VELAINSTRUMENTS®

Laser Metal Analyzer

Operations Manual

Jan. 17th, 2019
Vela Optoelectronics (Suzhou) co., Ltd

V1.1-201901

Section I

» Hardware

1、 Overview

Industrial-grade LCD resistive touch screen

Aluminum upper and front body

Multifunction trigger

IP56 certified enclosure

TPR anti-skid handle wrap

Battery compartment and cover

2、Install a Battery

- Press the button and open the battery compartment cover in the direction of arrow.

- Push the battery gently into the battery compartment. Stop when a clicking sound is registered

- Rotate and push the battery compartment cover slowly but firmly until there is a loud click.
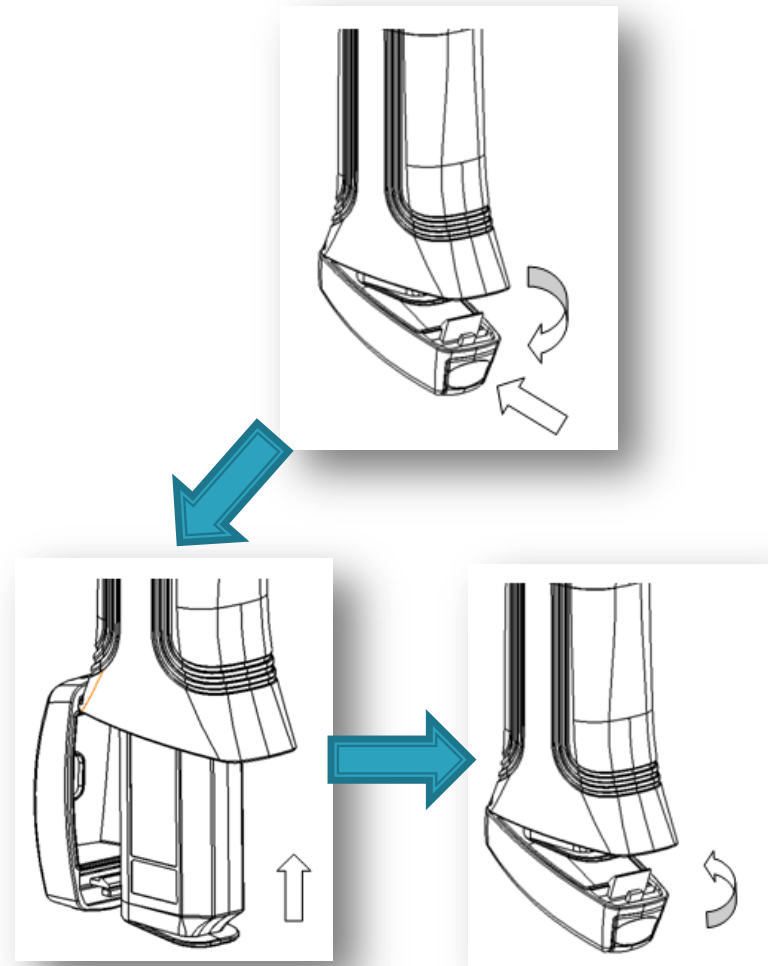
Battery is directional. Do not force it when it cannot go in. Reverse and retry

3、Power on

▸ Make sure the battery is fully charged

▸ Press and hold the trigger for ~3 seconds to power up the system. A green LED will light up to indicate system has powered up

▸ LCD screen will light up, initially white and then turning into a splash screen shown below. Eventually, a log-in page will be shown and the system is booted successfully
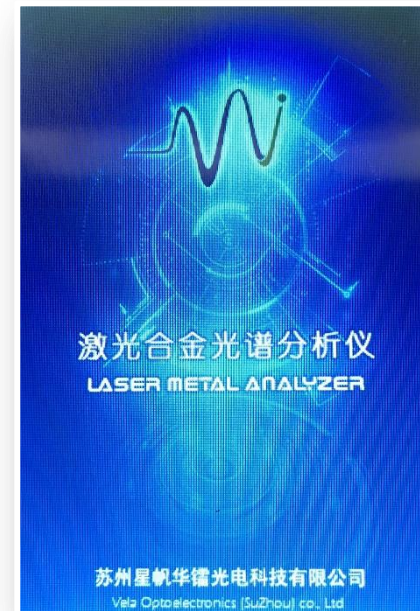
4、Password

