Huazheng®

HZ-582
Copper Sheet Corrosion Tester

Huazheng Electric Manufacturing (Baoding) Co., Ltd

Contents

I.Overview

This instrument is designed and manufactured in accordance with the requirements of GB/T 5096 *Test Method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test*. It is applicable to the determination of corrosion degree of aviation gasoline, jet fuel, vehicle gasoline, natural gasoline or other hydrocarbons, solvent oil, diesel oil, distillate fuel oil, lubricating oil, grease and other petroleum products with Reid vapor pressure not more than 124 kPa (930 mmHg) to copper strip. The instrument has the functions of automatic temperature control, automatic timing and time alarm.

1.1 Appearance of the Instrument

The appearance of the instrument is as shown in Figure 1.1 below.

Figure 1.1

1.2 Functions and Features

1. The instrument adopts intelligent measurement and control system with self diagnosis function;

2. The test bath is metal bath with precise temperature control;

3. Copper strip corrosion test time and alarm can be set;

4. PID temperature control technology is adopted.

II.Technical Parameters

Temperature sensors: Industrial platinum resistance, with graduation number Pt100;

Temperature control range: Room temperature ~ 150℃;

Temperature control precision: ±0.1℃;

Temperature display: LED digital display;

Heating power: 1500W;

Timing range: 1 minute -24 hours;

Time display: LED digital display;

Sample hole: 4;

Number of samples: (4-12)

Ambient temperature: Room temperature ~ 35.0℃;

Relative humidity: ≤85%;

Overall power consumption: not more than 1800W;

Working power supply: AC(220V±22V), 50Hz±5Hz;

Overall dimension: 480mm×360mm×520mm (L×W×H).

III.Operating Principle

The Copper Strip Corrosion Tester adopts digital temperature controller for constant temperature control and makes the bath temperature uniform through the mixing paddle driven by the mixing motor. It adopts timer to set different time for different tests. When the test is over, the timer will give a sound to prompt, which is intuitive and convenient.

IV.Instrument Installation

4.1 Accessory Inspection

After unpacking, please check the type, specification and quantity of accessories of the instrument with the packing list.

4.2 Instrument Installation

1. Position requirement

1. The instrument shall be placed on a flat, clean, steady workbench surface;

2. The natural gasoline with high pressure steam or the test bomb with oil sample of other products shall not be placed in the bath at 100℃;

3. This product involves inflammable materials and there should be no open fire (or device to produce sparks) around during operation;

4. The power supply must be equipped with good grounding terminal according to the national standard.

2. Starting method

1. Put the instrument on a clean and level workbench;

2. Plug the power cord into the AC220V instrument three-pin socket; must keep the instrument in a good grounding condition;

3. Connect the five-core aviation plug of the mixing motor and the temperature sensor to the aviation socket at the back of the chassis. (Viewed from the rear of the chassis, the mixing motor socket is on the left and the temperature sensor socket is on the right)

4. When everything is ready, turn on the power switch of the instrument to start the machine (it should not be powered on without bath solution).

V.Display and Keys

5.1 Display Instruction

1. Display of temperature controller

Turn on the power switch of the instrument, and the instrument display is as shown in Figure 5.1 below:

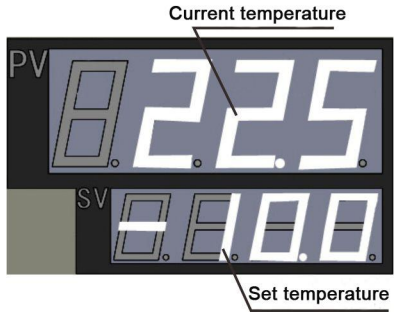

Figure 5.1

2. Display of digital time relay

Turn on the timing switch of the instrument, and the timer display is as shown in Figure 5.2 below:

Figure 5.2

5.2 Key Instruction

1. Keys on temperature controller panel

The instrument panel distribution is shown in Figure 5.3:

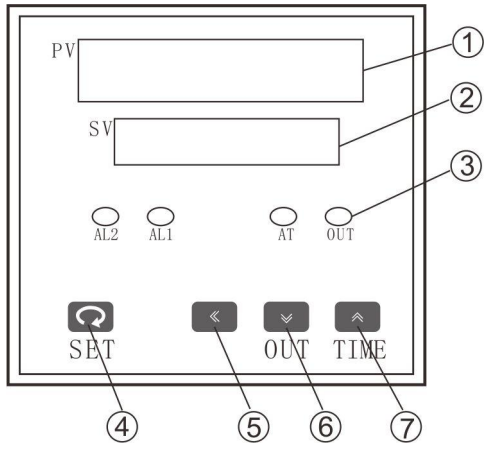

Figure 5.3

1— PV indicator window (red)

Note: It displays the measured temperature or various prompts according to the instrument status.

2— SV indicator window (green)

Note: It displays the set temperature or timing and various parameters according to the instrument status.

3— LED indicator

AL2 indicator (yellow), alarm setting value.

AL1 indicator (red), alarm setting value.

AT indicator (yellow), on during self-tuning operation

OUT indicator (green), it flashes according to duty cycle when there is output.

4— function key

Note: It modifies the set value, calls out the parameter, and confirms the parameter modification.

5— shift key

Note: When setting the parameter value, it is used to shift the fixed positioning.

6— minus key

Note: it is used to observe the current output power and used as the minus key to set the parameter value.

7— plus key

Note: it is used to observe the remaining time and used as the plus key to set the parameter value.

Power switch: as the main power switch of the instrument. Turn on the switch, and the instrument is powered on.

Mixing switch: when the power switch is on, turn on the switch, and the mixing motor starts to rotate.

Heating switch: when the power switch is on, turn on the switch and the heater will start heating.

Timing switch: when the power switch is on, set the timing before turning on the switch, and the timer starts timing.

2. Keys of digital time relay

The digital time relay controls time by manually adjusting the key with time control range from 0.01 seconds to 99 hours and 99 minutes.

It mainly consists of two parts:

1— Gear key

Located in the middle of the instrument, it is a black adjusting knob. When the stop is placed at the right end, the red light under "second" is on, and the timing unit is second, for example, when the "+" "-" key is adjusted to "0190", turn on the timing switch, the small red dot in the display starts flashing, and the timing starts. When the display screen shows "0190", the buzzer will alarm, and the timing is 2.5 seconds; when the stop is in the middle, the red light under "minute" is on, and the timing unit is minute, for example, when the "+" "-" key is adjusted to "0190", turn on the timing switch to start timing, when the display screen shows "0190", the buzzer will alarm, and the timing is 2.5 minutes; when the stop is in the left end, the red light under "hour" is on, and the timing unit is hour, take "0190" as an example, and the timing is 2.5 hours.

Note: Timing should be clear rather than being calculated. For example, when timing for 3 hours, you can set the gear key to the left end, and then directly set it to "0300". Of course, sometimes it is inevitable to be calculated.

2— Setting key

The setting keys are divided into "+" and "-" keys in 4 groups, and they can be used to modify the setting value respectively.

Every time you press "+" or "-" once, the current value of the selected bit will be added or subtracted by 1, and it will be added up from 0 after being added with 9, and so on.

VI.Instrument Operation

6.1 Key Functions

The menu of the instrument is divided into three levels. Menu A is the setting of given value, menu B is the setting of system parameters, and menu C supplements the setting of system parameters. They are switched through  ,  and  . The

specific operation flow is shown in Figure 6.1:

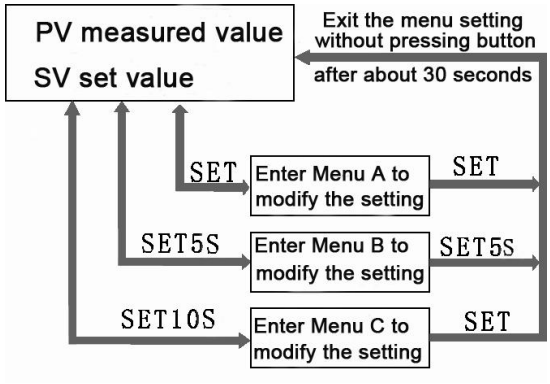

Figure 6.1

1. Switch the parameter name to the menu to be modified according to the operation process described in the menu.

2. Press , the bits of the parameter value will start to flash.

3. Press to move the flashing position to the position to be modified and then press or to change the bit to the expected number or symbol.

