后续

CONTINUATION

本说明书中的资料均以最新产品为依据，由于改进或其他变化，本说明书的描述可能与实际情况稍有出入，我公司将保留随时修改的权利，修改之处恕难一一相告。

Description in the manual is based on the newest products. Owing to improvement or other changes, contents of manual may differ from practical situation. Our company will reserve the right of recension at any moment. Please kindly forgive not to notify the revised place one by one.

制造商：温州山度仪器有限公司
MANUFACTURER: WENZHOU SUNDOO INSTRUMENTS CO.,LTD
地址:浙江省温州市龙湾区西台工业区西工西路5号
Add:No.5,Xigongxi Road,Xitai Industrial Zone,Wenzhou China
Fax:+86 577 88390155 Zip: 325011
Tel:400 826 0705 E-mail:sundoo@sundoo.com (中国)
Tel:+86 577 88609905 E-mail:export@sundoo.com (International)
Http://www.sundoo.com

Ver:1.02 Con:20170304

SUNDOO®
ADVANCED PRECISION INSTRUMENT

SVM-210 SERIES USER'S MANUAL

SVM-210
使用说明书

数码金相显微镜
METALLURGICAL MICROSCOPE

温州山度仪器有限公司
WENZHOU SUNDOO INSTRUMENTS CO., LTD

物镜(表1)
Object lens(form 1)

类别 Type	介质系统 Midea system	放大率 Magnification	数值孔径 Diameter	有效工作距离 Available work distance	备注 Remark
平场消色差物镜 Flat-field elimate coulaur difference object lens	干燥 Dry	4x	0.1	13.8	
		10x	0.25	11.2	
		40x	0.65	0.62	

目镜(表2)
Ocular(form 2)

类别 Type	放大率 Magnification	视场直径 Diameter of scense field
平场目镜 Flat-field ocular	16x	Φ11

规格参数(表 1)
Specification(form1)

型号 Model	SVM-210数码金相显微镜 SVM-210 Dgital Metallurgic Microscope	
成像器件 Pick-up device	目视系统 Optic System	1/2"CCD Panasonic 视频系统(Video system)
放大倍率 Magnification	64X /160X /640X	400X /1000X / 4000X
最大倍率对应精度 Accuracy for max magnification		0.3 μ
最大倍率对应解析度 Definition for max magnification		0.2 μ
显示方式 Display	目视 Eyes Inspect	监视器、电脑、电视、LCD Monitor, PC, TV, LCD
照明方式 Illumination	内置同轴光源 Inside converge axis illumination	

非常感谢购买SVM-210数码金相显微镜。

SVM-210数码金相显微镜是针对现代制造业的需要，为产品质量检测而研发。综合传统光学技术和现代数码技术，使SVM-210不仅可以目视观测还可以连接图像显示设备，多人同时观测。更可以对图像拍照，保存，测量分析及打印等后续处理功能。

本显微镜适合于工矿、科研、教学等单位作常规金相观察，适用于对细小颗粒、粉末试样观察和大批金相检查和大面积硅片检测。

Dear User, We're indebted for your patronage to purchase SVM-210 Digital Metallurgical Microscope.

SVM-210 metallurgical microscope measuring system includes video digital microscope and professional image measuring software. It is integrated traditional optic and digital video technology. The microscope is inspected with not only optical inspection but also connect with video device, that provide the image for inspection of many persons in same time. The software can be used in catching the image, saving the image, measuring sample, printing data, and so on. The microscope is applied with metallurgic inspection in mining industry, research, and teaching especially, It is used in metallurgic inspection of tiny granule , powder and silica wafer.

装箱清单
Package List

部件名称 Name		数量 Quantity
落射光照明器 Inside illumination		1
镜座 Lens base		1
平场消色差物镜 Flat- field Achromatic object lens	4x	1
	10x	1
	40x	1
平场目镜 Flat-field ocular	16x	2
载物板 Carry object platform		1
滤色片、淡蓝、淡黄 Achromatic lens ,Light blue, Light yellow		1
装箱单 Package list		1
CCD成像系统 CCD Photographic System		1
1A保险管(备件) Fuse 1A		1
检验合格证 Certificate		1
使用说明书 User’s Manual		1

Maintains

1. When the microscope is not used
   Please fix the protector of the lens and cover the dustproof cover. Your are advised that stock the lens and base of lens into damp proof container, and place drier and prevent them to be mould.
2. When the microscope is cleaned
   Don’t touch the optical component with hands.Use soft cotton or brush to clean the lens.You can clean the obstinate dirt as fingerprint, grease and so on with the cotton or lens tissue, which tipped alcohol.
3. You can blow the dust on the lens with blow bloom.
   The design of products is being improved, specification and subject to change without notice.

