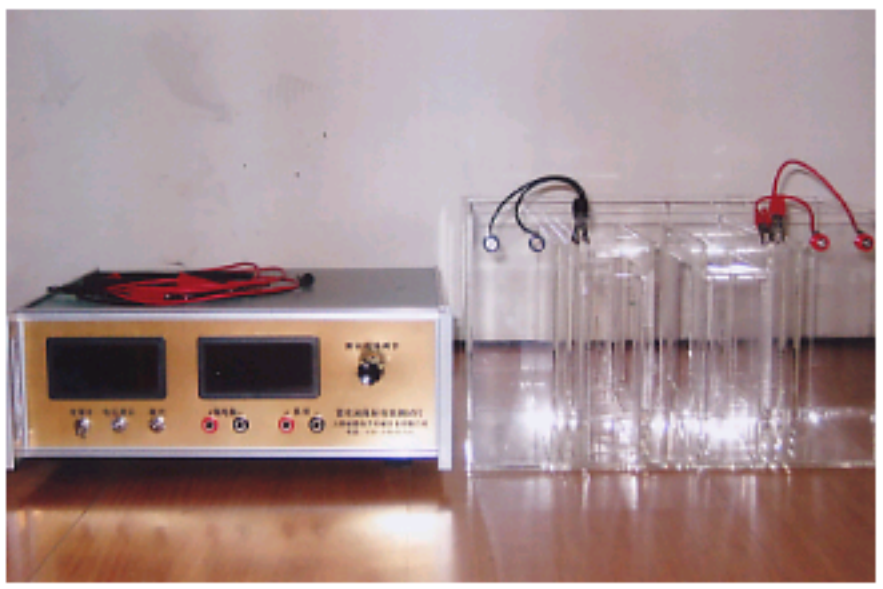
蓄 电 池 隔 板 电 阻 测 试 仪

Battery diaphragm resistance tester

WM-R-Ⅱ型

使用说明书

an instruction manual



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WM-R 型隔板电阻测试仪

Diaphragm resistance tester

在使用本产品前请仔细阅读本说明书，阅后请妥善保管以备后用。

Please read this manual carefully before using this product, and keep it properly for future use

一、 组成部分 component

一套三件: 主机 耐酸测试槽 镉电极

A set of three pieces: cadmium electrode of host acid resistance test tank

① 隔板电阻测试仪 1 台 主机 Diaphragm resistance tester 1 host

② 耐酸测试槽 1 台，内置镉电极 2 支，（正负极板各一片由用户自配）

One acid resistance test tank, with 2 cadmium electrodes built in (one positive and one negative electrode plate is provided by the user)

③ 连接导线 4 根 4 connecting wires

二、 特点 characteristic

① LED 窗口分别显示电流（A）电压（mV）The LED window displays current (a) and voltage (MV) respectively

② 测试精度高，测量准确，性能可靠 High test accuracy, accurate measurement and reliable performance

③ 配置高品质 5mm 低阻有机玻璃耐酸测试槽，高纯质镉电极及优质连接导线 Equipped with high-quality 5mm low resistance

organic glass acid resistance test tank, high-purity cadmium electrode and high-quality connecting wire

④ 各部分连接简单、紧凑、操作简便 The connection of each part is simple, compact and easy to operate

三、 技术指标 Technical indicators

量 程：Range:

WM-R-I 型电流表	0-2A	电压表	0-200 mV
WM-R-I ammeter	0-2A	voltmeter	0-200 mV
WM-R-II 型电流表	0-5A	电压表	0-500 mV
WM-R-II ammeter	0-5A	voltmeter	0-500 mV

精 度： Accuracy

数字电流表	±0.5%F.S.	Digital ammeter	±0.5%F.S.
数字电压表	±0.5%F.S.	Digital voltmeter	±0.5%F.S.