- Instrument is password protected. Input the correct password to unlock the system
- Use "<<" to remove the last input one at a time
- Use "C" to remove all inputs
- For customer specific password contact factory when placing your order
- Resistive touch screen is slightly different from that of a mobile phone. Apply slightly more force when touching. Allow more time for it to response.
- You may wear any protective gloves when operating a resistive touch screen!
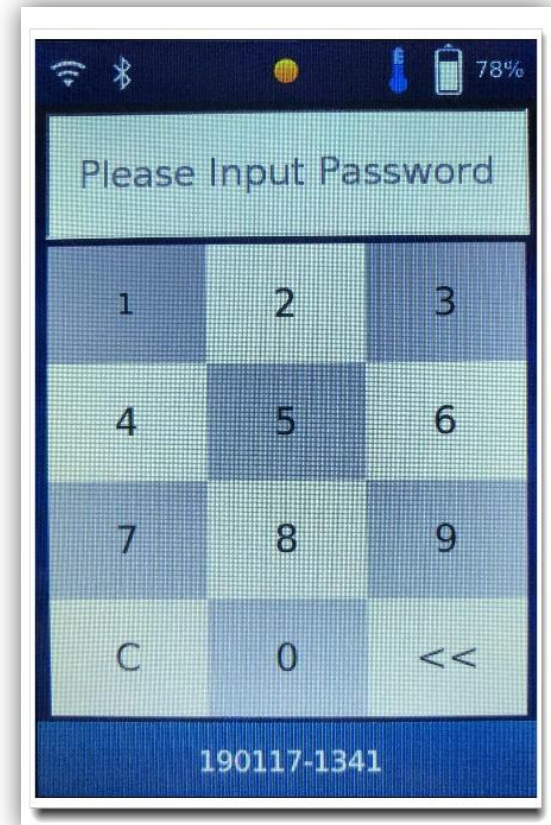
5、 System Initialization

- Upon power up, depending on ambient temperature the system requires several minutes to complete initialization. Watch for the thermometer icon on the status bar next to the battery icon

- Testing can only be conducted after the thermometer icon disappears

- Before initialization is completed, when trying to enter test mode a warning page will appear. That is normal. Just wait a moment longer
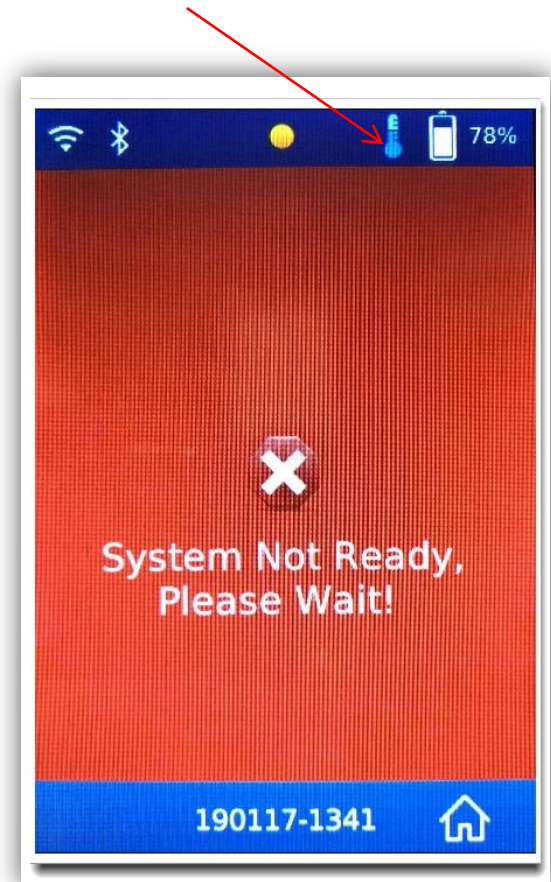
6、Testing

▸ Enter the testing page by touching the "Test" icon on the home page

▸ Select a relatively flat sample surface. Push the instruments front faceplate firmly against the surface and leave NO gap.

▸ Make sure the safety interlock is also pressed in fully. A yellow LED will light up to indicate it is ready for testing

▸ Press and hold the trigger for ~1 second to start a test. A red LED will light up and then turn off to indicate a test is finished

▸ The test results will be shown shortly after
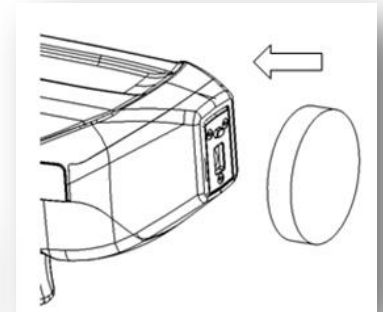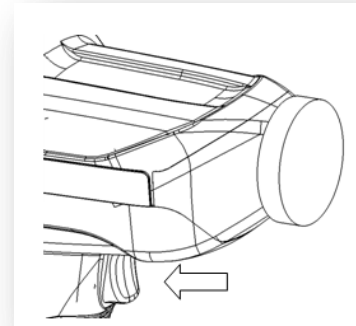
El	Min	%	Max	+/-
Al	95.80	**97.56**	98.60	0.13
Mg	0.80	**0.860**	1.20	0.025
Si	0.40	**0.677**	0.80	0.021
Cu	0.15	**0.296**	0.40	0.003
Cr	0.04	**0.229**	0.35	0.022
Fe	0.00	**0.224**	0.70	0.030
Ni		**0.048**		0.006
Mn	0.00	**0.034**	0.15	0.006

