目　　录

一、概述

本磁轭式磁粉探伤仪是小型便携式无损检测的专用仪器，是采用磁场磁化工件的原理设计而成的小型无损检测仪器，具有对被探工件的裂纹显示清晰，性能可靠稳定和操作方便等诸多特点。

此仪器利用直接缠绕于探头上的线圈，产生感应磁场，磁化工件。本设备具有体积小、重量轻、提升力大和活动关节可调等特点，适用平面焊缝、角焊缝、钢管、压力容器、管道、轴及形状复杂的零件的探伤。

图一：磁粉探伤仪外观

此仪器随机带有 LED 照明灯，极大方便客户的使用；其特点是亮度大、寿命长、更换方便，是便携式磁粉探伤仪的一次技术革新。本产品已申请了国家的技术专利，受国家专利法保护，其它企业禁止模仿。

二、主要技术指标

1、输入电压：～220V±10%，50-60HZ；

2、工作电流：AC2A；

3、探头极距：20-200mm；

4、提升力：（平面）7.5Kg；

5、仪器重量：2.9Kg；

6、灵敏度：A 型试片显示清晰；

7、电源电缆：5.5 米；

8、工作温度：-10-50℃；

9、外形尺寸：190×248×56mm；

10、工作周期：2 分钟开-2 分钟关；

11、LED 照明灯：3W。

三、主要结构特点

附件电源电缆是一根三芯电缆，一端通过圆形三芯航空插头插入探头，另一端与交流～220V 插座相连。配套探头采用高强度绝缘材料制成，检验合格后用环氧树脂胶连成一体，达到既密封绝缘，又不易损坏，操作舒适；探头上有活动关节，可供用户在特定的工件上使用；也可使用平面磁轭的两边，具体是看所磁化的工件形状。

四、使用与维修

1、先将电源电缆与探头连接旋紧，再通～220V 交流电。

2、根据被探工件的形状不同，调节探头的角度或取下活动关节。

3、使用此探伤仪之前，先将探头与被探工件接触好，在被探工件面上喷洒上

磁粉或磁悬液，这时按下探头手把上的充磁开关，工作呈磁化状态，松开按钮开关，观察工件是否有磁痕，工件上如有裂纹，在磁化时有裂纹的地方就会聚结磁粉，就形成磁痕。

图二：磁粉探伤仪现场实测图片

五、注意事项

1、仪器在使用时，应避免空载工作，防止产生不必要的温升或损坏。

2、使用探头时，端面与被检测工件要保持良好地接触，再按下手把上的充磁按钮开关，此时探伤效果最好，探头应避免碰撞，保持清洁。

3、在使用时，如果发现探头线包有发热情况，应适当休息后再投入使用；如果发现探头线包发热严重，应立刻停止使用，检查故障原因，经检修后再使用，否则会损坏探头。

4、仪器停止使用时，应切断配电板上的电源开关。

5、探伤结束后，在探头的活动关节部位，应清除杂物并加注润滑油。

6、磁悬液使用水剂时，应加入适量防锈剂。

7、不要盲目使用，不要接近高温物体；不要在雨中工作，喷洒磁悬液切勿喷到开关、插头座上。

8、如 LED 照明灯损坏，可以联系厂家维修；用户也可以从厂家购买 LED 灯，自行安装。

六、操作步骤

1、工件表面预处理

清除工件表面的污物，如油污、铁锈、涂料层、毛刺及灰尘、氧化皮和金属屑等。

2、磁化与磁粉介质的施加

磁化时，磁头必须与工件表面紧密接触，一边通电，一边喷洒磁粉，干法检测必须在工件表面和磁粉完全干燥的条件下进行，否则表面会粘附磁粉，使衬底变差影响缺陷观察。干法检测在整个磁化过程中要一直保持通电磁化，只有观察

磁痕结束后才能撤除磁化磁场。施加磁粉时，干粉应呈均匀雾状分布于受检工件表面。

七、装箱配置

1、磁轭式磁粉探伤仪	1 台
2、输入电源线	1 根
3、磁膏	1 盒
4、电笔	1 支
5、使用说明书	1 份
6、产品合格证	1 份
7、产品保修卡	1 份

注：随机配有电工用电笔，供用户定期检测探伤仪是否漏电

附录：磁膏的介绍及使用方法

磁膏的组成部分：

黑磁粉，润湿剂，分散剂，悬浮剂，消泡剂，防锈剂，随仪器配的磁膏易融于水，配置方便，可以提高磁粉探伤检测功效，灵敏度高，无毒无害。 磁粉检测方法根据载液不同分为湿法检测和干法检测：湿法检测是将磁粉悬浮在载液中进行检测的方法，干法检测是以空气为载体将干磁粉施加在工件表面进行检测的方法。使用湿法检测时，可将黑磁膏与水混合，得到浓度适宜的磁悬液，建议配制浓度为每 10-25g 黑磁膏配水 1 升。

