VISUTRON 900 *Touch*

Instructions for Use





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Refer to IEC 60601-1 for system level information.

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Caution: Federal law restricts this device to sale by or on the order of a licensed practitioner. Rx only.

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Symbol Information

The following symbols appear on the instrument.


Refer to Instruction Manual


Caution


Type B Product Classification


Protective Earth


Alternating Current Power


ON / OFF



Date of Manufacture



Catalog Number



Serial Number


Waste of Electrical and Electronic Equipment

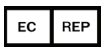

Compliance to Medical Device Directive 93/42/EEC



Authorized to mark given by Intertek ETL Semko for conformance with electrical standards


Fragile Contents in Shipping Container - handle with care


Keep Dry - Keep package away from rain



Authorized Representative in European Community



Authorized Representative for Switzerland


Unplug before opening


Operating Instructions

Warnings and Cautions

Reichert Technologies® (Reichert®) is not responsible for the safety and reliability of this instrument when unauthorized dealers or persons assemble, disassemble, repair, or modify the instrument, or when a person does not use the instrument in accordance with this User's Guide.

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

WARNING: UNITED STATES FEDERAL LAW AND EUROPEAN REGULATIONS REQUIRE THAT ONLY A LICENSED PRACTITIONER OR A PERSON ACTING ON BEHALF OF A LICENSED PRACTITIONER PURCHASE THIS DEVICE.

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

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

WARNING: NO PERSON IS ALLOWED TO MODIFY THIS INSTRUMENT. REICHERT MUST AUTHORIZE ANY MODIFICATION TO THIS UNIT TO ENSURE CORRECT OPERATION.

WARNING: IF ANY PERSON MODIFIES THIS INSTRUMENT, REICHERT MUST CONDUCT INSPECTION AND TESTING OF THE INSTRUMENT TO ENSURE ITS CONTINUED SAFE USE.

WARNING: CONNECT THIS EQUIPMENT ONLY TO A SUPPLY MAINS WITH PROTECTIVE EARTH TO AVOID THE RISK OF ELECTRIC SHOCK AND TO PREVENT DAMAGE TO THE INSTRUMENT AND/OR INJURY TO THE OPERATOR OR PATIENT.

WARNING: APPLY RATED INPUT VOLTAGE TO THE UNIT AS INDICATED ON THE DATA PLATE TO PREVENT DAMAGE TO THE INSTRUMENT AND/OR INJURY TO THE OPERATOR OR PATIENT.

WARNING: ONLY PLUG THE INSTRUMENT INTO AN OUTLET WITH AN EARTH GROUND. DO NOT REMOVE OR DEFEAT THE INSTRUMENT'S EARTH GROUND CONNECTION ON THE POWER INPUT CONNECTOR OR THE UNIT'S POWER CORD, OR YOU COULD CAUSE DAMAGE TO THE INSTRUMENT AND/OR INJURY TO THE OPERATOR OR PATIENT.

WARNING: DO NOT USE THE EQUIPMENT OR SYSTEM ADJACENT TO OR STACKED WITH OTHER EQUIPMENT. IF YOU NEED TO USE ADJACENT OR STACKED EQUIPMENT, OBSERVE THE EQUIPMENT OR SYSTEM TO VERIFY NORMAL OPERATION IN THE CONFIGURATION IN WHICH YOU USE IT.

WARNING: RISK OF ELECTRIC SHOCK OR FIRE. THIS DEVICE IS NOT INTENDED TO BE USED WITH LIQUIDS. DO NOT PLACE OR USE OPEN LIQUID CONTAINERS NEAR THE DEVICE, DUE TO THE RISK OF SPILLAGE OF LIQUID ONTO THE DEVICE.

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, MIGHT RESULT IN INCREASED EMISSIONS OR DECREASED IMMUNITY OF THE EQUIPMENT OR SYSTEM.

Warnings and Cautions (continued)

WARNING: PRIOR TO INSTALLING THE PHOROPTOR HEAD ONTO THE STAND ARM, VERIFY THAT THE ROD ON THE STAND ARM IS SECURE BEFORE ATTEMPTING TO INSTALL THE PHOROPTOR HEAD OR YOU MIGHT DAMAGE THE UNIT AND/OR INJURE THE PATIENT.

WARNING: OTHER ELECTRICAL OR ELECTRONIC EQUIPMENT CAN INTERFERE WITH THE BLUETOOTH WIRELESS CONNECTION TRANSMITTERS OR RECEIVERS, EVEN IF THAT EQUIPMENT ALSO COMPLIES WITH CISPR EMISSIONS REQUIREMENTS.

WARNING: PORTABLE RF COMMUNICATIONS EQUIPMENT (INCLUDING PERIPHERALS SUCH AS ANTENNA CABLES AND EXTERNAL ANTENNAS) SHOULD BE USED NO CLOSER THAN 30 CM (12 INCHES) TO ANY PART OF THE NSTRUMENT, INCLUDING CABLES SPECIFIED BY THE MANUFACTURER. OTHERWISE, DEGRADATION OF THE PERFORMANCE OF THIS INSTRUMENT COULD RESULT.

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 (ESDS) THAT ARE SENSITIVE TO STATIC CHARGES PRODUCED BY THE HUMAN BODY. DO NOT REMOVE THE COVERS WITHOUT TAKING PROPER ESDS PRECAUTIONS.

CAUTION: DO NOT USE SOLVENTS OR STRONG CLEANING SOLUTIONS ON ANY PART OF THIS INSTRUMENT TO ENSURE THAT YOU DO NOT DAMAGE THE UNIT. SEE THE MAINTENANCE SECTION OF THIS GUIDE FOR DETAILED CLEANING INSTRUCTIONS.

CAUTION: DO NOT USE AMMONIA-BASED CLEANERS ON THE LIQUID CRYSTAL DISPLAY (LCD) TO ENSURE THAT YOU DO NOT DAMAGE THE DISPLAY. SEE THE MAINTENANCE SECTION OF THIS GUIDE FOR DETAILED CLEANING INSTRUCTIONS.

CAUTION: MEDICAL ELECTRONIC EQUIPMENT REQUIRES SPECIAL PRECAUTIONS REGARDING EMC AND IT 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: DO NOT USE THIS INSTRUMENT NEAR HIGH-FREQUENCY EMITTING SURGICAL EQUIPMENT.

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

CAUTION: DO NOT INSTALL ANY ADDITIONAL SOFTWARE OTHER THAN WHAT IS SUPPLIED WITH THIS INSTRUMENT. IF YOU INSTALL ADDITIONAL SOFTWARE, IT MIGHT CAUSE UNEXPECTED OPERATION, RESULTING IN INSTRUMENT MALFUNCTION.

CAUTION: YOU MUST PLUG THIS INSTRUMENT INTO AN OUTLET WITH AN EARTH GROUND THAT IS CONNECTED TO THE RECEPTACLE TO PREVENT DAMAGE TO THE UNIT. DO NOT DISABLE OR REMOVE THE GROUND PIN.

CAUTION: INGRESS PROTECTION CLASSIFICATION FOR THE PHOROPTOR HEAD IS IP2X, WHILE THE CONTROLLER, AND CENTRAL UNIT ARE IP3X. DO NOT SPRAY, SPLASH, OR IMMERSE THESE INSTRUMENTS IN CLEANING SOLUTIONS.

CAUTION: ELECTROMAGNETIC INTERFERENCE FROM OTHER DEVICES MAY AFFECT THE PERFORMANCE OR SERVICE LIFE OF THIS INSTRUMENT. IF INTERFERENCE IS PRESENT, TURN OFF OTHER ELECTRONIC DEVICES, OR REMOVE THEM FROM THE IMMEDIATE AREA WHILE OPERATING THIS INSTRUMENT.

Introduction

Congratulations on your purchase of the Reichert Technologies (hereafter referred to as Reichert) Visutron 900 *Touch*.

This User's Guide is designed as a training and reference manual for operation, maintenance, and troubleshooting. We recommend that you read it carefully prior to use and follow the instructions in the guide to ensure optimum performance of your new instrument. Only properly trained eye care professionals, such as ophthalmologists, optometrists, opticians, and eye care technicians should operate this instrument. All parts of this Medical Electrical system are suitable for use within the patient environment.

Please retain this guide for future reference and to share with other users. For additional copies of this manual or questions related to the Visutron 900 *Touch*, contact your local authorized Reichert dealer, or contact our Customer Service department directly:

Tel: +1 716-686-4500
Fax: +1 716-686-4555
Email: reichert.information@ametek.com

Indications for Use

The Visutron 900 *Touch* Digital Refraction System is designed for:

- Subjective measurement of the refractive error of the eye.
- Determination of correction data for refraction anomalies and binocular functions as the basis for manufacturing eyeglasses and contact lenses.
- Use in refraction rooms in clinics and practices of physicians, optometrists, or opticians.
- Connection to other medical examination equipment or to an office Electronic Medical Records (EMR) system.
- Operation by physicians, optometrists, opticians, or properly trained clinical personnel.
- Installation under the conditions for medical equipment.
- The digital refractor Visutron 900 *Touch* with Prism is additionally designed for:
    - Measurement of ocular deviation in patients with latent or manifest strabismus.

Contra-Indications

- There are none associated with the Visutron 900 *Touch* Digital Refraction System.

Instrument Setup

Unpacking Instructions

Great care is taken to deliver the Visutron 900 *Touch* intact. Please read this User's Guide before operating the unit.

We package the instrument in shipping containers to protect the instrument from damage during shipping. Please carefully remove the Phoroptor Head, Controller, Central Unit, and Accessories Box from the packaging material.

Note: Please retain the original packaging and use it if future transportation of the instrument is required.

The main components of the Visutron 900 *Touch* are packed in two separate boxes. The first box contains the Phoroptor Head and Reading Rod, the second box contains the Central Unit, Controller, and Accessories Box.

Note: The Accessories Box includes a power cord, cable for the Phoroptor Head, Bluetooth antenna for the Central Unit, ClearChart 4 Bluetooth Adaptor, near vision card and illuminator, face shields, dust covers for the Phoroptor Head and Controller, and User's Guide.

Note: If any accessories or parts are missing, immediately contact Reichert.

Parts Identification

One of the following Visutron 900 *Touch* Systems is in the shipping container, depending on the system specifications ordered.

Systems Without Prisms		**Systems With Prism**	
Visutron 900 *Touch* System - Middle Mount	**16243**	**Visutron 900 *Touch* System - Middle Mount**	**16246**
Visutron 900 *Touch* Head Assembly	16222	Visutron 900 *Touch* with Prism Head Assembly	16223
Central Unit	16219	Central Unit	16219
Controller	16228	Controller	16228
Visutron 900 *Touch* System - Left Mount	**16244**	**Visutron 900 *Touch* System - Left Mount**	**16247**
Visutron 900 *Touch* Head Assembly	16224	Visutron 900 *Touch* with Prism Head Assembly	16225
Central Unit	16219	Central Unit	16219
Controller	16228	Controller	16228
Visutron 900 *Touch* System - Right Mount	**16245**	**Visutron 900 *Touch* System - Right Mount**	**16248**
Visutron 900 *Touch* Head Assembly	16226	Visutron 900 *Touch* with Prism Head Assembly	16227
Central Unit	16219	Central Unit	16219
Controller	16228	Controller	16228

The following accessories are included in all Visutron 900 *Touch* Systems:

Item	**REF**	**Item**	**REF**
User's Guide - German	16243-101-GER	Dust Cover – Phoroptor Head	559-153
Power Cord 230V	WCBL10027	Dust Cover – Controller	16217-029
Phoroptor Cable - Middle Mount	559-275	Near Bright Illuminator Kit	16200-869
Phoroptor Cable - Left/Right Mount	559-276	Face Shield Kit (2 sets)	16200-835
ClearChart 4 Bluetooth Adapter	13779		

The following optional accessories are available for use with the Visutron 900 *Touch* System:

Item	**REF**	**Item**	**REF**
Decimal Near Vision Kit	16237	Snellen Near Vision Kit	16236
Extension Cable (15ft), Visutron 900 *Touch* Head or Controller	16213-432	Extension Cable (25ft), Visutron 900 *Touch* Head or Controller	16213-433
Thermal Printer	16230	Cables and Bluetooth Dongle Kits	(Various)
Phoroptor Cable - Left/Right Mount	559-276	Snellen Card Holder	16231
Decimal Card Holder	16235	Card Beam Assembly	11636-860

Parts Identification (continued)

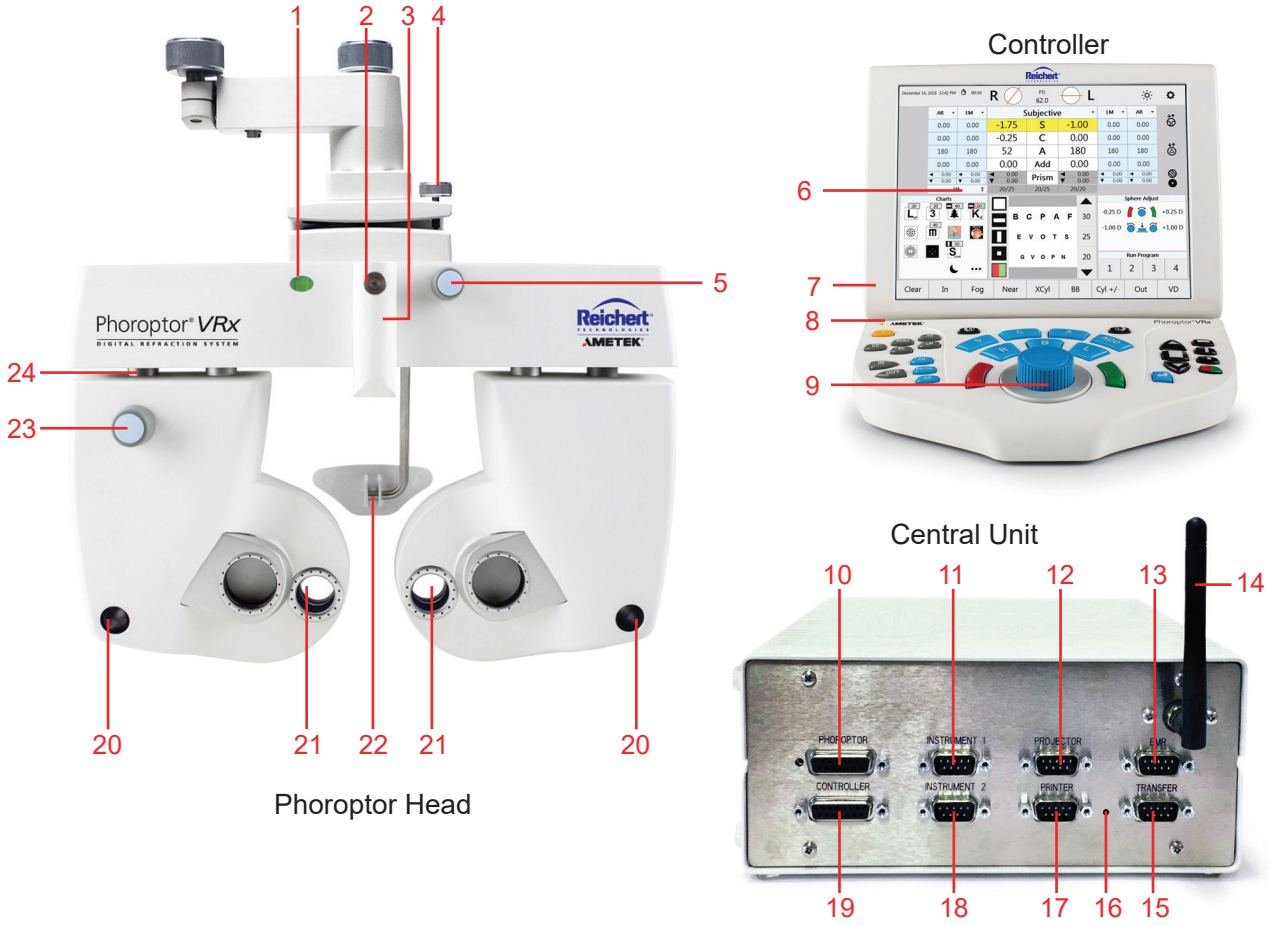


Figure IS-01, Parts Identification

1. Illuminated Bubble Level & Power Indicator Light
2. Threaded Screw for Near Vision Rod
3. Convergence Lever
4. Leveling Thumb Screw
5. Vertex Distance Adjustment Knob
6. Touch Screen Display
7. USB Port (on back)
8. Power Indicator Light
9. Control Knob
10. Phoroptor Head Connection Port
11. Instrument 1 Connection Port for connecting pre-test equipment
12. Projector Connection Port
13. EMR Connection Port for connecting to a computer
14. Wireless Antenna
15. Transfer Port for Daisy Chaining
16. Power Indicator Light
17. Printer Connection Port
18. Instrument 2 Connection Port for connecting pre-test equipment
19. Controller Connection Port
20. Corneal Vertex Distance Windows
21. Lens Apertures
22. Forehead Rest
23. Asymmetrical Height Adjustment Knob
24. Mid Position Height Marking

Connecting the Visutron 900 *Touch* System

WARNING: APPLY RATED INPUT VOLTAGE TO THE UNIT AS INDICATED ON THE DATA PLATE TO PREVENT DAMAGE TO THE INSTRUMENT AND/OR INJURY TO THE OPERATOR OR PATIENT.

WARNING: CAREFULLY ARRANGE THE CABLES FOR THE UNIT AND ACCESSORIES, SO THE CABLES DO NOT PRESENT A TRIPPING HAZARD TO THE EXAMINER OR A DANGER TO THE PATIENT.

WARNING: POSITION THIS INSTRUMENT SO THE PLUG IS EASILY ACCESSIBLE.

WARNING: DO NOT PLUG IN THE CENTRAL UNIT UNTIL THE VISUTRON 900 TOUCH SYSTEM IS FULLY SETUP.

The basic system setup contains three components programmed to interact with each other: the Phoroptor Head, the Central Unit, and the Controller. The Central Unit directs communication between the Phoroptor Head, Controller, and other pre-test devices, while the Controller acts as the user interface and controls the Phoroptor Head and the Input/Output of data.

The Visutron 900 *Touch* is also designed to communicate with Reichert and other manufacturers acuity systems.

External devices, including digital acuity systems, projectors, Lensmeters, Auto Refractors, printers, and computers are connected using serial cables or Bluetooth wireless serial adapters.

Note: Ensure that the pre-test equipment being interfaced is compatible. Refer to *Appendix A* for a complete list of external devices that communicate with the Visutron 900 *Touch*.

Please refer to the Connection Diagram below for plug and cable layout.

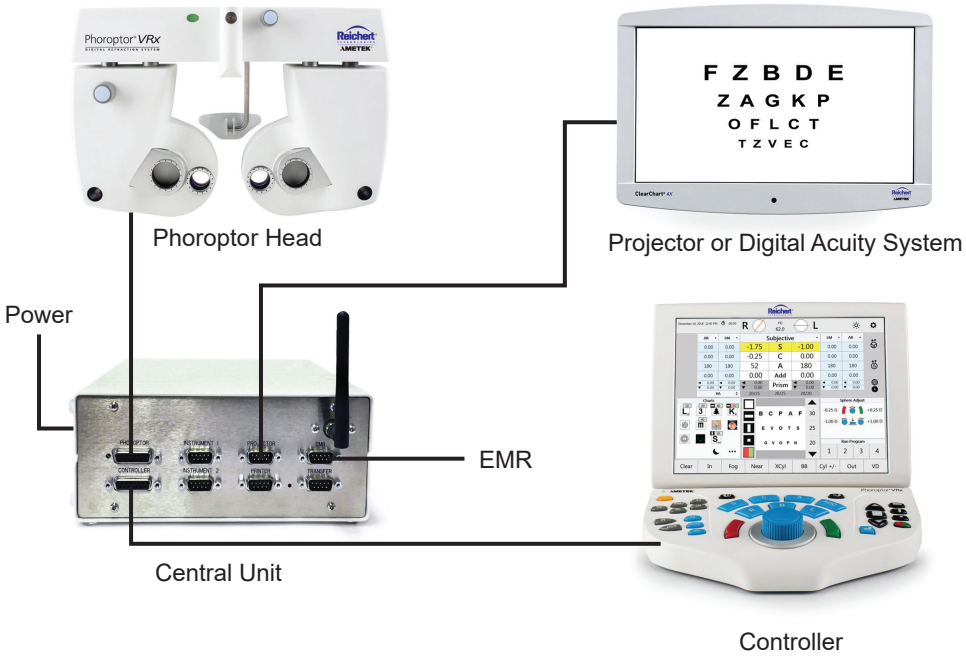


Figure IS-02, Connection Diagram

Connecting the Visutron 900 *Touch* System (continued)

1. Align the pins in the Phoroptor Cable with the Phoroptor head. Refer to figure IS-03.
2. Connect the cable by turning the metal collar clockwise until it is fully secure. Refer to figure IS-04.
3. Connect the other end of the Phoroptor Cable to the Phoroptor port in the Central Unit. Refer to Figure IS-05.
4. Connect the built-in cable on the Controller to the Controller port on the Central Unit.
5. Connect the Power Cord to the Central Unit, then plug in the power cord to an outlet providing appropriate voltage. Turn the unit on by turning the ON/OFF switch to ON.
6. Connect the Projector to the Projector port on the Central Unit in one of the following ways.
   a. Refer to the *Connecting with Cables* section if connecting with cable.
   b. Refer to the *Connecting with Bluetooth Dongles* section if connecting with Bluetooth.
   c. Refer to the *Connecting With Bluetooth USB (ClearChart 4 Series Only)* section if connecting with Bluetooth USB.
7. Connect Lensmeters or Auto Refractors to the Instrument 1 or Instrument 2 ports on the Central Unit in one of the following ways.
   a. Refer to the *Connecting with Cables* section if connecting with cable.
   b. Refer to the *Connecting with Bluetooth Dongles* section if connecting with Bluetooth.
8. Connect a computer to the EMR port on the Central Unit in one of the following ways. Refer to the *EMR Setup* section for setup instructions.
   a. Refer to the *Connecting with Cables* section if connecting with cable.
   b. Refer to the *Connecting with Bluetooth Dongles* section if connecting with Bluetooth.
9. If needed, connect the Transfer port to another Visutron 900 *Touch* in one of the following ways to send data from one device to another. Refer to the *Daisy Chaining Multiple Visutron 900 Touch's* section for instructions.
   a. Refer to the *Connecting with Cables* section if connecting with cable.
   b. Refer to the *Connecting with Bluetooth Dongles* section if connecting with Bluetooth.
   c. Refer to the *Connecting with Internal Bluetooth* section if connecting with Bluetooth.

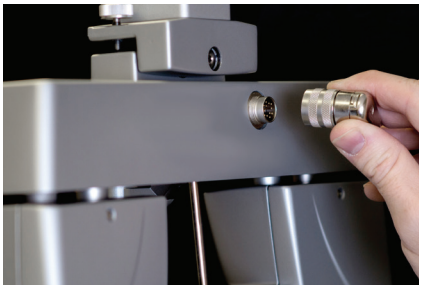


Figure IS-03, Phoroptor Cable

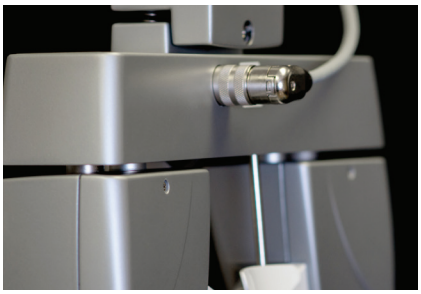


Figure IS-04, Phoroptor Connected

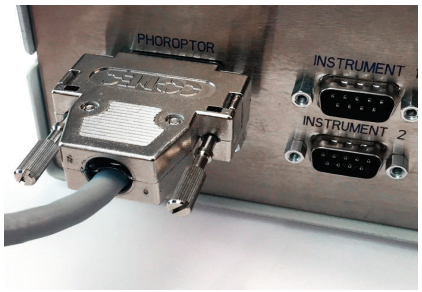


Figure IS-05, Phoroptor Connected

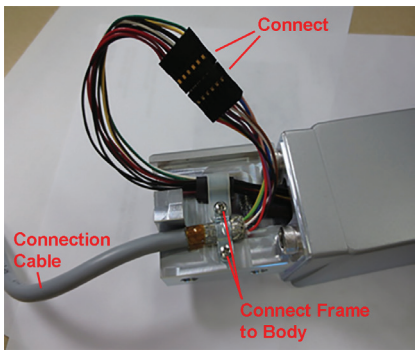


Figure IS-05A, Connection Diagram

Connecting a Right or Left Mount Visutron 900 *Touch*

Connect the Visutron 900 Touch using the connection cable (559-276) according to Figure IS-05A.

Connecting with Cables

The Visutron 900 *Touch* can connect to multiple Projectors, Lensmeters, and Autorefractors easily with a wired connection. Refer to the instructions below to connect instruments with a cable.

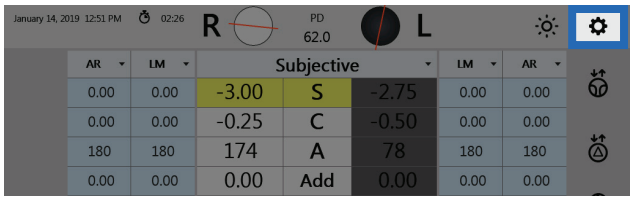


Figure IS-06, Settings

1. Tap **Settings**, located at the top right of the Controller screen. Refer to Figure IS-06



2. Tap **Ports** in the Settings menu.
3. In the Port Selection panel, tap the port being configured (e.g., Projector, Instrument 1, etc). Refer to Figure IS-07.
4. In the Port Settings panel, select the device being connected from the drop-down menu. Refer to Figure IS-07.
5. Set the Connection Type to **Cable**. Refer to Figure IS-07.
6. If storing or transferring of data is needed, check the corresponding boxes. Refer to the *Daisy Chaining Multiple Visutron 900 Touch's* section of this manual for more information on these two options.
7. If available, set the serial communication parameters to match the settings on the device being connected.
8. Tap **Apply**. "Connected" should appear in the top right. Refer to Figure IS-08.

