Reference and Instruction Manual

Optec® 6500 Vision Tester

Optec is a registered trademark of Stereo Optical Co., Inc.
Introduction

Congratulations! You have just received the most sophisticated and state of the art vision testing system on the market today!

The model 6500 is a precision vision testing device that can be used as a clinical testing device or used for vision testing for research and clinical trials. The 6500's precision illumination is continually controlled by a microprocessor for accuracy and repeatability of the tests. The exclusive LED (light emitting diode) system allows complete homogenous illumination that eliminates hot spots on testing slides, which can create inaccuracies of test results.

The instrument was designed to do quick, accurate, reliable and confidential testing. Please take a few moments to familiarize yourself with the model 6500.
External Features

1. Forehead Activator: Controls illumination inside the Vision Tester. It will only activate the lights when the subject maintains pressure against the activator, insuring the subject to be at a proper distance for testing. When forehead pressure is applied to the bar, the green "Ready" indicator will be illuminated on the control panel and the subject will be ready to be tested.

2. Headrest Tissue: The tissue cushions the subject's forehead while allowing maximum hygienic conditions.

3. Lens System: The upper lenses are for FAR Point testing (simulated distance of 20 ft.) as the subject looks straight ahead. The lower lenses are for NEAR Point testing (simulated distance of 16 in.) with the subject looking down while holding his/her head straight. The lenses are easily accessible for cleaning and the faceplate is wide enough to accommodate wide contemporary eyeglass frames.

4. Instrument Base: It gives a stable foundation for the vision tester in all positions.

5. Elevation Adjustment: Simply depress the button in the base and adjust the instrument to the desired height for each subject. Release button and the instrument is locked in place.

6. Observation Doors: Located on both sides of the instrument, allow the tester easy access to both FAR and NEAR test slides. A pointer can be used by the tester to assist the subject in identifying the targets. The pointer is held in place by clips inside the door. The doors are held closed with magnets.

7. FAR and NEAR Indicators: Located on both sides of the instrument. These lights indicate whether the instrument is set for a FAR test, or a NEAR test.

8. Test Dial and Knob: Located on both sides of the instrument, is used to indicate a change in position of the slides in the viewing area. The numbers on the dial correspond to the numbers on the record form for identifying the test slide. The number under the lit indicator is the number of the test in the viewing area. On the 6500 (motor-driven) Vision Tester, this small knob should not be used. All slides should be advanced from buttons on the remote control panel.

9. Electronic Control Panel: Operates the functions of the vision tester, power switch, Right and Left eye switches, Near/Far switches, Day/Night switches, Glare switch, and the Peripheral test controls.

10. Instrument Body: The Instrument Body is lightweight and is made of flame retardant ABS plastic.

11. Carrying Handle: Built-in for maximum convenience. The rigid handle and lightweight body aid in ease of portability.

12. Ancillary Lens Holder: See page 10 for intermediate lens details

The serial number is located on the inside of the right side observation door and underneath the instrument.
1 Forehead Activator
2 Headrest Tissue Holder
3 Lens System
4 Instrument Base
5 Elevation Adjustment
6 Observation Door
7 Far and Near Indicators
8 Test Dial & Knob
9 Receptacle for powercord and control panel
10 Instrument Body
11 Carrying Handle
12 Ancillary Lens Holder
13 On/Off Button
Internal Features

An advanced Day and Night lighting system renders a white homogenous light, resulting in high contrast images and truer color reproduction.

The microprocessor controlled homogenous illumination system assures accurate and repeatable testing results.

Front surface mirror offers a ghost-free image for more accurate testing of distance vision. The model 6500 also includes glare system for use in both Day and Night testing conditions.

Up to 12 test slides can be mounted on a rotatable drum and can easily be removed or replaced in seconds.

Stereo Optical's slides are manufactured from a high-resolution photographic film mounted between 2 layers of glass. The high resolution (500/line pairs/mm) affords a much finer acuity level for more accurate testing.

Stereo Optical's slides are transilluminated to eliminate glare and reflection. The result is a more accurate image, therefore a more accurate test.
Advanced Design Control Panel

The control panel is designed for convenience in both operation and maintenance. The figure on page 6 shows the control panel for the Model 6500.

**Right Eye:**
When the Right eye switch is ON, the right eye will see the test target. When the switch is turned OFF, the right eye will see nothing. To turn switch ON, depress; to turn OFF, press again. The forehead activator must be depressed in order to see the test target.

