

AP250

Automated Chart Projector

User's Guide



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Caution: Federal law restricts this device to sale by or on the order of a Physician or Practitioner.

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Warnings & Cautions

Reichert Technologies® (Reichert) is not responsible for the safety and reliability of this instrument when:

- Assembly, disassembly, repair, or modification is made by unauthorized dealers or persons.
- Instrument is not used in accordance with this User's Guide.

WARNING: AN INSTRUCTION THAT DRAWS ATTENTION TO RISK OF INJURY OR DEATH.



WARNING: UNITED STATES FEDERAL LAW AND EUROPEAN REGULATIONS REQUIRE THAT THIS DEVICE BE PURCHASED ONLY BY A PHYSICIAN OR A PERSON ACTING ON BEHALF OF A PHYSICIAN.

WARNING: THIS INSTRUMENT SHOULD BE USED IN STRICT ACCORDANCE WITH THE INSTRUCTIONS OUTLINED IN THIS USER'S GUIDE. THE SAFETY OF THE OPERATOR AND THE PERFORMANCE OF THE INSTRUMENT CANNOT BE GUARANTEED IF USED IN A MANNER NOT SPECIFIED BY REICHERT TECHNOLOGIES.

WARNING: DO NOT REPAIR OR SERVICE THIS INSTRUMENT WITHOUT AUTHORIZATION FROM THE MANUFACTURER. ANY REPAIR OR SERVICE TO THIS INSTRUMENT MUST BE PERFORMED BY EXPERIENCED PERSONNEL OR DEALERS WHO ARE TRAINED BY REICHERT OR SERIOUS INJURY TO THE OPERATOR OR PATIENT MAY OCCUR.

WARNING: MODIFICATIONS TO THIS INSTRUMENT ARE NOT ALLOWED. ANY MODIFICATION TO THIS UNIT MUST BE AUTHORIZED BY REICHERT OR SERIOUS INJURY TO THE OPERATOR OR PATIENT MAY OCCUR.

WARNING: IF THIS INSTRUMENT IS MODIFIED, APPROPRIATE INSPECTION AND TESTING MUST BE CONDUCTED TO ENSURE CONTINUED SAFE USE OF THIS INSTRUMENT.

WARNING: TO AVOID RISK OF ELECTRIC SHOCK, THIS EQUIPMENT MUST ONLY BE CONNECTED TO A SUPPLY MAINS WITH PROTECTIVE EARTH OR DAMAGE TO THIS INSTRUMENT AND/OR INJURY TO THE OPERATOR OR PATIENT MAY OCCUR.

WARNING: ENSURE THAT THE VOLTAGE APPLIED TO THE UNIT IS THE SAME AS THE VOLTAGE THAT IS INDICATED ON THE DATA PLATE OR DAMAGE TO THE UNIT MAY OCCUR.

WARNING: THIS INSTRUMENT MUST BE PLUGGED INTO AN OUTLET WITH AN EARTH GROUND. DO NOT REMOVE OR DEFEAT THE EARTH GROUND CONNECTION ON POWER INPUT CONNECTOR OR THE UNIT'S POWER CORD OF THIS INSTRUMENT OR DAMAGE TO IT AND/OR INJURY TO THE OPERATOR OR PATIENT MAY OCCUR.

WARNING: THE EQUIPMENT OR SYSTEM SHOULD NOT BE USED ADJACENT TO OR STACKED WITH OTHER EQUIPMENT AND THAT IF ADJACENT OR STACKED USE IS NECESSARY, THE EQUIPMENT OR SYSTEM SHOULD BE OBSERVED TO VERIFY NORMAL OPERATION IN THE CONFIGURATION IN WHICH IT WILL BE USED.

WARNING: THIS INSTRUMENT IS NOT SUITABLE FOR USE IN THE PRESENCE OF FLAMMABLE ANESTHETIC MIXTURES, SUCH AS OXYGEN OR NITROUS OXIDE.

WARNING: THE USE OF ACCESSORIES OR CABLES OTHER THAN THOSE SPECIFIED, WITH THE EXCEPTION OF THOSE SOLD BY THE MANUFACTURER AS REPLACEMENT PARTS FOR THE INTERNAL COMPONENTS, MAY RESULT IN INCREASED EMISSIONS OR DECREASED IMMUNITY OF THE EQUIPMENT OR SYSTEM.

WARNING: DO NOT OBSTRUCT ANY VENTILATION SLOTS.

WARNING: DO NOT SET-UP THE INSTRUMENT IN HUMID CONDITIONS. AVOID DRIPPING OR SPLASHING WATER NEAR THE INSTRUMENT.

WARNING: DISCONNECT THE POWER CABLE PRIOR TO REPLACING THE AP250'S HALOGEN BULB. ALLOW THE LAMP TO COOL-DOWN BEFORE TOUCHING OR INJURY (BURNING) MAY OCCUR.

Warnings & Cautions (continued)

CAUTION: AN INSTRUCTION THAT DRAWS ATTENTION TO THE RISK OF DAMAGE TO THE PRODUCT.



CAUTION: THE INTERNAL CIRCUITRY OF THE INSTRUMENT CONTAINS ELECTROSTATIC DISCHARGE SENSITIVE DEVICES (ESD) THAT MAY BE SENSITIVE TO STATIC CHARGES PRODUCED BY THE HUMAN BODY. DO NOT REMOVE THE COVERS WITHOUT TAKING PROPER ESD PRECAUTIONS.

CAUTION: DO NOT USE SOLVENTS OR STRONG CLEANING SOLUTIONS ON ANY PART OF THIS INSTRUMENT AS DAMAGE TO THE UNIT MAY OCCUR. SEE MAINTENANCE SECTION FOR DETAILED CLEANING INSTRUCTION.

