



Pensky-Martens Flash Point Tester LMPFT-A100

User Manual

Pensky-Martens Flash Point Tester LMPFT-A100

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1. Safety Measures

Precautions:

- The power line must have a good earth terminal to ensure electrical safety.
- The valve of the flammable gas source must be shut after using the instrument.
- Shut down the power switch and place it in a ventilated, dry place when the instrument is not in use.
- Place the spare oil cup into the cup base when it is not heating to avoid turnover.
- This instrument is suitable for determining the petroleum products whose closed cup flash point is below 400°C.
- If there is any breakdown in the electric circuit, please let the maintenance personnel check and repair.

Attention:

If there is any breakdown of the instrument, please shut down the power immediately. The instrument can be used again only after it has cooled down and has been repaired by a professional to avoid any accidents from happening!

2. Introduction

Pensky-Martens Flash Point Tester LMPFT-A100 is a compact, sophisticated, and cleverly designed system that provides high sample throughput. It determines the low-temperature operability in flammable liquids. It features a closed-cup design that is safer and more representative. Equipped with precise temperature control mechanisms that allow for the accurate and consistent heating of the test sample.

3. Features

- High-power cooling performance
- Mercury-filled rod-type thermometer with a variable temperature range
- Equipped with a stirring motor
- Encapsulated coal gas as the ignition source
- It is designed as per “Test Methods for Flash Point of Petroleum Products (Pensky-Martens Closed Cup Methods)” ASTM D93
- Guaranteeing close to zero maintenance while lowering operational cost

Pensky-Martens Flash Point Tester LMPFT-A100

4. Specifications

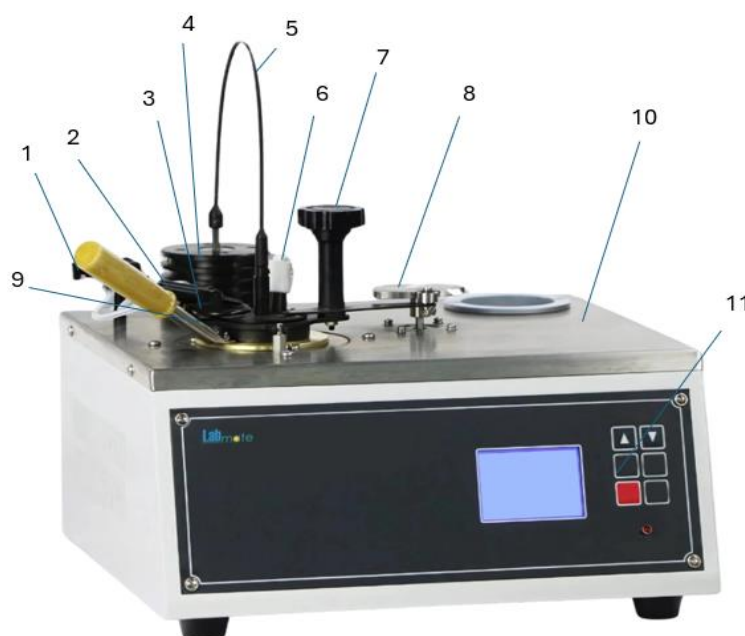
Model No.	LMPFT-A100
Ambient Temperature	$\leq 35^{\circ}\text{C}$
Relative Humidity	$\leq 85\%$
Temperature Range	5°C to 110°C , each scale division is 0.5°C 20°C to 150°C , each scale division is 1.0°C 90°C to 370°C , each scale division is 2°C
Aperture of Ignition Device	0.8 mm
Diameter of Oil Cup	50.7 to 50.8 mm
Depth of Oil Cup	55.7 to 56.0 mm
Depth Of Marked Line on The Oil Cup	33.9 to 34.3 mm
Oil Sample Cubage	About 70 ml
Stirring Speed	90 to 120 rpm for procedure A 250 ± 10 rpm for procedure B
Stirring Blade	8×40 mm
Sample Temperature Rising Rate	1 to 12°C per minute
Heating Power	0 to 600W
Power Consumption	600 W
Power Supply	AC 220 V $\pm 10\%$, 50 Hz
Dimension	$420 \times 350 \times 350$ mm
Net Weight	9 kg

5. Applications

It assesses the low-temperature operability of diesel fuel, biodiesel, fuel blends, and gas oils in quality control, research, and safety assessments across a variety of industries, including petrochemicals, pharmaceuticals, and transportation.