Packing List (View p16 form)

目录

产品概述

SVM-210是便携式正置金相显微镜，标准配置放大64x-640x,选配100x物镜，可达1600x。内藏亮度连续可调光照明电源，带可变视场光栏和孔径光栏、视场光栏中心可调。同轴式横向移动的机械载物台，同轴式粗微动调焦机构。本显微镜适合于工矿、科研、教学等单位作常规金相观察，尤其适用于对细小颗粒、粉末试样观察和大批金相检查和大面积硅片检测。独特的Video输出功能，可连接多种视频设备，选配测量软件实现测量功能。

光学原理

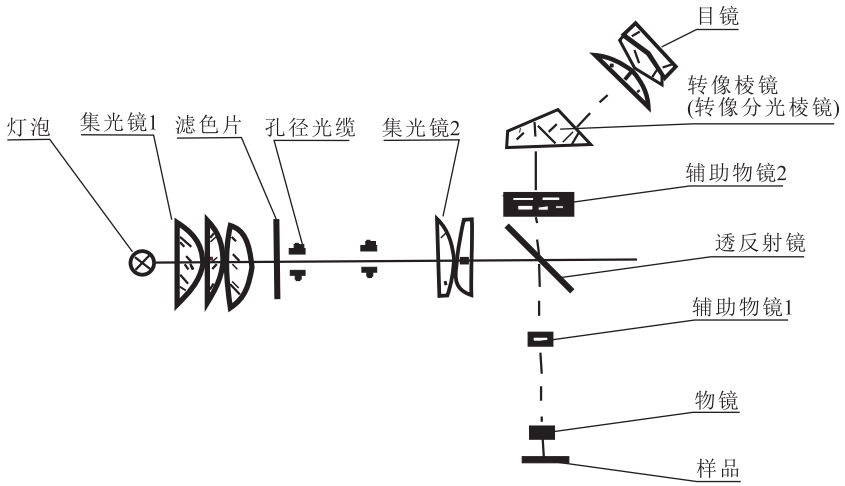


图1

图1是显微镜的光学原理图，由灯泡1发出的光线经集光镜聚光和透反射镜反射后，通过辅助物镜1照射在样品上，被照亮的样品所发出光线通过物镜，辅助物镜1透过透反射镜，经辅助物镜2，转像棱镜，成像于目镜的前焦面，通过目镜再次放大后，人眼可观察到放大的显微像。光线通过转像分光棱时，将分成两束光，一束光垂直向上，用于CCD摄像，另一束光与水平方向倾斜30度出射，用于人眼观察。

c. Achromatic lens

There are light blue, light yellow and light green achromatic lens applied with the microscope. The achromatic lens can off yellow, green light, which is sensitivity of eyes.

7. Changing the light bulb.

Please put off the power before changing light bulb. After the lamp be cold, remove the slant light cover, disassembled the halogen bulb and change it. Take off the window on the baseboard, you can change the bulb (halogen and fluoresce light) through the window.

8. Adjusting the center of bulb

The center of bulb has been adjusted, before the microscope is sold. That can keep illumination be nice. You must adjust it after change the bulb. Select the max of field of view raster and diaphragm raster, and select the lower times of ocular, adjust the focus. Loose the screw on the back of the lamp room, and move it up or down to move the bulb up and down. Turn in or turn out the screw on the right of back of lamp room. Then fix the bulb on correct location for nice illumination.

Optional appurtenance

1. AV/VGA, XGA-transfer card + CRT monitor

The XGA-transfer card can provide hi-definition image, display on CRT, without flash and with bright and flamboyant picture.

