

# 用户手册

**SAIKEDIGITAL**<sup>®</sup>

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## 现代显微与测控技术之家

影像测量 · 显微测量 · 机器视觉

**SK-T1**

**SK2700**

**SK2500**

**SK2300**

**SK2000**

工业显微镜

industrial digital Microscope

**SKDIGITAL**



新一代

亲爱的顾客：Dear customer

借此机会感谢您购买SK2000系列产品。请仔细阅读本用户手册，并妥善保管以便日后参考。

I am glad to take this opportunity to thank you for buying our Microscope series product. Please read this user's manual and keep it carefully for your reference in the future.

## 安全注意事项 Safety Cautions

### 警告 Warning

- ◆不能随意拆卸显微镜及部件。如发现仪器有故障，请找有经验的专业修理人员修理，或直接联系的售后服务人员。
- ◆Taking apart the Microscope series product or its parts by yourself is forbidden. If find any fault in the instrument, please find a professional maintenance personnel to get it repaired, or you can directly contact after-sales worker.
- ◆显微镜是一种精密仪器，操作应谨慎，任何震动或不规范操作都有可能造成损坏。
- ◆Microscope is a kind of precision instrument, please operate it carefully, any shake or nonstandard operation may cause damage to the Microscope series product.
- ◆在搬动显微镜观察时，请您务必断开连接的所有电缆。
- ◆When move the Microscope series product, please remember to disconnect all the power connected to the product.
- ◆清洁仪器之前，请拔出电源插头。勿使用液体或喷雾清洁剂擦拭电源部分。
- ◆When dean the instrument, please pull out the power plug. Please remember not using liquid or spray cleaner to wipe the power part.
- ◆为了减少对显微镜的干扰，请您务必使用我们推荐的部件。
- ◆In order to reduce the interference to the Microscope series product, please do remember using the recommended parts.

### 安全性 safety

- ◆显微镜备有12V电源，可连接220V电源插板，请保证接地可靠。注意当地供电电压必须与其相符。
- ◆Microscope series products have ground socket, if your machine doesn't have such socket, you need to install one and ensure the safety of it.
- ◆仪器在非额定电压条件下使用将会严重损坏。
- ◆The instrument would be seriously damaged if it is used in a non-rated voltage.

### 客服中心

客服电话：0755-85210571

本用户手册适用于SK2000系列工业显微镜，您所操作的产品部件等都可有与本用户手册中的图例略有不同。

本用户手册信息如有改变，恕不通知。

Product you are operating may have some difference with the pictures in this user's manual.

For any change of the above parameters, please acknowledge that we will not otherwise notify you.

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## ► 工作环境 Working environment

- ◆ 放置显微镜的工作平台，要求桌子水平、稳固、无晃动。  
The operating table of SK2700H/P series products shall be flat,stable and without any shake.
- ◆ 室内温度：0℃—40℃  
Indoor temperature:0-40℃
- ◆ 室内湿度：不大于60%  
Indoor humidity:≤60%
- ◆ 将显微镜远离腐蚀、震动和强磁场。  
Put Microscope series products away from corrosion,shake and strong magnetic field.
- ◆ 用于显微镜的室内灯光，建议使用可调整无频闪的灯源环境，将外界光源干扰减少到最低。  
It is suggested to use the adjustable and stroboflash free light for indoor lighting for the Microscope series products to reduce the exterior light source interference to the minimum.
- ◆ 避免热辐射。 Avoid heat radiation.
- ◆ 避免高压电辐射。 Avoid high voltage radiation.
- ◆ 避免结露现象。 Avoid fogging phenomenon.
- ◆ 避免暴露于雨中或潮湿环境中。 Avoid being exposed to rain or humid environment.