CAUTION: MEDICAL ELECTRONIC EQUIPMENT NEEDS SPECIAL PRECAUTIONS REGARDING EMC AND NEEDS TO BE INSTALLED AND PUT INTO SERVICE ACCORDING TO THE EMC INFORMATION PROVIDED IN THE ACCOMPANYING DOCUMENTS.

CAUTION: PORTABLE AND MOBILE RF COMMUNICATIONS EQUIPMENT CAN AFFECT MEDICAL ELECTRICAL EQUIPMENT.

CAUTION: THIS INSTRUMENT IS NOT TO BE USED NEAR HIGH-FREQUENCY EMITTING SURGICAL EQUIPMENT.

CAUTION: THIS INSTRUMENT IS NOT INTENDED TO BE CONNECTED TO EQUIPMENT OUTSIDE THE CONTROL OF REICHERT TECHNOLOGIES OR MUST BE TESTED TO AN APPLICABLE IEC OR ISO STANDARDS.

CAUTION: NEVER LOOK DIRECTLY INTO THE AP250'S LIGHT SOURCE.

CAUTION: DISCONNECT THE POWER CABLE PRIOR TO REPLACING THE AP250'S HALOGEN BULB. ALLOW THE LAMP TO COOL-DOWN BEFORE TOUCHING OR INJURY (BURNING) MAY OCCUR.

Symbol Information

Symbol Information

The following symbols appear on the instrument:



Caution symbol indicating important operating and maintenance instructions that are included in this User's Guide



Type B Applied Part



Accompanying Documents must be consulted



Alternating Current Power



Protective Earth Connection



ON / OFF



Date of Manufacture

REF

Catalog Number

S/N

Serial Number



Waste of Electrical and Electronic Equipment



Compliance to Medical Device Directive 93/42/EEC



Underwriter's Laboratories has independently evaluated this device using selected tests from US and Canadian versions of IEC 60601-1 standard, and assigned a control number



Authorized Representative in European Community



Fragile Contents in Shipping Container - handle with care



Keep Dry - Package shall be kept away from rain



This Way Up - Indicates correct upright position of package

Introduction

Congratulations on the purchase of your new AP250 Automated Chart Projector from Reichert Technologies®.

This user's guide is designed as a training and reference manual for the operation and maintenance of the instrument. We recommend that you read it carefully prior to use and follow the instructions to ensure optimum performance of your new instrument. Properly trained eyecare professionals such as ophthalmologists, optometrists, opticians and eye care technicians should operate this instrument.

Please retain this manual for future reference and to share with other users. Additional copies can be obtained from your authorized Reichert® distributor or from the Reichert customer service department at:

Tel: 716-686-4500

Fax: 716-686-4555

Email: reichert.information@ametek.com

Indications for use

In the field of subjective refraction, the AP250 is used for measuring visual acuity.

Contraindications

None.

Features and Functions

Instrument Components

- | | |
|----------------------------|--|
| 1. Projector Head | 8. Fuse Compartment with Voltage Indicator |
| 2. Projection Lens | 9. Power Input |
| 3. Remote Detection Window | 10. Halogen Bulb Housing |
| 4. Remote Control Unit | 11. Chart Focusing Control |
| 5. Mounting Bracket | 12. Distance Focusing Control |
| 6. Clamp-down Screw | 13. RS232C Serial Port |
| 7. Power Switch | |

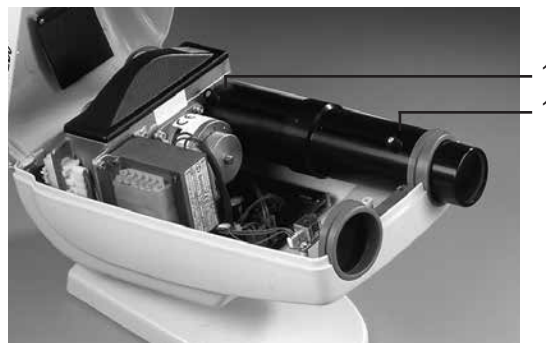
Package Contents

Your new AP250 Automated Projector and accessories were carefully packed and checked prior to shipment; however, please check condition and contents upon delivery. In addition to your AP250, this shipment should include:

- 1 Spare Halogen Bulb (P/N 13806)
- 1 Power Cord (P/N WCBL10018)
- 1 Dust Cover (P/N 4013110)
- 1 Remote Control (P/N 13816)
- 2 Hexagon Keys (3 mm and 5 mm)
- 2 Spare Fuses 500 ma (110 V)
- 2 Spare Fuses 250 ma (230 V)
- 1 Pair of red/green spectacles (P/N 13814)
- 1 Pair of polarizing spectacles (P/N 13815)
- 4 AAA-sized batteries
- 1 Wall mount (2 pieces) (P/N 12091)
- 1 Screen (P/N 11808)

Optional Accessories

- Flange Style Halogen Bulb (pre S/N 10897-02) (P/N 13813)
- 2-Pin Halogen Bulb (post S/N 10896-02) (P/N 13806)
- Table Mount (P/N 12090)
- Instrument Stand Mount (P/N 12092)
- Floor Stand Mount (P/N 12096)



Setup

Installation

The AP250 should be installed according to the following procedures.

1. If using a wall mount, it is best to locate a wall stud to support the projector's weight. Install the wall mount with appropriate hardware for the type of wall it is being installed on.
2. The following distances are important in the set-up of a refracting room:

REFRACTING DISTANCE (RD)

The distance from the patient's eye to the screen.

PROJECTION DISTANCE (PD)

The distance from the slide to the screen.

LETTER HEIGHT (LH) The height of a 20/200 character should be equal to the refracting distance times the tangent of 50 minutes of arc or $.014545 \cdot LH$ (inches) or (mm) = RD (inches) or (mm) $\times .014545$

For example, a refracting distance of 240 inches (20 feet) will require a 20/200 height of 3.49 inches (240 inches $\times .014545 = 3.49$ inches) or for a 4000 mm (4 m) refracting distance, you will require a letter height of 58.18 mm (4000 mm $\times .014545 = 58.18$ mm).