6. Instrument Introduction

Instrument Structure:



1	Air inlet valve	The supplied air source provides access to the air inlet valve to adjust the air demand of the igniting device.
2	Igniting device	Composed of a flame-adjusting knob and igniter head. It is used to adjust the size of the igniting flame and ignite the sample.
3	Latex tube	2 pieces, used to connect the air inlet valve to the igniting device
4	Stirring motor	Used to stir the sample in the oil cup
5	Driving a flexible shaft	Connect the stirring motor to the stirring vane
6	Temperature sensor	PT100
7	Igniting component	Rotate the rotating handle on the igniting component clockwise to open the igniting tuyere. Ignite the sample with the igniting tuyere. It is used when doing manual ignition. The igniting device, stirring vane, and jack of the temperature sensor are installed on this component.
8	Auto-igniting rotating wheel	Automatically ignite once per rotating turn. It is used when doing manual ignition.
9	Hole in the test glass	Place the sample oil cup or spring knob, and the stirring device
10	Oil cup	Used to contain the sample and placed in the heating furnace
11	Control panel	Refer to the 7.1 Control panel

7. Operations

7.1 Control Panel

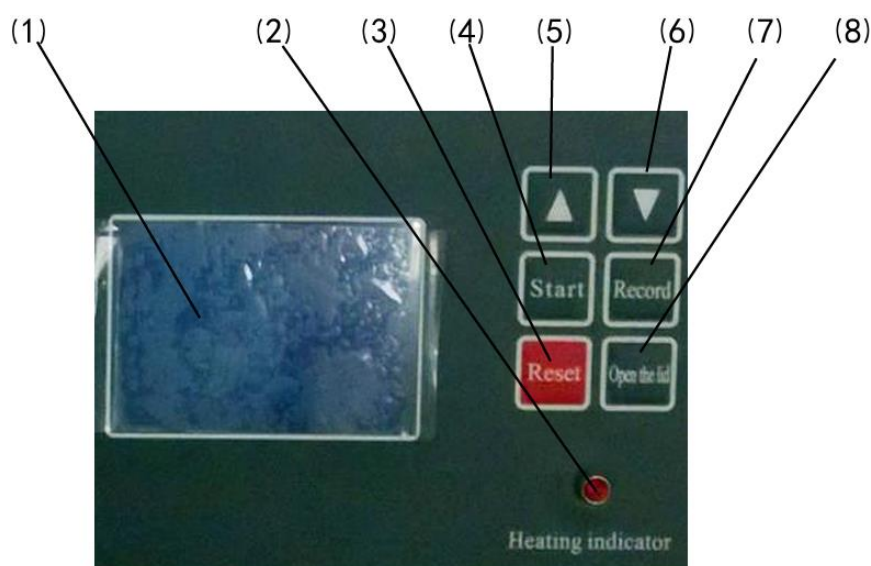


Figure-2

1	LCD screen	Display the set parameters and real-time display test parameters.
2	Heat indicator	Show the working condition of the heating furnace. The heating furnace works when the light is on and stops heating when the light is off.
3	Reset key	The single-chip microcomputer system starts to work after pressing the key.
4	Start key	The instrument starts to work after pressing the key.
5	Up key	Multifunctional key, used to move the cursor up and increase the number.
6	Down key	Multifunctional key, used to move the cursor down and enter a number.
7	Record key	The instrument will record and show the test results on the screen after pressing this key.
8	Uncap key	The instrument will uncap and do an ignition test after pressing this key.

7.2 Electrical schematic diagram

The electric circuit of the instrument is composed of a single-chip circuit, a temperature sampling circuit, a heating drive circuit, a stirring circuit, and an uncap circuit.

The electrical schematic diagram is shown in **Figure 3**.

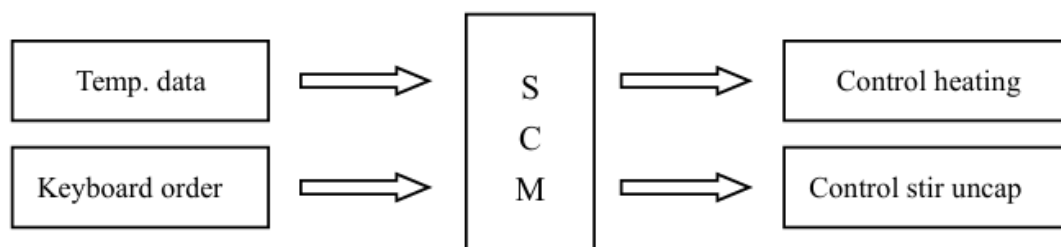


Figure-3

7.3 Usage of the instrument

7.3.1 Preparation before use

- 1) Please read the operation manual carefully before using the instrument.
- 2) Read the standard **ASTM D93 "Test Methods for Flash Point of Petroleum Products (Pensky-Martens Closed Cup Methods)"** carefully to know well the test method, test procedure, and test requirements.
- 3) Prepare all kinds of test tools and materials as per the requirements of **ASTM D93**. The instrument should be put in a dark and sheltered place for the operator to observe the flash fire easily.
- 4) Check the instrument's working condition to make sure that it is in accordance with the environment and conditions required in the operation manual.
- 5) Check the outer shell of the instrument to make sure it is in a good ground state.
- 6) Pour the quantitative sample into the oil cup and then put it in the heating furnace. The stirrer will be moved by a stirring motor via a driving flexible shaft. It should be installed well.