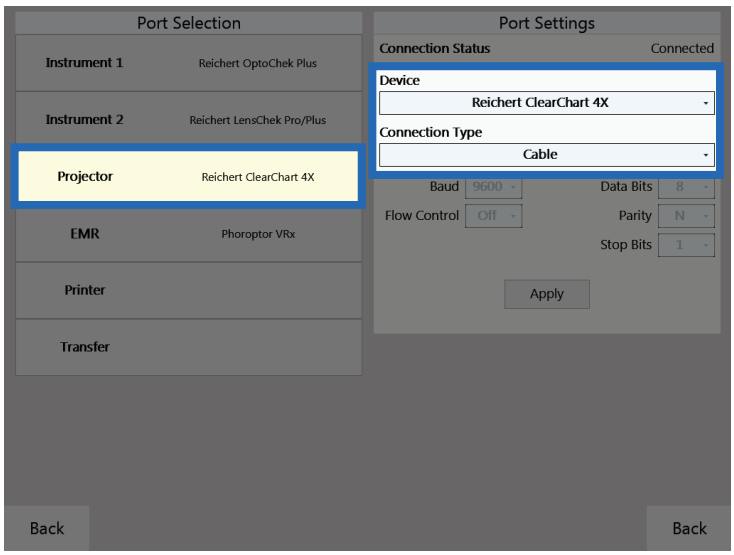


Figure IS-07, Port Settings Screen

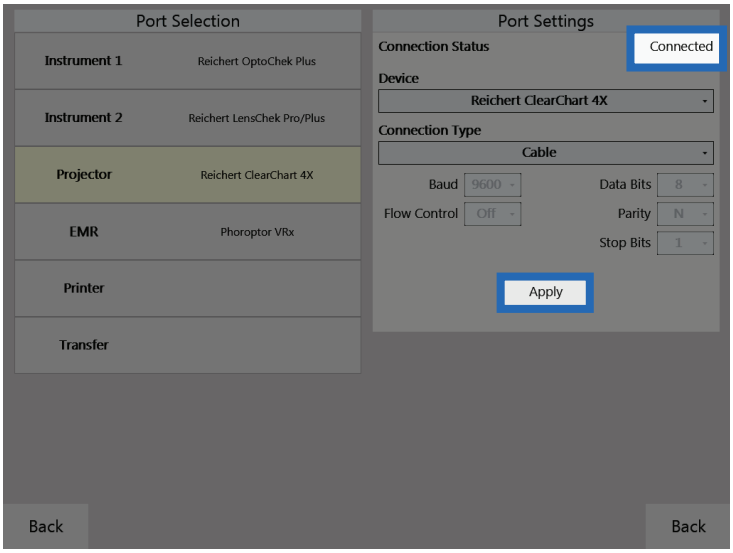


Figure IS-08, Port Settings Screen

Connecting With Bluetooth Dongles

Reichert developed a Bluetooth dongle to connect external devices wirelessly to the Visutron 900 *Touch*. To communicate properly, the Bluetooth dongle must be paired with a specific port on the Central Unit. Perform the following steps in order to configure each Bluetooth dongle.

Note: Do not connect the Bluetooth dongle to the power cord until directed to.

1. Tap **Setting**s, located at the top right of the Controller screen. Refer to Figure IS-09.
2. Tap **Ports** in the Settings menu.

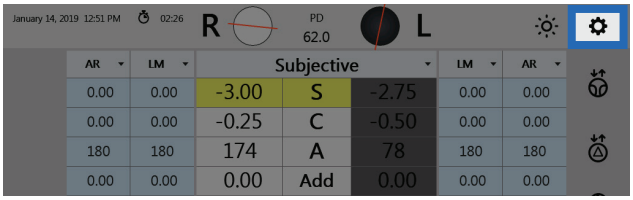


Figure IS-09, Settings



3. In the Port Selection panel, tap the port being configured (e.g., Projector, Instrument 1, etc). Refer to Figure IS-10.
4. In the Port Settings panel, select the device being connected from the drop-down menu. Refer to Figure IS-10.
5. Set the Connection Type to **Bluetooth (Dongle)**. Refer to Figure IS-10.
6. If storing or transferring of data is needed, check the corresponding boxes. Refer to the *Daisy Chaining Multiple Visutron 900 Touch's* section of this manual for more information on these two options.
7. If available, set the serial communication parameters to match the settings on the device being connected. Refer to Figure IS-11.

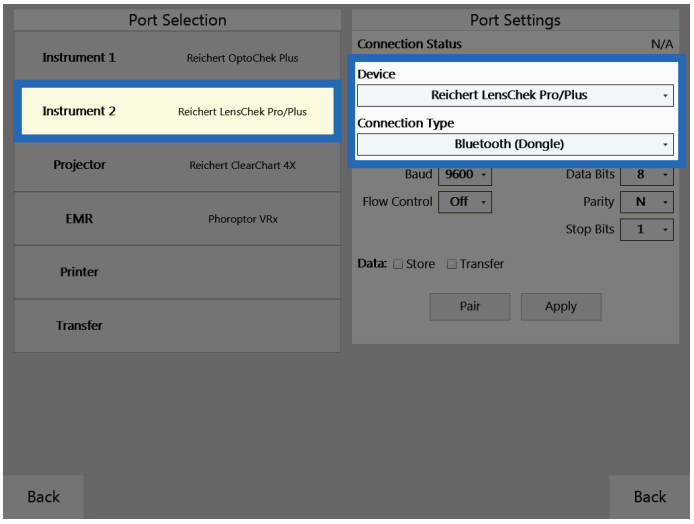


Figure IS-10, Port Settings Screen

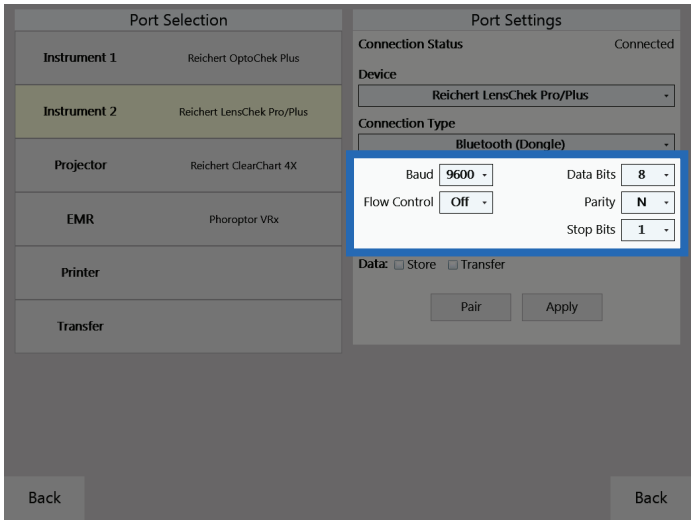


Figure IS-11, Serial Communication Parameters

Connecting With Bluetooth Dongles (continued)

8. Connect the Bluetooth dongle to the power adapter provided. The LED should illuminate red, indicating it is ready to be paired. Refer to Figure IS-12.
9. Connect the Bluetooth dongle to the corresponding Central Unit port with the provided pairing cable. Refer to Figure IS-13.
10. In the Port Settings panel on the Visutron 900 *Touch* controller tap **Pair**. Refer to Figure IS-14.

CAUTION: DO NOT TAP PAIR AGAIN. IF PAIR IS ACTIVATED, IT WILL BE NECESSARY TO REPEAT THE ABOVE PROCEDURE TO RE-ESTABLISH THE WIRELESS CONNECTION.

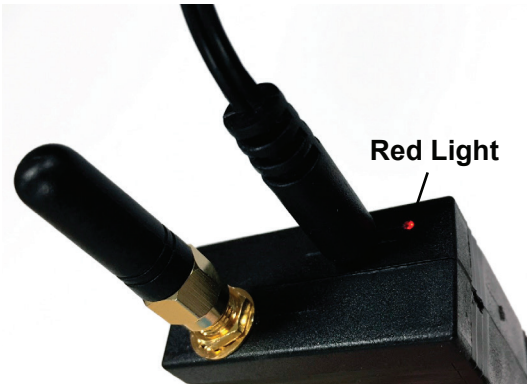


Figure IS-12, Ready to Pair

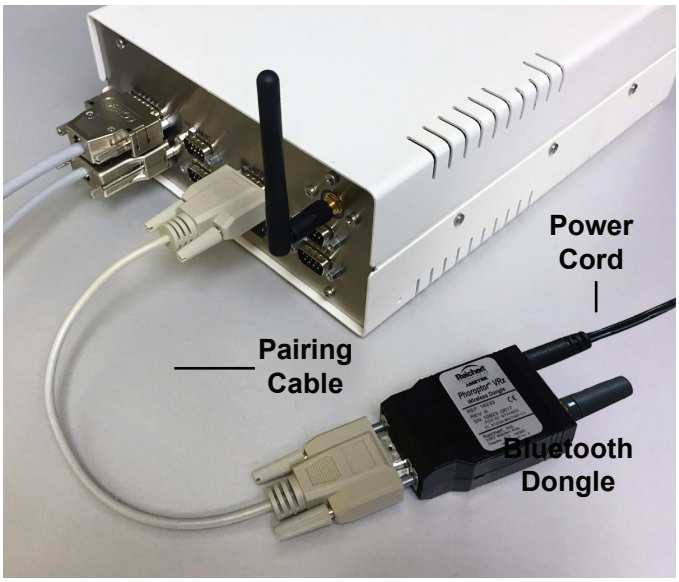


Figure IS-13, Bluetooth Dongle to Central Unit

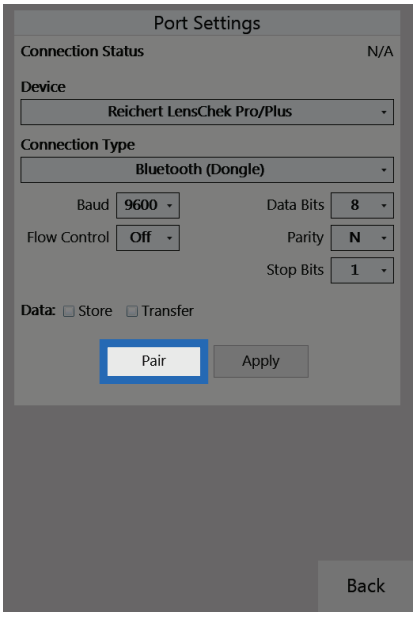


Figure IS-14, Pair Button

11. While connecting, the LED will illuminate blue. Do not disconnect the dongle. Refer to Figure IS-15.
12. Once the connection has been established, the LED will illuminate green. Refer to Figure IS-16.

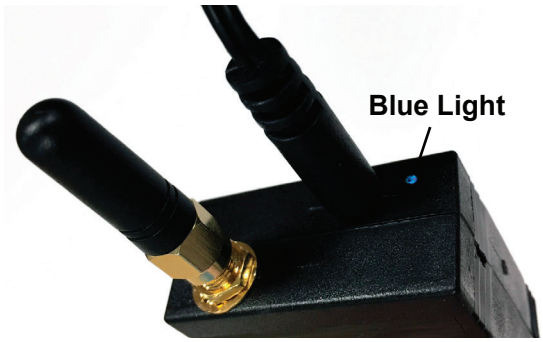


Figure IS-15, Actively Pairing

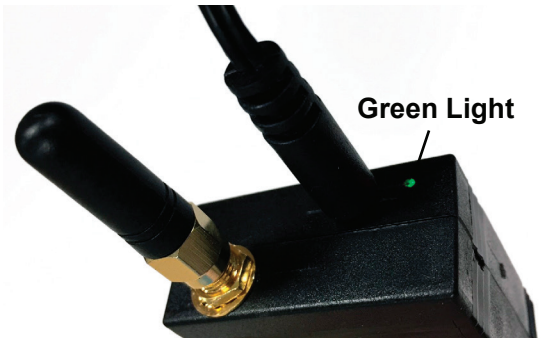


Figure IS-16, Connected

Connecting With Bluetooth Dongles (continued)

Note: The LED will blink red if the connection fails.

Note: If the Bluetooth dongle was successfully paired, “Connected” will appear in the upper right corner of the panel. Refer to Figure IS-18. If “Failed” appears, then press and hold the Bluetooth dongle’s reset switch, using an appropriate object (e.g., paperclip) for approximately 2 seconds. The reset switch is on the side of the Bluetooth dongle. Refer to Figure IS-17. The LED will illuminate solid red. Repeat the directions starting with step 10.

13. Disconnect the power cord and pairing cable from the Bluetooth dongle.
14. Connect the Bluetooth dongle to the external device’s serial port using the appropriate serial cable and/or adaptor using the corresponding cable, then power on using the power adaptor. The LED will illuminate blue.
15. Once the connection has been established again, the LED will remain green.

Note: At this point the Central Unit and Bluetooth dongle may be powered off and on in any order. The wireless connection will be established automatically once both devices are powered on.

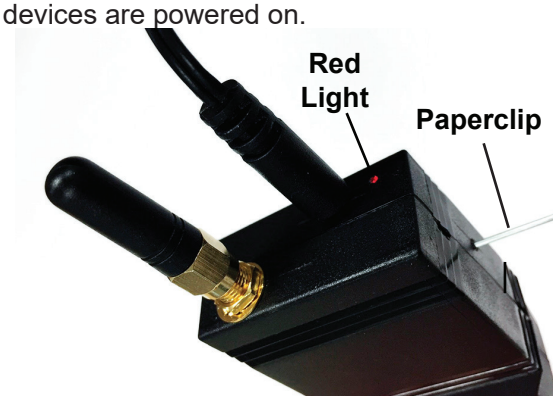


Figure IS-17, Reset the Dongle

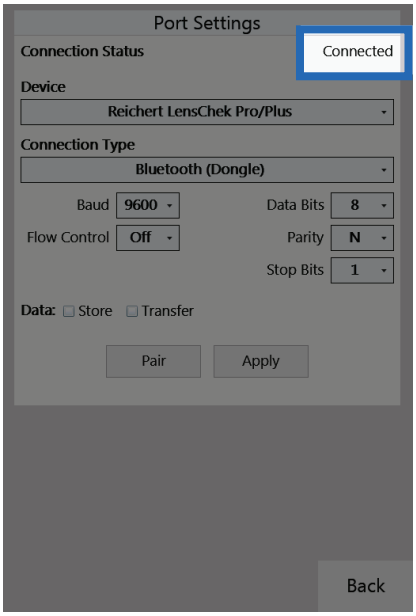


Figure IS-18, Connected Status

Bluetooth Dongle LED Lights Description

Solid Red Light	• No connection. • Ready to be paired
Blinking Red Light	• Pairing Failed • Reset Dongle and try to pair again
Solid Blue Light	• Connection In Progress. • Do not disconnect dongle from Central Unit
Solid Green Light	• Dongle successfully paired

Connecting With Bluetooth USB (ClearChart 4 Series Only)

Reichert has a Bluetooth USB option to connect a ClearChart 4, 4X, or 4P to the Visutron 900 *Touch*. In order to establish wireless communications between the Visutron 900 *Touch* and a ClearChart, the Projector port must first be paired to the Bluetooth USB adapter.

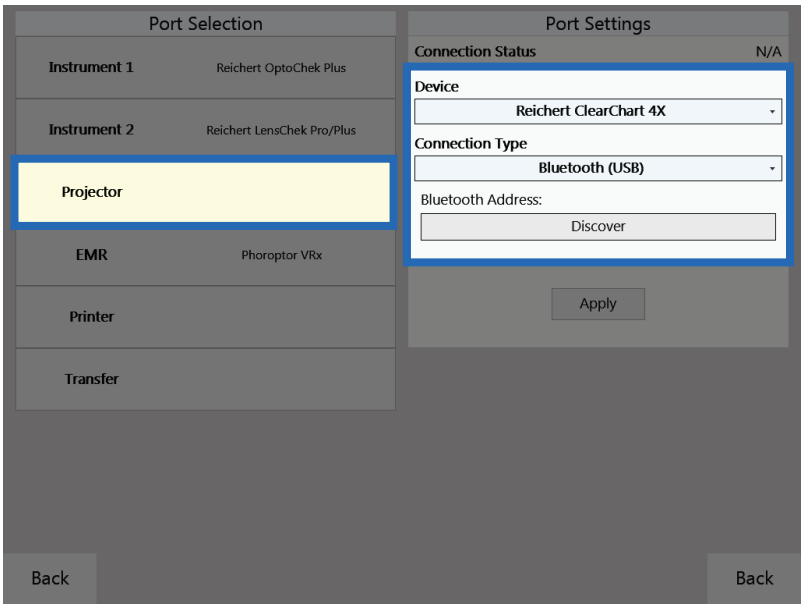


Figure IS-19, Device & Connection Type

1. Ensure the ClearChart is turned off before pairing.
2. Tap **Settings**, located at the top right of the Controller screen.
3. Tap **Ports** on the Settings menu.
4. In the Port Selection panel, tap **Projector**.
5. In the Port Settings panel, select the ClearChart model from the device list.

Note: The Bluetooth USB is only compatible with the ClearChart 4, 4X or 4P.



Figure IS-20, Bluetooth Address

6. Set the Connection Type to **Bluetooth (USB)**. Refer to Figure IS-19.
7. Install the Bluetooth USB into the ClearChart.
8. Turn the ClearChart ON.

Note: The Bluetooth USB must be installed in the ClearChart before the ClearChart is powered ON or the Bluetooth USB will not be paired properly.

9. Press the Menu button on the ClearChart remote and view the Bluetooth address in the lower right corner of the ClearChart. Refer to Figure IS-20.
10. Tap **Discover** on the Ports page and the Visutron 900 *Touch* will search for all available ClearChart Digital Acuity Systems. Refer to Figure IS-19.

Connecting With Bluetooth USB (ClearChart 4 Series Only) (continued)

Note: If the desired Bluetooth USB device is not found, tap the **Discover** button again.

11. Once the Bluetooth address is displayed, select the address that matches the address on the ClearChart and tap **Pair**. (Tapping Apply is not needed.) Refer to Figure IS-21.
12. Press the Menu button on the ClearChart remote to exit the menu.

Note: The Visutron 900 *Touch* will only display 'Initializing Device' until the ClearChart menu is exited. Once the ClearChart is displaying a chart, only then can the Bluetooth connect and *Connected* will appear. Refer to Figure IS-22 .

13. If pairing is unsuccessful, check all the connections and repeat the steps in this section.

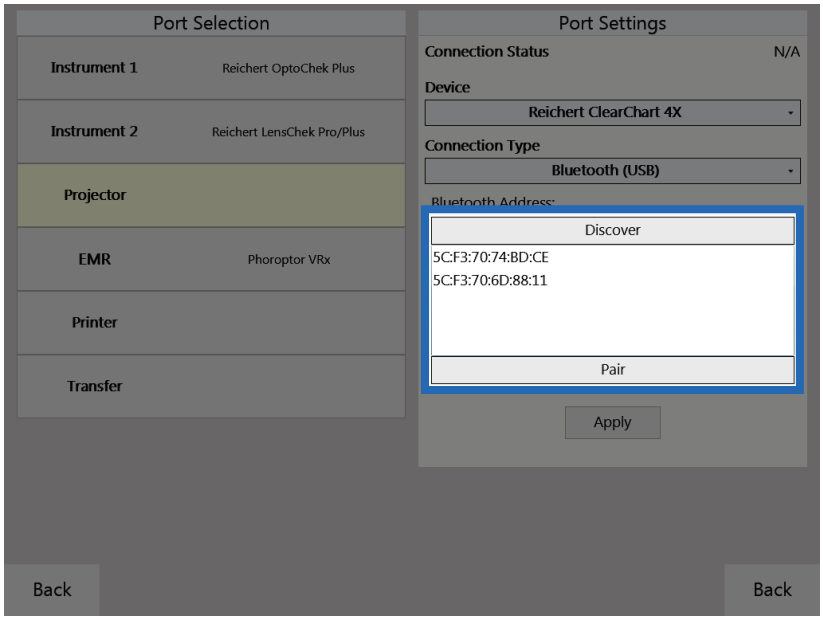


Figure IS-21, USB Address & Pair

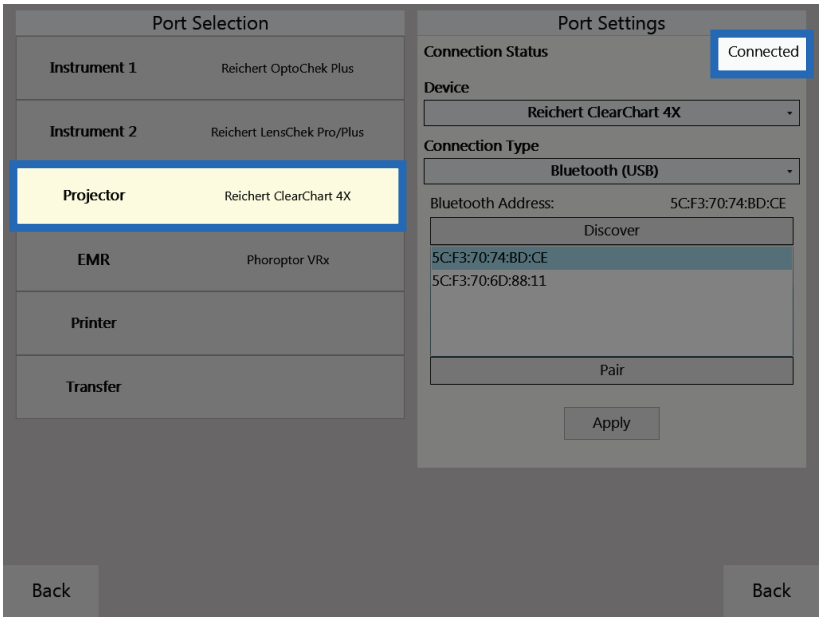


Figure IS-22, ClearChart Connected

EMR Setup

The Visutron 900 *Touch* can connect to an EMR system one of two ways, depending on the capability of the EMR system. Contact the EMR company to find out if the specific EMR system is configured to support one-way or two-way communication.

One-Way EMR

One-way communication means the EMR system can only accept data coming in. This configuration requires pre-test equipment to send data to the Visutron 900 *Touch*, then all of the data (the pre-test data and final refraction data) would transfer to the EMR. Refer to Figure IS-23.

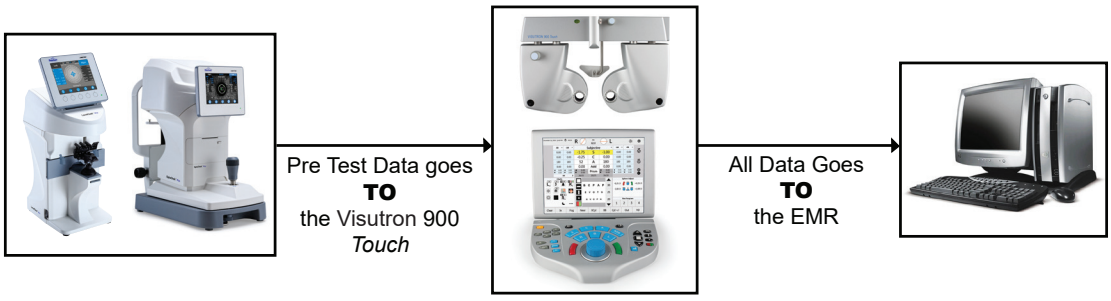


Figure IS-23, One-Way Communication Diagram

Note: If there are multiple lanes with Visutron 900 *Touch* systems, they will need to be connected via daisy-chaining. This will allow all pre-test data to be transferred to each Visutron 900 *Touch* system. From there, each Visutron 900 *Touch* can load the pre-test data and send all of the data to the EMR system. Refer to the *Daisy chaining Multiple Visutron 900 Touch's* section for more detailed information on this setup.

Two-Way EMR

Two-way communication means the EMR can send pre-test data out to the Visutron 900 *Touch* and receive final refraction data in from the Visutron 900 *Touch*. At the end of the exam, the Visutron 900 *Touch* will send only final refraction data out to the EMR. Refer to Figure IS-24.

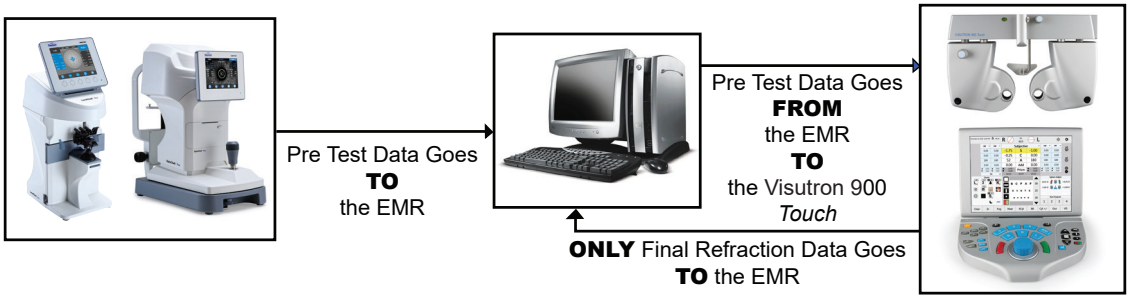


Figure IS-24, Two-Way Communication Diagram

EMR Setup (continued)

Setup

1. Tap **Settings**, located at the top right of the Controller screen.
2. Tap **Ports** on the Settings menu.
3. In the Port Selection panel, tap **EMR**. Refer to Figure IS-25.
4. In the Port Settings panel, select the device according to the list below.

   Devices
   Visutron 900 *Touch* - Sends Visutron 900 *Touch* final refraction data only (including subjective refraction data and binocular test results).
   Visutron 900 *Touch* Exp - Sends Visutron 900 *Touch* final refraction data (including subjective refraction data and binocular test results) **and** pre-test data.
   AutoPhor - Sends Visutron 900 *Touch* final refraction data only.
   AutoPhor Exp - Sends Visutron 900 *Touch* final refraction data **and** pre-test data.
   Vis900 - Sends data in original Visutron 900+ format, for Visutron 900 units **only**.

