

SVLD1 Valve Leakage Detector (AE)

User Manual



QAWRUMS Ltd.
www.aendt.com

Quick operation guide

Firstly, connect the sensor with the detector

1. press "start" for a long time to enter the main interface of the test, ensure that the sensor and valve are well coupled during the test.
2. Press "Test" button to do valve leakage detection;
3. Press" FFT" to view the FFT spectrum of the measured signal;
4. Press" Back" to switch to current displayed acoustic emission parameters;
5. Press" Save" to save the current testing datum;
6. Press" Valve" to switch to the saved valves;
7. Press "Filter" to switch the currently selected filter to the sampling rate ;

When no leakage calibration is carried out, press "Test" to get parameters like RMS, ASL, P of the valve, and the current display parameters can be switched by pressing "PARA", the reference value of corresponding leakage amount below is 0.

Leakage calibration :

Press "Menu", firstly add new valve to be calibrated in "valve" option, select the corresponding valve from the "calibration" options; select the corresponding filter and sampling rate in the "add" option, add the calibration curve, and select the corresponding curve in the calibration curve list.

After entering the standard leakage amount, move the cursor to the RMS option, press the "test" key to generate the current calibration value.

Remarks: The more points there are, the more accurate the reference value of leakage is.

Announcement

Our company is irresponsible for any results caused by mistaken operation, pls obey the operation manual strictly; if any abnormal conditions take places during usage, pls don't disassemble the machine without permission for maintenance, and timely contact our company for processing.

For more detailed info, please visit our website: <https://www.aendt.com>, or please call at: 86-20-32290092

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Chapter 1: Introduction

Firstly, thank for purchasing our Handheld Valve Leakage Detector (AE). Set up reference number of the leakage rate through gathering fixed length AE signals, processing and calculating effective parameters like RMS, ASL, P; at the same time can demarcate the leakage rate of the detecting device in advance, through internal calculation to output parameter- the demarcated curve of leakage rate, thus can output reference values of current leakage rate of the valve while testing.

This instrument applies the principle of acoustic emission technology, easy to operate small volumelong working time. Before using it, pls read the operation carefully. This manual mainly describes its function technical parameters, settings, operation, calibration, etc., in order to make customer to know how to operate it in short time.

1.1 Technical parameters

Model No.	SVLD1
Parameter	
Sampling frequency	optional 4MHz/2MHz/1MHz/500KHz/200KHz/ 100KHz/50KHz/20KHz
Sampling precision	16bit
Response frequency	1kHz-1MHz ($\pm 1.5\text{dB}$)
Protection level	Host machine: IP64; sensor: IP66
Channel quantity	1
Working temperature	-10°C ~ 50°C
Working humidity	20% ~ 90%RH
Built-in preamplifier	26dB (Sensor)
Analog filter	Six kinds of filters can choose (1KHz-1MHz, 1KHz-600KHz, 20KHz-1MHz, 20KHz-600KHz, 100KHz-1MHz, 100KHz-600KHz)
Power	3VDC (two pieces of AA alkaline battery)
Working time	280 hours (Auto backlight) 100 hours (Backlit open)
Screen	128x64 lattice LCD
Outside size	136 (L) x72 (W) x20 (H) mm
Weight	176g (including batteries)
Working temperature	-10°C ~ + 50°C (high temperature probe working temperature: < 300°C)
Working humidity	20% ~ 90%RH
Storage	50,000 groups testing datum
Valve quantity	200
Generated parameter	RMS, ASL, P

