LSC SERIES

MOISTURE METER

INSTRUCTION MANUAL

content

summarize and characteristic

The moisture meter configured with the high precision sensor and high efficiency, twice thermal radiation device on the basis of the electronic balance can measure the moisture content quick and accurately.

On the basis of the thermo-motive principle, the moisture meter can obtain the percentage moisture contents and other results by means of the dried weight and wet weight.

The moisture meter is widely used in the fields of industrial and mining enterprises, agriculture and forestry, scientific research institution etc..

It can test the contained free moisture of the samples of the tobacco, papermaking, foodstuff, tea-leaf, feed, grain, chemical materials, pharmaceuticals raw materials, textile raw materials etc..

The moisture meter uses the high-precision sensor which the analytical balance uses for the weighing high precision.

By reason of the high sensitive sensor, it only needs a few grams of samples for the testing and it can shorten the testing time.

The designed twice thermal radiation heating source using 500W halogen lamp can make the temperature of the sample up to 200 degrees in 3 minutes.

3 kinds of measuring modes;

Automatic mode:

The measuring will automatically stop and get the measured result when the change rate of unit time moisture is less than the pre-set limited value.

Timing mode:

Completes the sample drying in the reserved time and get the measured result.

Manual mode:

Terminate the measurement by key operation and get the measured result.

The moisture meter is equipped with the standard serial interface which can be connected to the printer or computer.

Note: description of LSC60A example

working environment

1. The work room should be kept clean and the environment temperature should be at 10—40 degrees. The humidity should be ≤85%（no condensated water）.The optimum environment temperature should be 20±5 degrees. The optimum humidity should be 50～60%.

2. When the moisture meter is moved to a warmer environment from a colder environment, the moisture in the air will be coagulated inside of the moisture meter and it will affect the accuracy and reliability of the measurement. For eliminating the effect of the moisture coagulation, you can keep the moisture meter unplugged at room temperature for 2 hours and after then you can use it.

3．The moisture meter should be used normality in a good adapted environment. It should be put at a stable and level working table instead of the places of the dust in air, air condition nearby, windiness, sunray direct radiation, heat source and electric-magnetic fields.

4. When weighing the heavy object, you have to handle it gently to avoid the strike on the pan. Otherwise it will lead to the problem of the

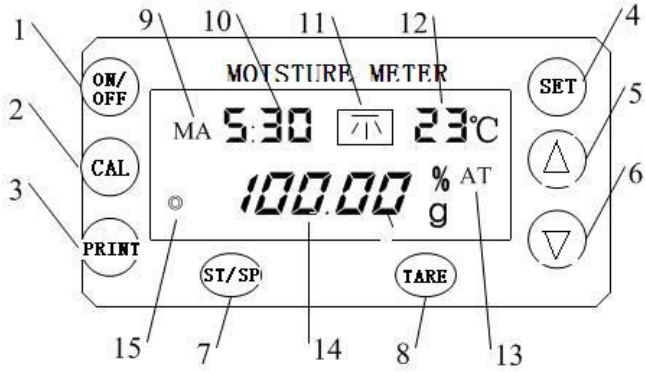
mechanical system homing of the moisture meter.

5. When weighing the liquid, you have to do it carefully to avoid the liquid flowing into the inside of the moisture meter from the edge of the pan. If it happens, you have to unplug the power cable at once and clean the liquid inside or wait till all the liquid evaporates to be sure that there is no any liquid left at all. After then you can use it again.

6. After the operation, it's better to cover it to avoid the dust

7. Keep the moisture meter clean and dry.

key description



1. ON/OFF KEY
2. CAL KEY
3. PRINT KEY
4. SET KEY
5. ▲key function adjusting key
6. ▼ key function adjusting key
7. START/STOP KEY