5. Connect the computer to the EMR port on the Central Unit with a cable or Bluetooth dongle.
   a. Refer to the *Connecting with Cables* section if connecting with a cable.
   b. Refer to the *Connecting with Bluetooth Dongles* section if connecting with Bluetooth.
6. Set the serial communication parameters to match the settings of the computer serial port.
7. Tap **Apply**.

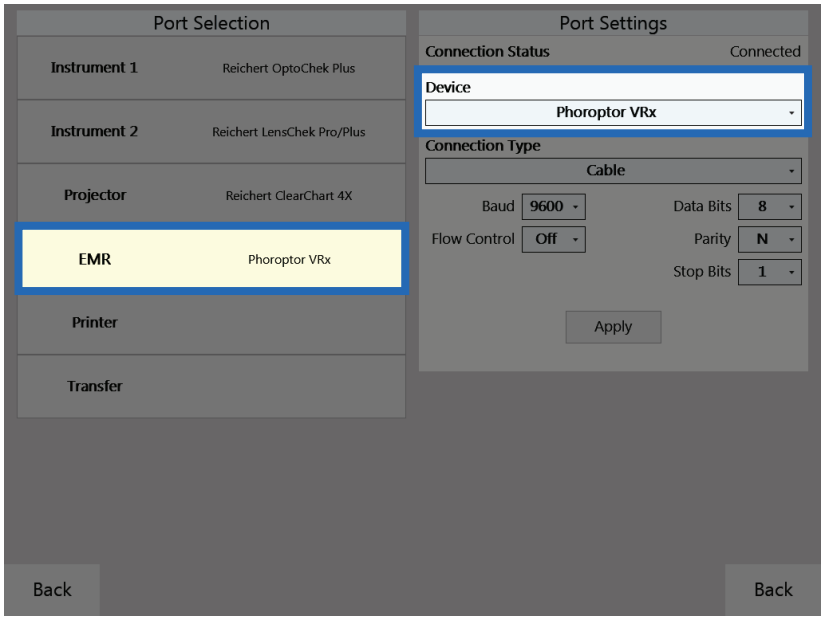


Figure IS-25, Port Settings Screen

Printer

1. Tap **Settings**, located at the top right of the Controller screen.
2. Tap **Ports** on the Settings menu.
3. In the Port Selection panel, tap **Printer**. Refer to Figure IS-27.
4. In the Port Settings panel, select the MCP1000. Refer to Figure IS-27.
5. Connect an MCP1000 printer to the system with a cable or Bluetooth dongle.
   a. Refer to the *Connecting with Cables* section if connecting with a cable.
   b. Refer to the *Connecting with Bluetooth Dongles* section if connecting with Bluetooth.
6. Select the Device driver in the Ports Settings panel and tap **Apply**.
7. Select the data to print in the Output Options in the Settings menu, in the lower right corner of the screen. Refer to Figure IS-26. The data printing options include:
   - Subj, AR, and LM values
   - Visual Acuity, FCC, NRA/PRA, Accommodation, Phoria, and Vergence value

   The Print Format drop-down list options include:
   - Far
   - Near
   - Far/Near
   - Far/Add

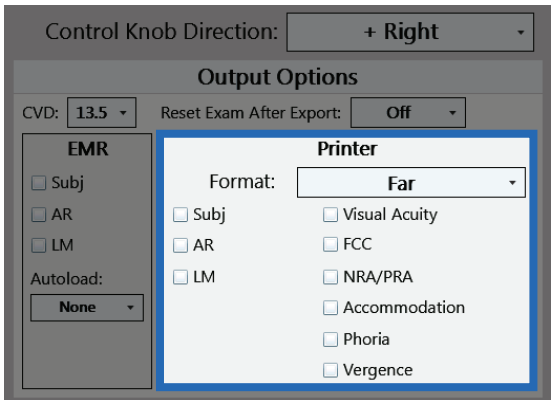


Figure IS-26, Printing Options

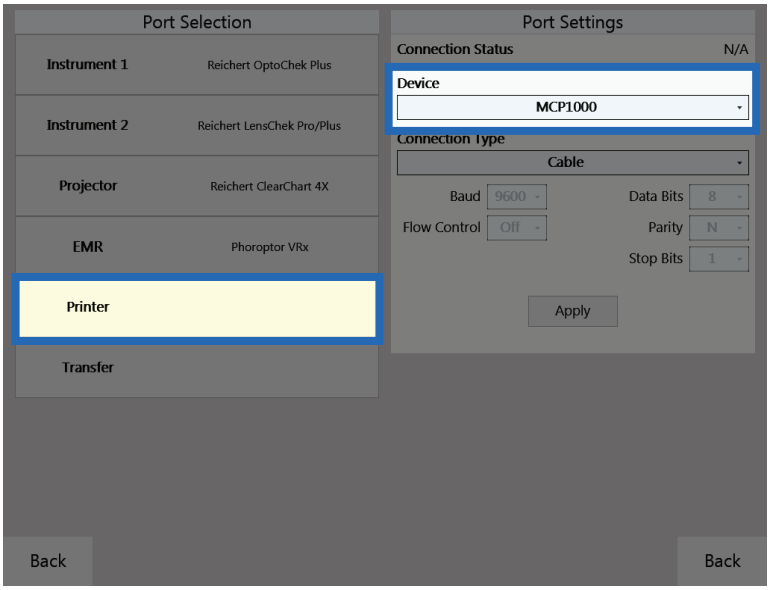


Figure IS-27, Printer Settings

Daisy Chaining Multiple Visutron 900 *Touch* Systems

When an EMR system only supports one way communication in a setup with multiple Visutron 900 *Touch* units, Daisy chaining is required to get the pre-test data to all of the Visutron 900 *Touch* units. Pre-test equipment is sent to the first Visutron 900 *Touch* in the chain, and the data is then sent to all of the other Visutron 900 *Touch* systems via the Instrument 1 or 2 and Transfer ports as shown in Figure IS-28.

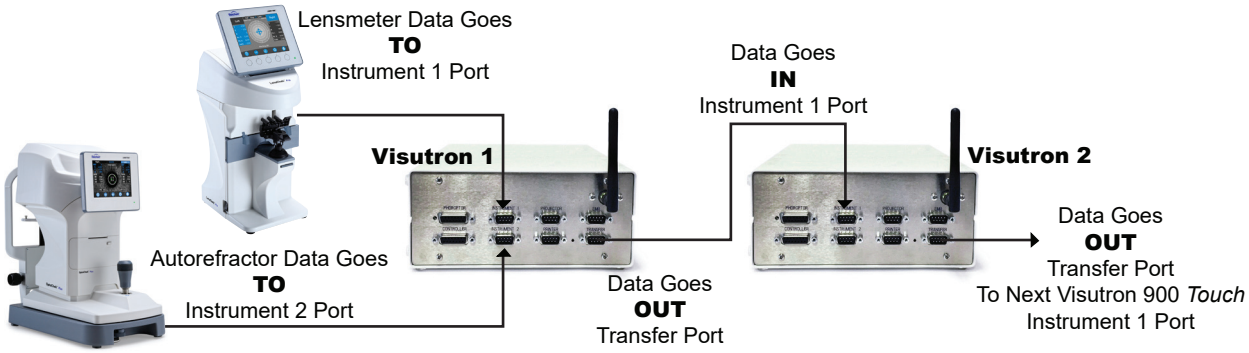


Figure IS-28, Daisy Chain Setup Diagram

1. Tap **Settings**, located at the top right of the Controller screen.
2. Tap **Ports** on the Settings menu.
3. Setup the Auto Refractor and Lensmeter to communicate with the Visutron 900 *Touch* closest to that location, using the Instrument 1 and Instrument 2 ports. Refer to the *Connecting the Visutron 900 Touch System* section of this manual for setup instructions for the pre-test equipment.
4. For both Instrument 1 and Instrument 2 section of the Ports page, check off both Store and Transfer in the Port Settings panel.
5. Connect the ***Transfer*** port on Central Unit of the first Visutron 900 *Touch* to the ***Instrument 1 Port*** on the Central Unit of the Visutron 900 *Touch* next in line, using a cable, Bluetooth dongle, or internal Bluetooth connection. Refer to Figure IS-28.
   a. Refer to the *Connecting with Cables* section if connecting with a cable.
   b. If connecting with Bluetooth dongles, refer to the *Connecting With Bluetooth Dongles* section of this manual.
   c. If connecting with internal Bluetooth, refer to the *Connecting With Internal Bluetooth* section of this manual.

Note: The Transfer port on the first Visutron 900 *Touch* is the ***data output*** port, and the Instrument 1 port on the next Visutron 900 *Touch* is the ***data input*** port.

6. In the first Visutron 900 *Touch* of the chain, for the ***Transfer*** port of the Port Settings panel, select **VRx Transfer** as the device, then tap **Apply.**
7. In the second Visutron 900 *Touch* in the chain, for the ***Instrument 1*** port of the Port Settings panel, select **AutoPhor Receive** as the device then tap **Apply**. For the ***Transfer*** port of the Port Settings panel, select **VRx Transfer** as the device, then tap **Apply**.
8. Continue this process until all exam rooms with Visutron 900 *Touch* systems are connected.

Note: The last Visutron 900 *Touch* in the chain does not need to have the Transfer port configured, only the Instrument 1 port. Under Instrument 1, the Transfer box does not need to be checked off, only the Store box.

Note: There is no limit to the number of Visutron 900 *Touch* units that can be linked together.

Daisy Chaining Multiple Visutron 900 *Touch*'s (continued)

Connecting with Internal Bluetooth

1. Tap **Settings**, located at the top right of the Controller screen.
2. Tap **Ports** on the Settings menu.
3. In the Port Settings panel, tap **Transfer** in the Port Selection column. Be sure that under Device, **VRx Transfer** is selected. Refer to Figure IS-30.
4. Select Bluetooth (Internal) under Connection Type. Refer to Figure IS-30.
5. Tap **Discover** under Bluetooth Address. Refer to Figure IS-30.
6. Tap the Bluetooth address for the Visutron 900 *Touch* that the data will be transferred to, then tap **Pair**.

Note: The Bluetooth address is found in System Information, in the Service Menu. Refer to Figure IS-29.

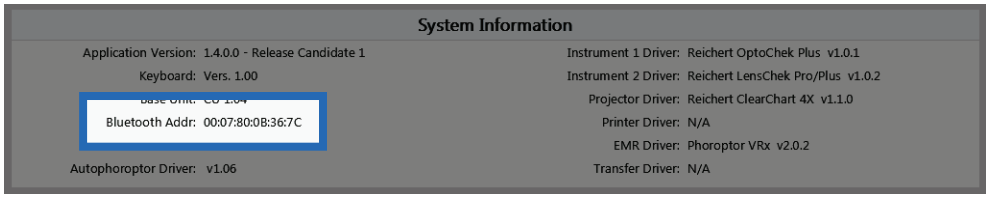


Figure IS-29, Bluetooth Address

7. Repeat all the above steps for the Instrument 1 port on the Visutron 900 *Touch* that is having the data transferred to it. Be sure that under Device, **AutoPhor Receive** is selected. Refer to Figure IS-31.
8. Repeat these connection steps for every Visutron 900 *Touch* in the chain.

Note: If the Bluetooth was successfully paired, "Connected" will appear in the upper right corner of the panel on both Visutron 900 *Touch* units. "Connected" will not appear until both Visutron 900 *Touch's* are configured. If "Failed" appears on either Visutron 900 *Touch* instruments, then repeat the directions from step 3.

Note: The last instrument in the chain only needs to have the Instrument 1 port configured, and not the Transfer port.

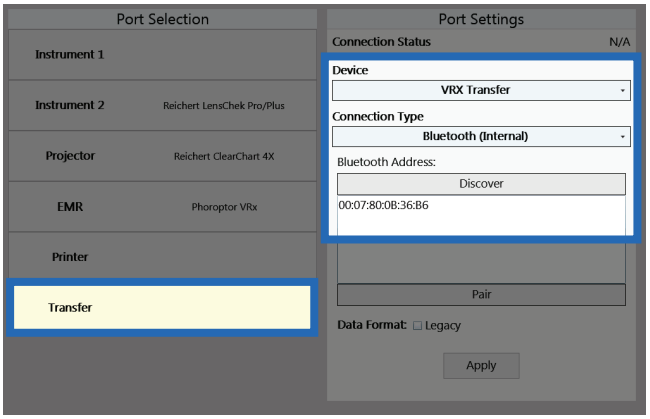


Figure IS-30, Internal Bluetooth Transfer

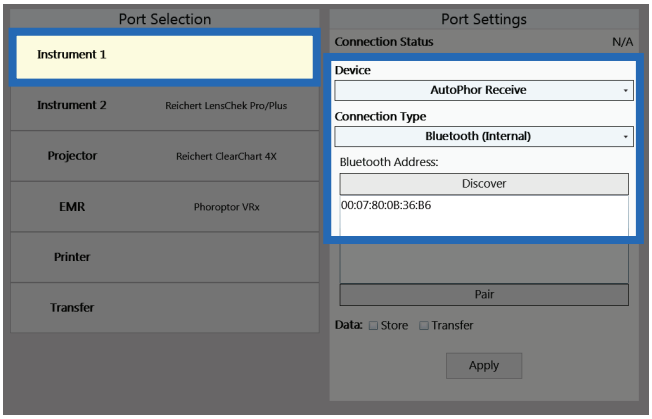


Figure IS-31, Internal Bluetooth Receive

Near Vision Rod and Card

The Visutron 900 *Touch* includes a Near vision rod, and a near vision card attached to a card illuminator. Place the three AAA batteries in the card illuminator.

Slide the card illuminator onto the near vision rod. Loosen the convergence lever thumb screw, install the rod into the convergence lever, and tighten the thumb screw. The reading rod is held up in the stored position by a spring clip.

Use caution when moving the Visutron 900 *Touch* head to make sure the rod is not accidentally lowered. The card illuminator will automatically turn on when the rod is lowered, and turn off when the rod is raised. Use the button on the underside of the NearBright to adjust the illumination level. The card illuminator will automatically shut off after 15 minutes when the rod is lowered.



Figure IS-32, Near Vision Rod and Card Holder

Face Shields

The Visutron 900 *Touch* includes two pairs of face shields. These are attached with magnets to the patients side of the Phoroptor head.

Turn the Visutron 900 *Touch* On and Off

The ON/OFF switch is located on the Central Unit. The entire system is powered by the Central Unit and turned ON/OFF from there.

When the Visutron 900 *Touch* is turned ON, the Controller software will bootup and the Phoroptor head will perform its initialization procedure. This will take approximately one minute.

To shut down the system, set the ON/OFF switch to OFF.



Figure IS-33, Card Illuminated

Controller Keypad

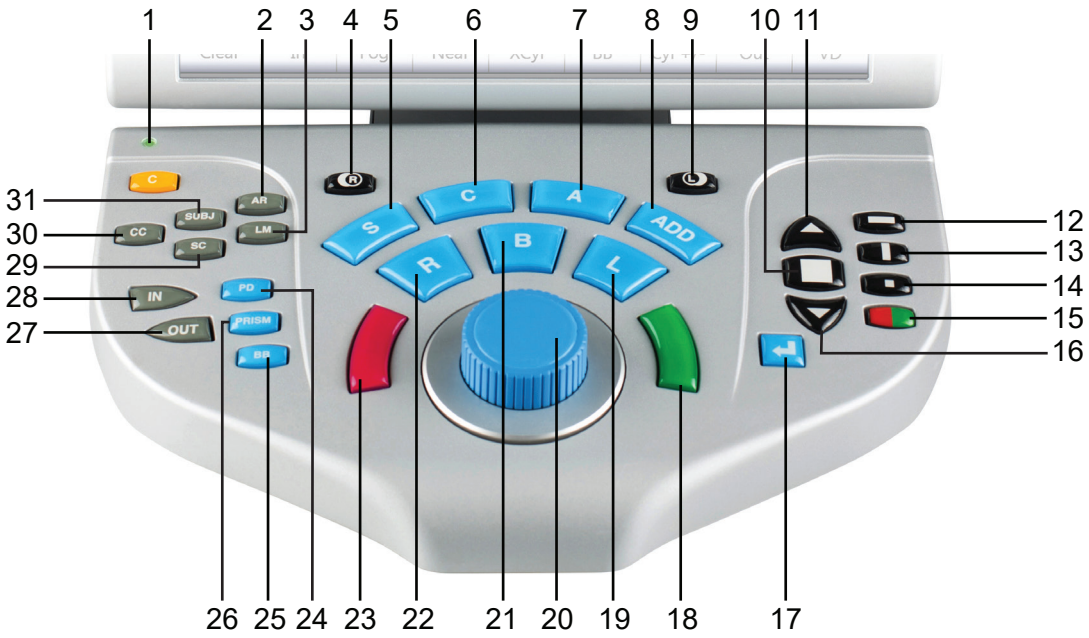


Figure IS-33, Controller Keypad

1. C—Clear
2. AR—Auto Refractor
3. LM—Lensmeter
4. R—Right Eye Occluder
5. S—Sphere Adjustment
6. C—Cylinder Adjustment
7. A—Axis Adjustment
8. ADD—Near Vision Addition Adjustment
9. L—Left Eye Occluder
10. Display Multiple Lines of Optotypes
11. Improves Visual Acuity or Increases Optotype Size
12. Horizontal Line
13. Vertical Line
14. Single Optotype
15. Red/Green Filter
16. Decreases Visual Acuity or Decreases Optotype Size
17. Enter Key
18. Green button for Split Prism Test
19. L—Open Left Eye, Close Right Eye
20. Control Knob
21. B—Binocular Vision Measurement
22. R—Open Right Eye, Close Left Eye
23. Red button for Split Prism Test
24. PD—Pupillary Distance Measurement
25. BB—Binocular Balance
26. PRISM—Brings in prism lenses
27. OUT—Export Refraction Data
28. IN—Import Pre-test Data
29. SC—Data Without Correction/Plano
30. CC—Data With Correction/Final
31. SUBJ—Subjective Refraction Data

Controller Keypad (continued)



Lens Buttons

These buttons control the lenses and apertures during an exam. Press the different types of buttons (S, C, A, Add) to activate different sets of lenses in the Visutron 900 *Touch* Head.

C Enters Clear Mode, to enable the clearing of individual data or all of the data.
R Occludes the right eye.
L Occludes the left eye.
S Activates sphere adjustment.
C Activates cylinder adjustment.
A Activates axis adjustment.
ADD Activates the near vision mode.
R Opens the right eye, occludes the left eye.
B Opens both eyes.
L Opens the left eye, occludes the right eye.
Red Either adjusts the current value by a single increment, or indicates patient preference in the Split Cylinder test.
Green Either adjusts the current value by a single increment, or indicates patient preference in the Split Cylinder test.
Enter Functionality depends on the current mode or test.

Control Knob

- Turn the Control Knob to adjust the sphere power, cylinder power, axis, or the power of prism.
- Press and turn the Control Knob at the same time to adjust the sphere by 1.00 D increments, to the cylinder by 1.00 D increments, the prism power by 1.00 D increments, or the axis by 10° increments.
- Press the Control Knob to move to the next refraction step or finish the operation.


Turn Button


Press Button

-continued-

Controller Keypad (continued)



Chart Buttons

These buttons control the optotype size and layout on the connected acuity chart.

Up Arrow	Improves visual acuity or increases optotype size, depending on the user selected setting.
Square	Displays three lines of optotypes.
Down Arrow	Decreases visual acuity or decreases optotype size, depending on the user selected setting.
Horizontal Line	Displays a single horizontal line of optotypes.
Vertical Line	Displays a single vertical line of optotypes.
Single Optotype	Displays one single optotype.
Red/Green	Displays red/green filter on selected optotype. Each half contains identical optotypes.



In & Out Buttons

These buttons access incoming pre-test data or export outgoing exam data.

IN	Presents pre-test equipment data imported into the Visutron 900 *Touch*.
OUT	Sends data out to the EMR system or prints the data. The specific data sent is selected in the Settings menu.

Controller Keypad (continued)



Quick Comparison Buttons

These buttons allow different lenses to be presented to the patient. Press each button to easily compare various prescriptions.

CC CC stands for '*cum-correctore*', or 'with correction'.
SUBJ This button presents the current subjective data in the Visutron 900 *Touch* head.
AR This button presents the autorefractor data in the Visutron 900 *Touch* head.
SC This button presents the plano lenses in the Visutron 900 *Touch* head. SC stands for '*sine-correctore*', or 'without' correction.
LM This button presents the lensmeter data in the Visutron 900 *Touch* head.



Special Function Buttons

These buttons quickly access specific functions on the Visutron 900 *Touch*.

PD This allows adjustment of the pupilary distance.
PRISM This activates prism deployment and enters prism adjustment mode.
BB This begins the binocular balance test.

Controller Screen

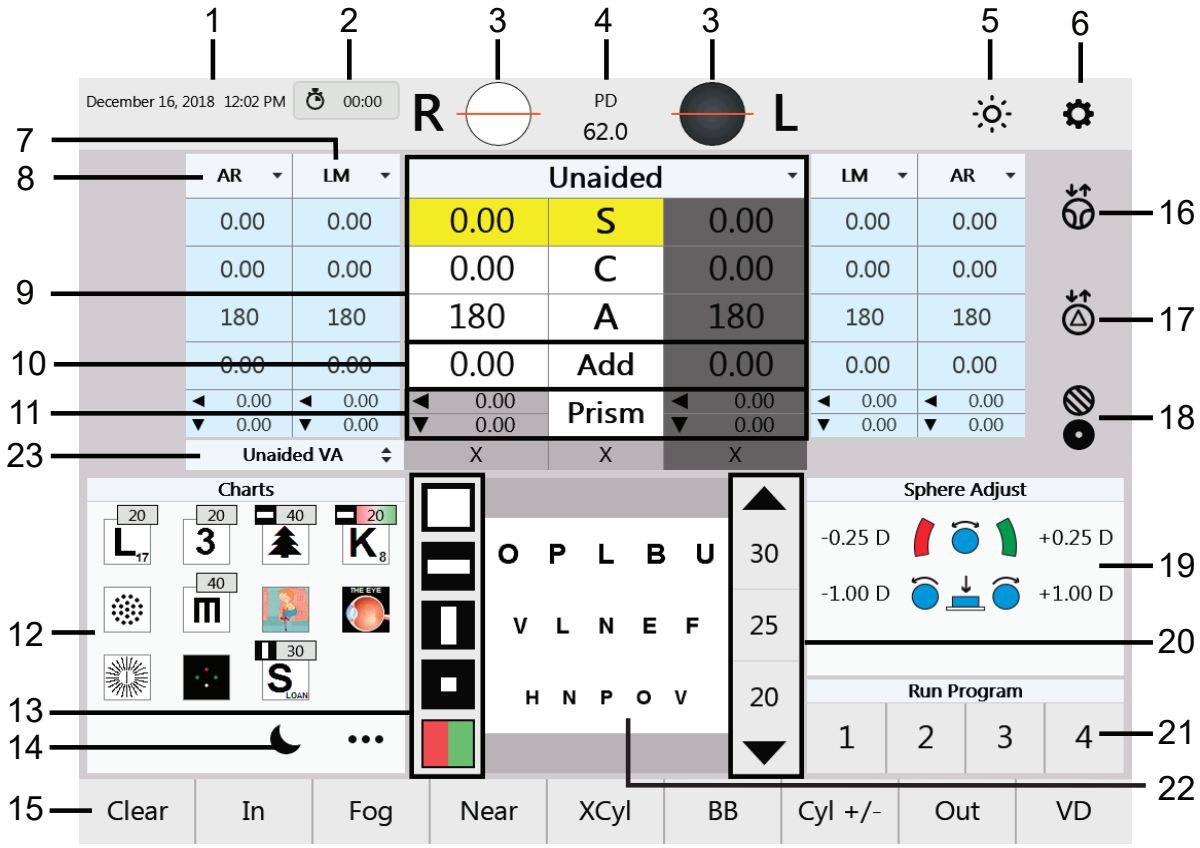
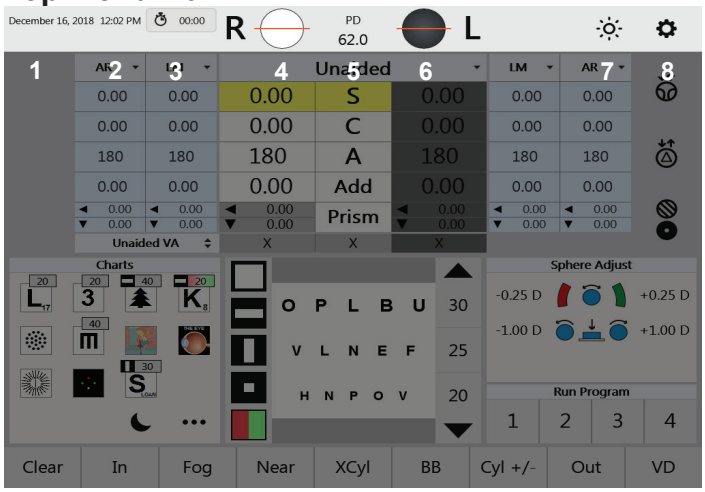


Figure IS-34, Display Screen

1. Date and Time
2. Exam Time
3. Right and Left Apertures
4. Pupillary Distance
5. Controller Illumination Adjustment
6. Settings
7. Lensmeter Data
8. Auto Refractor Data
9. Active Data
10. Near Vision Addition
11. Prism Adjustment
12. Pre-Selected Charts
13. Acuity Chart Masks
14. On/Off for Darkening Acuity Chart Display
15. Menu Bar
16. Near Vision Toggle
17. Prism Toggle
18. Auxiliary Lenses
19. Information Panel
20. Visual Acuity
21. Program Available or Currently Running
22. Projected Chart View
23. Visual Acuity

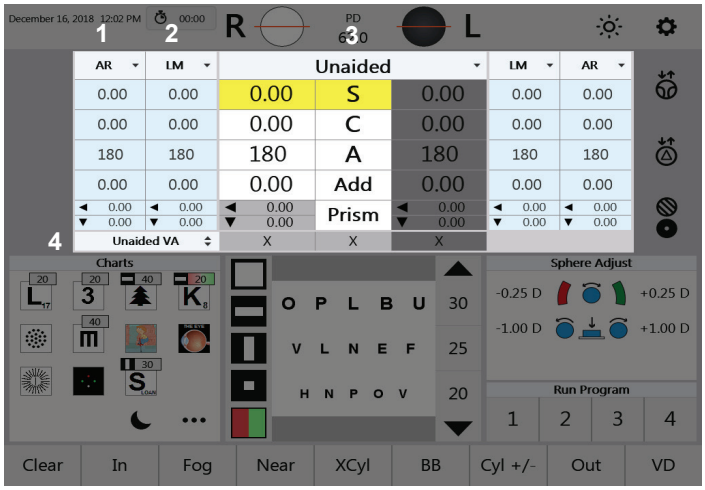
Controller Screen (continued)

Top Menu Bar



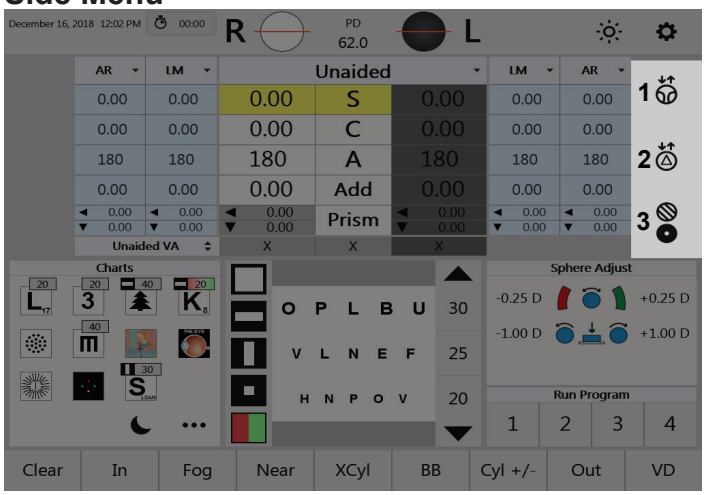
1. Date - Displays the current date.
2. Time - Displays the current time.
3. Exam Time - Shows how much time has elapsed for the current exam.
4. Right Eye Aperture - Shows the current state of the right eye aperture.
5. PD- Displays the current PD.
6. Left Eye Aperture - Shows the current state of the left eye aperture.
7. Controller Illumination Adjustment - Tap this to cycle through the screen illumination levels.
8. Settings - Tap to display the Settings menu.