AA6061
AA6070 (0.00)

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During a test, you may hear a high-pitch humming sound. That is from the laser interacting with the material and is completely normal

7、Power off

- Enter the Settings page and scroll down to locate the "Power off" icon

- Touch the "Power off" icon to enter the confirmation page. Touch "Yes" to start the proper power down procedures. Touch "No" to cancel

- Set the instrument aside to wait for the instrument to power off automatically. This could take up to 20 seconds (recommended)

- One can also press the trigger once to turn instrument off after "Yes" is touched AND the LCD screen turns to white completed (not recommended)

- In case of an emergency, press and hold the trigger for ~20 seconds to power off the system
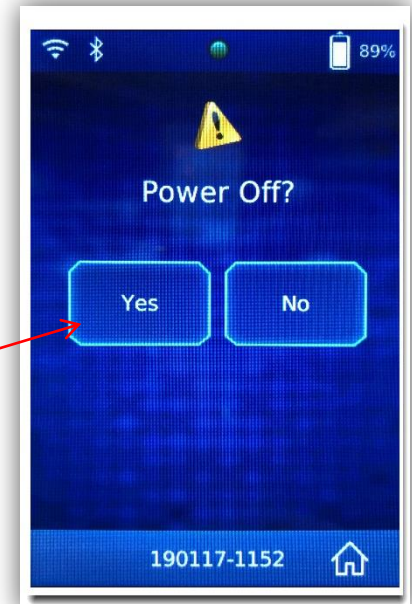
8、 Clean sampling chamber

- ▶ When a cleaning reminder is prompted on screen return to home page before cleaning the sampling chamber

- ▶ Use a dry cotton swab to gently swipe the two windows indicated on the right

- ▶ One can also damp the swab slightly with IPA to provide a better cleaning. If IPA is applied, allow adequate time for it to evaporate completely
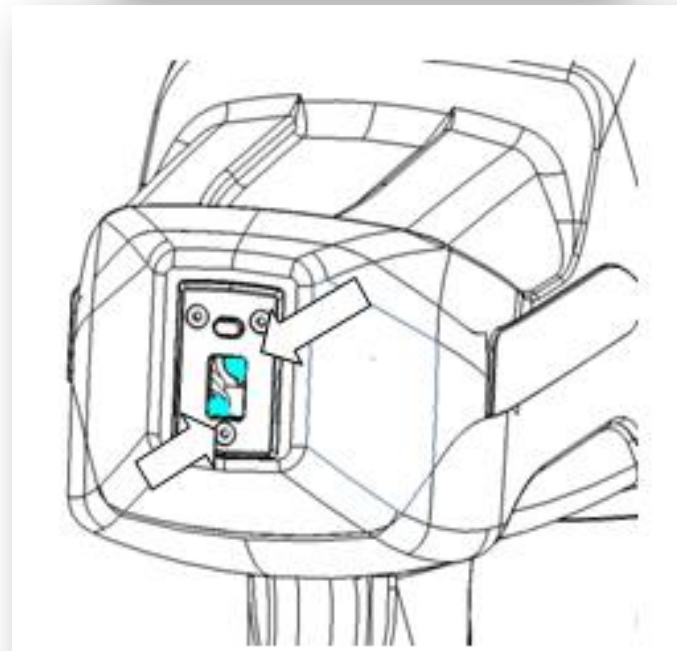
For your eye safety, return to home page before cleaning so that laser will NOT be triggered accidentally

9、Charge a battery

▸ Use only the factory supplied battery charging kit, including the DC power adaptor and a charging housing

▸ During a normal charging LED lights will flash

▸ Once fully charged all LED lights will stay on constantly. This may take up to 4~6 hours depending on the battery depletion level
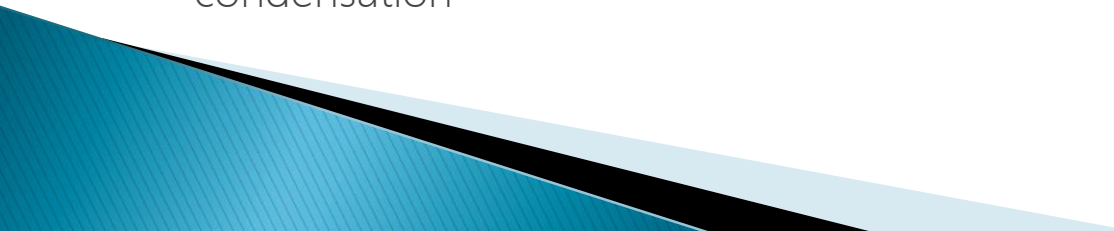
10、 Battery care

Battery display

- It is recommended to charge the battery when it reaches 20%. Do NOT let battery deplete completely

- The lithium battery pack will age over time. Contact factory for replacement when a battery can no longer hold adequate power.