3. Determine the refracting distance by measuring the distance from the patient to the screen. Please refer to Figures 1 and 2, below, which show combinations of refracting and projection distances achievable with this system.
4. Install the projector screen.
5. If attaching the AP250 to a mount, loosen the clamp-down screw (see page 6, #6) and insert the projector mount onto the ball. Tighten screw, allowing for some movement of the projector for final positioning. Fully tighten the screw after final adjustment and alignment of the system.
6. Make sure the voltage indicator number corresponds with the available local mains.
7. Plug power cord into AC inlet and into a wall power outlet. Set the power switch to the "ON" position.

Note: For proper operation, the remote typically needs to be more than 5 ft (1.5 m) away from the projector. Make sure no objects that could interrupt remote control signals are located between remote control and projector.

PROJECTION RANGE LIST					
Projection Distance		Minimum Refracting Distance		Maximum Refracting Distance	
ft	m	ft	m	ft	m
10	3.0	7.4	2.3	11.6	3.5
11	3.3	8.2	2.5	12.7	3.9
12	3.6	8.9	2.7	13.0	4.2
13	3.9	9.6	2.9	15.0	4.6
14	4.2	10.4	3.2	16.2	4.9
15	4.5	11.1	3.4	17.3	5.3
16	4.8	11.8	3.6	18.5	5.6
17	5.1	12.6	3.8	19.6	6.0
18	5.4	13.3	4.1	20.8	6.3
19	5.7	14.0	4.3	21.9	6.7
20	6.0	14.8	4.5	23.1	7.0
21	6.4	15.5	4.7	24.3	7.4
22	6.7	16.2	4.9	25.4	7.7
23	7.0	17.0	5.2	26.6	8.1
24	7.3	17.7	5.4	27.7	8.4
25	7.6	18.4	5.6	28.9	8.8
26	7.9	19.2	5.8	30.0	9.2

Figure 1 - Projection Range List - Feet & Meters

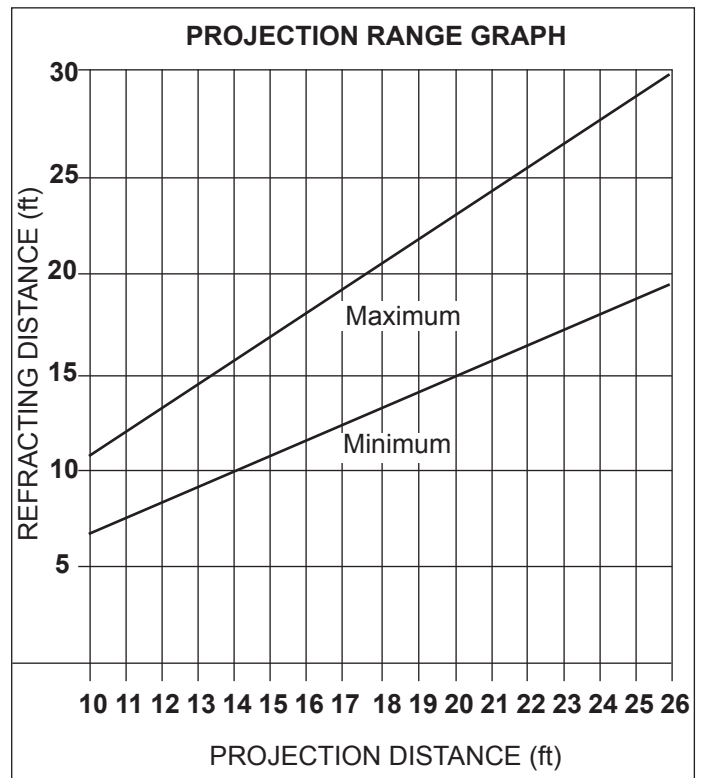


Figure 2 - Projection Range Graph in Feet

Setup (continued)

110V/230V Operation

To ensure proper operation, check the fuse voltage setting on the power input module. The factory setting is 110 V. If 230 V operation is desired, remove the fuse holder and pull out the white plastic insert. Refer to Figure 3. Rotate the insert so "230" appears in the window when inserted in the fuse holder. Remove the 500 mA fuses and replace them with 250 mA fuses. See page 14 for fuse types. Install the fuse holder in the power input connector.




Figure 3 - Fuse Orientation

Alignment & Focusing

WARNING: PROPER SETTING OF THE FOCUS AND DISTANCE CONTROLS REQUIRES THAT THE PROJECTOR COVER BE OPEN WHILE THE INSTRUMENT IS PLUGGED IN AND TURNED ON. UTILIZE ONLY THE DISTANCE AND FOCUS CONTROLS WHILE THE COVER IS OPEN. DO NOT TOUCH ANY OTHER COMPONENTS UNDER THE COVER OR PERSONAL INJURY MAY RESULT.

The AP250 can be optimally focused at projection distances between 10 ft (3 m) and 26.5 ft (8 m) when the patient and projector are equidistant from the projection screen.

1. Project a 20/200 or 0.1 character onto the screen by pressing the  key.
2. Check the three-dimensional alignment of the system. To optimize the alignment, it may be necessary to angle the screen to direct light towards the patient's head. As a test, place a mirror on the screen. The light should project where the patient's head would be (see Figure 3).
3. Adjust the image positioning on the screen. It may be necessary to adjust the projector and the screen. Secure projector by tightening mounting screw.
4. Determine the proper letter size based on the refracting distance used. Refer to the Letter Sizing Charts at the end of this manual.
5. Attach Letter Sizing Chart to the screen.
6. Open the projector cover by removing the hexagon screw under the front of the AP250.
7. Move the AP250's focusing controls (see page 5, # 11 & 12) until the 20/200 or .01 "Z" is in sharp focus and fills the bracket on the Letter Sizing Chart, as shown in Figure 3.