Data Fields



1. Autorefractor Data - entered electronically or manually.
2. Lensmeter Data -entered electronically or manually.
3. Active Data Field - the lenses currently in the Visutron 900 *Touch*. This can be swapped out with any of the other data sets at any time. The individual measurement boxes are one of three colors:
   White - Active field that can be adjusted.
   Yellow - Can currently be adjusted.
   Grey -Inactive field that cannot be adjusted.
4. VA - Visual Acuity for the displayed dataset.

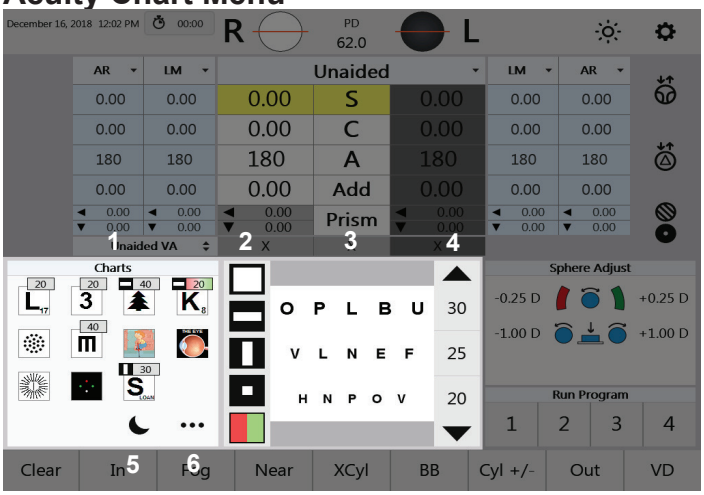
Side Menu



1. Progressive Lens Toggle - This will add and remove the progressive lenses from the Visutron 900 *Touch*.
2. Prism Lens Toggle - This will add and remove the prism lenses from the Visutron 900 *Touch*.
3. Auxiliary Lenses - Tap to show the available auxiliary lenses on the bottom menu bar. Tap the corresponding icon to place that lens in the Visutron 900 *Touch*.

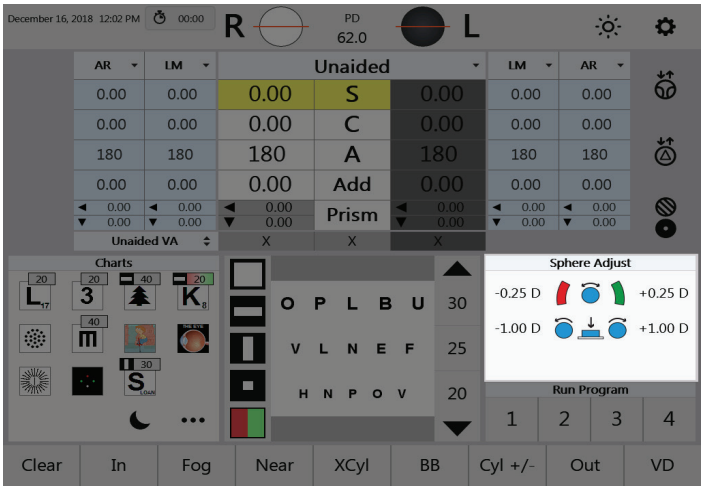
Controller Screen (continued)

Acuity Chart Menu



1. Charts - Easy access to the favorite charts that were selected in the Settings menu. Tapping a chart will display that chart on the acuity system.
2. Chart Masks - Multiple lines, single horizontal line, single vertical line, single optotype, and red/green masks are available. Tap to apply the mask.
3. Current Chart - This is the displayed chart.
4. Optotype Size - Tap the size to set the visual acuity measurement, or tap the arrows to increase/decrease the size or visual acuity.
5. On/Off - This darkens the chart.
6. More - Opens a panel to choose from all available charts.

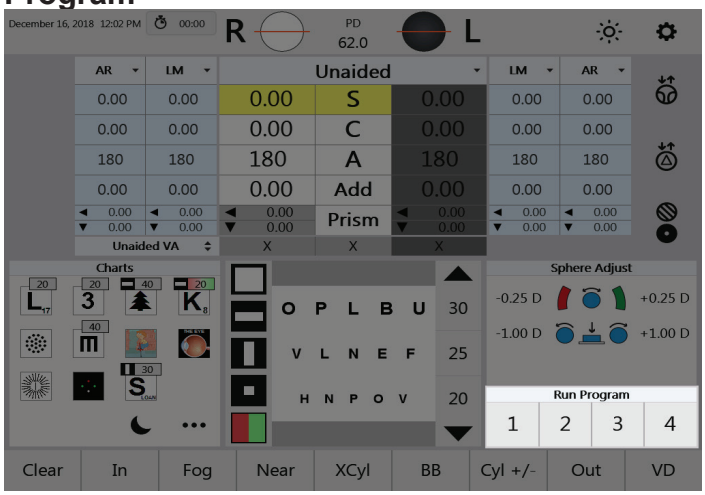
Control Knob and Button Functions



This information box gives instructions for the current mode and displays current test results.

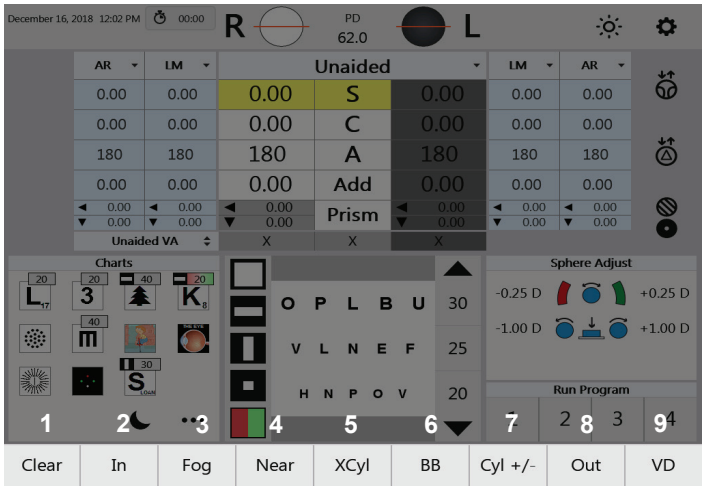
Controller Screen (continued)

Program



This section displays the available programs. When a program is selected, this will change to display the current, previous, and following step in the program, as well as controls to pause or stop the program.

Bottom Menu Bar

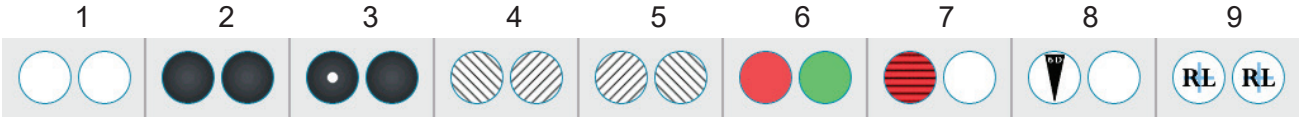


1. Clear - Tap to enter clear mode.
2. In - Tap to access imported pre-test data and load it into the current exam.
3. Fog - Add plus lenses based on what was selected in the Settings menu.
4. Near - Tap to access the Near Vision mode.
5. XCyl - Tap to access the three different XCyl tests.
6. BB - Tap to begin the binocular balance test and deploy the prism lenses.
7. Cyl +/- - Tap to view the current refraction values in the opposite cylinder sign.
8. Out - Tap to send data out to the EMR system or print the data.
9. VD - Tap to view the prescription at a different corneal vertex distance.

Controller Screen (continued)

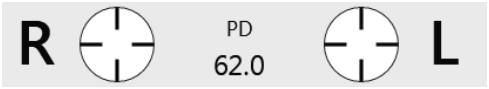
Auxiliary Lenses or Filters

Tap the **Auxiliary Lenses** icon to access the auxiliary lenses and filters. The bottom Selection Bar will change to display the available Auxiliary Lenses and Filters. Tap the icon again to exit the menu.



1. **Open Aperture -** Tap to open the apertures of the eye. If both eyes are occluded, tap it once to open one eye, and again to open both apertures.
2. **Occluder Aperture -** Tap to close the one aperture. Tap it again to close both eyes.
3. **Pinhole Mask -** Tap to set a pinhole mask in front of the right eye and occlude the left eye. Tap it again to switch, occluding the right eye and placing a pinhole mask in the left eye.
4. **Left Polarization Filter -** Tap to put a left polarized filter in the right eye and a right polarized filter in the left. Tap it again to set left polarization filter in both eyes.
5. **Right Polarization Filter -** Tap to put a right polarized filter in the right eye and a left polarized filter in the left eye. Tap it again to set right polarization filter in both eyes.
6. **Red/Green Filters -** Tap to change both filters, setting a red filter for the right eye and a green filter for the left eye. Tap it again to keep the red filter and remove the green filter.
7. **Maddox Cylinder -** Tap to place a horizontal Maddox cylinder in the right eye. Tap it again to place a vertical Maddox cylinder in the left eye.
8. **Dissociation Prisms -** Tap to place a 6 base up prism in the right eye. Tap it again to place a 10 base in prism in the left eye.
9. **Retinoscopy Lens -** Tap to place the retinoscopy lenses in both eyes. (The lens power is +1.5 D or +2.0 D, based on what was selected in the Settings menu.) Tap it again to place a pinhole mask in the left lens. Tap it a third time to switch the pinhole mask to the right eye. Tap it a fourth time to remove the pinhole and place the retinoscopy lenses in both eyes. Tap Open Aperture to remove the retinoscopy lenses.

Note: Cross hair lenses do not have a screen icon. They automatically switch in when measuring PD. They also switch in when measuring Fused Cross Cylinder addition at near. The icon appears on the Controller in the Active Lenses/Filters.



Note: The circles adjacent to the **R** and **L** above the Active Data Field indicate which filters are in place in the Phoroptor head apertures.

Settings

The Settings menu is accessible from the Main screen, by tapping the gear icon on the top right corner.

1. Tap **Settings**, located at the top right of the Controller screen.
2. To modify a setting, tap the box of the setting to reveal a drop-down list of options.
3. Tap the option in the list to select it.
4. Repeat for each setting to change.
5. Tap **Save** in the bottom right corner of the screen when finished.

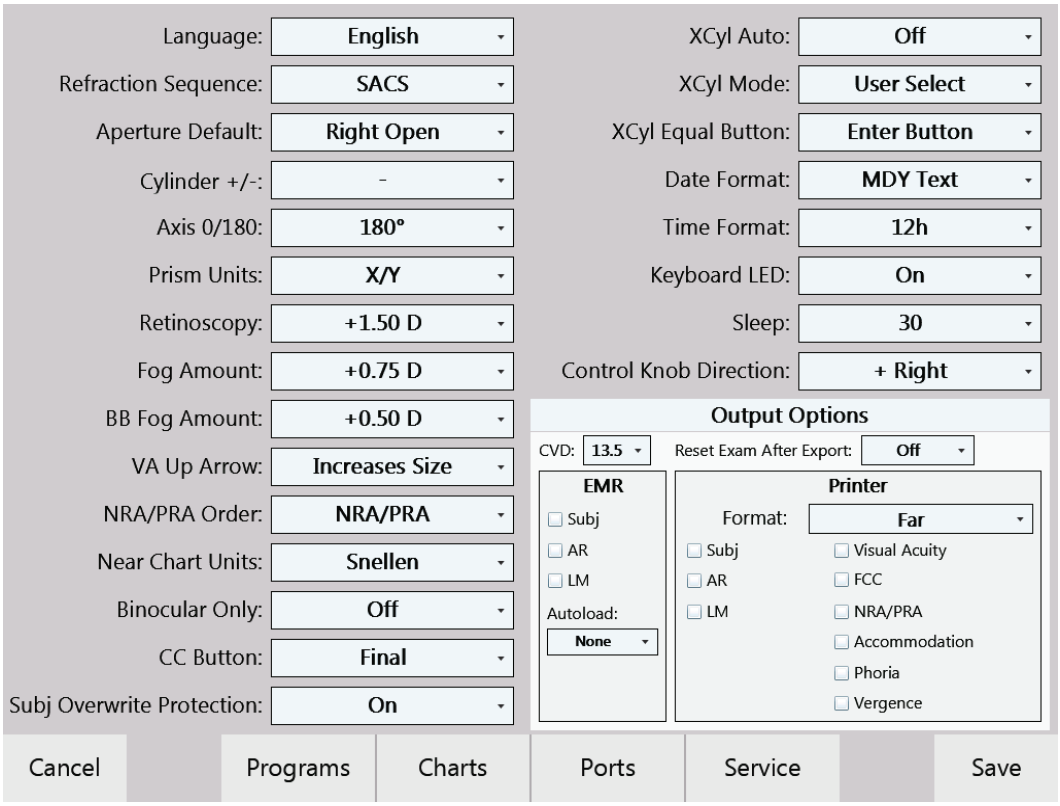


Figure IS-35, Settings Screen

Settings Options

Language

- English
- German
- French
- Spanish
- Italian
- Portuguese

Aperture Default

- Both Open
- Right Open
- Left Open

Refraction Sequence

- SCA (sphere, cylinder, axis)
- SAC (sphere, axis, cylinder)
- SCAS (sphere, cylinder, axis, sphere)
- SACS (sphere, axis, cylinder, sphere)
- SCACS (sphere, cylinder, axis, cylinder, sphere)

Axis 0/180

- 0º
- 180º

Settings (continued)

Settings Options (continued)

Prism Units
- X/Y coordinates (Base In, Base Out, Base Up, Base Down)
- Polar (Polar coordinates)

Fog Amount
Select the amount of auto-fogging preferred:
- +0.50D
- +0.75D
- +1.00D
- +1.50D
- +2.00D

VA Up Arrow
- Improves VA: Tap **VISUAL ACUITY UP** to improve visual acuity.
- Increases Size: Tap **VISUAL ACUITY UP** to increase the size of the Optotype (decrease Visual Acuity).

Near Chart Units
- Snellen
- Decimal

CC Button
- Final
- REF

Retinoscopy
- Sphere +1.5 D
- Sphere +2.0 D

BB Fog Amount
Select the amount of auto-fogging preferred for the Binocular Balance Test
- +0.50D
- +0.75D
- +1.00D
- +1.50D
- +2.00D
- None

NRA/PRA Order
- NRA/PRA: Find the upper limit (increase plus), then the lower limit (decrease plus).
- PRA/NRA: Find the lower limit (decrease plus), then the upper limit (increase plus).

Binocular Only
Leaves both eye apertures open during all far vision tests when selected to ON.

Subj Overwrite Protection
- On - Attempting to start a subjective refraction using existing AR, LM, or REF data will NOT copy that data if there is already subjective information. A warning will be displayed indicating the Subjective data is protected.
- Off - Attempting to start a subjective refraction using existing AR, LM, or REF data will copy that data to the Subjective dataset, overwriting any existing Subjective data.

WARNING: If set to “Off”, any attempted modification of the above datasets will overwrite existing refraction data. If switching between datasets to allow the patient to compare prescriptions, do not modify the data or the Subjective refraction data will be overwritten.

Settings (continued)

Settings Options (continued)

XCyl Auto
If Xcyl Auto is on, the XCyl Mode selected below automatically begins when Cylinder or Axis is selected on the Main Screen or Keypad.

XCyl Mode
Specifies the type of XCyl test that automatically starts when a XCyl test is selected.
- User Select
- Manual
- Smart
- Split Cyl

XCyl Equal Keypad Button
- **ENTER** button -Press the **CONTROL KNOB** to select patient's preferred image (better 1, better 2), then press **ENTER** when the patient sees the images are equal.
- **CONTROL KNOB** - Press **ENTER** to select patient's preferred image (better 1, better 2), then press the **CONTROL KNOB** when the patient sees the images as equally blurry.

Date Format
- YMD (Year-Month-Day)
- MDY (Month-Day-Year)
- DMY (Day-Month-Year)
- MDY TEXT (Month-Day-Year, displayed in the format "<name of the month>, <day as number>, <year as 4-digit number>".)

Time format
- 12h (12-hour time display, using AM and PM)
- 24h (24-hour time display)

Keyboard LED
The buttons on the Keypad of the Controller may be backlit.
- On
- Off

Sleep
The number of minutes of inactivity before the display backlight will turn off to save power.
- Off
- 5 minutes
- 15 minutes
- 30 minutes
- 60 minutes

Settings (continued)

Output Options

CVD (Corneal Vertex Distance)
The subjective refraction data sent to EMR and the printer is adjusted according to the selected vertex distance. The CVD of the Visutron 900 *Touch* head is 16mm and the values displayed in the main data area are shown using that CVD. The subjective refraction data sent to EMR and the printer is adjusted according to the vertex distance selected here.

- 0 mm
- 12 mm
- 13.5 mm
- 16 mm
- 18 mm

Reset Exam
When “On”, this will automatically clear the exam data after an exam is exported.

EMR Settings
Which data to send to an EMR system:
- Subj (Subjective)
- AR (Auto Refractor) (Not needed in two-way EMR communication.)
- LM (Lensmeter) (Not needed in two-way EMR communication.)

Autoload
Determines which refraction information to start the refraction with.
- None - Does not autoload pre-test data
- AR - Autoloads the autorefractor data
- LM - Autoloads the lensmeter data
- REF - Autoloads the imported refraction data

Printer Section
- Far (prints only distance vision)
- Near (prints only near vision)
- Far/Near (prints distance and near vision)
- Far/Add (prints distance and near vision addition)

In the first column, select which datasets should be printed: Subj, AR, and/or LM. In the second column, select which test results should be printed: Visual Acuity, FCC (Fused Cross Cylinder), NRA/PRA, ACC (Amplitude of Accommodation), Phoria, and/or Vergence.

Programs

Custom refraction steps can be recorded in up to four different programs. Programs are run by tapping the number of the program at the bottom right of the main screen.

Creating a Program



1. Tap **Programs** in the bottom bar of the Settings menu.
2. Tap the **Number** in the Program Selection panel to select the program to setup.
3. Tap the step or test to add to the program in the Mode panel.
4. Tap the **Eye** to run the test on in the Eye panel (if available). (R = right, L = left, B = binocular)
5. Tap the Chart icon located below the Eye section on the screen (if available).
6. Tap the chart, filter and size to use for that step.

Note: The Sphere Adjust, Cyl Adjust, and Axis Adjust steps allows a specific chart to be selected. The charts selected for the Prism, Phoria, Vergence, XCyl, and BB tests are used for those tests.

7. Tap **Insert** in the menu bar at the bottom of the screen. Each refraction step or test will appear in the Program Listing panel.
8. Repeat the above process to add tests or steps to the program.
9. Tap **Save** to save any changes made to programs.
10. Tap **Exit** to return to the main screen.

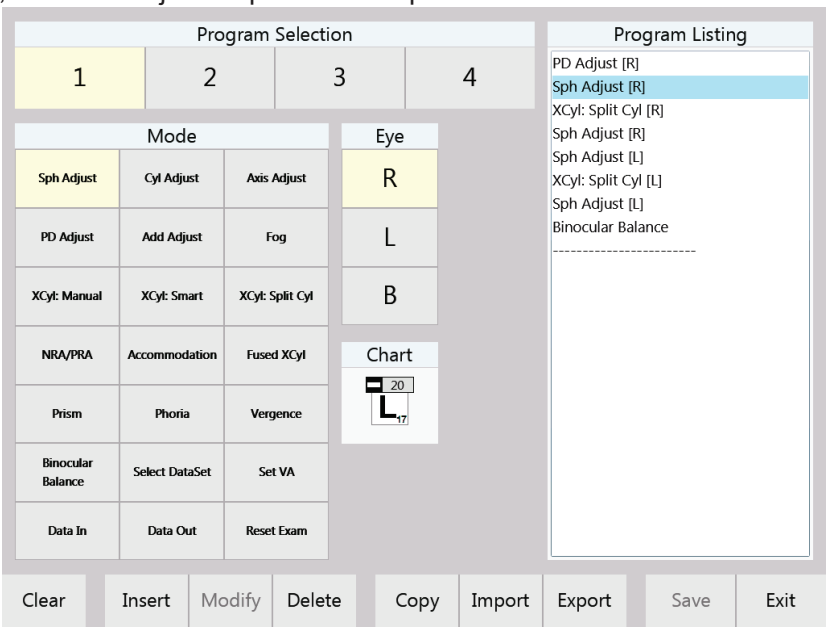


Figure IS-36 Programs

Clearing a Program

1. Tap the number of the program to be cleared in the Program Selection panel.
2. Tap **Clear** in the menu bar at the bottom of the screen.
3. Tap **Save** on the menu bar at the bottom of the screen.

Programs (continued)

Modifying and Deleting Steps

1. Tap the step to be modified or deleted in the Program Listing panel.
2. Make any desired changes to the selected Mode, Eye, or Chart.
3. Tap **Modify** or **Delete** in the menu bar at the bottom of the screen.
4. When modifications are complete, tap **Save** to save any changes made to the program.

Note: Tapping **Exit** without first tapping **Save** ignores any changes made in the Programs screen. Be sure to save any changes.

Copying a Program

Copying and pasting a program is a fast and easy way to create multiple programs that are similar to each other. Copy duplicates an existing program which can then be modified to create a unique program.



4. Tap the number of the program to be copied in the Program Selection panel.
5. Tap **Copy** in the menu bar at the bottom of the screen.
6. Tap the number of the program to paste the copied program into.
7. Tap **Paste** in the menu bar.
8. Make changes, then tap **Save** on the menu bar at the bottom of the screen to save the program.

Note: The copied program replaces any previously existing steps in the selected program.

Exporting a Program

Programs can be exported onto a thumb drive and then imported into another Visutron 900 *Touch*. This is a fast way to have the same programs put on multiple Visutron 900 *Touch* units.

1. Insert a blank USB drive into the side of the controller.
2. Tap **Export** in the menu bar at the bottom of the screen.
3. The currently selected program will be exported.

Note: The exported program is identified by the program number. Exporting programs from a USB drive overwrites any programs on the Visutron 900 *Touch* with the same program number.

Importing a Program From a USB Drive

1. Insert the USB drive that has the exported programs on it.
2. Select a program number to import.

Note: A program will only import to the same program number. (*e.g.,* Program 1 from one Visutron 900 *Touch* will only import into Program 1 of another Visutron 900 *Touch* unit).

3. Tap **Import** in the menu bar at the bottom of the screen. The program is automatically imported into the selected program.
4. Tap **Save** on the menu bar at the bottom of the screen to save the imported program.

Charts



The top half of the Charts screen contains all available charts. The lower left section contains the preferred charts. These charts are visible on the main screen and are quickly accessible when performing a refraction. The lower right section displays the chosen charts assigned to specific tests. Refer to Figure IS-37.

Selecting a Preferred Chart

5. Tap a box in the preferred charts section for the Chart to be changed/added.
6. Tap the desired Chart in the top half of the screen (from all available charts).
7. If an optotype chart is selected, the Chart Options dialog box will appear. In the Chart Options box, select the optotype size (using the ◄ and ► icons) and layout, then press **OK**.
8. The chart will appear in the preferred charts section of the screen.

Default Charts

Default Charts assigns a chart to be displayed at the beginning of each patient refraction, and charts to be displayed during specific tests.

Selecting a Default Chart

1. Tap a chart in the **Default Charts** section.
2. Tap the chart to be assigned for the test, from the **Charts** section. The **Chart Options** dialog box will appear if using optotypes.
3. Tap **Ok** to save the selected options.

