

Portable Oil Particle Counter

S41

Product Instruction

ShangHai LUWATECH Industrial Co.,LTD

Catalogue

1、Description	1
2、Technical Indicator	1
3、Instrument Structure	2
4、Instrument Installation	2
5、Operation Cautions	3
6、Menu Structure	4
7、Menu Function	5
7.1、 Power on	5
7.2、 Setup	6
7.3、 Measurement	8
7.4、 Data	9
7.5、 Calibration	10
7.6、 Flushing Maintenance	12
8、Maintenance	13
Appendix I Common standard solid particle pollution class code	14
Appendix II Cleaning method of inlet filter	26

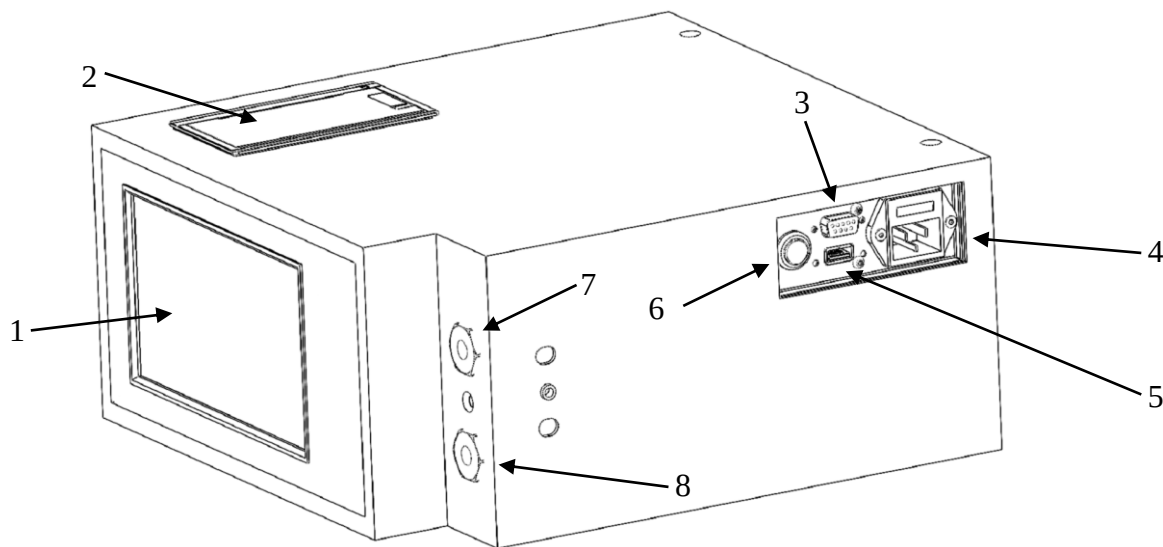
1、Description

The instrument is designed on the principle of light resistance (shading method) and is used to detect the size and number of particles in the liquid. Can be widely used in aerospace, aviation, electric power, petroleum, chemical industry, traffic, port, metallurgy, machinery, automobile manufacturing and other fields in the hydraulic oil, lubricating oil, transformer oil, insulating oil, turbine oil, gear oil, engine oil, aviation kerosene, water-based hydraulic fluid solid particle pollution tests such as oil, And the detection of insoluble particles in organic liquid and polymer solution.

2、Technical Indicator

- 1) Measurement Range: 0.8um~100um
- 2) Number of channel: 16channel, size can be set free (in the range of selected curve)
- 3) Sampling volume: ≥0.2ml
- 4) Sampling speed: 5~80ml/min
- 5) Resolution: <10%
- 6) Coincidence deviation limit: 10000 particles /ml
- 7) Pressure Range: Low Pressure: 0~6bar
High Pressure: 3~420bar
- 8) Data Storage: 1000 Group
- 9) Viscosity detection range: 0~50cSt (optional)
- 10) Water activity: 0~1aw (optional)
- 11) Water content: 0~360ppm (optional)
- 12) Power Supply: AC220V±10%; 50Hz; ≤75W
- 13) Battery Capacity: 5200mAh
- 14) Battery Continuous working time: 6~8Hrs
- 15) Data output: Built-in printer and R232 interface

3、Instrument Structure



1: used for touch control and display to realize the operation of the instrument.

2: Printer .Print out test data.

3: PC serial port. Through this serial port, the instrument is connected to the upper computer and the test data is uploaded.

4: External 220V power supply input.

5: USB disk interface. Insert the U disk to store the test data in the U disk.

6: Instrument power switch .

7: Oil sample input port .

8: Oil sample export port .

4、Instrument Installation

a、Power supply option: Use external power supply or battery power supply.