Connecting Step:

a. Attach the power, Connect the CRT's signal plus with thetransfer card's connector.

b. Inert MMI signal provide with the instrument into the reciprocal connectoron the transfer card, attach Ac cable With Photographic lens' output connector, insert another AVterminal into the connector on the yellow MMI cable.

2. Monitor, Computer, Video Card, Measuring Software

The Measuring Software can provide measuring function, that can measure width, radii, diameter, distance between two lines and angle.

Connecting Step:

Please insert the Video Card into the PCI connector, install Video Card's drive program and measuring program. Insert the AV plug into the CCD output connector, connect another AV terminal with input connector of VAG.

In the course of inspection, select a piece of metal for the sample thickness less than 35mm ,and put it on the carried object platform. The surface of the metal will be treated with rubdown, polishing and corrode. And move the sample with the motive platform, locate the inspected area under the object lens correctly.

3. Use the ocular base.

a.Pull the board on the ocular base to adjust the distance of pupil for the inspector. The image in the field of view must be overlapping, and record the value for future inspection.

b.Turn the angle of view adjust loop on the right ocular, make the line correct with your pupil-gap value. The length of cylinder is 160mm.

c.Inspect on left ocular with left eye, and adjust the focus adjust knob stil the image be clear.l

d.Inspect on right ocular with right eye, and adjust the nice focus adjust knob still the image be clear.

4. The binocular base are adjusted by the way, that can keep the same focus in different magnification. Find the inspected object with 10X object lens. Then select the magnification adjusting knob4 to get the higher magnification for inspecting the details of object. The image is little clear. When the magnification is changed from lower to higher, turning the fine adjusting focus knob slightly, you can get clear image.

5. The strain ness of the focus adjusting knob is adjusted by thestrain knobs. The strainness has been adjusted in the factory.

6. adjusting brightness

a. diaphragm raster

Fiddle the role of diaphragm raster to change the magnitude of diaphragm raster. To get good definition and contrast of object lens, you will change the diaphragm raster to smaller. For good brightness, you should increase the brightness of illumination.

b. Field of view raster

Fiddle the role of field of view raster to change the magnitude of diaphragm raster. Select the small field of view raster to elimate the interfere beam. The small field of view raster is for the contrast.You can adjust the screws on illumination base to change the center of the field of view raster. In general condition, you will adjust the field of view raster when you select new magnification.