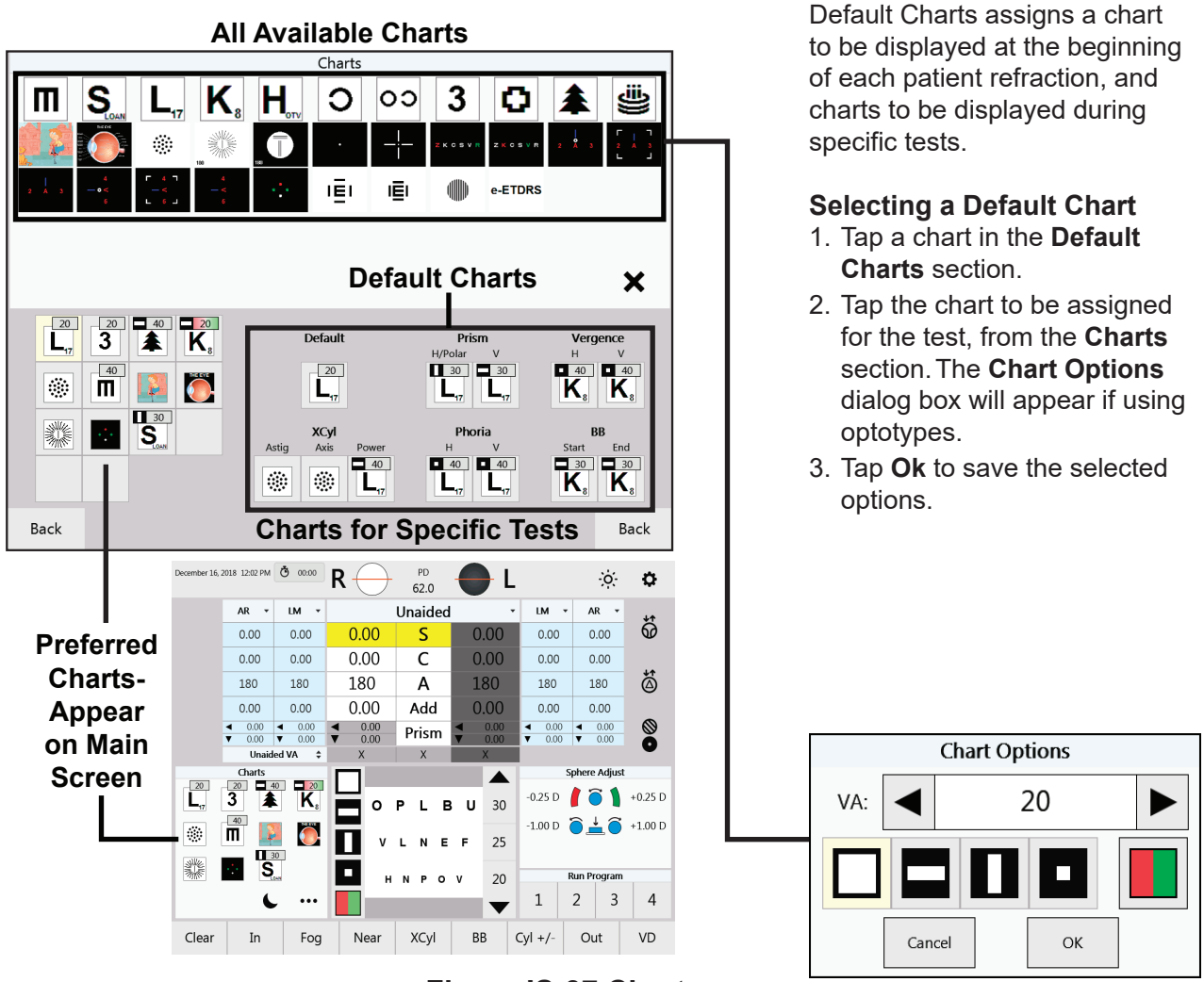


Figure IS-37 Charts

Aligning the Phoroptor Head

Once the Phoroptor Head is powered on and completes an initialization process, an exam can be performed.

1. Place the Phoroptor Head in front of the patient, centering it in front of the patient's eyes.
2. Position the patient's head against the forehead rest.
3. Check the illuminated bubble level to ensure the Phoroptor Head is level. Adjust by rotating the Thumb Screw on the top of the Phoroptor Head.
4. Adjust the Phoroptor Head to line up with the patient's left eye.
5. Using the Controller, adjust the pupillary distance between the right and left apertures on the Phoroptor Head.



Figure PE-01, Thumb Screw

Note: If the Auto Refractor or Lensmeter data transmits PD measurements when the data is brought in as a starting point for the refraction, and PD was not manually adjusted, the Visutron 900 *Touch* Head automatically moves to adjust to that PD.

6. Press the **PD** button, or tap **PD** at the top of the screen. Both apertures display the crosshair lenses. Use the crosses in the lenses to center the patient's pupils in each aperture.
7. Turn the **CONTROL KNOB** to the right to increase the pupil distance and to the left to decrease pupil distance.

   Binocular Adjustment
   Turn the **CONTROL KNOB** to increase or decrease PD in 1 mm increments.
   Monocular Adjustment
   Press the **R** or **L** button, or tap **R** or **L** on the screen to adjust PD for the right or left eye. Turning the **CONTROL KNOB** adjusts PD in 0.5 mm increments.

8. Look into the Corneal Vertex Distance Windows and line up the corneas by turning the forehead rest knob, so the target line and the target mark superimpose. (Please refer to Figure PE-02.)

Note: The default vertex distance is 16 mm.

9. Adjust the height of the lens banks by centering the left aperture in front of the patient's left eye, and centering the right aperture with the patient's right eye by turning the Asymmetrical Height Adjustment Knob.

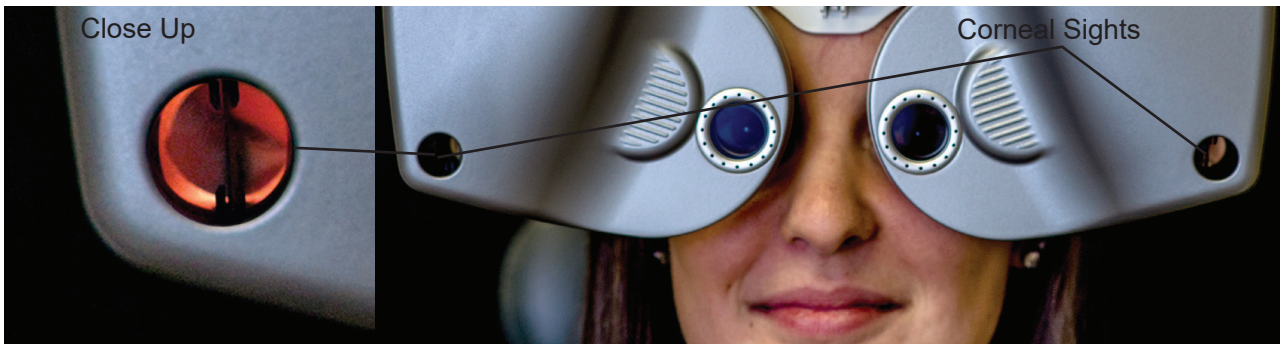


Figure PE-02, Corneal Sights

Data Input

Previous measurements can be imported as a starting point for a refraction. The data table containing columns of data is on the main screen. These columns are used to display data imported from connected equipment, or data entered manually. Refer to Figure PE-03.

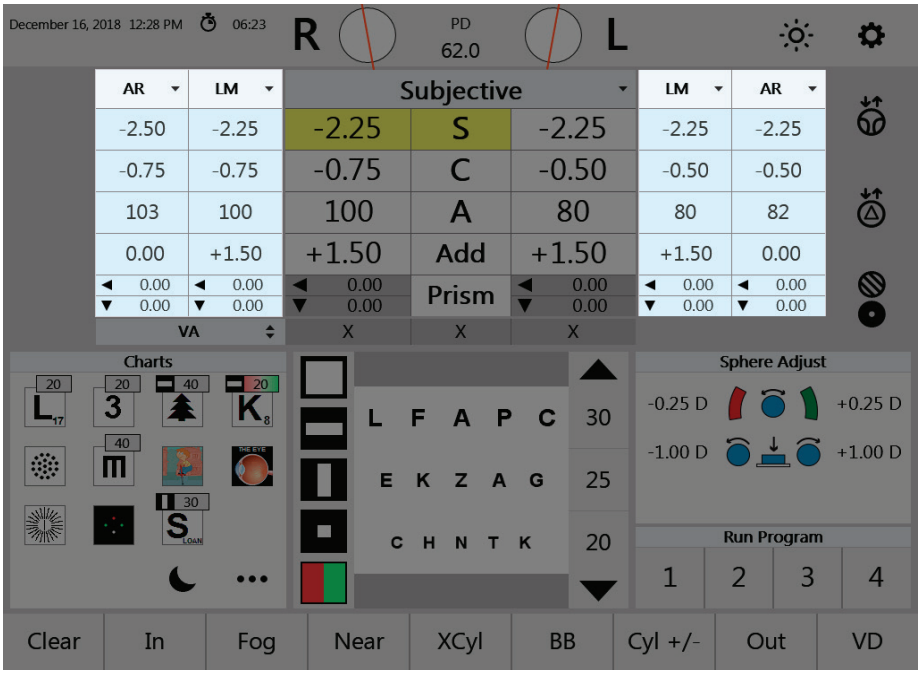


Figure PE-03 Import Data

Inputting Data Electronically

The Visutron 900 *Touch* allows data to be entered electronically from pre-test equipment, such as Lensmeters and Auto Refractors. Entering data into the Visutron 900 *Touch* is possible using one of the following options:

- Direct Connection - The lensmeter and autorefractor are directly connected to the Visutron 900 *Touch* using a serial cable or Bluetooth adapter, and their data populates the AR and LM data fields.
- Imported Data List - The pre-test data is sent directly to the Visutron 900 *Touch* and the data are stored in a Data List.
- EMR - If the EMR system interfacing with the Visutron 900 *Touch* supports two-way communication, the pre-test devices can send data to the EMR system, and then the EMR system sends the pre-test data to the Visutron 900 *Touch*. When pre-test data is sent to the Visutron 900 *Touch* from the EMR, it will automatically populate the AR, LM, and REF fields.

Data Input (continued)

Inputting Data Electronically (continued)

Direct Connection

The measurement data from the Lensmeter and Auto Refractor directly populates the LM and AR data fields in the Controller display. The data transfer takes place when the user presses the data output buttons on each pre-test device.

Imported Data List

To use the imported data list, the Store box in the Port Settings for Instrument 1 and/or Instrument 2 must be checked. Incoming Lensmeter and Auto Refractor data will be saved in the Imported Data List, and can be pulled into the AR and LM fields and be used as the starting point of a refraction. The data for a specific patient is identified by a time stamp. Some pre-test devices may also indicate an ID Number. This number is generated by the Lensmeter or Auto Refractor when the user selects the numbering option in the Settings for the specific device.

1. Press the **IN** button to access the Imported Data List. A screen with two columns will appear, one for Autorefractor data, one for Lensmeter data. Refer to Figure PE-04.
2. Tap the data to import from the two lists.
   a. Tap **Ok,** or press the **ENTER** button or **CONTROL KNOB** to bring the selected data set(s) to the main screen.
   b. Tap **Cancel** or press the **C** button to exit without importing data.

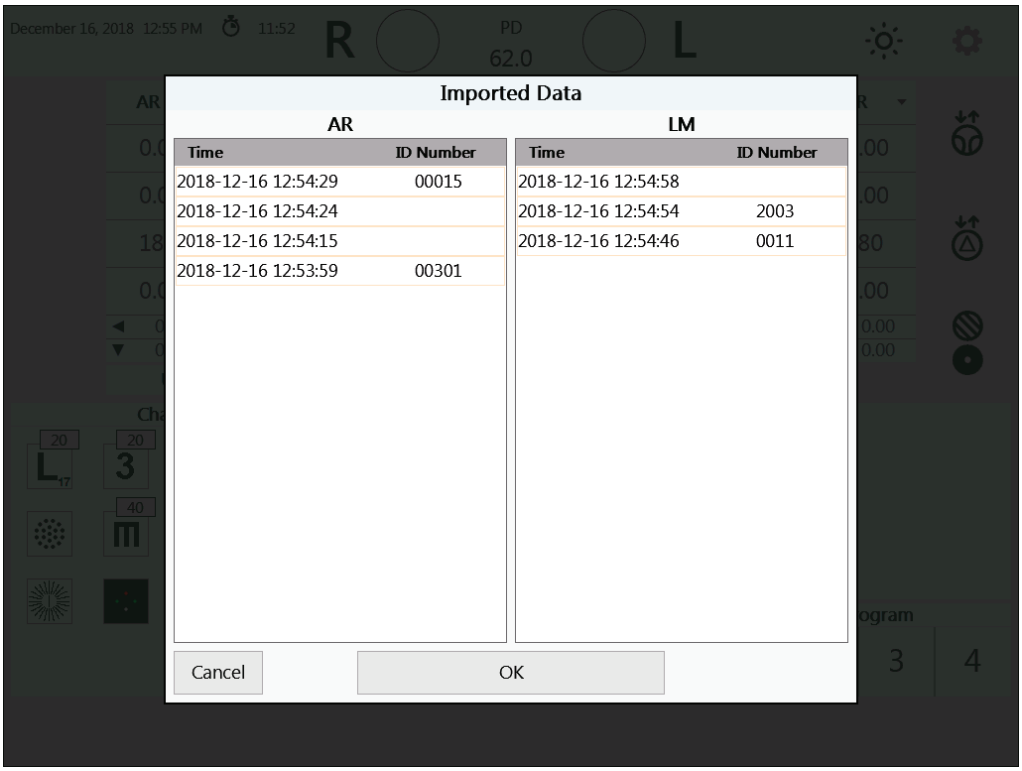


Figure PE-04, Data List

Data Input (continued)

Entering Data Manually

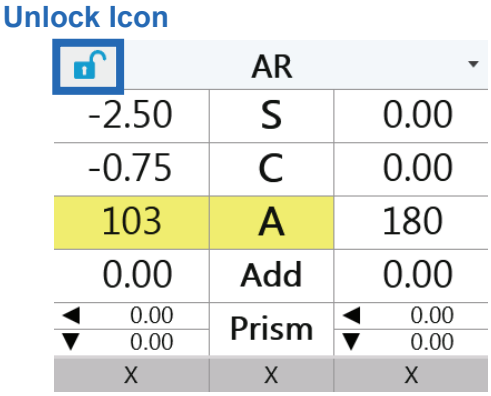


Figure PE-05 Lock/Unlock

1. Tap the drop-down list in the main display area to open a list of different data sets. Refer to Figure PE-06.
2. Select the type of data to enter. To enter auto refractor data, tap the **AR** option in the drop-down list or press the **AR** button. To enter lensmeter data, tap the **LM** option in the drop-down list or press the **LM** button.
3. The data set is unlocked if it has not been used. If the data set has already been used, to change it, first tap **Unlock** at the top left of the title bar. Refer to Figure PE-05.
4. Turn the **CONTROL KNOB** to enter the values for the data fields (Sphere, Cylinder, Axis, Add etc.).
5. Press the **CONTROL KNOB** to move to the next data field.
6. Tap **Lock**, after entering all the data for the left and right eyes to save the Auto Refractor data.
7. Repeat the above steps to enter other types of data.
8. Turn the **CONTROL KNOB** to begin changing Subjective data. The main measurement area title automatically changes to Subjective.

Note: To delete any of the data entered manually, tap the data field and tap or press **CLEAR**.

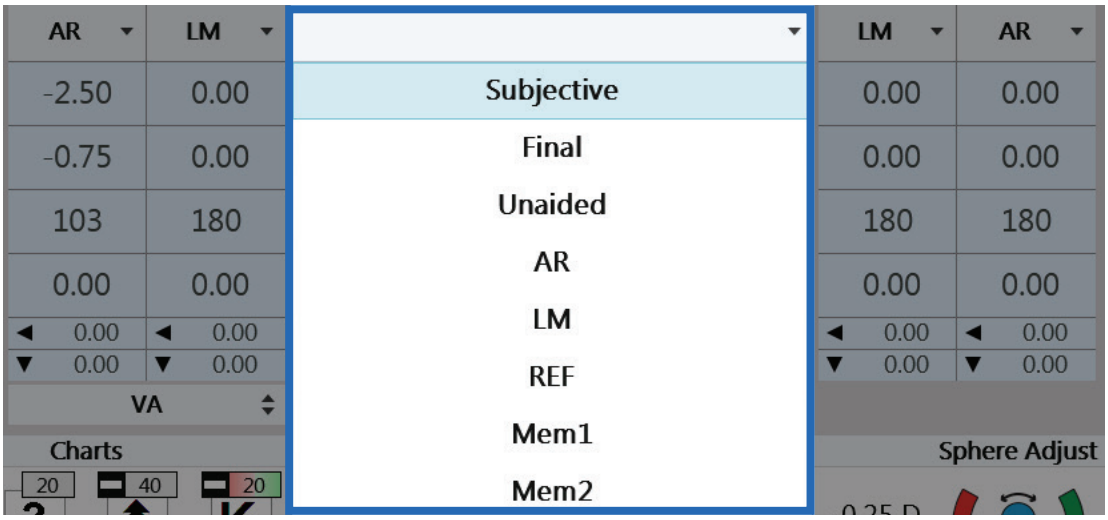


Figure PE-06, Data Input Drop-Down List

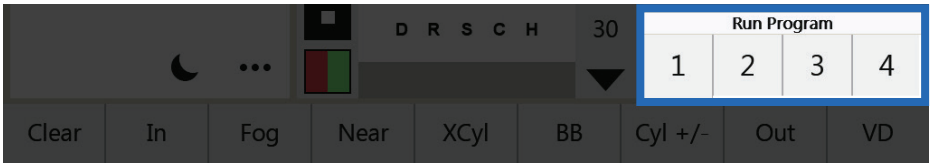
Starting a Refraction From Previously Saved, Transferred, or Input Data

1. Tap the drop-down list in the center display area or press the **AR** or **LM** button on the keypad to select the data to be used (*e.g.,* LM, AR). The data from the boxes are transferred to the active refraction data field.

Note: The data label reflects where the data came from (*e.g.,* LM, AR).

2. Adjust measurements from this starting point.
3. Once an adjustment is made, the center label changes to Subjective.

Running a Program



In the main screen, the programs created are displayed in the Run Program panel in the lower right corner of the screen.

1. To start a program, tap the program number. The first step of the program automatically begins.
2. Press the **CONTROL KNOB** to advance to the next step after completing a step in the program.
3. Tap the pause icon at the bottom right of the screen to pause the program. The icon will change to a play icon (green triangle). Tap the play icon to resume the program.
4. Tap the stop icon to stop and exit the program.

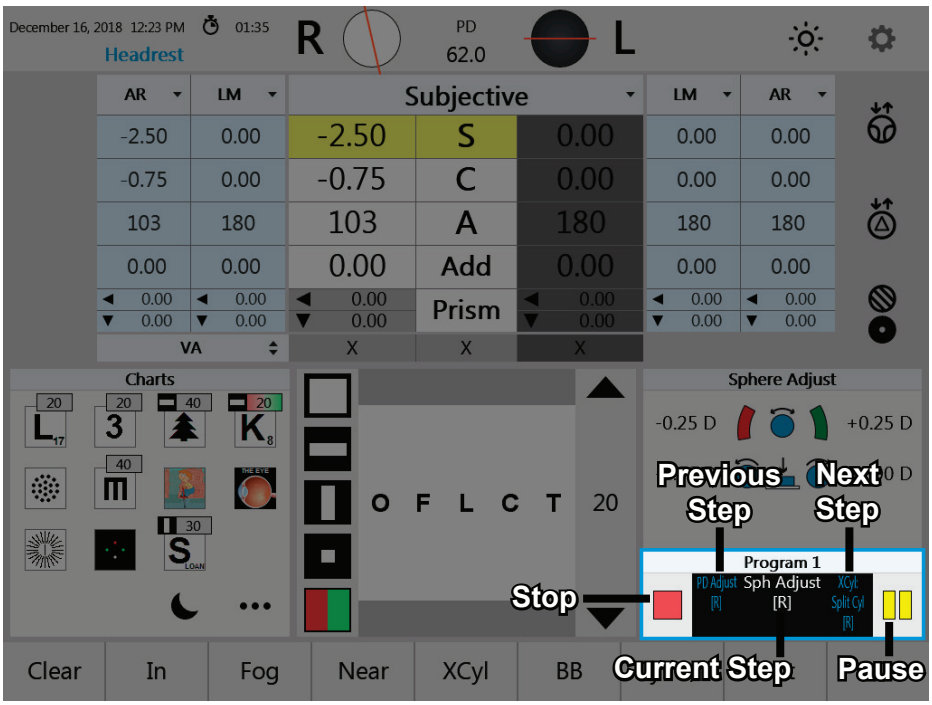


Figure PE-07, Run Program Screen

The Basics

Eye Selection

Press the **R**, **L**, or **B** button to open the apertures for the right eye, left eye, or both eyes, respectively . The aperture for the inactive eye automatically closes during refraction. The default setting for the open aperture at the start of a new exam is selected in the Setup Menu.

AR	LM	Subjective			LM	AR
0.00	0.00	+1.75	S	+2.50	0.00	0.00
0.00	0.00	-1.25	C	-0.50	0.00	0.00
180	180	8	A	5	180	180
0.00	0.00	0.00	Add	0.00	0.00	0.00
◀ 0.00 ▼ 0.00	◀ 0.00 ▼ 0.00	◀ 0.00 ▼ 0.00	Prism	◀ 0.00 ▼ 0.00	◀ 0.00 ▼ 0.00	◀ 0.00 ▼ 0.00
VA		X	X	X		

Figure PE-08, Values Table

Selecting a Data Field

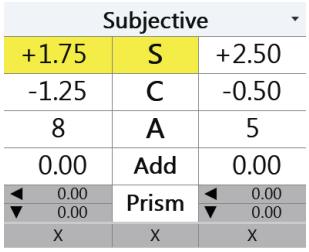
When adjusting sphere, cylinder, axis, etc., they can be selected using the touch screen or the controller buttons.

Tap the center column (**S, C, A, Add, Prism**) to activate both the left and the right eyes for that field. Tap the box to the left or right of the center column to activate only the left or right eye, respectively.

Press the **B** button, then the corresponding letter (**S, C, A, Add, Prism**) to activate both the left and the right eyes for that field. Press the **R** or **L** button, then the corresponding letter (**S, C, A, Add, Prism**) to activate only the left or right eye, respectively.

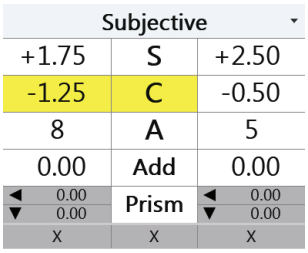
The yellow highlighted field indicates the adjustable value.

The Basics (continued)



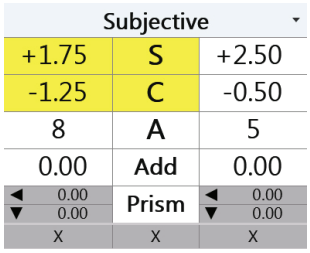
Adjusting Sphere

1. Activate the Sphere value field.
2. Turn the **CONTROL KNOB** to adjust the Sphere value by ±0.25 D, or press and turn the **CONTROL KNOB** to adjust the Sphere value by ±1.00 D per click stop.
3. Press the **CONTROL KNOB** to move to the next step.



Adjusting Cylinder

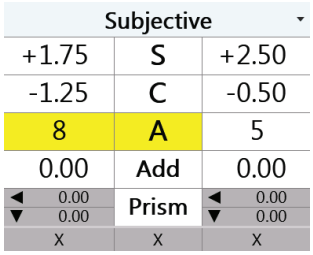
1. Activate the Cylinder value field.
2. Turn the **CONTROL KNOB** to adjust the Cylinder value by ±0.25 D, or press and turn the **CONTROL KNOB** to adjust the Cylinder value by ±1.00 D per click stop.
3. Press the **CONTROL KNOB** to move to the next step.



Adjusting Sphere and Cylinder Together

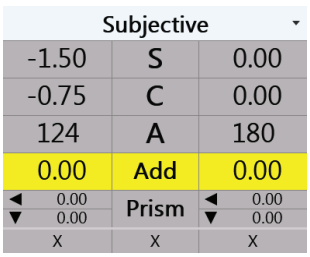
The Sphere and Cylinder values can be simultaneously adjusted to maintain the spherical equivalent.

1. Select **C**, then select **C** again to highlight both **S** and **C**, to activate Spherical Equivalent.
2. Turn the **CONTROL KNOB** to adjust the Sphere and Cylinder values together. A change of ±0.50 D in Cylinder power results in a corresponding ±0.25 D change in Sphere power.



Adjusting Axis

1. Activate the Axis value field.
2. Turn the **CONTROL KNOB** to adjust the Axis value by 1°, or press and turn the **CONTROL KNOB** to adjust the Axis value by 10° per click stop. The actual position of the Axis is graphically shown on the display in the lens aperture icon.
3. Press the **CONTROL KNOB** to move to the next step.



Near Vision Addition

1. Lower the Near Vision Rod and Card to automatically activate the **Add** field, converge the Phoroptor, and darken the Acuity Chart screen.

Note: Make sure the reading rod is lowered. If the rod is not lowered, "Convergence" displays at the top left of the screen and a "Beep" sounds.

2. Turn the **CONTROL KNOB** to adjust the Add value by ±0.25 D, or press and turn the **CONTROL KNOB** to adjust the Add value by ±1.00 D per click stop.
3. Press the **CONTROL KNOB** to save the value and exit Add mode.
4. Raise the Near Vision Rod and Card. The projector screen will illuminate again.

Cross Cylinder



1. Tap **XCyl** in the menu bar at the bottom of the main screen, or Press both the **C** and **A** buttons to activate the Cross Cylinder function.
2. If the XCyl Mode setting is set to “User Select,” three test options display: **Manual**, **Smart**, or **Split Cyl**.



- **Manual -** Refines Axis in 1°, 5°, or 10° increments, and adjust Cylinder in ±0.25 D, ±0.50 D, or ±1.00 D increments.
- **Smart -** Automatically brackets Axis and Cylinder based on patient response.
- **Split Cyl-** Use a Split Cyl lens to present two targets simultaneously to refine Axis and Cylinder.

Examination for Astigmatism

If the Cross Cylinder Mode (XCyl) is activated and the current Cylinder value is zero, an Astigmatism check will automatically start, and a 0.50 D JCC lens will be placed in the Phoroptor head.

1. Turn the **CONTROL KNOB** to present the Cross Cylinder target at 0° and 90°.
2. Ask the patient “which is better, 1 or 2?”
   - If the patient states a preference, turn the **CONTROL KNOB** to that number and press the knob, or tap **1** or **2** on the screen.
   - If the patient does not see a difference between the two charts, press the **ENTER** button or tap **Equal** on the screen.
3. Ask the patient to compare two charts at 45° and 135°.
   - If the patient states the charts are equal, no astigmatic correction is needed. Press the **ENTER** button or tap **Equal** on the screen.
   - If the patient has a preference, turn the **CONTROL KNOB** to that number and press the knob, or tap **1** or **2** on the screen.
4. If any patient preference was indicated, the test automatically advances to axis adjustment for the XCyl test that was selected.

Cross Cylinder (continued)

Manual Test

Note: Tap **Test** to switch the type of XCyl test (Manual/Smart/Split Cyl).

The Manual Cross Cylinder test allows the user to refine Axis in 1°, 5°, or 10° increments, and adjust Cylinder in ±0.25 D, ±0.50 D, or ±1.00 D increments. The Spherical equivalent is maintained during Cylinder power adjustment.

1. Tap **XCyl** on the menu bar at the bottom of the main screen.
2. Tap **Manual** to start the test.

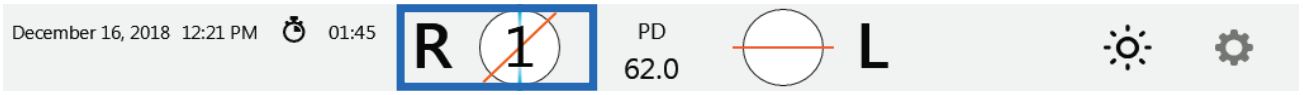


If the current Cylinder value is zero, an Astigmatism check will automatically start, and a 0.50 D JCC lens will be placed in the Phoroptor head. Refer to the *Examination for Astigmatism* section of this manual.

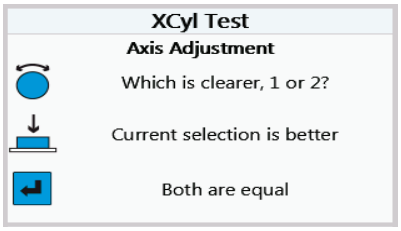
Note: **5°** will appear in the lower left of the screen. Tap to cycle through **1°**, **5°**, or **10°**.



3. Turn the **CONTROL KNOB** to present position 1 and position 2 to the patient. The direction of the Axis change is indicated in the lens aperture at the top of the screen. The orange lines represent the current axis. The blue lines represent the direction of the axis change offered to the patient.



4. Ask the patient: “Which is better, 1 or 2?”
5. If the patient states a preference, tap **1** or **2** on the screen, or turn the **CONTROL KNOB** to that number and press the button.
6. Repeat steps 3 - 5, until 1 and 2 are equal.



Note: It is possible to adjust axis beyond the increment that was selected for the axis adjustment. Turn the **CONTROL KNOB** 8 click stops in one direction when offering position 1 or 2 to the patient. After the 8th click stop, the axis changes in **1°** increments. This allows the user to freely modify the axis in that direction.

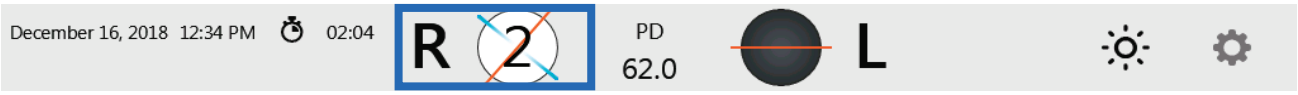
7. Press the **ENTER** button, or tap **Equal** on the screen, to advance to Cylinder power adjustment.



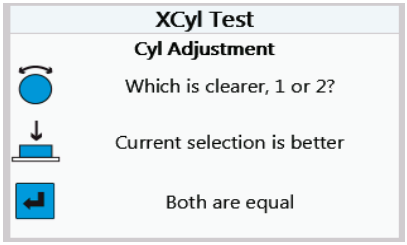
Cross Cylinder (continued)

Manual Test (continued)

8. Turn the **CONTROL KNOB** to present position 1 and position 2 to the patient. In the lens aperture at the top of the screen, the blue line indicates the axis of increased cylinder value presented to the patient.



9. Ask the patient: “Which is better, 1 or 2?”
10. If the patient states a preference, tap **1** or **2** on the screen, or turn the **CONTROL KNOB** to that number and press the button.
11. Repeat steps 8 - 10, until 1 and 2 are equal.



Note: Turn the CONTROL KNOB eight (8) click stops in one direction when offering position 1 or 2 to the patient. After the eighth (8th) click stop, the cylinder changes in 0.25D increments. This allows the user to freely modify the Cylinder.

12. Press the **CONTROL KNOB**, or tap **Equal** on the screen.



Note: Tap **Undo** at the bottom left of the screen to undo a step in the Cross Cylinder test.

Cross Cylinder (continued)

Smart Test

Note: Tap **Test** to switch the type of XCyl test (Manual/Smart/Split Cyl).

1. Tap **XCyl** on the menu bar at the bottom of the main screen.
2. Tap **Smart** to begin the Smart Cylinder test. Spherical equivalent is maintained during Cylinder power adjustment.

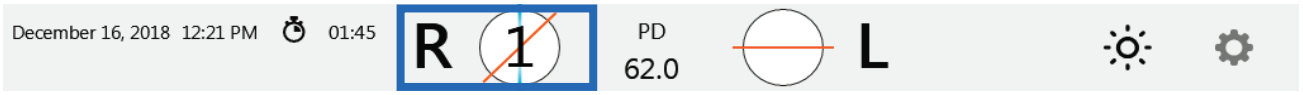


If the current Cylinder value is zero, an Astigmatism check will automatically start, and a 0.50 D JCC lens will be placed in the Phoroptor head. Refer to the *Examination for Astigmatism* section of this manual.

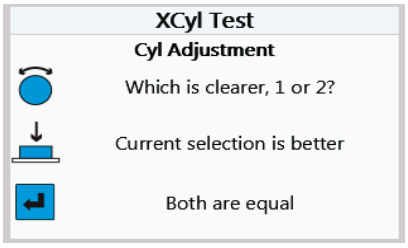
Note: The degree increment will appear in the lower left of the screen. Tap to cycle through 1°, 2°, 5°, 10°, or 20°.



3. Turn the **CONTROL KNOB** to present position 1 and position 2 to the patient. The direction of the Axis change is indicated in the lens aperture at the top of the screen. The orange lines represent the current axis. The blue lines represent the direction of the axis change offered to the patient.



4. Ask the patient: “Which is better, 1 or 2?”
5. If the patient states a preference, tap **1** or **2** on the screen, or turn the **CONTROL KNOB** to that number and press the button.
6. Repeat steps 3-5, until 1 and 2 are equal. As the patient responds, the system automatically reduces the axis change offered at each step.



Note: It is possible to adjust axis beyond the increment that was selected for the axis adjustment. Turn the **CONTROL KNOB** 8 click stops in one direction when offering position 1 or 2 to the patient. After the 8th click stop, the axis changes in 1° increments. This allows the user to freely modify the axis in that direction.

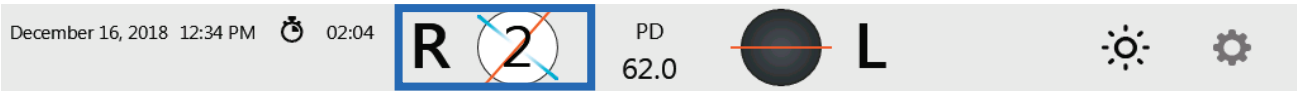
7. When the test determines the final axis has been reached, it will automatically proceed to the Cylinder power adjustment step. At any point, to advance to the next step, press the **ENTER** button or tap Equal.



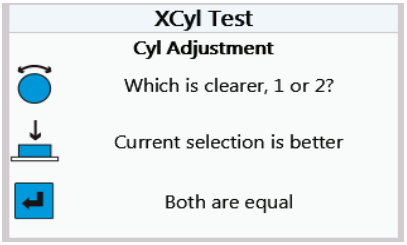
Cross Cylinder (continued)

Smart Test (continued)

8. Turn the **CONTROL KNOB** to present position 1 and position 2 to the patient. The amount of Cyl change is indicated in the lens aperture at the top of the screen.



9. Ask the patient: “Which is better, 1 or 2?”
10. If the patient states a preference, tap **1** or **2** on the screen, or turn the **CONTROL KNOB** to that number and press the button.
11. Repeat steps 8 - 10, until the test automatically finishes.



Note: Turn the **CONTROL KNOB** eight (8) click stops in one direction when offering position 1 or 2 to the patient. After the eighth (8th) click stop, the cylinder changes in 0.25D increments. This allows the user to freely modify the Cylinder.



Note: Tap **Undo** at the bottom left of the screen to undo a step in the Cross Cylinder test.

Cross Cylinder (continued)

Split Cyl Test

Note: Tap **Test** to switch the type of XCyl test (Manual/Smart/Split Cyl).



The Split Cyl Cross Cylinder test shows the patient two charts at the same time when adjusting Axis and Cylinder.

Note: When the patient has Sphere power equal to or greater than -12.25 D or 7.75 D, the Split Cyl test cannot be used.

1. Tap **XCyl** on the menu bar at the bottom of the main screen.
2. Tap **Split Cyl** to start the test.

If the current Cylinder value is zero, an Astigmatism check will automatically start, and a 0.50 D JCC lens will be placed in the Phoroptor head. Refer to the *Examination for Astigmatism* section of this manual.

Note: Axis is freely adjustable by turning the **CONTROL KNOB**.

Note: The amount of Axis change can be selected by tapping the **1°**, **5°**, or **10°** screen icon, located in the lower left of the screen.



3. Ensure the patient can see the red and green edges of the Split Cylinder lens.
4. Ask the patient: “Which chart is clearer, the red or the green?”
5. Press the **RED** or the **GREEN** button, or tap **Red** or **Green**, based on the patient’s response.
6. Repeat steps 4 and 5, until the patient sees the two charts equally clear or equally blurry.
7. Press the **CONTROL KNOB**, press the **ENTER** button, or tap **Equal**, to save the Axis value.

Note: The amount of cylinder change can be selected by tapping the **±0.25 D**, **±0.50 D**, or **±1.00 D** screen icon, located in the lower left of the screen.

8. Ask the patient: “Which half is clearer, the red or the green?”
9. Press the **RED** or the **GREEN** button, or tap **Red** or **Green**, based on the patient’s response.

Note: Cylinder is freely adjustable by turning the **CONTROL KNOB**.

10. Repeat steps 8 and 9, until the patient sees the two charts equally clear or equally blurry.
11. Press the **CONTROL KNOB**, press the **ENTER** button, or tap **Equal**, to save the Cylinder value. This completes the Split Cyl Cross Cylinder test.

Binocular Balance

1. Press the **BB** button, or tap **BB** on the main screen, to begin Binocular Balance.
2. The Binocular Balance test automatically places prism in each eye (3D base down in the right eye and 3D base up in the left eye), and fogs the left and right eye.

Note: The sphere values automatically fog by the amount specified in the Settings menu.

3. Verify that the patient can see two images, one up and one down.
   - Tap **Prism** to adjust the Prism values if the patient cannot see two images.
   - Tap **Set Prisms** to save the modified Prism values.
4. Ask the patient: “Which image is clearer, the top or the bottom?”
   - If the top image is clearer, increase sphere in the right eye.
   - If the bottom image is clearer, increase sphere in the left eye.
5. Adjust sphere until both lines look equal.
6. Press the **CONTROL KNOB**, or tap **Equal**.
7. Decrease sphere in both eyes to reach the best visual acuity.
8. Press the **CONTROL KNOB**, or tap **Save** to complete the test.



Near Vision Test

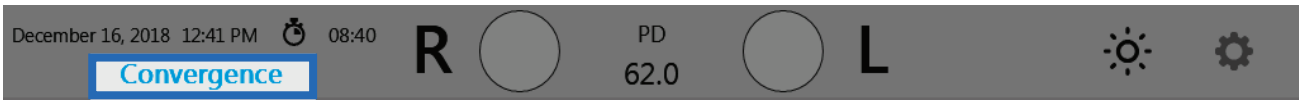


1. Lower the Near Vision rod.
   - The Add boxes are highlighted.
   - Both apertures are open.
   - Phoroptor head converges to 15.75 in. (40 cm).

Note: The NearBright automatically illuminates when the Near Vision rod is lowered.

2. The Card Illuminator light has two intensity levels. Adjust the light by pressing the button on the underside of the Card Illuminator.
3. Turn the **CONTROL KNOB** to adjust power in ±0.25 D increments.
4. When the Near Vision test is completed, raise the Near Vision rod. The Add boxes are no longer active and the Add power is removed from the Phoroptor head.

Note: If the Add data fields are activated and the Near Vision rod is not lowered, or if the Near Vision rod is not raised after completing the test, “Convergence” appears at the top of the screen.



Near Vision Test (continued)



Fused Cross Cylinder Test

1. Select the Cross Grid Chart on the reading card.

Note: The Fixed Cross Cylinder lenses (+0.50 D, Axis 90°) are placed in the lens apertures.

2. Ask the patient: “Which is better (sharper and clearer), the horizontal or the vertical lines?”
3. If horizontal is better, turn the **CONTROL KNOB** to add plus (+) power, if vertical is better, turn the **CONTROL KNOB** to take away plus (+) power.
4. Repeat steps 2 and 3, until the patient states that the horizontal and vertical lines appear equally sharp and clear.
5. Press the **CONTROL KNOB** or the **ENTER** button, or tap **Equal**, to save the values.
6. To exit the test, perform one of the following steps:
   A. Press the **CONTROL KNOB** or the **ENTER** button, or tap **Set Add**, to save the value to that determined by the Fused Cross Cylinder test and exit the test.
   B. Tap **Save** to save the values without setting the patient’s Add value and exit the test.

NRA/PRA Test

Near Vision Addition can be determined by measuring Negative Relative Accommodation (NRA) and Positive Relative Accommodation (PRA). The order of the test depends on the settings selected in the Settings menu, either NRA/PRA or PRA/NRA.

1. Select a line of letters in descending size or other optotypes on the reading card.
2. Turn the **CONTROL KNOB** to add plus (+) power in 0.25 D increments, until the patient states that the smallest lines of the optotype appear clear.
3. Continue to turn the **CONTROL KNOB** to add plus (+) power, until the patient states the image blurs.
4. Press the **CONTROL KNOB** or the **ENTER** button, or tap **Blur**, to save the upper limit.
5. Turn the **CONTROL KNOB** in the opposite direction to decrease plus (+) power, until the patient states that the chart appears clear again.
6. Continue to turn the **CONTROL KNOB** to decrease plus (+) power, until the patient states that the image blurs again.
7. Press the **CONTROL KNOB** or the **ENTER** button, or tap **Blur,** to save the lower limit.
8. To exit the test, perform one of the following steps:
   A. Press the **CONTROL KNOB** or the **ENTER** button, or tap **Set Add**, to set the Add value to the midpoint of the NRA and PRA values and exit the test.
   B. Tap **Save** to save the NRA/PRA values without setting the patient’s Add value and exit the test.

Near Vision Test (continued)

Amplitude of Accommodation Test

1. Tap the **Accommodation** screen icon to measure the Amplitude of Accommodation or Accommodative Response.

Note: Amplitude of Accommodation is measured monocularly.

2. Turn the **CONTROL KNOB** to add minus (-) power to the right eye (using the patient's Near Vision addition as the starting point), until the patient states that the target blurs.
3. Press the **CONTROL KNOB** or the **ENTER** button, or tap **Blur**, to save the right eye value.
4. Turn the **CONTROL KNOB** to add minus (-) power to the left eye (using the patient's Near Vision addition as the starting point), until the patient states that the target blurs.
5. Press the **CONTROL KNOB** or the **ENTER** button, or tap **Blur,** to save the left eye value.
6. Press the **CONTROL KNOB** or the **ENTER** button, or tap **Save,** to save the Accommodation values and exit the test.

Prism Testing

Prism lenses move in automatically when the prism test is engaged. Not all models of the Visutron 900 *Touch* come with prism compensators.

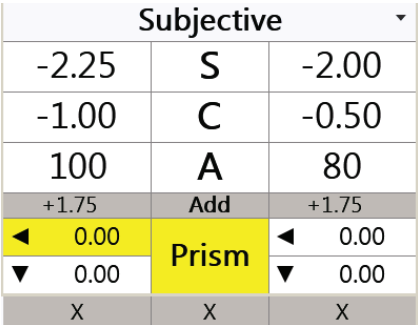


Figure PE-10, Prism Values

1. Press the **PRISM** button, or tap **Prism,** to begin the Prism test.

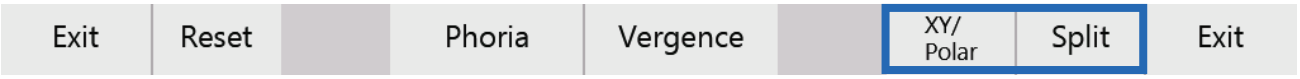
Note: When using any of the automated Prism tests (*e.g.,* Phoria, Vergence, Binocular Balance), the lens apertures are occluded initially when the prism lenses are activated, and open after the prism power is in place.

Note: The small triangles next to the Prism box on the data table indicate the orientation and direction of the Prism in each eye. Refer to Figure PE-10.

- ◄ = Horizontal prism - Right Eye: Base In (BI), Left Eye: Base Out (BO)
- ► = Horizontal prism - Right Eye: Base Out (BO), Left Eye: Base In (BI)
- ▼ = Vertical prism - Right Eye and Left Eye: Base Up (BU)
- ▲ = Vertical prism - Right and Left Eye: Base Down (BD)

2. Tap the box on the screen for the eye and the prism base orientation (horizontal or vertical) to be changed.
3. Turn the **CONTROL KNOB** to modify Prism in either the right or left eye.

Note: Press and turn the **CONTROL KNOB** (at the same time) to add prism in 1.00 D increments.

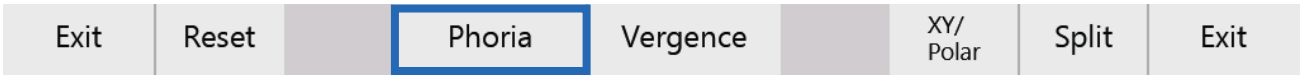


Note: Tap **XY/Polar** to temporarily view the Prism in XY (BI/BO, BU/BD) or Polar Coordinates (degrees).

Note: Tap **Split** to balance the current Prism power between both eyes.

Prism Testing (continued)

Phoria



Phoria Testing - Distance

1. Press the **PRISM** button, or tap **Prism**.
2. Tap **Phoria** in the menu bar at the bottom of the screen.

Note: The Phoria test automatically places Prism power of 6 D BD in the right eye and 10 D BI in the left eye. If these starting values need to be adjusted, refer to the *Adjust Initial Values* section of this manual.

Horizontal Phorias Test

1. Select an appropriate test chart of a single vertical line of optotypes or a single optotype.
2. Verify that the patient can see two images, one up and one down.
3. Adjust initial values if the patient cannot see two targets.
4. Decrease BI Prism, until the patient indicates the two images are vertically aligned, like buttons on a shirt.

Note: The ending value may be BO prism.

5. Press the **CONTROL KNOB**, or tap **Aligned**.



Note: The magnitude of lateral Phoria is the power of the Prism when the images are aligned. It appears in the dialog box in the field labeled “H”.

Vertical Phorias Test

After the horizontal phoria is determined, the Prism power is restored to 10 BI Prism in the left eye, as a starting value for the vertical phoria test.

1. Select an appropriate test chart of a single horizontal line of optotypes or a single optotype.
2. Verify that the patient can see two images.
3. Decrease BD Prism until the two images align horizontally, like headlights on a car, to measure the vertical phoria.

Note: The ending value may be BU prism.

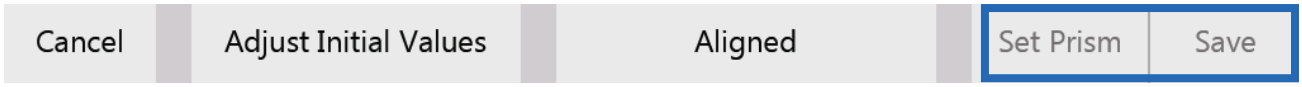
4. Press the **CONTROL KNOB**, or tap **Aligned**.

Note: The magnitude of the vertical Phoria is the power of the Prism when the images are aligned. It appears in the dialog box in the field labeled “V”.

Prism Testing (continued)

Phoria (continued)

Complete the Phoria Test



Tap **Set Prism** to set the patient's Prism values to that determined by the Phoria test or tap **Save** to exit the test and return the prisms to their previous values.

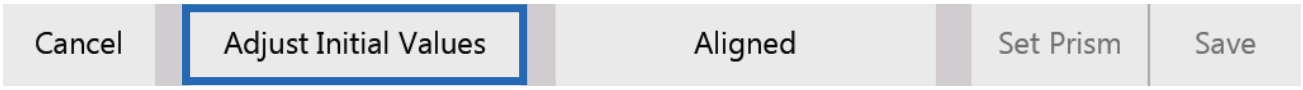
Phoria Testing - Near

1. Lower the reading rod to converge the Phoroptor to measure Near vision horizontal phorias.
2. Press the **PRISM** button, or tap **Prism**.
3. Tap **Phoria** to begin the test.
4. Select a vertical line of letters or the small block of letters on the Near Vision card for the horizontal phoria test, and a single horizontal line of letters for the vertical phoria test.
5. Follow the steps in the *Phoria Testing - Distance* section to determine horizontal and vertical phorias at near.

Note: The values for the Near Vision Phoria test are saved separately from the Distance Phoria test.

Note: Raising or lowering the reading rod during a phoria test will cancel the current test and start a new test at the new distance.

Adjust Initial Values



1. To change prism starting values for a particular patient, tap **Adjust Initial Values**.
2. Turn the **CONTROL KNOB** to adjust the value for the selected Phoria base. Tap **Save**.
3. Press the **CONTROL KNOB** to switch to the opposite eye.
4. After the desired base values are set, press the **ENTER** key or tap **Save** to save the values and return to the Phoria test.
5. Tap **Cancel** to discard the modified base values and return to the Phoria test.

Note: The modified starting values are only set for the current exam. They will return to the original default values when a new exam is started.

Prism Testing (continued)

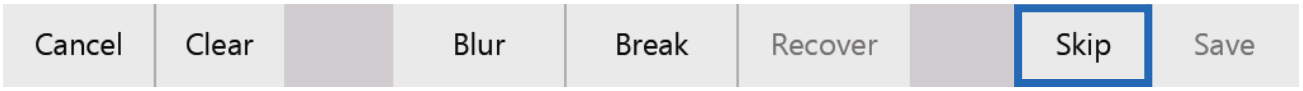
Vergence



Vergence Testing or Fusion Range Measurement - Distance

1. Press the **PRISM** button, or tap **Prism**.
2. Tap **Vergence** in the menu bar at the bottom of the screen. This test automatically advances through the steps of measuring:
   - Power of Divergence
   - Infravergence (Right Eye and Left Eye)
   - Power of Convergence
   - Supravergence (Right Eye and Left Eye)

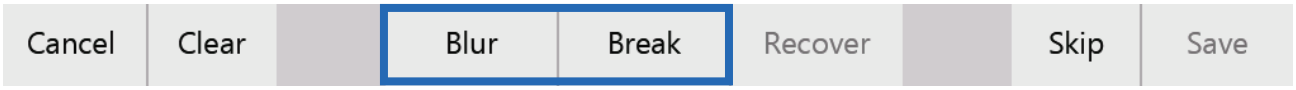
Note: Tap **Skip** to omit a specific step in the Vergence test function. Tap it for each step in the test to be skipped.



Power of Divergence

1. Set the acuity chart to a single vertical line of optotypes.
2. Enter BI prism slowly (starting from zero prism power), until the patient says the image is blurry.
3. Press the **CONTROL KNOB**, or tap **Blur**.
4. Enter additional BI prism, until the patient sees two images.
5. Press the **CONTROL KNOB**, or tap **Break**.
6. Enter BO prism until the images converge again.
7. Press the **CONTROL KNOB**, or tap **Recover**.

Note: The amount of Prism at Blur/Break/Recovery appears in the designated boxes on the screen and is saved.



Power of Convergence

1. Set the acuity chart to a single vertical line of optotypes at or near the patient's visual acuity.
2. Enter BO prism slowly in both eyes (starting from zero prism power), until the image is blurry to the patient.
3. Press the **CONTROL KNOB**, or tap **Blur**.
4. Enter additional BO prism, if necessary, until the patient sees two images.
5. Press the **CONTROL KNOB**, or tap **Break**.
6. Enter BI prism until the images converge again.
7. Press the **CONTROL KNOB**, or tap **Recover** step in the test.

Prism Testing (continued)

Vergence (continued)

Infravergence and Supravergence can now be measured in each eye.



Infravergence

1. Enter BD prism slowly, until the patient sees two images.
2. Press the **CONTROL KNOB**, or tap **Break**.
3. Enter BU prism until the images converge again.
4. Press the **CONTROL KNOB**, or tap **Recover**. The amount of Prism at Break and Recovery appears in the designated boxes on the screen and is saved

Supravergence

1. Enter BU prism slowly, until the patient sees two images. (Please refer to Figures IU-36 & IU-37.)
2. Press the **CONTROL KNOB**, or tap **Break**.
3. Enter BD prism until the images converge again.
4. Press the **CONTROL KNOB**, or tap **Recover**. The amount of Prism at Break and Recovery appears in the designated boxes on the screen and is saved.

Vergence Testing or Fusion Range Measurement - Near

Measure vergence for near vision using the following steps:

1. Lower the reading rod to converge the Phoroptor.
2. Press the **PRISM** button, or tap **Prism**.
3. Select **Vergence** in the menu bar at the bottom of the screen.
4. Follow the steps for measuring distance vergence as described in the *Vergence Testing or Fusion Range Measurement - Distance* section.