The instrument has two power supply modes: one is powered by an external power supply to the instrument, and the other is powered by a built-in lithium battery. Connect the power connection cable, insert the power plug into the power socket, and turn on the external power switch, Powered by external

power supply and charging the battery pack, " " is displayed in the upper right corner of the main interface; Disconnect the power supply cable and power it from the built-in lithium battery, The upper right corner of the main interface displays " " and indicates the current power.

b、Connect the liquid inlet and drain pipe and connect the drain pipe to the waste liquid container.

c、Install the printer paper

Before installing or replacing the printer paper, open the printer cover and remove the paper core. Confirm the installation direction of the thermal paper, and then put it into the printer paper bin.

d、PC serial port connection

If you need to connect a PC for data transmission, connect the serial port cable to the PC serial port on the instrument panel。

5、Operation Cautions

a) After starting up, the instrument should be warmed up for 10 minutes before testing.

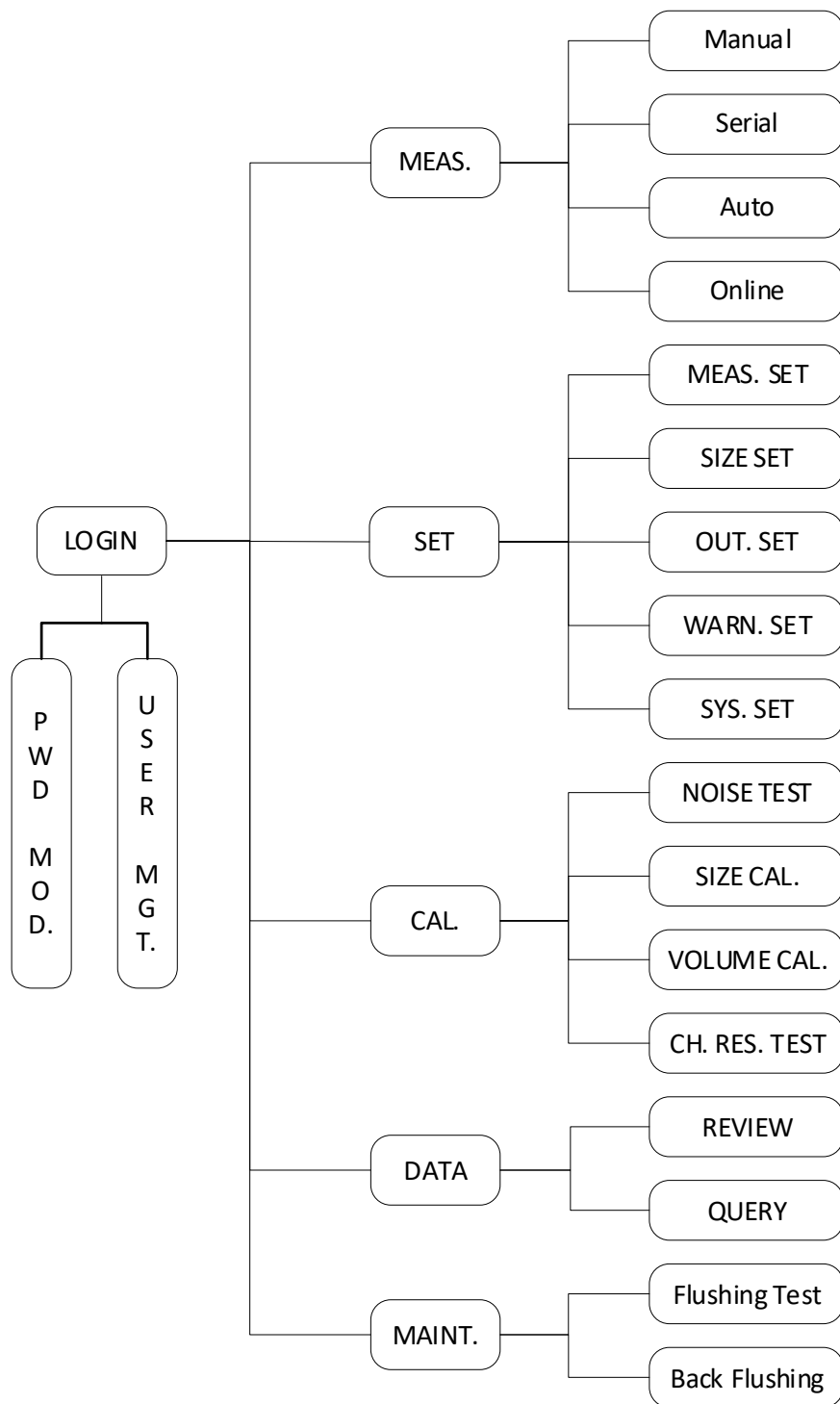
b) To ensure the accuracy of the test, appropriate solvents (such as petroleum ether) should be used to clean the pipeline and injection slit before the test.

c) At the end of the test and when the inspection is replaced, a suitable solvent (e.g. petroleum ether) must be used for cleaning operation, Ensure that the instrument pipeline is clean before shutting down or carrying out the next test.

d) The instrument should be kept away from high voltage, high frequency and electromagnetic interference sources.

e) When the battery is insufficient, it should be charged in time, and when it is not used for a long time, it should be charged regularly to ensure the life of the battery.

6、Menu Structure



7、Menu Function

7.1、 Power on

The power-on interface is displayed after the power is connected, and the self-check is carried out. After the self-check is completed, the login interface is entered.