（显示值机内可微调校准 Display the fine-tuning calibration in the check-in）

电 源： AC 220V 50Hz Power Supply: AC 220V 50Hz

四、 准备工作 IV Preparatory work

1. 镉电极 Cadmium electrode

① 清洗镉电极 Clean cadmium electrode

在制作镉电极时，其表面形成了一层保护膜，为获得最佳导电性能，需要将镉电极表面的保护膜清除，使用前从耐酸容器中取出，应用乙醇浸泡 1-2 小时，取出后用动物毛刷及纯水冲洗干净。

When making cadmium electrode, a protective film is formed on its surface. In order to obtain the best conductivity, it is necessary to remove the protective film on the surface of cadmium electrode. Before use, take it out of the acid resistant container, soak it in ethanol for 1-2 hours, and then rinse it with animal brush and pure water.

②浸泡镉电极 Immersed cadmium electrode

将清洗后的镉电极浸泡在比重(密度) ρ为1.10g/cm³的稀硫酸溶液中3昼夜以上，否则因极化作用面量值不准，应注意以后当不用镉电极时必须把它浸在稀硫酸溶液中，以防止其表面干燥。

Soak the cleaned cadmium electrode in specific gravity (density) ρ 1.10g/cm ³ In the dilute sulfuric acid solution for more than 3 days and nights, otherwise, due to the inaccurate value of the polarization surface, it should be noted that when the cadmium electrode is not used in the future, it must be immersed in the dilute sulfuric acid solution to prevent its surface from drying.

2、 硫酸分析纯及试样

① 硫酸(分析纯)

用液体比重计调试密度为1.28±0.005g/cm³硫酸溶液（25℃时）。

Sulfuric acid (analytical purity)

Use a hydrometer to adjust the density to 1.28 ± 0.005g/cm ³ Sulfuric acid solution (at 25 ℃).

② 试样的制备

将样品裁成142mm×146mm的试样，若样品尺寸小于上述尺寸，则至少裁成125mm×135mm（可按测试槽内面积裁最大尺寸）的试样，每组试样的片数不得少于表-1规定。将裁好的试样放入耐酸容器内使试样完全浸没在25±2℃，密度为1.28±0.005g/cm³硫酸溶液中，浸酸时间为1－5h(小时0，以试样浸透为限，启动干式荷电蓄电池用隔板浸泡为20 min，毡型隔板不用浸酸。

Preparation of samples

Cut the sample to 142mm × 146mm sample. If the sample size is smaller than the above size, it shall be cut to at least 125mm × For 135mm (the maximum size can be cut according to the area in the test tank), the number of pieces of each group of samples shall not be less than that specified in TABLE-1. Put the cut sample into an acid resistant container so that the sample is completely immersed in 25 ±2 ℃, and the density is 1.28 ±0.005g/cm ³ In the sulfuric acid solution, the soaking time is 1-5h (0 hours), which is limited to the soaking of the sample. The diaphragm for starting the dry-type charged battery is soaked for 20 minutes, and the felt diaphragm does not need

to be soaked in acid.

电阻测试插入试样片数（表-1）

Number of inserted samples for resistance test (TABLE-1)

厚　　度 thickness mm	片型 袋式隔板 Sheet type bag partition								毡型隔板 Felt diaphragm		
	≦1.0	>1-1.2	>1.2-1.3	>1.3-1.5	>1.5-1.8	>1.8-2.2	>2.2-2.7	>2.7	≦1.0	>1.0-1.5	>1.5
试　样片数 Sample Number of slices	10	9	8	7	6	5	4	3	5	4	3
测　试次　数 Testing Times	1	1	1	1	2	2	3	3	1	1	2

五、　操作 operation

① 将分析纯硫酸缓缓倒入测试槽内，调整测试槽内的硫酸溶液的温度为25±2℃；调整硫酸溶液密度为1.28±0.005g/cm³；调整测试槽内硫酸液面高度比试样被侧面上边高5mm。

Slowly pour the analytical pure sulfuric acid into the test tank, and adjust the temperature of the sulfuric acid solution in the test tank to 25 ±2 ℃; Adjust the density of sulfuric acid solution to 1.28 ±0.005g/cm ³; Adjust the height of sulfuric acid level in the test tank to be 5mm higher than the upper side of the sample.

