WindLabX2 Software Instruction Manual

Dalian Windtuner Technology Co., Ltd.

March 2024

Catalog

1 Overview

1.1 Software Overview

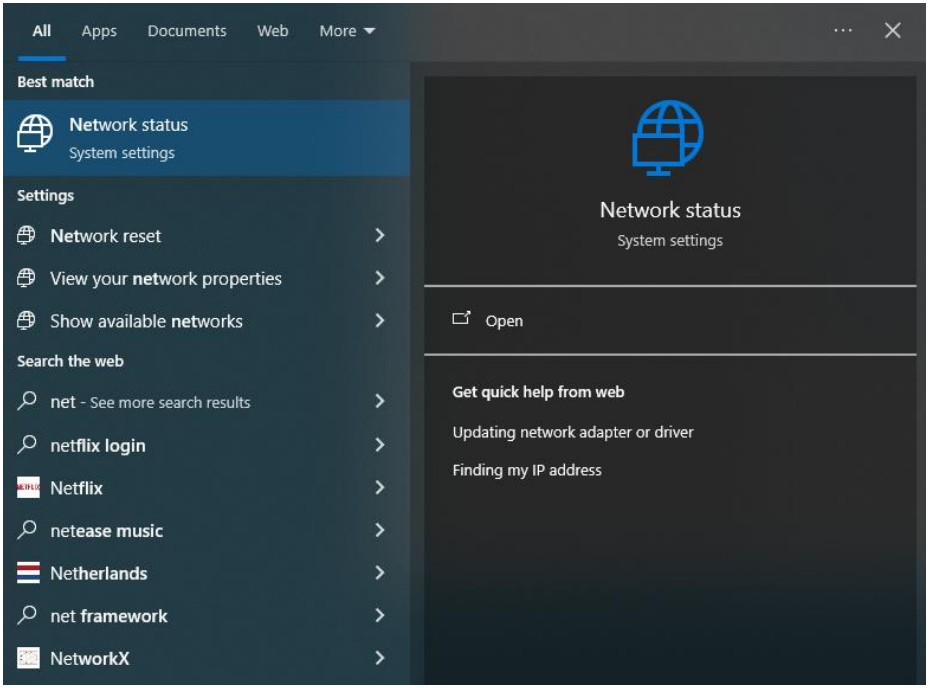
Independently developed by Dalian Windtuner Technology Co., Ltd., WindLabX2 software integrates the functions of data acquisition, data logging and equipment calibration.

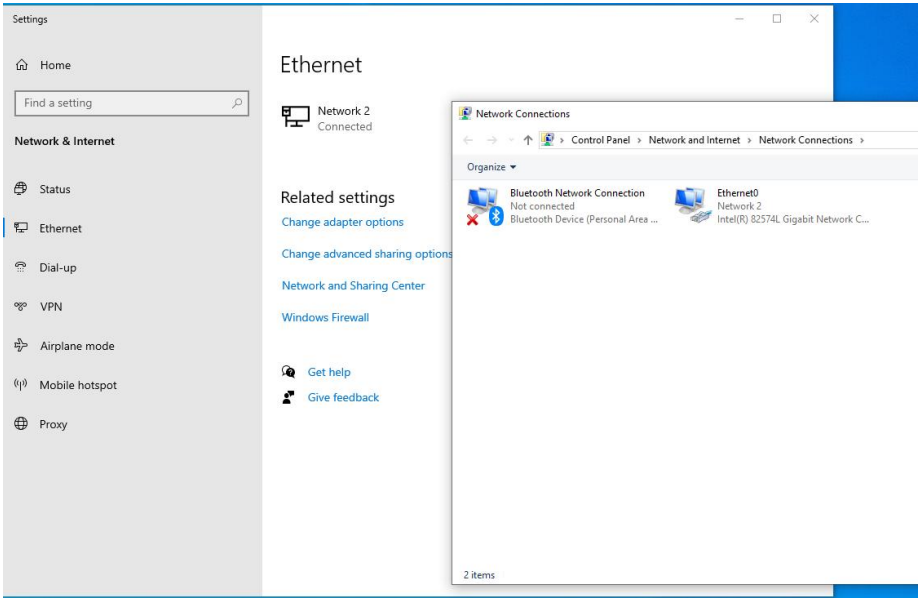
WindLabX2 has a friendly human-computer interaction interface, which can realize multi-type and multi-device data acquisition, storage, and management and support concurrent acquisition and storage of multiple devices. It can also support the common acquisition devices on the market (PSI9216, DSA3217) and our self-developed acquisition devices (WTN DAQ-P-1603, 1604) and so on.

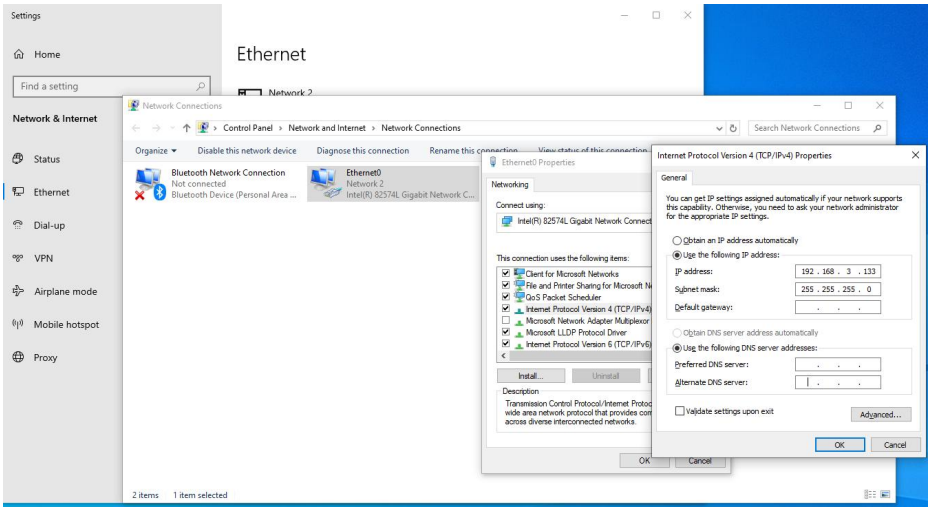
1.2 Software installation

- Network environment configuration

  Search for "Network Status" in the start menu and click -> Ethernet -> Change adapter Settings one by one. Right click Ethernet -> Properties ->TCP/IPV4, enter IP address 192.168.3.*, * is different from the device IP address, subnet mask 255.255.255.0, and disable the network after confirmation. Then enable the network again.