7.1.1、 Log in

In the user login interface, after entering the correct user name and password, the instrument will automatically log in and jump to the measure start interface. The administrator user name is **admin** and the initial password is **0**.

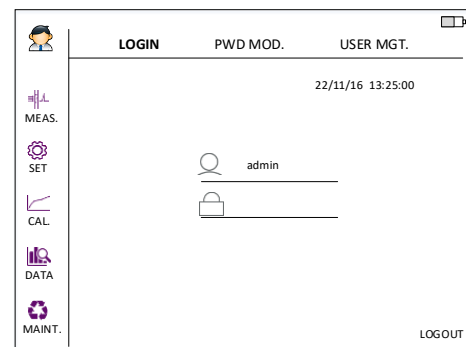


Fig. 7. 1. 1 LOGIN

On the user login interface, click the **LOGOUT** button to log out of the currently logged account.

Note: Nothing can be done without logging in!

7.1.2、 Modify Password

Click "👤" button to enter the administrator interface. Click the "**PWD MOD.**" tab to enter the interface of modifying password. Enter the initial password, new password and confirm the password, and click the **SAVE** button to save the new password.

7.1.3、 Operator management

Note: This function can only be used after logging in as an administrator.

Click "👤" button to enter the administrator interface. Click the "**USER MGT.**" tab to enter the user management

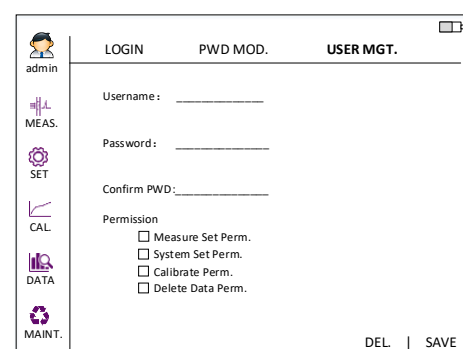


Fig. 7. 1. 3 USER Management

interface. On this interface, you can modify existing user permissions, create new users, and delete existing users (up to 5 users).

The right side of the display area displays the names of all current users, and the left side displays the user names and user permissions.

Modify existing user permissions: Click the user name on the right, take "operator" as an example, and the user name "operator" and the permissions of the user "operator" are displayed on the left. Choose the permissions check-box to change the user's permissions; Click the **SAVE** button to save the changes to the user's "operator" permission.

Setup new user: Enter the corresponding information in the "User Name", "Password" and "Confirm password" input boxes in the left display area. Choose the permission content in the permission check-box and click Save. (Note: Maximum 8 characters for username and maximum 8 characters for password)

Delete an existing user: click the right display area to select the user name to be deleted, click the **DEL.** button and click the Delete button again.

7.2、 Setup

After logging in, click the **"SET"** icon to enter the Settings interface, which defaults to the "Measurement Settings" interface, as shown in Fig.7.2.1.

7.2.1、 Measurement Setup

Pre Volume: The predicted volume before the test is used for pipeline flushing before the test, not counted.

Sample volume: test will be carried out according to the set test volume.

Repetition: the number of tests conducted for each set of tests when testing manually, automatically, or online.

Time interval: the time interval between each test when testing automatically, continuously, or online.

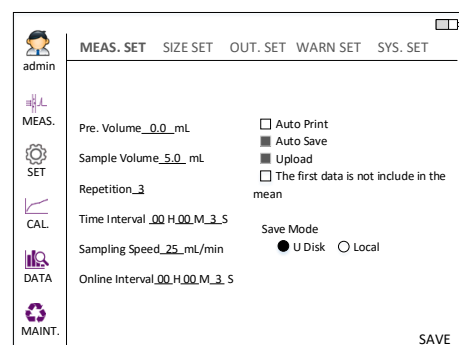


Fig. 7. 2. 1 Measurement Set

Sampling Speed: the flow rate during sampling.

Online interval: the time interval between each set of tests during online testing.

Click the corresponding selection-box to set whether the first data is included in the mean value, automatic storage, automatic printing, data upload ,and data storage mode (local storage, USB disk storage).

Note: online data(include history data) cannot be upload.

Click **SAVE** button and all Settings take effect.

7.2.2、Size Setup

When the particle size concerned by the user is not in the standard, the user can set the corresponding particle size in the custom setting. Users can set up to 50 custom channel particle sizes (depending on the actual model purchased). The user can set the particle size according to the calibrated curve (ISOMTD, ACFTD or CURVE3), and the particle size value should be between the maximum and minimum value of the calibration curve.

	1	2	3	4	5	6	7	8	9	10	11	12
4.0	13	25	37	49	61							
6.0	14	26	38	50	62							
14.0	15	27	39	51	63							
21.0	16	28	40	52	64							
38.0	17	29	41	53								
70.0	18	30	42	54								
	19	31	43	55								
	20	32	44	56								
	21	33	45	57								
	22	34	46	58								
	23	35	47	59								
	24	36	48	60								

Fig. 7. 2. 2 SIZE Set

7.2.3、Output Setup

The output setting interface is shown in Figure 7.2.3. Users can set "Sample name" and "Batch number" before testing. Click the corresponding text box to setup other item of output (Include "Sample Name", "Batch Number", "Volume", "Repetition", "Time", "Tester", "Data", "Mean" and "Level"). Finally click **SAVE** button to save all settings.

