

# IBEX

## User Guide

IBEX Wireless LED Binocular Indirect Ophthalmoscope



## Introduction

Congratulations on your new purchase and welcome to IBEX! We appreciate your patronage and the opportunity to exceed your expectations with outstanding products and services. As a valued customer, your experience with IBEX is our top priority, and we strive for a 100% customer satisfaction rate.

Your new IBEX Wireless LED Binocular Indirect Ophthalmoscope arrives with a comprehensive 3-Year Warranty, should you have any questions or concerns, please do not hesitate to contact us.

## Product Registration

If you purchased your product directly through IBEX, **your product is already registered.**

If you purchased your product from one of our many Business Partners, please register your products.

As part of our ongoing efforts to provide you with the best possible customer support and user experience, we urge you to register your new product at <https://www.ibexeye.com/welcome>. *It's fast & easy.*

IBEX Wireless LED Binocular Indirect Ophthalmoscopes are serialized in order to track product versions and revision changes. The serial number may be required to complete any necessary services and or repairs. Registering your product serial number simply allows our IBEX support team to better understand the product revisions in order to expedite your service.



Before you begin using your new **IBEX Wireless LED Binocular Indirect Ophthalmoscope**, please read, understand and follow all safety instructions. This will insure safe operation, optimum performance and a longer service life for your instrument. Be sure to retain this manual for future reference.

## Warning and Information Symbols



General Warning



Hot Surface



Voltage Hazard



Optical Radiation



General Mandatory Action



Read Operator's Manual



Type B Applied Part



Notes



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## Product Overview

### Indications for use

The IBEX Wireless LED Binocular Indirect Ophthalmoscope is a specialized microscope that provides stereoscopic, wide-angled, high resolution views of the entire fundus and overlying vitreous. Its optical principles and illumination system allows for visualization of the fundus regardless of high ametropia, hazy ocular media or central opacities.

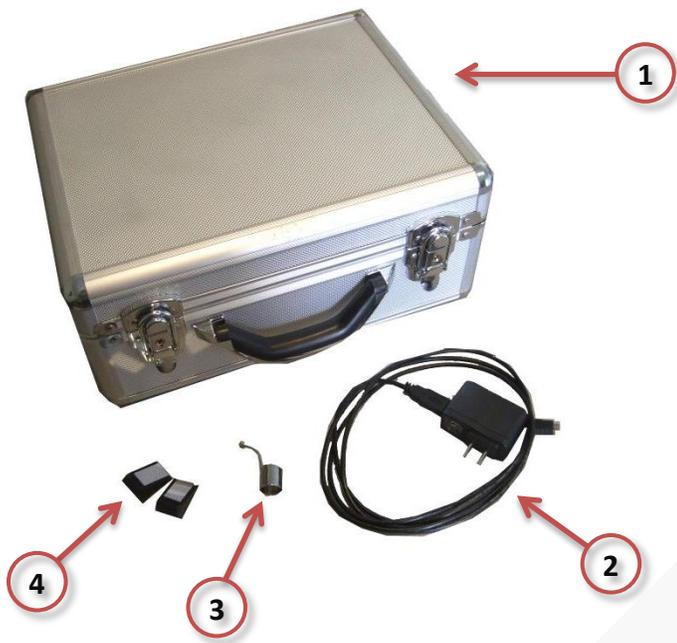
### Major Components



- |                                |                                  |                                     |
|--------------------------------|----------------------------------|-------------------------------------|
| 1. Overhead Sizing Knob        | 6. Color Filter Selector         | 11. Headband Sizing Knob            |
| 2. On/Off + Light control knob | 7. Headband                      | 12. Battery Status Indication light |
| 3. Illumination Tower          | 8. Battery Charger Input         | 13. Mirror Angle Adjustment Knob    |
| 4. Convergence control level   | 9. Illumination Tower Angle Knob | 14. P.D. Control Slide              |
| 5. Mirror Adjustment           | 10. Aperture Selector            |                                     |



## Accessories



1. Carrying case
2. USB Wall plug battery Charger
3. Scleral Depressor
4. Teaching mirror (2)

## Usage – Getting Started



Before use, the BIO should be allowed to adjust to the ambient room temperature for several hours. This is especially important when the unit has been stored or transported in a cold environment.



