sensor measurements support both single and continuous measurements.

The effect diagram of a single measurement, as shown below:



The continuous measurement is to keep the sensor in the measurement state, and output the data at a frequency of 6~54HZ. Unless the stop measurement command is sent (click the “Stop” button), the sensor will continue to work continuously, and the effect map will be continuously measured, as shown in the figure below:

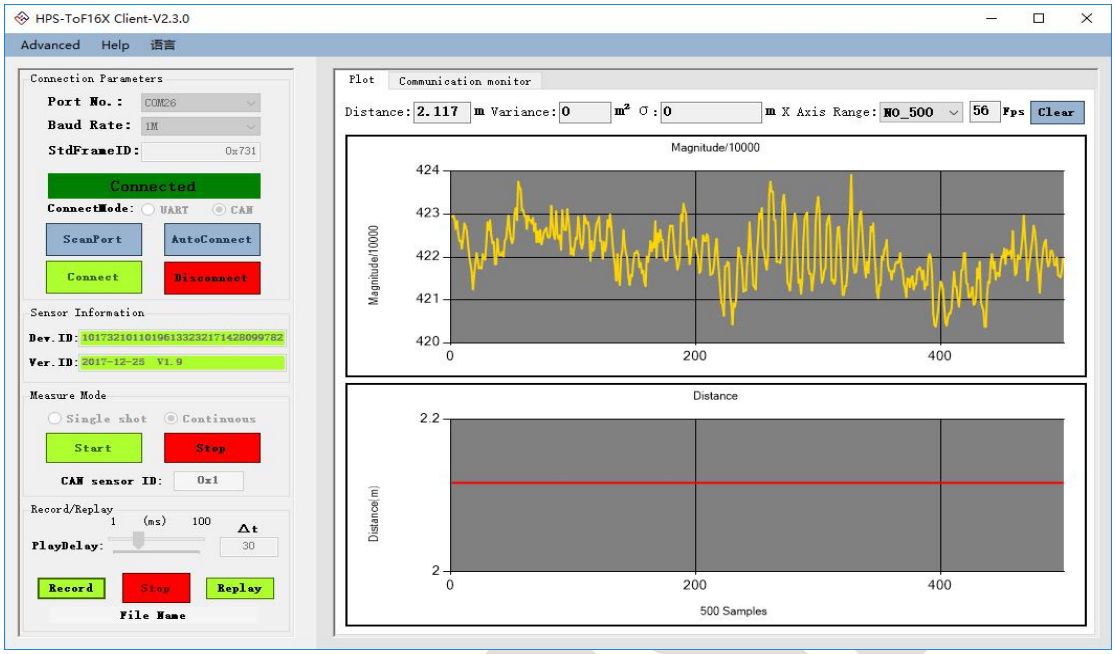


4.1.2 Variance Reference Value

The sensor analyzes a large amount of data and provides a reference value of the variance, which can be used as a reference index for sensor measurement reliability

(for reference only). The smaller the variance value, the higher the accuracy and more reliable, otherwise the opposite.

Smaller variance (More reliable) example as below:

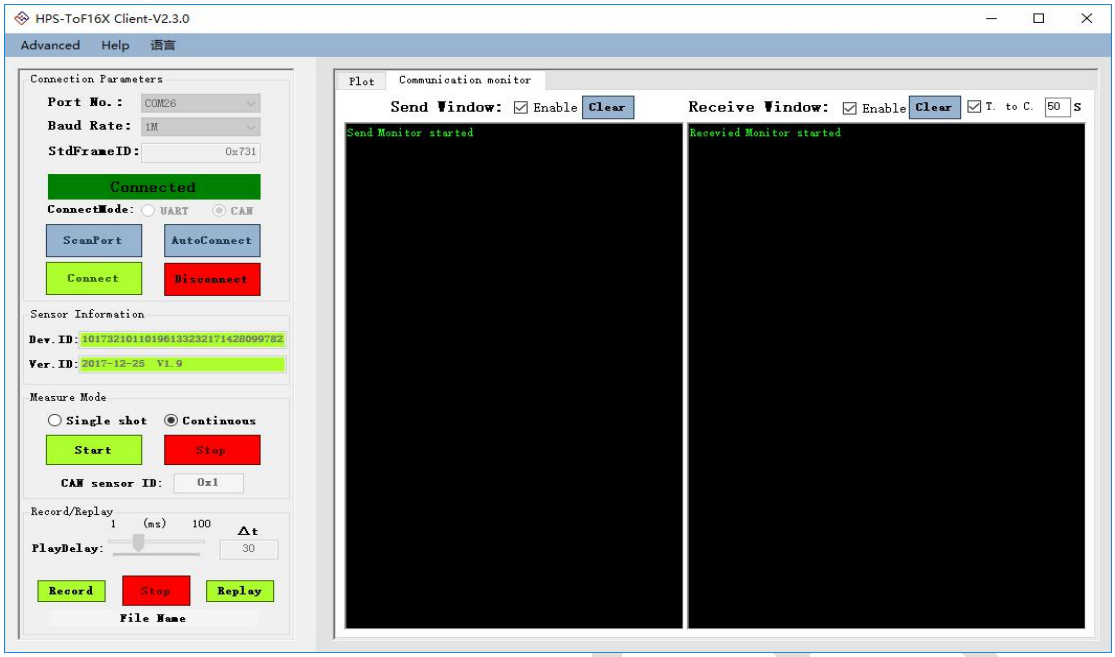


Larger variance (Not reliable) example as below:

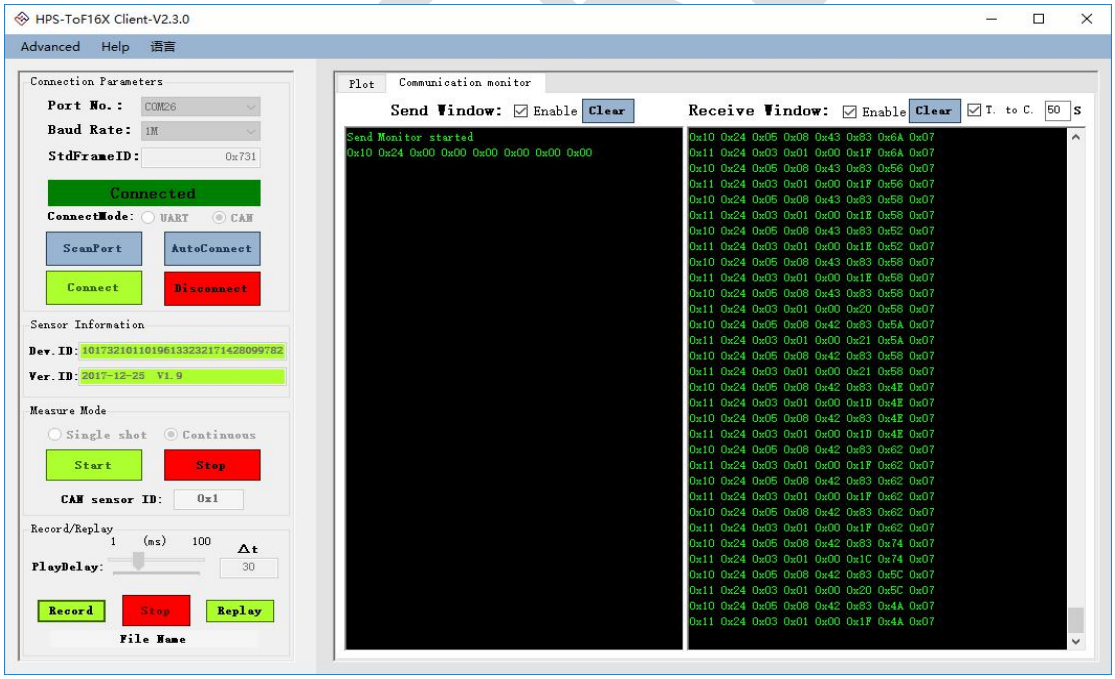
4.1.3 Communication monitor

The software supports monitoring of communication data packets between sensors and computers, facilitating user positioning errors and viewing common commands. Chick the "Communication Listener" tab to switch to this page. You can enable the two communication monitors by setting the enable option on both windows. You can also monitor the transmission separately or monitor the reception separately. Since there is more data in the continuous measurement mode in the data receiving window, the function of timing clearing is added. As

shown below:



After both windows are started, select continuous measurement, and click the “Start” button to start continuous measurement. In the Send Window, you can see the command packet sent to the sensor. In the Receive Window, there will be consecutively collected data packets, as shown below:

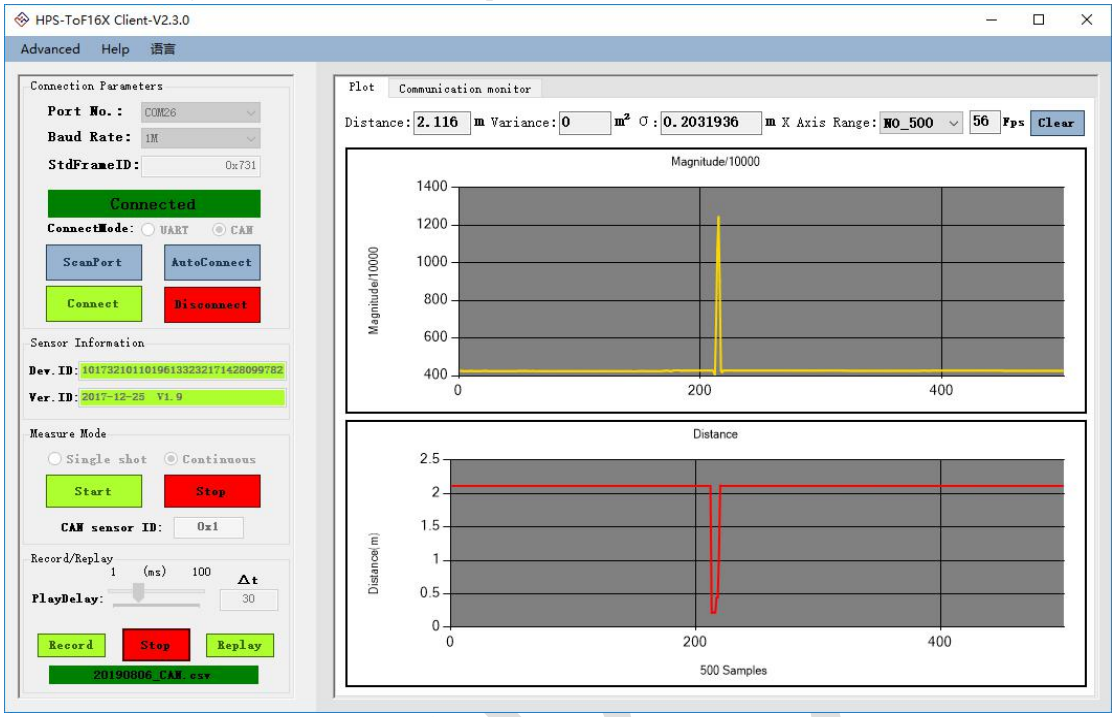


4.1.4 Record/Replay

（1）Data record

The software supports recording the measured data of the sensor to a computer in the format of a .CSV (comma delimited) file for the user to analyze the data. Use this function as follows: After connecting the sensor, click the “Record” button, select the path for the file to be saved and

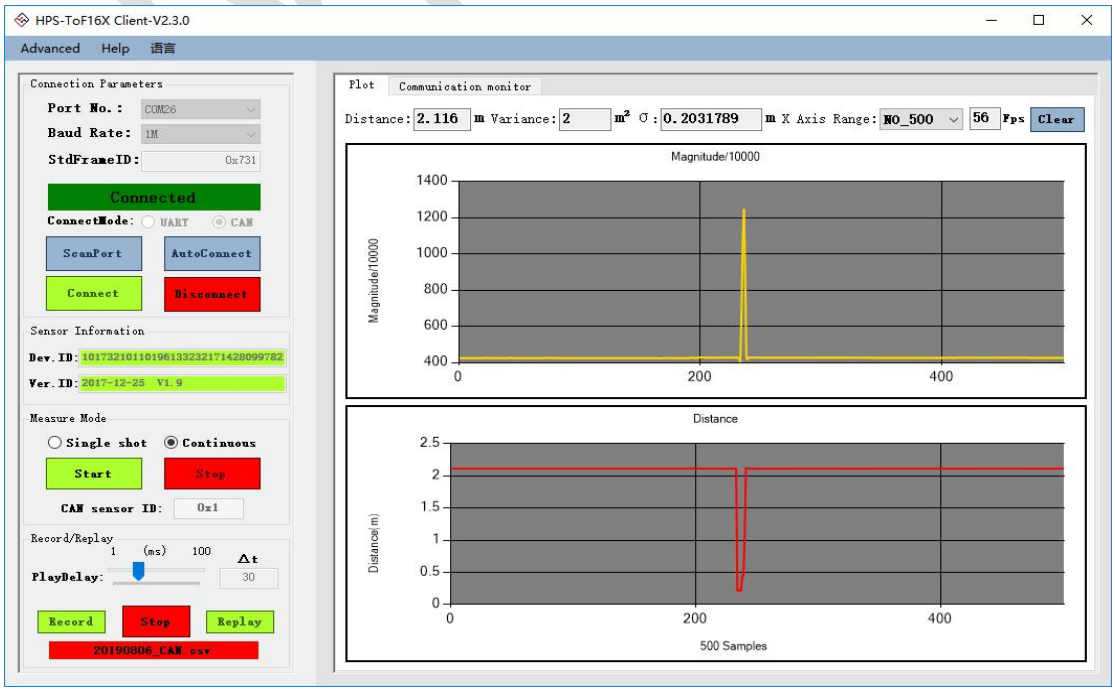
enter the file name to record the data, the file name will be displayed at the bottom of “Record/Replay”. The background will begin to flash alternately green and white. If you want to end the recording, click the red button "Stop". As shown below:



Note: Data records only when the measurement is ongoing.

（2）Data replay

The software supports replay of recorded files. Click the “Replay” button to select the corresponding file. You can adjust the “Replay Delay” slider to control the replay speed. During replay, the file name of the replay data will be displayed at the bottom of “Record/Replay”, and the background of the file name will start to flash alternately in red and white. If you want to end the recording, click the red button "Stop". As shown below:



4.1.5 Save user settings

Support users to save custom settings to Flash, to achieve the function when power loss without losing settings. Operation as follows: Advanced -> Save User Settings.

4.1.6 Restore user settings

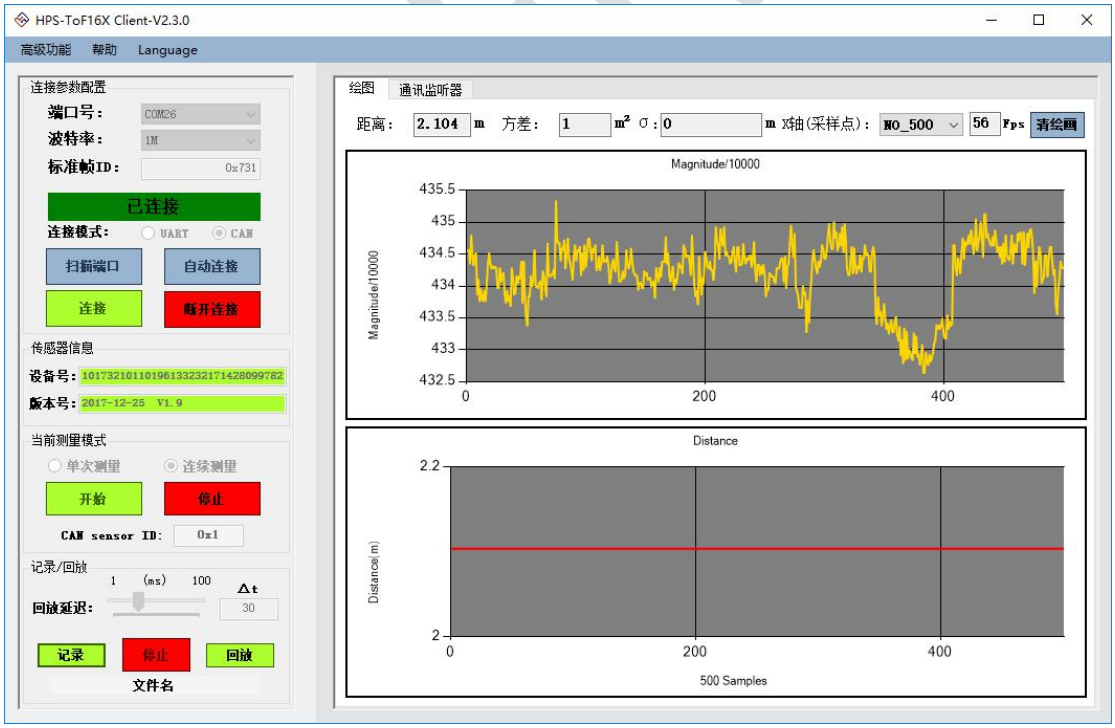
Used to restore user settings to the sensor and take effect immediately. Operation as follows: Advanced Function -> Restore User Settings. After the operation is completed, please restart the sensor.