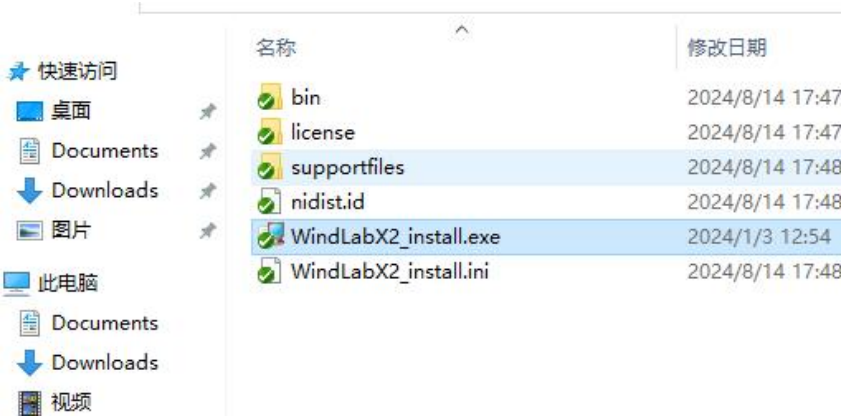

All
Apps
Documents
Web
More
Best match
Network status
System settings
Settings
Network reset
View your network properties
Show available networks
Search the web
net - See more search results
netflix login
Netflix
netease music
Netherlands
net framework
NetworkX
Network status
System settings
Open
Get quick help from web
Updating network adapter or driver
Finding my IP address

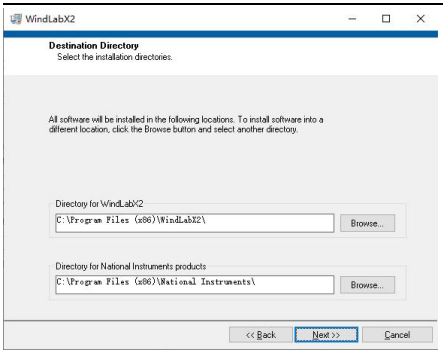

Settings
Home
Find a setting
Network & Internet
Status
Ethernet
Dial-up
VPN
Airplane mode
Mobile hotspot
Proxy
Ethernet
Network 2
Connected
Related settings
Change adapter options
Change advanced sharing options
Network and Sharing Center
Windows Firewall
Get help
Give feedback
Network Connections
Control Panel › Network and Internet › Network Connections ›
Organize
Bluetooth Network Connection
Not connected
Bluetooth Device (Personal Area ...
Ethernet0
Network 2
Intel(R) 82574L Gigabit Network C...
2 items

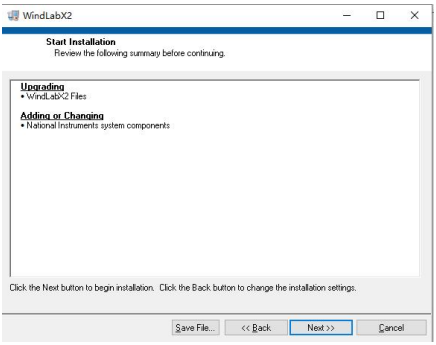


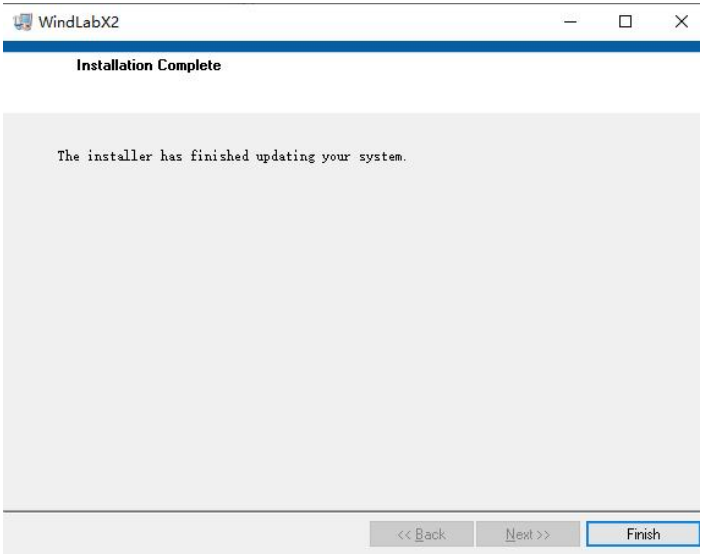
- **Software installation process**

  Double-click the installation package "WindLabX2_install.exe" and keep clicking the "Next" button until the installation is complete.