Sample name: _____

Batch Number: _____

Content:

- ☒ Sample Name
- ☒ Batch Number
- ☒ Volume
- ☒ Repetition
- ☒ Time
- ☐ Tester
- ☐ Data
- ☐ Mean
- ☐ Level

Fig. 7. 2. 3 Output Set

7.2.4、Warning setup

The user can set the corresponding

☒ Close the alarm

5-15um ☐ 15-25um ☐

25-50um ☐ 50-100um ☐

>100um ☐ Level ☐

Fig. 7. 2. 4 Warning Set

alarm limit in warning setting, as shown in Figure 7.2.4. The user can select the corresponding standard, and set each channel level independently, or turn off the alarm function.

7.2.5、 System Setup

Through the system setting function, users can set the instrument system language and time, as shown in Figure 7.2.5.

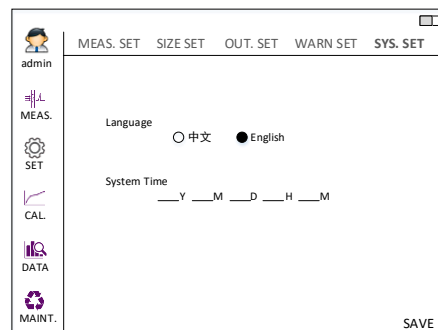


Fig. 7. 2. 5 System Set

7.3、 Measurement

Click the "MEAS." icon on the main interface to enter the test interface, as shown in Figure 7.3.1. Users can set the corresponding standards, select manual testing, serial testing, automatic testing and online testing mode. After a single test, the

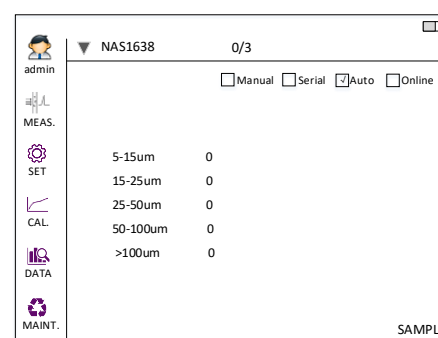


Fig. 7. 3. 1 Measurement

right information column gives the pollution level and mean value of the tested data. After the test, users can click the "standard" selection drop-down button to switch between different test standards and view the test data and levels under different standards.

After the test, the test data can be stored and printed.

Standard tests include NAS1638 standard, GJB420A standard, GJB420B standard, ISO4406 standard, SAE4059 standard, SAE4059CPC standard, GB/T14039, GOST17216 standard, QC/T29104 standard, JB/T9737 standard, DL/ T432 standard, SAE749D standard and HH005-2018 standard. The channel particle size Settings for the 13 test standards are as follows:

NAS1638 standard: 5-15 μ m、15-25 μ m、25-50 μ m、50-100 μ m、>100 μ m;

GOST17216 standard: 1-2 μ m、2-5 μ m、5-10 μ m、10-25 μ m、25-50 μ m、50-100 μ m;

SAE4059 standard: 5-15 μ m、15-25 μ m、25-50 μ m、50-100 μ m、>100 μ m;

QC/T29104 standard: >5 μ m、>15 μ m;

SAE4059CPC

standard: $>4\mu\text{m}_{(c)}$ 、 $>6\mu\text{m}_{(c)}$ 、 $>14\mu\text{m}_{(c)}$ 、 $>21\mu\text{m}_{(c)}$ 、 $>38\mu\text{m}_{(c)}$ 、 $>70\mu\text{m}_{(c)}$;

JB/T9737 standard: $>4\mu\text{m}_{(c)}$ 、 $>6\mu\text{m}_{(c)}$ 、 $>14\mu\text{m}_{(c)}$;

ISO4406 standard: $>4\mu\text{m}_{(c)}$ 、 $>6\mu\text{m}_{(c)}$ 、 $>14\mu\text{m}_{(c)}$;

DL/T432 standard: 5-15 μm 、15-25 μm 、25-50 μm 、50-100 μm 、 $>100\mu\text{m}$;

GB/T14039 standard: $>4\mu\text{m}_{(c)}$ 、 $>6\mu\text{m}_{(c)}$ 、 $>14\mu\text{m}_{(c)}$;

SAE749D standard: 5-10 μm 、10-25 μm 、25-50 μm 、50-100 μm 、 $>100\mu\text{m}$;

GJB420B standard: $>4\mu\text{m}_{(c)}$ 、 $>6\mu\text{m}_{(c)}$ 、 $>14\mu\text{m}_{(c)}$ 、 $>21\mu\text{m}_{(c)}$ 、 $>38\mu\text{m}_{(c)}$ 、 $>70\mu\text{m}_{(c)}$;

HH005-2018

standard: $>4\mu\text{m}_{(c)}$ 、 $>6\mu\text{m}_{(c)}$ 、 $>14\mu\text{m}_{(c)}$ 、 $>21\mu\text{m}_{(c)}$ 、 $>38\mu\text{m}_{(c)}$ 、 $>70\mu\text{m}_{(c)}$;

GJB420A standard: $>2\mu\text{m}$ 、 $>5\mu\text{m}$ 、 $>15\mu\text{m}$ 、 $>25\mu\text{m}$ 、 $>50\mu\text{m}$.

