

Ersa MOBILE SCOPE

Optical Inspection System



Operating Instructions

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1. Introduction

1.1 About the Ersa MOBILE SCOPE

The Ersa MOBILE SCOPE is a mobile Video Microscope designed for visual inspection, digital image recording and software measurements of solder joints of BGA, μ BGA, CSP, Flip-Chip packages. Ersa MOBILE SCOPE can also be used for visual control of pads, solders, components etc. on PCBs in the production plants as well as in the laboratories and for R&D.

1.2 Intended use

The Ersa MOBILE SCOPE has been built in accordance with the state of the art and standard health and safety regulations. Residual hazards can exist with the system, particularly if it is operated improperly by untrained personnel, or if it is used for purposes for which it is not intended.

The Ersa MOBILE SCOPE is intended exclusively for inspecting electronic components and electronic assemblies. Any other use, or use exceeding this specification, is considered to be improper. The manufacturer/supplier assumes no liability for damages resulting from improper use.

Proper use also involves compliance with the instructions in the operating instructions. Unauthorized conversions and/or modifications which influence the safety of the Ersa MOBILE SCOPE are prohibited and the manufacturer/supplier is not liable for any damages resulting from such conversions or modifications.

2. For your safety

2.1 Introduction

Ersa products are developed, produced and tested in compliance with the basic safety requirements.

Nevertheless, residual risks still exist!

For this reason, please read these operating instructions before you operate your device for the first time. It helps you to become familiar with the device's functions and to use them optimally.



The locally valid safety regulations and accident prevention instructions must additionally be adhered to when operating the device.

Please store these operating instructions at a place which is always accessible to all users!

2.2 Pictograph and symbol explanations

Pictographs are used to identify dangers, both in this instruction manual and on the device.



Special information or orders and prohibitions to prevent personal injury or extensive material damage are supplemented by a pictograph and in the text with hierarchically structured bold words:

Warning! Is used to warn of an imminent danger. Possible consequences can be death or personal injury.

Attention! Is used to warn of a possible dangerous situation. The consequences can be personal injury, material or environmental damage.

Caution! Is used for an application recommendation. The consequences of non-observance can be material damage.



This is used to mark text passages which contain explanations, information or tips.

- This is used to mark text passages
- actions you have to perform, or
- instructions which must be followed by all means.

2.2.1 Warning notes



Attention! Danger of blinding! Powerful light sources!

3. Technical data

Basic camera unit	Description
Image Sensor	1/3.2" N-MOS solid state color image sensor
Number of effective pixels	1600 (H) x 1200 (V) pixel (UXGA / 2.0 MP)
Pixel Size	2,8 µm (H) x 2,8 µm (V)
Interface	USB 2.0 serial bus
Drivers	MS-windows Direct Show compatible
Frame rate	Minimum 8 fps at 1600 x 1200 output size, 20 fps at 800 x 600
Camera software controls	Contrast, gamma, saturation, exposure (Auto and manual gain & time), white balance
Optical system	Built-in lens, 3 mm field of view, 21 mm working distance
Size	114 (L) x 36 (W) x 51 (H) mm (exclusive cable)
Length of the cable	2.5 m
Weight	max. 210 g
Storage environment	-20 °C – +60 °C, max 95 % RH, non-condensing
Operating environment	5.0 VDC, 450 mA minimum powered via USB port
Power source	5,0 VDC, 450 mA, angetrieben via USB Anschluss
ESD approval	EN 100 015-01, IEC 61340-5-1, IEC 61340-5-2

LED brush light	Description
Lamp type	Cool white power LED
Illumination output	64 x Ø 0.250 mm plastic optical grade fibres
Power source	3 x AA size batteries (Alkaline is recommended)
LED life time	> 5000 h
Size	Ø 26 x 250 mm (max. 40 x 250 mm)
Total weight	~ 220 g (incl. batteries)