1.2 Main Characteristics

- Applying the principles of acoustic emission technology, it is simplified operation process and easy to be operated. Multiple shortcut keys are set to complete leak detection with one key;
- Choosing AE time indicators (RMS, ASL, P) as leakage testing parameters, thus can calibrate the valve leakage rate. Once leakage rate is calibrated, the detector can display the referential values while testing;
- Obtaining FFT frequency spectrum analysis function, can check FFT frequency spectrum signals of current testing data at any time;
- Up to 200 kinds of different valves are available, each kind of valve can store up to 8 calibration curves;
- 16 digital sampling precision, sampling frequency can be adjusted based on the frequency range of leakage signal;
- kinds of analog filters can be selected, and can filter the noise signal according to test condition
- Two pieces of AA dry batteries to supply power, normal endurance time can achieve 100 hours, it is easy to replace the battery, and is applicable for long-time working outside, small volume low weight, easy to carry;
- Two kinds of alarming modes: beeping and flashing alarm, can set up two kinds of alarm limits: first level and second level, alarming data can be saved automatically;
- Datum storage shortcuts are set up, can finish datum storage by one button, can track and record time date simultaneously datum storage volume can achieve 50,000 groups;
- Communication interface: high speed of USB interface which can export the datum, also can processes datum on the master computer.
- Working way: can offer testing of valve AE parameters and valve AE leakage rate (which are under demarcated condition) ;
- Daily AE valve leakage detecting can be done through operating the functional button, easy to see and to learn, no need to operate it by entering menu.

1.3 Configuration list

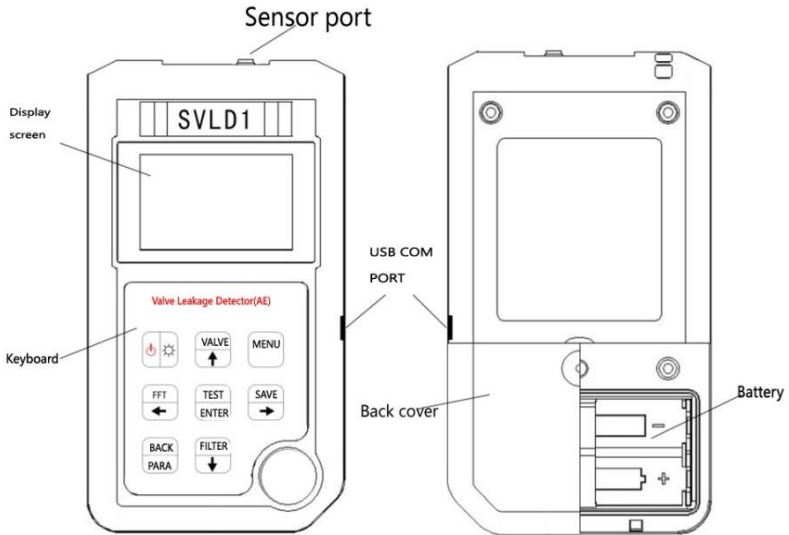
NO	Model Name	Unit	Quantity
1	SVLD1 Machine	set	1
2	Plastic box	piece	1
3	AE Sensor LS35 5VDC, with coaxial cable	piece	1
4	Mini-USB cable	piece	1
5	PC software	Set	1
6	User Manual	piece	1
7	Warranty Card	piece	1
8	Conformity Card	piece	1

1.4 Cautions

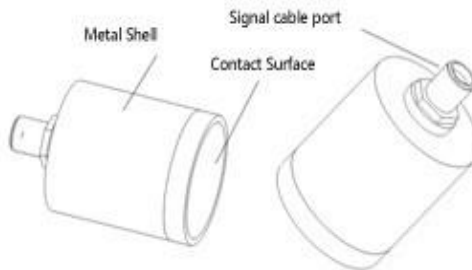
- In order to make sure safe operation, the person who use this instrument should know related NDT Knowledge firstly;
- This instrument should be used under permissive condition, especially cannot be used in strong magnetic field and under strong corrosive environment;
- During the operating process, please obey the instruction to use correctly, make sure safe operation, thus to avoid unnecessary loss;
- During testing process, if the instrument indicates that the power is too low, please replace the battery in time to avoid the measurement error caused by the voltage is too low;
- If the device is not used for a long time, the battery should be taken out and placed separately, in order to prevent battery leakage damage to the device;
- Please contact us if there is any fault, do not disassemble and repair by yourself.