The number of channels and particle size can be set according to the requirements of the test (see Custom Settings for details). The standard is IP565 in the instrument : $>4\mu\text{m}$ 、 $>6\mu\text{m}$ 、 $>14\mu\text{m}$ 、 $>21\mu\text{m}$ 、 $>25\mu\text{m}$ 、 $>30\mu\text{m}$.

Test operation:

Before the test, the pipe and the injection slit should be cleaned with appropriate solvent. After the cleaning, the pipe should be filled with the liquid to be tested before the test.

7.4、Data

Main interface Click the "**DATA**" icon to enter the main data interface, as shown in Figure 7.4.1. In this interface, you can review the historical data inside the stored instrument, review the historical data by switching standards, and review the data

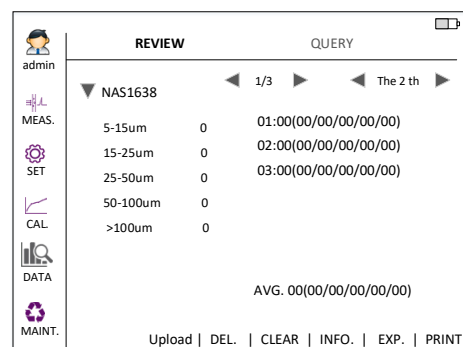


Fig. 7. 4. 1 Data Review

and mean values of different test times under each set of data. The functions of deleting the current group, clearing all data, exporting the current group data, uploading the current group data, printing the current group data, and viewing the current group data can be used for historical data.

Click the **"QUERY"** button to enter the query interface. Click the edit box corresponding to year, month, day, hour and minute to set the test time of the data to be queried. The stored test data will be queried according to the set date and the query result will be displayed.

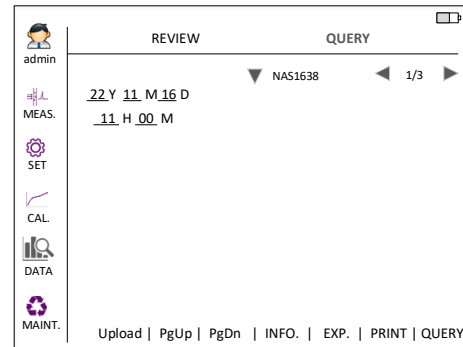


Fig. 7.4.2 Data Query

You can turn the page by pressing **"PgUp"** and **"PgDn"** keys, and switch the number of times in the current group by the left and right arrows. Click the **"PRINT"** button to print the current group data. Click the **"Upload"** button to upload the set of data to the PC side. Click the **"EXP."** button to export the set of data to the U Disk. Click the **"INFO."** button to view the details of the selected data.

7.5、 Calibration

Click **"CAL."** button to display the Calibration Menu. Noise test, Size calibration, Volume calibration and channel Resolution can be carried out. Click the corresponding button to enter the corresponding interface.

Note: The instrument has been calibrated, non-professionals are prohibited to carry out calibration operation!

7.5.1、 Noise Test

Before the test, fill the sensor with liquid (for one cleaning operation or test operation) and let it sit for five minutes. Click the **"Test"** button to start the noise test. After 60s, the test ends. If the test results do not meet the noise requirements, click the edit box to

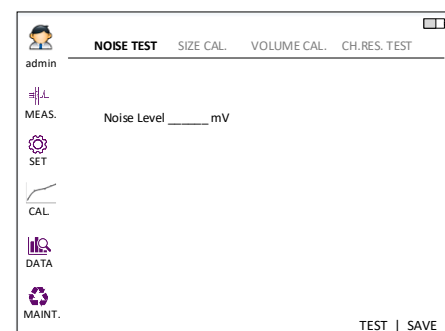


Fig. 7.5.1 NOISE Test

modify the noise threshold and then test until the data meets the requirements and is saved. The noise threshold level at this time is the noise level.

7.5.2、 Size Calibration

In Calibration main menu, click **"SIZE CAL."** button to display the size calibration menu. The user can enter the setting interface through the **"SET"** button, then can set the calibration volume, speed and calibration curve and can calibrate up to three curves of ACFTD, ISOMTD and custom.

No.	um	mV	Std. val.	data
1	4.00	56	0	
2	6.00	153	0	
3	14.00	1120	0	
4	21.00	2230	0	
5	38.00	4920	0	
6	70.00	8000	0	

Fig. 7.5.2 SIZE Calibration

Take the manual calibration of ISOMTD curve as an example:

In the particle size column (μm), the particle size value required for calibration is entered, and the corresponding threshold level (mV) is entered after this particle size value. Click the **"CAL."** button, the instrument will automatically extract the calibration solution, and give the measured value of each particle size per unit volume after the end. According to the deviation between the measured value and the calibration liquid standard value, the user can increase (or decrease) the particle size threshold level and test again until the deviation between the measured value and the calibration liquid standard value meets the corresponding national standard calibration requirements. Click **"SAVE"** button to complete the instrument calibration operation.