WindLabX2
Destination Directory
Select the installation directories.
All software will be installed in the following locations. To install software into a different location, click the Browse button and select another directory.
Directory for WindLabX2
C:\Program Files (x86)\WindLabX2\
Browse...
Directory for National Instruments products
C:\Program Files (x86)\National Instruments\
Browse...
<< Back
Next >>
Cancel


WindLabX2
Start Installation
Review the following summary before continuing.
Upgrading
• WindLabX2 Files
Adding or Changing
• National Instruments system components
Click the Next button to begin installation. Click the Back button to change the installation settings.
Save File...
<< Back
Next >>
Cancel


WindLabX2
Installation Complete
The installer has finished updating your system.
<< Back
Next >>
Finish

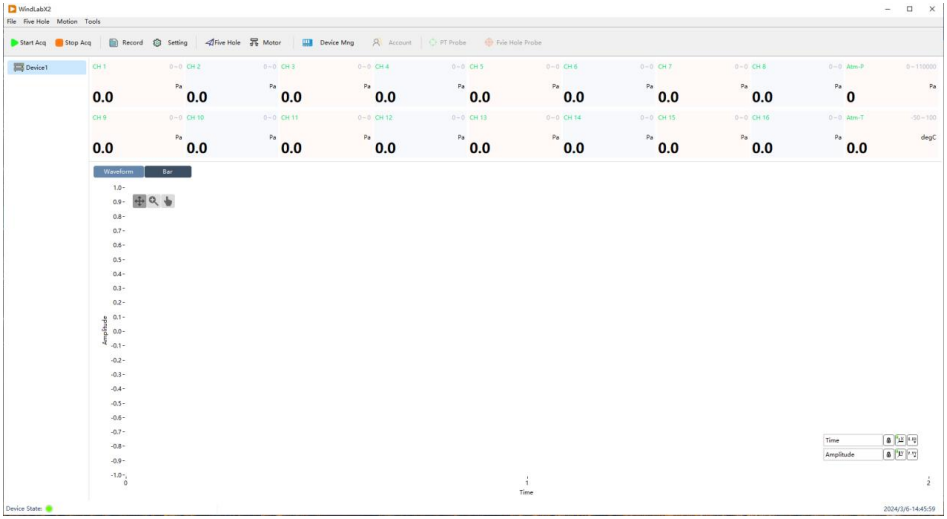
2 Software Functions

2.1 Software Startup

When the software starts, the welcome screen will appear first, and some configurations will be loaded. After the welcome screen, you will enter the main screen.

2.1.1 Welcome Screen

2.1.2 Main Screen



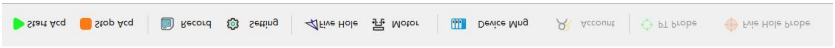
2.2 Interface Descriptions and Functional Instructions

2.2.1 Main Screen Descriptions

The main screen is laid out from top to bottom and left to right, as follows.

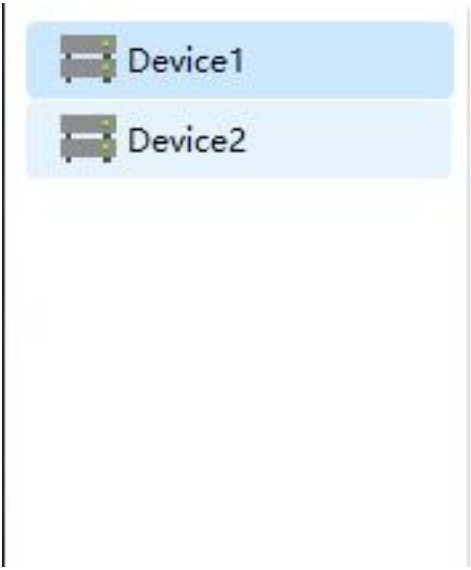
① Function Button Toolbar

Clicking on each button in the toolbar triggers the corresponding function or migrates to the screen of the corresponding module.



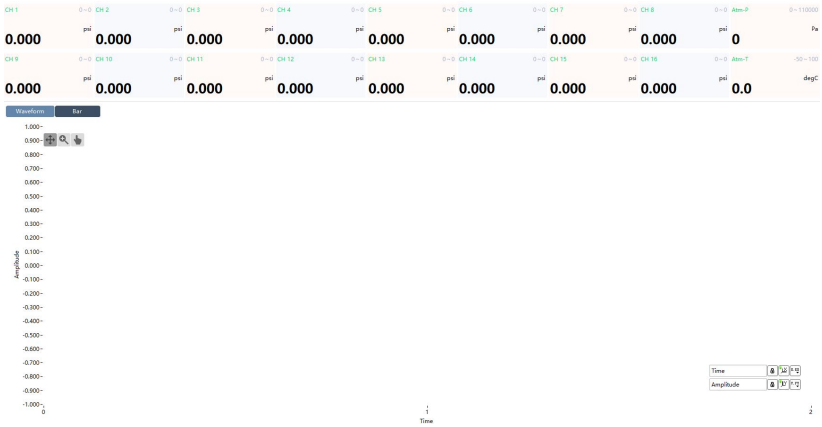
② Device List Column

The device list shows all the added devices. When you click on a different device button, the data display screen on the right changes to show the corresponding device information and collected data.



③ Data Acquisition Display Area

This section displays the collected data in digital form and the form of waveform graphs. It contains specific information about each channel (channel name, range and unit).



④ State Column

At the bottom of the screen, the state bar displays the device's connection, disconnection, and acquisition state along with the system's current time.

2.2.2 Start Acquisition

Click on the "Start Acq" button triggers all devices to start acquisition.

Note: The software supports simultaneous acquisition of multiple devices, and the acquisition threads of each device are independent and do not interfere with each other.

2.2.3 Stop Acquisition

Click on the "Stop Acq" button to stop the Acquisition of all devices.

2.2.4 Data Record

Click on the "Record" button to save the collected data. The button state switches to "Stop saving". Clicking the button again stops saving data. The file format of the saved data is text format (csv format). The saved information is displayed in the state bar at the same time.

2.2.5 Five-hole Probe Test Module

Click on the "Five Hole" button to enter the five-hole probe test screen.

The module has the following functions.

1、Display atmospheric pressure, atmospheric temperature, and five-hole pressure of a five-hole probe.