外形结构

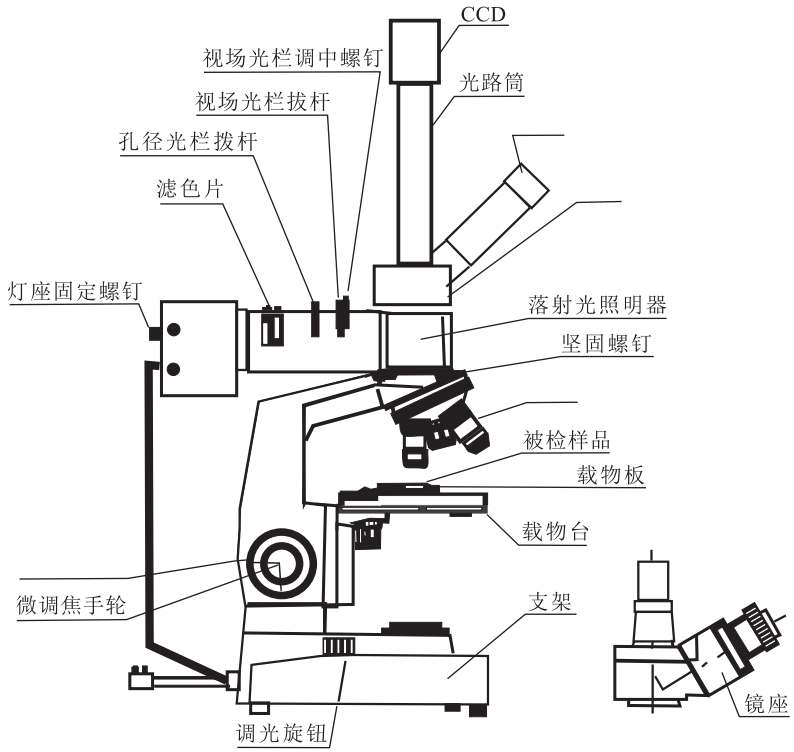


图2

规格参数

1、主要参数(见第17页表)；

2、物像共轭距离：195mm；

3、物镜(见第17页表1)；

4、目镜(见第17页表2)；

5、粗微动调焦范围40mm，全程微调，微动手轮格0.002mm；

6、机械载物台面积130X122mm²，横向移动70mm，纵向30mm；

7、人工光源：输入电压220V或110V，输出6V20W，溴钨灯泡，内藏连续调光照明电源。

注意事项

1、切勿拆卸

随便拆卸容易触电及损坏仪器，请不要随便拆卸本说明书所提及的能拆卸部件之外的任何部件。如果发现仪器有故障，请找有经验的专业人员修理或直接与厂家联系。

2、检查电压

①显微镜底座上标有额定输入电压，注意当地供电电压必须与其相符。否则找有经验的专业修理人员拆开底座，在电源线路板上有一只标有110V、220V的电压转换开关，拔动此开关，使示值与当地供电电压相符，然后装好底座。或直接与厂家联系。显微镜在非额定电压条件下使用，将严重损坏。

②供电插座应有接地线。

3、防烫防火

①在照明期间，灯泡及照明器灯室会很烫热，注意不要触及皮肤，以防灼伤。

②更换灯泡应待灯泡充分冷却后进行。

③不要将易燃物质靠近灯泡以防着火。

4、更换灯泡

①更换灯泡前，必须拔下电源插头，以免触电和损坏仪器。

②只能使用规定的溴钨灯泡，规格为6V20W。

③更换灯泡时，应戴手套或用保护套罩住灯泡，不要用手接触灯泡的玻璃部分，更换后，用洁布蘸上纯酒精擦去灯的指纹及污迹，否则灯泡易破裂及减弱亮度。

5、搬运放置

①在搬运仪器前要关闭电源开关。

②工作环境要求：

室温：0℃—40℃；

最大相对湿度：85% 。

③避免将仪器放置在日光直射下或房间灯光之下，明亮的环境会影响样品的成像质量。

bright light will affect the image of samples.

d.Prevent operate the microscope in the dusty environment.The microscope should be covered with dustproof cover,when it is not used.

e.The microscope should be place on the area without shock.

6.Operate in carefulness

a.Microscope is precision optical instrument. The violent shock and obstinate operation will damage the microscope. especially, do not turn the left and right adjust knobs in against direction. That will make the focus adjusting in malfunction.

b.Do not touch optical components with hands, which will cause the image to be blurred.

Installation(Refer to instructure diagram)

1. Please take binocular ocular base and main body out of the package.
2. Take the inside illumination out of the foam. Take off the dustproof cover, lean the V connector of inside illumination little, put it into to the connector of the main body, which is on the top of the main body. And fasten the screw on the left side of the connector to fix the illumination. Then connect the power wire with the power output connector on the base.
3. Fix the ocular lens base on the illumination base, and fasten the screw on the right of the illumination base to tight the lensbase.
4. Pull the 10X or 16X ocular into the lens base.
5. Fix three object lens into the turntable, from the lower to higher magnification. Keep the object lens tight with the screw of turntable.
6. Place the carrier object board onto the carrier object platform and fix it with clamps.
7. Please insert the Achromatic lens into the slots on the illumination base.

Operation

1. Connect power

Make sure the voltage of power supplyIs same as the rate input voltage. Then connect the microscope with the power supply. Turn the brightness controller on the base of main body. The lamp will be bright. Adjust the controller to get the suitable brightness.