## ► 显微镜的放置

### Placement of Microscope series products

- ◆ 显微镜在不使用时，请用塑料罩盖好，并贮存在干燥的地方。  
When not using Microscope series products,please cover them with plastic cover,and keep them in dry places.
- ◆ 监视器 Monitor
- ◆ 监视器的色彩、亮度、对比度都会影响到显微镜的显示效果。  
The color,brightness and contrast will affect the display effect of the Microscope series products
- ◆ 显微镜的显示方式支持监视器、电脑、液晶屏、电视机；本说明书以8寸显示屏为例。  
The display mode of the Microscope series products are applicable to monitor,computer,LCD screen and TV set In this user's manual,we take the 8-inch monitor as an example

## ► 定期检查 Regular inspection

- ◆ 为保持仪器的性能，建议进行定期检查。  
In order to maintain the performance of the machine,it is suggest to conducting regular inspection.



## ► 产品介绍 Product introduction

SK2700工业显微镜是SK2000的补充，属于中型平台。其平台尺寸为280\*250mm，工作半径为130mm，物件最大允许高度为80mm，配带环形光源照明。适用于观察尺寸在280\*250\*80mm范围以内的各类物件，特别是片状、板状物件和中小型立体物件。与SK2000A相比，SK2700平台窄而略长，亦为黑色台面的暗场环境，市场定位非常接近，仅取决于被观察物件形状特征与工位安排需要。应用于消费电子、微电子、小五金、中小塑胶制品生产等需要。

工业显微镜，又名工业视频显微镜、工业数码显微镜、单筒显微镜、CCD显微镜等。系列属于赛克数码的中低倍模组化产品线，这条产品线派生出众多型号的产品，其中最为常用的产品型号有：SK2000、SK2100、SK2200、SK2300、SK2400、SK2500、SK2600、SK2700、SK2900等。每个型号又因配置镜头的倍率不同而分为A、B、C三种，A型镜头倍率为19 -135倍；B型为38 -270倍；C型为特制倍率的镜头(定制)，因此派生出SK2000A、SK2000B、SK2000C等产品，其它型号以此类推。

SK2000系列工业显微镜是在原SK2004和SK2005基础上开发的，是一个产品族系庞大的产品线，可以派出近千种差异性产品。这些产品可以满足于不同行业、不同材质、不同物件、不同工位安排的差异性需要。SK2000系列产品全部使用了高像质连续变倍镜头，变倍比从原SK2004的1:3，SK2005的1:6.3，提升为1:6.9。同时，具有了齐焦能力(即在变倍中，图像不发虚，无须对焦)。SK2000系列是一条常规产品和系统集成产品的产品线，不仅支持现有模组进行自选配置，还支持模组构件的定制和系统集成。

The industrial microscope of SK2700 is the supplement of SK2000. It belongs to a middle-sized platform. Its platform dimension is 280\*250mm, with the work radius of 130mm. The maximum allowable height of the article is 80mm. It is equipped with ring light illumination. It is applicable to observe various articles within the dimension range of 280\*250\*80mm, especially the flake, plate, small-and middle-sized three-dimensional articles. Compared with SK2000, The platform of SK2700 is narrower and

longer. Besides, it is dark environment with the black platform. The market positioning is quite close to each other. It only depends on the shape feature of the observed articles and the demands of the station. It is applied in the demands of several domains, such as consumer electronics, micro-electronics, hardware, plastic products, etc.

The industrial microscope is also named as industrial video microscope, industrial digital microscope, monocular microscope, CCD microscope, etc. The series of SK2700 belongs to the middle-and low-power modularization product line of SAIKE Digital. This production line derives many types of products, among which, the most common types are as follows: SK2000, SK2100, SK2200, SK2300, SK2400, SK2500, SK2600, SK2700, SK2900, etc. Due to the different multiplying power of the allocated lens, each type is divided into three kinds, e.g. A, B and C. The multiplying power of the lens of Type A is 19 -135 times; that of Type B is 38 -270 times; Type C is the lens (customized) with the exclusive multiplying power. Therefore it derives the products of SK2000A, SK2000B, SK2000C, etc. Other types can be analogized according to the rule.

The industrial microscope of SK2000 series is developed on the basis of the original SK2004 and SK2005. It is a production line with a giant product family. It also can derive almost thousands of different products. These products can meet different demands of different industries, materials, articles, and station arrangement. All products of SK2000 series adopt continuous zooming lens with high-quality image. The zooming ratio is increased to 1:6.9 from 1:3 of SK2004 and 1:6.3 of SK2005. Meanwhile, it has parfocalization ability, namely, during the zooming, the image is not blurring and it does not need focusing. SK2000 series is a production line with conventional products and system-integrated products. It not only supports the existing modules to conduct optional configuration, but also supports the customization and system integration of the module components.