Chapter 2: Brief Introduction of Host Machine, Keyboard and Display

2.1 Introduction of the host machine



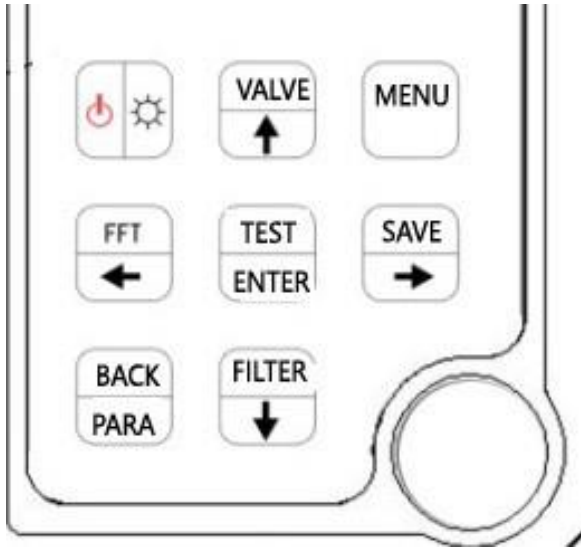
Picture 2-1: SVLD 1 Valve Leakage Detector (AE) host machine



Picture 2-2: Sensor Sketch Map


2.2 Keyboard introduction


The keyboard of the leak detector is shown in picture 2-3.




Picture 2-3: Keyboard Sketch Map

Keyboard Introduction:

: " On/off" , press it for 2 seconds to turn the instrument on, at the same time it performs the self-inspection; once under the testing condition, press it for 2 seconds to turn off the instrument. Press this button only for short time, turn on or off the screen backlight.

 : Under the test interface, press this key to quickly switch and select the gate. Press this key in the menu interface to select or change values up.

 : press the key to enter the menu list, in the menu list can do setting calibration or view operations.



In the test interface, press the key to analyze the current test data FFT, display the FFT spectrogram, and press the key again to exit. Press this key in the menu interface to perform the left selection operation.



: In the test interface, press the key to test, and the results are displayed on the screen. Press this key in the menu interface to perform the confirmation operation.



: In the test interface, press the key to save the current test results, and the data is stored according to the valve number with time mark. Press this key in the menu interface to perform the operation of right selection.

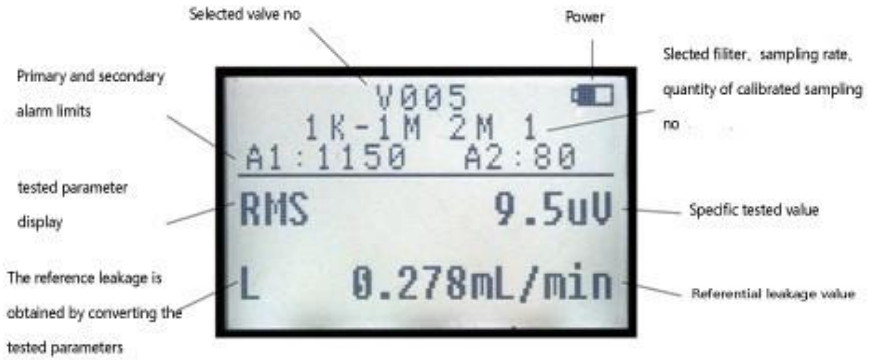


: In the test interface, press this key to switch the currently displayed parameters; Press this key in the menu interface to perform the back operation .




: Under the test interface, press this key to quickly switch and select the filter and sampling frequency of the current gate. Press this key in the menu interface to select or change values down.

2.3 Display introduction



Picture 2-4: Test interface diagram

Chapter 3: Menu and display

This chapter will introduce the menu functions and Settings Press  to enter the menu interface, including four options: valve, calibration, save and set, as shown in picture 3-1.