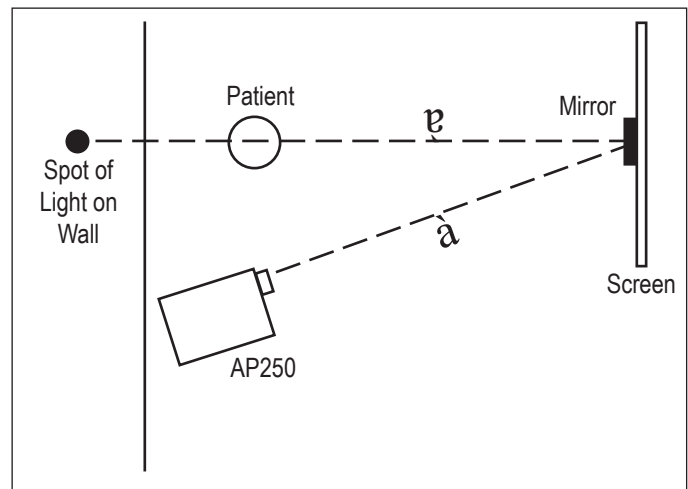


Figure 3 - Checking three-dimensional alignment.

Note: To obtain longer refracting distances in small rooms, a mirror or system of mirrors can be used. A high quality front-surface mirror is required. See Figure 4 as an example of a short room with a full refracting distance of 20 feet.

Note: To prevent interference with the operation of the Remote Control window, care should be taken not to position any bright lights directly toward the front of the AP250.

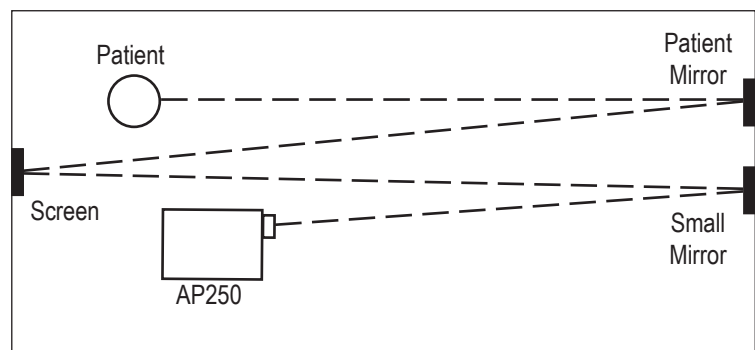


Figure 4 - Using a mirror system in a small room.

Instructions for Use

Remote Control

The AP250 is operated by an intuitive remote control that is divided into various sections for ease of use. When the power switch on the back of the instrument is in the ON position, slides can be projected by simply pushing any button. The Lamp ON / OFF button can be used to turn the lamp off at anytime. Otherwise, the AP250 lamp shuts off automatically after 10 minutes of non-use.

To use the AP250, simply press any button on the remote control and the respective slide will be displayed. Red/ Green or Polarizing filters, and a variety of character / line isolation masks can be applied to almost any chart by pressing the appropriate buttons.

Note: The re indicator light flashes when pressing any remote control function, indicating that the control is functioning properly.

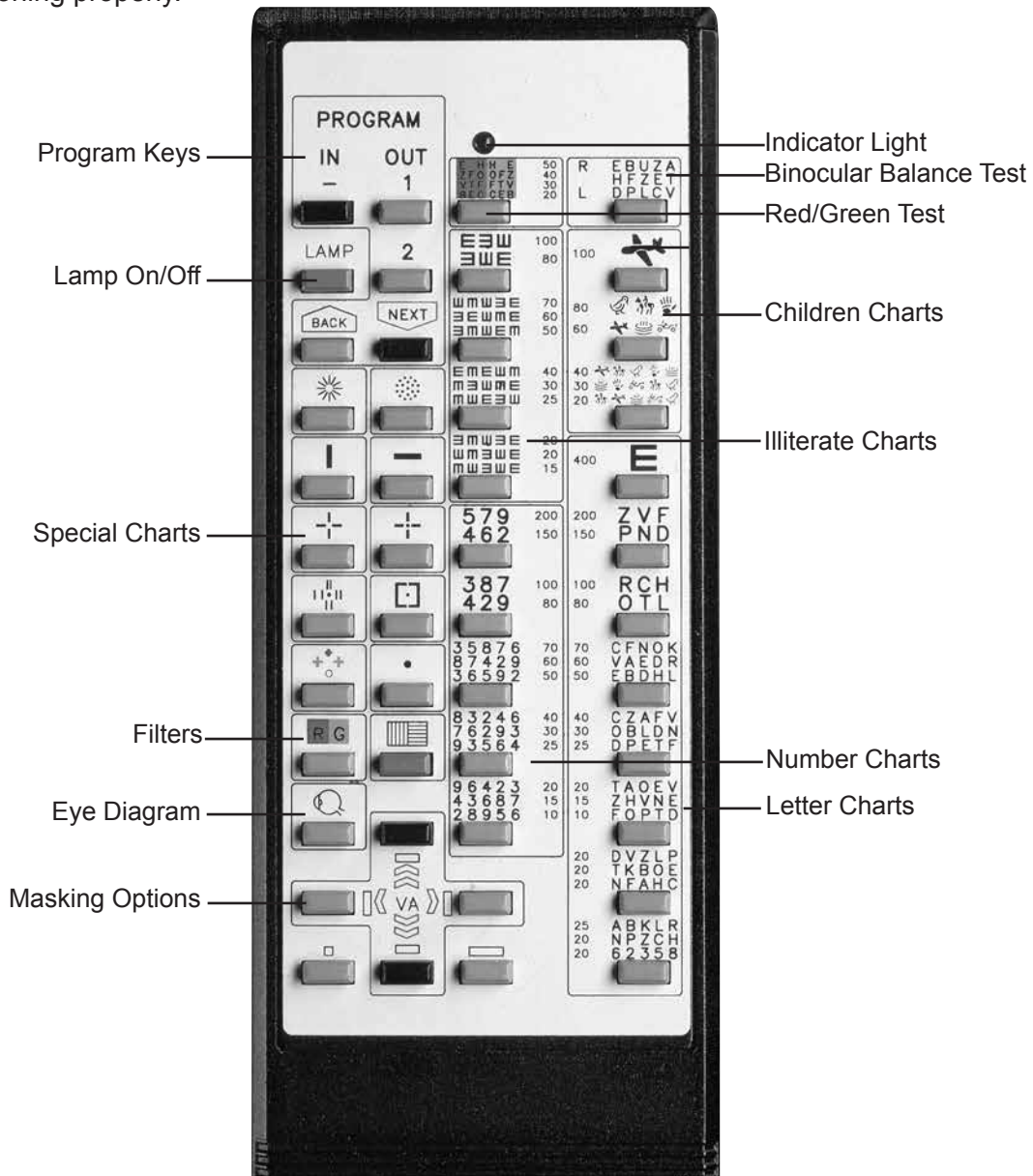


Figure 5 - Remote Control Unit

Instructions for Use (continued)

Programming the Remote

When more than one projector is used in close proximity to another, it may be necessary to program the remote control to respond with a specific unit.

Earlier AP250 remote controls are black in color and have dip switches accessible from the back of the remote as in Figure 6. Newer remotes are gray in color and do not have these switches. Refer to the corresponding section for your remote to program the remote to work with your projector.

Remotes with Dip Switches

The codes of the projector and remote control are factory set to 00. To change the code, follow the steps below:

1. Open the battery compartment on the rear of the remote control (see Figure 6). Use a small pointed object to select a new switch position combination. Sixteen combinations are possible.
2. Turn the power switch on the rear of the projector to the OFF position. With the Remote Control approximately 5 ft (1.5 m) away from the AP250's Remote Detection Window, press the IN Program Key while simultaneously switching on the projector. You may require an assistant to help.
3. The AP250 will emit a short beep. Continue holding the IN Program Key until you hear a longer beep. The code setting is now complete.

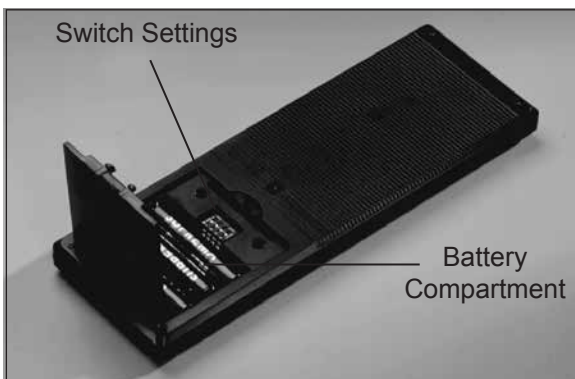
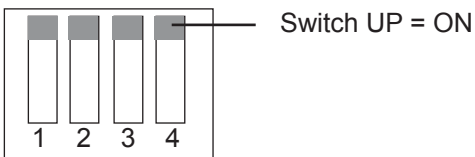


Figure 6 - Changing the Switch Settings

Remotes without Dip Switches Configure the Remote

The following will program the individual remote to a specific configuration.

1. Turn on the AP250.
2. At the same time, press key "1" and "3" on the remote control. Refer to Figure 7.

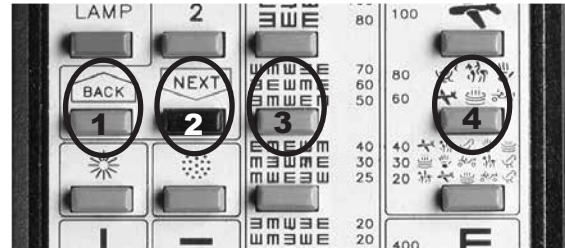


Figure 7 - Corresponding Buttons

3. The LED light on the remote control will turn on.
4. Choose a configuration for this remote control by pressing "1", "2", "3" or "4".

Note: If multiple units are in the same room, repeat steps 1-4 with the other remote controls, choosing a different configuration number for each unit.

Connect the Remote

Once the remote is programmed to a specific configuration, it must be programmed to work with a specific projector.

1. Turn off the AP250.
2. Place the remote control within 3 feet of the front of the AP250 so that infrared rays can be easily received by the projector.
3. Press and hold the IN button on the remote control, and then turn on the AP250.

Note: In other models you must use "Program1" or "Program2" button.

4. The AP250 will make short "beep" sounds.
5. Once the remote is programmed to the AP250, the AP250 will make a long "beep".

Instructions for Use (continued)

Programming Slide Sequences

The AP250 can record two (2) custom slide sequences, including masks. Follow the steps below to store, edit and interrupt a programmed slide sequence. Refer to Figure 8 for the following instructions.

Storing a Slide Sequence

1. Press Program Key 1 or 2.
2. Press the IN Program Key.
3. Press the buttons of the desired slides, in the desired order, followed by the NEXT button after each slide.
4. After pressing the final slide of the sequence, press the OUT Program Key. The slide sequence is now stored in the selected order as program 1 or 2.

Using the Programmed Sequence

1. Press the Program Key (1 or 2).
2. Press the NEXT or BACK Key to display the slides within your program sequence.

Interrupting a Slide Sequence at a Defined Point

1. Press the Program Key (1 or 2) you want to interrupt.
2. Press the IN Program Key.
3. Press the NEXT Program Key until the slide appears that you want to conclude the sequence.
4. Press the OUT Program Key. The new slide sequence is now stored.

Editing a Stored Slide Sequence

1. Press the Program Key (1 or 2) you want to edit.
2. Press the NEXT Program Key until the slide to be changed appears on the screen.
3. Press the IN Program Key.
4. Press the new slide.
5. Confirm the new slide selection by pressing the NEXT Program Key.
6. Press the OUT Program Key. The new slide sequence is now stored.

Masking Options

The AP250's masking options allow the operator to isolate horizontal lines, vertical lines and individual charts. See Figure 7 below for functions of masking buttons.

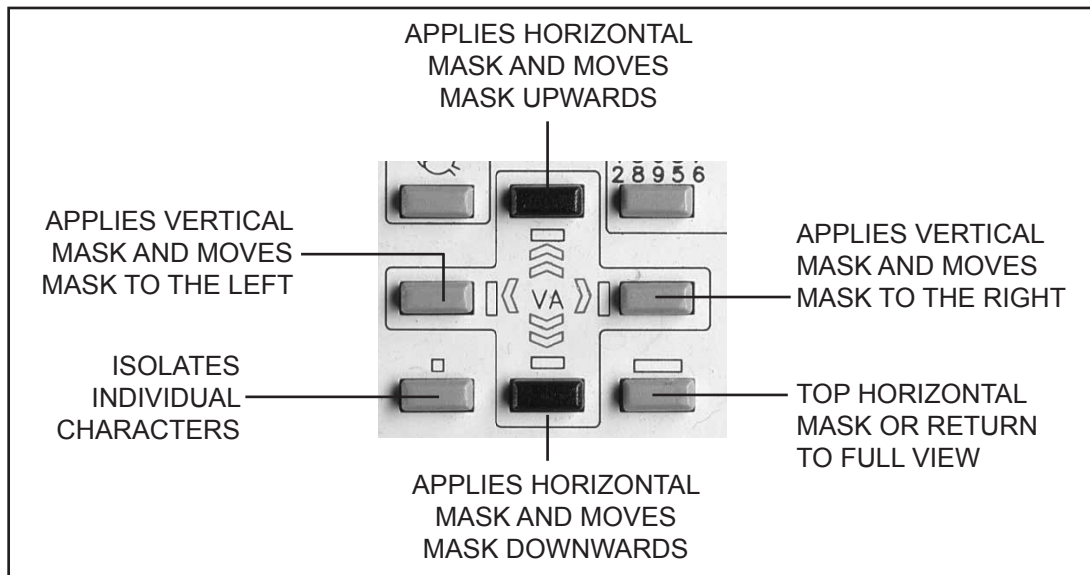
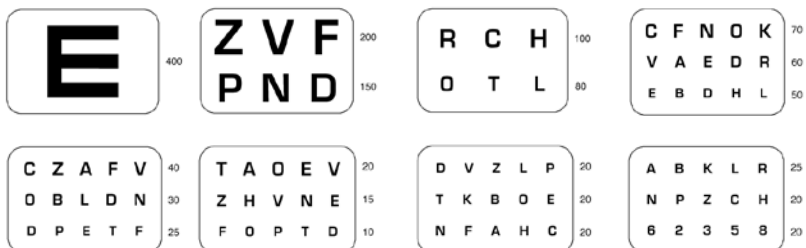


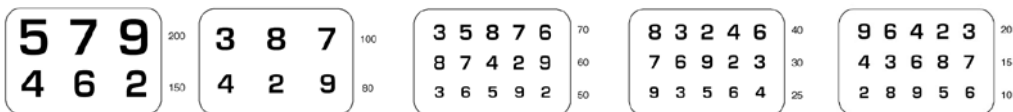
Figure 8 - Functions of masking buttons

Slide Library

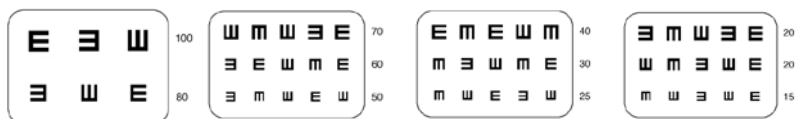
Letter Charts



Number Charts



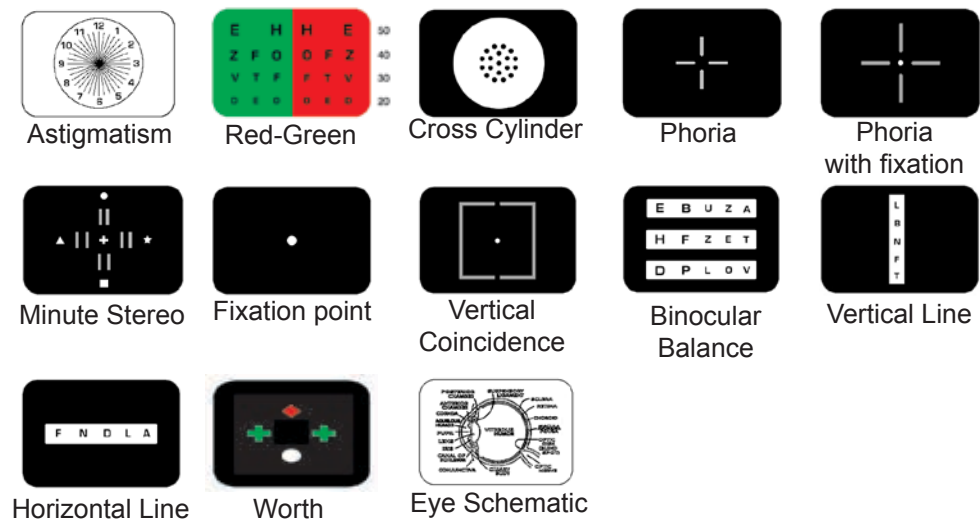
Illiterate Charts



Children Charts



Special Charts



Cleaning & Maintenance

WARNING: RISK OF ELECTRIC SHOCK. ALWAYS DISCONNECT THE POWER CORD FROM THE WALL AND THE INSTRUMENT BEFORE PERFORMING ANY OF THE FOLLOWING CARE AND MAINTENANCE PROCEDURES.

Cleaning

External Cleaning

Clean the external surfaces of this instrument using a clean, soft cloth moistened with a mild detergent solution (1 cc of liquid dish soap to one liter of clean, filtered water).

Projector Lens Cleaning

The projector lens and window for remote detection can be cleaned with a soft, clean, optics-safe cloth.

Cleaning the Remote Control

To clean the remote control, wipe with a soft, clean, dry cloth.

Cleaning the Screen

CAUTION: THE SCREEN IS VERY SUSCEPTIBLE TO SCRATCHES AND FINGERPRINTS. HANDLE WITH CARE.

To clean the screen, wipe with a soft, clean, dry cloth.

Changing the Halogen Bulb

WARNING: NEVER TOUCH A HALOGEN BULB WITH BARE HANDS AS FINGERPRINTS WILL SHORTEN THE BULB LIFE. NEVER REMOVE A BULB THAT HAS RECENTLY BEEN IN USE AS IT WILL BE VERY HOT. WAIT UNTIL IT HAS COOLED AND USE GLOVES OR A THICK CLOTH WHEN HANDLING ANY HALOGEN BULB.

1. Open the top portion of the projector housing by loosening the 3 mm hexagon screw located underneath the front portion of the AP250 head.
2. Remove the cover from the bulb housing.
3. Remove the bulb by lightly pulling upwards on it. Refer to Figure 9.
4. Position a new bulb over the pins and gently push it down until fully seated.
5. Replace the bulb housing cover.
6. Close the top portion of the projector housing and tighten the cover screw.

Note: If illumination is not uniform, call your Reichert dealer or our Customer Service department.

Changing the Remote Control Batteries

CAUTION: OBSERVE POLARIZATION MARKINGS ON THE INSIDE OF THE BATTERY COMPARTMENT AND INSERT BATTERIES ACCORDINGLY.

1. Open the battery compartment on the rear side of the remote control (see Figure 6).
2. Remove the batteries.
3. Insert four new AAA batteries and close battery compartment.

Changing the Voltage/Replacing Fuses

WARNING: RISK OF ELECTRIC SHOCK. ALWAYS DISCONNECT THE POWER CORD FROM THE WALL AND THE INSTRUMENT BEFORE CHANGING FUSES.

CAUTION: MAKE SURE THE RATING OF THE INSERTED FUSES COMPLIES WITH THE RATING SPECIFIED ON THE RATING PLATE (SEE PAGE 5, #8).


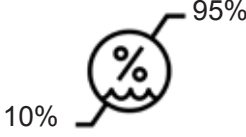

1. Pull out the fuse holder in the fuse compartment located on the backside of the AP250.
2. Replace blown fuses.
3. Insert the fuse holder into the fuse compartment until it snaps in.
4. Reconnect the power cord and turn the projector on.



Figure 9 - Replacing the Halogen Bulb

Specifications

Catalog Number 13800

Physical Dimensions Size: Weight, unpacked: 12.0 lbs (5.5 Kg) Height: 7.0 in (17.78 cm) Weight, packed: 15.9 lbs (7.2 Kg) Width: 8.0 in (20.32 cm) Depth: 13.0 in (33.02 cm)	
Electrical 110 V Operation Voltage: 110 VAC Power Input: Max 40 VA Frequency: 50/60 Hz Fuse: Time-Lag (0.5A, 250V), 5x20mm, RoHS (P/N WFAG10018) Halogen Bulb: P/N 13806 (12V, 20W)	Electrical 230 V Operation Voltage: 230 VAC Power Input: Max 40 VA Frequency: 50/60 Hz Fuse: Time-Lag (0.25A, 250V), 5x20mm, RoHS (P/N WFAG20001)
Masks Red/Green, Polarization, Single Horizontal Lines, Single Vertical, Single Letters and Single Numbers. Number Of Test Charts 33 Standard Test Charts Projection Distance 10 Ft (3 M) To 26.5 Ft (8 M) Refraction Distance 7.4 Ft (2.3 M) To 30 Ft (9.2 M) Tilt Range Of Projector ± 15° Automatic Switch-Off After 10 Min. Without Operation.	Protection Class 1 Degree Of Protection IP 21 Power Consumption 40 VA
Operational Conditions Environmental: The environmental conditions are as follows: Operating: Temperature: 10° C (50° F) to 40° C (104° F) Relative Humidity: 30% to 95% Atmospheric Pressure: 70 kPa (20.7 in. Hg) to 106 kPa (31.3 in. Hg) Transportation & Storage: Temperature: -40° C (-40° F) to +70° C (158° F) Relative Humidity: 10% to 95% Atmospheric Pressure: 50 kPa (14.8 in. Hg) to 106 kPa (31.3 in. Hg)	  

Disposal

This product does not generate any environmentally hazardous residues. At the end of its product life, follow your local laws and ordinances regarding the proper disposal of this equipment.

Appendix A

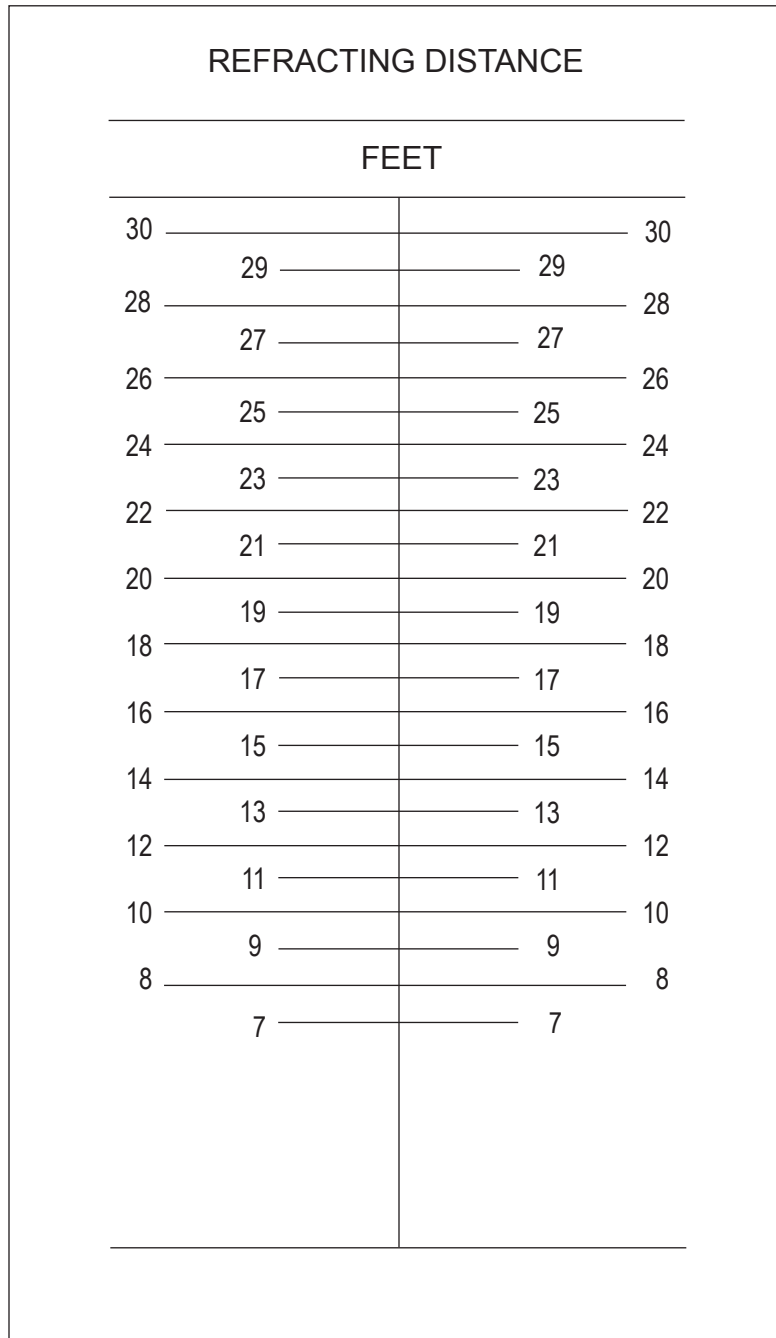


Figure 10 - Letter Sizing Chart in Feet

Appendix A

REFRACTING DISTANCE			
METERS			
9.00	8.75	8.75	9.00
8.50	8.25	8.25	8.50
8.00	7.75	7.75	8.00
7.50	7.25	7.25	7.50
7.00	6.75	6.75	7.00
6.50	6.25	6.25	6.50
6.00	5.75	5.75	6.00
5.50	5.25	5.25	5.50
5.00	4.75	4.75	5.00
4.50	4.25	4.25	4.50
4.00	3.75	3.75	4.00
3.50	3.25	3.25	3.50
3.00	2.75	2.75	3.00
2.50	2.25	2.25	2.50
2.00			2.00

Figure 11 - Letter Sizing Chart in Meters

Warranty

This product is warranted by Reichert Technologies against defective material and workmanship under normal use for a period of one year from the date of invoice to the original purchaser. (An authorized dealer shall not be considered an original purchaser.) Under this warranty, Reichert's sole obligation is to repair or replace the defective part or product at Reichert's discretion.

This warranty applies to new products and does not apply to a product that has been tampered with, altered in any way, misused, damaged by accident or negligence, or which has had the serial number removed, altered or effaced. Nor shall this warranty be extended to a product installed or operated in a manner not in accordance with the applicable Reichert instruction manual, nor to a product which has been sold, serviced, installed or repaired other than by a Reichert factory, Technical Service Center, or authorized Reichert Dealer.

Lamps, charts, cards and other expendable items are not covered by this warranty.

All claims under this warranty must be in writing and directed to the Reichert factory, Technical Service Center, or authorized instrument dealer making the original sale and must be accompanied by a copy of the purchaser's invoice.

This warranty is in lieu of all other warranties implied or expressed. All implied warranties of merchantability or fitness for a particular use are hereby disclaimed. No representative or other person is authorized to make any other obligations for Reichert. Reichert shall not be liable for any special, incidental, or consequent damages for any negligence, breach of warranty, strict liability or any other damages resulting from or relating to design, manufacture, sale, use or handling of the product.

PATENT WARRANTY

If notified promptly in writing of any action brought against the purchaser based on a claim that the instrument infringes a U.S. Patent, Reichert will defend such action at its expense and will pay costs and damages awarded in any such action, provided that Reichert shall have sole control of the defense of any such action with information and assistance (at Reichert's expense) for such defense, and of all negotiation for the settlement and compromise thereof.

PRODUCT CHANGES

Reichert reserves the right to make changes in design or to make additions to or improvements in its products without obligation to add such to products previously manufactured.

CLAIMS FOR SHORTAGES

We use extreme care in selection, checking, rechecking and packing to eliminate the possibility of error. If any shipping errors are discovered:

1. Carefully go through the packing materials to be sure nothing was inadvertently overlooked when the unit was unpacked.
2. Call the dealer you purchased the product from and report the shortage. The materials are packed at the factory and none should be missing if the box has never been opened.
3. Claims must be filed within 30 days of purchase.

CLAIMS FOR DAMAGES IN TRANSIT

Our shipping responsibility ceases with the safe delivery in good condition to the transportation company. Claims for loss or damage in transit should be made promptly and directly to the transportation company.

If, upon delivery, the outside of the packing case shows evidence of rough handling or damage, the transportation company's agent should be requested to make a "Received in Bad Order" notation on the delivery receipt. If within 48 hours of delivery, concealed damage is noted upon unpacking the shipment and no exterior evidence of rough handling is apparent, the transportation company should be requested to make out a "Bad Order" report. This procedure is necessary in order for the dealer to maintain the right of recovery from the carrier.



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