磁膏的适用范围：

1. 黑磁膏适用于特种设备上的焊缝、宇航工件及灵敏度要求较高的工件检测。
2. 黑磁膏适用于大批量工件的检测，常与固定式设备配合使用。
3. 黑磁膏适用于检测表面微小缺陷，如疲劳裂纹、磨削裂纹、焊接裂纹和发纹等。

使用磁膏时的操作要点：

1. 黑磁膏所配制的磁悬液可采用浇法、喷法和浸法，但不能采用刷涂法。
2. 连续法宜用浇法和喷法，黑磁膏所配液体液流要微弱，以免冲刷掉已经形成的磁痕显示。
3. 水与黑磁膏配比时，应进行水断实验。
4. 水与黑磁膏的配比浓度为推荐浓度，可根据各种工件表面的不同，选择不同的黑磁膏配比浓度。

5. 仰视检测和水中检验宜使用黑磁膏。

黑磁膏适用于湿法非荧光磁粉探伤，当被检工件为浅色时，黑磁膏与工件对比度极高；若工件表面为深色，黑磁膏与工件对比度不够清晰，建议采用反差增强剂来提高黑磁膏与工件对比度。

磁膏颗粒度：10μm≤80%≤40μm

建议配制浓度：每 10-25g 黑磁膏配水 1 升

Handheld Magnetic Particle NDT Yoke

OPERATION INSTRUCTIONS

The Contour Probe is a rugged high performance instrument for Magnetic Particle inspection to accepted nondestructive testing stands. Certain operating procedures and safety precautions should be observed.

CHARACTERISTICS:

New concept of the magnetic yoke flaw detector is applied;

Being listed by aircraft maintenance manual for specific products;

Using many advanced techniques to the formation of induced magnetic field;

Controller and solid state electronic devices as one of the high-performance portable instruments;

Fixed AC magnetic field, for surface and near surface defect detection; Concentration of the magnetic field can be applied to the detection of high-energy area, to quickly and accurately find material defects;

Yoke is light, reliable, can be used with dry powder and wet fluorescent magnetic particle;

TECHNICAL PARAMETERS:

Power: 220VAC

Frequency: 50-60Hz

Current: AC2A

Magnetic field: AC

Pole spacing 20-200mm

Lift: > 7.5KG

Operating temperature: -10-50 ℃

Dimensions 190 * 248 * 56mm

5M long 3-core cable size

Work cycle: 2 minutes on -2 minutes off

Weight 3.0KG

ELECTRICAL:

The Contour Probe is designed to operate from a standard 220VAC, 50Hz, grounded power source. Repairs should not be attempted on the yoke units. Units are sealed and should be returned to the factory for service.

INSTRUMENT DESCRIPTION:

Basically the Coutour Probe is an electromagnet producing a strong AC magnetic field. Plcement of the two poles (legs) upon ferrous materials merely provides a path for the intense magnetic fied to pass from one pole to the other. The part completes the flux path and becomes highly magnetized.

In overall design and performance, the Contour Probe comprises a coil wound on a laminated steel leg assembly contained within the rugged molded housing.

Flexibility of the legs allows the field to actually be “focused” at the precise area of inspection.

OPERATION:

Plug the Conter Probe into a Grounded power source . Place the Probe legs upon the work surface with the suspected defect at right angles to the legs. Push the test switch and lightly dust or float inspection powder over the area being inspected.

Defect indications will be revealed by oberserving irregular patterns. Turn the Probe 90 degrees from the first test and repeat the procedure . Test switch should be released after powder application. However, if excess powder is to be lightly blown away, as is the procedure to reveal minute indications, the Probe should remain energized while this procedure is performed.

DEMAGNETIZATION:

Small pieces which have become residually magnetized, may be easily demagnetized by the following procedure. Energize the Probe and pass small parts through the area between the pole ends “feet” and withdraw to a distance of about two feet. On large pieces, place the Probe in the same poition as inspection, energize and lift from the work surface to a distance of about two feet. This procedure may need to be repeated more than once to remove the residual field.

AC MAGNETIZATION:

An AC field induced into a part is a skin or surface field and does not penetrate the cross section of the material. A bi-product of AC is in the form of eddy currents which tend to guide or direct the magnetic field in a basically narrow pattern between the poles. Another bi-product is a vibratory action which adds mobility to the inspection particles to form a highly defined powder build-up at the defect. For these reasons, an AC field is the most desirable for the detection of surface or surface breaking defects.

Maintainance:

This series contour probes are designed to provide a strong magnetic field for the detection of cracks and flaws in ferrous metals. The instrument should be tested periodically to assure adequate field strength, per applicable inspection agency.

The instrument should be wiped clean with a general purpose cleaner after each use .

The contour probes are sold without electrical power plugs. Only approved plugs should be used and installed by certified personnel.

Duty Cycle:

Two Minutes “On”, Two Minutes “Off”.

Operating Environment:

Temperature: 14° to 122° F(-10° to 50° C). Relative humidity:10% to 95%, non-condensing.

Shipping and Storage Environment:

Temperature: -40° to 140° F (-40° to 60° C). Relative humidity: 5% to 95%.

Vibration and shock:

As encountered in normal shipping and handling with no degradation.