Picture 3-1: Menu display

3.1 Valve

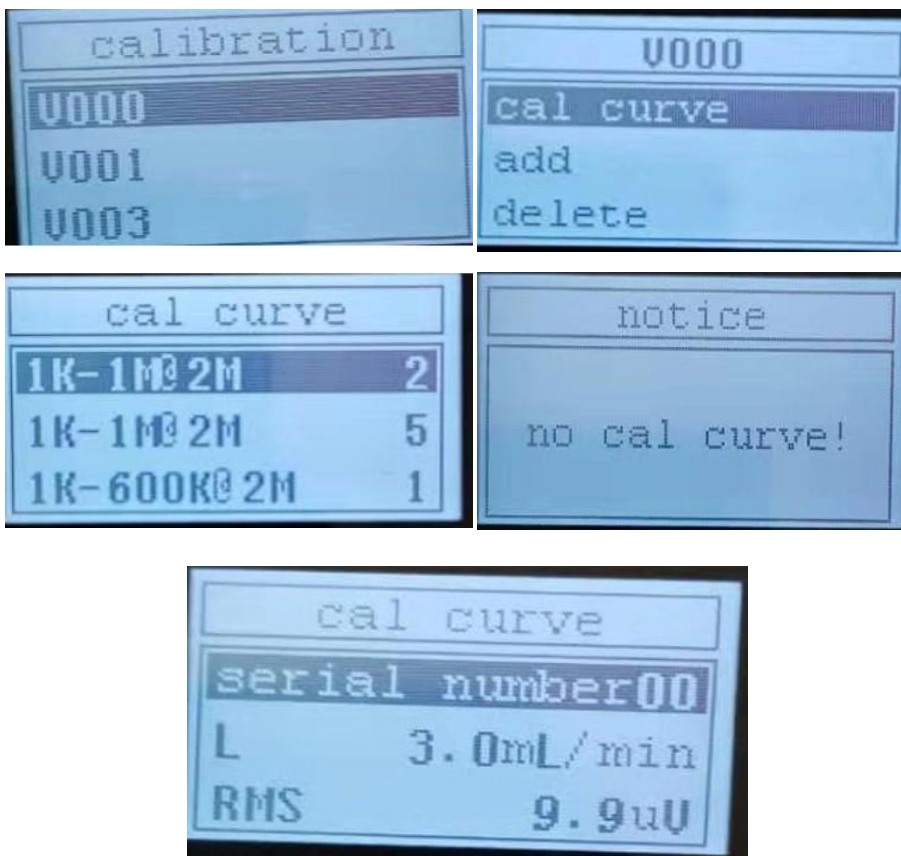
Enter the valve option to view the valves that have been set for the current instrument, and to add or duplicate the valve number as needed (change valve number), and to delete specified valve number.



Picture 3-2: Valve options related to operation

3.2 Calibration

Enter the valve calibration option to select the specified valve sampling rate and filter, and at the same time, perform the calibration operation (detailed in chapter 4). According to the same valve, up to eight calibration curves can be set (namely, a total of eight sampling rates and filters be matched). And the calibration curve can be added or deleted.



Picture 3-3: Calibration related operation

3.3 Save

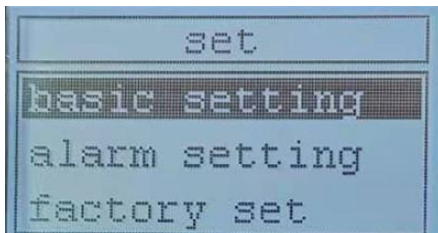
Once enter the save, user can check and see the measured data and alarm data, and check the total memory space and available space.



