Ophthalmic Equipment Repair and Maintenance

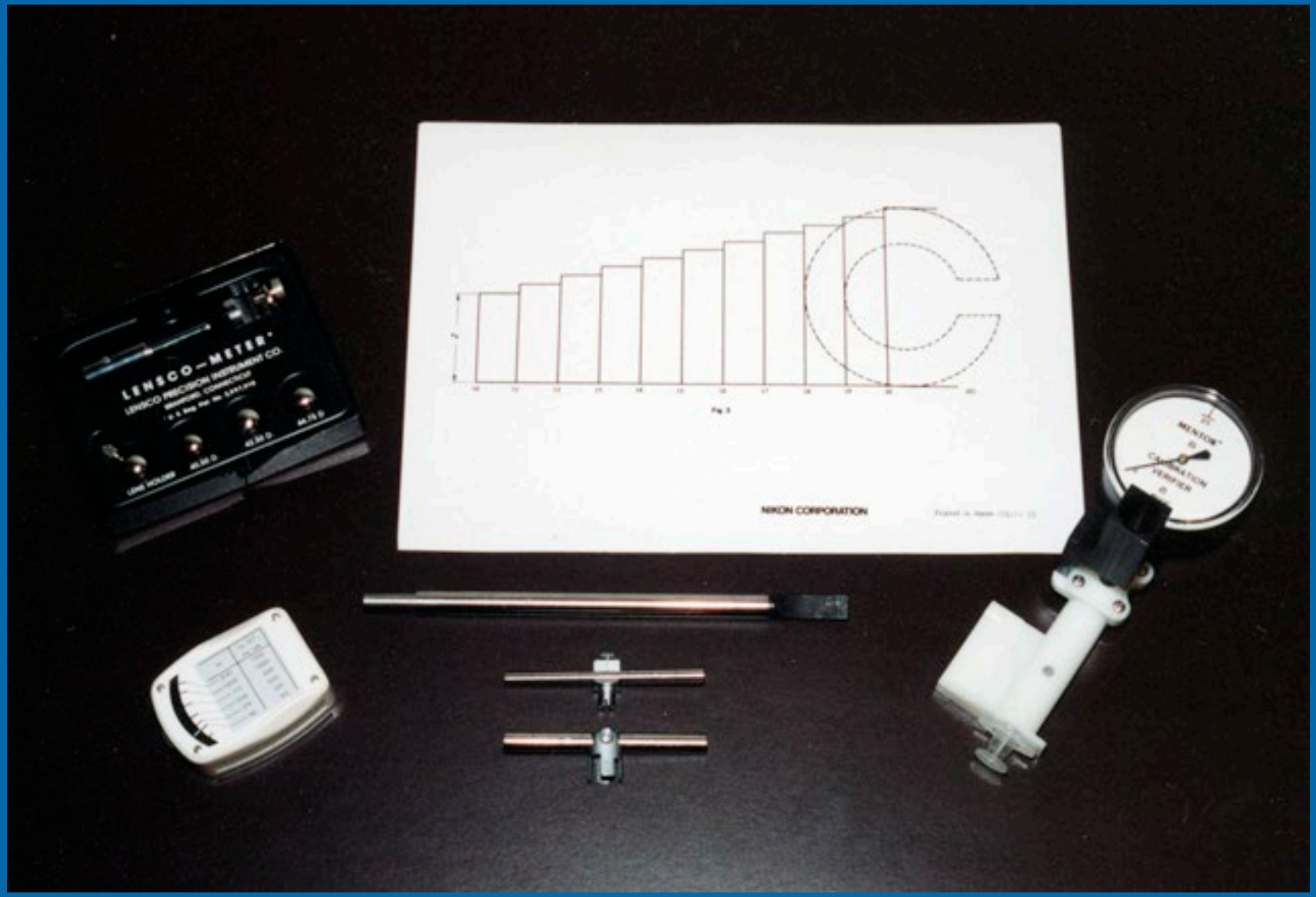
Certified By

1. Haag Streit
2. Relance Medical
3. Marco Instruments
4. B & L, AO, Leica, Reichert
5. RH Burton

Supplies Needed

1. Tool Kit
2. Brushes
3. Cleaning Cloths
4. Cleaning Solutions
5. Lubricants


STANLEY
ELECTRONIC TOOL


LENSCO—METER
NIKON CORPORATION

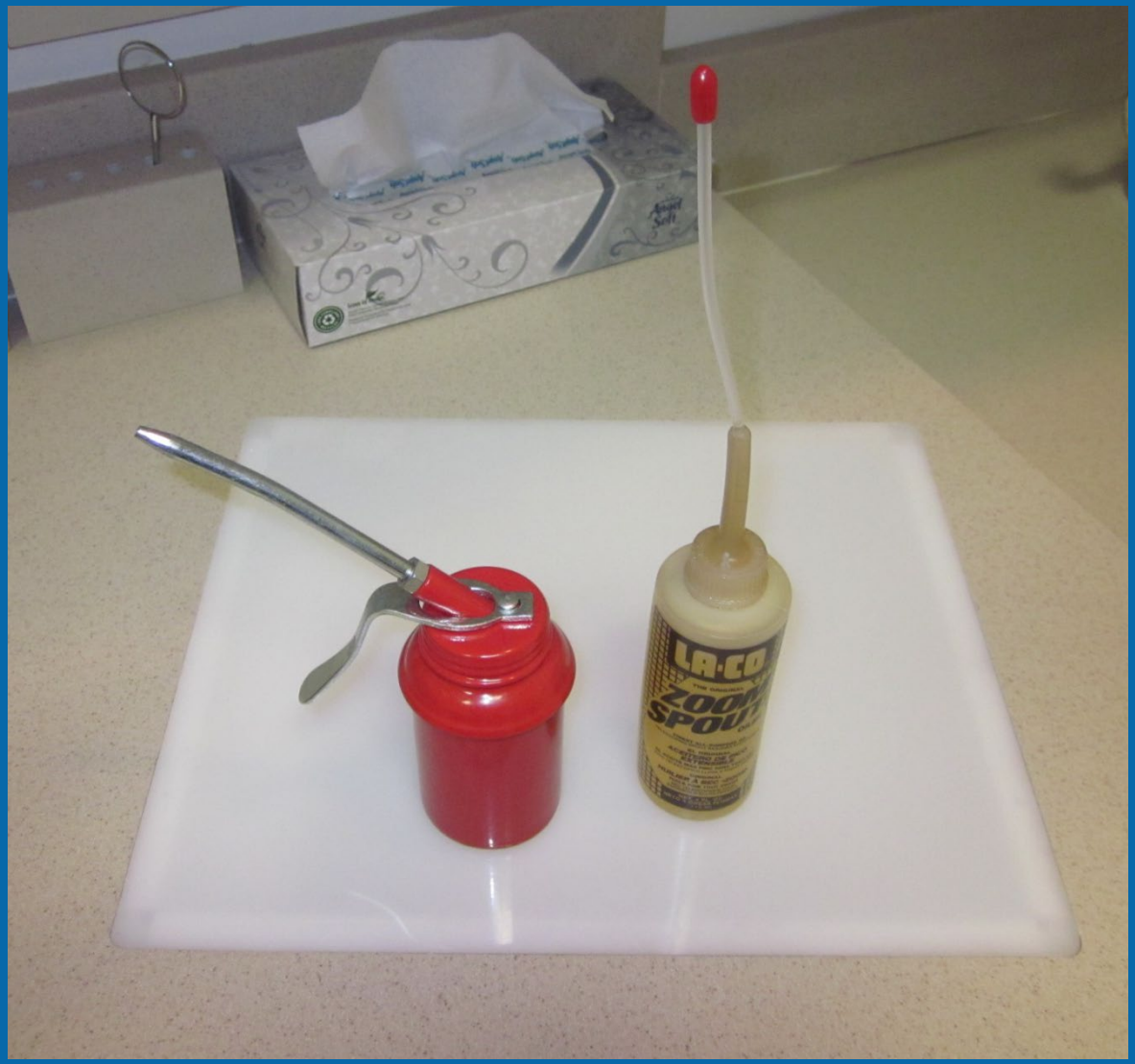

ADVANCE #544
ROYAL


CLARITY
PEARLE VISION FOUNDATION


Pur-Wraps
REF 25-806 2WC
Pur-Wraps
STERILE COTTON TIPPED APPLICATORS
HARDWOOD PRODUCTS COMPANY LP
GUILFORD, MAINE
STERILE UNLESS ENVELOPE IS DAMAGED OR OPEN

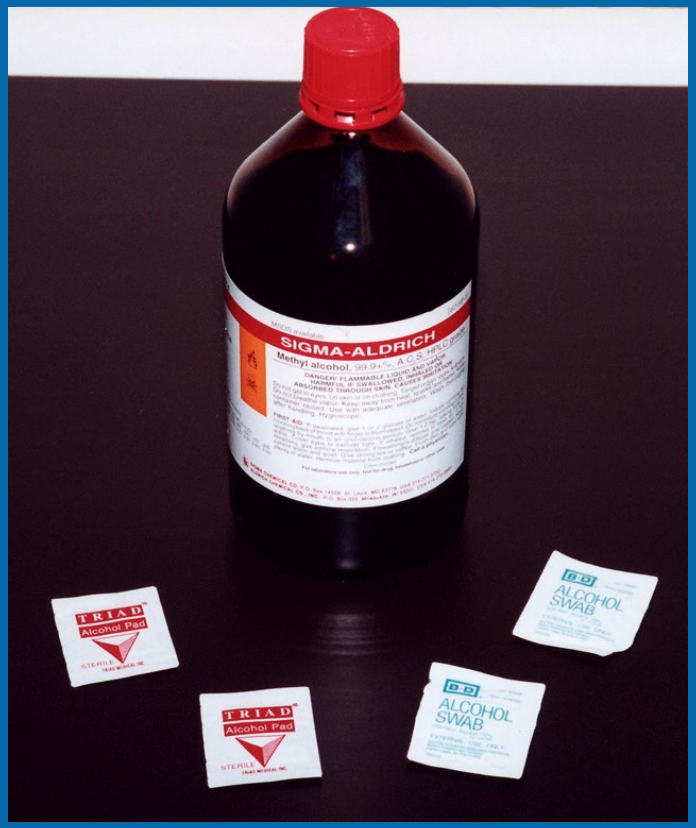

PROFESSIONAL
LENS KLEENER
• Anti-Static
• Anti-Fog
For All
Eyeglass
Lenses
KLEER
O-FOG
A STEAM PREVENTING
ANTI-STATIC
LENS CLEANER
not for use in eyes
APPLY AND POLISH
LENSES WITH A SOFT
CLOTH OR TISSUE
FOR GLASS AND
PLASTIC LENSES
WINCO
OPTICAL INC.
4 FL OZ
Lens Cleaner


CONTENTS 4 OUNCES
Sklarol
A HIGH GRADE LIGHT LUBRICATING OIL for SURGICAL APPARATUS and PUMPS
#100-728
Especially Prepared for J. SKLAR MFG. CO. LONG ISLAND CITY, N.Y.
TOP COCK GREASE
SILICONE
HOUSEHOLD OIL


LA-CO

Things Not to Use

1. Harsh Cleaning Chemicals
2. Lubricants that Melt and Destroy
3. Compressed Air
4. Abrasive Cleaning Aids




KANO
SiliKroil
The oil that creeps
. . . plus silicone.
Order Direct From
KANO LABORATORIES
(615) 833-4101
WD-40

Compressed Air

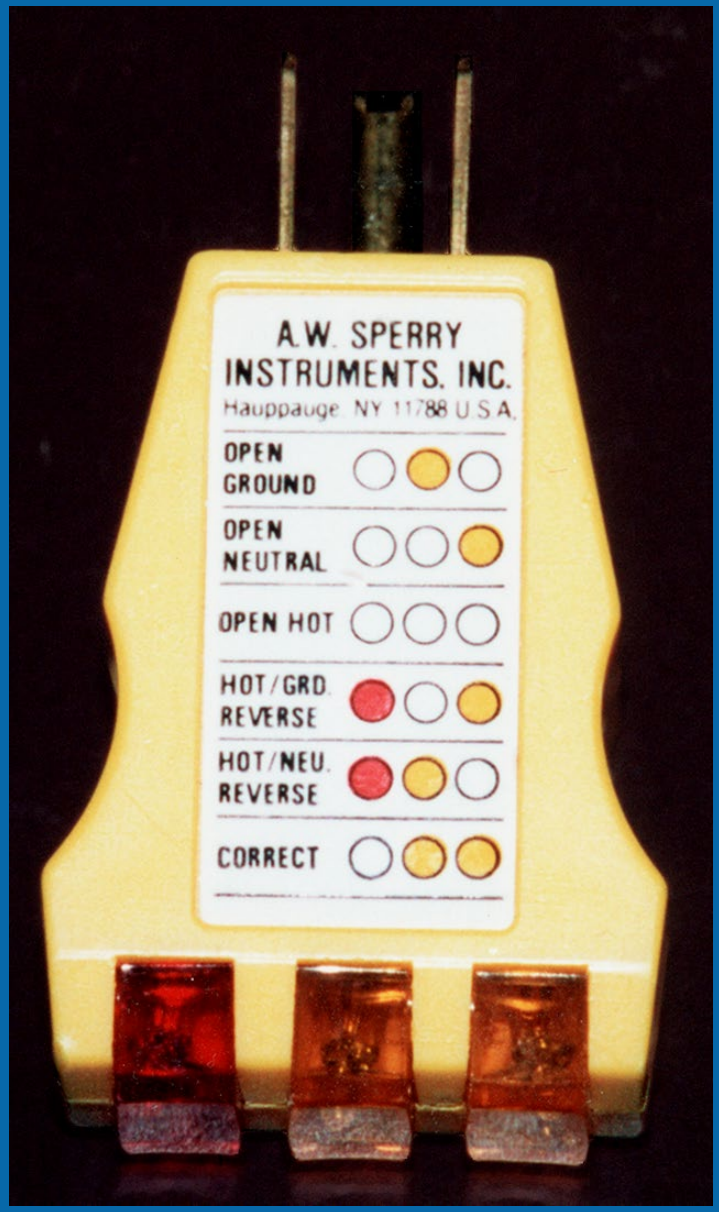
1. Contains moisture and chemicals which make surfaces hard to clean
2. Displaces dust and dirt
3. Not Ozone friendly

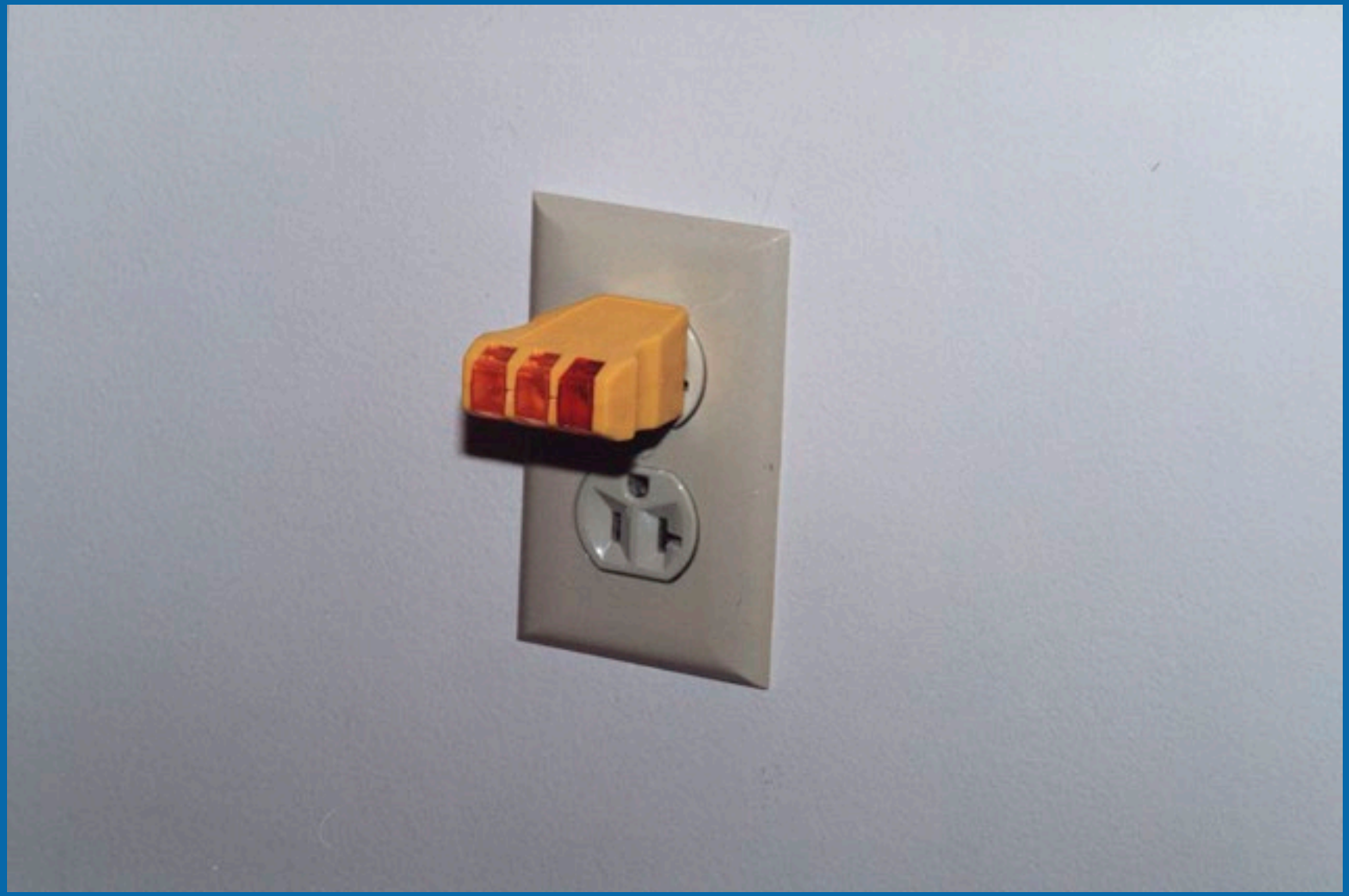

Surpass
Surpass

Remember to Check the Big Four

1. Power
2. Connection
3. Rheostat
4. Bulb

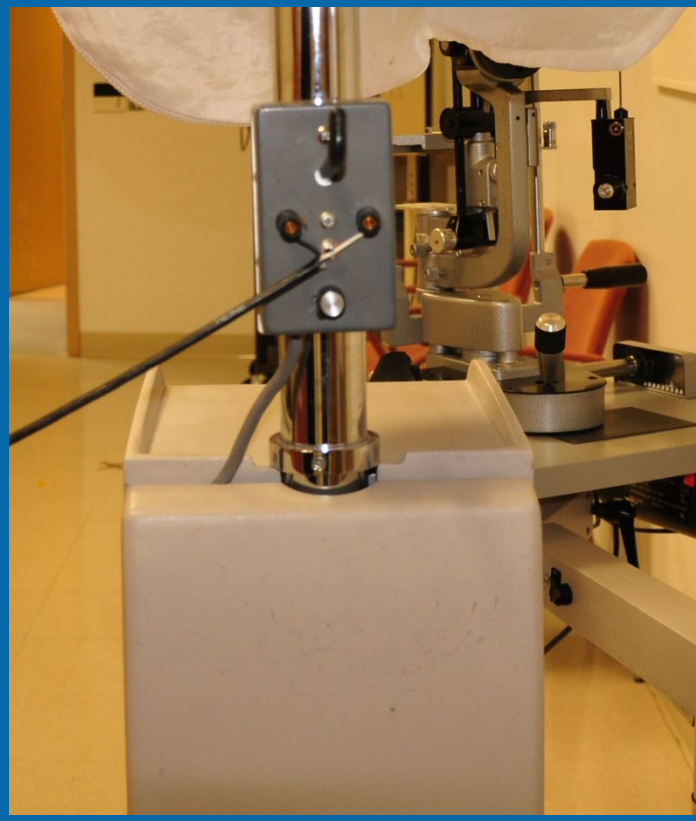
Check for power with circuit analyzer or plug in any electrical instrument that is known to be working





Rheostats Control The Amount Of Electrical Current Going To A Piece Of Equipment.

1. Make sure rheostat is turned up to desired current which will increase the brightness of light source
2. Make sure when using indirects that you match its proper power source with the correct indirect or when you turn the rheostat up it will blow the bulb



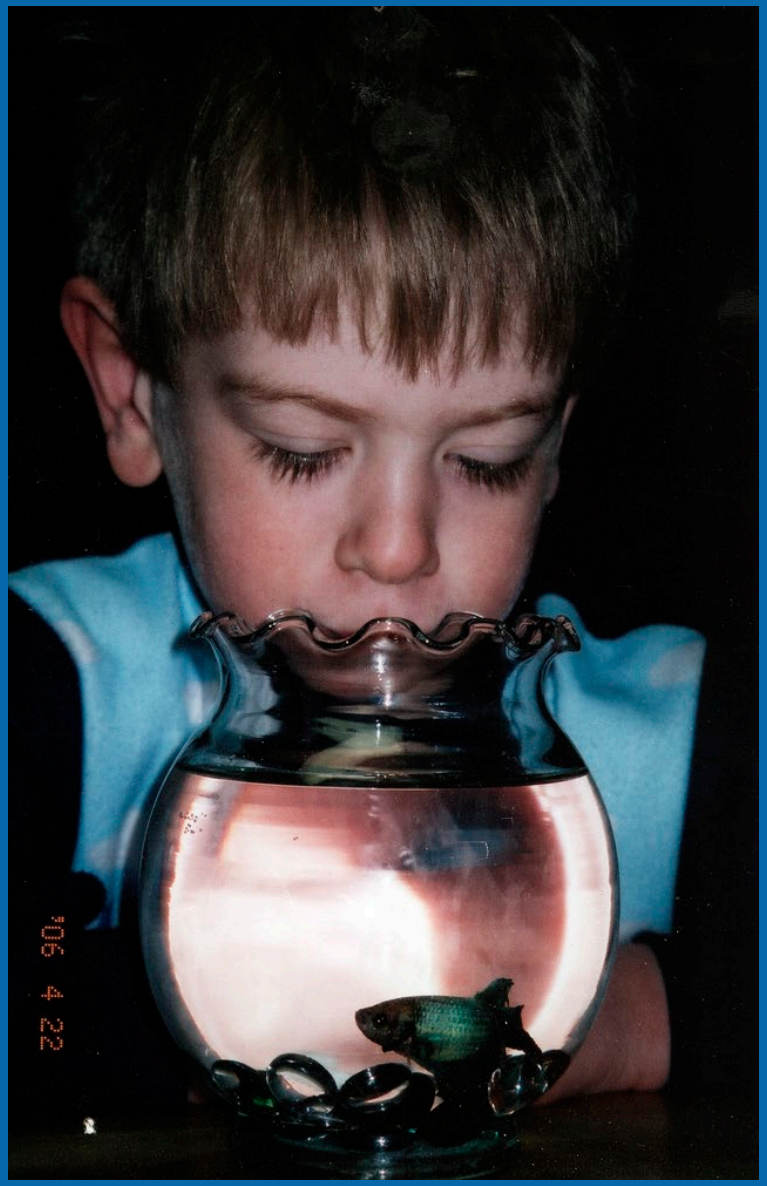
Some pieces of equipment have built in rheostats which control the amount of current

Keep a Supply of Bulbs and Batteries

1. Saves Down Time
2. Saves Money
3. Keeps Doctor Happy

Bulbs

- Generic or Name Brand?
- Good or Bad?
- Stop and Think

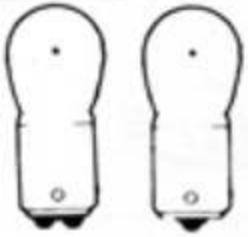



Microscope Lamps
Special base replacement bulbs for
ZEISS, LEITZ, WILD, & REICHERT MICROSCOPES
BT348 12V-60W
BT56Z 6V-30W
BT86Z 6V-50W
BT77Z 6V-15W
BT70249 6V-20W
BT53Z 6V-25W
BT75Z 6V-15W
NIKON
77903
77904
77910
71818
BAUSCH & LOMB
1634
787
BLC
EJM
15S11/102CL
OLYMPUS
8-B153
8-C102
8-C103
8-M102
8-M103
AMERICAN OPTICAL
BFM (GSL 306)
1460
1460X
1630
1631X
SWIFT
MA 722
MA 737
MA 738
MA 2201
MA 886
UNITRON
EL-1B
EL-2B
EL-3B
EL-12B

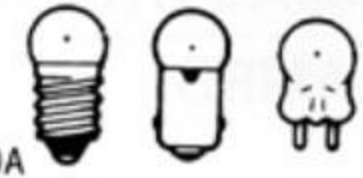
Domestic Miniature Bulbs

B-3½
Voltage Range
1.9V - 12.5V
Amps: .25A - 60A

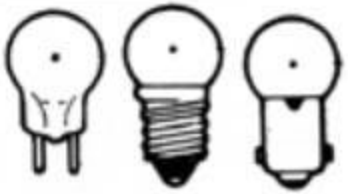
B-6
Voltage Range
6.5V - 28V
Amps: .56A - 1.78A



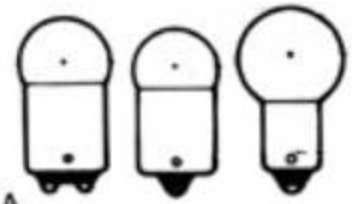
G-3½
Voltage Range:
1.25V - 28.0V
Amps: .10A - .50A



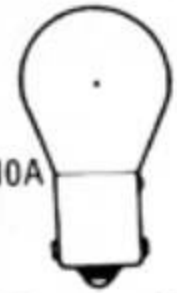
G-4½
Voltage Range
1.25V - 18.0V
Amps: .04A - 60A

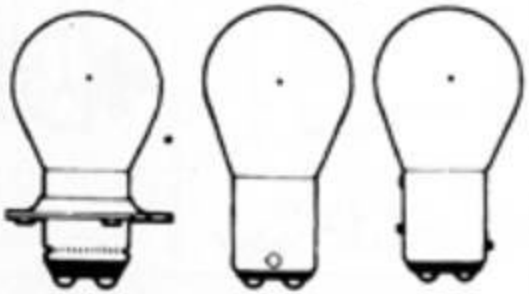


G-5
Voltage Range:
20.0V - 28.0V
Amps: .17A - .25A

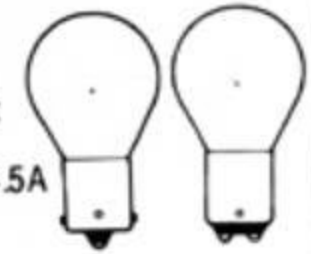


S-8
Voltage Range:
5.0V to 40.0V
Amps: .48A to 4.10A



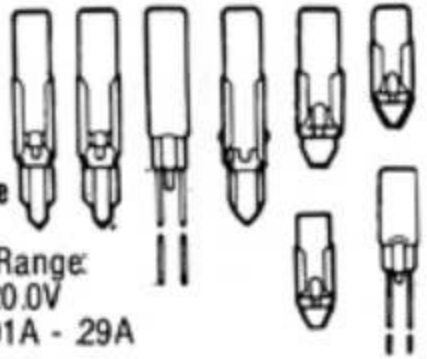


S-11
Voltage Range:
6.2V - 28.0V
Amps: .90A - 4.5A

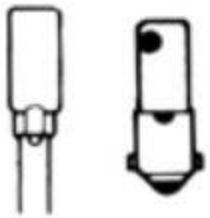


T-¾
Voltage Range:
3.5V - 5.0V
Amps: .06A - .20A

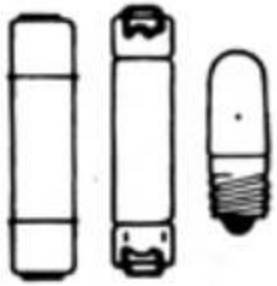
T-2
Telephone Slide
Voltage Range:
4.0V - 120.0V
Amps: .01A - .29A



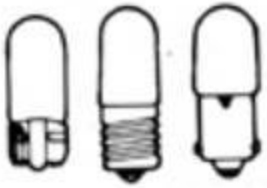
• T-2½
Voltage Range:
6.0V - 120.0V
Amps: .03A - .17A



T-3
Voltage Range:
12.8V - 24.0V
Amps: .17A - .97A



T-3¼
Voltage Range:
2.0V - 14.0V
Amps: .04A - .70A



Do Generics Cost More?

- Generics do the job but are not dealer approved parts
- Use more bulbs
- Lose illumination and convince of focus
- Filaments are set a certain distance from base
- If not they will lose the quality of the image at focal point

Generic vs. Name Brand

Bulbs for Haag Streit

- Generic L-1000 last 1 - 3 months and cost $18.00
- Brand name HS930 last 6 months to 1 year and cost $39.00
- Haag Streit stopped production on these bulbs
- Stock Pile if you can
- Haag Streit Slit lamps are being upgraded to LEDs (No bulbs) Cost of upgrade $3200


LOMBART
SOUTHEAST
1-800-782-8570
FAX 941-794-0938
LOMBART
NORTHEAST
1-800-BAD-EYES
1-800-333-3937
LOMBART
SOUTHWEST
1-800-443-0120
FAX 972-487-7900
LOMBART
WEST
1-800-537-2020
FAX 858-578-8369
LOMBART
1-800-LOMBART
HAAG-STREIT
INTERNATIONAL
Périmètre à Projection
HAAG-STREIT
INTERNATIONAL
Perímetro esférico
de proyección
Haag-Streit A
CH-309
Köniz

Generic vs.. Name Brand

Welch Allyn Retinascope

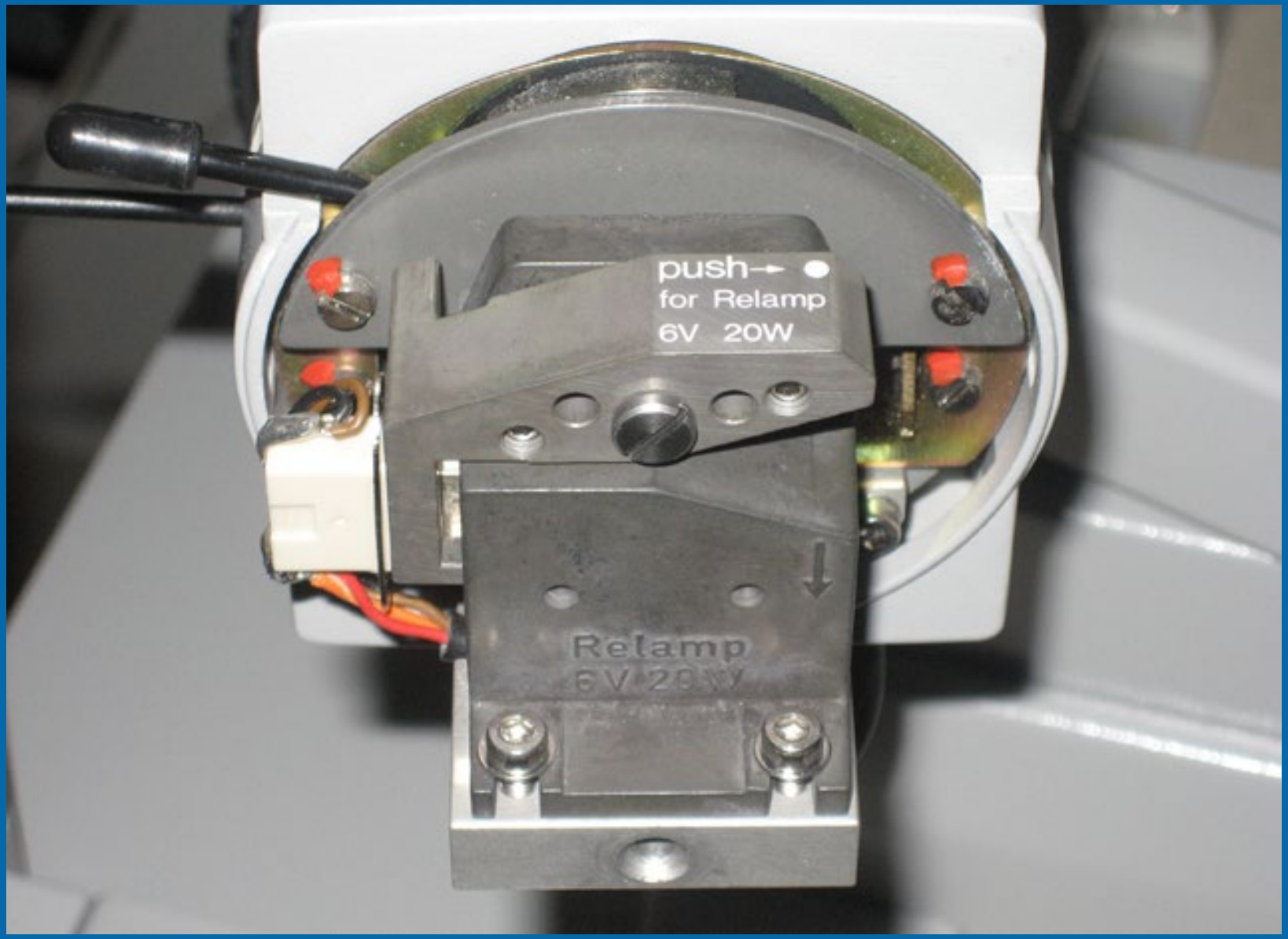
- Generic $17.50, last 6 months
- Brand name $30.00, last 1 - 2 years

Bulb Care

- Always clean bulbs to remove grease and oil before installation. (This will add more time to the life of the bulb.)

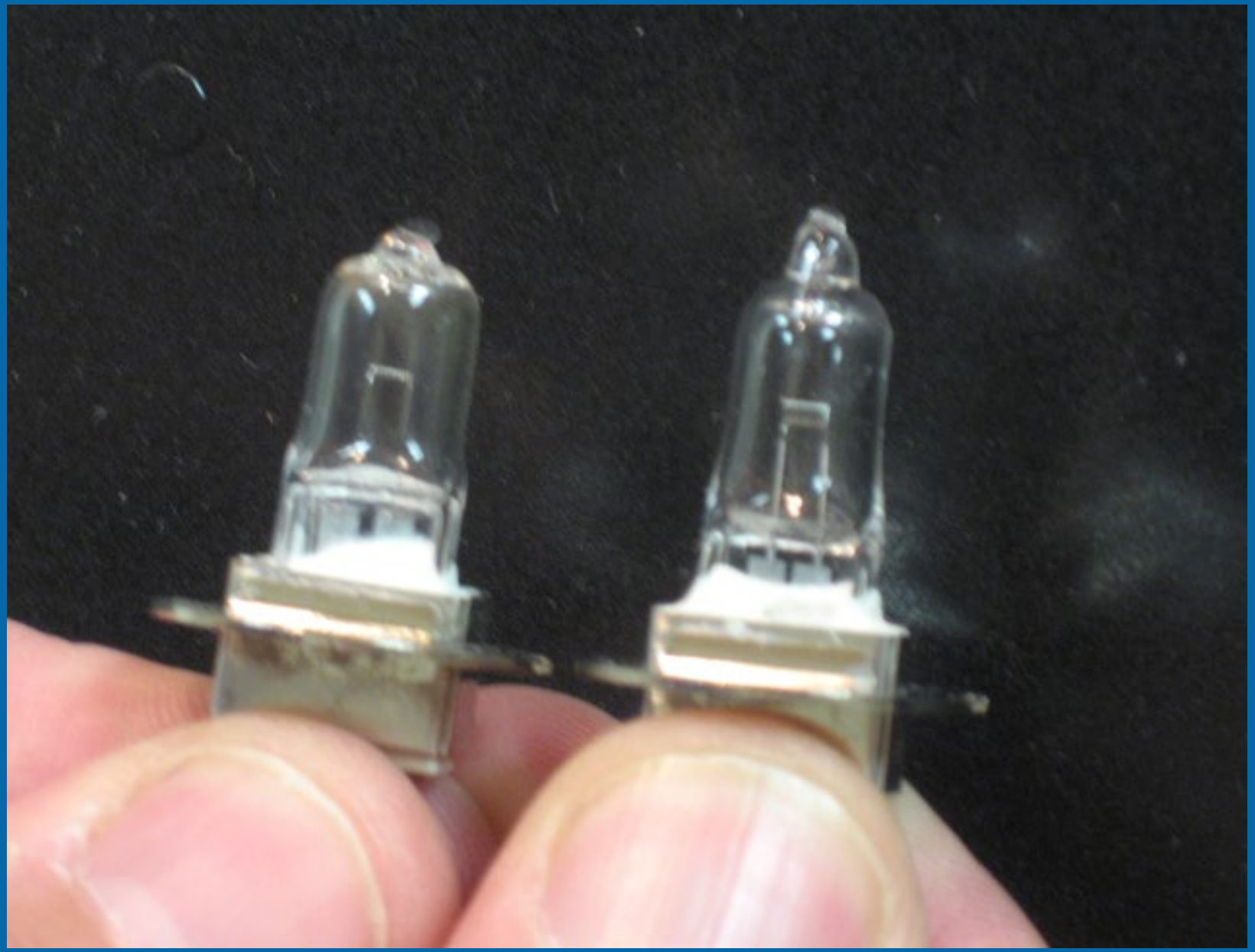
Bulb Care

- Make sure you have the right bulb for the unit
- Check voltage and watts


push→
for Relamp
6V 20W
Relamp

They all look alike, but are they the same?


YAG
64 260
38 01 20-7040
12V 30W
Made in Germany
OSRAM
HALOGEN
PHOTO OPTIC
LAMP
XENOPHOT
HLX 64251
6V 20W



Battery Care for Welch Allyn Instruments

- Have a chemical mix
- Need to charge for 24 hours prior to use, then run down to zero power
- Then charge for another 24 hours to obtain optimal battery life!

Battery Care for Welch Allen Instruments Generics vs. Name Brand

- Generic cost $22.00, last 6 months to a year
- Name Brand cost $37.00 and last 4 to 6 years

Indirects

1. Make sure no breaks in cords
2. Make sure good connection
3. Clean mirrors
4. Check rheostat
5. Newer indirects are sealed to keep out dust and debris

New Cordless Indirects

1. LED no bulbs to change
2. Freedom of movement from side to side or room to room
3. Easy access to lithium battery which gives you 4 hours of continuous use
4. Better detail, brighter, lighter, longer lasting

Welch Allyn Instruments

1. Clean oxidation on bottom of handles at recharging point
2. Heads are sealed at factory and you cannot get replacement parts
3. Most handles are interchangeable for use on different heads.

Welch Allyn Instruments

4. Cheaper to buy new heads than to have them repaired

   Muscle Light $85.00

   Direct Ophthalmascope $240.00

   Retinascope $285.00

Keratometer

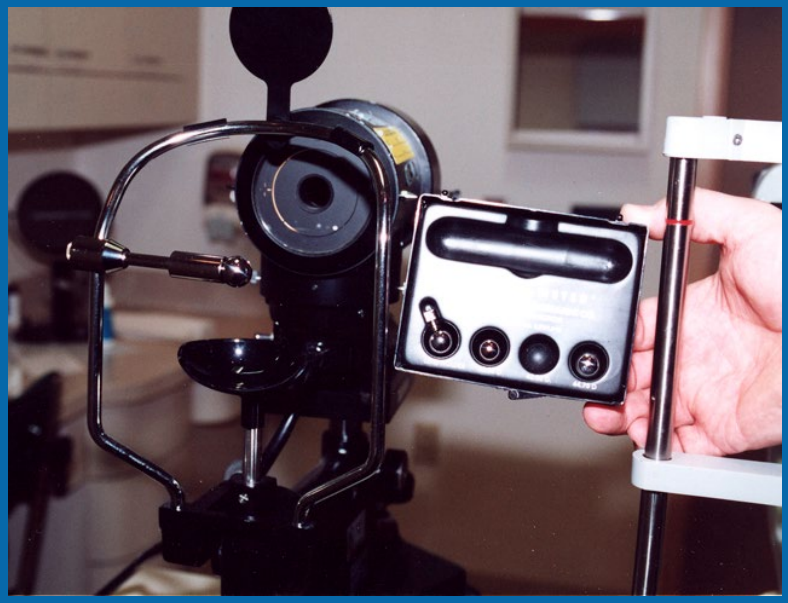
1. Keep locks and risers well oiled so base moves freely
2. Keep lenses and mirror around bulb clean
3. Keep occluder tighten
4. Remember to turn off

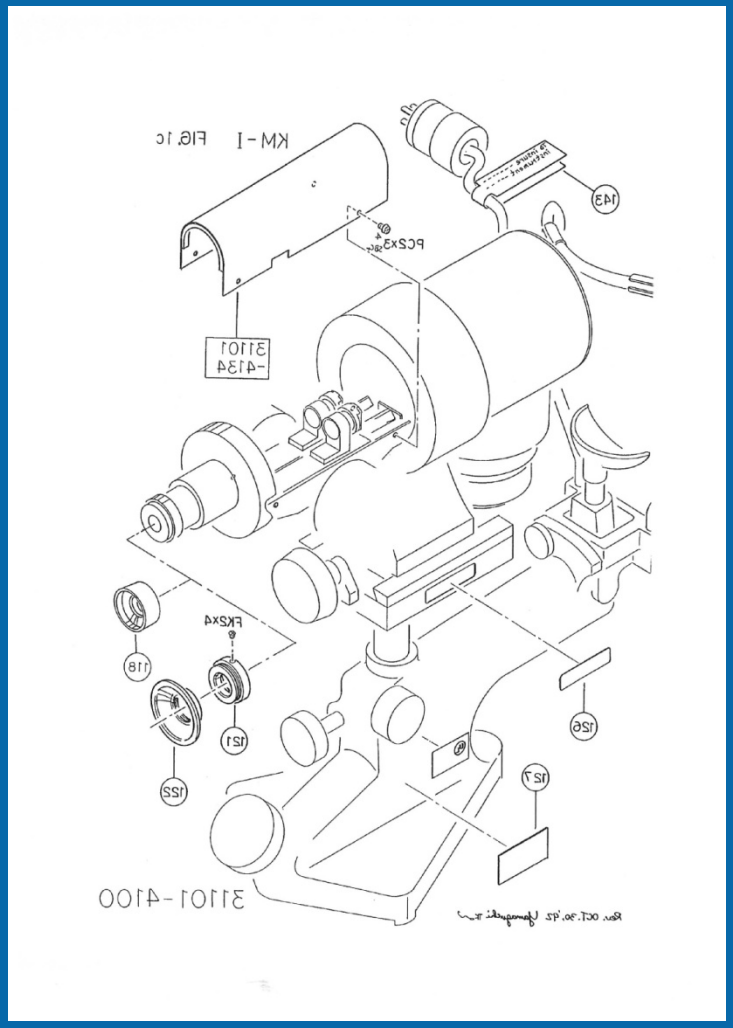
Keratometer

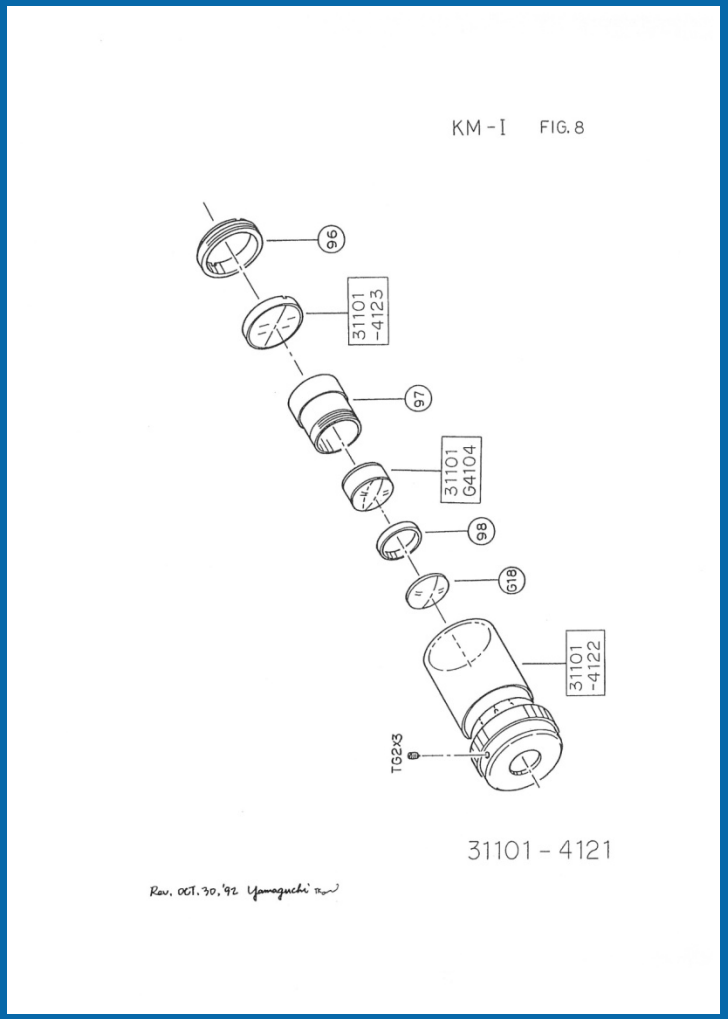
Bulbs will last 6 months to a year if turned off and 1 week if left on

Calibration

1. Calibrate every 7 to 30 days, everyday if units are mobile, they could be bumped
2. Focus eye piece
3. Use all three calibration balls to check for accuracy
4. Keep calibration balls well oiled as rust or dents can cause irregular mires and improper readings



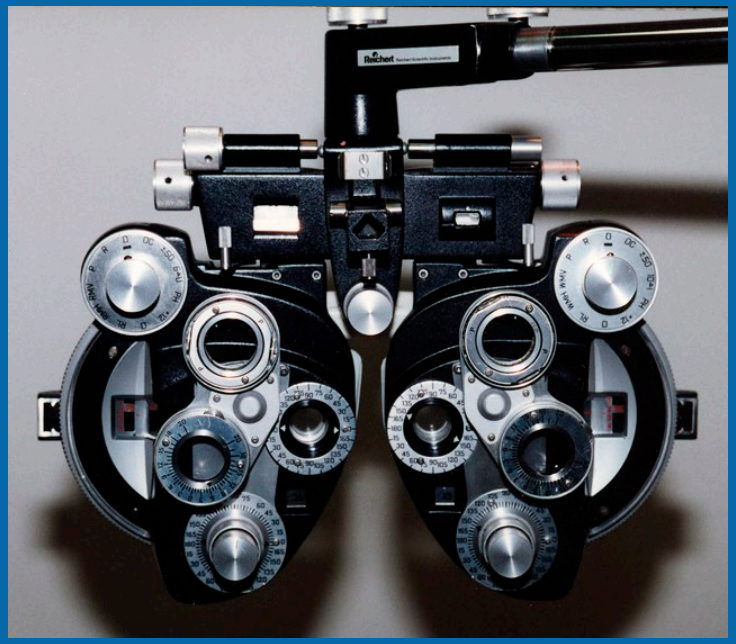



KM-I FIG. 8
96
31101
-4123
97
31101
G4104
98
G18
31101
-4122
TG2x3
31101 - 4121
Rev. OCT. 30, '92 Yamaguchi

The future of Keratometery

Reichert Phoroptor

1. Cost $4000.00
2. Should be cleaned every year and overhauled every 3 years
3. Reichert warranties Phoroptors, for life if overhauled every 3 years by certified technician
4. Bearings must be lubricated. If lubricant dries out, you will have metal on metal scraping and you will lose fluid movement
5. Most of all, keep instrument covered when not in use.



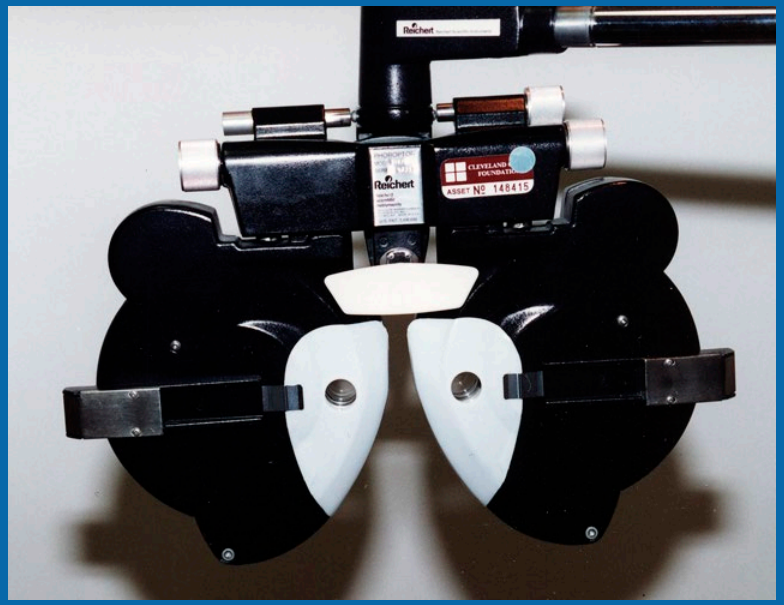
Marco Phoroptor

LED lights are standard which make refracting in the dark easier

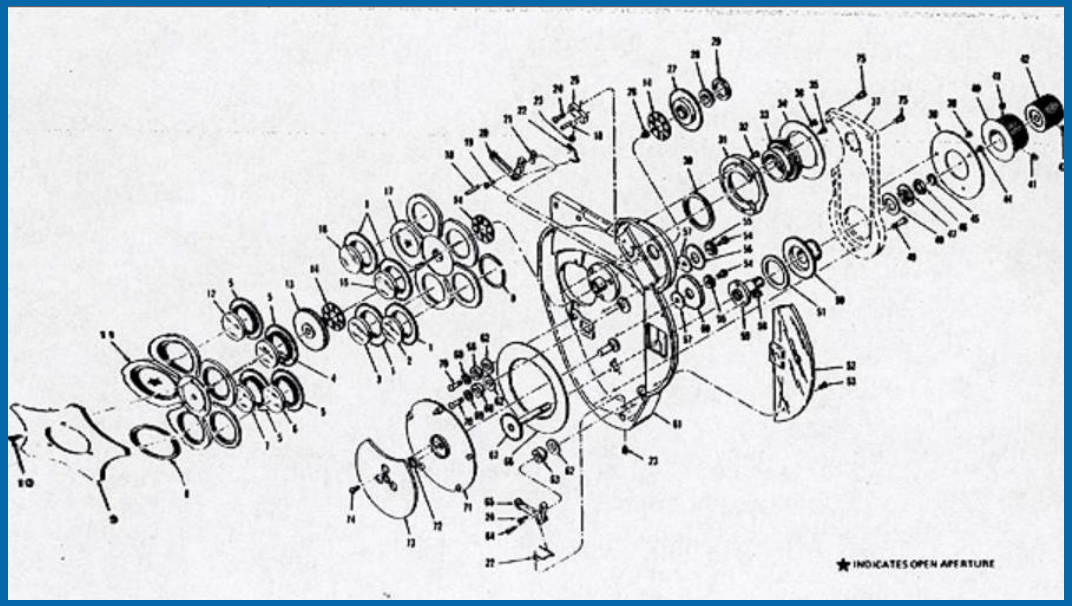
Phoroptor face shield

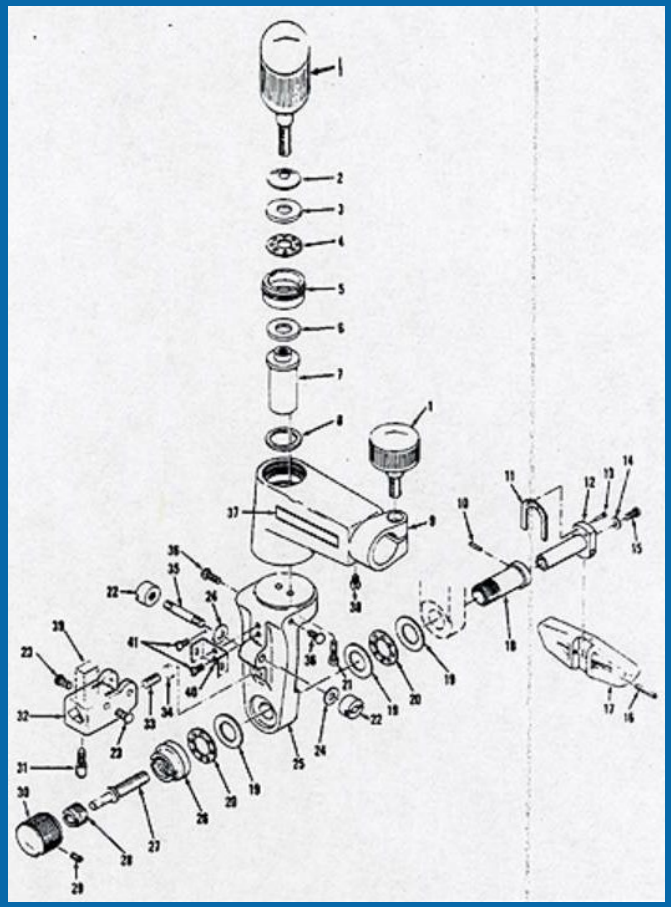
Pop out dust lens as it will fall back into phoroptor causing internal mechanisms to jam

To Clean Phoroptor



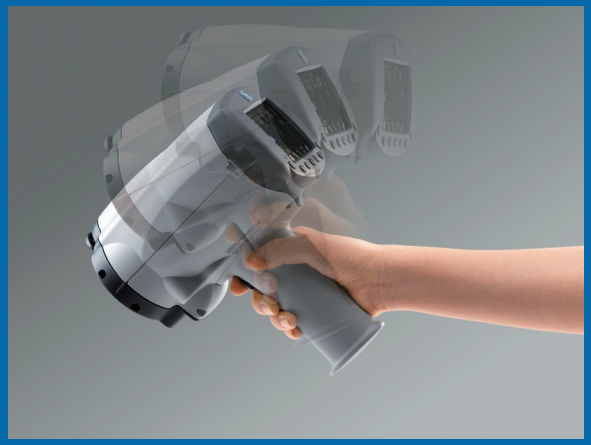
1. Use Q-Tips with warm water or Windex
2. Do not use alcohol, acetones, or harsh chemicals. They melt adhesive that holds lenses in place. You cannot just pop the lenses back in place as you will have improperly allied lenses
3. Newer face shields have protective lenses that could pop out and get stuck in Phoroptor causing down time and repair costs


★INDICATES OPEN APERTURE



Refraction System of the Future

Marco Handy Ref-K



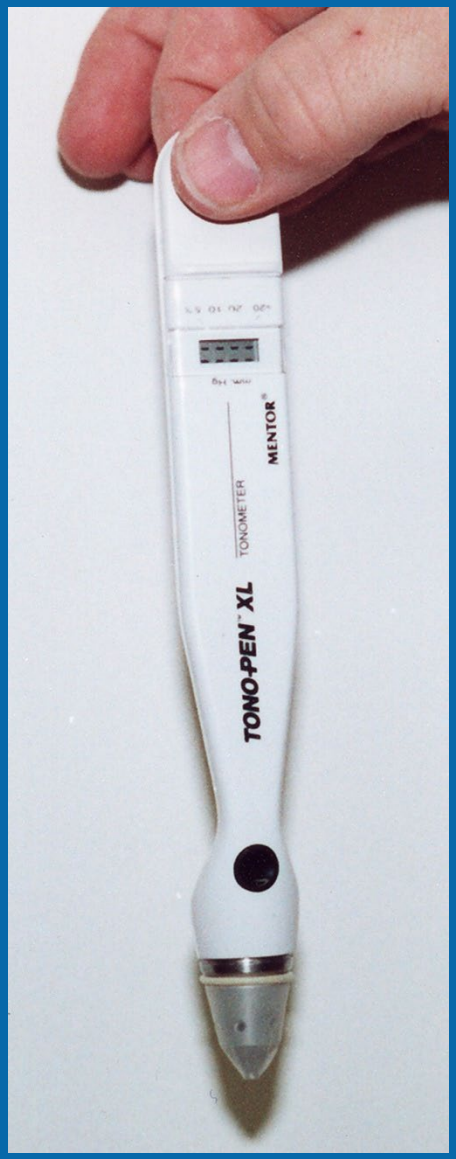
- Hand held autorefractor / keratometer
- Light weight and portable
- Can be used away from docking station
- Can be used on elderly, pediatric and handicapped patients
- Self calibrating
- Keep docking station ports clean

Tonopen

1. Always use Tonopen covers they cost $62.00 for 200 covers or $163 for 600, if not plunger will get stuck in the tip and will not calibrate
2. Always use the (blue) Reichert brand as opposed to the white or gray made by Trogen Company as these have powder on them and will gum up the plungers in the tip.
3. If plunger gets stuck, clean the tip with denatured alcohol
4. Clean battery terminals with denatured alcohol if any corrosion
5. Do not use Isopropyl alcohol 30% water causes corrosion

Tonopen Calibration (Calibrate once a day or as needed)

1. Push black button twice until calibration prompt appears
2. Hold Tonopen by back end tip facing down until up-command appears
3. Hold straight up until calibrated prompt appears
4. Push button again, wait until two broken black lines appear then check pressure



Pneumatonometer

1. Always use tip membrane or you will have inaccurate readings or even worse you could cause a corneal abrasion. Pneumatonometer tips $85 for one or three for $210.00

Pneumatonometer

2. Make sure air filters in back are clean and replace if necessary
3. Make sure tubes have no knots or obstruction in them
4. Calibrate once a week using approved calibration devices

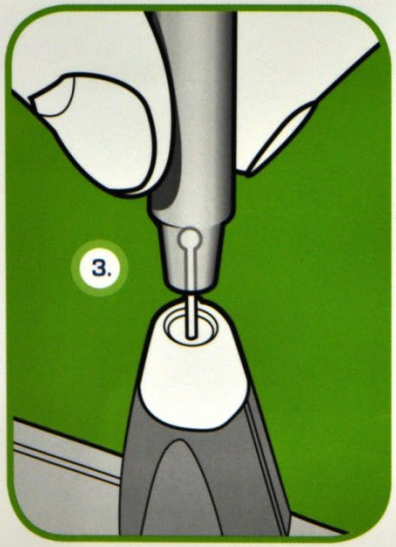
icare

- Runs on 4 Double A batteries
- One time usable probes are 82 cents
- Come in packs of 100
- Can be used in seconds
- Takes up to six measurements and gives you the average
- Self calibrating
- Clean probe base with alcohol and compressed air

TURNING THE TONOMETER ON AND LOADING THE PROBE

ALWAYS USE WRIST STRAP
FOR SAFE AND SECURE USE

1. Press the measuring button.
2. When display shows LoAd, load the single use probe into the tonometer as follows:
3. Open the probe tube. Remove the cap and insert the probe into the probe base. Be careful not to drop the probe from the tonometer.
4. Press the measuring button once. The tonometer is ready for use when 00 appears on the display.

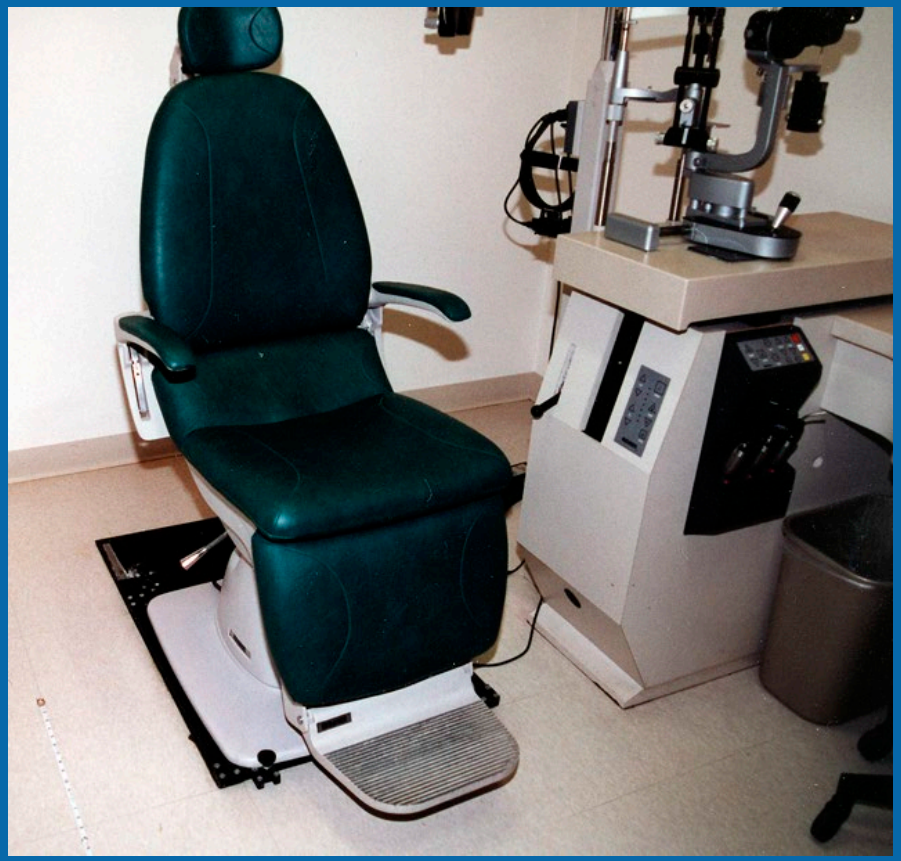


QUICK GUIDE


icare

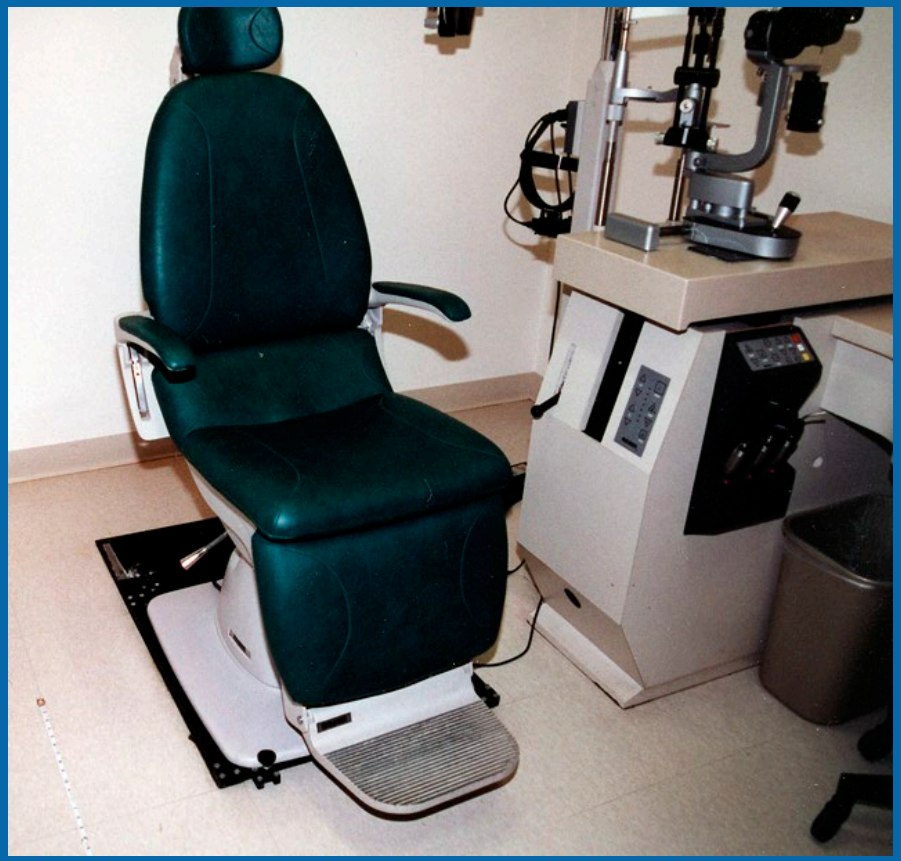
Chairs and Stands

- Hydraulic chairs are best and can lift a 300 pound patient
- Chairs with worm gears will break and strip if over 300 pounds are lifted.



Chairs and Stands

1. Use warm water and mild soap to clean chairs. Then use a protective coating of Armorall to keep from cracking and drying out.
2. Never use alcohol on vinyl as it will cause cracks.
3. Do not use graphite grease, turns into metal then dries out. Use bearing grease or 3 in 1 oil.

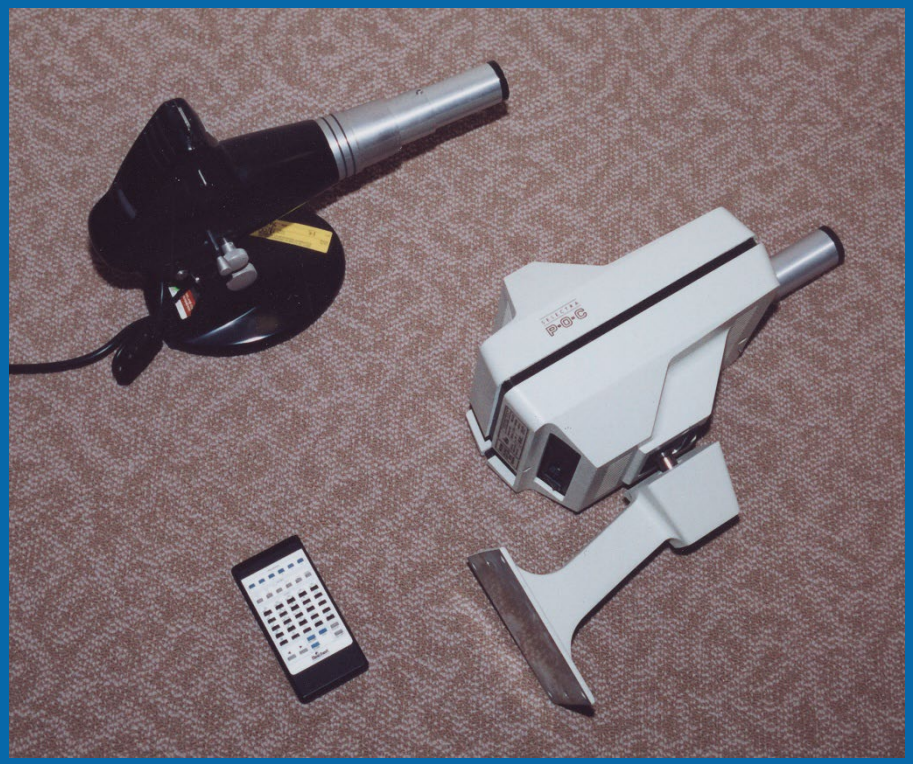


Macro Chairs

- Soft rubber on arms can be cleaned inbetween each patient with alcohol

POC Projection of Chart

1. Bulbs should be free of grease and dirt. Wipe with tissue before installing. Grease will burn on bulb surface causing short bulb life.
2. Old style POC incandescent bulbs cost $5.00 and cast a yellowish hue on chart.



POC Projection of Chart

3. New style halogen POC bulbs cast a white back ground on screen, cost $34.00
4. Old CAX bulb cost $9 lasts 40 hours. New Halogen lasts 1000 hours Within 4 years you can pay for a new POC at a cost of $980

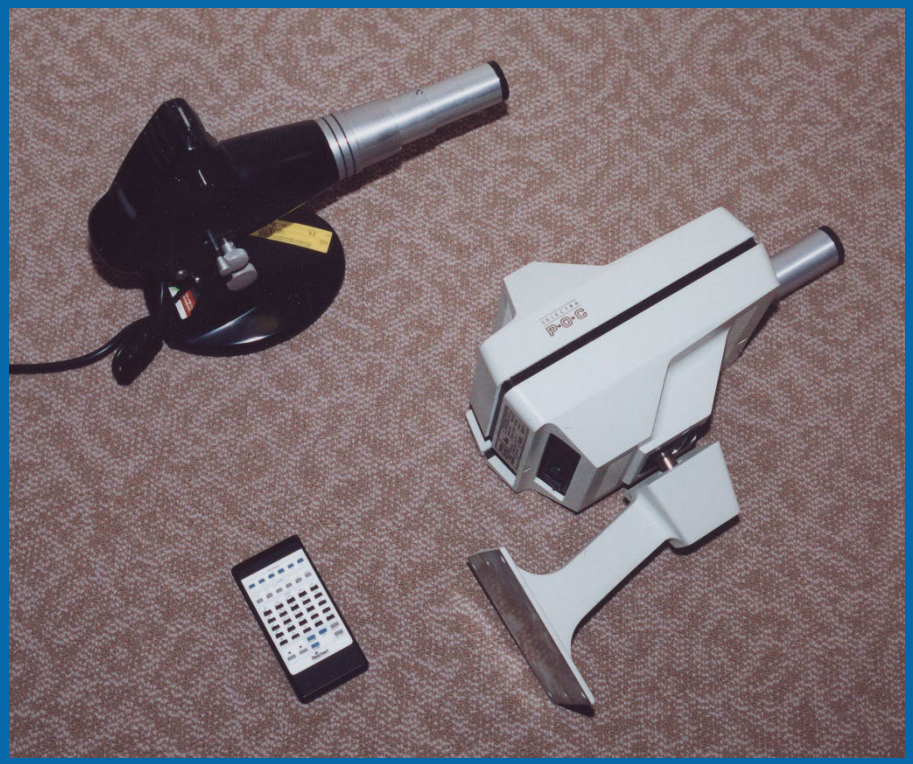


Chart Calibration

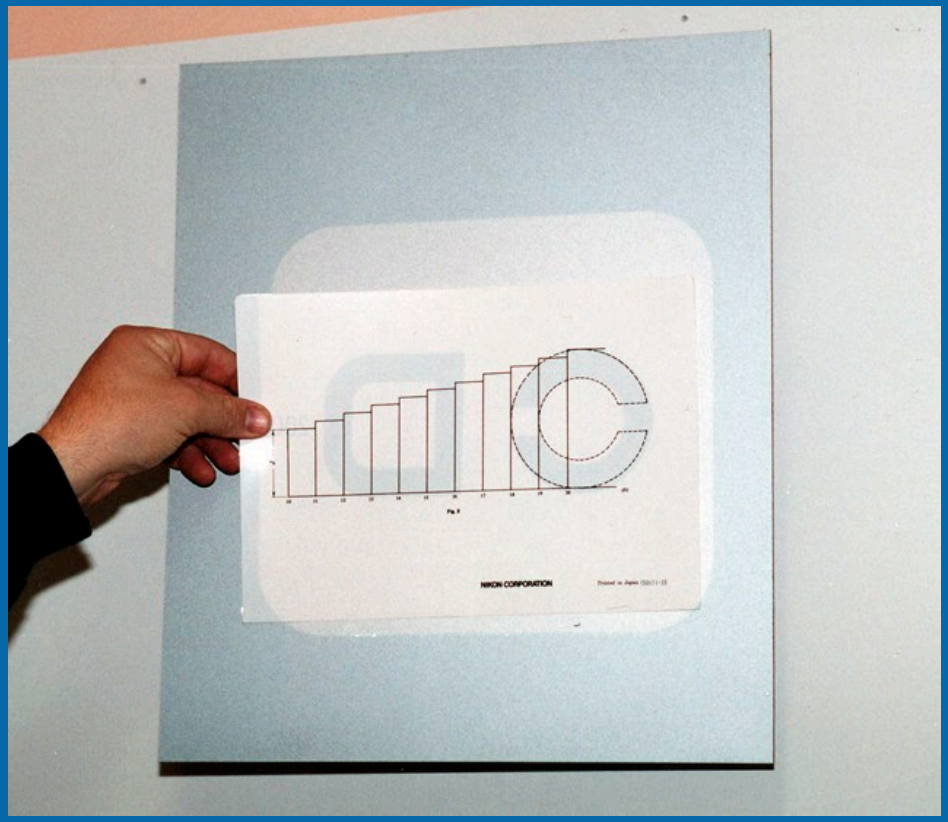
1. Chart Calibration should be done with a calibration chart set at the equivalent of 20 feet using mirrors with moveable mounts if necessary and a calibration chart at 20/200 snellen symbol
2. Do not use a xerox or photo copy of chart, only an original manufacturer chart

Chart Calibration

- Slide bars should be cleaned with Windex using tissues. Never use water. Characters are pressed between two pieces of glass and water marks between glass and cannot be removed.

Chart Calibration

- Mirrors need to be at same angle as reflected image or lines will not appear straight.



Technology of the future

Slit Lamps

- 2 Styles

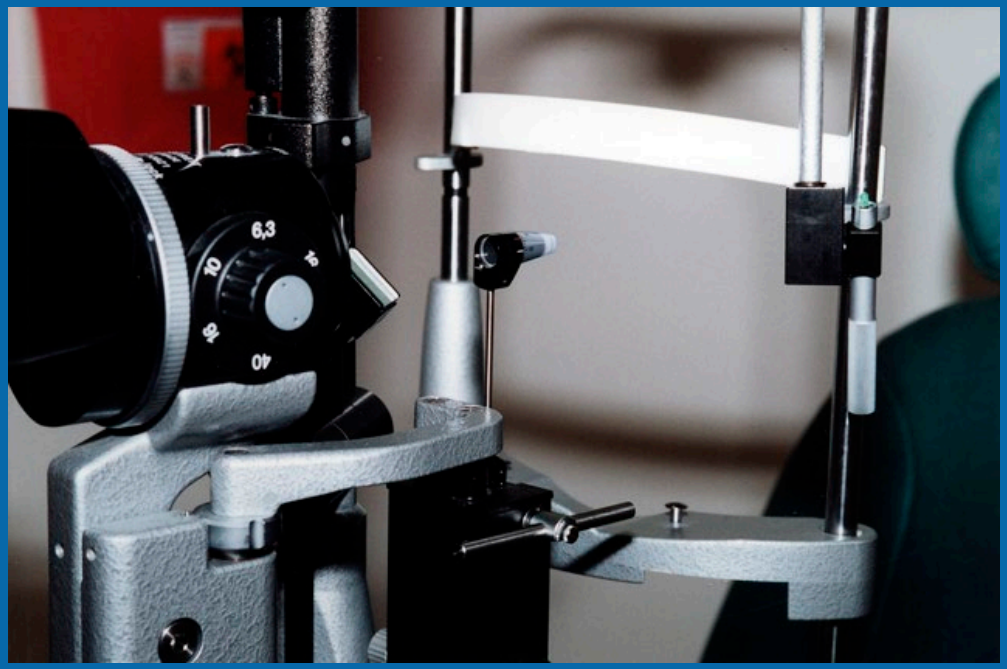
Haag Streit

Zeiss

Care of Slit Lamp

- Keep mirrors and optics clean with Windex or warm soap water. Never use alcohol or acetone.
- Lubricate guide racks, cylinder walls, and center pins
- Clean dust bunnies on bottom of joystick and lubricate joystick and pad
- Haaug Streit slit lamp. Clean objective lens underneath bulb when replacing do dust and dirt going through cap

Calibration of Slit Lamp



- Calibrate with calibration rod that corresponds with type of Tonometer you have. Insert rod in corresponding hole and check at 0, 20, and 60 by moving Tonometer knob and checking for balance of prism.

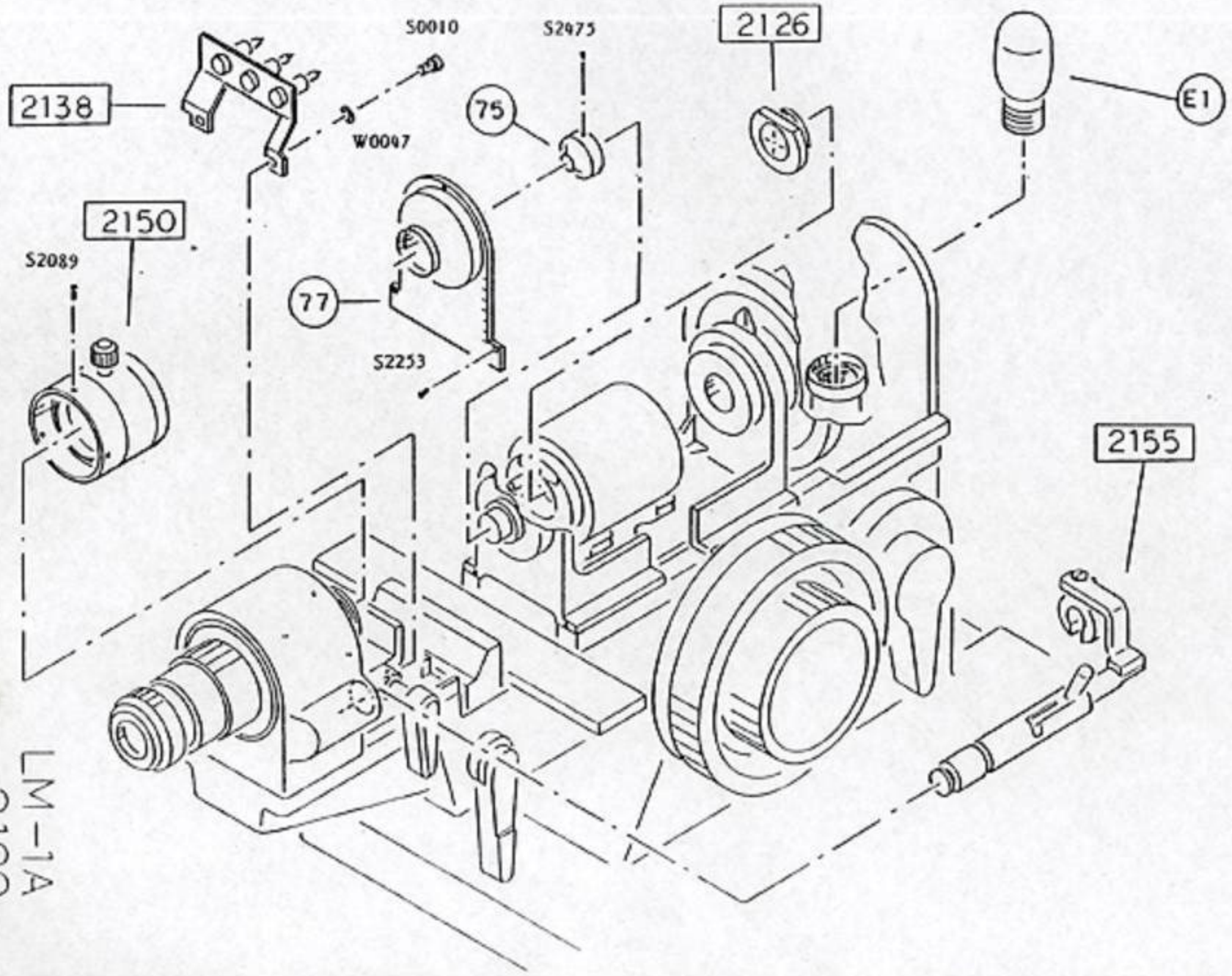

5
12
8
20
12
32

Calibration of Slit Lamp

- Use focusing rod to check optics, and adjust if possible from outside.
- Focusing rods put you at the best working distance
- Never touch the internal prisms.

Lensometers
Automated and Manual

- Adjust eye piece with piece of white paper
- Keep eye piece clean and dust free
- While checking calibration, set side knob at plano. Looking through calibrated eye piece, you should see sphere and cylinder bars clear at 90 and 180.
- Clean eye piece with soap and warm water, never alcohol or solvents as they will melt the rubber over time and leave black marks on your face.



LM-1A
2100
Rev.

FIG 1-b


TOPCON
CL 2000
HUMPHREY

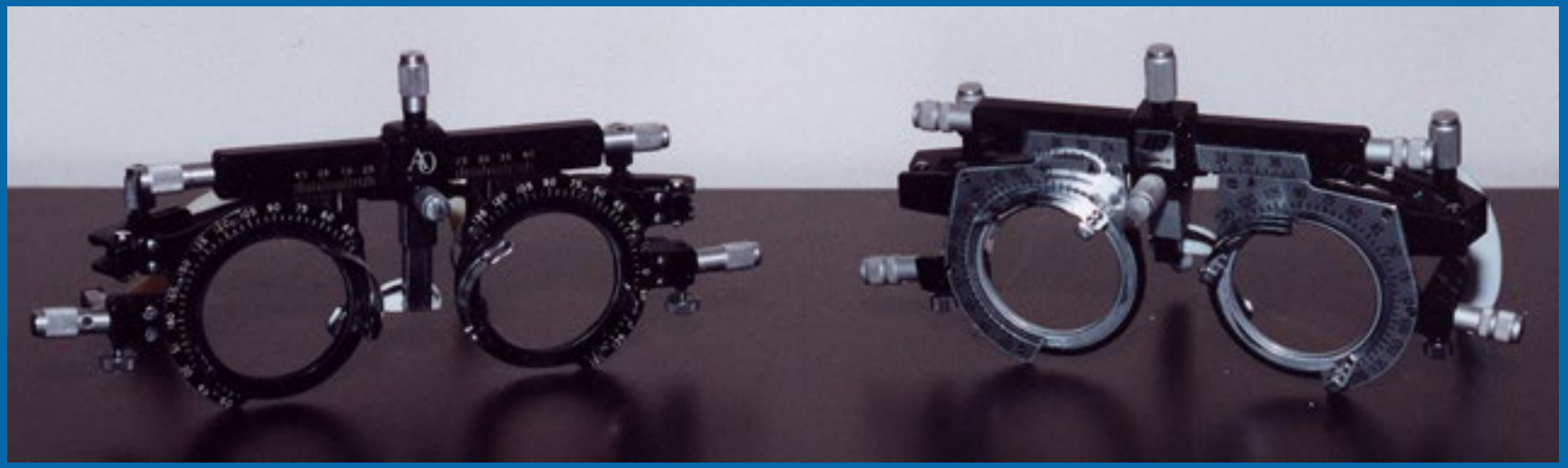
Technology of the Future

WAVE PRO Auto Lensometer XV-40

- Made by visionix in Buffalo, New York
- Only lensometer that reads prism at a touch of a button
- Will read both lens in 30 seconds
- Keep lens base clean


VISIONIX

Trial Frames



- Tighten screws (Use Loctite or Nail Polish to tighten stripped screws)
- Clean ear pieces
- Crimp lens holders
- Lubricate movable parts

Other Types of Equipment

- Various other types of equipment are self contained
- Bulbs need to be replaced
- Lens, bulbs, and contacts need to be kept clean
- Clean globes with soap and warm water

Hand Held Lens Care

- Clean with Windex or warm water, and a soft cloth. Never use harsh chemicals, alcohol or abrasive materials such as facial tissues as you could wipe off protective lens coatings.
- O rings can be tightened using two plastic instruments, such as, a plastic screw driver. Never use metal as it will slip out of the side slots and scratch your lens.


VOLK® Pan Retinal
VOLK®
VOLK® DOUBLE ASP
STEREO FUNDUS LENS U.S.A.
U.S.A.

Remember to Check the Big Four

1. Power
2. Connection
3. Rheostat
4. Bulb

Cover Your Equipment

- Heat and air conditioning are not your equipment's best friend
- Drop ceiling will harbor dust and fibers that will drop into your epuipment
- New office construction, never install vents over equipment
- Covering equipment will save you cleaning time and repair costs

Cover Your Equipment

- If you have clean equipment in good working condition it will make your job a whole lot easier and make for a happier work environment.

With Friends and Co-Workers

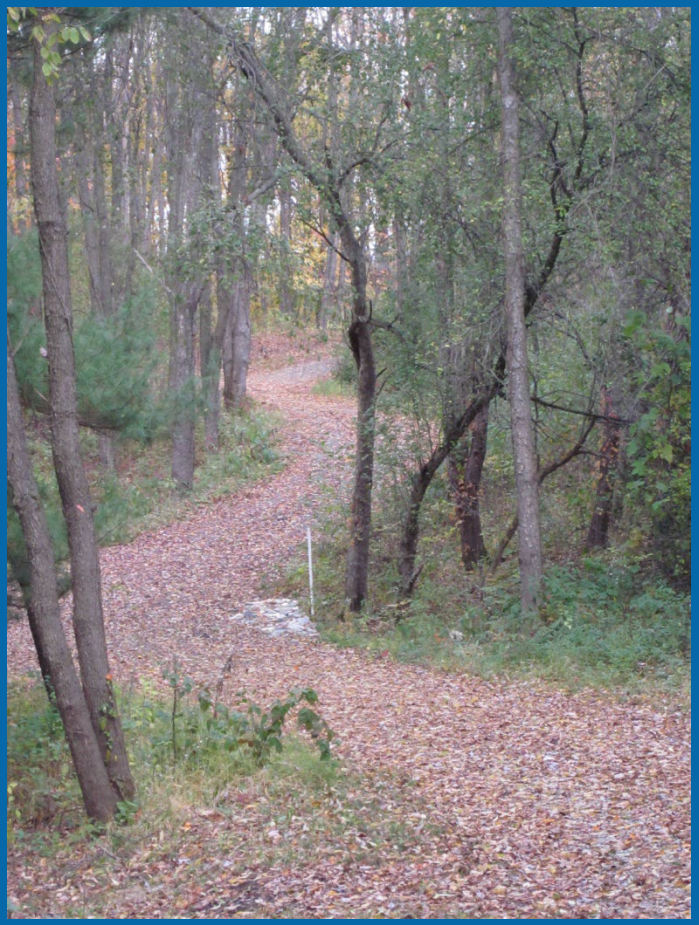
Happy Doctors

And the most important things of all . . .

Time to Get Away and Have Some Fun

Success is not measured by the easiest route

With all the new equipment out there. . .
There is a long and winding road ahead….



Remember to Always Look Towards the Future. . .