2. Locate the sample

Cautions

1. Do not disassemble the microscope.
   To reduce the risk of electric shock, do not remove the parts, which are not described to be removed in the manual. If the microscope is in trouble, refer servicing of quality service personnel.
2. Check the Power
   a.The rate input voltage is signed on the pedestal of Microscope. The input voltage is according with the rate input voltage. If the voltage of power supplied is not accord with the rate voltage, please ask the experience personnel to open the cover on the pedestal, turn the switch, which have a symbol 110V~220V.Select the voltage same as the power supply, then fix the cover on the pedestal. Or refer service with the service personnel. That will damage the microscope; the microscope is operated with the rate voltage.
   b.The socket must be with earth.
3. Prevent the Fire or Scald
   a.During the bulb provides illumination, it is in high temperature. Pay more attention to do not touch the bulb to prevent scale.
   b.When you change the bulb, please wait for the bulb is cold.
   c.To prevent fire, do not take tinder close to the bulb.
4. Change the Light Bulb
   a.Please cut off the power before change bulb, prevent electric shock or damage the microscope.
   b.The bromine tungsten lamp is only applied with the microscope, specification 6V20W
   c.When you change the bulb, please wear gloves or pack the bulb with cover. Do not touch the glass part of the bulb with hand. After change the bulb, please sweep the finger mark or dirty with clean soft cloth dip in pure alcohol, on the bulb.Otherwise, the bulb should easy to crack or reduce the brightness.
5. Delivery and Stock.
   a.The power must be cut off, before remove the microscope.
   b.Operation Environment
   Temperature: 0℃-40 ℃; Relative Humidity: 85%.
   c.The microscope is prevented the direct sunlight and bright light. The

④避免将显微镜放置在有灰尘的环境之中，显微镜不使用时应用防尘罩盖好。
⑤显微镜应平放在无震动的地方。

6、小心操作
①显微镜是一种精密光学仪器，强烈震动及硬性操作都会导致仪器严重损坏，特别注意不得将左右粗动调焦手轮用力相互反向旋转，否则将会导致调焦严重丧失精度甚至失灵。
②不要用手触摸光学零件表面，否则成像模糊。

仪器装配

1、 将主机从泡沫中取出，放在工作台上。
2、 将落射光照明器从泡沫中取出，取下上下接口处的防尘盖，稍微倾落射光照明器V型接口，将其放入主机顶部接口并拧紧主机接口左侧的滚花螺钉，将落射光照明器固牢。将灯室电源线与主机底座电源输出接口接牢。
3、 将镜座安装在落射光照明器上接口，拧紧落射光照明器右侧的滚花螺钉，将镜座固牢。
4、 将10X（或16X）目镜插入镜座筒内。
5、 将三个物镜由低倍至高倍按顺序旋入物镜转换器螺孔内，并保证物镜与转换器螺纹端贴紧。
6、 将载物板置于载物台并紧贴载物台面，用弹夹弹紧。
7、 需要使用滤色片时，可将滤色片插入落射光照明器靠近灯室处的槽内。

注：可参照结构图2，安装各部件

操作实例

1、接通电源

检查底座后面的额定输入电压，确认与市电电压一致后，将电源线插入市电插座内，转动底座的调光旋钮，打开电源，落射

光照明器灯室内的灯泡被点亮，将调光旋钮转至适当位置，获得合适的照明亮度。

2、试样放置

当需要进行金相观察时，取小块试样（厚度应小于35mm），将所需观察面按常规金相观察要求进行处理(磨平、抛光、腐蚀)，将其放在载物台上的载物片上，用载物台移动样品，使其所观察的区域正好对正物镜的下端。对于大面积半导体集成电路样品，也可按同样方法放置在载物台的载物片上。对于细小颗粒或粉末样品，可取小量直接放在载物片上进行观察。

3、观察镜座的使用

①拉动镜筒左、右盖板，调节瞳距大小，使之适合操作者双眼瞳距，在视场中双眼观察的像重合。当左、右筒中的图像重合为一的时候，横向指示标尺所指的值就是操作者的瞳距。记住自己的瞳距数值，以后操作者可以直接按此数值调节瞳距。

②转动右目镜筒的视度调节环，使刻线对准自己的瞳距值，此时，右边光学系统的机械筒长为160mm。

③用右眼在右目镜筒上观察，使用粗微动调焦手轮调焦，直至成像清晰为止。

④用左眼在左目镜筒上观察，调节视度环至成像清晰为止。（此时不要调节粗微动调焦手轮）。

4、 镜座按上述方法调节很重要，这样可保证使用不同倍数物镜时，得到齐焦。通常使用10X物镜进行调焦和寻找样品目标。用10X物镜调好焦后，再根据观察样品的特点换至其他倍数物镜。