7.5.3、Volume Calibration

Click the **"VOLUME CAL."** button on the calibration interface to enter the volume calibration interface, as shown in Figure 7.5.3. The sampler is reset and pre-injected to calibrate the volume. After the pre-injection, the volume calibration operation of the instrument can be carried out.

Fig. 7.5.3 Volume calibration

Before volume calibration, fill the pipe with volume calibration solution. Operate according to the interface prompts. After the sampling operation, calculate the liquid volume difference before and after calibration and enter the "Volume difference" input box. Click **"SAVE"** button to complete the volume

calibration operation. If the injection volume is not accurate, the sampling operation can be repeated several times.

If the volume calibration fails, you can initialize the volume parameters by pressing the "RESET" button.

7.5.4、 Channel Resolution Test

Click the "**CH.RES. TEST**" button on the calibration interface to enter the channel resolution test interface, as shown in Figure 7.5.4. Enter "threshold level", click "TEST" button and wait for the instrument to complete the test of channel resolution. This item can only be operated by the manufacturer or unit of measurement.

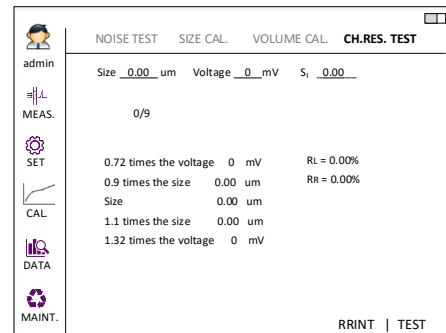


Fig. 7.5.4 Channel resolution

7.6、 Flushing Maintenance

In the main interface, click the "**MAINT.**" button to enter the maintenance interface, as shown in Figure 7.6. Flushing test or Back flushing operations can be carried out. Users can read the prompt information on the maintenance interface carefully and operate according to the prompt information. You can choose whether to carry out flushing test. If you choose flushing test, you can stop cleaning after judging that the actual particle concentration meets the requirements according to the calibration curve, particle size and corresponding particle concentration. If the flushing test is not selected, stop flushing when the cleaning volume is reached.

Note: It must be emptied before reverse flushing.

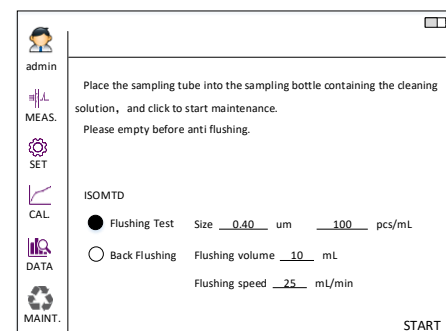


Fig. 7.6 Maintenance

8、Maintenance

a. The laser sensor assembly shall not be disassembled by itself under any circumstances.

b. The sampling window and case should be kept clean and dry to prevent the inspection liquid from corroding the instrument components and case.

c. When the instrument is not in use, the power supply of the instrument should be turned off to extend the usage life of the laser parts.

d. The instrument often detects the inspection liquid with large viscosity or large particle size, which is easy to cause the blockage of the slit of the injection glass. The performance is as follows: prolonged injection time; In the process of sample injection, the speed of sample injection is slower than that of the high pressure syringe, and a large amount of gas is pumped into the high pressure syringe. The data is too large and unstable, etc., and the processing methods are as follows:

Reverse flushing method

See 7.6 Back flushing to reverse cleaning in maintenance.

Alternate cleaning method

Enter the flush interface to input the cleaning times. At the beginning of cleaning, remove the sample liquid level from the injection needle, and make the air and sample enter the injection glass slit alternately.

Repeat several times to remove the substances blocking the injection glass slit and make it unblocked.

e. The liquid inlet of the instrument is installed with a filter screen. When too many impurities in the liquid sample will block the filter screen and affect the sample injection, resulting in abnormal test data. Therefore, the filter screen of the liquid inlet should be cleaned regularly. See Appendix II for cleaning methods.

Appendix I Common standard solid particle pollution class code

NAS1638 (Particles/100ml)

Cleanliness Class	Size/ μm				
	5-15	15-25	25-50	50-100	>100
00	125	22	4	1	0
0	250	44	8	2	0
1	500	89	16	3	1
2	1000	178	32	6	1
3	2000	350	63	11	2
4	4000	712	126	22	4
5	8000	1425	253	45	8
6	16000	2850	506	90	16
7	32000	5700	1012	180	32
8	64000	11400	2025	360	64
9	128000	22800	4050	720	128
10	256000	45600	8100	1440	256
11	512000	91200	16200	2880	512
12	1024000	182400	32400	5760	1024

GJB420A (Particles/100ml)

Cleanliness Class	Size/ μm				
	>2	>5	>15	>25	>50
000	164	76	14	3	1
00	328	152	27	5	1
0	656	304	54	10	2
1	1310	609	109	20	4
2	2620	1220	217	39	7
3	5250	2430	432	76	13
4	10500	4860	864	152	26
5	21000	9730	1730	306	53
6	42000	19500	3460	612	106
7	83900	38900	6920	1220	212
8	168000	77900	13900	2450	424
9	336000	156000	27700	4900	848
10	671000	311000	55400	9800	1700
11	1340000	623000	111000	19600	3390
12	2690000	1250000	222000	39200	6780

GJB420B (Particles/100ml)

Size code	A	B	C	D	E	F
Size	>1μm	>5μm	>15μm	>25μm	>55μm	>100μm
	>4μm _(c)	>6μm _(c)	>14μm _(c)	>21μm _(c)	>38μm _(c)	>70μm _(c)
000	195	76	14	3	1	0
00	390	152	27	5	1	0
0	780	304	54	10	2	0
1	1560	609	109	20	4	1
2	3120	1220	217	39	7	1
3	6250	2430	432	76	13	2
4	12500	4860	864	152	26	4
5	25000	9730	1730	306	53	8
6	50000	19500	3460	612	106	16
7	100000	38900	6920	1220	212	32
8	200000	77900	13900	2450	424	64
9	400000	156000	27700	4900	848	128
10	800000	311000	55400	9800	1700	256
11	1600000	623000	111000	19600	3390	512
12	3200000	1250000	222000	39200	6780	1020

ISO4406

/ml		Code
Greater than	Less than or equal to	
2500000		>28
1300000	2500000	28
640000	1300000	27
320000	640000	26
160000	320000	25
80000	160000	24
40000	80000	23
20000	40000	22
10000	20000	21
5000	10000	20
2500	5000	19
1300	2500	18
640	1300	17
320	640	16
160	320	15
80	160	14
40	80	13
20	40	12
10	20	11
5	10	10
2.5	5	9
1.3	2.5	8
0.64	1.3	7
0.32	0.64	6
0.16	0.32	5
0.08	0.16	4
0.04	0.08	3
0.02	0.04	2
0.01	0.02	1
0.00	0.01	0

SAE4059 (Particles/100ml)

Cleanliness Class	5-15um	15-25um	25-50um	50-100um	>100um
	6-14 um _(c)	14-21 um _(c)	21-38 um _(c)	38-70 um _(c)	>70 um _(c)
00	125	22	4	1	0
0	250	44	8	2	0
1	500	89	16	3	1
2	1000	178	32	6	1
3	2000	356	63	11	2
4	4000	712	126	22	4
5	8000	1425	253	45	8
6	16000	2850	506	90	16
7	32000	5700	1012	180	32
8	64000	11400	2025	360	64
9	128000	22800	4050	720	128
10	256000	45600	8100	1440	256
11	512000	91200	16200	2880	512
12	1024000	182400	32400	5760	1024

SAE4059CPC (Particles/100ml)

Cleanliness Class	>1μm	>5μm	>15μm	>25μm	>50μm	>100μm
	>4μm _(c)	>6μm _(c)	>14μm _(c)	>21μm _(c)	>38μm _(c)	>70μm _(c)
000	195	76	14	3	1	0
00	390	152	27	5	1	0
0	780	304	54	10	2	0
1	1560	609	109	20	4	1
2	3120	1217	217	39	7	1
3	6250	2432	432	76	13	2
4	12500	4864	864	152	26	4
5	25000	9731	1731	306	53	8
6	50000	19462	3462	612	106	16
7	100000	38924	6924	1224	212	32
8	200000	77849	13849	2449	424	64
9	400000	155698	27698	4898	848	128
10	800000	311396	55396	9796	1696	256
11	1600000	622792	110792	19592	3392	512
12	3200000	1245584	221584	39184	6784	1024

GB/T14039

particles/ml		Code	particles/ml		Code
Greater than	Less than or Equal to		Greater than	Less than or Equal to	
2500000		>28	80	160	14
1300000	2500000	28	40	80	13
640000	1300000	27	20	40	12
320000	640000	26	10	20	11
160000	320000	25	5	10	10
80000	160000	24	2.5	5	9
40000	80000	23	1.3	2.5	8
20000	40000	22	0.64	1.3	7
10000	20000	21	0.32	0.64	6
5000	10000	20	0.16	0.32	5
2500	5000	19	0.08	0.16	4
1300	2500	18	0.04	0.08	3
640	1300	17	0.02	0.04	2
320	640	16	0.01	0.02	1
160	320	15	0.00	0.01	0

ГОСТ17216

Cleanliness Class	Less than or equal to （Particles/100ml）									Less than %		
	>0.5-1	>1-2	>2-5	>5-10	>10-25	>25-50	>50-100	>100-200				
00	800	400	32	8	4	1		A.O	A.O			
0	1600	800	63	16	8	2						
1		1600	125	32	16	3						
2				250	63	32	4		1			
3					125	63	6	2				
4					250	125	12	3				
5					500	250	25	4	1			
6				1000	500	50	6	2	1	0.0002		
7				2000	1000	100	12	4	2	0.0002		
8				4000	2000	200	25	6	3	0.0004		
9				8000	4000	400	50	12	4	0.0006		
10				16000	8000	800	100	25	5	0.0008		
11				31500	16000	1600	200	50	10	0.0016		
12				63000	31500	3150	400	100	20	0.0032		
13							63000	6300	800	200	40	0.005
14							125000	12500	1600	400	80	0.008
15								25000	31500	800	160	0.016
16								50000	63000	1600	315	0.032
17									125000	3150	630	0.064

QC/T29104

particles/ml		Code	particles/ml		Code
Greater than	Less than or Equal to		Greater than	Less than or Equal to	
80000	160000	24	10	20	11
40000	80000	23	5	10	10
20000	40000	22	2.5	5	9
10000	20000	21	1.3	2.5	8
5000	10000	20	0.64	1.3	7
2500	5000	19	0.32	0.64	6
1300	2500	18	0.16	0.32	5
640	1300	17	0.08	0.16	4
320	640	16	0.04	0.08	3
160	320	15	0.02	0.04	2
80	160	14	0.01	0.02	1
40	80	13	0.00	0.01	0
20	40	12			

JB/T9737

particles/ml (n)	Code
Greater than	
$n > 2500000$	>28
$1300000 < n \leq 2500000$	28
$640000 < n \leq 1300000$	27
$320000 < n \leq 640000$	26
$160000 < n \leq 320000$	25
$80000 < n \leq 160000$	24
$40000 < n \leq 80000$	23
$20000 < n \leq 40000$	22
$10000 < n \leq 20000$	21
$5000 < n \leq 10000$	20
$2500 < n \leq 5000$	19
$1300 < n \leq 2500$	18
$640 < n \leq 1300$	17
$320 < n \leq 640$	16
$160 < n \leq 320$	15
$80 < n \leq 160$	14
$40 < n \leq 80$	13
$20 < n \leq 40$	12
$10 < n \leq 20$	11
$5 < n \leq 10$	10
$2.5 < n \leq 5$	9
$1.3 < n \leq 2.5$	8
$0.64 < n \leq 1.3$	7
$0.32 < n \leq 0.64$	6
$0.16 < n \leq 0.32$	5
$0.08 < n \leq 0.16$	4
$0.04 < n \leq 0.08$	3
$0.02 < n \leq 0.04$	2
$0.01 < n \leq 0.02$	1
$0.00 < n \leq 0.01$	0

DL/T432 (particles /100ml)

Cleanliness Class	5-15um	15-25um	25-50um	50-100um	>100um
	6-14 um _(c)	14-21 um _(c)	21-38 um _(c)	38-70 um _(c)	>70 um _(c)
00	125	22	4	1	0
0	250	44	8	2	0
1	500	89	16	3	1
2	1000	178	32	6	1
3	2000	356	63	11	2
4	4000	712	126	22	4
5	8000	1425	253	45	8
6	16000	2850	506	90	16
7	32000	5700	1012	180	32
8	64000	11400	2025	360	64
9	128000	22800	4050	720	128
10	256000	45600	8100	1440	256
11	512000	91200	16200	2880	512
12	1024000	182400	32400	5760	1024

SAE749D (particles /100ml)

Cleanliness Class	Particle size range (μ m)				
	5~15	15~25	25~50	50~100	>100
0	2700	670	93	16	1
1	4600	1340	210	28	3
2	9700	2680	380	56	5
3	24000	5360	780	110	11
4	32000	10700	1510	225	21
5	87000	21400	3130	430	41
6	128000	42000	6500	1000	92

Appendix II Cleaning method of inlet filter

The cleaning method of liquid inlet filter is as follows

1) Emptying line of liquid

See 7.6 Maintenance.

2) Remove the liquid inlet pipe

Use a No. 14 wrench to unscrew the liquid inlet pipe.

3) Remove liquid inlet port:

Use a No. 14 wrench to remove the liquid inlet port,
Can see interface internal filter. (Fig.1 on the right)



Fig.1

4) Remove the filter

Use the attached hex wrench to remove the filter. (Fig.2 on the right)



Fig.2

5) Clean the filter

After cleaning the impurities on the filter screen, Clean with the appropriate solvent until the filter is clean.

6) Install a filter

Install the cleaned screen using the attached hex wrench.

Note: Ensure the installation of the filter screen as shown in Fig.3

Screen face up!

7) Install the liquid inlet port

Install the liquid inlet port with a no. 14 wrench.

8) Install the liquid inlet pipe:

Install the liquid inlet pipe with a no. 14 wrench.



Fig.3

上海罗湾实业有限公司

ShangHai LUWATECH Industrial Co.,Ltd

地址：上海浦东新区康桥东路 333 号 5 栋南门 2 楼

TEL: 13917337146 微信 021-58073569

E-mail: maorong.long@luowansy.com

<https://luwatech.1688.com>

<http://www.luwatech.com>

油品检测仪器专业供应商