



## **KERATRON™ WITH KERATRON™ BRIDGE**

Videokeratoscope

### **INSTALLATION AND OPERATING MANUAL**

**OPTIKON 2000 S.p.A.**

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OPTIKON 2000 S.p.A. is an ISO 9001 and ISO 13485 certified company which manufactures surgical and diagnostic devices for ophthalmology.

Its products are manufactured to satisfy the requirements of 93/42/EEC Medical Devices Directive.

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## 1 DISCLAIMER

OPTIKON 2000 S.p.A. requires that the user of this system carefully read the specific warnings found in this manual. It is operator's responsibility to ensure that its personnel have a thorough understanding of how the instrument works prior to use. Under no circumstances shall OPTIKON 2000 S.p.A. be held liable for any injuries or incidental or consequential damages affecting the purchaser, the operators, or the patients as a result of using the product.

The use of this system is a matter of professional medical judgment in all cases. Optikon 2000 S.p.A. is not responsible for any clinical problems resulting from the incorrect use of this equipment and makes no medical recommendations.

Optikon 2000 S.p.A. will be considered liable for the equipment's safety, reliability and performance only if:

- Revisions, calibrations, and repairs are performed by authorized OPTIKON 2000 S.p.A. personnel.
- The system is used in accordance with its instructions for use.
- The electrical system to which the system is connected is in compliance with IEC safety regulations.

### IMPORTANT NOTICE:

**Every effort has been made to ensure that all the illustrations and information in this manual accurately represent the product and its functioning as of the time of printing. Changes to some items may be made during the life of this manual in order to continue to meet users' needs as effectively as possible. On occasion, these changes may be made without notice.**

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## 2 LIMITED WARRANTY CONDITIONS

All OPTIKON 2000 S.p.A. equipment and accessories sold and installed in the European Union are guaranteed against defective workmanship and faulty parts materials for ONE YEAR from the date of the invoice. The warranty on consumables is limited to the initial use of the equipment.

Please contact your local authorized OPTIKON 2000 S.p.A. distributor for warranty conditions in countries outside the European Union.

All parts covered by the warranty will be repaired or replaced free of charge.

The warranty covers identification of the causes of the defects, repair of the breakdown, and final inspection of the unit or part(s).

This warranty does not cover improper use, accidents, abuse, tampering, or alterations made by anyone other than authorized OPTIKON S.p.A. Service Department personnel.

In the event of a breakdown OPTIKON 2000 S.p.A. reserves the right to verify whether the instrument and/or its accessories have been altered or tampered with in any way or have been damaged as a result of improper use.

OPTIKON 2000 S.p.A. also reserves the right to modify the instrument and/or its accessories if so required by operating techniques.

No warranty will be recognized if the serial number of the instrument and/or accessories assigned by OPTIKON 2000 S.p.A. is missing, has been tampered with, and/or is not clearly legible.

This warranty does not cover the costs for returning the instrument and accessories: all expenses for transport, packing, etc. are to be borne by the purchaser.

If a specific request is made for service by OPTIKON 2000 S.p.A. technicians, all travel and accommodation costs will be charged to the customer.

OPTIKON 2000 S.p.A. cannot be held liable for damages caused by transport. In this case the customer must immediately notify the shipping company that handled the consignment.

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### 3 WARNINGS

#### *General warnings*

- The Keratron™ was developed and optimized to measure human eyes. The use and evaluation of the Keratron™ in conditions that do not comply with this manual or while using surfaces with a reflectivity or shape that is different from those that are typical of human eyes (for example: contact lenses, surfaces having discontinuity in the tangent or concavity of any of its section profiles, or surfaces that create multiple reflections or the disappearance of some mires ) cannot guarantee results with the same degree of precision; therefore, you are advised not to perform these actions in this manner.
  
- Situations that result in the overlapping of mires can occur in limited areas in human eyes. This must be prevented by ensuring good lacrimation and good image acquisitions (refer to the sections on image acquisition of the eye and the last page of this manual) and, if necessary, corrected by properly using the “Process Editing” functions. Therefore, you can either adjust the mires detection parameters or eventually discard the artifacts. In any case, the operator must check that each individual mires reconstruction is adequate before accepting the resulting topographic data as valid.
  
- Use of accessories and cables other than those provided with the unit may result in an increase of the emissions or in decreased immunity of the system. Portable and mobile communications equipment can affect the performance of the unit.
  
- Carefully follow the instructions when installing and using the unit , in order to prevent harmful interferences with other devices in the vicinity. If the unit causes harmful interferences to other devices (determined by turning the unit off and on), the user is encouraged to try to correct the interference by one or more of the following measures:
  - Reorient or relocate the other devices.
  - Increase the distance between the equipment.
  - Connect the unit into an outlet on a circuit different from that to which the other devices are connected.
  - Consult your local distributor or OPTIKON 2000 technical assistance.

### ***Environmental warnings***

- Do not dispose of the Keratron™ with Keratron™ Bridge unit as unsorted urban waste. Collect it separately in accordance with the local laws and regulations that govern the disposal of electric and electronic equipment.

### ***Electrical warnings***


- **Exercise due caution when inserting or unplugging the connecting cable between the Keratron™ and Keratron™ Bridge units.**

Inserting the cable:

- Turn off the Keratron™ Bridge unit before connecting the cable to the VK.
- Check that the connector orientation is correct.
- Insert it perpendicularly.
- Tighten the lock screws.

Unplugging the cable:

- Turn off the Keratron™ Bridge unit before disconnecting the cable from the VK.
- Unloosen the lock screws.
- Remove without twisting.
- **Make sure to observe conformity to Standard EN 60601 when connecting the PC to the Keratron™ Bridge unit.**

The connection between the PC and the Keratron™ Bridge equalizes the leakage currents of the two pieces of equipment. If the computer or monitor are not equipment with Class II isolation (**identifiable by the symbol** ) as per Standard EN60950 or in conformity with Standard EN60601, the following are the

risks you encounter when equipment is connected whose compliance with Standard EN 60601-1 is unknown:

- Under normal operating conditions the ground leakage current of noncompliant equipment could result in excessive ground LEAKAGE CURRENT of the system.
- In the case of single breakdown conditions (interruption of common protective ground conductor), a noncompliant leakage current value of the equipment's enclosure could result in an excessive ENCLOSURE LEAKAGE CURRENT of the entire system.

In these situations it is advisable **to adopt countermeasures** in order to limit the leakage currents in the event of single breakdown conditions.

Below are listed several precautions:

1. Connect the Keratron™ videokeratoscope to the ground using the bushing identified with the symbol ⊕, located on the front of the base. This will allow the leakage current to be nullified. It should also be taken into consideration that the Videokeratoscope must be connected to the ground in the room in which it is to be used. **Do not use multiple power strips or extension cords** to simultaneously power the Keratron™ Bridge and the PC. In fact, in this case if there is a single breakdown, both the PC and the Keratron™ Bridge, and therefore the Keratron™ unit itself, will have an inadequate ground connection or will be isolated from the ground. In this case the overall leakage currents will be those of the PC.
2. Use an electrical isolation transformer.

### ***Mechanical warnings***

- Do not block the slits on the Keratron™ Bridge. During operation, the Keratron™ Bridge develops heat that is dissipated into the room through the slits located on the sides and upper part of the instrument. To prevent overheating which could jeopardize the instrument's operation, do not block these opening in any way.