**Left Eye:**
When the Left eye switch is ON, the left eye will see the test target. When the switch is turned OFF, the left eye will see nothing. To turn switch ON, depress; to turn switch OFF, press again. The forehead activator must be depressed in order to see the test target.

**Binocular:**
When both Left eye and Right eye are activated, a binocular test is being performed. Day or Night can be used for either monocular or binocular tests. Glare can be used for binocular or monocular testing and Day or Night conditions. The forehead activator must be depressed to see targets.

**Far/Near Switch:**
When the FAR switch is illuminated, the unit is set for FAR point testing. The FAR testing distance simulated in the instrument is 20 feet. When the NEAR switch is illuminated, the unit is set for NEAR point testing. The NEAR testing distance simulated in the instrument is 16 inches. Cycle the test appropriately to achieve the test you desire according to the Near and Far indicators.

**Power Switch:**
Master On/Off power is located on the back of the instrument. Press the rocker switch to the right to turn the instrument ON. A green indicator light will illuminate when the instrument has been turned on. Press the rocker switch to the left to turn the instrument OFF. The green indicator light will turn off.

**Ready Light:**
Green light indicates that the subject is pressing against headrest activator and is at proper testing distance.

**Perimeter Switches:**
Model 6500 Vision tester with perimeter. The perimeter function is to test the lateral (horizontal) visual field. Four switches pertain to peripheral vision testing. All are momentary switches; they stay on only if pressure is applied.

45° nasal 70° temporal
55° temporal 85° temporal
The same switches are used for both monocular (Right or Left eye only) and binocular testing (Right & Left eye together). Depress the eye selector for the eye(s) to be tested.

**Forward and Reverse Switches:**
These switches determine direction of the slide advancement. Pressing this switch once advances test slides one at a time. Holding this switch down allows for continual advancement of the test slides until the desired slide is in the correct position.

![Model 6500 Control Panel Image]
Vision Testing--The Right Way

It is important to be comfortable with your new vision tester. Start by looking into the instrument and note what happens when the eye switches are ON and OFF. Experiment with viewing FAR point slides at NEAR point and vice versa by dialing through all 12 slides. First, view all slides in the FAR point mode, and then repeat in the NEAR mode. Note that FAR test slides viewed at NEAR are upside-down, as are the NEAR test slides viewed at FAR. It is important to recognize whatever the subject may be describing and be able to answer any questions. Concentrate on acquiring a smooth delivery of instruction and description of the test target, as well as confidence in handling the instrument. The tester's administrative expertise can help relax the subject, achieve cooperation, and attain a more accurate response.

When speaking to the subject, never act surprised or provoked by their response or lack of response. Give the subject every opportunity to demonstrate his/her best vision.

If the subject normally wears glasses or contact lenses, he/she should wear them during the testing to determine whether or not his/her prescription is still adequate.

Select a table or counter of convenient height with sufficient surface space for the instrument and the recording of these results. Normal room lighting is acceptable, but care should be taken to avoid light shining on the lenses or on the subject's face.

IMPORTANT CHECKPOINTS:

- Be certain the instrument is plugged into a 110V to 220V AC or 240 V to DC power + 24V outlet.

- Adjust instrument to proper height for subject's comfort by depressing button on base and moving the housing.

- Push power switch on back of instrument to activate the instrument.

- Tear off headrest tissue, so a clean tissue is ready for the subject.

- Be certain the subject presses their forehead against the headrest activator so the illumination in the unit is activated and the GREEN "READY" indicator on the control panel is lit.

- Be certain the subject is comfortable.

- Be certain to have a clean record form and a scoring marker.

*You are now ready to test.*
Model 6500 Peripheral Test

This is a test of peripheral vision on the horizontal plane. The lights will flash at 55°, 70°, and 85° temporally and approximately 45° nasally, for a total possible approximate 130° of arc for each eye to be attained. (Highest temporal reading plus nasal reading.)

Caution should be taken because the temples of eyeglass frames could interfere with this test. The test should be taken with eyeglasses on and again with the glasses off to determine if the frame interferes with peripheral vision.

To administer the test:
1. FAR Switch Illuminated
2. RIGHT Eye switch illuminated
3. LEFT Eye switch OFF
4. Dial at #1 (Yellow) Indicator

The subject should look straight ahead, through the FAR lens system, with his/her forehead against the headrest activator. Ask the subject to look at slide #1. Then ask the test subject to point in the direction of the light. The test administrator will then press one of the four switches on the upper right section of the control panel. The switches can be pressed in any order and should be held down for two or three seconds. Repeat the test with the left eye by turning the RIGHT occluder OFF and the LEFT occluder ON.