8. TARE KEY
9. TEST PRECCISION SELECTION （MA、HA、LA、SD）
10. RUNNING TIME
11. HEATING OPERATION
12. HEATING TEMPERTURE
13, MANNER OF WORKING SELECTION （AT、MT、TIMER）
14. WEIGHT VALUE/MOISTURE PERCENTAGE VALUE
15. WEIGHT STABILIZATION SYMBOL

technical parameters

MODEL	**LSC-50A**	**LSC-60A**	**LSC-60B**	**LSC-60B5**
readability	0.0001g/0.001%	0.001g/0.01%	0.001g/0.01%	0.005g/0.05%
repeatability （standard error ≥5g sample）	0.05%	0.1%	0.2%	0.5%
measuring method	500W Halogen lamp heating system of efficient radiating and high precision weighing technology, automatic measure of the moisture percentage of the measured object			
Weighing range	50g	60g		
data output	standard RS-232			
setting time	1～99 minutes（interval 1 minute）			
heating source	halogen lamp（circular500W）			
temperature range	60℃～200℃（interval 1℃）			
drying procedure	standard drying: short time up to the setting temperature and then up to the constant setting temperature			
measuring mode	automatic/timing/manual			

display type	LCD display	
display content	moisture（percentage）,time/weight	
operating temperature range	10℃~40℃	
tare range	full scale	
Power supply/ power	AC 220V (-15%~+10%) 50Hz /500W	
pan size（mm）	Φ90mm	
dimension	330mm×200mm×155mm	
weight	5.5kg	3.1kg

screen display information

serial No。	Display identifier	comments
1	g	reading unit
2	%	moisture percentage value
3	℃	temperature
4	HA	measured accuracy class----high
5	MA	measured accuracy class----medium
6	LA	measured accuracy class----low
7	SD	measured accuracy user-defined
8	AT	auto measuring mode
9	MT	manual measuring mode
10	TIMER	timing measuring mode
11	O	data stabilization identifier
12	—CAL—	standard waiting display
13	CAL--0	prompt message of zero calibration
14	CXXX	waiting for loading standard weight XXX weight value
15	CAL—End	calibration end
16	Err--0	zero error of calibration
17	Err--1	full scale error of calibration
18	E	over Max limit value of the moisture meter
19	-E	under Max limit value of the moisture meter
20	……..	processing data

installation

1. the installation of the pan subassembly

Install Dirt-proof boot on the moisture meter and pan on the erection column correctly to avoid the contact with others.

2. level adjusting

Adjust the adjustable anterior inferior adjustable footing of the moisture meter to keep the level bubble at the center of the level bubble instrument.

3. power on

Insert the power plug into the outlet of 220V/50HZ AC power supply and another end into the socket at the back side of the moisture meter.

function setting

1、working parameter setting

In the state of power-on, press **SET** key to set the parameters of the measuring mode, precision, temperature and measuring time. Press ▲ key or ▼key to change the set parameter value. Press **ON/OFF** key to get back and preserve it.

A. setting of the measuring precision

In the state of power-on, press **SET** key the symbol will twinkle （HA、MA、LA、SD）.One of them represents the state of setting of the measuring precision. Press ▲ key or ▼key to change the set value therein circularly. Just select the proper measuring precision.

precision specification

model	readability	precision			
		HA	MA	LA	SD
LSC-50A	0.0001g	0.01%	0.02%	0.05%	0.001%-0.5%
LSC-60A/B	0.001g	0.02%	0.05%	0.10%	0.01%-5%
propositional sample weight		10g	5g	2g	

Note;

The numerical value in precision represents the minimum rate of water loss. It's effective in the auto mode. When the system measures the rate of water loss up to the indexes mentioned above, it will stop drying moisture.

the acquiescent measuring mode; MA

B. setting of measuring time

After selecting the measuring precision in the state of setting precision press **SET** key to enter into the state of the time setting. The twinkling symbol is the set numerical value position. Press ▲ key or ▼key to change the set value therein circularly. Press **SET** key once the twinkling symbol will move to the next position. The setting range is 100 minutes. The set time is effective in the timing mode. After the instrument working time which means the set time reaches to the test time, the instrument will stop automatically and now it displays the measured moisture value.

C. setting of measuring temperature

After the setting of measuring time finished press **SET** key and it will move automatically to the working temperature setting position.

Press ▲ key or ▼key to change the set value therein circularly. Press **SET** key once the twinkling symbol will move to the next position.
The set temperature range is 50-200 degrees.
The instrument will perform the warming and constant temperature control according to the set temperature.

D．setting of measuring mode

After the setting of measuring time finished press **SET** key and then it will move automatically to the measuring mode setting position. The symbol will twinkle （HA、MA、LA、SD）.One of them represents the state of set measuring mode. Press ▲ key or ▼key to change the set value therein. Just select the proper measuring mode.

AT; auto mode

When the rate of change of the containing moisture/min in automatic mode is less than the pre-set value（ the setting value of measuring precision）,the measuring will stop automatically.
The measuring is over.

MT; manual mode

Stop the measurement by pressing the keys on the overlay and get the measured results（The setting value of the measuring precision is invalid.）.

TIMER; timing mode

It performs the timing measurement according to the set parameters of the measuring time（The setting value of the measuring precision is invalid.）.

E．Setting of user-defined precision

The instrument enters into the setting state of the user-defined precision parameters automatically after the test mode setting finishes. In the auto mode if HA, MA, LA precision of measuring precision setting can't meet the user requirement you can set this parameter value.

2、system parameter setting

In the state of power-off, press **PRINT** key twice continuously and it will display 'Cx—Y'. Among of them, X value is 1-8. Press **PRINT** key to examine Cx parameter value circularly. Among of them Y is the set value of Cx parameter. Press **SET** key to change Y value. After the setting is completed press **ON/OFF** key to store the current set parameter and it will get back to the standby state**.**

Please see the system parameter table for the specific implications of the relevant parameters.

system parameter table

Cx	Cx—y	significance
C1： reserve/unused	*C1-0	undefined
C2：backlight control	*C2-0	auto
	C2-1	normally-on
	C2-2	normally-off
C3： Zero minimum displayed value	C3—0	non-zero tracking state
	C3—1	1d
	C3—2	2d
	C3—3	3d
	C3—4	4d
	*C3—5	5d

	C3—6	not applicable for user
C4： serial port baud rate selection	*C4—0	2400bps
	C4—1	1200bps
	C4—2	4800bps
	C4—3	9600bps
C5：reserve/unused	*C5—0	undefined
C6： Key voice	*C6—0	no
	C6—1	yes
C7：reserve/unused	*C7—0	undefined
C8：power-on displayed version, measuring range message	*C8-0	ON
	C8-1	OFF

*** means default state**

●commend control output

P＜CR＞＜LF＞ command transferred to the moisture meter via the serial port or the contained command above via **PRINT** key regards as the print control command. After the moisture meter receives the command at a time it will output a group of current measuring data.

3、command control

After the moisture meter receives the command, it will post back the received command to the external device at once and inform the external device of the successful response command. If the wrong command posts back the “Err” to the external device, it means what the external device received is the illegal command.

the effective command;

A. O ＜CR＞＜LF＞ ON/OFF command.

The function is the same as the function of **ON/OFF** key on the overlay（4F 0D 0A)；

B. T ＜CR＞＜LF＞ TARE command.

The function is the same as the function of **TARE** key on the overlay（54 0D 0A)；

C． C ＜CR＞＜LF＞CAL command。

The function is the same as the function of **CAL** key on the overlay（43 0D 0A)；

D．P ＜CR＞＜LF＞PRINT command

The function is the same as the function of **PRINT** key on the overlay. If only the moisture meter receives this command, it will output a group of current important data（50 0D 0A） to the external device.

＜CR＞＜LF＞the significance as follows

＜CR＞：carriage return（0D）

＜LF＞：line break（0A）

operation

1、preparation

After the moisture meter is powered on each time, it should be preheated for 30 minutes at least for the best weighing and moisture measuring effect.

2．preheating

Put a sample pan (silver paper pan) as the sample on the pan and press **ST/SP** key to preheat the moisture meter. After the moisture meter is powered on 3 - 5 minutes press **ST/SP** key to stop preheating it.

3、moisture measurement

Put the silver paper pan in the state of the room temperature on the pan and then press **TARE** key for zero clearing and after then take away the

silver paper an.

After the temperature of the silver paper pan cools to the room temperature put on the moderate sample（Put the sample on the pan as evenly as possible on it..If it's the granular sample please roll it to the well-proportioned powder）.