Picture: Saving related operation

3.4 Setting

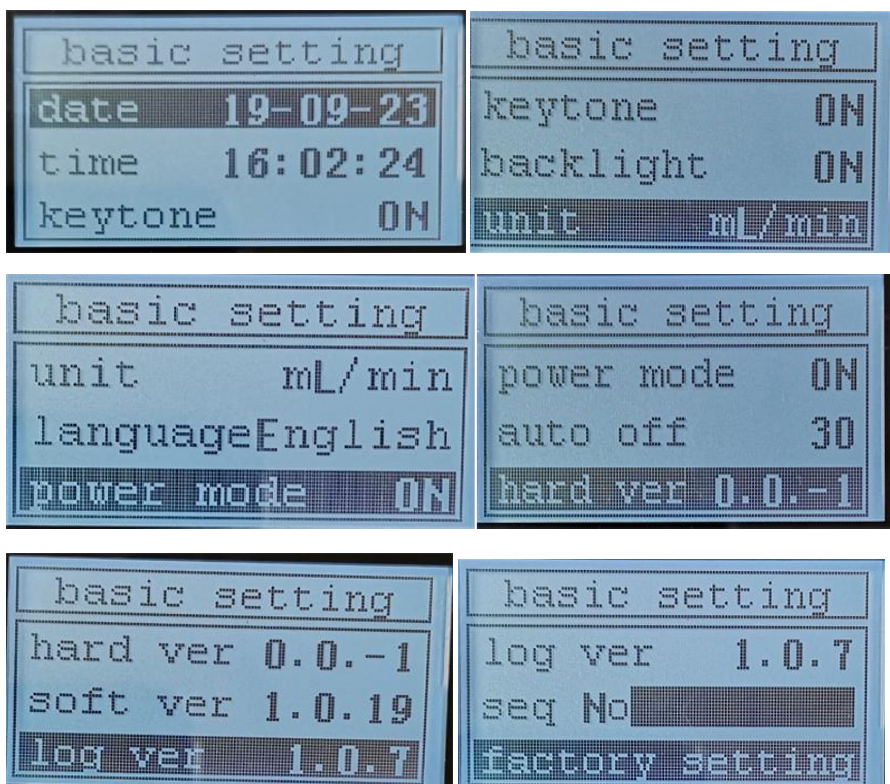
The setting options include basic setting, alarm setting and factory setting, in which the factory setting is used by the manufacturer for debugging, and the operator does not need to change it.



Picture 3-5: Setting option

3.4.1 Basic Setting:

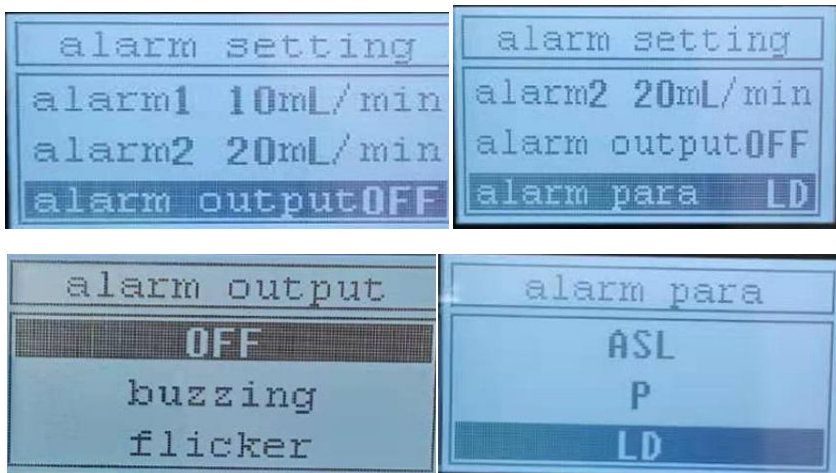
- Enter the basic Settings option and change the following Settings:
- Date and time, once the data is stored, the current time is also stored for easy looking up;
- The key sound and backlight can be turned on or off
- Unit can be set as the display unit of leakage amount: mL/min or L/min;
- Language options can be switched between Chinese and English; The power-saving mode can be turned on or off. The power consumption of the instrument will be reduced when the power saving mode is turned on and the battery life will be prolonged
- Automatic shutdown time can be set in min. All the series no of Hardware version, software version and logical version is systematically displayed, and cannot be changed.
- Click on factory Settings and it will prompt you to restore factory Settings. Click confirm to restore factory Settings and the data will be cleared.



Picture 3-6: Basic setting related operation

3.4.2 Alarming Setting

When entering the alarm setting options, one or two alarm limits can be set; the alarm output can turn off the alarm, or the alarm can be prompted by buzzing or flickering mode; the alarm parameters can be selected as the reference standard for the alarm (RMS/ASL/P) or leakage.








Picture 3-7: Alarming setting related operation

Chapter 4: Brief Operation Introduction

4.1 Value Setting

When setting valve number, input calibration leakage, setting time and date, setting alarm line and so on, value will be needed. Take increasing valve number

as an example, press  to select the position to be changed, press  buttons of   to change the related numerical value, press  to complete the value.