NOTE: This test can be administered to a person with vision in only one eye. In this case, the nasal test becomes very important because it will determine if there is peripheral vision on the blind side.
Maintenance of your Model 6500 Vision Tester

Stereo Optical's model 6500 Vision Tester is designed to minimize maintenance. All bearings and internal mechanisms have been sealed at the factory. It has been engineered and built for a lifetime of use. The only annual maintenance required is simple and does not necessitate a service call.

The only components requiring occasional maintenance are:

**Eyepiece Lenses:** The external side of these lenses need to be cleaned occasionally. Care should be taken not to use any abrasive material on the lenses. Use the cleaner supplied with the Vision Tester, or plain soap and water can be substituted. It is important to dry the lenses with a soft, lint-free cloth.

**Replacement of the Slides:** The slide drum assembly holds up to 12 slides and can be easily accessed through the door located above the power switch. To replace a slide, rotate the dial until the number of the slide to be removed is under the YELLOW indicator. Open rear door, remove slide on top of drum by rotating clips toward each other until they clear the slide. Remove unwanted slide. Insert new slide with label showing and arrow pointing into the instrument; return spring clips to their former positions to secure slide. Close the rear door and you are again ready for operation.

**Cleaning of Slides:** Open the rear door. Use a damp, soft, lint-free cloth with lens cleaner and wipe the slide. Turn the dial and go on to the next slide repeating the same procedure. Note: Always unplug the tester before opening the back door and accessing the slides.

**Control Panel Removal:** The panel is designed with reliable solid state components. The modular design allows quick segmentation from the rest of the instrument. If a problem is diagnosed here, contact Stereo Optical's repair department at 1-800-344-9500, or in Illinois at 1-773-777-2869.

**Exterior:** The plastic, which composes the instrument body and base, is similar to your telephone and can be cleaned in the same manner. Use damp, clean cloth and a mild detergent. A dust cover is provided for dust protection and to discourage tampering when instrument is not in use. The 8 foot power cord can also be disconnected to discourage tampering.

**Inside Mirror:** Behind the rear door you will find a front-surface mirror. Handle the mirror with care and avoid placing fingers on its surface. We recommend using the cleaner supplied with the instrument along with a damp, soft, lint-free cloth. DO NOT TAMPER WITH THE FOUR SCREWS INSIDE THE REAR DOOR. The mirror has been carefully aligned to achieve precise light reflections and any tampering will require factory adjustment.
Accessories and Supplies Available

Slides:  Black and White
        Color
        Special

Reference & Training Manual: F.A.C.T.® (Contrast Test Slides)
                               Custom

Record Forms: F.A.C.T.®          50 sheets per pad    10 pads per package
              Custom          50 sheets per pad    10 pads per package

Headrest Tissue - 50 sheets per pad          100 pads per package

Dust Cover

Pointer:  6 per package

Power Cord

Lens Cleaner - 2 oz. bottle

Plus Lenses:  plus 1.75 D
             plus 2.25 D

Intermediate Lenses:  Set of 5


  Lens #1  39.25 in.   100 centimeters
  Lens #2  31.48 in.   80 centimeters
  Lens #3  26.23 in.   66.7 centimeters
  Lens #4  22.49 in.   57.1 centimeters
  Lens #5  19.68 in.   50 centimeters

EyeView® Software:  Requires PC Platform (Macintosh not currently supported), with 486
                    DX/66MHz or higher processor.  Windows 95 or higher.  VGA color monitor.  CD-ROM or DVD-ROM
                    drive.

F.A.C.T., is a registered trademark of Stereo Optical Company, Inc.  EyeView, Contrast Vision Test developed by Arthur P. Ginsburg, Ph, D. Licensed under US Patent #4, 365, 873 & 5,414,
Accessory Kit
(supplied with the instrument)

Reference and Instruction Manual .................................................................1
(including slide descriptions)

Scoring Pad ....................................................................................................1 pad of 50 sheets

Headrest Tissue .............................................................................................10 pads of 50 sheets

Dust Cover ......................................................................................................1

Pointer ............................................................................................................1

Lens Cleaner ...................................................................................................1 bottle (2 oz.)

Power Cord ...................................................................................................1
Glossary

Accommodation:
The ability of the eye to refocus from one distance to another.

Acuity:
Clearness or sharpness of images.

Amblyopia:
Also referred to as lazy eye, loss of sight in one eye.

Astigmatism:
A mis-shaping of the eye that prevents light rays from coming to a single focus on the back of the eye.