4.1.7 Restore factory settings

When the distance measurement problem occurs due to improper setting, the sensor can be restored to the factory settings by this operation, and the sensor's ranging capability can be restored. Operation as follows: Advanced Function -> Restore factory settings. After the operation is completed, please restart the sensor.

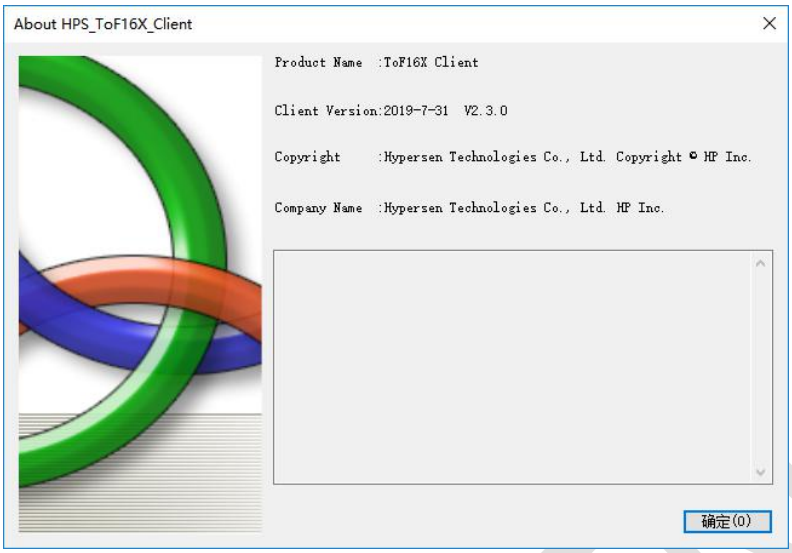
4.1.8 Language

The software supports Chinese and English. Operation: Language->English. After the setting is completed, the software configuration file will be written. When started next time, the previous setting will be executed. As shown below:



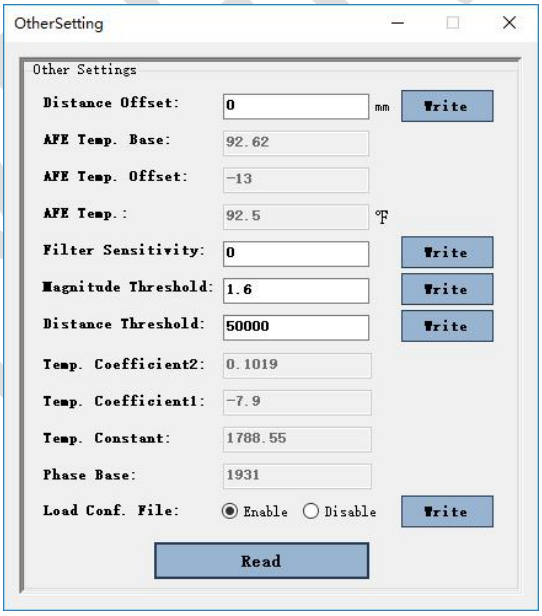
4.1.9 About

Information about this software. Operation: Help -> About. As shown below:



4.2 Other parameters settings

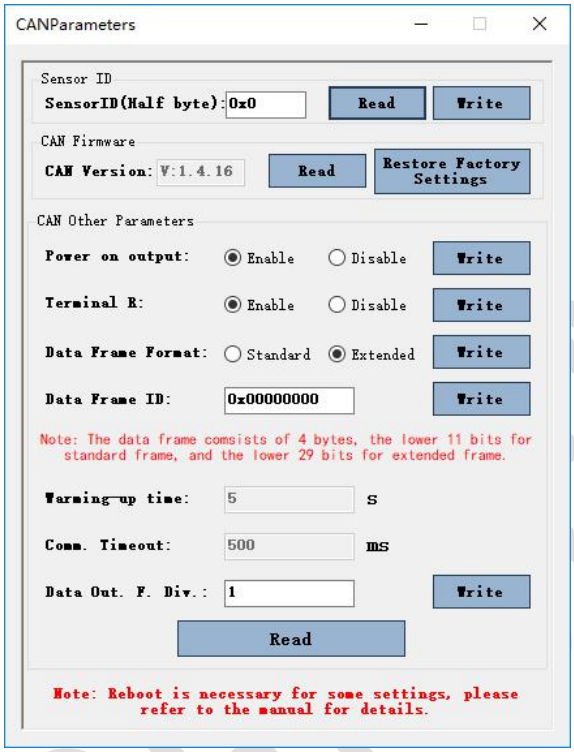
The software supports setting the distance offset (Distance Offset), the filter (System Sensitivity), the magnitude threshold (MagThre), the distance threshold (DistanceThre) and the load configuration file (Load Conf. File) on the sensor, Other parameters about the sensor can also be obtained. Refer to the HPS-16X data sheet for specific meaning. Operations as below: Advanced Features -> Other Settings.



4.3 CAN Parameters settings

This setting is valid only for sensors of the CAN interface. The software supports sensor ID setting and acquisition of the CAN adapter board, acquisition of the CAN firmware version and restoration of the CAN firmware factory settings. Set the power-on automatic output, terminal

resistance, data frame format, data frame ID (supported by CAN firmware version V1.4.11 or higher) and data output division factor (supported by CAN firmware version V1.4.15 or higher), and other parameters about the CAN adapter board can be obtained (supported by CAN firmware version V1.4.11 or higher). Refer to the HPS-16X data sheet for specific meaning. Operation as below: Advanced function -> CAN parameter setting.



5 FAQs

5.1 "Connection failed. Please reconnect!" error message appears

①The serial port driver is not installed correctly. Please check the driver.

②Check if the wire part of the FPC wire is off or not in good contact.

③Check if the USB to serial port module is damaged.

④Check the adapter board.

⑤Check if the sensor is damaged (the sensor is energized and will send "Hypersen" via the UART, which can be checked by an oscilloscope or logic analyzer)。

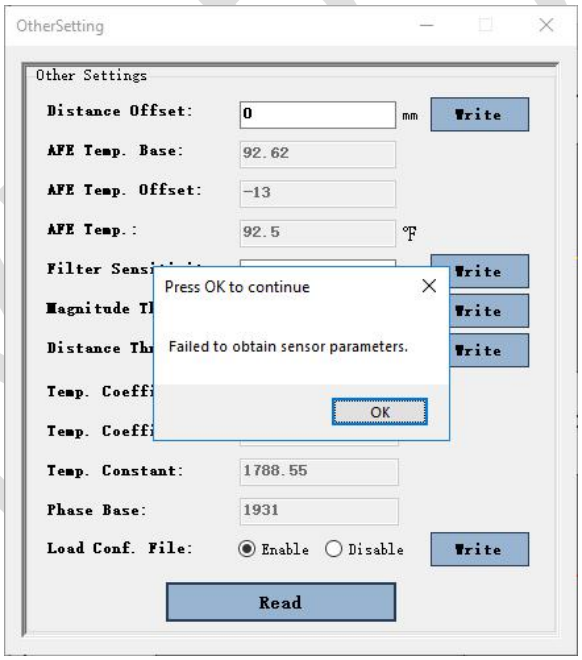
5.2 The sensor is connected, but no data after clicking the "Start" button?

①Close the software, restart the computer, reconnect and try again.
②Check the firmware version and contact Hypersen Technologies Co., Ltd.

5.3 The sensor is connected and data can be measured, but the data is obviously dropped.

①Check if the Magnitude value is too low or if the distance is too far. The sensor realizes automatic integral adjustment inside, and adjusts the internal integration time according to the reflectivity of the object and the intensity of the reflected signal to achieve stable and reliable data.

② Check if the serial cable is too long. Check whether the signal is stable with an oscilloscope or other equipment. If the serial cable is too long, the error rate may increase. The software performs CRC check on the data. Data dropped situation may happen if there is a bit error.



5.4 Failed to get other parameter settings or failed to perform other operations?

①Try it a few more times.
②If failed too often, operate in the following order：
a. Close the software, pull out the USB to serial port module;

b. Reconnect the interface between the FPC line and the sensor;

c. Ensure that the wiring of each line of the USB to serial port module is normal;

d. Insert the USB to serial port to the computer;

e. Open the software.

③If the problem is not resolved or if fails every time, do the following:

a、Please check the firmware version and contact Hypersen Technologies Co., Ltd.

b、Please check if each device is soldered, if it is in poor contact or if the sensor is powered normally.

5.5 The interface layout of the software is confusing?

This problem is caused by the resolution mismatch. The software supports resolution adaptation. Please maximize the software window. If not, adjust the resolution ratio to 16:9 or 16:10 or change the monitor.