For best battery performance, remove the charging adapter from the unit after the charging period has completed.

Do not store the unit with the charging adapter attached and plugged in.

Each eyepiece and the PD must be individually adjusted for each examiner.



Never attempt to connect or disconnect this instrument with **wet or damp** hands.

Do not disconnect this instrument from the charger by pulling on the power cord. Grip and hold the connector firmly when disconnecting from the power source.



LED fixtures can reach high temperatures during use – allow ample time to cool before handling any potentially hot surface.

## Knowing the BIO



Your BIO comes fully charge from the factory and ready to use

## Headband Adjustment

Adjust the overhead sizing knob, so that the instrument is supported comfortably around and on top of the head.

Overhead Sizing Knob



Headband Sizing Knob

## Optical Tower Position Adjustment

For vertical angle alignment of the optical tower with respect to the eyepiece, adjust the angle by loosening the tension of the knob. Tighten the knob when in position.

Illumination Tower Angle Knob



## Pupillary Adjustment

Because the eyes are dissociated, particular care must be taken to ensure the optics (eyepieces) are set properly in front of each eye. Always set the aperture selection to the large light spot for this exercise. Place an object, perhaps the thumb, approximately 40cm from the face and center it horizontally in the light patch. Then, close one eye. Using the thumb and forefinger of the opposite hand, slide the P.D. Control sliding knob of the open eye (located directly under each eyepiece) so that your object moves into the center of the field, keeping the object in the center of the light spot. Repeat for the other eye.

Eye Piece

P.D. Control Sliding Knob



## Illumination Control

Illumination control knob is located at the side of the headband. This knob also serves as the unit On/Off switch.

Illumination Control Knob



## Small Pupil Convergence Control Lever

With the adjustment of the control level, the optimize image depth perception and illumination can be achieved by one single movement. In general, for dilated pupil, move the control level underneath the instrument to the large circle. For small pupil, move the control level to the small circle.

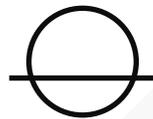
Convergence control level



## Light Beam Angle Adjustment

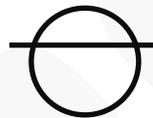
The angle of the light beam can be adjusted by rotating the mirror angle adjustment knob clockwise or counterclockwise.

Image location when turning the knob counterclockwise



Center reference line

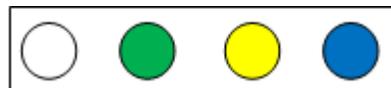
Image location when turning the knob clockwise



Mirror angle adjustment knob

## Filter Selector

Various filters are available for the operator to choose during operation. It can be changed by rotating the lever forward and down or up and back.



1. Open
2. Red Free
3. Yellow
4. Cobalt Blue

## Aperture Selector



Various sizes of apertures are available for the operator to choose during operation. It can be changed by moving the lever forward and down, or up and back.

Aperture size	Image size @480mm working distance
1. 4.2mm	75.0mm
2. 3.2mm	55.0mm
3. 2.2mm	40.0mm
4. 1.2mm	22.0mm

## Basic Instrument Operation



**If no light is visible after turn on the switch, adjust the mirror knob.**

For the best result, observe with dilated pupils. Place the headset in place comfortably on the forehead and set the light intensity in the mid-range. With the +20D condensing lens, position the lens about 18 to 20 inches in front of the patient's eye. Direct the light beam into the pupil, producing a complete red pupillary reflex. Then pull backward on the lens, maintaining the central position of the pupil reflex, until the entire lens is filled with the fundus image. Fine tune the adjustment to create a distortion-free image by tilting and changing the vertex distance of the lens.

## Battery and Battery Charger



Before using the charger, read all instructions and cautionary markings on the battery charger, batteries, and device. **Always make sure that the unit is turned off.**

Rechargeable batteries can be recycled free of charge at any Rechargeable Recycling Corporation (RBRC) participating location.