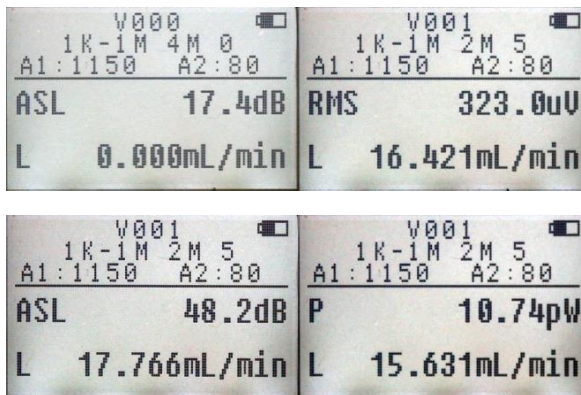


Picture 4-1: Valve no setting

4.2 Test


No matter whether the instrument has been calibrated in advance or not, the valve can be tested. The difference is that only the acoustic emission parameters (RMS/ASL/P) are obtained when the instrument is not calibrated, and the corresponding leakage is shown to be 0. After calibration, acoustic emission parameters and corresponding leakage reference values can be displayed simultaneously. Firstly, the sensor is well coupled to the valve to be tested and pressed under the test interface. After the instrument completes the test, the results are automatically displayed and the current display parameters are switched by keys.

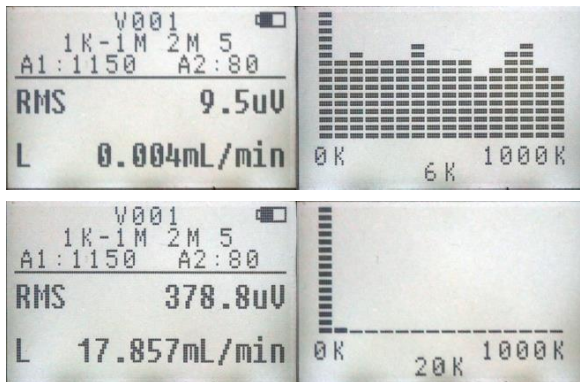
Picture 4-2: The display result of no-calibration and after- calibration



Note: After calibration, the instrument will make three independent curves according to different parameters, and then get the reference value of leakage, according to different parameters, the value of leakage will be different.

4.3 FFT Spectrum Analysis

After the test is completed, the instrument can perform FFT spectrum analysis of the current test results: under the test interface, press  to enter the spectrum analysis interface, the vertical coordinates are generated with the peak of the spectrum as the maximum value, the left and right sides of the abscissa show the frequency boundaries of the two ends respectively, and the middle part below shows the calculated peak frequency position. The following figure shows the FFT spectrum of the sensor when exposed to air to test blank noise and normal test respectively.








Picture 4-3: Blank noise and normal test FFT spectra

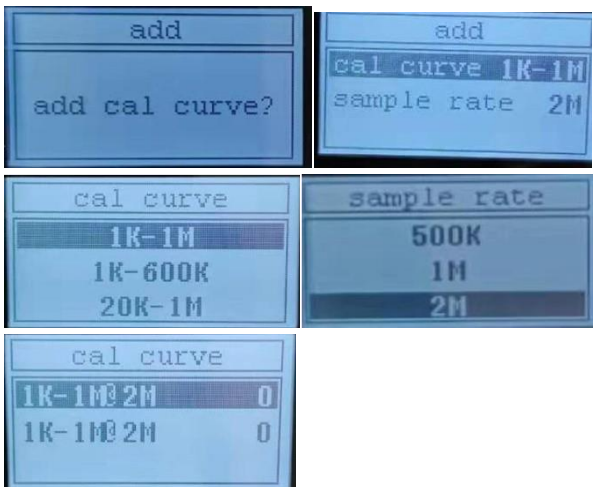
Note: FFT analysis results only show and cannot be saved

4.4 Calibration

When the operator has calibration conditions, that is to say, the current leakage flow can be quantitatively displayed through the flow meter for the designated valve, and the calibration curve can be generated inside the instrument by measuring the parameters under different flow rates. The reference value of leakage can be displayed according to the calibration curve during the test.