BGA Lens, 90° Optical Head	Description
On screen magnification	~ 180x – 15x on 14" monitor
Working distance range	~ 0.5 – 30 mm (focusing range)
Field of view	~ 2,0 – 24 mm
Depth of focus	~ 2 mm at 15x magnification; ~ 0.2 mm at 180x magnification
Illumination	Integrated long life cool white LED illumination
Mounting system	Attachable to camera with quick snap function
Minimum Stand-off	~ 0,05 mm (50 microns)
Size of the optical head tip	8,2 x 2,2 mm (B x D)
Foot print of the optical head tip	8,2 x 0,8 mm (B x D)
Required free working area	~ 1.2 – 2.2 mm around BGA package
Size of complete lens	83 (L) x 20 (Ø) mm (max. 83 x 30 mm incl. Focus position adjustment pin)
Weight of complete lens	max. 60 g
Storage Environment	-10° – +60 °C, max 95 % RH, non-condensing
Operating Environment	0° – +45 °C, max 90 % RH, non-condensing

Macro-Zoom 80x with LED light	Description
On screen magnification	~ 80x – 8x auf 14" monitor
Working distance	~ 5 – 200 mm
Field of view	~ 5 – 45 mm
Depth of focus	~ 20 mm at 8x magnification; ~ 0.4 mm at 80x magnification
Illumination	Integrated long life cool white LED illumination
Mounting system	Attachable to camera with quick snap function
Size	43 (L) x 19 (Ø) mm. (85 x 35 mm max incl. telescopic stabilizer)
Weight	max. 35 g
Storage Environment	-10° – +60 °C, max 95 % RH, non-condensing
Operating Environment	0° – +45° C, max 90 % RH, non-condensing

4. Transport, storage and disposal

The Ersa MOBILE SCOPE are each delivered in a stable box enclosure. Only use the original packaging for transport and interim storage of the systems. Do not move jerky or drop the Ersa MOBILE SCOPE. The Ersa MOBILE SCOPE must be protected from weather influences such as rain, fog, sea air, etc. If the units will be stored for a longer period of time under humid conditions, then the Ersa MOBILE SCOPE must be packed air-tight with desiccating agents in the enclosure. Damages due to improper transport and storage are not covered by the guarantee.



Disposal Notice in accordance with directive 2002/96/EC of the European Parliament and the council of January 27, 2003 on Waste Electrical and Electronic Equipment (WEEE).

Products labelled with the symbol of the crossed out wheeled bin must not be disposed of with unsorted municipal waste. For this purpose, the local authorities have set up collecting points. Please ask your municipality which possibilities are offered for the separate collection of WEEE. This way, you make your contribution to the reuse or other forms of use of WEEE to protect our environment and health.

5. Commissioning

5.1 Before starting operation

Please check the contents of the packaging for completeness.

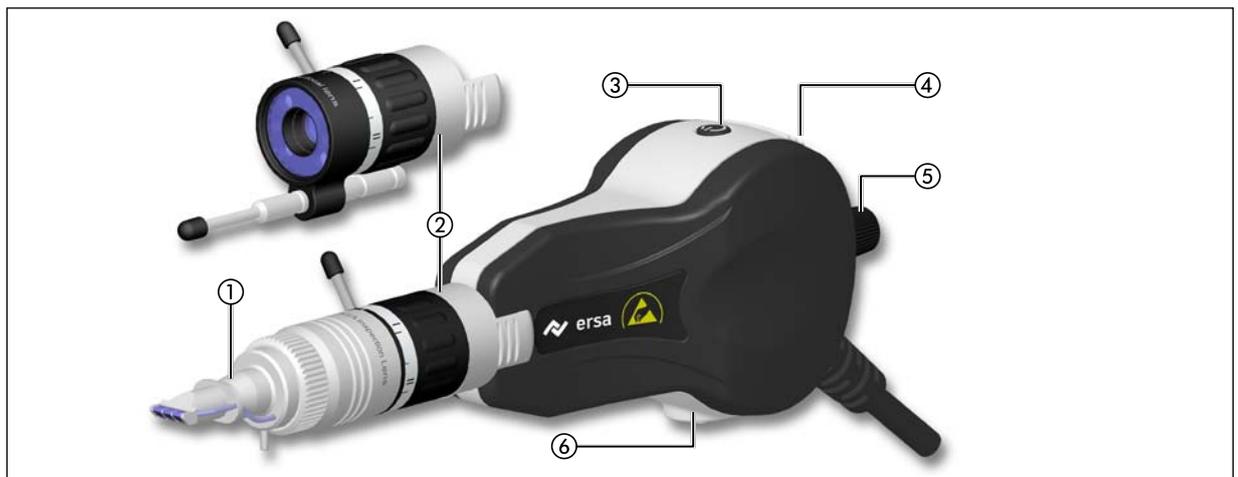
Content ↓	Order number →	0VSSC060VK1	0VSSC060VK2	0VSSC060VK3
Basic camera unit, digital		1x	1x	1x
BGA lens, 90° optical head		1x	--	1x
Macro-Zoom 80x with LED light		--	1x	1x
LED brush light with dimmer		1x	--	1x
Desk-top holder for camera unit		1x	--	1x
Operating manual		1x	1x	1x
ImageDoc Basic (Inspection-software)		1x	1x	1x
Aluminium case for Erska MOBILE SCOPE		--	--	1x



Should the listed components be damaged or incomplete, please contact your supplier.

5.2 Overview

- ① Optical head (BGA)
- ② BGA & Macro-Zoom lens (Zoom & focusing ring)
- ③ Turn ON/OFF switch
- ④ Power ON indication LED
- ⑤ Illumination control
- ⑥ Threaded hole for stand



Erska MOBILE SCOPE

5.3 Mounting the BGA or Macro-Zoom lens

- Remove the lens-protecting caps and the protecting plugs from optical head and Ersas MOBILE SCOPE ①.
- Gently push the lens ② inwards to lock (snap position). Power connection for LED light must be in correct orientation.
- Ersas MOBILE SCOPE is directly plugged to a PC or a portable computer via USB 2.0.



Mounting the BGA or Macro-Zoom lens

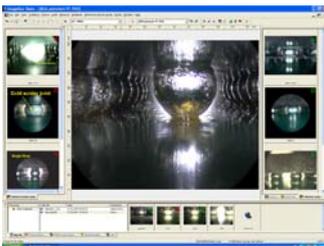


If the LED light is not working after installing the lens it needs to be turned by 180° and installed again.



For installation of Ersas MOBILE SCOPE or camera drivers to your computer please refer to instructions during software installation.

5.4 Installing the software



- Assemble the system as described in chapter [Mounting the BGA or Macro-Zoom].
- Ensure that the USB 2.0 camera driver has been installed on the PC before connecting the camera cable to the PC. Please follow the description attached to your individual Ersas software.
- After the camera drivers have been installed properly, connect the camera cable to a USB connection on your PC. The camera is automatically detected and configured by the PC.
- Install your Ersas inspection software. Follow the instructions in the booklet with your software CD.

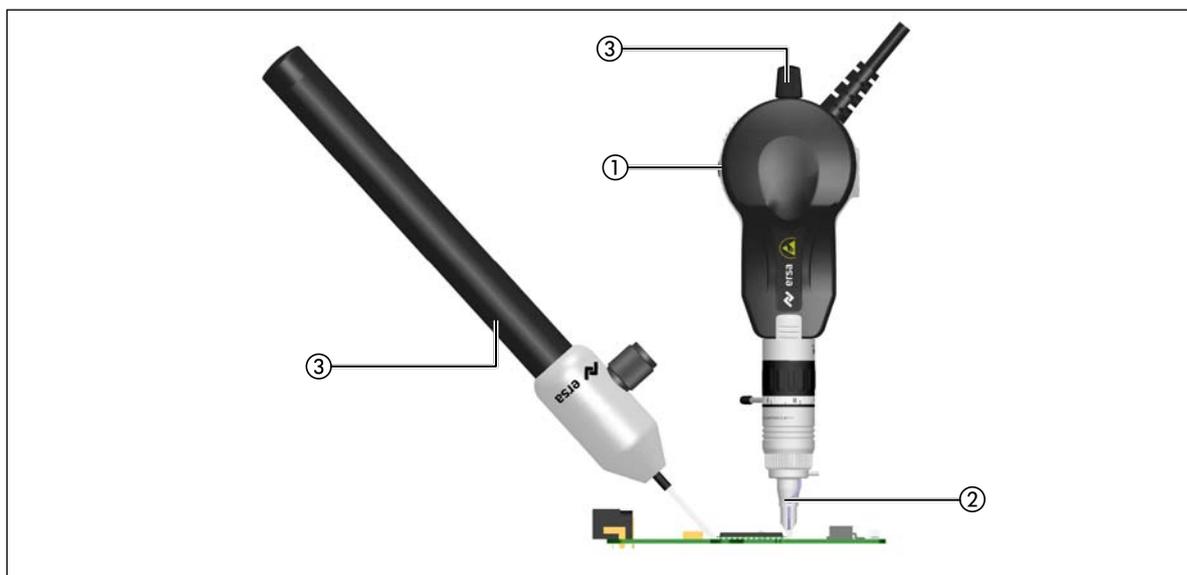
6. Functional description

6.1 How to inspect BGA packages

- Turn on the Ersa MOBILE SCOPE ①.
- Put the PCB on a solid base or fixture. Take the Ersa MOBILE SCOPE in one hand and carefully set down the optical head ② to the PCB location, you want to inspect.
- Adjust the LED light intensity ③.
- Use the LED brush light ④ if additional light is required or as a back light to detect e.g. bridges under a BGA.



Caution! Do not press BGA lens to the PCB, especially not onto solder joints or components, the glass prism may break!

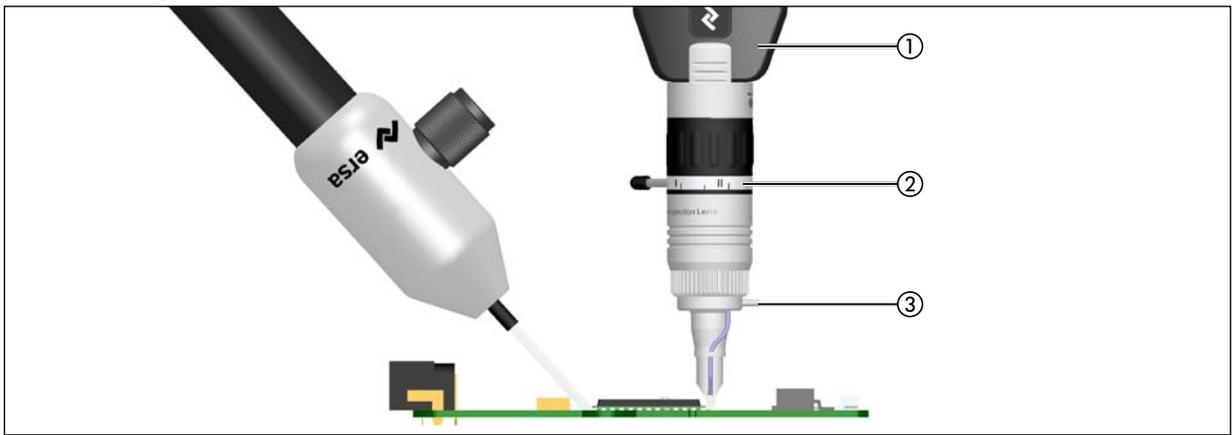


Inspection of BGA

6.2 Zoom, focus and image tilt adjustment

Image magnification as well as object distance of the BGA lens can be adjusted by turning “zoom ring” of the lens. Image tilt can also be adjusted by rotating optical head of the BGA lens about its axis a few degrees. Turn the “zoom ring” in order to focus deeper underneath the BGA component.

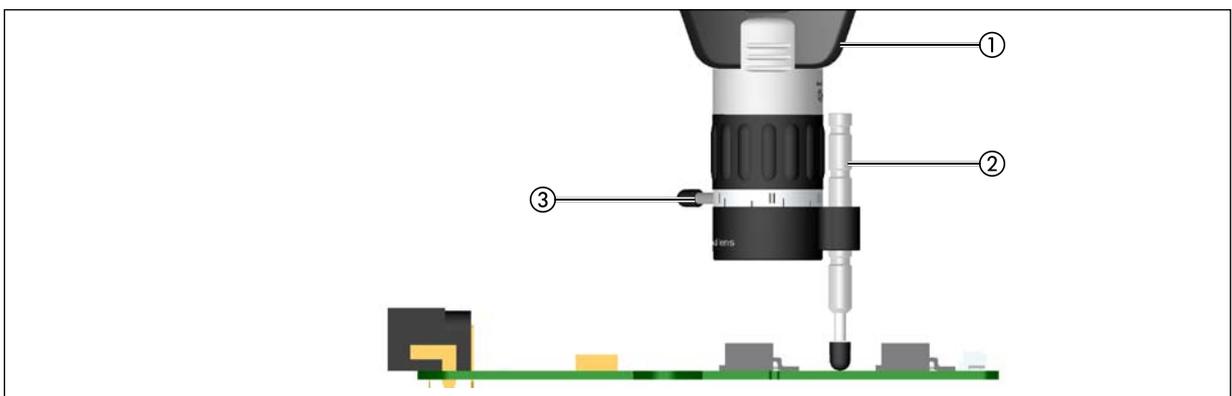
- Move down Ersa MOBILE SCOPE ① to contact with PCB surface. The optical head should be at right angle to the PCB.
- Rotate “zoom ring” ② to alter object distance and optical magnification.
- Pin ③ for adjustment of image tilt.



Adjust BGA head

6.3 How to use the Macro-Zoom lens

- Install the Macro-Zoom lens as described in section [Mounting the BGA or Macro-Zoom lens].
- Adjust the distance between Macro-Zoom lens and PCB with the spacer ②.
- Move down Erska MOBILE SCOPE ① to contact with PCB surface.
- Rotate “zoom ring” ③ to alter object distance and optical magnification.



Adjust Macro-Zoom lens



The spacer ② is equipped with a suspension in the top and covered with rubber to prevent damage.

7. Servicing and maintenance

7.1 General



Caution! Do not scratch or hit front edge of the side viewing prisms to hard objects! This precaution is especially important at free-hand operation of Ersas MOBILE SCOPE when the microscope is not assembled on stand.

Caution! Do not knock or drop Ersas MOBILE SCOPE or BGA lens.

Keep the equipment clean.

Use cotton swabs damped with pure ethanol, isopropanol for cleaning the optics or Ersas lens cleaning kit (OVSLC100). Try to clean surface of lenses and prism at regular intervals. Dust and dirt on the clear aperture of the optics decreases image contrast and resolution.

Caution! Never use acetone or other similar solvents for cleaning any part of the equipment.

Attention! Only use DC power sources provided or approved by Ersas – e.g. for LED brush light.

Attention! Only use accessories provided or approved by Ersas.

Caution! Keep the video microscope away from direct sunlight, heat and extreme humidity.

Caution! Protect the BGA lens, zoom lens and ring light by the supported rubber caps or store them inside their boxes when the equipment is not used.

Caution! Right angle prisms on the bottom of the BGA 90° optical heads are protected by the stainless steel metallic housing. These prisms, however, are precision optical components and can be damaged if the equipment is not handled with care.

7.2 Cleaning the optical components

In order to maintain an optimal image quality, the optical components must be maintained in clean condition at all times. Light dirt, such as dust, can be carefully removed with an oil and dust free compressed air (e.g. from an air can).



Caution! When using compressed air make absolutely sure that it is free of dust and oil! Avoid excessive pressure!

In case of excessive dirt wet cleaning is required.



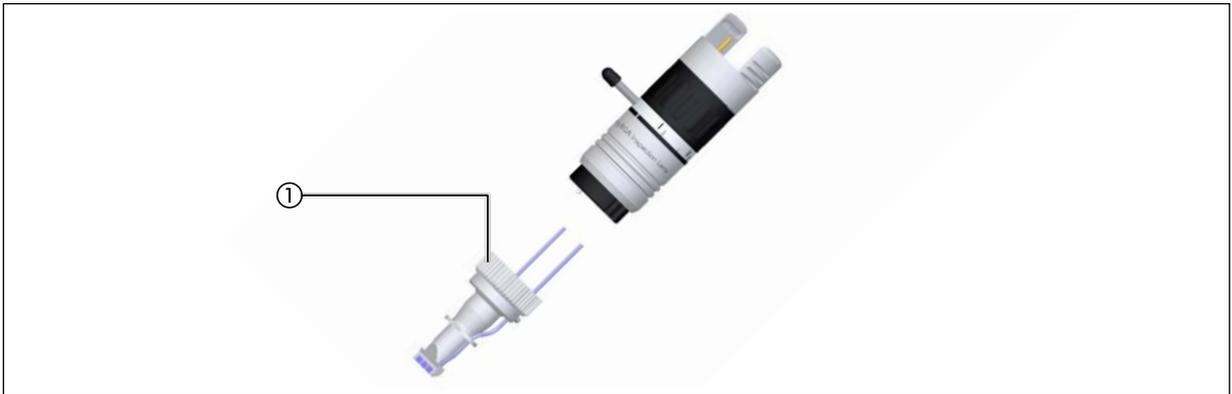
Caution! For wet cleaning use only cleansing liquid, but no solvent containing substances - these could cause considerable damage to the optical components after! In cases of wet cleaning dry the cleaned components carefully. Otherwise there is a risk of residues drying on.

7.3 Changing Optical Head of the BGA lens

- Unscrew the knurled ring ① and pull out the optical head.



Caution! Micro prisms on the tip of the optical head are protected by mechanical housing of the lens but still can be damaged if pressed against hard edges! Never use any tools!



Changing optical head

8. Spare parts and accessories

8.1 Spare parts

Product name	Order number
Basic camera unit, digital	0VSCA060
BGA lens, 90° optical head	0VSSE060-90K
Macro-Zoom 80x with LED light	0VSSE060-MZ80
LED brush light with dimmer	0VSL030
Desk-top holder for camera unit	0VSCA060A
Aluminium case for Erska MOBILE SCOPE	3VP00703
DC-adapter for LED brush light	0VSL030NA
USB Image capture foot-switch "F3"	0VSSC060FS
90° optical head	3VSSE060-01
Brush light fibers 64x with adapter	3VSL030-01

8.2 Accessories

Product name	Order number
Focusing stand, coarse/fine movement	0VSST060
Manual XY-translation Board, 25 x 25 mm travel, incl. 2 x quick feed micrometer screws	0VSXY060
Stand for LED brush light	0VSL030H
Erska lens cleaning kit	0VSLC100

9. Warranty

The warranty period is specified in the applicable version of the General Terms of Sales Deliveries and Payment of Ersä GmbH (indicated in the Ersä price list, for example). Warranty claims will be accepted only if the devices or parts are returned in the original packaging.



Attention! All the parts of this equipment are precision parts. Please take all due care when using these parts. Wearing parts and damage as a result of improper use or bad handling are not covered by the warranty.

Use only original Ersä consumable items and spare parts to ensure reliable functioning and to retain your guarantee. Ersä has produced these Operating Instructions with the utmost care. Nevertheless, we cannot provide any guarantee for the content, completeness or quality of the information contained in this manual. The content is being continually updated and adapted to current conditions.

All the data contained in these Operating Instructions, including specifications of products and procedures, have been obtained by us in good conscience and using the latest technical equipment. These specifications are provided without obligation and do not discharge the user from the responsibility of conducting an inspection before using the device. We accept no responsibility for violations of the industrial property rights of third parties or for applications and procedures that we have not previously expressly approved in writing.

We reserve the right to make technical changes in the interest of product improvement.

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We reserve the right for technical modifications with the intention of improving the product. In the context of the legal possibilities, liability for any damage, including direct and indirect damage, which results from the acquisition of this product, is ruled out.

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