When battery status indication light turns red, the unit runs low on battery. It has less than 5 minutes of battery life remaining.

**Remember the unit will charge much faster when it is turned off!**

Battery Charging indicator light

Micro USB charging plug



## Battery Charging Procedure



Never attempt to connect or disconnect this instrument with **wet or damp** hands.

Do not disconnect this instrument from the charger by pulling on the power cord. Grip and hold the connector firmly when disconnecting from the power source.



To reduce the risk of injury, charge only manufacturer's specified batteries. Other types of batteries might burst, causing personal injury or damage to your BIO and charger.

Although many adapters look similar, it's important to use only the adapter that came with your unit.

**Always make sure that the unit is turned off before charging.**

Step 1: Insert the mini USB charger plug into the hole on the right hand side of the unit. Plug the charger into a wall outlet. A RED light will illuminate when the unit is charging.

Step 2: Let the battery recharge for 6 hours.

Step 3: When the RED light turns Green, charging is completed. For Best battery performance, remove the charging adapter from the unit after the charging period has completed.

Step 4: The fully charged battery will last up to 18 hours under normal operation.

Charging:      Red = In progress  
                     Green = Charge Completed

## OD auxiliary lens in the BIO

Your BIO comes with a set of OD auxiliary lens for your convenience.



Be sure your lenses are clean before you start.



Unscrew the lens cover by turning it counterclockwise.



Remove the current lens from by tipping the BIO while holding your fingers around the outside of the lens.



The lens value and the direction of the arrow are on the side of the lens.



Insert the auxiliary lens (arrowhead first) into the BIO.



Replace the lens cover by screwing the cap clockwise.



## Maintenance & Cleaning

### Routine maintenance



Never attempt to connect or disconnect this instrument with **wet or damp** hands.

Do not disconnect this instrument by pulling on the power cord. Grip and hold the connector firmly when disconnecting from the power source.



Before performing any maintenance or cleaning procedure, ensure the dial knob switch is set to the off position.

**IBEX** LEDs have a life expectancy of 10,000+ hours and should not require changing by the user. We recommend turning off the device after each use to conserve energy and LED life.

In the unlikely event of failure of the LED, please contact your IBEX representative for guidance.

### General cleaning



Before any cleaning of the instrument or the base unit insure that the power cord is disconnected from the power source.

To keep your BIO in optimum condition, the BIO should be cleaned with a **lightly damp lint free cloth** whenever dust or dirt is detected. Do not use any form of chemical liquids and/or corrosive agents to clean the BIO.

### Tips for taking care of your optical parts

- Since oil and debris from your hands or from used lens tissue can stain or damage optical coatings, you should not touch any transmissive or reflective surface of your optical system and never reuse a lens tissue.
- *If it's not dirty, don't clean it!* Handling optics increases their chances of getting dirty or damaged, so you should clean optics only when necessary.

Inspect the eyepieces for dust and stains by holding it near a bright visible-light source. Viewing the optic at different angles allows you to see any scattering of dust and stains.

## Recommended Lens Cleaning Technique and Procedure

### Step 1 - Remove dust

Dusting is always the first step in cleaning your optics. Wiping a dusty optic is like cleaning it with sandpaper. So always dust with a canned air duster, soft optical brush or air blower before wiping any optic. If the dusted optic has no visible stains after you dust it, remember: *“If it’s not dirty, don’t clean it.”* If it’s still not clean, proper use of solvents and lens tissue can often do the trick.

### Step 2 - Wiping the optic

Remember “always wipe slowly and clean the edges first.”

Blow off the dust before attempting to clean any optics. Place the brush on the optic surface, apply slight pressure and slowly wipe straight across, from one edge of the optic surface to the other. If the optic still appears dirty proceed to step 3.