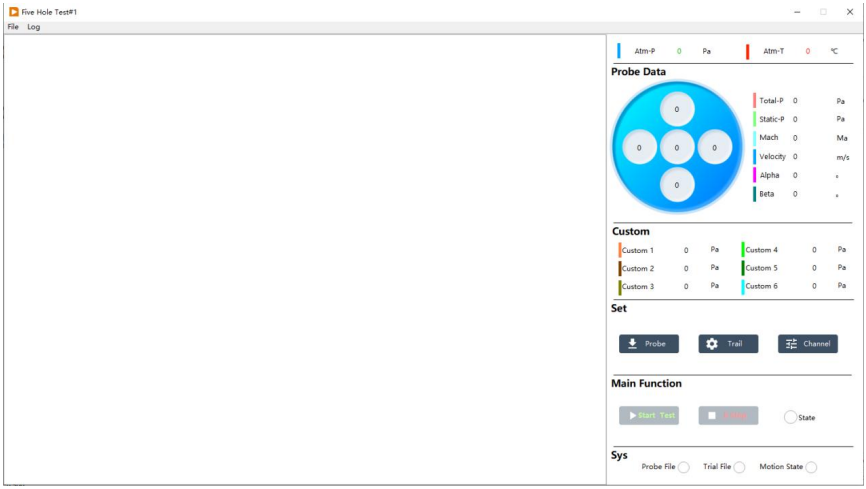
2、After selecting the interpolation file, the interpolation result can be displayed in real time. Support single interpolation file and multi-interpolation file selection at the same time. Support multi-Mach number fitting and interpolation (according to the known prb file, fit and interpolate the Mach number corresponding to non-prb).

3、Channel-selectable configurations for atmospheric pressure, atmospheric temperature, and five-hole probe pressure.

4、Linking with the displacement mechanism is available. Perform the

specified trajectory movement of the five-hole probe and collect data, then interpolate and save the test results.

5、 Six custom controls (Custom Area).

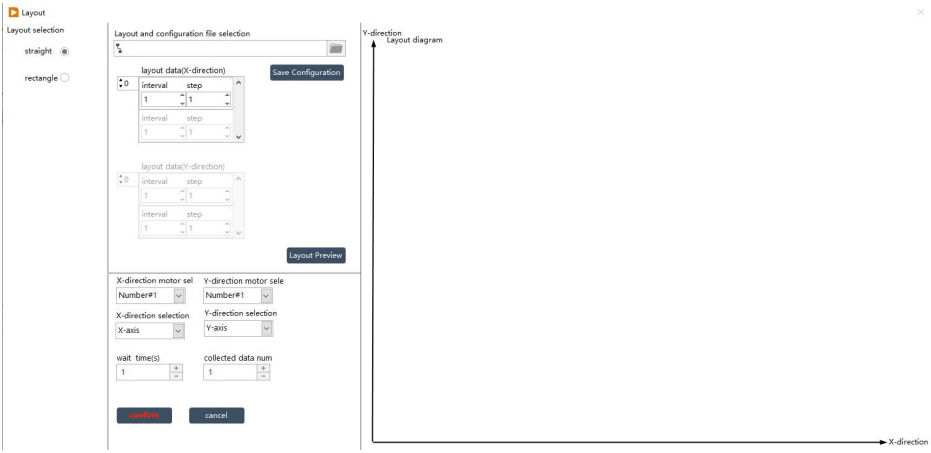


2.2.5.1 Select Interpolation File

Click on the "Probe" button on the screen to bring up the interpolation file selection screen. You can select one or more interpolation files.

2.2.5.2 Layout

Click on the "Trial" button to enter the setup screen.



- Layout selection:

  Currently support straight and rectangle selection.

- Layout:

  In layout data, specify the interval and number of running steps of layouts. It can support many different line segments (different intervals and number of steps, just specify multiple lines of data).

  Right click on "layout data" to delete the last line of layout data.

Right click on "layout data" to delete the last line of layout data.

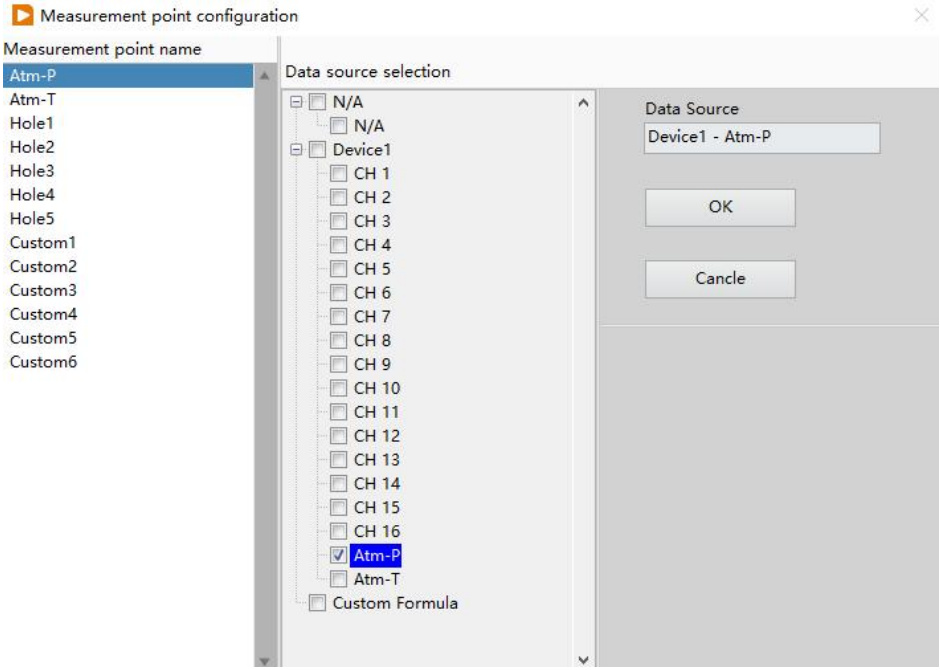
- Direction selection:
- When the layout selection is straight, the X-axis direction selection is valid, and the layout motion will occur according to the selected axis. When the layout selection is rectangle, the X and Y axis selection is valid.
- Wait time:
- Indicate that the motor waits for a specified period of time for data acquisition after achieving each layout.
- Collected data num
- Indicate the number of data collected at each layout, which are averaged and then interpolated.
- Save configuration:

  Click on the "Save Configuration" button to save the current configuration. Once saved as a file, it can be loaded later.
- Layout preview.