After then put the silver paper pan on the pan and close the heating mantle. Wait for the indicating value to stabilize and then it starts to measure the moisture. At the moment the displayed temperature value is approaching to the set value gradually.

After the measurement is over the buzzer will send out the alarm song showing that it's over and it will display the moisture content of the measured sample.

Note;

Press **ST/SP** key to stop the measuring process in the process of moisture measurement.

Press **PRINT** key, the printer will print out the sample No, initial weight, the weight and the temperature at the end of measurement, the time spent on the measurement and moisture content value.

calibration

1、preparation

a. Put the moisture meter on a strong plane and adjust the level.

b. Power on, preheat the moisture meter at least for 30 minutes.

2．calibration procedure

a. Remove the other objects from the pan. Press **TARE** key and it will display '0.000'g.

b. Press **CAL** key and it will display '……'. After about 2 seconds it will display "CAL—0' with twinkling. At this moment the sampling calculation of the zero reference data of the moisture meter proceeds.

About 3 seconds later it will display ‘C100”.

c. Put a 100g weight（F1）on the center of the pan lightly and close the door of the weighing room.

d. Press **TARE** key and it will display ‘C—100’ with twinkling. About 5 seconds to 10 seconds later the calibration will be over. After then it will display the weight value of the calibration weight after the calibration.

e. If the deviation of the displayed weight value and actual weight value is greater than ±1d，you have to calibrate it again till the deviation of the calibration result and calibration weight value is within ±1d.

Now the calibration operation is over.

RS232 communication

1. Working manner of the serial port; asynchronous communication

Baud rate; Refer to the system parameter table---C4

Start bit; 1

Data bits; 8

Check bit; no

Stop bit; 1

2. data transmission mode

Output mode; output via print key, external command control

3. Data transmission format; ASCII code

Transmission format; Sample No: 1

Initial Weight: 5.000g

Final Weight: 4.000g

Final Temperature: 105C

Analysis Time: 5m 5s

Result Moisture: 20.00%

4. connection method of the data line of the external serial port

moisture meter computer moisture meter printer with serial port

9 pins 9 holes 9 pins 25 pins

2----------2 2----------2
3----------3 3----------3
5----------5 5----------7

connection diagram of moisture meter with computer and printer

Note; The length of the data line must not exceed 15 meters.

failures and solution

fault	cause	solution
no display	●no power supply ●fuse broken	●plug in power cord ●change fuse ●Broken again after changing, be repaired in the maintenance dept.
unstable weight value	●bad work environment ●weighing room door not close properly ●touching of pan with machine shell or foreign matter	●improve the work environment, keep away from vibration and airflow disturbance ●Take out the foreign matter. Turn the pan avoiding the touch. ●Connect an external AC power regulator

	between them ●unstable power supply, beyond allowable value ●unstable weighed object （as it absorbed moisture or moisture evaporated）	
Discrepancy between displayed value and actual weight	●Not calibrate ●No zero clearing before weighing ●Not adjust level	●Calibrate the moisture meter ●Press TARE key for zero clearing ●Adjust the level

cleaning matters needing attention

• Pull out power line before the cleaning.

•. Don't use corrosive cleanser. Suggest using alcohol or gentle solvent.

• Avoid the water or other liquid splashing into the inside of moisture meter.

• Wipe dry the moisture meter with dried, soft cloth after cleaning.

• Don't measure the samples causing explosion or generating poisonous gas and generating the dangerous chemical reaction when drying.

• Don't use it in the environment of combustible gas around avoiding the explosion and fire.

• The used power supply must be accorded with the technical requirements. If it's the extra high voltage it will cause the fire or

damage the machine.

• Turn off the power when changing the halogen lamp. Don't break up the lamp when discarding the damaged halogen lamp.

• Use the power socket with the earth jack to connect the shell to the earth ground reliably.

guarantee

Warranty period; 1 year

Except of one of the items below

1. Warranty period expired.

2. The moisture meter was damaged because of the user's fault.

3.The moisture meter was damaged because the user operated it not according to the instruction manual.

4.The moisture meter was damaged by reason of exposing to the environment with the radioactive and corrosive materials.

5. The moisture meter was damaged caused by the unauthorized disassembly or repair by other maintenance personals not appointed by our company.