### Step 3 - Use of solvents and lens tissue

Glass-cleaning solvents will streak, and tissue paper or a t-shirt can scratch, so always clean optics with optical cleaning solution and a low-lint tissue manufactured for cleaning optics. Always use lens tissue with a solvent, because dry lens tissue may scratch optical surfaces. Cleaning the optic’s edges before cleaning its faces prevents dirt from being drawn up onto the face. Wiping slowly allows the solvent to evaporate without streaking. Remember, slow and steady cleans the optic.

## Technical Specifications

Optical System	Stereoscopic
Power Supply	I/P: 100V – 240V AC 50Hz – 60Hz, 180mA O/P: 5.7V DC / 700mA,
Li-Polymer Battery	Rechargeable. 3.7V DC, 1500mAh
Light Source	LED, 3.6V DC, 1W
Pupillary Distance	52 – 74 mm adjustable
Net Weight	520g
Aperture size	4.2mm, 3.2mm, 2.2mm, 1.2mm
Smallest pupil size	2mm
Filters	Red Free, Yellow, Cobalt Blue
Battery Charging time	4.5hrs.
Battery Usage time	6hrs. @ continuous maximum setting

## General Classifications

Mode of operation:	Intermediate
Degree of mobility:	Portable
Type of protection against:	Electrical Shock - Class I
Degree of protection against:	Electrical Shock - Type B
Protection against harmful ingress of water:	IPX-0
Power of Requirements:	Battery Charger: I/P: AC 110V AC / 220V AC, 50Hz / 60Hz; O/P: 12V DC, 500mAh
Battery:	Rechargeable Li-Polymer, 3.7V 1360mAh

## Basic Troubleshooting

If your Ophthalmoscope does not function at all, check your battery level



To help prevent the possibility of electrical shock always unplug the Battery charger before removing or placing the battery case.

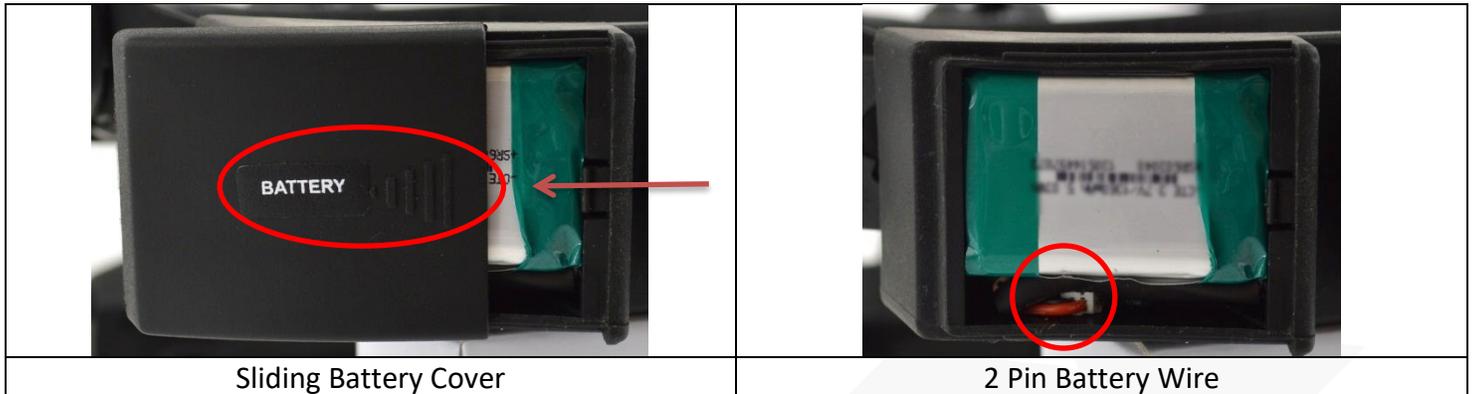
If the main illumination lamp does not light, check the followings:

1. Check the ON/OFF switch located on overhead band.
2. Turn the intensity knob clockwise for brightness.
3. Check your status of the battery level.
  - a. Red Light: Less than 5 minutes of battery life remaining



Due to the complicated design of the MCPCB (LED star). Only an authorized Trevi Technology<sup>®</sup> technician can perform the procedure of replacing the LED star. Please contact your dealer for further instruction.