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## 4 SYMBOLS

The table below shows some I.E.C. approved symbols and their corresponding meaning. If there is insufficient space, these symbols are often used on medical equipment for easy and quick communication of information and warnings. Sometimes two or more symbols are combined to produce particular meanings.

These are the symbols used on the Keratron™ and Keratron™ Bridge labels. Before beginning to use the units, you should familiarize yourself with them and their definitions listed in the table.

### SYMBOLS PUBLISHED BY THE IEC

SYMBOL	DESCRIPTION
	ALTERNATING CURRENT
	DIRECT CURRENT
	PROTECTIVE EARTH (GROUND)
	IMPORTANT: CONSULT ACCOMPANYING DOCUMENTATION
	OFF (POWER: DISCONNECTED FROM THE MAINS)
	ON (POWER: CONNECTED TO THE MAINS)
	TYPE B PART APPLIED TO THE PATIENT (BODY)
	TYPE BF FLOATING PART APPLIED TO THE PATIENT (BODY – FLOATING)
	CLASS II EQUIPMENT
	HIGH VOLTAGE
	SEPARATE COLLECTION OF ELECTRICAL AND ELECTRONIC EQUIPMENT WASTE

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## 5 GENERAL INFORMATION

### 5.1 SYSTEM DESCRIPTION

The KERATRON™ unit is a modular “**Computer Assisted VideoKeratographer**” (abbreviated as CAVK in the documentation) that was designed to measure the shape of the cornea and to represent it as a color-coded map of the corresponding axial and refractive powers, its local curvatures, or its elevations in several formats (corneal topography)).

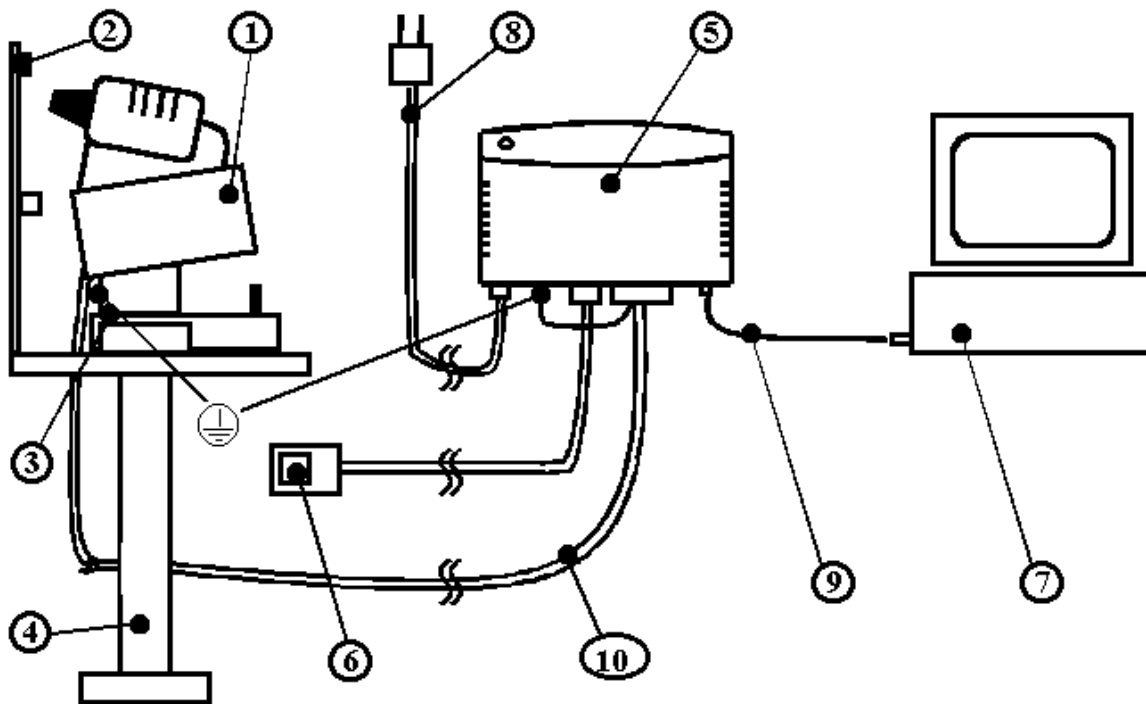


Fig. 1: The Keratron™ system

The KERATRON™ system consists of:

- A **Videokeratoscope (VK)** for acquiring the image of the mires reflected on the eye (1).
- A **Keratron™ Bridge (5)** for powering the VK (by means of the cable 10) and communicating with the VK by means of a cable and a **USB** (Universal Serial Bus) port (9) of any Personal Computer (7) (not included).

- A range of **accessories**, including a **base (3)**, an **electric support (4)**, a **footswitch (6)**, and a **chinrest (2)**.

The VK possesses 28 mires shaped as back-lighted concentric rings, alternating 14 black and 14 white, arranged on the inside surface of a transparent Perspex cone called a **mires cone**, which is removable and carries an opto-electronic pair, consisting of an IRED and a phototransistor, placed at the two opposite sides of its outside edge.

The cone is back-lighted by a lamp board consisting of a tight array of LEDs. Behind the lamp board are found the fixation LED, focused at infinity, and a TV camera.

The IRED – phototransistor pair at the edge of the optical head intercepts the eye vertex when it is located at a set distance from the optical head. An electronic circuit (**EPCS**) eliminates the background light and measures the “degree of coverage,” which is used to accept the acquisition only within a preset range. On the black-and-white monitor a row of notices superimposed on the real-time image of the eye being examined indicates to the operator when to move toward the eye and when to move away from it. If the eye is not at the proper distance, it will not be possible to capture the image.

Therefore, the operator can take images simply by pressing the footswitch only when the patient’s eye is at the preset distance, which is the same distance at which the instrument was previously calibrated on a sphere having a known curvature radius.

During a test, 2 or 3 photographs are usually taken on each eye. These photographs are then processed by means of algorithms to reconstruct the shape of the cornea at more than 7000 points arranged at the intersections between the 28 black-to-white and white-to-black mire edges and 256 radials or “meridians.”

Graphic routines then interpolate these values and represent them in the form of color-coded maps.

The center of the rings represents the **corneal vertex**, that is, the point of the cornea closest to the TV camera; it is an important reference point for all the corneal maps. The **entrance pupil** is also detected.



## 5.2 TECHNICAL SPECIFICATIONS

<b>PARAMETER</b>	<b>SPECIFICATIONS</b>
Manufacturer:.....	OPTIKON 2000 S.p.A. Via del Casale di Settebagni, 13 00138 Rome, Italy
Model:.....	Keratron™ pupillometry unit with Keratron™ Bridge
Regulatory compliance: .....	93/42/EEC Medical Devices Directive (MDD)
Technical standards: .....	EN 60601-1, EN 60601-1-1, ..... EN 60601-1-2

<b>PARAMETER</b>	<b>SPECIFICATIONS</b>
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### WORK AREA SPECIFICATIONS

Storage: .....	Temperature range: between -10°C and +60°C
.....	Humidity: 10-100% (condensing)
.....	Atm. pressure: from 500 to 1060 hPa
Operation:.....	Temperature range: between 0°C and +40°C
.....	Humidity:0-90% (noncondensing)
.....	Atm. pressure: from 700 to 1060 hPa

### ELECTRICAL SPECIFICATIONS

#### KERATRON™ BRIDGE

Input voltage: .....	Selectable from among 100/120/220/230-240 VAC
Frequency:.....	50/60 Hz
Power consumption: .....	60 VA
Fuses:.....	220/240 Volts: 1 A T 100/120 Volts: 2 A T

#### KERATRON™

Power requirements:.....	12 VDC, 5 VDC, and -12 VDC supplied by the Keratron Bridge
Power consumption: .....	28 VA

**PRECISION**

Ophthalmometric data (sim-K):..... Within +/- 0.25D on a normal cornea.  
Distance error:..... BFS (Best Fit Sphere) deviation: with adapter for typical slit lamp within +/- 0.15D.  
Within +/- 0.25D in a handheld configuration. To be checked by means of the “reproducibility check” function.  
Misalignment error:..... Slight deviation on the map: +/- 0.1D with misalignment up to 1 mm.