- Never unplug the battery when system is powered on. This will result in irreversible hardware damage and void your warranty

- Do not use non-original charger. Contact factory for replacement
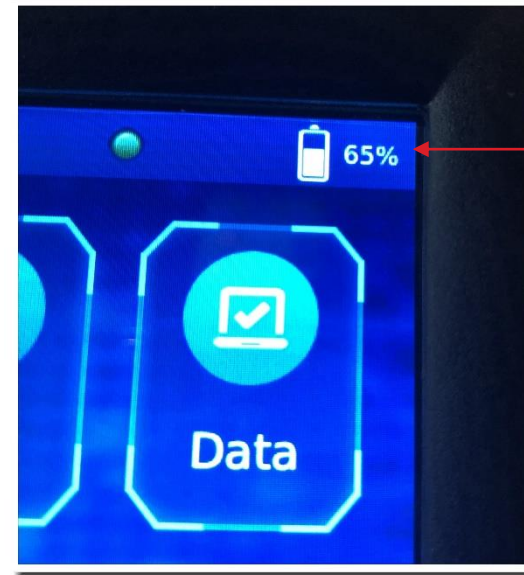
11、Instrument care

▸ Avoid small, hard, and sharp objects entering into the sampling chamber

▸ Always wear safety strap around the wrist

▸ Always put the instrument on a stand or in the Pelican case when not using

▸ Avoid hitting the instrument with any hard object. Shock may damage the delicate optical components inside

▸ Always take out the battery before placing it in the Pelican case. Store the battery in its dedicated slots inside the case separately.

▸ Do not attempt to repair or open the instrument. This voids the warranty

▸ Avoid using the instrument in rain. It may resist occasional water splash but it is not water proof. Water damage is not covered by warranty

▸ Avoid using the instrument in very humid environment to prevent failure caused by condensation

Section II

» Software

12、Home page

- ◆ Test - enter the test mode

- ◆ Data – review test results.

- ◆ Library – review available grades

- ◆ Settings – access various system settings
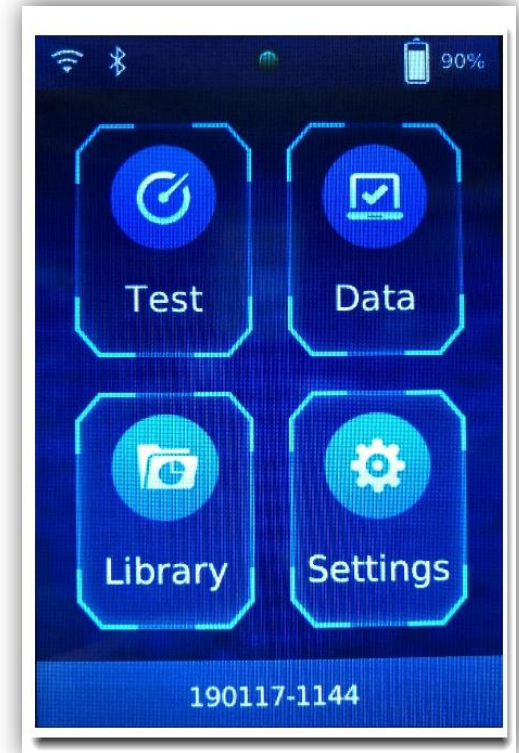
home page

13、Settings

1. Select Test Mode:

◆ Quick - single test with the grade and composition

◆ Sorting - single test with only the grade

◆ High precision - multiple tests with grade and composition

◆ Quick 2 – single test with only the composition

2. Select Alloy Mode: (Vary with system configuration)

3. Calibration mode

◆ To improve accuracy, regular calibration is recommended

◆ Use provided standards and follow the onscreen instructions to proceed

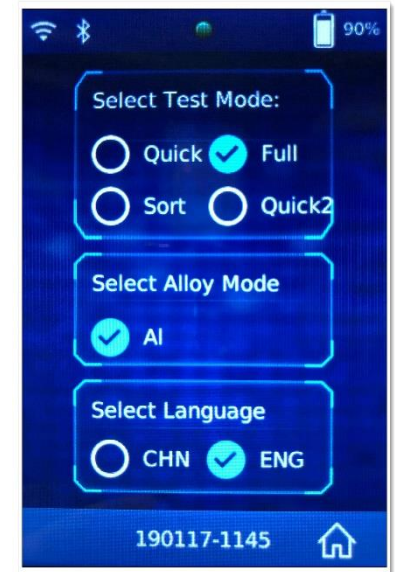## 4. WIFI

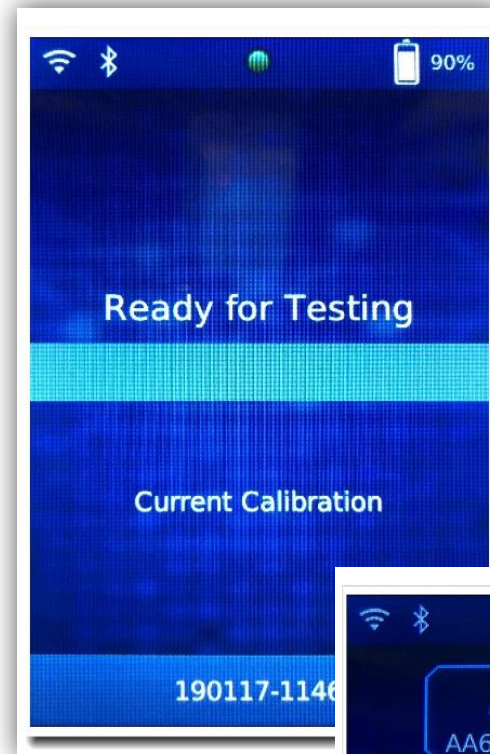◆ access only password protected WIFI networks

5. Bypass Safety:

◆ user can temporarily disable the safety interlock

◆ Safety interlock will reset to the default enable state upon restart

◆ A triangle warning icon will be shown in status bar when interlock disabled

6. Power off
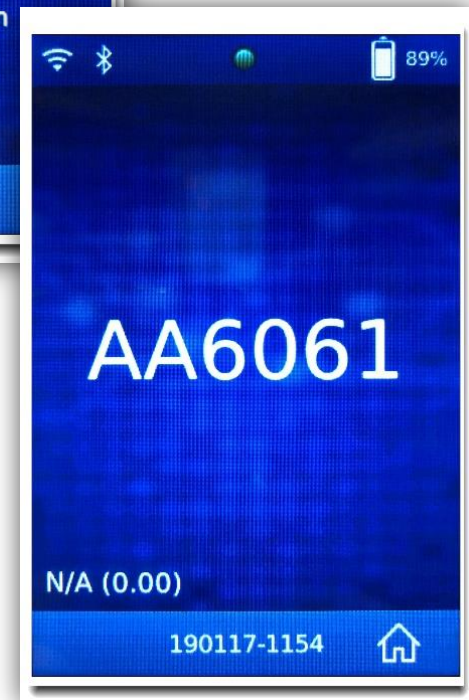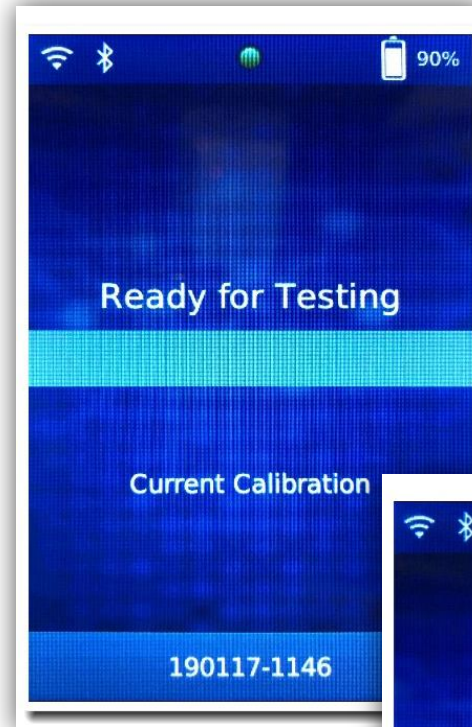
14、 Test – Quick Mode

1. Select the "Quick" option in the "Setting" menu and the proper alloy mode (if applicable)

2. Enter "Test" and wait for "Ready for Testing" to occur before starting a test. If calibration is available it will display related information under "Current Calibration"

3. Start a test

4. The test results in the quick mode will be displayed on the screen immediately

15、Test – Sort Mode

1. Select the "Sort" option in the "Setting" menu and the proper alloy mode (if applicable)
2. Start a test
3. The test results in the quick mode will be displayed on the screen immediately
4. **If available the second highest ranking matching grade will be displayed in the lower left corner**

16、 Test – High Precision Mode

1. Select the "High Precision" option in the "Setting" menu and the proper alloy mode (if applicable)
2. Start a test
3. High Precision mode contains multiple tests. The final results are the averaged values to counter inhomogeneity in material composition and testing fluctuation, ensuring the best results
4. Follow the onscreen count-down interval to ensure the best test results. The dot should be green before any test

17、 Test – Quick2 Mode

1. Select the "Quick" option in the "Setting" menu and the proper alloy mode (if applicable)
2. Start a test
3. The test results in the quick mode will be displayed on the screen immediately
4. **Quick2 mode display compositions only**

Name	Conc %	Err %
Al	97.34	0.00
Mn	1.08	0.00
Mg	0.794	0.000
Fe	0.548	0.000
Si	0.077	0.000
Cu	0.071	0.000
Ni	0.044	0.000
Cr	0.044	0.000
Zn	0.000	0.000