## Removing and replacing the battery



Step 1: Slide the battery cover to the left.

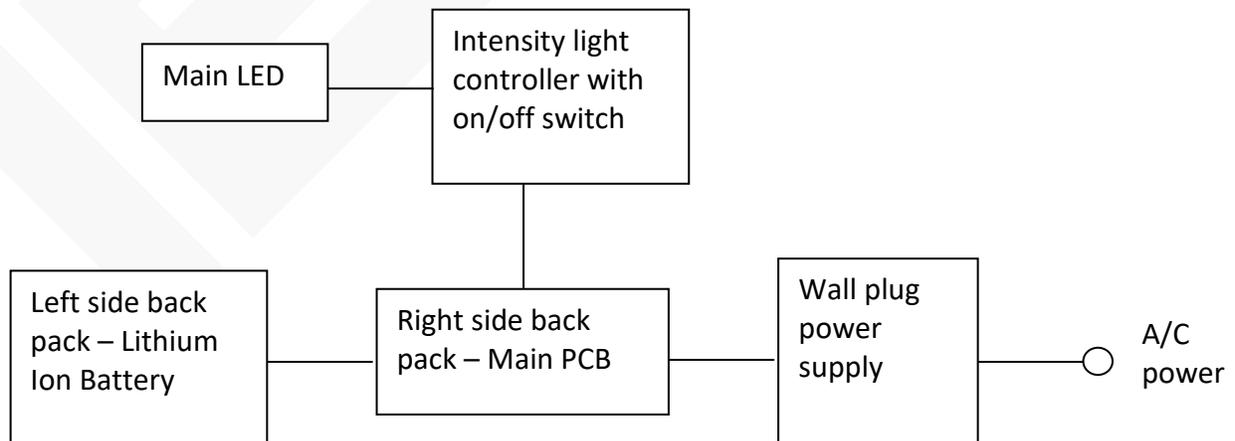
Step 2: Carefully lift out the battery pack and disconnect the old battery wire terminal by pulling apart the wire terminal connectors. Then remove the battery pack.

Step 3: Connect the new battery pack wire terminal connector to the unit.

Step 4: Insert the battery pack.

Step 5: Insert the cover into the battery pack grooves and slide the cover to the right.

## Block Diagram



## Storage, Transportation & Environment

**Storage:**      Temperature -5°C to +50°C  
                    Air Pressure 35% to 95%  
                    Relative Humidity 700kPa to 1060kPa

**Transport:**    Temperature -40°C to +70°C  
                    Air Pressure 35% to 95%  
                    Relative Humidity 700kPa to 1060kPa

### Environment Condition of Use:

                    Temperature 0°C to + 50°C  
                    Air Pressure 35% to 95%  
                    Relative Humidity 700kPa to 1060k

## Warranty

### Three-Year Comprehensive Warranty

**IBEX Wireless LED Binocular Indirect Ophthalmoscopes** are guaranteed for thirty-six months against faulty workmanship, materials or factory defects. The Warranty is a Return-To-Base (RTB) Basis at the cost of the customer. All parts and services rendered are included at no additional cost to the customer and in most cases the work is completed within 2-3 business days.

The **IBEX** LED illumination system is designed to operate with consistency for 10,000+ hours of continuous use and therefore is considered as a non-consumable item. In the unlikely event of an LED failure within or after the warranty period, please contact Trevi Technology, Inc. for a replacement.

In case of any defect during warranty period, the concerned person / hospital / institution, shall immediately contact Trevi Technology®. Trevi Technology® will rectify the problem and replace any parts if necessary with no cost.

## Quality Systems

### Safety Instructions



Read and follow the instructions, cautions and warnings before installing or using this instrument.

The repair/service of this instrument will only be performed by a qualified technician authorized by Trevi Technology®.

Trevi Technology® is responsible for the safety and performance of the equipment only if it is used in accordance with its intended use and the instructions given in the user guide.