  Click on the "Layout Preview" button to preview the current layout. This is displayed on the Layout Preview screen.

2.2.5.3 Measurement Point Configuration

Click on the "Channel" button to bring up the measurement point configuration screen, where you can select and configure each measurement point.



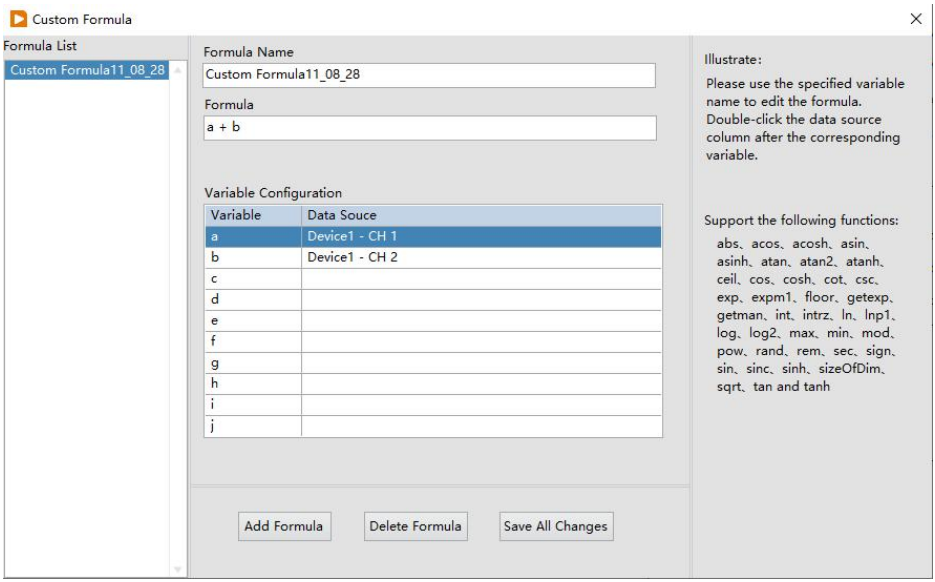
2.2.5.4 Testing and Emergency Stops

When the test conditions are met, all three indicators in the SYS area light up, and the button "Start Test" changes from the disabled state to the enabled state, which means that the test can be started.

Click on the "Start Test" button to start the test. During the test, every time a point is completed, the color of the point on the layout screen will change to red, which means that the data acquisition of that point is completed. Click on the "E-Stop" button during the acquisition process will stop the current test (including the operation of the displacement mechanism), and click on the "Start Test" button again will start the test again.

2.2.5.5 Custom Formula

Select the File -> Custom Formula from the menu item to enter the Custom Formula screen.



Custom formulas allow you to bind a specified device channel to a specified variable and perform calculations according to a specified formula. These formulas can be selected and used from the measurement point configuration screen.

- Add formula

  Click on the button "Add Formula" to add a formula;

  The formula name is initially composed of a fixed string "Custom Formula" concatenated with the current time (Hour_Minute_Second) and can be changed manually;

  Formula input box, according to demand, can be entered the specified formula. It supports the following correspondence.

Abs、acos、acosh、asin、asinh、atan、atan2、atanh、ceil、cos、cosh、cot、csc、exp、expm1、floor、getexp、getman、int、intrz、ln、lnp1、log、log2、max、min、mod、pow、rand、rem、sec、sign、sin、sinc、sinh、sizeOfDim、sqrt、tan and tanh

After inputting the formula, click on the blank space of the screen with the mouse, the bottom of the formula will prompt whether the formula is input correctly or not;

The variable names of the formulas are fixed, from a to j;

Double-click the “Data Source” column after the variable to bring up the data principle screen and bind the device channel to the variable.

Please click on the Save All Changes button after creating or changing a formula to make it effective.

- Delete formula

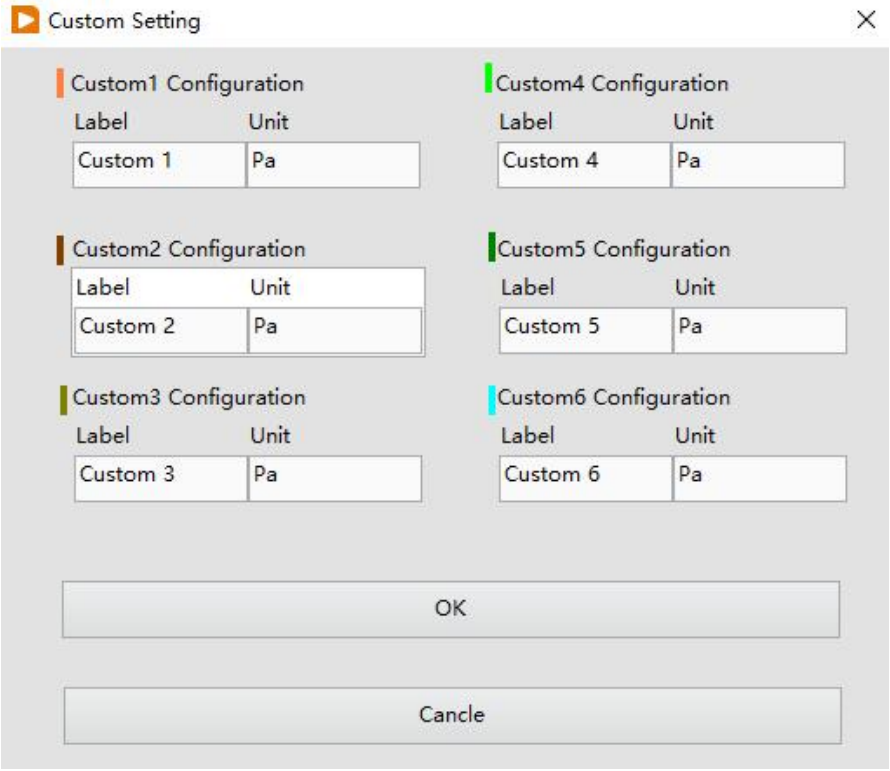
  Select one of the Formula List, click on the Delete Formula button to delete the formula, after deletion, please click on the Save All Changes button in order to take effect.