## ► 简明操作步骤 Operation steps

- ◆拆箱：将工业显微镜主机从包装箱中取出，放置在不震动的平台上，检查包箱内物件是否与发货清单相符。
- ◆安装：连接主机上的中转线，中转线连接视频信号线、电源线，显示屏连接电源、信号线，安装环形灯。
- ◆开机：检查仪器与显示屏的视频信号线是否连接；检查CCD电源、显示屏电源是否接电，并保证接地可靠；
- ◆检测：放置工件，根据工件材质调节光源，更换倍率等。
- ◆关机：关闭电源。
- ◆Unpackin:Take the SK2700 main processor out of the packing container,place it on a shake free table.Check whether the contents in the packing container are the same with the packing list.
- ◆Installation: Check whether you have bought the loop lamp,if yes,please install it according to the part of "Install the loop lamp";
- ◆Startup: Check whether the instrument is connected with the video cable of the monitor, check the CCD power,put on the power of the monitor.
- ◆Testing:placing workpiece,override,etc.
- ◆Shutdown:Turn off the power.

## ► 拆箱 Unpack

在拆箱之前，请检查发货仪器型号是否与购买仪器型号相同。如果不同，请联系客服中心。

在拆箱时，请检查包装箱内物品是否与发货清单相符。如果不同，请联系客服中心。

取出产品主机，并将它放置在不震动的平台上。注意：取出主机时，应使用双手握住主机立柱取出，避免用手握住镜头取出。

Before unpacking,please check the delivered instrument model is the same with that you have bought.If not,please contact Salkedigital's customer service center.

During the unpacking,please check whether the contents in the packing container are the same with the packing list.If not,please contact Salkedigital's customer service center.





### ➤ 带屏标准附件 Standard accessories

打开包装，可看到以下标准附件：  
主机，8寸屏，12V固定+可调电源控制器+环形灯头，USB尾线+信号线+一分二电源线，用户手册。  
After the unpacking, you will see the following standard accessories:  
Microscope host, power control box+ring light, USB Tail line+Signal line +One point two Power line, User manual.



SK2700H2  
Microscope host SK2700H2



12V固定+可调电源控制器+环形灯头  
power control box



USB尾线+信号线+一分二电源线  
USB Tail line+Signal line +One point two Power line

### ➤ 不带屏标准附件 Standard accessories



HDMI线+USB线+相机电源+遥控器



12V可调电源控制器+环形灯头



VGA线+相机电源

➤ 可选购附件 Optional accessories



移动平台  
Mobile platform



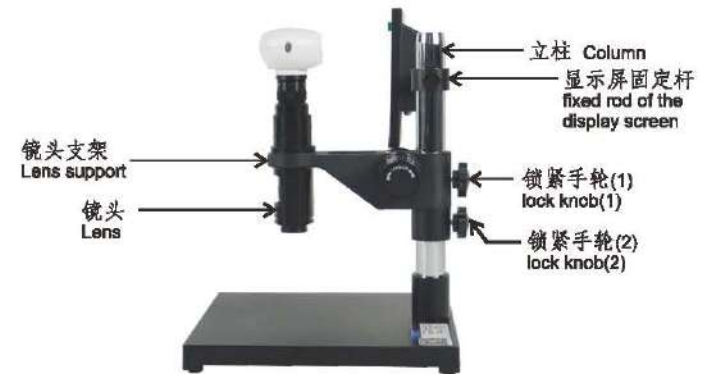
AV转USB转换器  
AV-USB image box

➤ 结构图 Structure Chart

正面图 Front View



侧面图 Side view



## ➤ 安装 Installation

### 一、装机 Transfer cable jointing

- 1、取出底座及镜体支架，将镜头组装入支架中，锁紧（如图1-2）  
Take out the support bottom seat and mirror body support, assemble the lens into the support, and fasten.
- 2、取出显示屏支架，装柱锁紧（如图3）；  
Take out screen supporting rods, assemble it into the column, and fasten.
- 3、取出显示屏，卡槽位对准固定件滑入，锁紧（如图4）。  
Take out screen, align card slot with fixing member and slip into it, and fasten.