1. Press  →select “Calibration” →select appointed VXXX→select “add calibration curve” or modify the content of existing calibration curve
→set the filter range of the calibration curve and sampling rat→press   to finish setting. In the calibration curve, select the corresponding settings


keys →press   to enter the calibration interface, as shown in the figure below:1K-1M@2M is the filter range and sampling rate, and 0 is the current number of calibrated points.

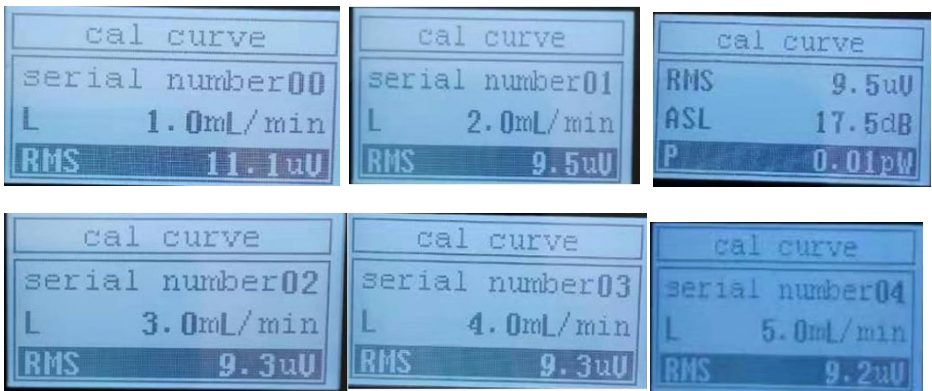


Picture 4-4: Adding calibration curve


2. No is current number of calibrated point→L is the standard leakage value set

→Press  to modify the valve→Cursor moves to RMS, press  to get the

parameter date and save automatically→Cursor moves to No, press  to turn to the next serial number, repeating above operation, and get more multi-point calibration curves.



Picture 4-5: Calibration leakage value

3. After the calibration, press  to exit to the test interface. Refer to 4.2 to test the valve leakage.

Note: The maximum number of calibration lines is 8. The more the number of calibration points, the more accurate the reference value of leakage generated.

Chapter 5: Maintenance

5.1 Application notice

- Do not expose this instrument to strong acid or alkali chemicals;
- Please do not use sharp objects to depict the display screen.
- While replacing the sensor, please pinch the probe cable plug and insert it. Do not pull the probe cable directly.
- Avoid wiping instruments and accessories with wet cloth during daily cleaning.
- Forbid to touch liquid at probe and USB interface
- Never scrape the sensor surface on the rough surface

5.2 Daily Maintenance and servicing

- Clean up the dirt on the surface of the instrument regularly.
- Wipe the instrument surface with a semi-wet cloth when cleaning.
- Use neutral detergent to clean instrument surface
- If you do not use the battery for a long time, please take it out.

Chapter 6: Fault analysis and troubleshooting

Fault phenomenon	Fault Eliminating
Excessive deviation of measurement data	<ol style="list-style-type: none"> 1. Check whether the sensor and valve are well coupled. 2. Check whether the sensor is in good contact with the instrument. 3. If the contact is good, please replace the sensor and try again. 4. Retry after restoring factory settings 5. Please contact us when all the above tests are normal. Please contact us.
Unable to open	<ol style="list-style-type: none"> 4. Check if the battery is installed correctly. 5. Please contact us when all the above tests are normal.
4. Degradation of measurement accuracy	<ol style="list-style-type: none"> 1.Re-calibration of probe zeros 4.Re-calibration of material sound velocity

Chapter 7: PC Software

Firstly, use “USB” cable to connect the machine and the computer, the computer can automatically identify the storage function of the machine, user can down load the testing leakage datum and save them to the proper position in the computer.