7.3.2 Display interface and keyboard operation method

- 1) The display interface will be shown as **Figure 4** after switching on or pressing the Reset key:

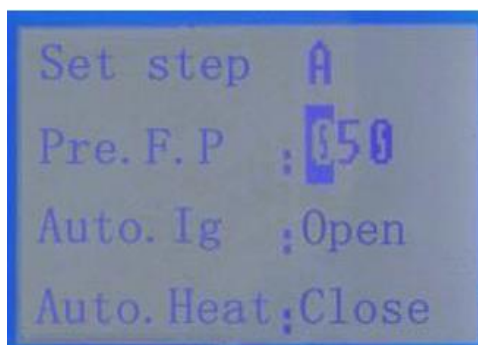


Figure-4

At this time, the operator can press ▼ the key to move the cursor and press ▲ the key to change the parameters and set states.

- The set step is divided into A and B.
- Automatic ignition has an Open and Close.
- Automatic heating has an Open and Close.
- The preset range of flash point is 0°C – 400°C.

The instrument will automatically store the set parameters after all the parameters have been set up.

- 2) After switching on or resetting, press the **Record** key, and the operator can get the interface shown in **Figure 5**.
 - **TC** is the modified value. It means the difference between the actual temperature and the measuring temperature.
 - **PC** is the Parameter value of PID adjustment.
 - **IC** is the I parameter value of PID adjustment.
 - **DC** is the D parameter value of PID adjustment.

The operator can set the parameters above at this interface.

- 1) Press the Record key to move the cursor. Then press ▲ the key to increase the parameter or press ▼ the key to decrease the parameter. The parameter will increase or decrease rapidly if the operator keeps pressing the ▲ key or ▼ keys.
- 2) Under general conditions, the three parameters of PC, IC, and DC have been set up when leaving the factory, and do not need to be revised casually.
- 3) Under the condition of Reset, press the **Start** key, and the working interface will be shown as **Figure 5**.

The Temp. means the location temperature of the temperature sensor. The **Power** means heating power. The heating power increases as the value grows. The Time means the relative time when working. At this time, the instrument does not really work. Press the **Start** key again, the instrument starts to go into work condition, and the time value begins to change.

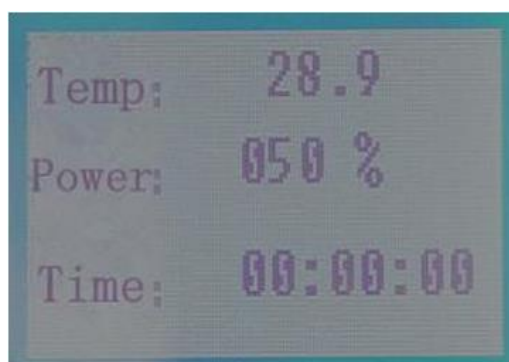


Figure-5

7.3.3 Work pattern of step A

- 1) Set the step to be A state. Automatic ignition and automatic heating should be on.
- 2) Press the **Start** key to make the instrument go into the initial working condition of step A.
- 3) Press the **Start** key again to make the instrument go into the actual work condition of step A.
- 4) Under the condition of step A, the stirring rate is 90(r/min) - 120(r/min), and the heating rate is 5(°C/min) - 6(°C/min).
- 5) Begin to ignite under the expected flash point 23(±5°C). Ignite once every increase of 1°C and stop stirring when igniting.

7.3.4 Work pattern of step B

- 1) Set the step to be the B state. Automatic ignition and automatic heating should be on.
- 2) Press the **Start** key to make the instrument go into the initial working condition of step B.
- 3) Press the **Start** key again to make the instrument go into the actual work condition of step B.
- 4) Under the condition of step A, the stirring rate is 250(±10r/min), and the heating rate is 1.0(°C/min) - 1.5(°C/min).
- 5) Others are the same as step A.

Attention: The operator must use the instrument strictly according to the requirements of **ASTM D93**.

7.3.5 The automatic ignition is in the off state

After the instrument goes into the actual working state, manually (press ▲a key or ▼key) change the heating power to control the heating rate.

7.3.6 Record the flash point

If the flash fire occurs in the actual working process, immediately press the **Record** key to record the flash point of this test. The stirring and heating will stop at this time.

8. Troubleshooting

Fault	Reason	Solution
The power indicator does not light	The power is cut	Check the outer power supply
	The fuse is bad	Check and replace the fuse
	The power switch is bad	Check and replace the power switch
The furnace does not heat	The heating wire is cut	Check and replace the heating wire
	The SSR is bad	Check and replace the SSR
The stirrer does not work	The motor cable is dropped	Check and connect the motor cable well
	The control panel broke down	Check the control panel and replace it
	The flexible axle is not connected	Check and connect the flexible axle well
	The stirring vane hits the wall	Check and get rid of this fault
The screen doesn't light	No power supply	Check and connect the power supply
	The screen cable has dropped	Check and connect the screen cable
	The switching power supply broke down	Check the switching power supply to get rid of the faults, or replace it
	The screen broke down	Check the screen and replace it if it truly broke down
The screen glitters	The instrument shell is ungrounded	Check the instrument shell to ensure it is grounded well
	There exists electromagnetic interference around the instrument	Check the electromagnetic interference around the instrument and get rid of it