This instrument is designed to perform as per the declared indications for safe and reliable service.

Do not modify and/or repair this equipment without authorization of the manufacturer. The manufacturer declines any and all responsibility for loss and/or damages resulting from unauthorized repairs and/or modifications. Any repairs must only be performed by trained and authorized specialists.

Check your **IBEX Wireless LED Binocular Indirect Ophthalmoscope** periodically for any signs of damage or misuse.

This device is intended to be used only by suitably trained and authorized healthcare professionals. Federal law restricts this device to sale by or on the order of a licensed physician.



Never use this device in a potentially explosive environment where volatile solvents (alcohol, petrol, etc.) or flammable anesthetics are in use.



Connect the equipment to properly powered outlets. The entire electrical system in the room or building where your slit lamp is located should conform to IEC and/or local government regulations.

Disconnect the equipment from AC power before servicing and/or cleaning.

Never touch the cable and main power supply system with **wet or damp** hands.

Before any cleaning of the instrument or the base unit insure that the power lead is disconnected.



LED fixtures can reach high temperatures during use – allow ample time to cool before handling any potentially hot surface.

## Safety Standards

The FDA and CE marks on the **IBEX Wireless LED Binocular Indirect Ophthalmoscope** indicates that it has been tested to meet and/or exceed the U.S. Department of Health and Human Services, Food and Drug Administration Guidance for Slit Lamp Optical Equivalency and Radiation Safety, International Standards within the 93/42/EEC Medical Device Directive and Electrical Safety.



The optical radiation emissions from the slit lamp do not exceed the Threshold Limit Values (TLVs) for optical radiation, as established by the American Conference of Governmental Industrial Hygienists (ACGIH) under worst case clinical exposure conditions and times for ultraviolet and infrared radiation, and visible and near infrared radiation including blue light and aphakic hazards.

It is recommended that the intensity of the light directed into the patient's eye be limited to the minimum level necessary for diagnosis. **IBEX Wireless LED Binocular Indirect Ophthalmoscopes are equipped with protective filters that eliminate UV radiation and short wavelength blue light.** Children, infants, aphakes and any person with diseased eyes may be at greater risk. The risk may also be increased if the person being examined has had any exposure with the same instrument or any other ophthalmic instrument using a visible light source during the previous 24 hours. This will apply particularly if the eye has been exposed to retinal photography.

The **IBEX Wireless LED Binocular Indirect Ophthalmoscope** is manufactured under strict quality manufacturing systems and certifications as established by ISO 9001:2008 and ISO 13485:2012. These systems encompass materials, processes, assembly and packaging.

## Standards Compliance

**IBEX Wireless LED Binocular Indirect Ophthalmoscope** development, production, testing, set-up, maintenance and repair is compatible with IEC 60601-1 (electrical safety), IEC 60601-1-2 (electromagnetic compatibility), EN ISO 15004-2 (optical radiation safety). In addition, **IBEX Wireless LED Binocular Indirect Ophthalmoscopes** are compliant with the Directive 93/42/EEC as confirmed by the CE marking.

This device meets all the requirements for electromagnetic compatibility according to IEC 60601-1-2. This device is built so that the generation and emission of electromagnetic interference is limited to the extent that other devices are not disturbed in their use in accordance with the regulation and so that the slit lamp itself has appropriate immunity to electromagnetic interference.

This device is designed to comply with the following safety aspects.

Leakage current is less than 0.5mA in normal condition.