② 关闭测试仪所有开关按（向下位置），将电源插头插入电源插座，

从左到右顺序打开所有开关，旋动“调节电流”旋钮使电流表的读数为1-2A，对测试槽进行充电，直到电压表的读数稳定（第一次充电时间较长）

Turn off all switches of the tester, press (down position), insert the power plug into the power socket, turn on all switches from left to right, turn the "adjust current" knob to make the reading of the ammeter be 1-2a, and charge the test tank until the reading of the voltmeter is stable (the first charging time is long)

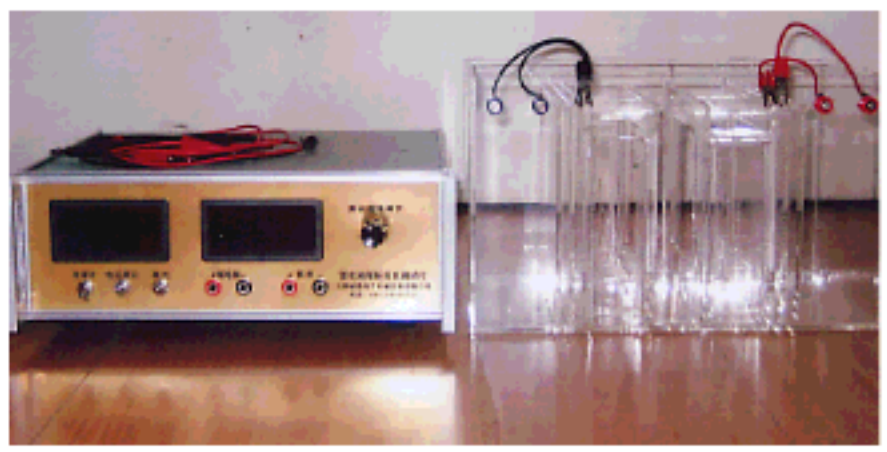
③ 旋动“调节电流”按钮，使电流表读数为1.00A，待电流表读数稳定后记录电压表的读数“V0”，然后根据表-1规定，从耐酸容器中取出试样插入测试槽中间空格中（毡型隔板直接插入），若试样间存在间隙应用夹具紧试样，待电压表读数稳定后记录电压“V1”。

Turn the "adjust current" button to make the reading of the ammeter be 1.00a. After the reading of the ammeter is stable, record the reading of the voltmeter "V0". Then, according to the provisions of TABLE-1, take the sample out of the acid resistant container and insert it into the middle space of the test tank (the felt diaphragm is directly inserted). If there is a gap between the samples, clamp the sample tightly, and record the voltage "V1" after

the reading of the voltmeter is stable.

④ 根据电压测定法公式计算 Calculated according to the formula of voltage measurement method

$$R=(V1-V0)\times S/(m\times I)$$



式中 Where

R: 试样电阻 Ω

Sample resistance

V0: 插入试样前电压表读数

Voltmeter reading before sample insertion

V1：插入试样后电压表读数

Voltmeter reading after sample insertion

S: 试样有效测试面积 cm

Effective test area of sample cm

I: 电流 1A Current 1A

m: 插入试样的片数 Number of inserted samples

注：若起动用干式荷电蓄电池用隔板浸泡 20min 测定不合格，而浸泡 20min 以上电阻测定合格，则该隔板适用于非干式荷电蓄电池。

Note: if the diaphragm used for starting dry-type charged battery is not qualified after soaking for 20min, and the resistance is qualified after soaking for more than 20min, the diaphragm is applicable to non dry-type charged battery.