- Saving changes

  No matter adding, deleting or changing formulas, you need to click Save All Changes to make it effective.

2.2.5.6 Customized Measurement Points

Select the File -> Custom configuration item from the menu item to enter the custom measurement point screen.

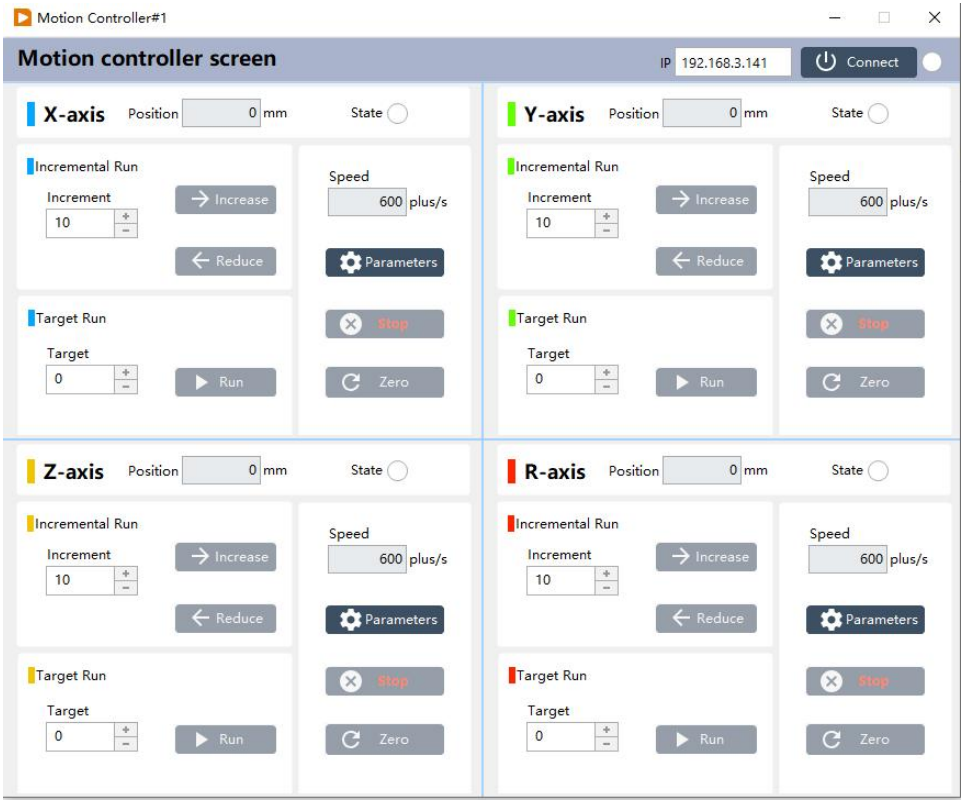


The names and units of the six controls here correspond to the six controls in the Custom section of the five-hole probe test screen. The label and unit can be changed.

2.2.6 Motion Mechanism

Click the "Motor" button to enter the Motion Controller screen.

The main screen shows the control interface for 4 axes (X, Y, Z, R).



① Device Connection: Input the IP address of the device at the top right, and click on the Connect button to connect. When the connection is successful, the indicator light next to the device will turn green.

② Motion Axis Run:

Control of the movement of the displacement axis can be divided into

two ways, one for the Incremental Run, the second for the Target Run.

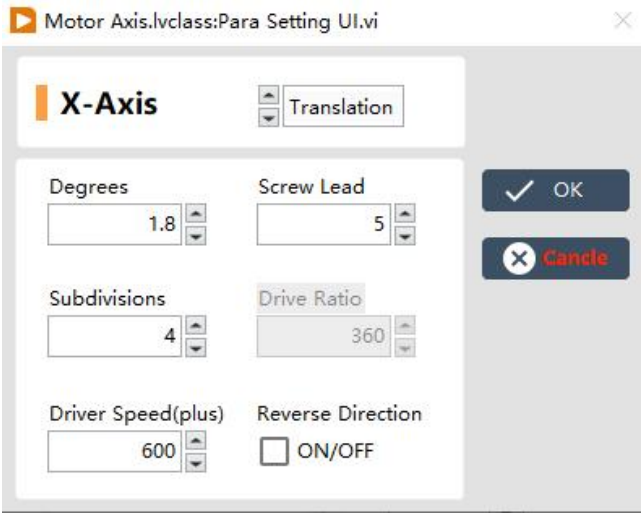
After inputting the incremental value, click Increase or Reduce button to control the motion axis to run in the corresponding direction. In the Target Run section, enter the target distance and click on the Run button to move the motion axis to the set target position.

③ Parameter Settings.

The stage type (translation stage or rotary stage) can be set for each axis. Parameters are set according to the actual motion table hardware parameters.

The drive speed is measured in pulses and is normally not greater than 1000.

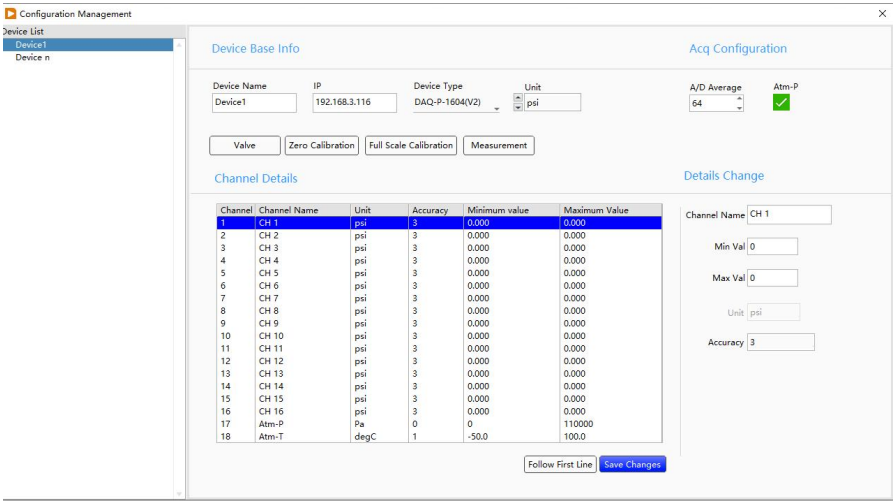
After selecting the Reverse Direction, you can reverse the current direction of motion (forward to reverse or reverse to forward).



2.2.7 Equipment Management and Configuration

This module allows to add, delete and configure devices.

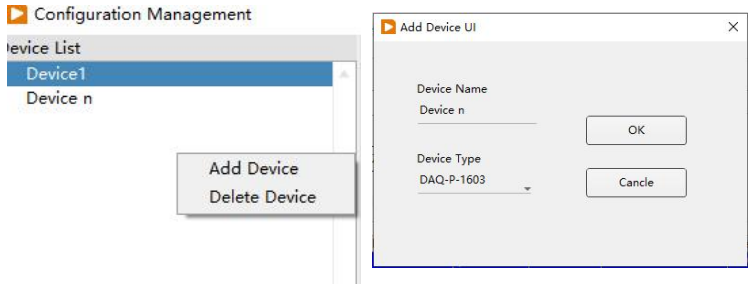
The left list is the device list column, and the right is the device configuration screen. The device configuration screen is different for different device types.



Channel	Channel Name	Unit	Accuracy	Minimum value	Maximum Value
1	CH 1	psi	3	0.000	0.000
2	CH 2	psi	3	0.000	0.000
3	CH 3	psi	3	0.000	0.000
4	CH 4	psi	3	0.000	0.000
5	CH 5	psi	3	0.000	0.000
6	CH 6	psi	3	0.000	0.000
7	CH 7	psi	3	0.000	0.000
8	CH 8	psi	3	0.000	0.000
9	CH 9	psi	3	0.000	0.000
10	CH 10	psi	3	0.000	0.000
11	CH 11	psi	3	0.000	0.000
12	CH 12	psi	3	0.000	0.000
13	CH 13	psi	3	0.000	0.000
14	CH 14	psi	3	0.000	0.000
15	CH 15	psi	3	0.000	0.000
16	CH 16	psi	3	0.000	0.000
17	Atm-P	Pa	0	0	110000
18	Atm-T	degC	1	-50.0	100.0

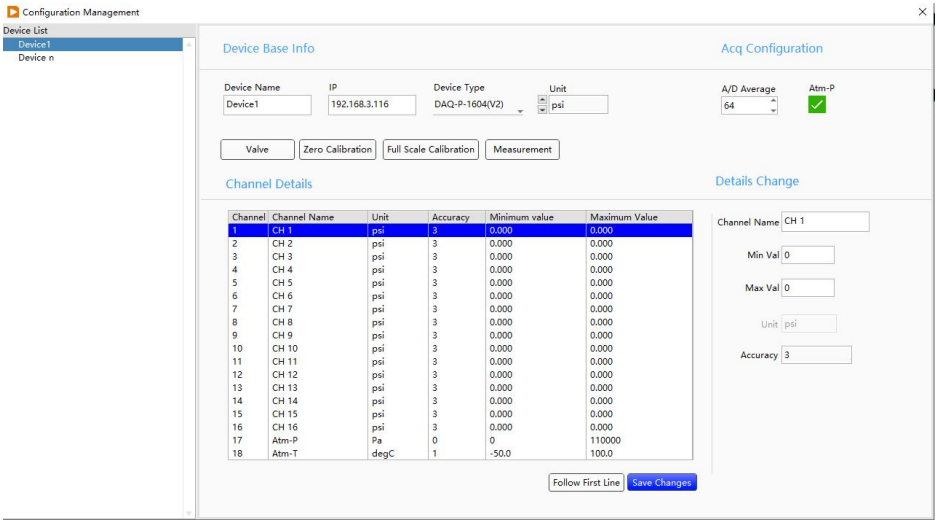
2.2.7.1 Add and Delete Equipment

Right click on the blank space of the device list, a shortcut menu will pop up, select Add Device, a list of device types will pop up, and you can add the corresponding device. (Note: Please restart the software after adding or deleting devices. When you add a device for the first time, please enter the IP address of the device and save it, and please restart the software to configure the rest of the configurations after the connection is successful).



2.2.7.2 Equipment Configuration

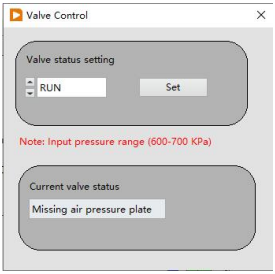
Take WTN DAQ-P-1604(V2) as an example, after adding the device, the configuration screen is as follows.