Binocular:
Ability to use both eyes simultaneously to focus on the same object and to fuse two images into a single image.

Candela:
The standard unit of luminous intensity. Illumination of target slide represented in cd/m².

Cataract:
Opacity of the crystalline lens.

Color Deficiency:
Diminished ability to perceive differences in certain colors.

Contact Lens:
The thin shell of plastic which rests directly on the tear film of the cornea and corrects refractive error.

Convergence:
Turning the two eyes inward to see a nearby object.

Cornea:
The clear transparent covering on the front of the eye.

Dark Adaptation:
The process by which an eye adjusts to decreased illumination and becomes more sensitive to light.

Depth Perception:
The ability to judge distance of objects from each other or from the observer.

Diopter:
A measurement of optical power of lenses.

Diplopia:
Double vision.
Divergence:
The process of directing two eyes from a near point to a far point.

Esophoria:
The tendency of the eye to pull inward on the horizontal plane.

Exophoria:
The tendency of the eye to pull outward on the horizontal plane.

Far Point:
Twenty feet to infinity.

Fixation:
Directing the eye so the image centers on the fovea.

Focus:
The point at which light rays will come together after passing through a lens.

Fusion:
Power of coordination by which images received by two eyes become a single image.

Hyperopia:
Farsightedness, the images focus behind the retina.

Hyperphoria:
When either eye has a tendency to pull up on the vertical plane.

Intermediate Vision:
Vision which focuses at some point beyond 16 inches or 40.64 centimeters (Near Point) and less than 20 feet or 6 meters (Far Point).

LUX:
The unit for measuring glare.

Malingering:
A person who pretends to have a vision problem.

Mesopic:
Pertaining to illumination between the photopic and scotopic ranges.

Monocular:
Seeing with only one eye.

Muscle Balance:
The coordination of muscles allowing two eyes to work together on the vertical and lateral planes.
Myopia:
Nearsightedness; has problem seeing at a distance; images focus in front of the retina.

Near Point:
16 inches or 40.64 centimeters.

Occlusion:
Obscuring the vision of an eye.

Orthophoria:
Expected or normal teamwork of the eyes.

Peripheral Vision:
Ability to perceive the presence, motion, or color of objects outside the direct line of vision.

Phoria:
Root word denoting a latent deviation in which the eyes have a constant tendency to turn from the normal position for binocular vision.

Photopic:
Vision under bright lighting levels.

Potential Acuity:
A quick assessment of macular function in cataract patients and documents that surgery is expected to improve visual performance.

Presbyopia:
Loss of accommodation so it is difficult to focus on near objects.

Refraction:
The bending of the rays of light. Sometimes used to refer to an examination for glasses or contact lenses.

Scotopic:
Vision at low light levels.

Stereopsis:
The ability to perceive depth.

Strabismus:
A muscle imbalance. Eyes turn inward or outward.

Suppression:
The non-use of vision in one eye.

Vision:
The ability to see and to interpret what is seen.

Visual Acuity:
Vision of an eye or eyes.
Safety Aspects

Use this device properly and safely.

BEFORE USE OR MAINTENANCE, READ THIS MANUAL.

This operator's manual contains information necessary for the operation of the OPTEC® VisionTester. This manual includes operating procedures, safety precautions, and specifications. IEC standards are applied in this manual.

Safety Precautions

In this manual, a signal word is used to designate the degree or level of safety alerting. The definitions are as follows.

CAUTION Indicates a potentially hazardous situation which, if not avoided, may result in injury or property damage.

Even situations indicated by "CAUTION" may result in serious injury under certain conditions. Safety precautions must be strictly followed at all times.

Handling Precautions

Before use of instrument

CAUTION

- Do not use the device for other than its intended purpose.

- STEROE OPTICAL CO., INC. will assume no responsibility for accident or malfunction caused by improper use.

- Never modify or touch the internal structure of the device.

- Electric shock or malfunction may result from any modification made to the instrument.

- There are no user-serviceable parts inside the device.
-Verify that the following specified environmental conditions for installation are met. In addition, verify that usage area meets the following conditions:

Humidity 30% to 75%
No large amount of dust is contained in the air
Subdued ambient light
Locate instrument in a place free from vibration or impact
Locate instrument on a stable surface

-Be sure that a power outlet meets the power requirements.

-If the supplied voltage is too high or low, the device may not deliver full performance and malfunction, or fire may result.

-Be sure to use the power supply that came with the device. Using any adapter other than the supplied one may result in malfunction, or may void the warranty.

-Do not use an extension cord when supplying the device with the power.