图1



图2



图3



图4

### 二、连线、接电 Line connection, electricity connection

- 1、取出电源控制盒、环形灯、连接线，分别将环形灯与一分二电源线的主端连接至电源控制盒上  
Take out the power source control box, ring light, connecting line, and respectively connect the ring light and the main terminal of the one-to-two power line to the power supply control box.
- 2、将中转线USB端接入CCD后座USB端口  
Connect transfer line USB port with CCD backseat USB port.
- 3、将信号线的另一端连接至显示屏的AV端口（黄色插孔）  
Connect the other end of the signal line with the AV port of screen (yellow jack)
- 4、将一分二电源线的1/2端连接至显示屏的DC端口  
Connect 1/2 terminal of the one-to-two power line to DC port of screen
- 5、取下镜头防尘盖，将连接好的环形灯套入镜头底端居中锁紧  
Remove the dustproof cover of the lens, set the bottom of the ring light at the middle of the lens, and fasten



SK2700H3接线图 (Wiring diagram)



### 三、补充 Supplement

- 1、将锁紧旋钮与配件配套安装（如图1-3）；  
Install the locking knob with accessories
- 2、将立柱旋入底座，用内六角扳手锁紧（如图4-5）；  
Screw the column into the base and lock it with an Allen wrench
- 3、将限位环放入立柱（如图6）；  
Put the limit ring into the column



图1



图2



图3



图4



图5



图6

- 4、将滑动机构放入立柱锁紧后，移动限位环至滑动机构下方锁紧（如图7-8）；  
After putting the sliding mechanism into the column and locking, move the limit ring to the bottom of the sliding mechanism to lock
- 5、将单臂支杆滑入滑动机构锁紧（如图9-10）；  
Slide the single arm support rod into the sliding mechanism to lock  
注：如需调整角度，则松开固定旋钮，转动单臂支杆至合适角度后锁紧2个固定旋钮；  
Note: If you need to adjust the angle, loosen the fixed knob, turn the single-arm support rod to a proper angle and then lock the two fixed knobs
- 6、将调焦机构安装杆的停止环放下后，放入单臂支杆（11-12）；  
Unscrew the stop ring of the mounting rod of the focusing mechanism and put it into the single arm support rod



图7



图8



图9



图10



图11

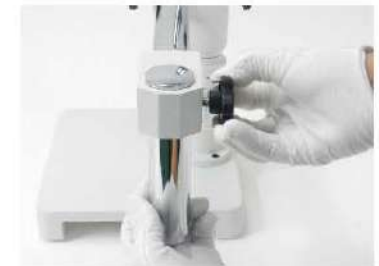


图12

7、将调焦机构放入安装杆，锁紧固定旋钮，旋上停止环（如图13-16）。

Put the focusing mechanism into the mounting rod, lock the fixed knob, and screw on the stop ring (Figure 13-16)



图13



图14



图15



图16



SK-T1(HDMI-T2)接线图 (Wiring diagram)



SK2500U接线图 (Wiring diagram)

## ► 调节 Adjust

### 一、开电 Power on

1. 将电源控制盒的电源插头接入110-220V电源插座  
Connect the power plug of the power control box to the 110-220V power socket
2. 将电源控制盒的开关拨至“1”，旋转控制盒旋钮可调光源明暗度  
(如图1-2)  
Dial the switch of power supply control box to "1", and rotate control box knob to adjust the brightness of the light source



图1



图2

### 二、对焦 Focus

1. 在镜头下放置观察件，托住镜头支架，松开锁紧旋钮，上或下升降调焦机构直到显示屏画面清晰时停住锁紧，镜头下端离观察件工作距离95-100mm  
(如图1-2)；  
Place the observation piece under the lens, hold the lens holder, loosen the locking knob, raise or lower the focusing mechanism up or down until the display screen is clear, and lock the locking. The working distance of the lower end of the lens from the observation piece is 95-100mm.
2. 观察件表面高低不平时旋对焦手轮升降精细调焦(如图3)；  
When the surface of the observation piece is uneven, the focus of the hand wheel is lifted and finely adjusted.
3. 焦距调清晰后，将限位环移至调焦机构下方锁紧，保护调焦机构不下滑  
(如图4)。  
After the focus is adjusted, the limit ring is moved to the lower side of the focus mechanism to protect the focus mechanism from slipping.



图1



图2



图3



## 二、变倍 Magnification adjustment

拨动镜头倍率环0.67-4.6连续变倍，  
0.67最小，4.6最大；  
Trigger lens magnification ring  
0.67-4.6 continuous zoom,  
0.67 minimum, 4.6 max  
倍率越小视场范围越大，  
倍率越大视场范围越小。  
The smaller the magnification,  
the larger the field of view, the  
larger the magnification, the  
smaller the field of view.



## ➤ 选择照明光源 Select illumination source

根据各种材料对光线的敏感程度不同，在同样的光照条件下，材料的成像质量也会不同，而成像质量的好坏直接影响到测量的精度。为了更好地发挥测量仪器的性能，针对不同材料的工作选择正确显微方式及合适的光照。

According to the different sensitivities of various materials to light, under the same light, the imaging quality of different materials is also different and directly affects the accuracy measured. In order to better give play to the measuring instrument's performance, it is required to choose the correct microscopic imaging method and proper light according to the workpieces made of different materials.

### 透明工件：

如玻璃、透明的塑料工件等，对透光工件建议使用透射的显微方式，即关闭环形灯，同时根据成像效果在监视器上对图像进行亮度、对比度及颜色调节。

### Transparent workpiece:

Non-transparent workpiece: It is suggested to use penetrating microscopic imaging method, that is, close the loop lamp, for workpieces made of glass or transparent plastics. Meanwhile, adjust the brightness, contrast and color of the images on the monitor according to the effect of the images.

### 不透明工件：

如金属等，对不透明工件建议使用正射的显微方式，即打开环形灯。同时根据成像效果在监视器上对图像进行亮度、对比度及颜色调节。

### Non-transparent workpiece:

It is suggested to use orthographic microscopic imaging method, that is, open the loop lamp, for workpieces made of metal. Meanwhile, adjust the brightness, contrast and color of the images on the monitor according to the effect of the images.

## ► 清洁 Clean

主机清洁 Clean the main processor

使用柔软的刷子或纱布清洁灰尘。对于更多的较顽固的污迹，如指纹、油脂等，可以用干净的软棉布，镜头纸或纱布蘸上汽油轻轻地擦拭。  
Use soft brush or stamine to clean the dust. For more and obstinate smudginess, such as fingerprint, grease, use clean soft cotton cloth, lens tissue or etamine which are dipped with gasoline and wipe gently.

镜头清洁 Clean the lens

取下镜头，使用棉签或镜头纸带有3:7的乙醚、乙醇混合液擦拭镜头(如右图)

Take down the lens, use cotton bud or lens tissue dipped with mixed liquid of diethyl ether and ethylalcohol (3:7) to wipe the lens (as shown in the right figure)



## ► 常见故障 Common faults

### 1、显示屏内无图像显示(黑屏)

- 检查CCD电源与显示屏电源是否正常供电
- 检查显示屏是否在开启状态(按POWER键)。
- 检查视频线的连接是否正常。
- 检查显示屏的“亮度”。

### 2、屏幕图像出现有规律的波纹

- 先排除干扰源，检查附近是否有其他电器干扰等。
- 确认干扰后，现象仍然存在，检查视频线连接是否正常。

#### 1. No image displayed in the monitor (blank screen)

- Check whether SK2700P's DC12V power supply is in normal condition.
- Check whether the monitor is got started.
- Check whether the video cable is connected.
- Check whether the monitor's brightness is adjusted to the highest degree.

#### 2. There are regular waves on the images.

- Get rid of interrupting source at first. Check whether there are other electrical appliances which may cause interference.
- After ensuring that there is no interference, if the waves still exist, check whether the video cable is connected.