Secondly, open the PC software, then open the proper data file saved before in the computer, then all the related parameters can be displayed in the computer. Below picture 7-1:is an operation snapping sample:

Cal Curve - QingCheng AE Institute Co. Ltd (www.ae-ndt.com)

Open Folder: D:\产品资料\20190603\附件\网站翻译\手持声发射仪\选器检测例\DATA\V001 Cal Name: V001

ID	Filter	Sample Rate	Sample Length	Cal Points	Leakage Display	RMS	ASL	Power
1	1KHz - 1MHz	2MHz	1024	2	10.0000	9.8903	17.9483	0.0098
					11.0000	9.9718	17.9417	0.0099
					12.0000	0.0000	0.0000	0.0000
					0.0000	0.0000	0.0000	0.0000
					0.0000	0.0000	0.0000	0.0000
					0.0000	0.0000	0.0000	0.0000
					0.0000	0.0000	0.0000	0.0000
					0.0000	0.0000	0.0000	0.0000

Test Data: 15

ID	Date Time	Filter	Sample Rate	RMS	ASL	Power	RMS Leakage	ASL Leakage	Power Loss
1	2019/08/13 11:41:12	1KHz - 1MHz	1MHz	10.1047	18.1372	0.0102	9.8706	9.9196	9.7437
2	2019/08/13 11:41:13	1KHz - 1MHz	1MHz	10.1047	18.1372	0.0102	9.8706	9.9196	9.7437
3	2019/08/13 11:43:20	1KHz - 1MHz	2MHz	11.0720	18.8162	0.0126	24.5686	2.4721	27.6266
4	2019/08/13 11:43:21	1KHz - 1MHz	2MHz	11.0720	18.8162	0.0126	24.5686	2.4721	27.6266
5	2019/09/10 13:44:16	1KHz - 1MHz	2MHz	10.6257	18.3075	0.0116	21.3321	7.4010	23.0299
6	2019/09/10 13:44:18	1KHz - 1MHz	2MHz	10.6257	18.3075	0.0116	21.3321	7.4010	23.0299
7	2019/09/10 13:44:18	1KHz - 1MHz	2MHz	10.6257	18.3075	0.0116	21.3321	7.4010	23.0299
8	2019/09/10 13:44:18	1KHz - 1MHz	2MHz	10.6257	18.3075	0.0116	21.3321	7.4010	23.0299
9	2019/09/10 13:44:19	1KHz - 1MHz	2MHz	10.6257	18.3075	0.0116	21.3321	7.4010	23.0299
10	2019/09/10 13:44:19	1KHz - 1MHz	2MHz	10.6257	18.3075	0.0116	21.3321	7.4010	23.0299
11	2019/09/10 13:44:20	1KHz - 1MHz	2MHz	10.6257	18.3075	0.0116	21.3321	7.4010	23.0299
12	2019/09/10 13:44:21	1KHz - 1MHz	2MHz	10.6257	18.3075	0.0116	21.3321	7.4010	23.0299
13	2019/09/10 13:44:21	1KHz - 1MHz	2MHz	10.6257	18.3075	0.0116	21.3321	7.4010	23.0299
14	2019/09/10 13:44:21	1KHz - 1MHz	2MHz	10.6257	18.3075	0.0116	21.3321	7.4010	23.0299
15	2019/09/10 13:44:22	1KHz - 1MHz	2MHz	10.6257	18.3075	0.0116	21.3321	7.4010	23.0299
16	2019/09/10 13:44:22	1KHz - 1MHz	2MHz	10.6257	18.3075	0.0116	21.3321	7.4010	23.0299
17	2019/09/10 13:44:22	1KHz - 1MHz	2MHz	10.6257	18.3075	0.0116	21.3321	7.4010	23.0299
18	2019/09/10 13:44:22	1KHz - 1MHz	2MHz	10.6257	18.3075	0.0116	21.3321	7.4010	23.0299
19	2019/09/10 13:44:58	1KHz - 1MHz	2MHz	10.5770	18.3623	0.0115	20.9705	7.3447	22.5687

Read Completed. VA: 15; VC: 1; VD: 19.

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Picture 7-1: Leakage Data Display on the Computer