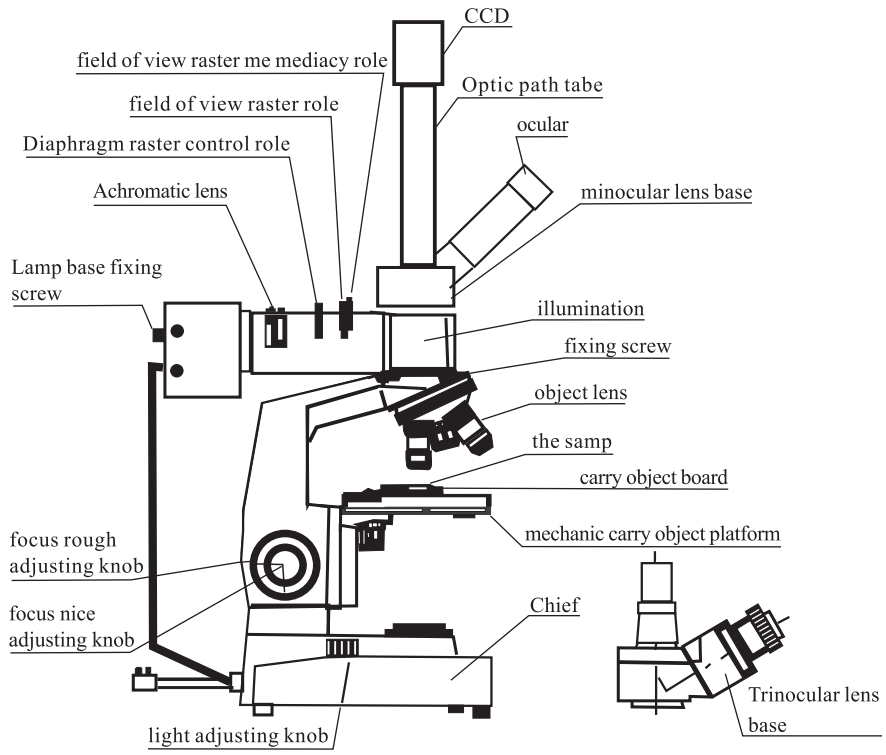
5、 粗动调焦手轮的松紧可以用轻重调节手轮进行调节，出厂时已调好，操作者认为松紧不合适，可自行调节，但不要过松或过紧，过松会导致载物台自动下滑，过紧会使粗动调节不舒适。

6、落射光照明器的调整

①孔径光栏

拔动孔径光栏拔杆，可改变孔径光栏大小。为了更好地发挥

Product Construction



Picture 2

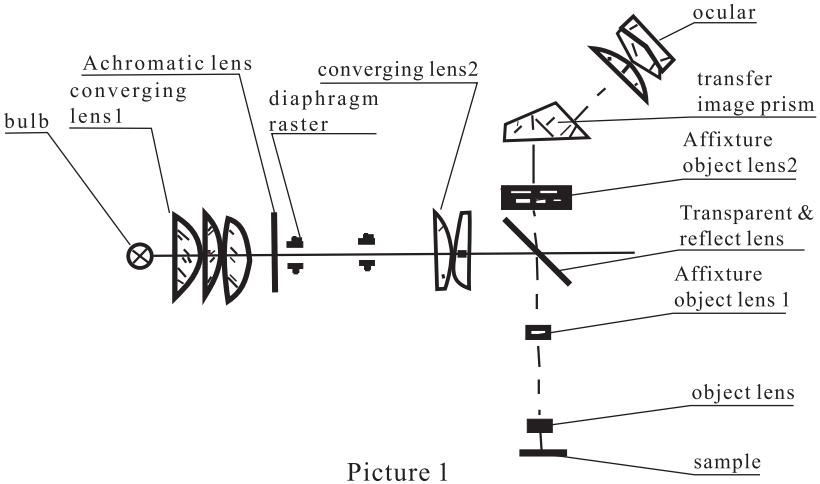
Parameters

1.Parameters View p17 form.
2.Conjuquate distance of object and image ;
3.Object lens(view P2 form 1) ;
4.Ocular (view P2 form 2) ;
5.Length of focus adjust: 40mm graduation of nice focus adjusting is 0.002mm;
6.The area of mechanic carry platform is 130×122mm²Distance of horizontal motion is 70mm distance of vertical motion is 30 mm;
7.Illumination : Input voltage :220V or 110V;
Output : 6V 20W halogen bulb
inside brightness adjusting power supply.