Note: Raising or lowering the reading rod during a vergence test will cancel the current test and start a new test at the new distance.

Vertex Distance Calculator

Clear	In	Fog	Near	XCyl	BB	Cyl +/-	Out	VD

To view the current refraction data at a different vertex distance, use the Vertex Distance Calculator. Tap the different vertex distances to display the adjusted values. Tap **SE t**o display the spherical equivalent. Close the Vertex Distance Calculator by tapping **Exit**.

Note: The Vertex Distance Calculator is for reference only. The Visutron 900 *Touch* ***does not send*** the adjusted data out.

Saving Visual Acuity

Visual acuity for monocular and binocular vision for both unaided and aided visual acuity can be saved at any time in the refraction.

1. Press the **R**, **L**, or **B** button, or tap **R**, **L**, or **B** to select the right eye, left eye, or both eyes.
2. Show the patient a chart of multiple lines of optotypes.
3. Ask the patient to choose the smallest line of optotypes they can read.
4. Tap the number on the screen next to that line (*e.g.,* “20” for Snellen or 1.0 for Decimal).
5. This saves the visual acuity for the eye(s), which appears in the data field below each eye.

Note: Follow the same steps for Visual Acuity - Near as with Visual Acuity - Distance.

Note: The VA and Unaided VA boxes change to Near VA and Unaided Near VA when working with Visual Acuity - Near.

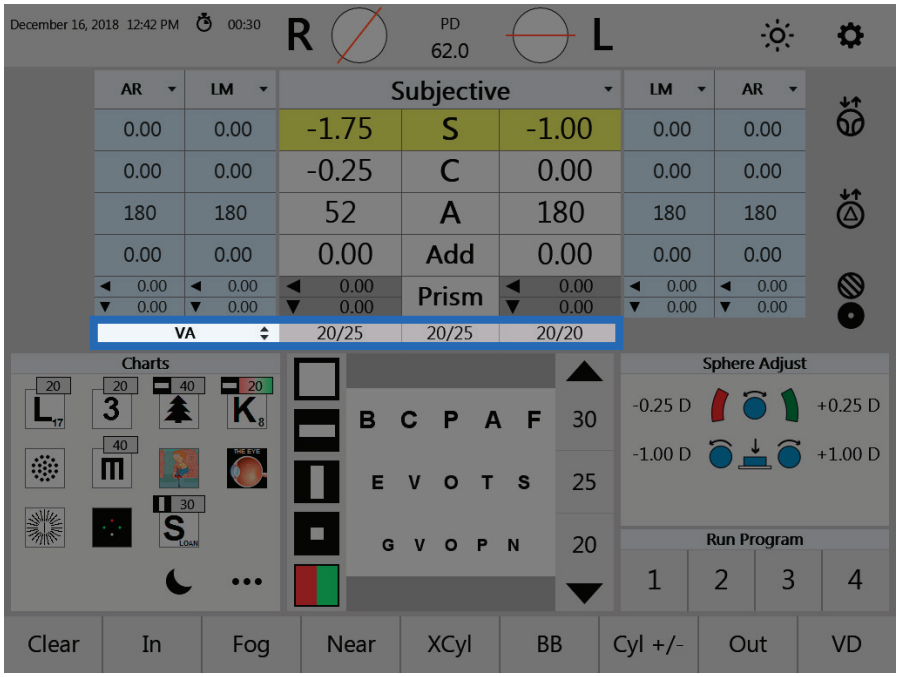


Figure PE-11, Visual Acuity

Comparing Refraction Data

One of the advantages of the Visutron 900 *Touch* is the ability to quickly and easily compare different refractions with the push of a button, enabling patients to see the difference between old and new prescriptions, or the difference between two possible prescriptions.

Refraction data can be transferred and stored in the Final, Mem1, and Mem2 storage boxes.

Once data is entered for a particular dataset, it can be called up at any point by the drop down menu, or by one of the corresponding buttons. The subjective, lensmeter, autorefractor, unaided, and final data can be quickly called up with the press of a button.



Figure PE-12, Gray Data Keys

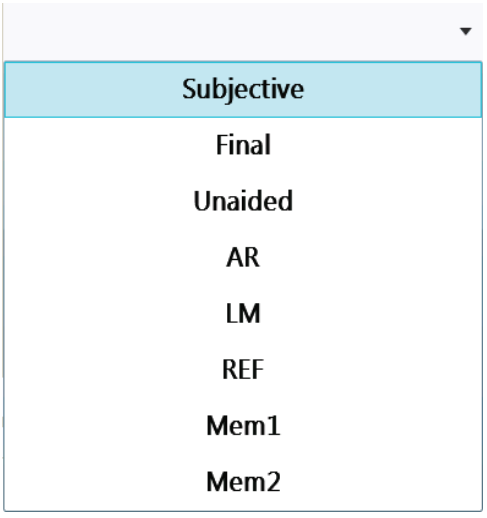


Figure PE-13, Drop Down List

EMR and Printing

It is essential to either send the refraction data to an EMR system or the printer before clearing data and preparing for the next patient. The refraction data is not stored in the Visutron 900 *Touch*, so it cannot be recalled for reference at a later time.

Visutron 900 *Touch* data is able to be sent electronically to an EMR system, printed, and manually recorded.

Note: Results may be both printed and sent to an EMR system as long as the user configures both the printer and EMR ports for output in the Settings menu.



After the exam is completed and the Data Output options are set, press the **OUT** button, or tap **Out** to transfer the data out.

Note: The default data that is sent to the EMR system or the printer is the Final refraction data. If the measurements are not saved as Final refraction data, the Subjective refraction data is sent.

If the data was sent successfully, a message will appear in the top left of the screen. If there is an error and the data is not able to be sent out, an error will appear. Refer to Figure PE-14.

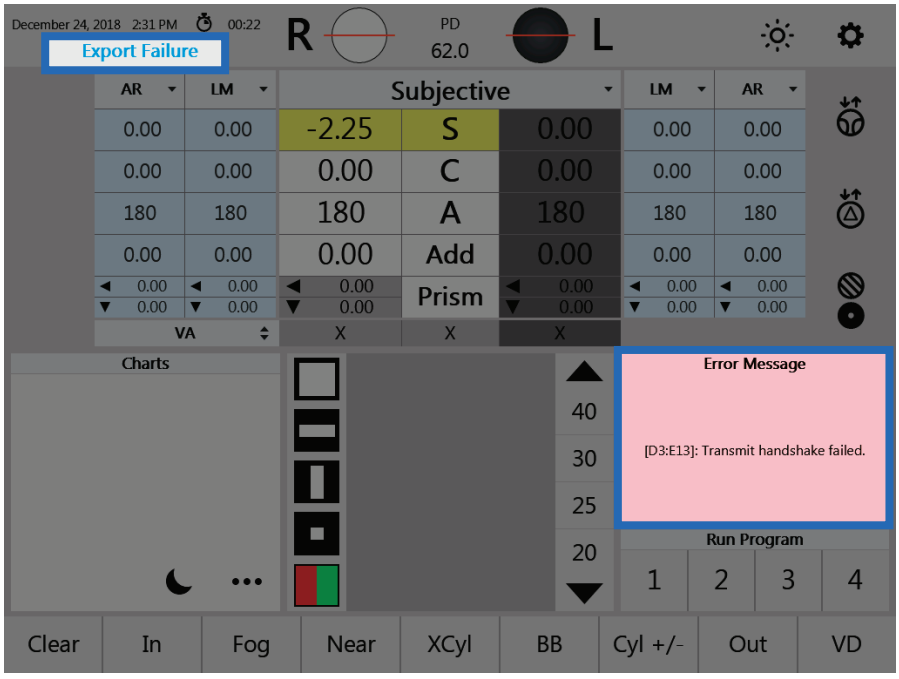


Figure PE-14 Export Failed

EMR and Printing (continued)

Data Output

Each patient data record includes:

- Sphere (Right and Left Eye, Far and Near)
- Axis (Right and Left Eye)
- Visual Acuity Distance Unaided and Aided (Right Eye, Left Eye, Binocular)
- Vertex Distance
- Fused Cross Cylinder Add Value NRA/PRA
- Distance Phoria (Horizontal, Vertical)
- Distance Vergence (Horizontal, Vertical)
- Cylinder (Right and Left Eye)
- Prism (Right and Left Eye)
- Visual Acuity Near Unaided and Aided (Right Eye, Left Eye, Binocular)
- Pupillary Distance
- Amplitude of Accommodation
- Near Phoria (Horizontal, Vertical)
- Near Vergence (Horizontal, Vertical)

The ReichertCapture™ software can be downloaded from the Reichert website (www.reichert.com) and installed on the connected computer to interface with the EMR.

Clear



Press the yellow **C** button (in the upper left corner) or tap **Clear** on the bottom of the controller screen to enter Clear mode.

Note: Clear Mode will be active until the **ENTER** button is pressed, or **Exit** is tapped, to exit Clear Mode.

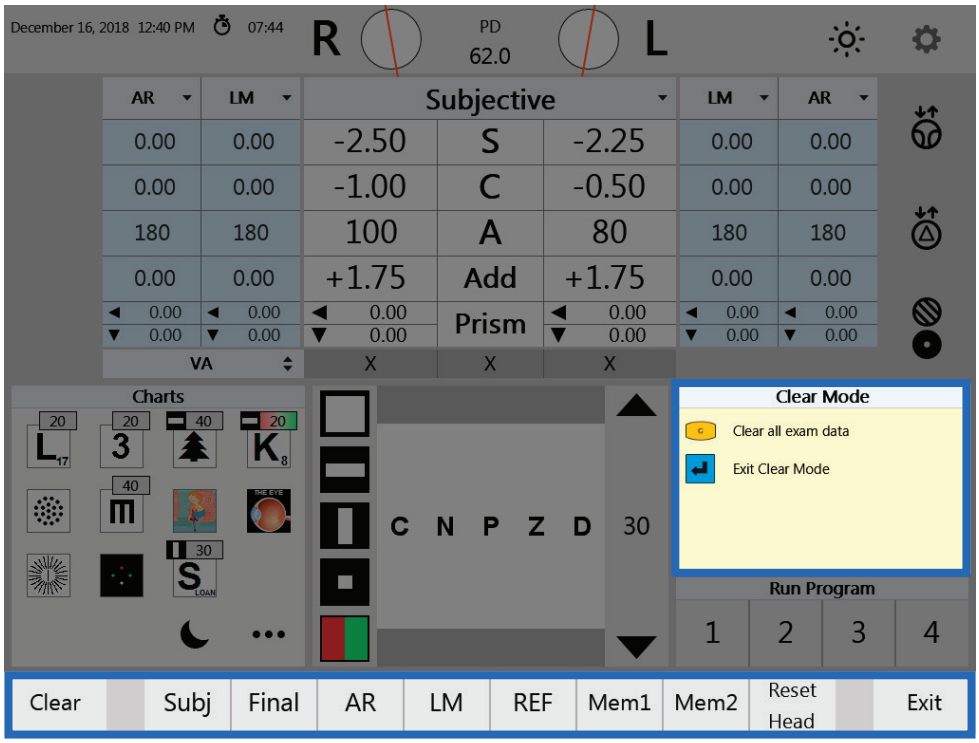


Figure PE-15, Clear Mode

Clearing a Single Field

Tap the box on the screen for the individual data field to be cleared (*e.g.,* Tap the Right Eye, Sphere).

Clearing Data for One or Both Eyes

Press the **R**, **L**, or **B** button, or tap **R**, **L**, or **B** next to the lens apertures.

Clearing Individual Data Sets

Tap **Subj**, **Final**, **AR**, **LM**, **REF**, **Mem 1**, or **Mem 2**, located on the menu bar at the bottom of the screen, or press the corresponding grey button, to indicate the data set to be cleared.

Clearing All Data

Press the **C** button, or tap **Clear**, to clear all the data. This will reset the entire exam and prepare the Visutron 900 *Touch* for the next patient.

Reset Head

Tap **Reset Head** to reinitialize the Phoroptor head.

Cleaning and Maintenance

Cleaning

WARNING: ANY REPAIR OR SERVICE TO THIS INSTRUMENT MUST BE PERFORMED BY EXPERIENCED PERSONNEL OR DEALERS THAT ARE TRAINED BY REICHERT SO THAT CORRECT OPERATION OF THIS INSTRUMENT IS MAINTAINED.

WARNING: ALWAYS UNPLUG THE POWER CORD BEFORE CLEANING ANY SURFACE ON THE INSTRUMENT.

CAUTION: DO NOT USE SOLVENTS OR STRONG CLEANING SOLUTIONS ON ANY PART OF THIS INSTRUMENT OR DAMAGE TO THE UNIT MAY OCCUR.

CAUTION: USE OF AMMONIA BASED CLEANERS ON THE LIQUID CRYSTAL DISPLAY (LCD) OR ANY PLASTIC SURFACE MAY CAUSE DAMAGE TO THE INSTRUMENT.

CAUTION: INGRESS PROTECTION CLASSIFICATION FOR THE AUTO PHOROPTOR HEAD IS IP2X, WHILE THE CENTRAL UNIT AND CONTROLLER ARE IP3X. DO NOT SPRAY, SPLASH, OR IMMERSE IN CLEANING SOLUTIONS.

TheVidutron 900 *Touch* is an enclosed unit with an ingress protection classification of IP2X (Phoroptor Head) or IP3X (Central Unit and Controller). The lenses and other internal parts cannot be accessed by the operator for cleaning.

TheVidutron 900 *Touch* requires no user maintenance. It is recommended to send in the Phoroptor Head to Reichert if interior lens cleaning is necessary.

To ensure that theVidutron 900 *Touch* Head remains clean, cover the Phoroptor Head with the dust cover when not in use. Consistent use of the dust cover will help keep dust and other contaminants off of the unit and from getting inside and possibly affecting operation.

Note: Make sure the power to theVidutron 900 *Touch* is OFF before covering the instrument.

The following cleaning solutions have been approved to clean theVidutron 900 Touch:

- Soap and Water
- 70% Isopropyl Alcohol
- 5.25% Bleach and Water Solution
- 7.5% Hydrogen Peroxide and Water Solution
- Sani-cloth* Prime Germicidal Wipes (Didecyl Dimethyl Ammonium Chloride, isopropyl alcohol and ethyl alcohol.)

External Cleaning

Clean the external surfaces of this instrument using a clean, soft cloth moistened with an approved cleaning solution.

Controller Screen Cleaning

CAUTION: DO NOT USE ANY CHEMICAL SOLVENT, ACIDIC, OR ALKALI SOLUTIONS.

Clean the touch screen with a lint-free cloth, lightly dampened with an approved cleaning solution.

* Sani-Cloth is a registered trademark of PDI, Inc., Woodcliff Lake, NJ.

Cleaning (continued)

Face Shield Cleaning and Disinfection

For hygienic reasons, the Face Shields may be cleaned and disinfected with a clean cloth moistened with an approved cleaning solution.

Note: Be sure the Face Shields are completely dry before positioning another patient.

Forehead Rest Cleaning and Disinfection

For hygienic reasons, the Forehead Rest may be cleaned and disinfected with a clean cloth moistened with an approved cleaning solution.

Note: Be sure the Forehead Rest is completely dry before positioning another patient.

Fuse Replacement

1. Unplug the Central Unit power cord.
2. Squeeze in the tabs on the Fuse Holder and pull the Fuse Holder out.

Note: Tweezers or a similar tool can be used to remove the fuse holder.



Figure CM-01, Fuse Holder

3. Remove the fuses that require replacement, and install new fuses.

Note: Refer to the *Specifications* section of this manual for fuse specifications.

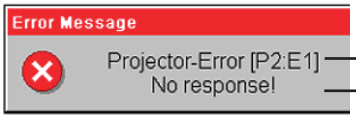
4. Install the Fuse Holder into the Central Unit until it snaps into place.

Battery Replacement

Time and Date are maintained in memory by a long-life battery (CR 2032 Lithium Coin Cell Battery), in the Controller. This long-life battery lasts many years. If the Time and Date do not work, contact Reichert (Please refer to the *Troubleshooting* section of this manual).

Troubleshooting

Only those errors indicated on the display are directly important to the user and are listed below. In case of support requests, please refer to the Error Log File (Settings - Service - Show Error Log File) where a detailed listing of all errors, warnings, and status messages are located.



Error Source [identification code]; Necessary for all support requests.
Brief Description.

Error Source	Probable Cause	Solution
Refractor [PH:yy]	• Cable to refractor failure, damaged, or loose. • Incorrect initiation. • Failure of refractor electronics.	• Turn the unit on and off. • Check the cable to the refractor.
EMR-Port [Dxx.yy]	• Wrong unit driver. • Wrong interface parameters. • Connection cable failure, damaged, or loose.	• Tap the Settings menu on the screen, and open the Ports Settings screen. • Set the correct unit driver and interface parameters for Instrument 1 or 2. • Check the connection cable.
Instrument 1 or 2 Port [Dxx:yy]	• Wrong unit driver. • Wrong interface parameters. • Connection cable failure, damaged, or loose.	• Tap the Settings menu on the screen, and open the Ports Settings screen. • Check the connection cable.
Projector [Pxx:yy]	• Projector not connected. • Projector turned off. • Wrong projector driver. • Projector cable failure, damaged, or loose.	• Connect the projector to the central unit and turn on. • Select a suitable projector driver. • Setup the correct interface parameters in the Ports Settings screen. • Check the connection cable.
Base-Unit [BU:yy]	• Incorrect power supply. • Failure of central unit.	• Check the power supply.
Application [MA:yy]	• Failure of software. • Failure of Controller. • Cable to central unit failure, damaged, loose, or positioned near an interfering source. • Failure of power supply.	• Perform a software update. • Check the cable to the central unit. • Check the power supply.
Green LED on the central unit not lit.	• Cable not connected. • Switch set to OFF.	• Connect the cable. • Set the switch to ON.

Troubleshooting (continued)

Error Source	Probable Cause	Solution
No image in the display despite switched-on unit.	• Failure of fuses on the cable plug of the central unit.	• Exchange the fuses on the cable plug of the central unit.
Time & date do not work.	• Long-life battery empty or failure.	• Replace the long-life battery in the Controller. Contact Reichert for service.
Split Cylinder Red/ Green color rings do not match controller display orientation. (Causes operator to walk cylinder.)	• Unit powered-down during lens motion. • Lens dial stall.	• In turn, press and hold a 3 - Button sequence: • Right side correction: “R”, “A”, Red/ Green • Left side correction: “L”, “A”, Red/ Green
Lens in incorrect position, or only half of lens is visible in the aperture.	• Lens dial stall.	• Press Clear, followed by Reset Head. Current refraction data will be saved. • Reboot the system. (Current refraction data will be lost.)

xx = Driver identification code.
yy = Identification code for error, warning, or status messages.

If failures cannot be remedied by one of these measures, please contact Reichert Technical Support as indicated on the back of this manual.

Service Menu

Tap **Service** in the menu bar at the bottom of the Settings menu to display the System Information.

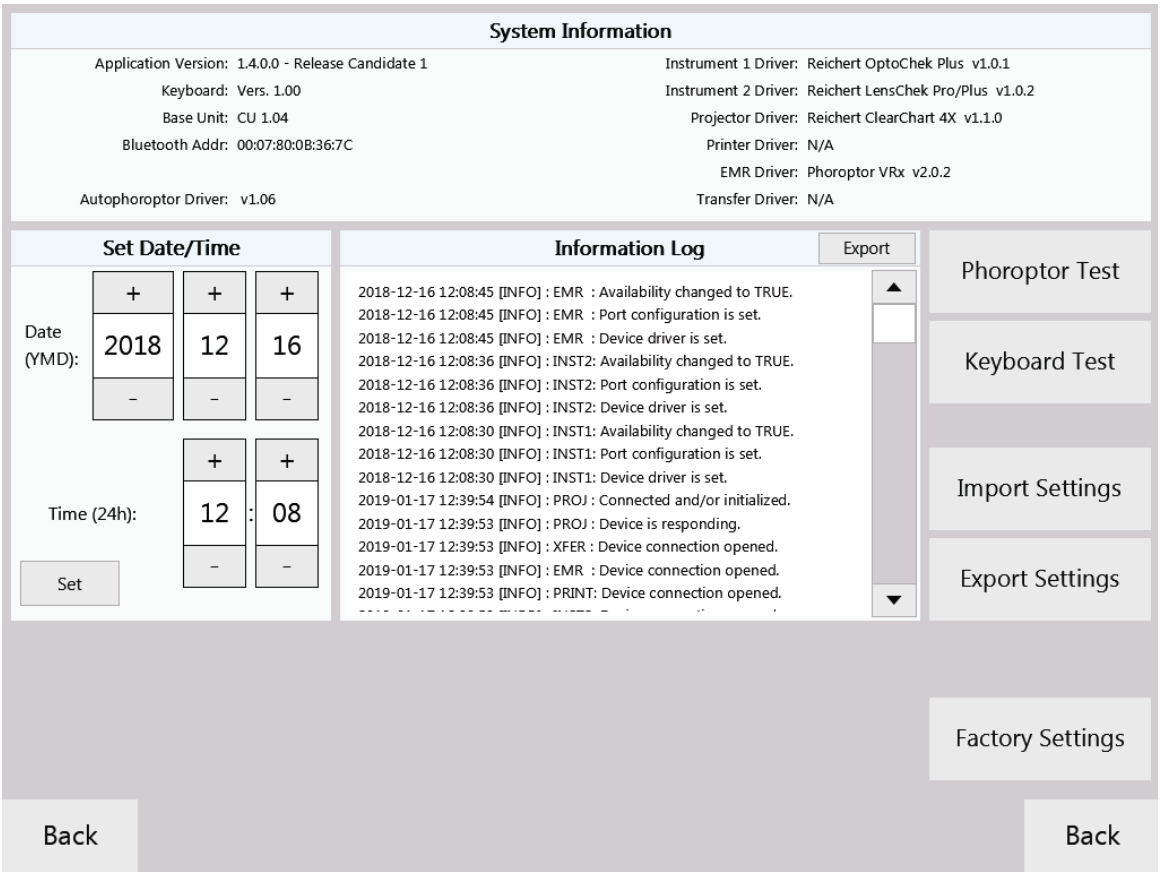


Figure IS-33, Service Menu

System Information

The Service Information section lists the following information:

- **Application Version** - The installed system software.
- **Keyboard Version** - The installed controller software.
- **Base Unit** - The installed base unit software.
- **Bluetooth Address -** Bluetooth address for the Central Unit
- **Autophoroptor Driver -** The device driver for the phoroptor head.
- **Instrument 1 Driver** - The device driver activated for the Instrument 1 port.
- **Instrument 2 Driver** - The device driver activated for the Instrument 2 port.
- **Projector Driver** - The device driver for the selected projector or acuity system.
- **Printer Driver** - The device driver activated for the Printer port.
- **EMR Driver** - The device driver activated for the EMR port.
- **Transfer Driver** - The device driver activated for the Transfer port.

The Service Menu screen allows the user to set the date and time on the Visutron 900 *Touch*. Please have the system information on this page ready when contacting Reichert Technical Services.

Service Menu (continued)

Set Date/Time

1. Tap **+** or **-** in the Set Date/Time box to change the date and time.
2. Tap **Set** to set the date and time.

Import Settings and Export Settings

Import Settings
Import Settings allows the user to import settings from a USB drive.

Export Settings
Export Settings allows the user to export the current settings to a USB drive.

Factory Settings
Factory Settings allow the user to restore settings to the factory default.

Note: This will also reset all communication configurations.

Phoroptor Test
Tap **Phoroptor Test** to run a Phoroptor Head operation check. Tap:

- **Start** to begin the test.
- **Stop** to pause the test.
- **Close** to end the test.

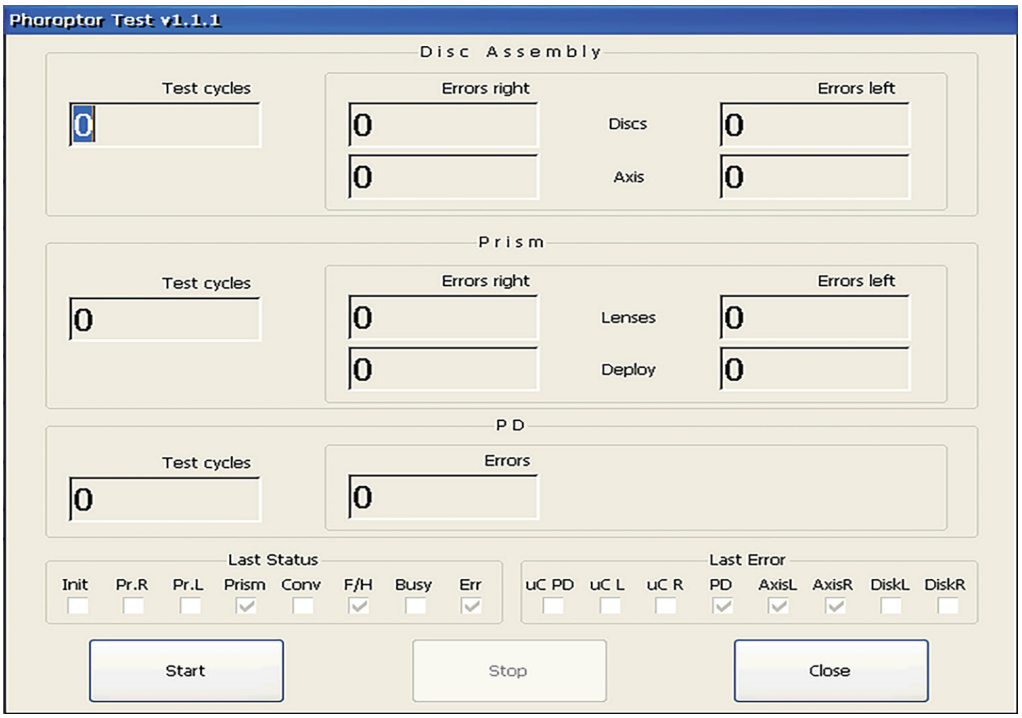


Figure IS-34, Phoroptor Test Screen

Service Menu (continued)

Keyboard Test

Buttons

1. Tap **Keyboard Test** to begin the test, which ensures that all of the Keypad buttons function properly. Refer to Figure IS-35.
2. Press each Keypad button to ensure all buttons function properly.
3. Tap **Reset Button** to restore the list of buttons.