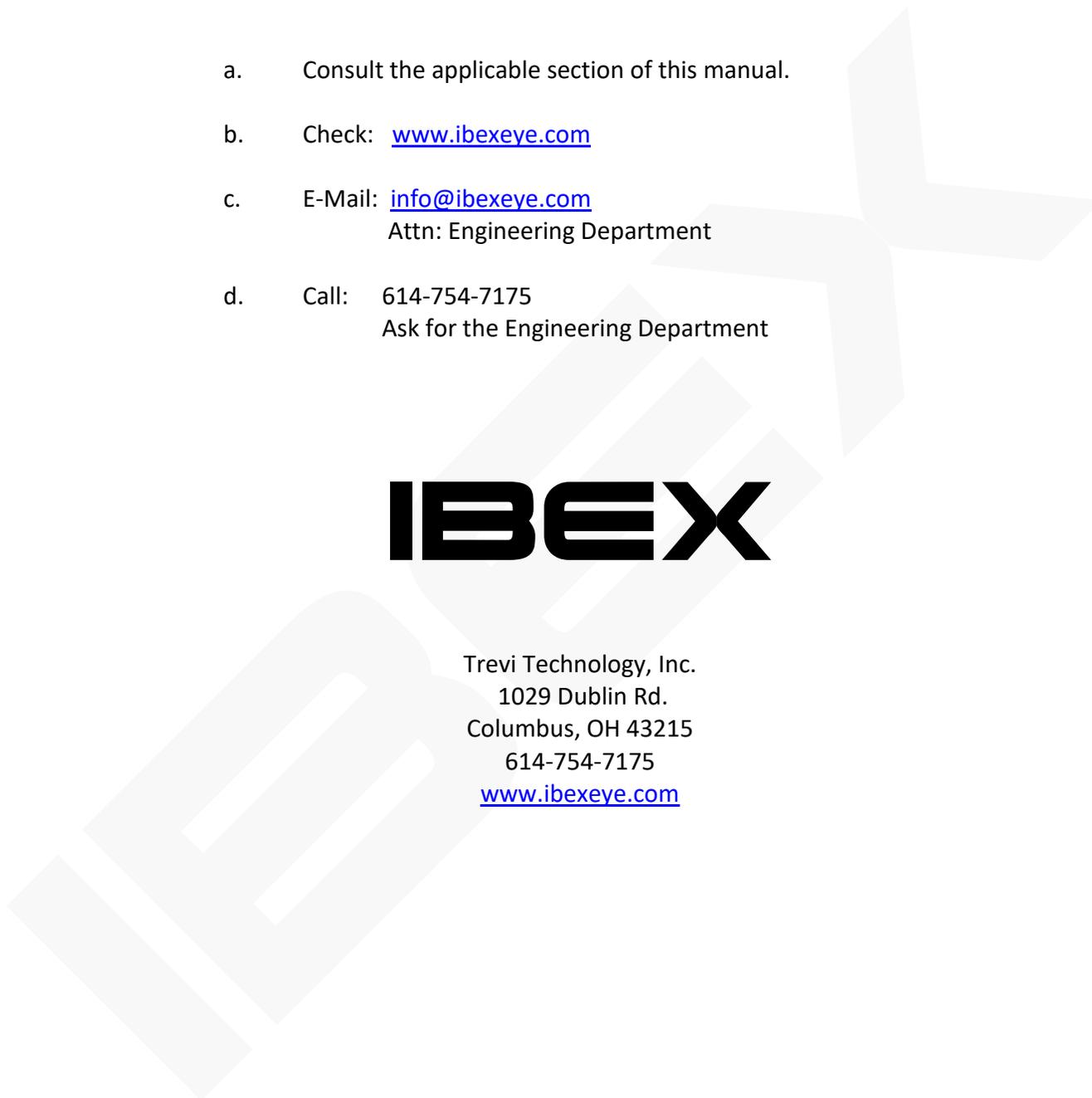
Leakage current is less than 1.0mA in a single fault condition.

Isolation voltage between ground and main wires is greater than 1500V.

## Contact Information

If for some reason your, **IBEX Wireless LED Binocular Indirect Ophthalmoscope** does not perform properly or you incur a problem with the instrument:

- a. Consult the applicable section of this manual.
- b. Check: [www.ibexeye.com](http://www.ibexeye.com)
- c. E-Mail: [info@ibexeye.com](mailto:info@ibexeye.com)  
Attn: Engineering Department
- d. Call: 614-754-7175  
Ask for the Engineering Department



# IBEX

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