Summary

SVM-210 Metallurgical Microscope Measuring System includes Video DigitalMicroscope and professional image meas uring software. It is integrated Traditional Optic and Digital Video Technology. The brightness of Inside Same Axis Illumination is continuous adjusted. The Electric Magnificationsis 400x-4000x and the Optic Magnifications is 40X-400X. The accuracy, whichis 300 Nanometers,, make the imagination be more clear. The professional measuring software can capture the image quickly and exactly. It has the picturemeasurement, management, treatment and so on.

Principle



Picture 1

diagram 1 is the optical principle of the microscope ,the emited light after gathered by converging lens and reflect by transparent reflect lens,shine to sample by affixture objuect lens,the light emit from sample pass object lens, affixture object lens ,pass transparent reflect lens ,through affixture object lens to transfer image prism, the image be in ocular and be magnified again, inspector will inspect the magnified image. When the image transfer to prism ,the beam will be advided into 2 beams, one beam is refracted to vertical direction for CCD camera, another beam is refracted to the 30° angel direction for person's eye observation.

物镜分辨率和提高图像对比度，孔径光栏通常取小点为宜，如果视场中对比度不好，更应关小孔径光栏，为了获得足够照明亮度，可增大灯泡照明亮度以弥补关小孔径光栏带来的光亮度不足。

②视场光栏

拔动孔径光拔杆，可改变孔径光栏大小。关小视场光栏可减少镜筒的杂光干扰，提高图像对比度。通过调节落射光照明器上的两颗滚花螺钉，可适当调节视场光栏的中心位置，一般使用物镜转换器转换一种倍数的物镜，就需要对光栏中心作一次适当的调整。

③滤色片的选用

仪器配有淡蓝、淡黄、淡绿三种颜色滤色片。淡绿色、淡黄色滤色片可使光源发出入眼最敏感的黄、绿色光，淡蓝色滤色片可以提高光源的色温（颜色发白）。

7、更换灯泡

本仪器使用6V20W溴钨灯泡，安装在落射光照明器灯室灯座内。当需要更换灯泡时，先关闭电源，灯泡冷却后，松开灯室右边的滚花螺钉，再将后盖用力推至左边，同时以左边缘为转轴逆时针方向向外旋转即可取出灯室后盖板。用新灯泡更换旧灯泡，灯泡插到底。更换新灯泡时，应用擦镜纸或软布包住灯泡玻璃部分，不要使灯泡的玻璃有手印。

8、灯泡中心的调整

出厂时配在仪器上的灯泡已对其中心进行调整，保证照明均匀，用户更换新灯泡时应对灯泡中心进行调整。将落射光照明器的孔径光栏和视场光栏开至最大，用低倍物镜4X和10X目镜对试样调焦，拧松灯室后盖中部的滚花螺钉上下移动滚花螺钉，使灯泡上下移动；拧进或拧出灯室右边的滚花螺钉，使灯泡左右移动，直至视场照明均匀为止。然后拧紧灯室后盖中部的滚花螺钉，灯泡被固定在正确位置，得到均匀照明。

配件选择

1、AV/VGA、XGA转换器+CRT显示器

采用此转换器可获得最高1024x768x75Hz高质量图像，并在CRT上显示，无闪烁，色彩明亮艳丽。

连接方法：

①将转换器电源接通，并将CRT信号线插头和转换器上的母插头连接；

②将转换器配套MMI线插入转换器相应接口，再将AV连接线一头插入摄像头AV输出接口，另一头插入MMI线引出的黄色接口，其它插头空闲。

2、显示器+电脑主机+视频采集卡+测量软件

使用测量软件可获得显微测量功能，可进行宽度、圆半径/直径、线间距，线间角度等测量。

连接方法：

将视频采集卡插在电脑主机PCI插槽上，并安装视频采集卡驱动程序和选配件测量软件。然后将AV连接线一头插入摄像头AV输出接口，另一头插入视频采集卡AV输入口。

保养及维修

包装清单（见第16页表）

CONTENTS