4. Repeat step 3 until all four digits are modified.

5. Press to confirm the input and the parameter value will not flash or skip to the next menu.

6. Repeat the above operations to modify other parameters.

7. After all parameters are modified, press to exit the parameter setting menu and return to the normal working state.

6.2 Parameter Settings

1. Temperature setting

In the normal measurement interface, press to enter the instrument temperature modification interface status, as shown in Figure 6.2:

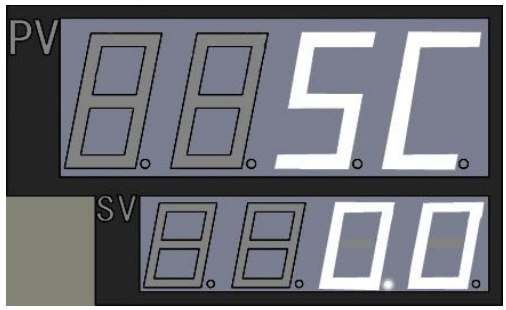

Figure 6.2

At this time, SV value starts to flash, press « to move the flashing position to the position to be modified, and then press ^ or v to change the position to the expected value. After the value is modified, press « to save the settings and exit the modification interface.

2. Counting time setting

In Figure 6.2, press ↻ to enter the instrument counting time modification interface, as shown in Figure 6.3:

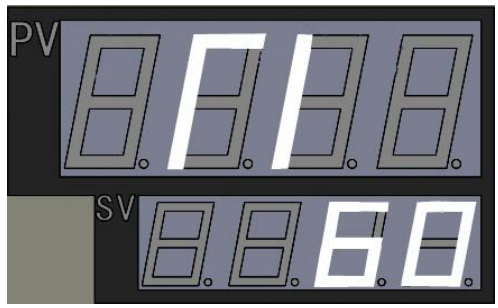

Figure 6.3

Press « to move the flashing position to the position to be modified and then press ^ or v to change the position to the expected value. After the value is modified, press « to save the settings and exit the modification interface.

VII.Test Method

7.1 Preparation Before Test

Please read the operation instruction carefully before the utilization of the instrument.

2. Before the test, please carefully read GB/T 5096 *Test Method for Corrosiveness*

to Copper from Petroleum Products by Copper Strip Test. Understand and get familiar with test methods, steps and requirements described in the standard.

Prepare various test apparatuses, materials and so on for testing according to the requirements specified in the standard.

4. Check the working condition of the instrument and make sure it meets the working environment and working conditions specified in the manual.

5. Check whether the shell of the instrument is well grounded.

7.2 Test Steps

Note: The test method is illustrated with automobile gasoline as an example. (For other test samples, please read GB/T 5096 *Test Method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test*, and pay attention to experimental temperature and time).

1. Preparation of test piece:

1) Surface preparation: Put a piece of silicon carbide or aluminum oxide (corundum) sandpaper on a flat surface, and make the sandpaper wet with kerosene or washing solvent (any volatile, sulfur-free hydrocarbon solvent that does not change color of copper strip at 50℃ for 3 hours can be used, and isooctane is used for anti-explosion test), rub six copper strips against the sandpaper by rotating action, and clamp them with a disc grinder to avoid direct contact with the copper by hand, and remove the grinding traces left by other sandpaper with 65 μm (240 grain) silicon carbide or aluminum oxide (corundum) sandpaper. Wipe off the metal scraps on the copper strip with quantitative filter paper, and immerse the copper strip in the washing solvent, take out the copper strip from the washing solvent and polish it directly or store it in the washing solvent for standby.

2) Final polishing: Take out the copper strip from the washing solvent with the fingers protected by the ashless filter paper, and rub the end edges of the copper strip with absorbent cotton stained with silicon carbide or alumina (corundum) sand particles of 105 μm (150 mesh) (clamp it with stainless steel tweezers rather than touch it with fingers), and then put it on the grinder and polish the main surface. It should be ground

along the long axis of the copper strip in one direction rather than back and forth. When grinding, the moving range should exceed the end of the copper strip. Rub the copper strip vigorously with a piece of clean absorbent cotton to remove all metal scraps until there is no stain left when it is wiped with a new absorbent cotton and put it into the prepared oil sample immediately after wiping.

2. Vehicle gasoline sample test:

1) The sample shall be completely clear, free of suspended water or internal water, and poured into a clean and dry test tube at the scale line of 30 ml.

2) Set the temperature at 50℃ controlled by the temperature controller and turn on the heating switch to start heating.

3) Slide the processed copper strip into the oil sample tube, plug the tube with the tube plug, and put the tube into the bath solution which has been maintained at 50 ± 1℃, and keep it away from strong light.

4) Adjust the timer to 3 hours and turn on the timer switch to start timing. When the time is up, the timer will alarm.

5) Pour the contents of the test tube into 150ml high beaker while keeping the copper strip sliding in gently to avoid breaking the beaker, take out the copper strip immediately with stainless steel tweezers and immerse into the washing solvent to wash the sample. Take out the copper strip immediately and dry the washing solvent on the copper strip with quantitative filter paper.

6) Put the copper strip into the observation tube, and plug the observation tube with absorbent cotton.

7) Compare the copper strip with the corrosion standard color plate to check for discoloration or corrosion signs.

8) Record the results after the test.

VIII.Precautions

1. Before the instrument is powered on, water, oil or mixed liquid must be added to the bathtub. When there is no liquid in the bathtub, it should not be powered on. The

heater must not be used in the air without liquid.

2. If there is no display after the machine is started, check the fuse at the interface of the three-core power line behind the instrument.

Check whether it is in good condition. If the fuse is broken, replace it.

Note: The instrument shall be provided with one backup fuse when delivery; at the position as shown in the Figure 8.1 above, only the fuse holder needs to be taken out and can be replaced.

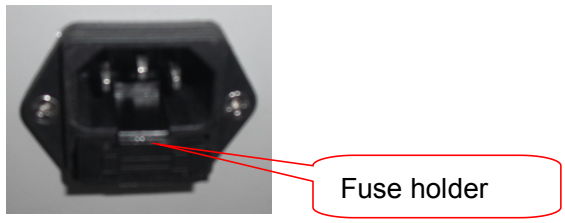

Figure 8.1

3. In case of failure, the power supply shall be cut off immediately. After the bathtub temperature of the instrument returns to normal, it is necessary for professional personnel to repair it and remove the failure before it can be used to prevent accidents.

4. Before the instrument leaves the factory, the self-tuning parameters of the temperature controller have been set, and it can enter the self-tuning state automatically after the machine is turned on, and the user does not need to reset it. When the temperature effect becomes poor, reset it with reference to the operation of the instrument.

5. If it is not easy to judge the test results, please refer to GB/T 5096 *Test Method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test* for conclusions.

6. In case of failure, it is necessary to cut off the power supply immediately and repair it and remove the failure by professional personnel before it can be used to prevent accidents. It must not be disassembled by yourself, otherwise, it will lead to accidents.

IX.Packing List

No.	Item	Qty
1	Main engine	1
2	Test cartridge bracket	1
3	Tube holder	2
4	Audition	2
5	test tube	8
6	Test bomb	8
7	Observation tube	2
8	Grinder	5
9	Thermometer（(0～100）℃，0.5℃）	1
10	Test tube stopper	1
11	O-ring（(Φ40/Φ42）×3.5）	14
12	Standard swatch	2
13	Thermometer retaining ring	1
14	Stainless steel tweezers（1#）	4
15	Cotton wool	1
16	power cable（250V 15A）	1
17	Fuse（15A）	1