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18、Data

In "Data" you may:

1. Review the available storage size

2. Review any previous test results

3. Delete single results

4. Delete all results to free up storage
   space

5. Search previous results by Name or
   Data/Time

6. Print the results via Bluetooth Printer
   (Optional accessory)
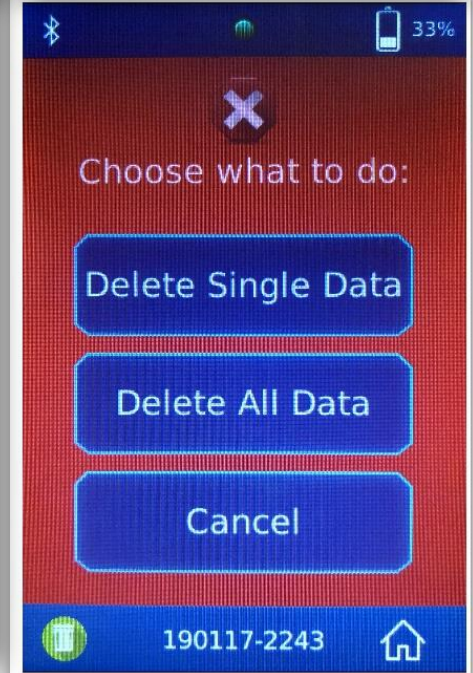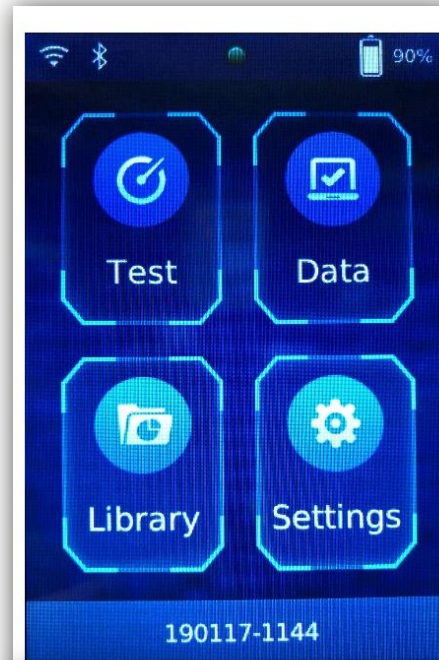
19、Library

In "Library" you may:

1. Review available grades including custom-defined grades

2. Search a specific grade by Name or Data/Time

20、WIFI Setting

In "WIFI" you may:

1. Review available

2. Connect to any password-protected WIFI network by entering corresponding password

3. Review current IP address

21、Calibration

In "Calibration" **you may:**

1. Review available calibration method. Their names indicate the specific standards to be used

2. Perform calibration procedure by following closely the onscreen instructions

3. Remove (reset) all previous calibrations.

4. A new calibration will automatically overwrite the existing one
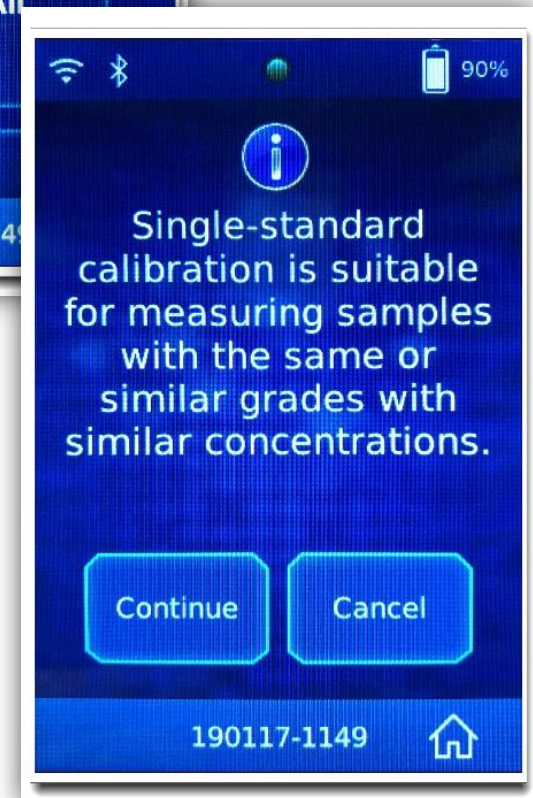
22. Printer (Optional)

1. Immediately after each test you will have the option to print the results if your instrument is properly configured with a Bluetooth thermal printer

2. You may also be able to print any previous test result in "Data"

3. Contact factory when ordering your instrument to add on a printer
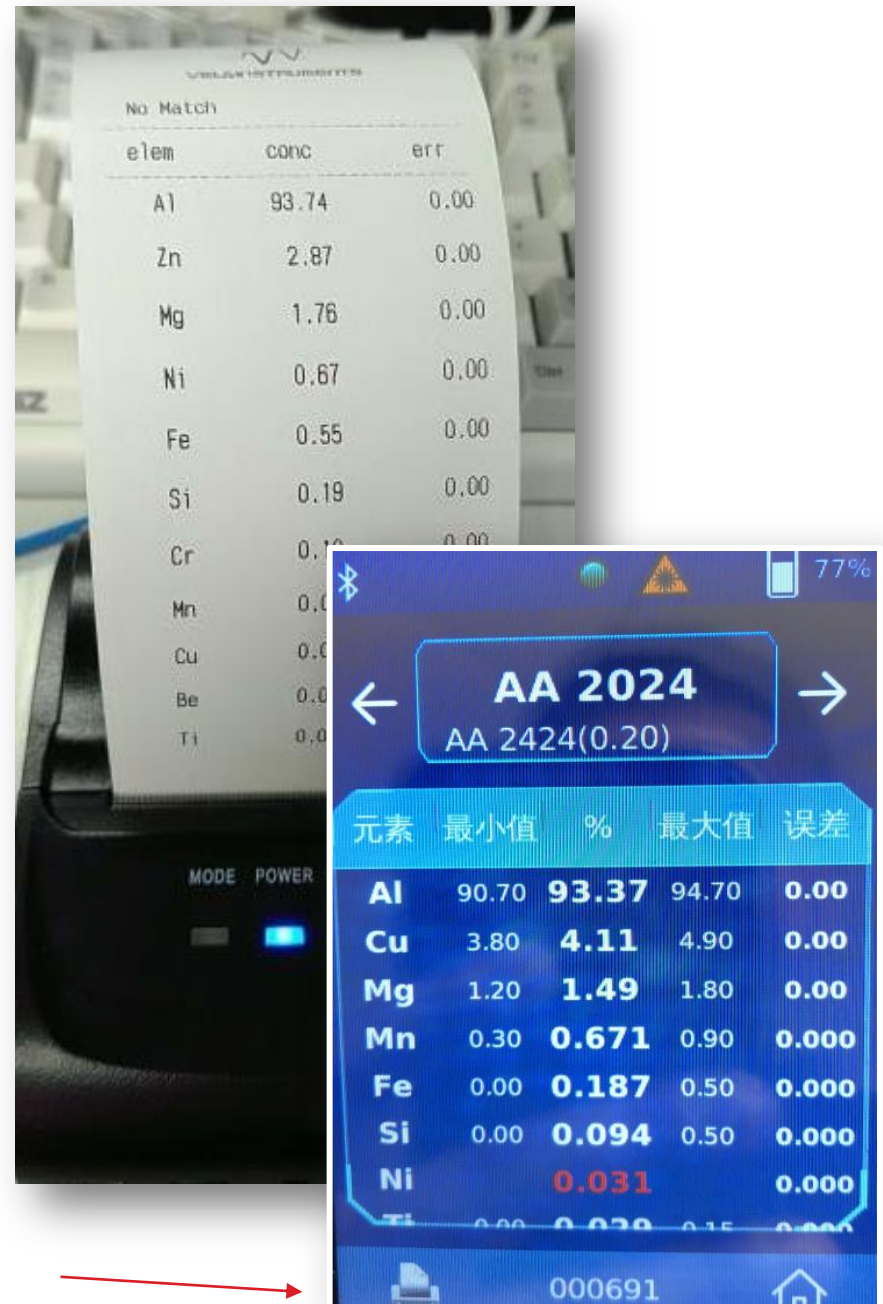
23、 Languages

1. Currently we support Chinese and English

2. Contact factory when ordering your instrument if a different language is needed
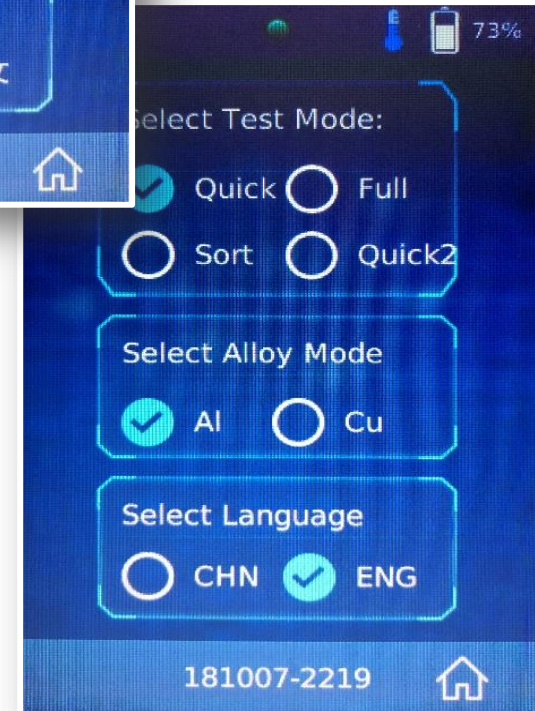
24、Test Results Explanation

Results page consist of two parts:

▸ Grades. If available, the second highest ranking grade also shown in the lower left corner with its relative likeliness in parenthesis

▸ Composition, sorted by concentration in descending order

▸ White: values in grades defined range.