You can set the device name, IP address, range of each channel, unit, and channel name of the device.

- Valve setting

For devices that support valve settings, the device state can be set to switch between PURGE\ CAL and RUN states.



- Automatic full scale calibration (for 1604(V2) device type)

Click on the "Full Scale Calibration" button to enter the Full Scale Calibration function module.

This module enables full scale calibration of pressure scanning valves by means of standard pressurization equipment.

After entering the screen, if the device is connected, the corresponding "Open" button of the device will be grayed out and disabled, and the Device State will show the current state.

Note: When you use this module function, the device must be set to the CAL state..

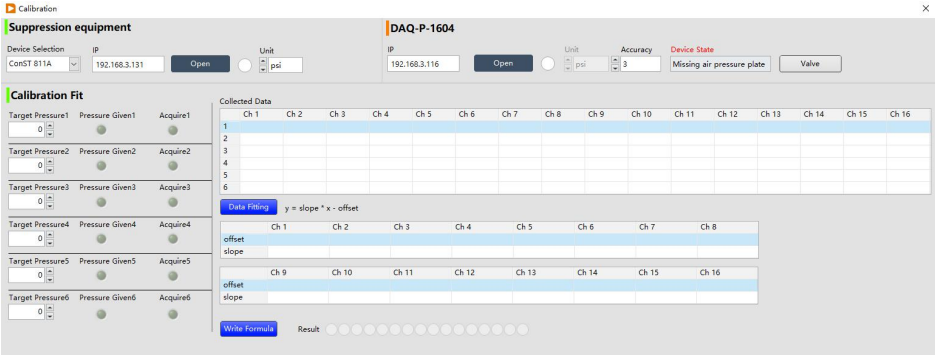
When the pressurizing device is successfully connected, the Pressure Given button will become available. Clicking on this button will cause the pressurizer to output the corresponding target pressure, which is the pressure value specified in the Target Pressure control.

When the pressure is stabilized, the corresponding Acquire button can be clicked to collect the equipment pressure, and the collected data will be

displayed in the Collected Data table.

When the target pressure and equipment pressure have been collected, click on the "Data Fitting" button to perform the fitting operation.

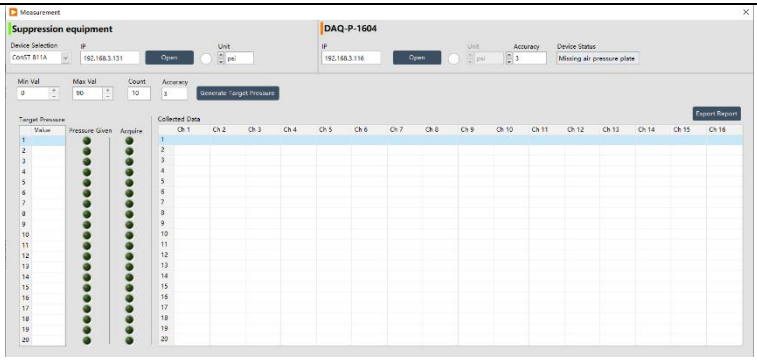
Click on the "Write Formula" button to write the fitting results to the device.



- Equipment Measurement

Click on the “Measurement” button to enter the equipment measurement module.

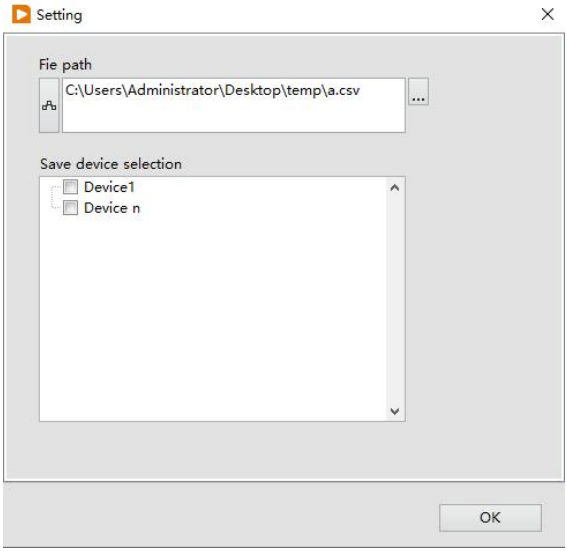
Click on the button “Generate Target Pressure” button to generate the target pressure according to the three values: Min Val, Max Val and Count. Click on the Pressure Given button to control the output pressure of the pressurizing equipment. Click on the Acquire button to collect the pressure of the current device. When all the data have been collected, click on the Export button to save the data to a specified file (the file template will calculate and output the data).



2.2.8 Setting

The setup screen allows you to set the path to save the data file and the device where the data is to be saved.

The data will be saved only when the device is checked.



2.2.9 State Column

At the bottom of the main screen is the state column. The bottom left corner is the device state indicator, and the bottom right corner is the system time.

Indicator lamps express the state of the device in different colors and states.

- White color not flashing: not connected, will not be connected automatically.
- Alternating white and red flashing: automatically connecting.
- Green: connected.
- Alternating green and red flashing: in the process of data acquisition.

Support and Service

Windtuner provides you with comprehensive technical support. For support, please visit the official website of www.windturner.com. You can also call Windtuner for help from engineers. For technical support, please call 0086+ 4006896933 or email us tech@windtuner.com Get support.

Disclaimer

Before ordering the product, please inquire with the manufacturer or distributor in detail about whether the product performance meets your needs;

2. Proper transportation, storage, assembly, installation, debugging, operation, and maintenance are prerequisites for product safety and normal operation. Our company is not responsible for any direct, indirect, intentional or unintentional damage or hidden dangers caused by improper installation or use.