六、 维护 maintain

镉电极使用说明

Instructions for cadmium electrode

镉电极用纯度很高的镉金属材料精制成（φ5X150mm）棒状。外形光亮，

镉电极用作参比电极，分别与铅蓄电池的正极群及负极群组成电池，测量在硫酸溶液中的电极电位，即测得所谓“ 镉压”。

对正极测得的电压叫“ 正镉压”，对负极测得的电压叫“ 负镉压”。根据正负镉压数值可以判断铅蓄电池的正极或负极的好坏程度。

平时用电压表测出的铅蓄电池的电压，只是代表整个电池的好坏程度。

测量镉压只能在电池充电或放电时进行，无负荷时测出的数值 只与电液比重有关，不能代表极板的工作情况，因此时电池无极化作用存在。

Cadmium electrode is refined from cadmium metal material with high purity（ Φ5 x 150mm) rod. Bright appearance,

The cadmium electrode is used as a reference electrode to form a battery with the positive and negative groups of lead-acid batteries respectively. The electrode potential in sulfuric acid solution is measured, that is, the so-called "cadmium pressure" is measured.

The voltage measured for the positive pole is called "positive cadmium voltage", and the voltage measured for the negative pole is called "negative cadmium voltage". According to the positive and negative cadmium pressure

values, the quality of the positive or negative electrodes of lead-acid batteries can be judged.

The voltage of lead-acid battery measured by voltmeter at ordinary times only represents the quality of the whole battery.

The measurement of cadmium pressure can only be carried out when the battery is charged or discharged. The value measured at no load is only related to the specific gravity of electrohydraulic, which cannot represent the working condition of the electrode plate, because at this time, the battery has no polarization.

镉电极属易损品。每次使完，在硫酸中会有损耗。

长期不用时，用水洗净，以免在酸液腐蚀。并保持干燥不要受潮。，

Cadmium electrode is vulnerable. After each use, there will be loss in sulfuric acid.

When not in use for a long time, wash it with water to avoid corrosion in acid. And keep dry and don't get damp.

七、故璋现象：Guzhang phenomenon

1，调节电流旋钮，电流表显示仍为 0.00。 ①测试开关没打开，②或主机和测试槽连接线没插好，③或测试槽极板插孔线夹与极板没连接可靠。

Adjust the current knob, and the ammeter display is still 0.00. ① The test switch is not turned on, ② or the connecting line between the host and the test slot is not plugged in properly, ③ or the jack clamp of the test slot polar plate is not reliably connected with the polar plate

2、电压表显示 000.0。① 电压显示开关没打开 ②或主机和测试槽连接线没插

好 ③或测试槽镉电极插孔线夹与镉电极没连接可靠。

The voltmeter shows 000.0. ① The voltage display switch is not turned on ② or the connecting wire between the host and the test tank is not plugged in ③ or the cadmium electrode jack clamp of the test tank is not reliably connected with the cadmium electrode.

八、注意事项 matters needing attention

1.镉电极金属部分浸入电液内的面积不得少于 2 平方厘米，

2.测试槽的四个插线孔与主机四个插线孔，必须对应正对正，负对负，镉电极对镉电极，极板对极板，正确无误，用随机配上四根导线连接可靠。严禁接错。

3. 测试完后，按从左到右顺序关闭测试仪上开关，断开测试槽与主机的连接导线，并将测试仪，连接导线和测试槽放置在通风、干燥地方。以备再用。

1. The area of cadmium electrode metal immersed in electrohydraulic fluid shall not be less than 2 square centimeters,

2. The four plug-in holes of the test slot and the four plug-in holes of the host must correspond to the positive and negative, cadmium electrode to cadmium electrode, and electrode plate to electrode plate. They are correct, and they are connected reliably with four wires randomly. Wrong connection is strictly prohibited.

3. After the test, turn off the switch on the tester from left to right, disconnect the connecting wire between the test slot and the host, and place the tester, connecting wire and test slot in a ventilated and dry place. For reuse.