▸ Yellow: values outside the defined range but within 10% deviation

▸ Red: values with a deviation of more than 10% , or undefined element (tramp) concentrations

25、Error Message

An error message shown to the right will occur when a test is deemed invalid. The underlining causes are:

1. Sample is not firmly touching the front faceplate of the instrument, resulting in a much small signal which SNR exceeds safe guards

2. If such error persists it may indicate severe hardware malfunction or failure. Reboot several times to see if it clears. If not, contact factory promptly to get a RMA number for repair
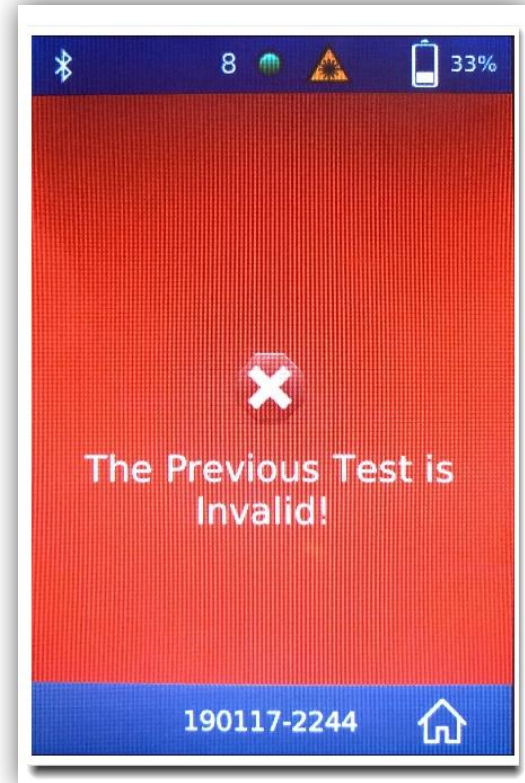
Error messages

Customer Service Contact

◆ Our customer service hotline is：

    ◆ +86 512 58716803 （Beijing Time from 8:00 to 17:00, UTC +8 ）

◆ The emergency contact number during non-working hours is：

◆ Our professional engineers will help you solve any problems in the use of the equipment.

◆ Send an email to : help@velahh.com for product support

Technology	Laser based, no ionizing radiation hazards
Dimension (L*W*H)	227*86*234 mm
Weight	2.75 lbs (1.25 Kg), including battery
Battery	14.8V, 3250mAh, 48Wh,
IP certification	IP54
WIFI	2.4GHz 802.11n wireless
Bluetooth	Bluetooth 4.1 Classic, Bluetooth Low Energy
Display	4.0 inch Resistive touch screen, 320*480 pixels
Internal Storage	8Gb standard, 16Gb upgradable
Laser	Class 3B, 1064nm Passive Q-switch solid state
Spectrometer	< 0.2nm resolution, 250~415nm spectral range
Single Test time	~1 second
Alloy Base	Aluminum alloy
Element Capability	Al Be Bi Cu Cr Fe Mg Mn Ni Si Ti Zn (other elements possible)
Sample Varity	Block, sheet, foil (~0.1mm), large chips (no powders)
Detection Limit	Varies with elements, the least sensitive is Zn (~0.1%)
Grade	1000~8000 wrought aluminum and cast aluminum grades
Library	UNS based, highly customizable
Working Temperature Range	0~40 Celsius, 5~35 Celsius recommended
Other Features	• Easy to use, no extensive training required,
	• Safety, laser interlock, safety harness strap
	• Spot calibration function
Warranty	One year factory warranty on all parts
Cost	among the most competitive
Maintenance	• Daily sample chamber cleaning;
	• Regular calibration using CRM's
Accessories	• Bluetooth thermal printer
	• Silicone protective sleeve
	• Leather protective wrap
	• Two-position metal stand
	• Curved face plates for measuring pipes
	• Small fixtures for measuring welding rods
	• Compact Pelican iM2100 Storm with custom foam inserts
	• Safety harness strap

RF Exposure Information and Statement

The SAR limit of USA (FCC) is 4.0 W/kg averaged over ten gram of tissue. Device has also been tested against this SAR   limit.

This device was tested for typical extremities operations with each surface of the devices against the human hand.

To maintain compliance with FCC RF exposure requirements, The use of accessories may not comply with FCC RF exposure requirements, and should be avoided.

This device complies with part 15 of the FCC rules and RSS-247 of Industry Canada. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This Class A digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

NOTE: The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCCRules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FC IC