

Instruction Manual 737-268

Vision Screening with Keystone View VS-V GT Medical Model # 1160/821-618



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IMPORTANT NOTICE: The instrument is held closed by a magnetic latch. To free the latch, place thumbs on the top edge of the base on each side and fingers under the edge of the metal housing of the screener. Pull up. (See illustration).
DO NOT LIFT UP ON BLACK EYESHIELD ASSEMBLY.

The *KEYSTONE VIEW* VS-V GT Medical Instruments: Features and Capabilities

The *KEYSTONE VIEW* VS-V GT Medical uses the popular acuity, color, phoria and stereopsis test combination and adds to it the glare and contrast sensitivity testing suitable for glaucoma and cataract indicators.

Nine tests evaluate seven important visual functions. The series can be completed in only 3-5 minutes.

The *KEYSTONE VIEW* VS-V GT Medical instrument evaluates the following areas of visual function:

- **Acuity** – Screens the fineness of visual discrimination of the right and left eyes separately and together at far point—20 feet/6m, intermediate— 26"/66 cm, and near point— 40"/1m
- **Color vision** – Tests for severe (red/green) and/or mild (blue/violet) color blindness existence
- **Horizontal peripheral visual field test** – Looks for “tunnel vision” – a grossly-restricted peripheral vision field.
- **Phoria** – Checks eye muscle balance and coordination needed for efficient binocular (both eyes together) vision
- **Stereopsis**— Measures depth perception due solely to the coordinated use of the eyes
- **Contrast sensitivity** – Evaluates the ability to see details when their luminance level does not vary much from the luminance level of the environment surrounding them
- **Glare recovery** – Examines the subject's ability to first adapt to decreased illumination and then to recover rapidly from exposure to glare

Note 1: Glare recovery — the ability of the eyes to quickly re-adapt to darkness after encountering a sudden bright light

Note 2: No official standards have been set for contrast sensitivity or glare recovery testing.

Note 2: These contrast sensitivity and glare recovery tests have been used by various persons and/or organizations for the “dark

KEYSTONE VIEW VS-V GT Medical Screening

With the introduction of this instrument, vision screening became even more complete and convenient than in the past due to the addition of contrast sensitivity and glare recovery testing.

Eight stereoscopic targets and long-life LED lamps provide tests for seven visual functions: acuity, phoria, depth perception, color perception, horizontal visual fields, contrast sensitivity and glare recovery.

Binocular screening is a significant feature on this instrument. Certain tests designed to check the acuity of one eye are given with both eyes open. This design format models the natural use of the eyes in an everyday environment. The technique may also disclose suppression (blocking of vision) in one eye, a condition that cannot be detected when one eye is simply occluded during tests such as the wall chart technique.

General Screening Procedure

The screening process is extremely easy to administer. All tests are operated using the *Keystone* Elliptech hand control or *Keystone* Visionary software. It is quick and comfortable for all ages. The total screening series can be given in under five minutes.

The subject sits or stands before the instrument with her/his face leaning into the viewing head, with or without glasses. The examiner explains the targets and the subject reports what s/he sees. The subject responses are noted on the *Keystone View* Record Form 5572/737-267 or on the *Keystone* Visionary Software program.

Screening Significance

Keystone Views instruments and screening programs are not intended to provide detailed diagnostic data, but are meant to be used as a general measure of an examinee's binocular visual skills. *Keystone's* eighty-plus years of vision screening (also referred to as “testing”) leadership ensures accurate and dependable testing of those skills. All tests are time-proven and given under standardized conditions. Should an examinee fail any part of the screening, referral to a vision specialist is recommended.

About the Screening Instrument

The *KEYSTONE VIEW* VS-V GT Medical is designed for standardized and confidential testing. Targets are enclosed in the unit so subjects cannot see or study them in advance. Internal target illumination ensures consistency of viewing conditions, and the unit pivots through a 63-degree arc to adjust to the eye level of any subject.

The *KEYSTONE VIEW* VS-V GT Medical is compact and completely self-contained at only 10 inches (25 cm) wide, 15 ½ inches (39 cm) long and 7 inches (17 cm) tall. A magnetic catch holds the unit closed when not in use. The total weight is less than 11 pounds (5 kg). The *KEYSTONE VIEW* VS-V GT Medical operates from a standard 110 or 220 volt a.c. power supply..



1. **Headrest:** Accommodates a wide variety of eyeglass frames. During testing, the subject's forehead should rest lightly against this specially-designed strip.
2. **Peripheral vision test:** Horizontal peripheral vision fields are measured using light-emitting diode target lamps, positioned between the lenses and recessed in the temple areas of the viewing head. **Caution:** Some wide eyeglass stems may block the lit diodes! In such circumstances, repeat the test without the glasses.
3. **Keystone View Elliptech Control unit:** By pressing appropriate selectors, the examiner can advance or reverse the test targets, occlude either of the subject's eyes, and control target illumination. Designed for hand-held or desk-top operation.
4. **Power Switch:** The off-on power control is located on the rear of the instrument.
5. **Power Supply:** To eliminate electrical and heat hazards, power is converted to 12 Volts DC. To ensure safe operation of the equipment, the instrument must only be used with the transformer supplied by the manufacturer. Use of any other transformer not approved by the manufacturer could result in safety problems.

PART NUMBER: 818-470 INPUT: 110/220 VAC-50/60 Hz OUTPUT: 12 VDC-.83A

The Class II symbol on the transformer label indicates that the transformer not only relies upon basic insulation to protect against electric shock, but includes *double* insulation as an additional safety precaution.

Recommended Environment: Operating temperature: 0° to 40°C / Storage temperature: -20° to 70°C

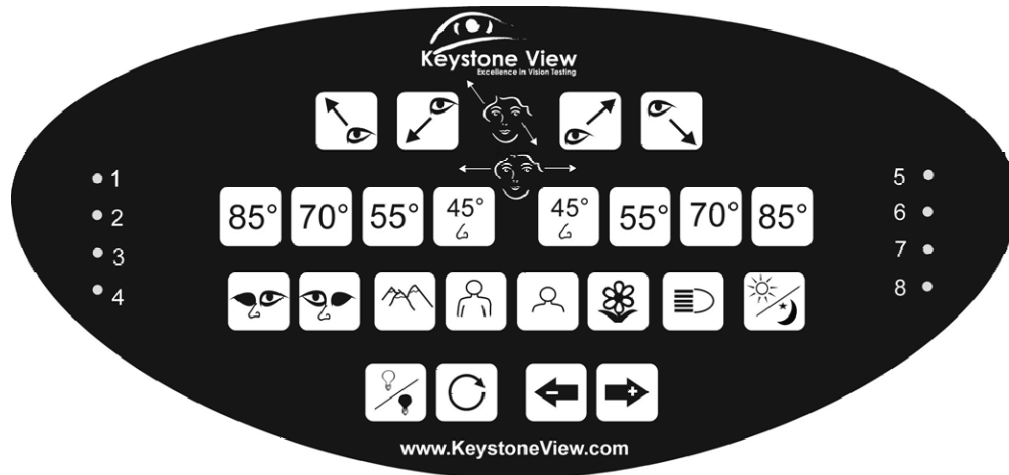


Type B Device




In accordance with
Directive 93/42/EEC


Keystone View Elliptech Control Unit





1-8 Lists stereo tests. A lamp next to each test label indicates the target being presented.


85° Illuminates horizontal peripheral vision target lamps. A signal lamp indicates the eye and angle being tested.


 Illuminates vertical peripheral vision target lamps. A signal lamp indicates the eye being tested.


 Occludes (darkens) left eye.


 Occludes (darkens) right eye.


 Far point (20').


 Intermediate 1 Distance (26").


 Intermediate 2 Distance (39").

 Near point (16").


 Activates glare lighting.

 Activates reduced illumination/night vision conditions.

 Head Sensor override allows operation of the machine without an examinee's head activating the sensor.

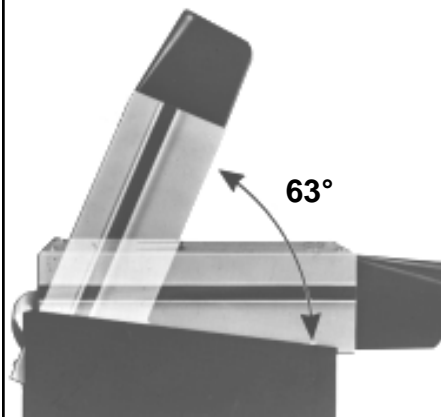
 Resets drum, lights and lenses to original setting.

 Reverse to previous stereo target.

 Advance to next stereo target.



Target drum and illumination lamps are readily accessible by removing the top cover of the case. The drum accommodates eight permanently-mounted stereoscopic targets. Client drum removal is not recommended



The *KEYSTONE VIEW VS-V GT Medical* adjusts effortlessly to the eye level of any test subject. It pivots through a 63° arc with free floating action fully controlled by the subject. When not in use a magnetic catch holds the unit closed.

A convenient storage area, accessible from the rear, is built into the base of the instrument. The instruction manual and extra record forms may be stored here when the *KEYSTONE VIEW VS-V GT Medical* is not in use.

Accessible on the rear panel of the *KEYSTONE VIEW VS-V GT Medical* is the:

- main power switch "on/off"
- USB connection port
- main power receptacle

Screening Preparation and Administration

The Screening Area Note: Throughout this manual, the terms “screen(ing)” and “test(ing)” are used synonymously.

KEYSTONE VIEW VS-V GT Medical testing should be given in a reasonably quiet area to avoid distractions and interruptions that may interfere with the accuracy or speed of the examinations. Subjects should be admitted from the waiting area into the test area one at a time to prevent those subjects who are waiting from overhearing spoken comments or remarks that could impact the validity of their examinations.

Position the *KEYSTONE VIEW* VS-V GT Medical unit near the edge of the table or counter at a height that allows for a comfortable 3-5 minutes of testing. The examiner can stand or sit anywhere that provides a comfortable and sufficient working space in the immediate vicinity of the subject.

Equipment Readiness

At the beginning of the work day, dust the *KEYSTONE VIEW* VS-V GT Medical housing and lenses with a soft, alcohol and water or white vinegar and water-dampened cloth *(never spray any liquid directly on any part of the instrument)*, and examine the unit using the following checklist:

- Is the unit transformer connected to a standard a.c. outlet? Do both target illumination lamps light up when the power switch is turned on?
- Do the horizontal field target (peripheral) lamps light up when the appropriate selectors on the control panel or software are pressed?
- Does the appropriate target illumination lamp go out when each of the “occlude” selectors is selected?
- Do the illumination lights on both targets dim when the night vision selector is pressed?
- Do the glare recovery lights illuminate when the appropriate selector is activated on the *Keystone* Elliptech hand control unit and when night vision is activated?

Points regarding the subject

Good posture is essential for accurate test results. The strain of standing in an uncomfortable position may cause a subject to be distracted during the exam. The subject's forehead should rest comfortably against the headrest throughout the examination without pulling back or away from the instrument between individual tests or tilting the head to the side. The subject can directly control adjustment of the height and angle of the *KEYSTONE VIEW* VS-V GT Medical during the exam and may feel more comfortable grasping the side of the unit with one or both hands while her/his elbows rest on the desk or counter.

If the subject normally wears glasses or contact lenses while driving, these should be worn during the examination. If corrective lenses are only worn for reading, they should be removed for distance screening and worn only for the near point test targets.

Caution: Some wide eyeglass stems may block the lit diodes! In such circumstances, repeat the test without the glasses.

Conducting The Screening

Screening Guide

The examiner administers all test operations through the push-selector remote *Keystone* Elliptech control unit or the *Keystone* Visionary-Software program. After the examiner briefly explains the purpose of each test (see “Screening Procedure”), the subject reports what s/he sees, and the examiner records these answers using the *KEYSTONE VIEW* VS-V GT Medical record forms or the *Keystone Visionary* software program.

The *KEYSTONE VIEW* VS-V GT Medical is designed to conduct driver vision testing in a standardized and sequential fashion to ensure consistent results. However, a subject's visual skills rating can be significantly impacted by the attitude of the examiner. The examiner's role is to evoke the most accurate testing responses possible from the subject:

- Record basic subject identification information before beginning the series of vision tests
- Encourage the subject to be as frank as possible in telling what s/he sees
- During testing, keep conversation to a minimum to avoid unconsciously leading the subject into a certain kind of response
- Acknowledge each response but do not indicate approval or disapproval

Note: Subjects with vision problems might exhibit slower test responses. Be sure to allow her/him sufficient time to respond.

Screening Procedure

Note: (1) If you are using the *Keystone Visionary Software* program, please disregard the “*KEYSTONE VIEW VS-V GT Medical*” instructions below unless otherwise noted. (2) The words “Screen(ing)” and “test(ing)” are used synonymously in this manual

Tests 1, 2 and 3: Acuity

To test acuity (fineness of visual discrimination), blocks of digits are presented for identification by the subject testing the right eye (Test 1) and the left eye (Test 2) and both eyes together (Test 3). Test 1 screens the acuity of the right eye while the left eye is open and seeing. Test 2 similarly tests the acuity of the left eye while the right eye is open and seeing. All tests are at far point (20 feet, 6m) and results are calibrated at values from 20/200 (6/60) to 20/20 (6/6). All three acuity targets employ Sloan-type numerals without serifs.

At least five of the six numbers must be read in the number block of Line 2, Column A of Tests 1, 2, and 3. The passing standard is 20/40 for each eye separately and both eyes together. This standard corresponds to most U.S. government and/or licensing agency requirements. Business and industry may have more strict requirements to consider.

The subject may report that no boxes or numbers are seen. This may indicate the existence of a visual suppression. When a certain stress level is reached in the lack of binocular co-ordination, one eye simply lets the other work alone and with comfort. The existence of suppression is important because it reliably indicates some other binocular vision problem. Cases of suppression mandate immediate referral to a vision professional.

Far Point Right Eye: Acuity Test 1

Question: “Here are three rows containing blocks of numbers in three columns. Please read the block numbers in Row 1, Column A.”

Response: If five of the six numbers are correctly identified, the subject is considered as having 20/20 (6/6) acuity in the right eye and need not read further. If the first block is not correctly read, have the subject continue across each row consecutively from left to right until the numbers in a block are called correctly.

Note: The subject may report that no boxes or numerals are seen. This indicates the existence of a visual suppression in the right eye. Should this occur, occlude the left eye and proceed with screening. When the occluder is used, responses on the record form should be circled rather than checked.

Recording: Place a check mark beneath the line on the record form showing the first box correctly read.

Far Point Left Eye: Acuity Test 2

Question: “Here are three rows containing blocks of numbers in three columns. Please read the block numbers in Row 1, Column A.”

Response: If five of the six numbers are correctly identified, the subject is considered as having 20/20 (6/6) acuity in the right eye and need not read further. If the first block is not correctly read, have the subject continue across each row consecutively from left to right until the numbers in a block are called correctly.

Note:: The subject may report that no boxes or numerals are seen. This indicates the existence of a visual suppression in the left eye. Should this occur, occlude the right eye and proceed with test. When the occluder is used, responses on the record form should be circled rather than checked.

Recording: Place a check mark beneath the line on the record form showing the first box correctly read.

| | A | B | C |
|---|--------|--------|--------|
| 1 | 647638 | 428676 | 943862 |
| 2 | 795823 | 357248 | 7236 |
| 3 | 9574 | 92 | 5 |

| | A | B | C |
|---|--------|--------|--------|
| 1 | 745932 | 578236 | 346752 |
| 2 | 534268 | 752386 | 6254 |
| 3 | 8453 | 85 | 3 |

Far Point Binocular: Acuity Test 3

Question: "Here are three rows containing blocks of numbers in three columns. Please read the block numbers in Row 1, Column A."

Response: If five of the six numbers are correctly identified, the subject is considered as

having 20/20 (6/6) acuity and need not read further. If the first block is not correctly read, have the subject continue across each row consecutively from left to right until the numbers in a block are called correctly.

Recording: Place a check mark beneath the line on the record form showing the first box correctly read.

Intermediate 1 is a default distance of 39 inches (1 meter), while Intermediate 2 is a default distance of 26 inches (66 cm). Push the Intermediate 1 selector (half body) or Intermediate 2 selector (quarter body) on the hand control at this time.

Intermediate Distance Binocular: Acuity Test

Question: "Here are three rows containing blocks of numbers in three columns. Please read the block numbers in Row 1, Column A."

Response: If five of the six numbers are correctly identified, the subject is considered as having 20/20 (6/6) acuity and need not read further. If the first block is not correctly read, have the subject continue across each row consecutively from left to right until the numbers in a block are called correctly.

Recording: Place a check mark beneath the line on the record form showing the first box correctly read.

Switch back to Far Point (mountains) **here.**

Far Point Color Vision Test 4

Push the **Far** selector on the hand control to proceed with this screening. This target presents severe color blindness (red/green) on the top row and mild color blindness (blue/violet) on the bottom row.

Question: "Here you see two rows, each containing three circles. Moving from left to right on the top row, please read the numbers you see in the circles."

Response: Correctly naming two out of three numbers in each row is the minimum acceptable answer.

Recording: Check the number of circles on which all three numerals are correctly identified on the record form.

Note: Failure to name two out of three numbers correctly on the top (red/green) row indicates possible severe color blindness. Failure to name two out of three numbers correctly on the bottom (blue/violet) row indicates possible mild color blindness.

Do not advance the drum at this time. Use the "Color Vision" target to conduct the peripheral vision screening.

Horizontal Field Testing (Peripheral Vision Testing)

Miniature lamp (LED) targets between the lenses and recessed in the temple (side) areas of the viewing head show how far to the side a subject's visual field extends when s/he looks straight ahead. The horizontal targets are selectively lit by individual selectors on the control panel to show a 45° nasal field and to check temporal fields at angles of 85°, 70°, and 55°. (A total field of vision up to 130° can be measured for each eye). The eyes may be tested separately or together.

Note: The "N" selector tests 45 degrees across the nose, in the nasal field. Testing right eye nasal will yield a "left side" response, and, vice versa. For a one-eyed driver, a range (or peripheral vision) should be tested. Do this by depressing both the "N" and "70 degree" selectors for the eye in question. A response of "both sides" or "two lights" should be expected.

HORIZONTAL FIELD

85 70 55 N

N 55 70

Question: "Look at the center circle of Row 1 or Row 2. At any time, a light may flash to the left or right side. If you see a light on the left side, please say 'Left'. If you see one on the right side, please say 'Right'."

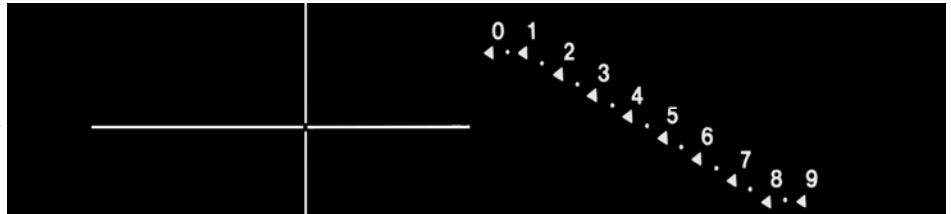
Response: Subjects should be able to respond to at least the 55 degree and 70 degree temporal tests for each eye. If they cannot, visual problems may exist; and referrals should be made for a full professional eye examination.

Recording: Check the appropriate boxes on the record form.

Far Point Phoria: Lateral and Vertical Test 5

(The red line measures lateral phoria. The green line measures vertical phoria).

Question: "Here you see a scale of numbers and dots with two crossed lines running through it. Where does the green line pass through the scale?" "Where does the red line pass through the scale?"



Response: The expected response for both lines is "Between 4 and 5." Responses may be delayed by the apparent movement of the red line. To assist in speeding a response, ask for a number within the range of movement. When this has been obtained, determine how far each way the movement continues.

Recording: Check the appropriate spaces on the record form to show exactly what the test subject reports. If the red line continues to fluctuate, draw a line between the number areas in which it moves. If it keeps moving in one direction, wait until it stops before making notations on the record form.

- Note:** (1) If a subject with binocular vision sees *only* the crossed lines, s/he is suppressing or suffers from amblyopia ("lazy eye"), strabismus, or a similar deviated eye condition. Discontinue testing.
- (2) Some test subjects may report one or both lines seem to break before and after passing through the scale. This is not important. However, a decided *head tilt* is important and can significantly affect the finding. Be sure proper posture is maintained. And the subject's head is straight into the instrument viewing head.
- (3) Should a subject *wearing glasses* report the *green* line passes through the scale at some point other than between 4 and 5, test her/him a second time without glasses. If, on the retest, the line passes correctly between 4 and 5, the probable cause of the discrepancy is *bent eyeglass frames*. Recommend to the subject that s/he have an optician check the glasses.

Far Point Stereopsis Test 6

Question: "Here you see five rows of symbols (shapes) with columns of numbers to each side of them. Each row across has five different symbols. Row 1 shows a star, a ball, a heart, a box, and a cross.



Does one of the symbols in this row seem to float out in the air.....closer to you than the others?" "Which one?" "In the second row, which symbol floats closer to you than the others?" Continue through all five rows.

Response: The normal response is to correctly report all five rows. If the subject does not report the box as "floating out" toward her/him in the first row, it may be necessary to rephrase the questions for better understanding.

Recording: Place a check mark on the last symbols correctly read.

Far Point Contrast Sensitivity Test 7

Contrast sensitivity is a very different visual function than acuity. A person with 20/20 (6/6) acuity under high contrast conditions may have the equivalent of 20/400 (6/120) or worse in low-contrast conditions, for example. The Keystone View VS-V GT Medical contrast sensitivity targets show images at different levels of contrast, using reflective light to mimic real-world vision. For measuring results, a person who is able to detect details in very low contrast conditions is said to have high-contrast sensitivity.

A person who cannot detect details in very low contrast conditions is said to have low-contrast sensitivity. Subjects are presented with nine blocks of numbers varying in contrast from 10 to 90 percent (%) under dusk/night driving conditions. All tests are given at 20/70 (6/21) acuity. Line 1, Column A is 10% contrast, Line 1 Column B is 20% contrast, Line 1 Column 3 is 30% contrast, Line 2 Column A is 40% contrast, etc.

- Note:** (1) Make sure the day/night switch (white bulb/black bulb) is in the night position (black bulb).
(2) Be sure to instruct the subject to keep both eyes open at all times.
(3) **To date, no standards for contrast sensitivity have been set.**

Question: Please read the numbers on Line 1 Column A.

Response: If the first line is read correctly, /he has the ability to read a 20/70 (6/21) acuity test at 10% contrast and need not read any further. Continue across each line reading each block from left to right until your test subject reads all three numbers in a single block successfully. Reading a minimum of all three numbers on Line 2 Column A is considered acceptable. If the test subject is unable to correctly identify all three numbers in the 40% block further examination by a vision professional is recommended.

Recording: Place a check mark on the last percentage response.



Target 8: Glare Recovery

Subjects are presented 3 rows of 7 numbers shown at decreased (night) illumination. A bright glare will illuminate for 3 seconds and return to night illumination. The subject must immediately read the numbers across the line of your choosing.

Note: Be sure to instruct the subject to keep both eyes open at all times. Set the day/night selector to the night position. Press the glare selector on the *Keystone* Elliptech control panel. The glare lamps will illuminate for a period of 3 seconds.

Question: "A bright light will flash in your field of view. When the bright light turns off, will you immediately please read Line _ (1, 2, or 3, as specified by examiner) to me?"

Response: Reading six out of the seven numbers in any one line in less than 5 seconds is considered passing. If at least 6 of the 7 numbers in a row are not correctly identified, further examination by a vision professional is recommended.

Note: No standards for glare recovery have been set to date.

| | |
|---|---------------|
| 1 | 2 6 5 1 4 3 9 |
| 2 | 8 2 9 4 6 3 5 |
| 3 | 6 3 9 5 2 7 4 |

Push the Near Point selector (flower) on the hand control to proceed with Near distance tests.

Near Point Right Eye: Acuity Test 1

Question: "Here are three rows containing blocks of numbers in three columns. Will you please read the block numbers in Row 1, Column A?"

Response: If five of the six numbers are correctly identified, the subject is considered as having 20/20 (6/6) acuity in the right eye and need not read further. If the first block is not correctly read, have the subject continue across each row consecutively from left to right until the numbers in a block are called correctly. The subject may report that no boxes or numerals are seen

| | A | B | C |
|---|-------------|-------------|-------------|
| 1 | 5 4 7 6 3 8 | 4 2 8 5 7 6 | 9 4 3 8 5 2 |
| 2 | 7 9 5 8 2 3 | 3 5 7 2 4 8 | 7 2 3 6 |
| 3 | 9 5 7 4 | 9 2 | 5 |

Recording: Place a check mark beneath the line on the record form showing the first box correctly read.

Near Point Left Eye: Acuity Test 2

Question: "Here are three rows containing blocks of numbers in three columns. Will you please read the block numbers in Row 1, Column A."

Response: If five of the six numerals are correctly identified, the subject is considered as having 20/20 (6/6) acuity in the right eye and need not read further. If the first block is not correctly read, have the subject continue across each row consecutively from left to right until the numbers in a block are called correctly. The subject may report that no boxes or numerals are seen

Recording: Place a check mark beneath the line on the record form showing the first box correctly read.

| | A | B | C |
|---|-------------|-------------|-------------|
| 1 | 7 4 5 9 3 2 | 5 7 8 2 3 6 | 3 4 6 7 5 2 |
| 2 | 5 3 4 2 6 8 | 7 5 2 3 8 6 | 6 2 5 4 |
| 3 | 8 4 5 3 | 8 5 | 3 |

Near Point Binocular: Acuity Test 3

Question: "Here are three rows containing blocks of numbers in three columns. Please read the block numbers in Row 1, Column A."

Response: If five of the six numbers are correctly identified, the subject is considered as having 20/20 (6/6) acuity and need not read further. If the first block is not correctly read, have the subject continue across each row consecutively from left to right until the numbers in a block are called correctly.

Recording: Place a check mark beneath the line on the record form showing the first box correctly read.

| | A | B | C |
|---|-------------|-------------|-------------|
| 1 | 8 8 7 4 3 8 | 8 7 4 2 3 8 | 3 8 2 4 5 7 |
| 2 | 5 6 3 4 7 2 | 8 5 9 4 2 3 | 8 9 2 7 |
| 3 | 2 9 7 8 | 4 3 | 9 |

Interpretina Test Results

The results of the *KEYSTONE VIEW* VS-V GT Medical screening tests should not be considered separately, but as a *whole*. Taken in entirety, results provide reliable indication of the test subject's visual efficiency. **Remember:** The *Keystone* test series is designed to identify persons who may benefit from professional vision care. It is not intended to provide diagnostic or clinical data.

SUGGESTED VISUAL STANDARDS

If all of an individual's test scores are recorded in the clear area of the "Acceptable" column on the record form, it may be assumed that s/he has adequate visual skills for normal living.

If some scores are marked in the lightly shaded area of the "Marginal" columns, the subject can be considered to have "doubtful performance."

However, some authorities will accept 20/40 (6/12) acuity as a passing minimum and many driver licensing agencies accept 20/40 (6/12) as a minimum standard. Also, if a subject's occupation demands good vision at the reading distance but not at far point, consider 20/30 (6/9) as a minimum score for near point and 20/40 (6/12) as the minimum score at far point. The opposite would apply if visual skills are critical at far but not at near points, as in the case of a crane operator. Therefore, consider scores in the clear area as good general standards for visual abilities, but allow scores in the lightly shaded areas if those visual tasks are not in demand.

Scores falling in the darkly shaded "Unacceptable" areas of the record form indicate the subject will benefit from a professional vision examination. Be sure to test subjects with their eye glasses on if glasses have been prescribed.

Do not refer for professional consultation if "Unacceptable" performance is recorded on the color test. No remedy has yet been perfected for defective color vision. However, for reasons of safety, persons who are color blind should be made aware of their deficiency and might wish to pursue it further with a specialist.

Stereopsis is a highly developed visual skill subject to maturation factors. Persons over the age of 25 years may do better in this test than those under 25. However, adults whose occupations involve moving machinery or materials should, for safety reasons, score in at least the lightly shaded "Acceptable" area. This level indicates 75% stereopsis on the Shepherd-Fry Scales.

ACUITY

Refer to *Keystone View* Record Form 5669/821-928 for Snellen equivalents in the Unacceptable, Marginal, and Acceptable columns for each of the three acuity areas: Far Point, Intermediate, and Near Point.

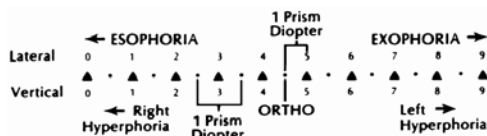
PHORIA

Phoria readings are important and "failure" can indicate reasons for headaches and fatigue. The record form gives the following passing ranges:

Lateral (Distance) Phoria: Not more than 6 prism diopters esophoria or 4 prism diopters exophoria

Vertical (Near) Phoria: Not more than 4 prism diopters esophoria or 6 prism diopters exophoria

Right or left hyperphoria: Not more than 1 prism diopter. **Test Key** follows:



Important: Refer for professional consultation if suppression is indicated on the phoria test and only the yellow numbered line is seen or only the crossed red and green lines are seen.

COLOR VISION

Color Vision Severe (red/green)—Examinees must identify numerals 32, 79, and 23

Color Vision Mild (blue/violet)—Examinees must identify numerals 92, 56, and 63.

DEPTH PERCEPTION (STEREOPSIS)

Test (F-8 and N-6) Identification of the stand-out symbol in line 4

| Line | 1 | 2 | 3 | 4 | 5 |
|--------------------|-----|-------|-------|------|-------|
| Symbol | Box | Heart | Cross | Star | Cross |
| Shepherd-Fry Scale | 10% | 30% | 60% | 75% | 85% |
| Degree of Arc | 592 | 208 | 74 | 45 | 32 |

of the Test Key below:

HORIZONTAL PERIPHERAL VISION

This test is particularly significant in the case of vehicle operators. A person with normal lateral vision will be able to see a moving object when it is 90° (or at right angle) to his eye on the temporal (outside) side.

No exact standards have been developed that show the point where diminution of lateral fields has an effect on accidents. Yet authorities state that a field more restricted than 60° would be a serious danger to a vehicle or a cyclist.

A temporal reading of 70° should be considered the minimum standard for safety. **Point of Guidance:** The U.S. Interstate Commerce Commission requires a lateral field of at least 70° for each eye.

It is suggested that when anyone who holds a motor vehicle operator's license demonstrates a severely restricted field, even though her/his other visual skills are normal, s/he be referred to a vision specialist for examination and professional opinion.

Additional Aids to Test Interpretation

With individuals of any age, definite *vertical phoria* which is not due to bent eyeglass frames will provoke a tendency to diplopia (seeing double). At far point, this presents a definite safety hazard. At near point, it can adversely affect work or study performance.

Periodic Retesting

An individual's vision is not static. It changes with time and can be affected by such factors as age, general health, emotional disturbances, fatigue and working conditions. It is, thus, desirable that an individual's visual skills be re-screened periodically. Many of the optometric associations recommend screening twice a year

KEYSTONE VIEW VS-V GT Medical Maintenance Red

With normal use and conditions, the *KEYSTONE VIEW* VS-V GT Medical instrument requires minimum attention if protected by a cover when not in use. Virtually no repair or adjustment is needed since all operating components are protected and solid-state circuitry assures exceptionally high reliability.

Cleaning *Be sure to disconnect the unit from its power supply before cleaning.*

Periodically, some cleaning will be necessary. The instrument housing and *Keystone* Elliptech control unit should be dusted with a soft cloth or brush, and the lenses washed with alcohol or white vinegar diluted with water on a dampened cloth and dried with a soft cloth or tissue. If the instrument has become very soiled, it may be cleaned with a mild soap-and-water mix or general purpose cleaner on a dampened cloth. Rinse with clear water. *Never spray cleansers directly on or in the instrument.* Other solvents are not recommended.

Lamp Replacement

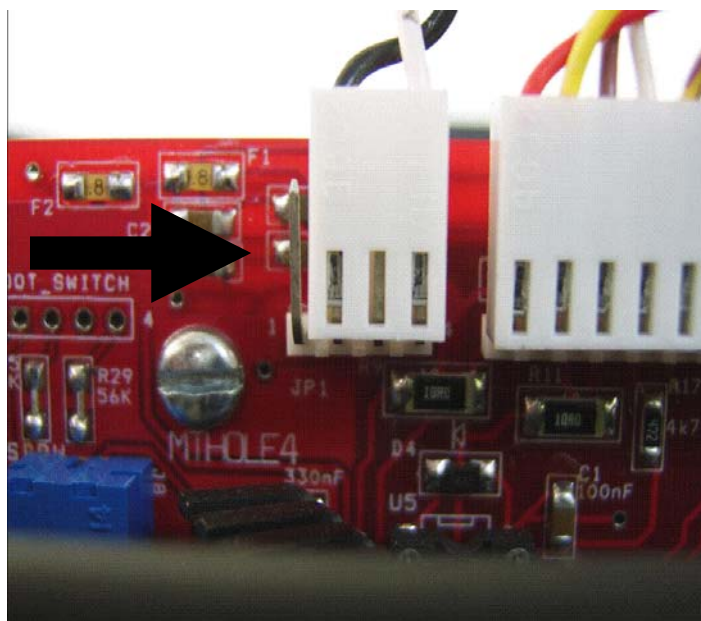
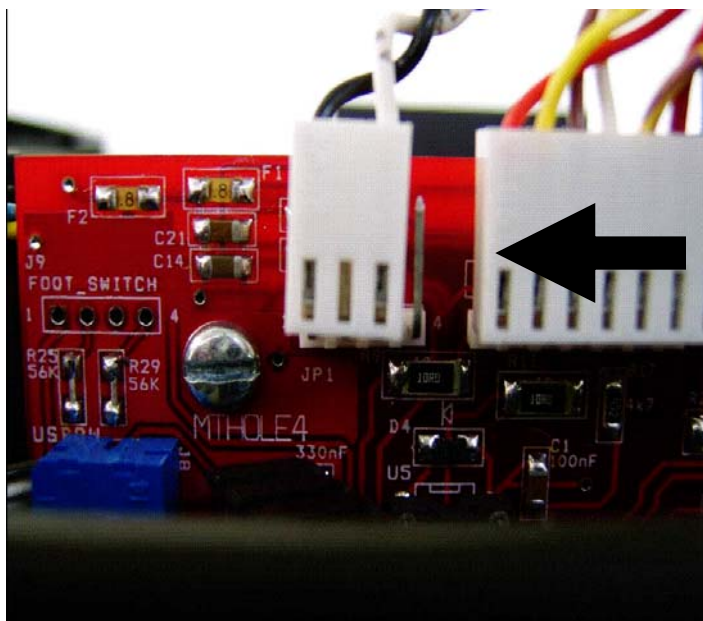
Two Nichia NSPW515BS Daylight LED lamps provide illumination of the stereo targets. Though the lamps are long life-rated, replacement may eventually be required. Contact your local distributor or *Keystone View* direct to order replacement LEDs. Carefully follow the instructions provided with the lamps, as improperly installing them can cause immediate failure.

The peripheral vision test targets in the viewing head and the signal lights on the *Keystone* Elliptech control panel are light-emitting diodes (LEDs). They are designed for extremely long life and should not require replacement during the lifetime of the instrument.

Troubleshooting If The Instrument Will Not Turn On

In the unlikely event that a fuse has blown on the mother board, the vision screener will not activate after turning on the power switch. If this occurs, a connector on the inside of the machine needs to be moved over one position to receive power from one of the backup fuses. Please follow the steps below

- Remove the top of the instrument.
- Attached to the on-off switch is a black and white cable. Follow this to the other end where it is attached to a white connector with three (3) terminals.
- Turn the instrument so the target drum is to your left and the eye shield is to your right. You will now be facing the red mother board.
- Remove the specified connector from the four-pin receptacle where it is currently placed. There should be one unoccupied pin to the right of the connector.
- Move the connector one position to the right so it now occupies the pin furthest to the right, and the unoccupied pin is to the left.



Glossary

Accommodation: The power to adjust the focus of the eyes for seeing objects distinctly at different distances.

Acuity, visual: Sharpness of vision. Ability to distinguish detail.

Amblyopia: Sometimes referred to as "lazy eye", amblyopia is decreased vision in one or both eyes not caused by anatomical damage. Vision therapy often is used to treat amblyopia, since the condition is usually not correctable by optical means; i.e., eyeglasses.

Astigmatism: A common condition often occurring with near-sightedness or far-sightedness, where all the rays of light entering the eye do not focus on the same plane. The result is out-of-focus vision. The cause is unknown. A minor degree of astigmatism is considered normal and does not need correction.

Binocular: Using two eyes simultaneously.

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

Color blindness: An inherited condition most commonly seen in men and with the colors red and green. It is caused by a deficiency of certain "cones", or color detectors, in the eye. There is no cure, but the condition does not significantly impact day-to-day vision functions.

Convergence: The inward movement of eyes toward each other.

Depth perception: Stereopsis. How a person judges how far away an object is from her/him; combining such factors as the apparent size of the object, apparent rate of motion, the object's height in the field of vision, the image's clarity and various shadows.

Diplopia: Commonly known as "double vision," when a person sees two images of an object instead of one. Binocular diplopia - double vision in both eyes - is caused by a misalignment of the eyes and is often treated with vision therapy. Monocular diplopia - double vision in only one eye - can be caused by various factors including astigmatism, dry eye and retinal problems.

Esophoria: Commonly referred to as "cross-eyed", or under convergence; occurs when the two eyes do not aim simultaneously at the same object; but instead, point in different directions - in this case inward. The condition impacts binocular vision- the ability of both eyes to work together- and depth perception.

Exophoria: commonly referred to as "wall-eyed", or over convergence, occurs when the two eyes do not aim simultaneously at the

same object; but instead, point in different directions - in this case outward. The condition impacts binocular vision—the ability of both eyes to work together- and depth perception.

Far Point: 20 feet (6 m) to infinity.

Fusion: Defines how well both eyes work together to combine images into one clear, coherent, joined image.

Heterophoria: A squint due to weak eye muscles.

Hyperopia: Farsightedness; occurs when light rays focus behind a person's retina, as opposed to directly on it. A farsighted person can see distant objects clearly but has difficulty seeing objects close by.

Ishihara test: A pseudo-isochromatic test that screens individuals for color blindness.

Monocular: Pertaining to one eye.

Muscle Balance: Orthophoria; the tendency of either eye to remain in the position of fixation when fusion of images is prevented.

Muscle Imbalance: Esophoria or exophoria; the tendency of either eye to turn away from the position of fixation, when fusion of images is prevented.

Myopia - Nearsightedness; occurs when light rays focus in front of a person's retina, as opposed to directly on it. A nearsighted person can see objects close to them clearly but has difficulty seeing objects that are far away.

Near Point: The average reading distance - 14 to 16 inches.

Occluders: Any device used by a vision health professional or lay screener to temporarily obscure vision in one or both eyes while testing eye functions.

Orthophoria: Expected position of eyes in relation to each other; muscle balance.

Peripheral vision: Refers to the areas at the edges of the vision field; side vision, or, what a person sees "out of the corner of the eye." Loss of peripheral vision, often called "tunnel vision", can be caused by stroke, glaucoma, migraine headaches or retinal damage.

Phoria, Lateral: Descriptive of the relative horizontal position assumed by the eyes when dissociated (no fusion). See exophoria and esophoria on this page. Phoria are indices of the accommodative-convergence relationship and indicate a lack of coordination between the eyes.

Phoria, Vertical: Description of the relative,

vertical position assumed by the eye when dissociated. See hyperphoria on this page.

Snellen Chart: Rows of letters, numbers, or symbols in standardized graded sizes with a designated distance (usually 6 meters (20 ft.) at which each row should be legible to a normal eye. Used to determine visual acuity.

Strabismus: Eye misalignment caused by extraocular muscle imbalance. See "Phoria" on this page. Often results in suppression of one eye, causing the other to be stronger.

Stereopsis: See Depth Perception

Stereotarget: A pair of photographs or reproductions mounted in an instrument designed to present each eye with a separate image.

Suppression: The voluntary or involuntary non-use of vision, usually by one eye.

Vision Screening: A test for many facets of functional vision, designed to identify subjects who may benefit from an examination by a vision specialist.

Vision Specialist: Ophthalmologist or Optometrist.

SNELLEN EQUIVALENTS

20/20 = 6/6
20/25 = 6/7.5
20/30 = 6/9
20/40 = 6/12
20/50 = 6/15
20/60 = 6/18
20/70 = 6/21
20/100 = 6/30
20/200 = 6/60

NEAR VISION EQUIVALENTS

20/20 = N.4 / J.1
20/25 = N.5 / J.2
20/30 = N.6 / J.4
20/40 = N.8 / J.6
20/50 = N.10 / J.8
20/60 = N.12 / J.10
20/70 = N.14 / J.12
20/100 = N.18 / J.14
20/200 = N.36



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