**CLASSIFICATION OF THE INSTRUMENT IN ACCORDANCE WITH IEC 60601-1**

Type of protection against electrical discharges:

Keratron™ Bridge ..... Class I  
Keratron™ ..... Class I

Degree of protection against electrical discharges:

Keratron™ Bridge ..... Type B  
Keratron™ ..... Type B

Degree of protection against harmful water ingress:

Keratron™ Bridge ..... Ordinary  
Keratron™ ..... Ordinary

Level of safety of the application in the presence of an inflammable anesthetic mixture:..... Unprotected

Mode of operation..... Continuous

**DIMENSIONS**

**KERATRON™ BRIDGE**

Height: ..... 65 mm  
Width:..... 250 mm  
Depth: ..... 185 mm  
Weight:..... Approx. 2100 g

KERATRON™

Height: ..... 440 mm  
Width:..... 610 mm  
Depth: ..... 180 mm  
Weight:..... Approx. 11 Kg

BASE

Height: ..... 30 mm  
Width:..... 610 mm  
Depth: ..... 430 mm

CHINREST

Height: ..... 450 mm  
Width:..... 400 mm  
Weight of base + chinrest: ..... Approx. 10 Kg

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NOTES:

- 1) The weights and dimensions indicated are approximate.
  - 2) Specifications are subject to change without notice.
-

## 5.3 EMC TABLES


### 5.3.1 GUIDANCE AND MANUFACTURER'S DECLARATION – ELECTROMAGNETIC EMISSIONS

The Keratron™ is intended for use in the electromagnetic environment specified below. The customer or the user of the Keratron™ should assure that it is used in such an environment.

Emissions test	Compliance	Electromagnetic Environment – Guidance
RF emissions CISPR 11	Group 1	The Keratron™ uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class B	The Keratron™ is suitable for use in all establishments including domestic establishments and those directly connected to the public low voltage supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/Flicker emissions IEC 61000-3-3	Complies	

### 5.3.2 GUIDANCE AND MANUFACTURER'S DECLARATION – ELECTROMAGNETIC IMMUNITY

The Keratron™ is intended for use in the electromagnetic environment specified below. The customer or the user of the Keratron™ should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic Environment - Guidance
Electrostatic discharge (ESD) IEC 61000-4-2	<ul style="list-style-type: none"> <li>±6 kV contact</li> <li>±8 kV air</li> </ul>	<ul style="list-style-type: none"> <li>±4 kV contact</li> <li>±8 kV air</li> </ul>	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%
Electrical/fast transient/burst IEC 61000-4-4	<ul style="list-style-type: none"> <li>±2 kV for power supply lines</li> <li>±1 kV for input/output lines</li> </ul>	<ul style="list-style-type: none"> <li>±2 kV for power supply lines</li> </ul>	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	<ul style="list-style-type: none"> <li>±1 kV differential mode</li> <li>± 2kV common mode</li> </ul>	<ul style="list-style-type: none"> <li>±2 kV differential mode</li> <li>± 2kV common mode</li> </ul>	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions, and voltage variations on power supply input lines IEC 61000-4-11	<ul style="list-style-type: none"> <li>&lt;5% U<sub>T</sub> (&gt;95% dip in U<sub>T</sub>) for 0.5 cycle</li> <li>40% U<sub>T</sub> (60% dip in U<sub>T</sub>) for 5 cycles</li> <li>70% U<sub>T</sub> (30% dip in U<sub>T</sub>) for 25 cycles</li> <li>&lt;5% U<sub>T</sub> (&gt;95% dip in U<sub>T</sub>) for 5 sec</li> </ul>	<ul style="list-style-type: none"> <li>&lt;5% U<sub>T</sub> (&gt;95% dip in U<sub>T</sub>) for 0.5 cycle</li> <li>40% U<sub>T</sub> (60% dip in U<sub>T</sub>) for 5 cycles</li> <li>70% U<sub>T</sub> (30% dip in U<sub>T</sub>) for 25 cycles</li> <li>&lt;5% U<sub>T</sub> (&gt;95% dip in U<sub>T</sub>) for 5 sec</li> </ul>	Mains power quality should be that of a typical commercial or hospital environment. If the user of the Keratron™ requires continued operation during power mains interruptions, it is recommended that the Keratron™ be powered from an uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic field should be at level characteristic of a typical location in a typical commercial or hospital environment.
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 Vrms	Portable and mobile RF communications equipment should be used no closer to any part of the Keratron™, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.
Radiated RF IEC 61000-4-3	3V/m 80 MHz to 2.5 GHz	3V/m	<p>Recommended separation distance:</p> $d = 1.2 \sqrt{P}$ $d = 1.2 \sqrt{P} \quad 80\text{MHz to } 800 \text{ MHz}$ $d = 2.3 \sqrt{P} \quad 800\text{MHz to } 2.5 \text{ GHz}$ <p>where P is the maximum output power rating to the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in metres (m).</p> <p>Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey a, should be less than the compliance level in each frequency range. b</p> <p>Interference may occur in the vicinity of equipment marked with the following symbol:</p> 

**NOTE:**

$U_T$  is the a.c. mains voltage prior to application of the test level

Note 1: At 80 MHz and 800 MHz, the higher frequency range applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

<sup>a</sup> Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To access the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the Keratron™ is used exceeds the applicable RF compliance level above, the Keratron™ should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the Keratron™ unit.

<sup>b</sup> Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

**5.3.3 RECOMMENDED SEPARATION DISTANCES BETWEEN PORTABLE AND MOBILE RF COMMUNICATION EQUIPMENT AND KERATRON™**

Keratron™ is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of Keratron™ can help preventing electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and Keratron™ as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter (W)	Separation distance according to frequency of transmitter (m)		
	150 kHz to 80 MHz $d = 1.2 \sqrt{P}$	80 MHz to 800 MHz $d = 1.2 \sqrt{P}$	800 MHz to 2.5 GHz $d = 2.3 \sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rates at maximum output power not listed above, the recommended separation distance in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

**NOTE:**

Note 1- At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

Note 2- These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.

## 5.4 WIRING DIAGRAMS

On request, OPTIKON 2000 S.p.A. can make available wiring diagrams, a list of components, descriptions, instructions for calibration, and other information to assist the operator's qualified technical personnel in repairing the reparable components of the equipment.

## 5.5 COMPOSITION

MODULE	CODE	DESCRIPTION
KERATRON™	161104	VK Keratron™ with pupillometry, complete with 28-mire cone, calibration sphere, calibration target, Keratron™ Bridge, footswitch, base, chinrest, covers, 2-meter A-B USB cable, Keratron™ Scout software, and user manual.
KERATRON™ BRIDGE	162104	Keratron™ Bridge, 2-meter A/B USB cable, Keratron™ Scout software, and user manual.

## 5.6 ACCESSORIES NOT SUPPLIED

Computer (minimum requirements):	<ul style="list-style-type: none"> <li>Pentium III (450 MHz) or higher</li> <li>64 MB RAM (absolute minimum, expandable)</li> <li>10 GB hard drive (minimum)</li> <li>1.44 MB 3.5" floppy disk drive</li> <li>CD-ROM drive</li> <li>SVGA video board with video mode of at least 1024x768 pixels, true color (16-32 bits)</li> <li>USB port 1.1 or 2.0</li> <li>Windows 95 or 98/Me</li> <li>Windows 2000/XP 32 bit only with USB interface</li> <li>Windows Vista 32 bit (only from "Scout" software release 4.3 or later.)</li> <li>Graphic color printer</li> </ul>
Remote optical head	162105





## **6 INSTALLATION**

### **6.1 INTRODUCTION**

This section provides a detailed description of the recommended procedure for installing the Keratron™ corneal topography system.

Carefully comply with the instructions for installation and use, proceeding step by step; all the information needed to ensure the correct functioning of the Keratron™ corneal topography system will be acquired in a short period of time.

### **6.2 UNPACKING AND INSPECTION**

This unit has been packed to minimize the risk of damage during shipping. Open the packaging and examine the components. Handle all components with care during unpacking. Use caution when cutting through the packaging material to ensure that you do not damage the contents. If the packaging or contents are damaged, notify the carrier as soon as possible (postal service, railway, or shipping agent) as well as Optikon 2000. Check the contents against the attached shipping documentation. In the event of any discrepancies, inform Optikon 2000 immediately.

#### **6.2.1 INSTALLATION PROCEDURE**

Connect the Keratron™ Videokeratoscope to the Keratron™ Bridge unit (refer to Fig. 1), using the socket marked "Videokeratoscope" (Fig. 2).



Fig. 2: Rear view of the Keratron™ Bridge unit

Use a screwdriver to lock the cable into the connector.

Connect the yellow-green cable's ground pin to the Keratron™ Bridge's grounded socket (Fig. 2) marked with  $\oplus$ .



**Insert the VK cable carefully**

To insert the cable:

- Turn off the unit before connecting the VK cable.

To remove the cable:

- Turn off the unit before removing the VK cable.
- Remove without jerking.

Connect the footswitch to the socket on the Keratron™ Bridge unit labeled “Footswitch.”

Connect one end of the the USB cable to the USB socket on the Keratron™ Bridge unit and the other end to the PC. To install the driver, follow the instructions given below in the section titled “Installing the USB drivers.”

## 6.3 SOFTWARE INSTALLATION

### 6.3.1 INTRODUCTION

The Keratron™ Scout software does not require special instructions because it is driven by an appropriate Setup program that is already installed when you receive the system.

The following precautions are recommended:

1. The PC must be IMB compatible and possess the Windows 98/ME or Windows 2000/XP operating system. The Windows95 and Windows NT operating systems do not support the USB interface; therefore, they cannot communicate with the Keratron™ Bridge unit.
2. The screen properties may be set in any mode, but it must be in true color (65K or 16M colors). It is recommended to set the screen resolution to at least 1024x768 pixels.
3. Do not alter any of the system files installed by the Keratron™ Scout setup software or any files in the database, unless you have had specific training in PC and LAN management. In this case, refer to the service manual.

Updating the Keratron™ Scout software is easy and does not alter the database, the instrument's calibration, or the settings entered by the user that are stored on the hard drive.

You must first uninstall the previous version, and then install the updated version of the Keratron™ Scout setup.

The most recent version can be downloaded (after registration) from Optikon 2000's website: <http://www.optikon.com/>.

**NOTE:**

In the Windows 2000 and XP operating systems you must have system administration (Administrator) privileges to install the software.

**NOTE:**

A printer has to be installed and set as default before running the Scout.exe software.

### **6.3.2 DOWNLOADING THE KERATRON™ SCOUT SOFTWARE FROM THE INTERNET**

Visit the website <http://www.optikon.com/scoutmain.htm>

The procedure is different depending on whether you are a registered user or not.

#### **IF YOU ARE NOT A REGISTERED USER**

- Click on the hyperlink “Go to the registration page.”
- Fill in all the items and click on the “Register Me” button.
- You will be allowed to download the software within 24 hours, after receiving a confirmation e-mail from Optikon 2000.

#### **IF YOU ARE A REGISTERED USER**

- Click on the hyperlink “Go to the download page.”
- When prompted, enter your username and password, and then click the OK button.
- Create an empty folder on your hard drive (e.g., “C:\ScoutSW”).
- Right-click on the hyperlink “Setup.exe,” choose “Save Target As” when prompted, and save the file in the folder you have created.

### **6.3.3 INSTALLING THE KERATRON™ SCOUT SOFTWARE**

Whether you are installing the Keratron™ Scout software from our website or from a CD-Rom, you will need to remove any previous versions of the Keratron™ Scout software from your PC before installing the new Keratron™ Scout software.

If you are installing the software from the CD-Rom:

- Place the CD-ROM in the drive.
- Wait a few seconds; an HTML page will load.
- Select the hyperlink “English.”

- Select the hyperlink “Install Scout Rel xx.xx, for Keratron Scout & Keratron Bridge.”
- Select “Run” when prompted.

If you are going to install the version downloaded from our website:

- Using “Windows Explorer,” select the folder where the downloaded files are located.
- Run “Setup.exe” by double-clicking on it.

Regardless of whether the program was installed from a CD-Rom or from downloaded files, the setup procedure could issue some messages, such as conflicts with DLL versions, etc.

Consult the troubleshooting section in this manual (refer to 9.1.1) for the proper action to be taken.

#### **6.3.4 IMPORTING OLD KERATRON™ TESTS**

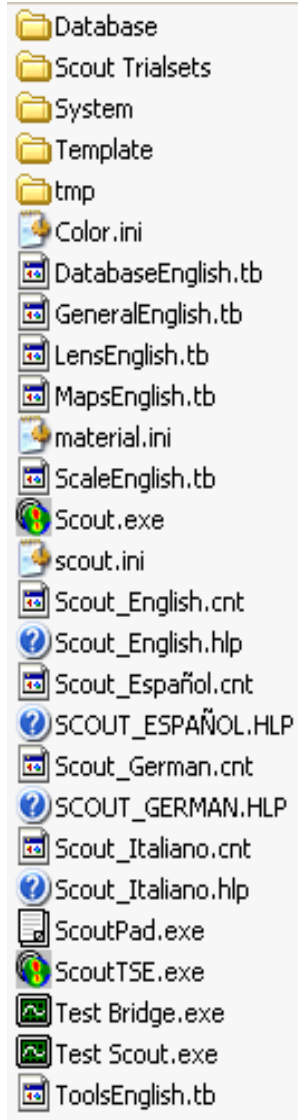
The Keratron™ Scout’s exam files format is different from the previous Keratron format. The files in the previous Keratron™ format need to be converted to the new format before they can be used with the Keratron™ Scout’s software. This operation can be performed by means of the import function:

- Select “File” -> “Import tests...” from the menu bar.
- Select the folder that contains the tests and click the OK button.
- The “Test Manager” window will appear.
- Click on the “Import” icon.

It is advisable to read the following tips before importing the tests:

- If there is a large number of tests, do not import them all at the same time. Instead, import the tests in small groups and check them before proceeding.
- Pay careful attention to the list in “Test Manager”: Make sure that each first name, family name, sex, date of birth, test number, and test date have been imported correctly.
- You can change the import parameters by using “Tools” -> “Options...”, selecting the “Database” section, and clicking on the “Conversion Options...” button.

### 6.3.5 KERATRON SCOUT SOFTWARE STRUCTURE



Default database folder.

Scout Trialsets folder (empty after the first installation).

Keratron Scout system files. Be careful with this folder!!

Place here the imported print templates as well as those that you create new.

The software places temporary files here.

*.tb	Toolbar settings
Scout.ini	Software settings
*.cnt	Help contents files
*.hlp	Localized help files
ScoutTSE.exe	Trial-set editor for Keratron Scout lenses
Scout.exe	Main program
ScoutPad.exe	Print template generator
Test Scout.exe	Scout test tool communication
Test Bridge.exe	Keratron test tool communication
Color.ini	List of available lens colors
Material.ini	List of available lens materials

### 6.3.6 CUSTOMIZING THE KERATRON SCOUT SOFTWARE

You can customize and/or change the toolbar buttons and how the software functions.

You can change how the software functions by means of the “Options” window, which can be accessed from the “Tools” menu.

You can customize the toolbar by simply right-clicking on it.

### 6.3.7 INSTALLING THE USB DRIVERS

After the initial Windows desktop screen has opened, insert the CD-Rom containing the drivers.

First, connect the cable to the PC's USB Port; then connect its other end to the Keratron™ Bridge's USB port.

Turn on the Keratron™ Bridge and follow the instructions listed below, according to your operating system.

#### **Windows 98/ME**

The device's Plug & Play interface will allow it to be immediately recognized by the operating system, which will then display the “Add New Hardware Wizard” dialog box.

Now:

Click on the **Next** button.

A new window will appear. Select the radio button “**Search for the best driver for your device (Recommended).**”

Then click on the **Next** button again.



**Fig. 3: Initial screen for installing the USB driver**

In the next window select only “**Specify a location.**” Then click on the “Browse” button to select the directory **software\drivers\EPPUSB\_Bridge\Win9x** on the CD-Rom as shown in Fig. 3.

Click on the **Next** button.

The computer will display a message confirming that a suitable driver has been found and will be installed.

Continue by clicking on the **Next** button.

The “Add New Hardware Wizard” will finish the installation as shown in Fig. 4.



**Fig. 4: Message that Windows has finished the installation**



Click on the **Finish** button.

## Windows 2000/XP

**NOTE:**

You must have system administration (Administrator) privileges to install the USB drivers.

The device's Plug & Play interface will allow it to be immediately recognized by the operating system, which will then display the "Add New Hardware Wizard" dialog box.

Click on the **Next** button.

From the next window select the radio button "**Search for the best driver for my device (Recommended).**" Then click the **Next** button.

From among the options in the next window, select only "**Specify a location**" and click on the **Next** button.

The operating system will then ask you where you would like the files to be copied.

You have to specify the **software\drivers\leppusb\_bridge\Win2k** directory under Windows in the box "Copy manufacturer's files from:".

Click the **OK** button to start the installation.

Start the installation by clicking on the **Next** button in the window confirming that the proper file was found and that the system is ready to make the installation.



**Fig. 5: Installation for Windows XP has finished**

The window shown in Fig. 5 confirms that the driver has been correctly installed.

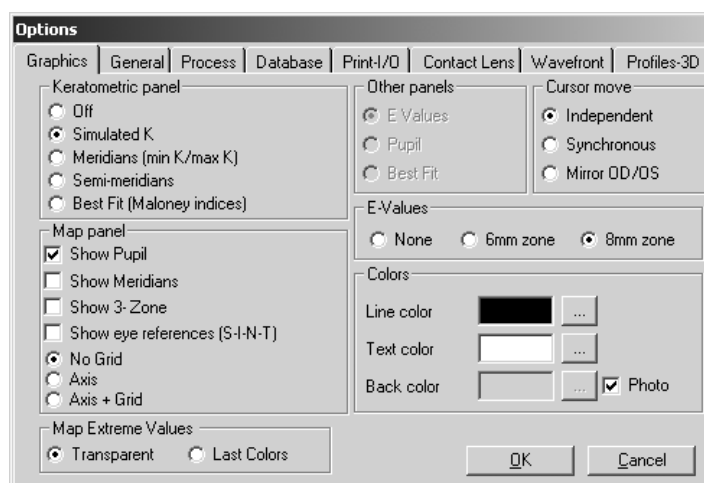
Complete the operation by clicking on the **Finish** button.

### 6.3.8 CONFIGURING THE KERATRON™ SCOUT SOFTWARE

The next phase consists of enabling USB communication in the Keratron Scout software.

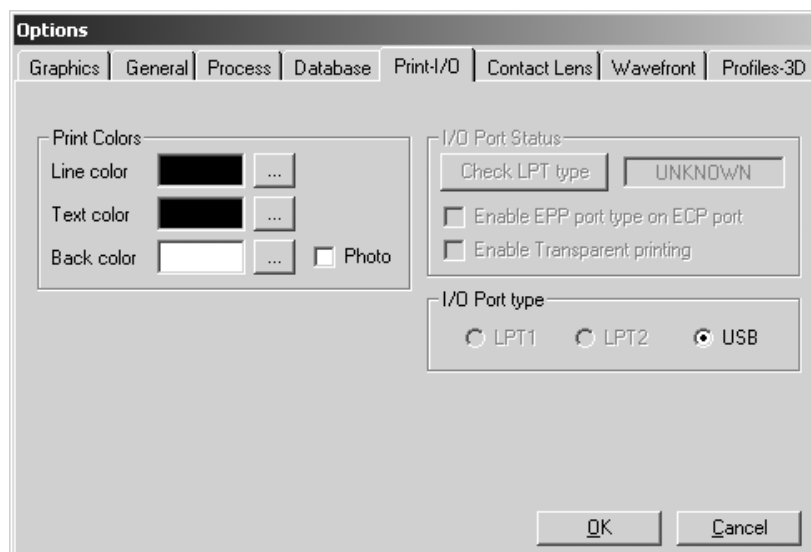
Start the Keratron™ Scout software. In the menu bar select “Tools,” and then select the item “Options....”

The dialog box will appear as shown in Fig. 6 below.



**Fig. 6: Tools->Options menu**

Select the tab labeled “Print” and the dialog box will appear as shown in Fig. 7 below.



**Fig. 7: Selection of USB communication**

Select the **USB** option in the I/O Port Type box, and then click on **OK**.

### 6.3.9 UNINSTALLING THE KERATRON™ SCOUT SOFTWARE

We can imagine two different methods: the first one uses the Windows standard uninstall procedure:

1. Open the control panel.
2. Click on the "Add/Remove Programs" icon.
3. Select "Keratron Scout."
4. Click on the "Add/Remove" button.
5. Follow the instructions. If the uninstall procedure asks to remove some DLLs, click on the "Yes to all" button.

The second method calls up a specific uninstall utility:

1. From the Windows "Start" -> "Programs" -> "Keratron Scout" menu, select "Uninstall Keratron Scout."

For both of these methods verify that the following files have actually been removed or erased from the PC:

- C:\Keratron\Scout.exe
- C:\Keratron\ScoutTSE.exe
- C:\Keratron\ScoutPad.exe
- C:\Keratron\Test Bridge.exe
- C:\Keratron\Test Scout.exe

Finally, restart the PC.

## 7 DESCRIPTION OF COMMANDS AND SCREENS

### 7.1 INTRODUCTION

In this section only the basic operation is described. For a more complete and updated description of the software functions, refer to the HELP menu (corresponding command or “?” key on the menu bar).

### 7.2 CCD CENTERING

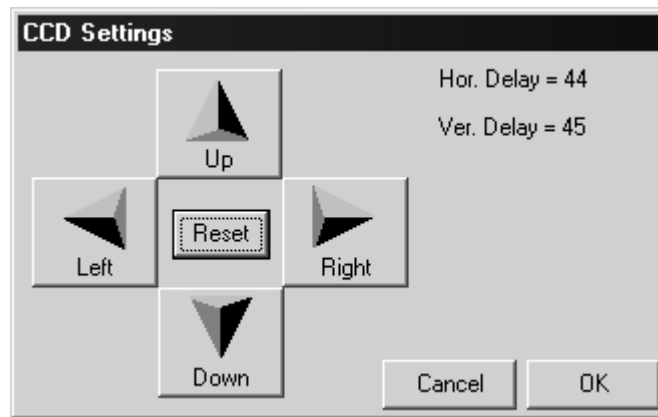
This function is used to center the image seen by the CCD on the Keratron™ kinoscope. This operation is to be performed immediately after the first installation of the SCOUT.EXE software (refer to the section Installing the software) and repeated in the following cases:

- Maintenance operations on the video camera (rarely).
- Replacement of the computer.
- Formatting the hard drive.
- Connecting a different Keratron™ VK.

To center the CCD:

Select the item “CCD setting” from the Calibrate menu.

Using the calibration target provided with the cone, center the image on the videokeratoscope’s kinoscope by means of the Up, Down, Left, and Right buttons in the window shown in Fig. 8. When the operation has been completed, click on the OK button.



**Fig. 8: Menu for centering the CCD**

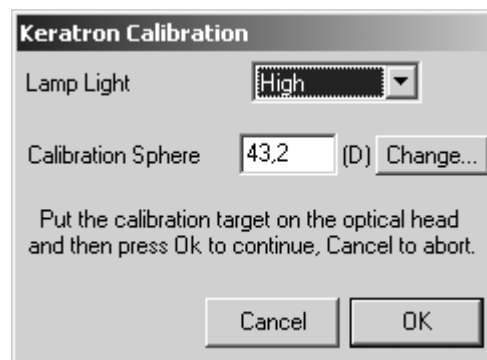
### 7.3 CALIBRATION

To ensure accurate measurements, it is advisable to calibrate the Keratron™ often. In particular:

- After any transportation or installation.
- After any mires cone removal or replacement.
- Periodically, according to its use (e.g.: daily or after each time it is turned on).

To perform the calibration:

- Check that the sphere radius saved in the PC matches that listed on the back of the calibration sphere itself. If this is not the case, set it in the CALIBRATE menu (just the first time after installation).



**Fig. 9: Calibration dialog window**

- Start the calibration from the menu or by means of the CALIBRATE button on the PC screen.
- After selecting OK, you will be asked to place the calibration sphere in the corresponding hole in the chinrest. Make sure that the calibration sphere is perfectly clean. Capture the perfectly centered and focused image.
- Wait for the image to be transferred to the PC and accepted automatically. If the software is not able to locate the center automatically, then follow the instructions that will appear on the screen.

## 7.4 HOW TO ACQUIRE A GOOD IMAGE

Acquiring an image is the most critical operation of topography, because each time the image must be captured at the same distance without artifacts. For this reason, the Keratron™ is equipped with an exclusive device which allows an image to be captured only when it is in perfect focus.

Moreover, its software and hardware do not require the image to be perfectly centered. In fact, the system is able to compensate (within limits) for lateral misalignment of the images, thereby allowing the operator to concentrate exclusively on obtaining a good image (also refer to “*How to acquire a good image*” in the online help).

Begin by asking the patient to place his chin on the chinrest and turn his head slightly in the direction opposite from that of the eye that is to be acquired. The specific shape of the head and the eye sockets could give an indication, for some patients, of the slight rotation of the head (not inclination) necessary to facilitate acquisition.

Select the IMAGE ACQUISITION icon or the Acquisition menu. The IMAGE ACQUISITION window will appear on the display accompanied by an intermittent beeping sound indicating that the system is ready to make the acquisition. Having previously moved the videokeratoscope away from the patient, now proceed to slowly move the Keratron™ cone toward the patient's eye. When you are near the eye, refer to the videokeratoscope's monitor and use the joystick to center the white cross on the visible ring closest to the middle.

Again use the joystick to put the eye into focus by means of the white arrows that appear on the right side of the videokeratoscope's monitor. The white arrow (pointing up) in the lower right-hand corner of the monitor indicates that the videokeratoscope must be brought closer to the eye. Instead, a white arrow (pointing down) in the

upper right-hand corner of the monitor indicates that the videokeratoscope must be moved away from the eye. Be careful to move forward and backward very slowly. Continuing in this manner, other white arrows will appear on the monitor (pointing up or down) as you achieve correct focus. The image will be in focus when the arrows are replaced by a white rectangle in the middle of the monitor (OK). Now press the footswitch to capture the image and display it on the computer's monitor. Note that you may capture up to a maximum of eight images and that the system is able to automatically distinguish the right (R) eye from the left (L) eye.

During the acquisition of an image, the Keratron™ emits a series of “beeps” that vary in pitch and rhythm. This is meant to serve as an audio cue to the operator during the acquisition phase. A distinct sound will be emitted when you achieve perfect focus. The audio cues allow the operator to concentrate more on the video image on the videokeratoscope's monitor rather than on the arrow indicators.

It is advisable not to rush during the acquisition of an image and not to move the unit while pressing the footswitch.

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NOTE:

It is very important that the patient opens BOTH eyes VERY WIDE, to avoid *eyelash artifacts* (refer to the last page in this manual). If the eyelash shadows reach the horizontal line passing through the center of the image, they can fool the measurement system, and you will get a map with abnormally high curvatures. If in doubt, take more than one photograph and check for reproducibility. If necessary, hold the eye open with your fingers and again instruct the patient to open it very wide.

NOTE:

Do not waste time aligning the cross perfectly within the circles. An error of even 4-5 rings results in an error of less than 0.1D. It is much more important that the eyes be opened very wide.

NOTE:

If the tear film is insufficient, ask the patient to blink. If any dust or grime does not go away, ask him to gently rub his eyelids.

---

## 7.5 HOW TO PROCESS, PRINT, AND SAVE IMAGES

After acquisition you can process the individual images by double clicking on them; however, it is advisable to process all of them at the same time by using the “Process All” menu or by clicking on the corresponding icon.



Processing an image means analyzing the circular mire reflections on the cornea so as to produce a topographic map.

The centering and tracking of the rings are reported in detail in the Photo Process window. Here you can check how and where on the map the photograph was taken correctly and without artifacts. Furthermore, it is possible to adjust the processing conditions and/or delete bad tracks.

To select the graphic image, which is created automatically and displayed on the screen during processing (including the Photo-Process window), select "Options" from the "Tools" menu, and then select "Processing." From the "Default Map Type" section select the desired image, and then click on OK.

Apart from that setting, if, for instance, starting from an axial map, you would like the curvature to be displayed, click on the above-mentioned map (the title bar is activated) and then select "Make" "Axial" from the menu.

To activate the various types of keratometric data, select "Options" from the "Tools" menu. As an alternative to this procedure, you can click on any map with the right mouse button and select "Options."

Any change to the graphics options is immediately reflected in all the maps that are currently displayed on the screen, although this can take a few seconds.

Finally, select "Save Test" from the menu or click on the corresponding icon.

Discard all images except for the best one for each eye. This will save space on the disk and will speed up review.

Fill out the patient form, if this has not yet been done. Always enter the name, date of birth, sex, group, diagnosis, and operator (refer to Patient Form).

These keywords will be essential for finding tests within specific groups, even when your database becomes very large.

To print the screen, simply select "Print Screen" from the "File" menu. You can print while in Acquisition mode only if the "Transparent printing" function is enabled.

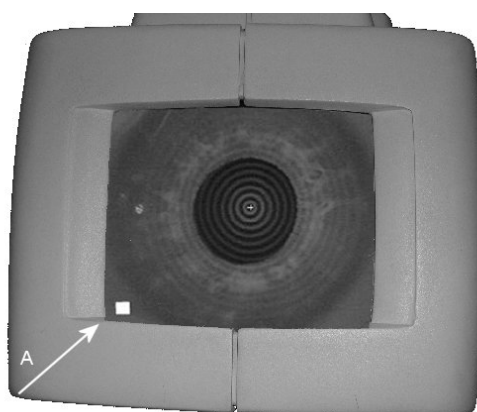
To print one or more tests (those that have been saved and stored as well as those displayed on the screen) use print templates, by means of the "Print" menu or icon, or the "Test Manager."

## 7.6 PUPILLOMETRY

This section discusses only basic information on how pupillometry images should be acquired with a Keratron™ videokeratoscope (VK) equipped with a pupillometry lamp board.

You can find more detailed information on pupillometry functions, on how pupillometry is represented on Keratron™ maps, as well as useful information on pupillometry itself, through the **Online Help** of Scout software, release 3.6.0 or later.

To acquire an *IR-pupillometry* image, start image acquisition as usual by pressing the footswitch, then press the [P] key on the computer keyboard. This will cause a flashing white square to appear in the bottom left-hand corner of the videokeratoscope's monitor (A in Fig. 9) and the mire cone will darken. Pressing the [P] key again will restore the topography lighting.



**Fig. 10: Indication on the VK monitor for the pupillometry mode**

Then wait at least 10-15 seconds in order to allow the pupil's size to adjust to the dark. Then acquire the dilated pupil's image as you would for a normal acquisition. Usually you only need to take one IR image per eye; its pupil track will then be automatically associated with all map views. You can, however, take more than one *IR-pupillometry* image for the subsequent selection of the best one or for the purpose of averaging (refer to "Help").

Then wait at least 10-15 seconds in order to allow the pupil to adjust to the scotopic conditions. Acquire the dilated pupil's image as you would for a normal acquisition. Usually you only need to acquire one IR image, whose pupil track will then be associated with all map views. You can, however, capture more than one IR image for the subsequent selection of the best one or for the purpose of averaging (refer to "Help").

**IMPORTANT NOTICE:**

You must keep the room illumination at a very dim level (for scotopic/mesopic conditions) and cover the contra-lateral eye with an eye-occluder. Avoid any direct light sources (lamps or bright objects) behind the operator's shoulder that would be in the patient's visual field. Such sources of illumination could significantly compromise the IR measurement of the pupil.

Pressing the [P] key (on the keyboard) again during the acquisition phase will return the lamp to the standard lighting condition for topography.

## 8 CLEANING, STERILIZATION, AND MAINTENANCE

The medical personnel are responsible for keeping their instruments and equipment in optimum working condition. The simple steps described below constitute practical guidelines for establishing a suitable care and maintenance program.

### 8.1 CLEANING AND DISINFECTION

The Keratron™ Bridge interface, the Keratron™ videokeratoscope, and accessories do not require sterilization, because they do not come into contact with the patients.

The forehead-rest must be cleaned with alcohol or a bactericidal disinfectant before use with any patient.

From time to time, and whenever there is the possibility of skin allergy or cross infection, the external black conical surface of the optical head can also be cleaned and disinfected, taking care not to touch the two small photo-electronic tips on the cone.

In special cases, or on a monthly basis, the optical head can be removed and cleaned inside. To perform this operation you must:

- Use your hand to grasp the mire cone by its flap and remove it.
- Clean inside the hole using a can of compressed air for cleaning (or with low-pressure compressed air).
- Return the cone to its proper position by pressing it firmly against the videokeratoscope.
- Perform a calibration as described in the CALIBRATION window.

### 8.2 STERILIZATION

The Keratron™ videokeratoscope, the computer, and accessories do not require sterilization, because they do not come into contact with the patients.

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**NOTE:**

In order to ensure the safety of the system, its compliance with the current leakage limits specified in Standard EN60601-1 must be tested at least once a year. Contact the Bioengineering Department in your health care facility or your local Optikon distributor or service center.

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## 9 TROUBLESHOOTING GUIDE

### 9.1 SOFTWARE INSTALLATION

The following message may appear while the installation utility is copying the Keratron™ Scout files onto the PC's hard drive:

THE FILE YOU ARE COPYING IS OLDER THAN THE FILE PRESENT IN THE PC

- In this event leave the more recent file (already installed in the PC) on the PC, and do not overwrite it with the older version.

After installation, check that the software runs properly and test the Scout program. If any error messages appear (Automation error, DLL xxx.dll not found, etc.), it is suggested to take the following actions:

- Download the Scout software (refer to section 6.4.2).
- Reinstall the program, overwriting the files when prompted.

### 9.2 THE SCOUT.INI FILE

This file contains all the settings selected using the "Option Panel" as well as other settings provided by the software.

This file must be used if:

1. The software hangs when it is run.

If this occurs, try renaming the "Scout.ini" file (**do not delete it!!**) and restart the software..

2. Runtime error occurs while exporting tests.

If this occurs, open the Scout.ini file and then, in the "[Export]" section, check the "path." It is probably pointing to a network path that is not currently available or to an unconnected external drive. Delete the string "path=x:\nnnn\mmmm\" and retry.

### 9.3 SHARING THE KERATRON™ WITH OTHER OPERATORS

If more than one user performs tests with the Keratron™ unit, how can the tests be kept separate to avoid confusion?

There are two ways to proceed:

- Create your own “group” (e.g., your name) in the database and save every test you perform in that “group” (**not recommended**).

or

- Create more databases (**recommended**).
- Create one folder for each user (using “Windows Explorer”).
- Create one database for each folder (using the “Keratron Scout” function, “File” -> “New Database”).
- Each user will point to his own database using “File->Open Database,” or from the “File->Recent Database” list.

### 9.4 REPLACING THE PC

- Backup the database(s) (in a network, using a CD-Rom, etc.).
- Backup the file “C:\Keratron\Scout.ini” (options, settings, MRU path).
- Backup the file “C:\Keratron\\*.tb” (toolbar settings).
- Replace the PC.
- Reinstall the Keratron Scout software.
- Reinstall the trial-sets.
- Restore the database(s) (from the network, from a CD-Rom, etc.).
- Restore the “Scout.ini” file in the “C:\Keratron” folder.
- Restore the file “C:\Keratron\\*.tb” (toolbar settings).

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**NOTICE:**

If you installed some external programs, you have to re-enter the passwords.

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## 9.5 MISCELLANEOUS PROBLEMS

The following guide lists several problems which may occur, their symptoms, and the corrective actions to be taken. If the Keratron™ system remains inoperative even after performing the corrective actions indicated below, contact the Optikon 2000 S.p.A. Service Department.

### SYMPTOMS

### CORRECTIVE ACTION

#### A.C. Powered Units

Keratron™ is completely inoperative.

- a. The Keratron™ Bridge A.C. power cord is not connected. Connect the power cord to the control console and the power mains. (Refer to section 6.3.1).
- b. The A.C. line fuse is burnt out. Replace the line fuse.
- c. The videokeratoscope's power cord is not properly inserted in the Keratron™ Bridge. Insert the power cord properly.

#### Acquisition and Processing Images

The acquired image is broken into horizontal blocks.

- a. Check whether Scout.exe and TestBridge.exe were run at the same time (look at the Windows Toolbar).
- b. Check for the presence of resident software that could interfere with the USB port. Check the icons in Windows Toolbar (bottom right side) and deactivate them.

The map colors are non uniform, they sometimes change, or they look different ("strange" colors).

Check the PC's screen settings. If the number of colors is 256, increase them. Keratron™ requires a 16, 24 or 32 bit true color" display.

The VK is not detected when in acquisition mode or when attempting to enter acquisition mode.

- a. Check that the Keratron™ Bridge is ON and that the VK is being powered (CRT is on and lamp is turned on at low intensity).
- b. Check that both ends of the USB Cable connecting the Keratron™ Bridge to the PC are inserted well.
- c. Check the cable between the Keratron™ Bridge and the VK.
- d. Check the settings of the USB port in the

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**SYMPTOMS**

**CORRECTIVE ACTION**

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The Scout software cannot find some files (for example, DLL files, INI files, etc.).

- motherboard's BIOS setup, making especially sure that the USB port is enabled.
- a. If possible, identify the missing or damaged file and try to copy, move, or overwrite it.
  - b. Uninstall the Scout.exe software, launch the PC, and install the Scout software again.
  - c. Reinstall Windows and then reinstall the Scout software.

When many images are processed, the windows are empty or incomplete, the maps are black or absent, the images on the shortcut keys (icons) disappear, or other unusual behavior occurs while the windows are being updated.

- a. Insufficient RAM memory is available in the PC.
- b. Check in the menus '?', 'About', and 'System Info...', the percentage of system resources still available. If it is less than 10%, close all possible programs that consume memory or increase the RAM memory in the PC (64 Mb is suggested). However, limit the excessive simultaneous use of system resources.

The text on the buttons or in the window titles are non legible (it is cut off or there is a new paragraph).

- a. Check the video screen and drivers (try different video modes and settings). Check that no programs or settings in Windows are the cause of the malfunctioning (for example, the additional settings of Windows).
- b. Check the "video settings" of Windows in "Screen properties."

**Database**

The database is locked; it is not possible to open or close a database.

- a. Update with the latest software release and try again.

Solution A

- a. Exit the Scout program.
- b. Rename the folder of the database in use (the selected database is indicated on the bar at the top of the Scout screen) - e.g.: from "C:\My Documents\Database" to "C:\My Documents\Database\_old."
- c. Run the Scout program.
- d. Use the "New database" menu command to recreate the database "C:\My Documents\Database." If the database was "C:\Keratron\Database," you don't need to



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**SYMPTOMS**

**CORRECTIVE ACTION**

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recreate it, because it is the default database and therefore is automatically created by the program if it is not found.

- e. Import tests from the folder "C:\My Documents\Database\_old".

Solution B (if you are working in a LAN group)

- a. Completely exit the Scout program.
- b. Open the file indtest.mdb (from the folder located at the top of the Scout screen).
- c. Open the "tabLock" table.
- d. Modify the first record of the table from the present value to "Unknown."
- e. Save and exit.

**CAUTION!**

The Scout database is saved with DAO 3.5 (Access '97). If you are using a more updated version of Access, do not modify (save) the database using the new version, because the modified file would not be readable by the Scout software. If the problem is due to a mistake by an inexperienced user, reload the database and save it again with the DAO 3.5 version ("previous Access database version").

No test is visible in the "database explorer."

- a. An empty database has been selected.
- b. Check whether 'Group' has been pressed and this selection is not present in the database.
- c. Check whether 'Operator' has been pressed and this selection is not present in the database.

---

**Note:**

The selections "Group" and "Operator" are "toggle" type selections; therefore, they cannot be alphabetically or chronologically selected.

---

The default settings do not correspond to the latest settings, or the database seems

- a. Exit the Scout program.

---

**SYMPTOMS**

**CORRECTIVE ACTION**

---

to have “disappeared.”

- b. Delete or change the name (for greater security) of the file “C:\Keratron\Scout.ini.”
- c. Restart the Scout program and set your preferred options again.

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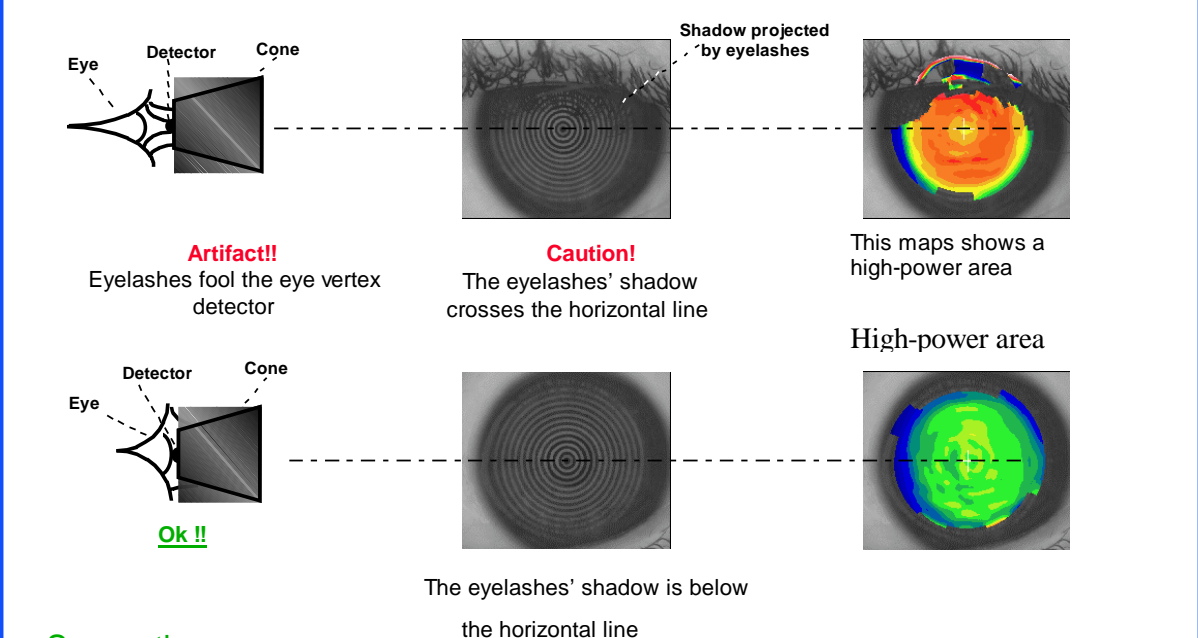
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## 11 APPENDIX

### Eyelash artifacts



**Artifact!!**  
Eyelashes fool the eye vertex detector

**Caution!**  
The eyelashes' shadow crosses the horizontal line

Shadow projected by eyelashes

This maps shows a high-power area

**Ok !!**

The eyelashes' shadow is below the horizontal line

High-power area

**Suggestions:**

- Instruct the patient to OPEN BOTH eyes WIDE (if necessary you can hold the eye open with your fingers, away from the cone).
- Acquire at least 2 images per eye, check for reproducibility, and save only the best images.