Note: As each button is pressed, if it is functioning properly, the name of the button will disappear from the list.

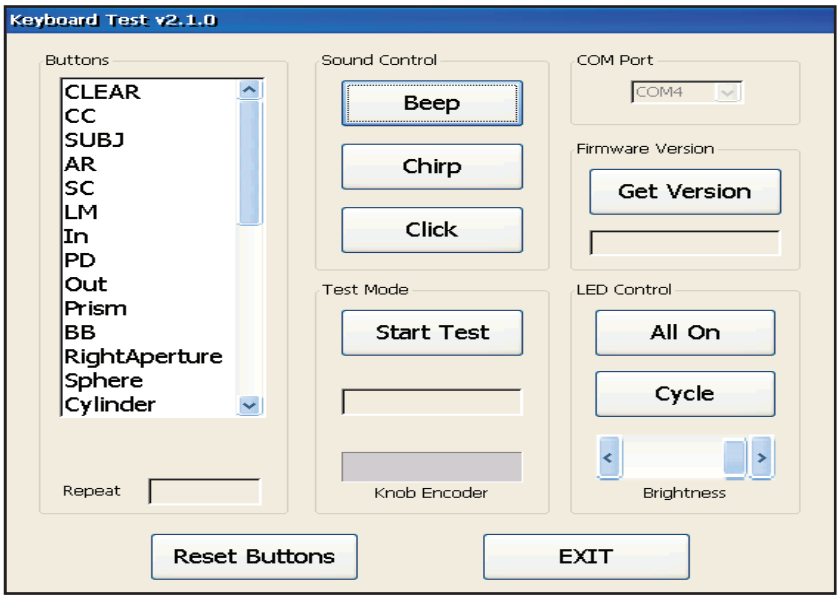


Figure IS-35, Keyboard Test Screen

Sound Control

The Sound Control section tests the sounds emitted by the Controller when performing various functions.

The following list explains the sounds:

- Beep - Indicates an error message or that certain keys are not active when performing certain operations in the Visutron 900 *Touch*.
- Chirp - Indicates that a test or function completed successfully.
- Click - Is a response to pressing buttons or pressing and turning the Control Knob.

Test Mode

The Test Mode section verifies the function of the Control Knob.

1. Tap **Start Test**.
2. Turn the **CONTROL KNOB** to the right and left one click stop to test the knob.

Firmware Version

Tap **Get Version** to view the keyboard firmware version of the instrument.

LED Control

The LED Control section tests all of the LED lights that backlight the Keypad buttons.

- **All On** - Illuminates all of the keys at once.
- **Cycle** - Illuminates the keys one at a time.
- **Brightness** - Adjusts the illumination of the LEDs in the Keypad.

Tap **Exit** to close the Keyboard Test screen.

Specifications

REF 16241 / 16242

Physical Dimensions

Phoroptor Head

Spherical Effects	+17.75 to -22.25 D
Steps	0.25 and 1.0 D
Cylinder Power	-8.0 to +8.0 D
Steps	0.25 and 1.0 D
Axis Adjustment	0° to 180°
Steps	1° and 10°
Cross Cylinder Test	±0.25 D
Prismatic Effects (Optional)	± 0.20Δ per eye
Steps	0.50Δ per eye 0.25Δ per eye
Corneal Vertex Distance	16 mm
Pupil Distance	50 to 80 mm
Steps	1 mm binocular
Convergence	400 mm
Height Level of Eyes, adjustment	±3 mm
Leveling	via bubble level
Free Aperture	19 mm
Thickness of Housing at the Viewing Aperture	26 mm
W x H x D (at PD = 64 mm)	31 x 20.3 x 7.1 cm (12.2 x 8 x 2.8 in.)
Weight With Mount and Without Prism Compensator	4.42 kg (9.75 lb)
Weight With Mount and With Prism Compensator	4.65 kg (10.25 lb)
Weight Without Mount and Without Prism Compensator	3.95 kg (8.70 lb)
Weight Without Mount and With Prism Compensator	4.17 kg (9.20 lb)

Controller With Display

Controller (W x H x D)	23.4 x 4.6 x 16.8 cm (9.9 x 1.5 x 6.9 in.)
Display (W x H x D)	22.4 x 15.7 x 1.5 cm (10.0 x 7.0 x 2.8 in.)
Display Size (Diagonal)	10.0 in. (25.4 cm)
Total Height with Display	8.4 in. (21.3 cm)
Weight	6.40 lb (2.90 kg)

Central Unit

W x H x D	20.1 cm x 8.9 x 26.7 cm (7.9 x 3.5 x 10.5 in.)
Weight	3.2 kg (7.1 lb)

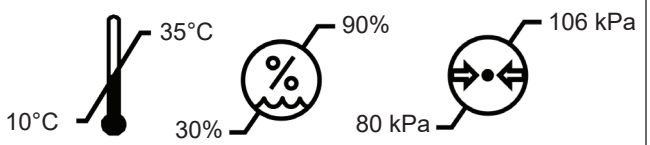
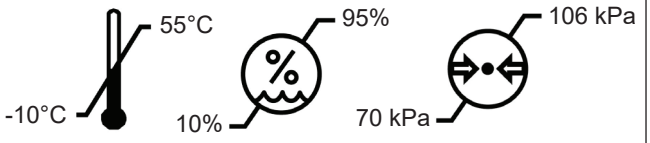
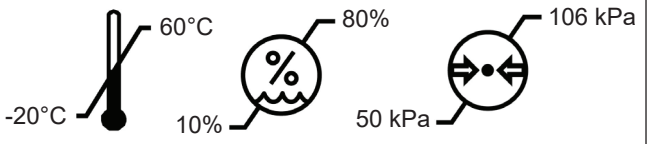
Electrical

Model	16219
Input Voltage	100 - 240V~
Frequency	50 - 60 Hz
Power (max.)	60 VA
Fuses	T2AL 250V
Weight	3.2 kg (7.1 lb)

Ports: (1 each)

Phoroptor, Controller (Keypad), Projector, Printer, Instrument 1 I/O, Instrument 2 I/O, EMR Port, Transfer Port

Specifications (continued)

Operational Conditions	
Operating: Temperature: 10° C (50° F) to 35° C (95° F) Relative Humidity: 30% to 90% Atmospheric Pressure: 80 (23.6 in. Hg) to 106 kPa (31.3 in. Hg)	
Storage: Temperature: -10° C (14° F) to 55° C (131° F). Relative Humidity: 10% to 95% (non-condensing) Atmospheric Pressure: 70 (20.7 in. Hg) to 106 kPa (31.3 in. Hg)	
Transportation: Temperature: -20° C (-4° F) to 60° C (140° F). Relative Humidity: 10% to 80% (non-condensing) Atmospheric Pressure: 50 (14.8 in. Hg) to 106 kPa (31.3 in. Hg)	

Disposal

Dispose of the Visutron 900 *Touch* in accordance with local regulations. The Visutron 900 *Touch* contains no hazardous materials.

Software Revision

The software version is located in the Service Menu in the Controller, or by contacting Reichert with the Central Unit serial number.

Classifications

Compliance

The Visutron 900 *Touch* complies with:

- IEC 60601-1
- AAMI ES60601-1
- CSA C22.2#60601-1
- IEC 60601-1-6
- IEC 62366
- UL 60601-1
- CSA C22.2#601.1
- EN 55032:2015
- IEC 60601-1-4
- IEC 60601-1-2 Edition 4.0
- CENELEC EN60601-1
- ETSI EN 301 489-1:2017 Ed. V2.1.1
- ETSI EN 301 489-17:2017 Ed. V3.1.1
- ISO 15004-1
- FCC 47 CFR Part 15 Subpart 2 15.247
- FCC 47 CFR Part 15 Subpart B
- ISED ICES-003:2016 Ed. 6
- Radio Equipment Directive (RED) 2014/53/EU

Device Classification

Electrical Protection:	Class I
Ingress Protection Rating:	IP3X (Central Unit and Controller) or IP2X (Phoroptor Head)
Instrument Type (60601-1):	Type B
Operating Mode (60601-1):	Continuous
US FDA:	REF 16241 Class I, 21 CFR 886.1770 REF 16242 Class I, 21 CFR 886.1665 and 886.1770
EU Medical Device Directive:	Class I, Rule 12
CAN CMDR:	Class I, Rule 12

Table 201 – Guidance and Manufacturer's Declaration

Electromagnetic Emissions

All Medical Electrical Equipment and Medical Electrical Systems

Guidance and Manufacturer's Declaration – Electromagnetic Emissions

The Visutron 900 *Touch* is intended for use in the electromagnetic environment specified below. The customer or user of the Visutron 900 *Touch* should ensure that it is used in such an environment.

Emissions Test	Compliance	Electromagnetic Environment - Guidance -
Conducted and Radiated RF Emissions CISPR 11	Group 1	The Visutron 900 *Touch* uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
Conducted and Radiated RF Emissions CISPR 11	Class A	The Visutron 900 *Touch* is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies building for domestic power.*
Harmonic Distortion IEC 61000-3-2	Class A	
Voltage Fluctuations and Flicker IEC 61000-3-3	Complies	

Note: *The emissions characteristics of this equipment make it suitable for use in industrial areas and hospitals (CISPR 11 class A). If it is used in a residential environment (for which CISPR 11 class B is normally required) this equipment might not offer adequate protection to radio-frequency communication services. The user might need to take mitigation measures, such as relocating or re-orienting the equipment

Bluetooth RF Transmitter Characteristics - Central Unit

- Contains FCC ID: QOQWT11u
- Contains IC: 5123A - 5123A-WT11u
  - Frequency 2402-2480 MHz, Spread Spectrum, 0.045 W

Bluetooth Adapter (Dongle) Characteristics

- Contains FCC ID: QOQWT11µ
- Contains IC: 5123A-5123A-WT11µ
  - Frequency 2402-2480 MHz, Spread Spectrum, 0.045 W

FCC / IC Statements

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter, except in accordance with FCC test procedures. This transmitter is considered as mobile device.

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

The minimum separation distance to human body 40 mm. RF exposure or SAR evaluations is not required when the separation distance is 40 mm or more.

Table 202 – Guidance and Manufacturer's Declaration

Electromagnetic Immunity

All Medical Electrical Equipment and Medical Electrical Systems

Guidance and Manufacturer's Declaration – Electromagnetic Immunity

The Visutron 900 *Touch* is suitable for use in electromagnetic environment specified below. The customer or user of the Visutron 900 *Touch* should ensure that it is used in such an environment.

Immunity Test	**IEC 60601 Test Level**	**Compliance Level**	**Electromagnetic Environment** - Guidance
Electrostatic Discharge IEC 61000-4-2	±8kV Contact ±2kV, ±4kV, ±8kV, ±15kV Air	±8kV Contact ±2kV, ±4kV, ±8kV, ±15kV Air	Floors should be wood, concrete or ceramic tile. If floors are synthetic, the R/H should be at least 30%.
Electrical Fast Transients / Bursts IEC 61000-4-4	±2kV Mains Power Lines ±1kV I/O Lines 100kHz repetition frequency	±2kV Mains Power Lines ±1kV I/O Lines 100kHz repetition frequency	Mains power quality should be that of a typical residential, commercial or hospital environment.
Surges IEC 61000-4-5	±0.5kV, ±1kV Line-to-line ±0.5kV, ±1kV, ±2kV Line-to-ground	±0.5kV, ±1kV Differential Mode ±0.5kV, ±1kV, ±2kV Common Mode	Mains power quality should be that of a typical residential, commercial or hospital environment.
Voltage Dips IEC 61000-4-11	0% Ut; 0.5 cycle at 0°, 45°, 90°, 135°, 180°, 225°, 270°, 315°	0% Ut; 0.5 cycle at 0°, 45°, 90°, 135°, 180°, 225°, 270°, 315°	Mains power quality should be that of a typical residential, commercial or hospital environment. If the user of the Visutron 900 *Touch* requires continued operation during power mains interruptions, it is recommended that the Visutron 900 *Touch* be powered from an uninterruptible power supply or battery.
	0% Ut; 1.0 cycle and 70% Ut; 25/30 cycles Single phase: at 0°	0% Ut; 1.0 cycle and 70% Ut; 25/30 cycles Single phase: at 0°	
Voltage Interruptions IEC 61000-4-11	0% Ut, 250/300 cycles	0% Ut, 250/300 cycles	
Power Frequency 50/60Hz Magnetic Field IEC 61000-4-8	30A/m 50 Hz or 60 Hz	30A/m 50 Hz or 60 Hz	Power frequency magnetic fields should be that of a typical residential, commercial or hospital environment.

Table 204 – Guidance and Manufacturer's Declaration

Electromagnetic Immunity

Medical Electrical Equipment and Medical Electrical Systems that are NOT Life-supporting

Guidance and Manufacturer's Declaration – Electromagnetic Immunity

The Visutron 900 *Touch* is intended for use in the electromagnetic environment specified below. The customer or user of the Visutron 900 *Touch* should ensure that it is used in such an environment.

Immunity Test	**IEC 60601 Test Level**	**Compliance Level**	**Electromagnetic Environment** - Guidance
Conducted disturbances induced by RF fields IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz 6 Vrms in ISM bands between 150 kHz and 80 MHz 80% AM at 1 KHz	(V1) = 3 Vrms 150 kHz to 80 MHz (V1) = 6 Vrms in ISM bands between 150 kHz and 80 MHz 80% AM at 1 KHz	Portable and mobile RF communications equipment should be no closer to any part of the Visutron 900 *Touch*, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended Separation Distance: d=(3.5/V1)(√P) d=(3.5/E1)(√P) 80 to 800 MHz d=(7/E1)(√P) 800 MHz to 2.7 GHz Where P is the max output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed transmitters, as determined by an electromagnetic site survey, should be less than the compliance levels in each frequency range. Interference may occur in the vicinity of equipment marked with the following symbol. 
Radiated RF Electromagnetic Fields IEC 61000-4-3	3 V/m 80 MHz to 2.7 GHz 80% AM at 1kHz	(E1) = 3 V/m 80 MHz to 2.7 GHz 80% AM at 1kHz	
	10 V/m 80 MHz to 2.7 GHz 80% AM at 1kHz	N/A	

Note 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

* Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. The measured field strength in the location in which the ME Equipment or ME System should be observed to verify normal operation. If abnormal performance is observed, additional measures many be necessary, such as re-orienting or relocating the ME Equipment or ME System.

* Over the frequency range 150 kHz to 80 MHz, field strengths should be less then [V1] V/m.

* The ISM (industrial, scientific and medical) bands between 0,15 MHz and 80 MHz are 6,765 MHz to 6,795 MHz; 13,553 MHz to 13,567 MHz; 26,957 MHz to 27,283 MHz; and 40,66 MHz to 40,70 MHz. The amateur radio bands between 0,15 MHz and 80 MHz are 1,8 MHz to 2,0 MHz, 3,5 MHz to 4,0 MHz, 5,3 MHz to 5,4 MHz, 7 MHz to 7,3 MHz, 10,1 MHz to 10,15 MHz, 14 MHz to 14,2 MHz, 18,07 MHz to 18,17 MHz, 21,0 MHz to 21,4 MHz, 24,89 MHz to 24,99 MHz, 28,0 MHz, to 29,7 MHz and 50,0 MHz to 54,0 MHz.

Table 206 – Recommended Separation Distances between Portable and Mobile RF Communications Equipment for ME Equipment and ME Systems that are NOT Life-supporting.

Guidance and Manufacturer's Declaration - Electromagnetic Immunity

Recommended Separation Distances for between Portable and Mobile RF Communications Equipment and the Visutron 900 *Touch*

The Visutron 900 *Touch* is intended for use in the electromagnetic environment in which radiated RF disturbances are controlled. The customer or user of the Visutron 900 *Touch* can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF Communications Equipment and the Visutron 900 *Touch* as recommended below, according to the maximum output power of the communications equipment.

Max Output Power of Transmitter (W)	Separation (m) 150kHz to 80 MHz Outside ISM Bands d=(3.5/V1)(√P)	Separation (m) 150kHz to 80 MHz In ISM Bands d=(10/3)(3.5/V1)(√P)	Separation (m) 80 to 800 MHz d=(3.5/E1)(√P)	Separation (m) 800MHz to 2.7GHz d=(7/E1)(√P)
0.01	0.1166	0.1944	0.1166	0.2333
0.1	0.3689	0.6149	0.3689	0.7378
1	1.1666	1.9444	1.1666	2.3333
10	3.6893	6.1489	3.6893	7.3786
100	11.6666	19.4444	11.6666	23.3333

For transmitters rated at a maximum output power not listed above, the recommended separation distance (d) in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (w) according to the transmitter manufacturer.

Note 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.

Note 3: The compliance levels in the ISM frequency bands between 150 kHz and 80 MHz and in the frequency range 80 MHz to 2.7 GHz are intended to decrease the likelihood that mobile/portable communications equipment could cause interference if it is inadvertently brought into patient areas. For this reason, an additional factor of 10/3 has been incorporated into the formula used in calculating the recommended separation distance for transmitters in these frequency ranges.

Table 9 – Guidance and Manufacturer's Declaration

Electromagnetic Immunity

Immunity to Proximity Fields from RF Wireless Communications Equipment

Guidance and Manufacturer's Declaration - Electronic Immunity

The Visutron 900 *Touch* is intended for use in the electromagnetic environment as specified below related to proximity fields from RF wireless communications equipment.

Immunity Test	IEC 60601Test Level							Compliance Level	Electromagnetic Environment -Guidance-
Radiated RF IEC 61000-4-3	Test Frequency (MHz)	Band (MHz)	Service (MHz)	Modulation	Maximum Power (W)	Distance (m)	Immunity Test Level (V/m)	Compliance Level	RF wireless communications equipment should be no closer to any part of the Visutron 900 *Touch*, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended Separation Distance: $d = 6/E \sqrt{P}$ where d = Minimum separation distance in meters E = Immunity test level in V/m P = Maximum power in Watts (W)
	385	380-390	TETRA 400	Pulse Modulation 18 Hz	1,8	0,3	27	27 V/m at 0,3 m	
	450	430-470	GMR 460, FRS 460	FM ±5 kHz deviation 1 kHs sine	2	0,3	28	28 V/m at 0,3 m	
	710	704-787	LTE Band 13, 17	Pulse Modulation 217 Hz	0,2	0,3	9	9 V/m at 0,3 m	
	745								
	780								
	810	800-960	GSM 800/900, TETRA 800, iDEN 820, CDMA 850, LTE Band 1, 3, 4, 25; UMTS	Pulse Modulation 18 Hz	2	0,3	28	28 V/m at 0,3 m	
	870								
	930								
	1720	1700-1990	GSM 1800; CDMA 1900; GSM 1900; DECT; LTE Band 1, 3, 4, 25; UMTS	Pulse Modulation 217 Hz	2	0,3	28	28 V/m at 0,3 m	
	1845								
	1970								
	2450	2400-2570	Bluetooth WLAN, 802.11 b/g/n, RFID 2450, LTE Band 7	Pulse Modulation 217 Hz	2	0,3	28	28 V/m at 0,3 m	
	5240	5100-5800	WLAN 802.11 a/n	Pulse Modulation 217 Hz	0,2	0,3	9	9 V/m at 0,3 m	
	5500								
	5785								

Appendix A - Compatibility Chart

WARNING: ANY NON-MEDICAL ELECTRICAL EQUIPMENT USED WITH THE VISUTRON 900 TOUCH MUST BE COMPLIANT WITH APPLICABLE IEC OR ISO SAFETY STANDARDS.

Auto Refractors

REICHERT RK600/700
REICHERT OPTOCHEK™
CANON R-XX
CANON RK-XX
CANON RK-F1
CANON RK-F2
HUMPHREY HARK-XXX
HUVITZ HARK-XXXX
HUVITZ MRK-XXXX
MARCO AR-XXX
MARCO ARK-XXX
MARCO OPD-SCAN II
MARCO RKT-7700
MARCO TONOREF II
NIKON/RIGHT MEDICAL RETINOMAX K2
NIKON/RIGHT MEDICAL RETINOMAX K+3
NIKON SPEEDY K
TOMEY RC5000
TOMEY RC-800
TOMEY TR-4000
TOPCON KR-1
TOPCON KR-1W
TOPCON KR-7000P
TOPCON KR-8000/8000 PA
TOPCON KR-800S
TOPCON KR-8800
TOPCON KR-8900
TOPCON RM-8000
TOPCON RM-8800
TOPCON RM-8900
VISIONIX VX-XXX
VISIONIX/LUNEAU L67
ZEISS IPROFILER
ZEISS VISUREF

Projectors

ClearChart® 2
ClearChart® 3P
ClearChart® 4 Series
AP250
L29 Typ 17D
M3000
Polastar
M&S Smart System 2020

Lensmeters

REICHERT AL 200
REICHERT AL 500
REICHERT AL 700
REICHERT LENSCHEK™ PLUS
REICHERT LENSCHEK™ PRO
HOYA AL-3100
HUMPHREY/ZEISS LA-XXX
HUVITZ CLM-3100
MARCO 970
MARCO LM-XXXX
TOMEY TL-XXXX
TOPCON CL-XXX
VISIONIX/LUNEAU L70
VISIONIX/LUNEAU VX40

Printer

Martel MCP 1000 Printer

Transfer / EMR

VRx Transfer
Autophoroptor Receive
EMR AutoPhor Expanded
EMR Vis 900
EMR Auto Phor

Appendix B - Visutron 900 *Touch*, Lensmeter, and Auto Refractor Data

Data output from the printer will now always include final subjective refraction data from the Visutron 900 *Touch* and Auto Refractor and Lensmeter data if they were sent to the Visutron 900 *Touch*. This is a sample of the printer data output.

November 12, 2014 2:33 PM

<<<< Visutron 900 Touch Data >>>>

<< << Final Data >> >>

CVD: 13.50 PD: 62

FAR	[R]		[L]
	-2.00	[SPH]	-1.50
	-0.75	[CYL]	-1.50
	103°	[AXS]	123°
	0.00	[PRS]	8.00 I
	4.00 u		0.00

VA	[R]	[B]	[L]
s.c.	20/63	20/50	20/40
c.c.	20/25	20/32	20/40

NEAR	[R]		[L]
	-2.00	[SPH]	-1.50
	-0.75	[CYL]	-1.50
	103°	[AXS]	123°
	0.00	[PRS]	8.00 I
	4.00 u		0.00

VA	[R]	[B]	[L]
s.c.	20/32	20/25	20/20
c.c.	20/50	20/63	20/63

ACC:	3.25		2.50

NRA:	+0.25	PRA:	0.00

FCC: 0.00

	[H]		[V]
PH-F	10.00 BI		6.00 BD
PH-N	X		X

VRG-F	[BL]	BK]	[RE]
[DI]	+1.00	+2.50	+4.00
[CO]	-0.50	-0.50	-3.00
[IR]	X	+0.25	+0.50
[SR]	X	-0.25	-1.00
[IL]	X	-0.75	-13.50
[SL]	X	-13.00	-12.50

VRG-N	[BL]	BK]	[RE]
[DI]	X	X	X
[CO]	X	X	X
[IR]	X	X	X
[SR]	X	X	X
[IL]	X	X	X
[SL]	X	X	X

<< << Subj Data >> >>

CVD: 13.50 PD: 62

FAR	[R]		[L]
	-2.00	[SPH]	-1.50
	-0.75	[CYL]	-1.50
	103°	[AXS]	123°
	0.00	[PRS]	8.00 I
	4.00 u		0.00

VA	[R]	[B]	[L]
s.c.	20/63	20/50	20/40
c.c.	20/25	20/32	20/40

NEAR	[R]		[L]
	-2.00	[SPH]	-1.50
	-0.75	[CYL]	-1.50
	103°	[AXS]	123°
	0.00	[PRS]	8.00 I
	4.00 u		0.00

VA	[R]	[B]	[L]
s.c.	20/32	20/25	20/20
c.c.	20/50	20/63	20/63

ACC:	3.25		2.50

NRA:	+0.25	PRA:	0.00

FCC: 0.00

	[H]		[V]
PH-F	10.00 BI		6.00 BD
PH-N	X		X

VRG-F	[BL]	BK]	[RE]
[DI]	+1.00	+2.50	+4.00
[CO]	-0.50	-0.50	-3.00
[IR]	X	+0.25	+0.50
[SR]	X	-0.25	-1.00
[IL]	X	-0.75	-13.50
[SL]	X	-13.00	-12.50

VRG-N	[BL]	BK]	[RE]
[DI]	X	X	X
[CO]	X	X	X
[IR]	X	X	X
[SR]	X	X	X
[IL]	X	X	X
[SL]	X	X	X

<< << ARK Data >> >>

CVD: 13.50 PD: 62

	[R]		[L]
	+1.25	[SPH]	+0.75
	-0.75	[CYL]	-1.50
	115°	[AXS]	115°
	1.00 I	[PRS]	1.00 I
	0.00		2.00 D

<< << LM Data >> >>

PD: 62

FAR	[R]		[L]
	-1.25	[SPH]	0.00
	-1.50	[CYL]	-1.50
	102°	[AXS]	102°

NEAR	[R]		[L]
	-1.25	[SPH]	0.00
	-1.50	[CYL]	-1.50
	102°	[AXS]	102°
	3.25		2.50

Visutron 900 Touch

Warranty and Limitation of Liability

This product is warranted by Reichert Technologies (“Reichert”) against defective material and workmanship under normal use for a period of two years 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 that has 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 applicable Reichert instruction manual, nor to a product that has been sold, serviced, installed or repaired other than by a Reichert factory, Technical Service Center, or authorized Reichert Technologies Dealer.

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

All claims under this warranty must be in writing 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 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 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 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 in advertently overlooked when the unit was packed.
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 should be filed within 30 days.

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.

Notes

Notes

Notes

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CE

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