-Be sure to connect using a grounded outlet. Electrical shock or fire may result in event of malfunction or electrical leakage.

-Never crush or pinch the power cord with heavy objects. Damage may result in electrical shock or fire.

-Before connecting cables to the device turn the instrument OFF and disconnect the power cord of the power supply from the power outlet.

Usage Precautions

CAUTION

The device has been tested and found to comply with the limits for the medical devices to the IEC 60601-1-2 and EN55011. These limits are designed to provide reasonable protection against harmful interference in a typical medical installation. This device generates, uses and can radiate radio frequency energy. If not installed and used in accordance with the instructions, may cause harmful interference to other devices in the vicinity. However, there is no guarantee that the interference to other devices, which can be determined by turning the device off and on, is caused by this instrument. The user is encouraged to try to correct the interference by one or more of the following measures:

-Reorient or relocate the receiving device.

-Increase the separation between the instrument and receiving device.

-Connect the device into an outlet on a circuit different from that which was previously used.
- Consult STEREO OPTICAL CO., INC. for help.

- Connect the cable to the interface connector securely, maintaining the correct orientation of the connector to the cable.

- Proper data communication with an external computer will not perform if the internal wires of the power cord are exposed, power to the device is interrupted by moving the cord, or the plug or cord becomes extremely hot. This indicates that the cord is damaged. Immediately replace the power cord.

- In case of malfunction, immediately unplug from the power outlet and contact STEREO OPTICAL CO., INC. or your authorized distributor for replacement; otherwise, electric shock or fire may result.

- In the event that a strange odor or smoke is noticed coming from the device, turn it off and unplug the power cord immediately. After confirming that the odor or smoke is no longer being produced, contact STEREO OPTICAL CO., INC. or you authorized distributor. Continued use may result in electric shock or fire.
Maintenance

CAUTION

-Only service technicians trained properly by STEREO OPTICAL CO., INC. may service the device. STEREO OPTICAL CO., INC. assumes no responsibility for accidents resulting from improper servicing.

-There are no user-serviceable parts inside the device.

-All returns must have a Return Material Authorization number.

Disposal

-Follow local governing ordinances and recycling plans regarding disposal or recycling of device components. It is recommended to commission the disposal to a designated industrial waste disposal contractor.

-When disposing of packing materials, sort them by material and follow local governing ordinances and recycling plans.

Before use: Device Description

Power Supply

Special adapter that converts the AC power to 110V to 220V or 240 V to DC power + 24V.

Labels and indications on the device

Warning labels and indications are affixed on the device. If the labels are removed, contact STEREO OPTICAL or your authorized distributor.
**Maintenance**

**Troubleshooting**

In the event that the device does not work properly, correct the problem according to the following table before contacting STEREO OPTICAL CO., INC. or your authorized distributor.

Suggested action:
If the device will not work at all:
- Make sure that the power cord is connected properly.
- Make sure that the power supply cord is connected properly. Make sure that the voltage applied to the power outlet is within the specified range.

Contact STEREO OPTICAL CO., INC. or your authorized distributor if the above suggestions do not eliminate the corresponding problem.

**Cleaning**

When the cover or panels of the device becomes soiled, wipe with a soft cloth. For stubborn soiling, immerse the cloth in a neutral detergent diluted with water, wring it well, and wipe. Finally wipe with a dry, soft cloth.

**CAUTION**

- Never use an organic solvent such as paint thinner. The surface of the device may be damaged.

- Never use a sponge or cloth containing excessive moisture to wipe the device. The water may leak into the inside of the device and cause device malfunction.
Specifications and Classifications

Classifications

[Classification under the provision of 93/42/EEC (MDD)] Class I
The Vision Tester is classified as a Class I

[Type of protection against electric shock]
The Vision Tester is classified as Class I

A Class I is a device in which the protection against electric shock does not rely on basic insulation only, but which includes an additional safety precaution in such a way that means are provided for the connection of the device to the protective (ground) conductor in the fixed wiring of the installation in such a way that accessible metal parts cannot become live in the event of a failure in the basic insulation.

[Degree of protection against electrical shock] Type B Applied Part
The Vision Tester is classified as a device with a Type B Applied Part.
A Type B Applied Part provides a particular degree of protection against electrical shock, particularly regarding the following:
- allowable leakage currents
- reliability of the protective earth connection (if applicable)

[Degree of protection against the entrance of liquid] IP20 *1
The Vision Tester is classified as an ordinary device without protection against liquid intrusion. Avoid exposing water or other liquid to the device.
Notes: