Reichert® 7CR

Auto Tonometer + Corneal Response Technology®

User's Guide



AMETEK®
ULTRA PRECISION TECHNOLOGIES

Reichert®
TECHNOLOGIES

©2020 AMETEK, Inc.

Reichert, Reichert Technologies, Corneal Response Technology and “CR” design mark are registered trademarks of Reichert, Inc.

AMETEK is a registered trademark of AMETEK, Inc.

All other trademarks are property of their respective owners.

The information contained in this document was accurate at time of publication. Specifications subject to change without notice. Reichert, Inc. reserves the right to make changes in the product described in this manual without notice and without incorporating those changes in any products already sold.

ISO 13485 Certified – Reichert products are designed and manufactured under quality processes meeting ISO 13485 requirements.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, recording, or otherwise, without the prior written permission of Reichert, Inc.

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

Contents

Warnings & Cautions 4
Symbol Information 6
Introduction 7
- Indications for Use 7
- Contraindications 7

Instrument Setup 8
- Unpacking Instructions 8
- Application of Input Power 9
- Disconnection of Input Power 9
- Parts Identification 10
- Accessories 10
- Icon Definition 11
- Default Settings 12
  - Customized Options 13
- Tonometer Settings 14
- General Settings 15
- Printout Settings 16
- Communication Settings 17

Instructions for Use 18
- Definitions & Interpretation of Measurement Values 18
- Alignment and Measurement 18
  - Demo Puff 19
  - Correct Patient Positioning 21
  - Measurement Count 24
  - Score 25
  - Intelligent Averaging of Data 25
  - Straight Averaging of Data 25
  - Example - Intelligent Averaging 26
  - Example - Straight Averaging 27
  - Measuring the Next Eye 28
- Sleep Mode 29
- Low Confidence Readings 30
- Positioning Error Messages 31
- Printing Measurement Data 32

Cleaning & Maintenance 33
- Fuses 33
- External Cleaning 33
- Forehead Rest Cleaning 33
- Operator Display Cleaning 33
- Printer Paper 33
- Positioning Windows and Airtube Cleaning 34
- Forehead Rest Pad Replacement 35

Troubleshooting 36
- Help Screens 36
- Chart of Common Errors 37
- Print-Related Errors 38

General Specifications 39
Classifications 40
Guidance Tables 41
Warranty 46

Warnings & Cautions

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

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

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



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

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

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

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

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

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

WARNING: ENSURE THAT THE VOLTAGE APPLIED TO THE UNIT IS THE SAME AS THE VOLTAGE THAT IS INDICATED ON THE DATA PLATE OR DAMAGE TO THE INSTRUMENT AND/OR INJURY TO THE OPERATOR OR PATIENT MAY OCCUR.

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

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

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

WARNING: DO NOT PLACE FINGERS INTO THE OPENING SURROUNDING THE NOSEPIECE.

Warnings & Cautions (continued)

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



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

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

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

CAUTION: USE OF AMMONIA BASED CLEANERS ON THE LIQUID CRYSTAL DISPLAY (LCD) MAY CAUSE DAMAGE TO THE DISPLAY. SEE MAINTENANCE SECTION FOR DETAILED CLEANING INSTRUCTION.

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

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

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

CAUTION: USE OF ACCESSORIES AND CABLES OTHER THAN THOSE SPECIFIED OR PROVIDED BY REICHERT COULD RESULT IN INCREASED ELECTROMAGNETIC EMISSIONS OR DECREASED ELECTROMAGNETIC IMMUNITY OF THE INSTRUMENT AND RESULT IN IMPROPER OPERATION.

CAUTION: 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 INSTRUMENT, INCLUDING CABLES SPECIFIED BY THE MANUFACTURER. OTHERWISE, DEGRADATION OF THE PERFORMANCE OF THIS INSTRUMENT COULD RESULT.

Symbol Information

Symbol Information

The following symbols appear on the instrument:


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


Type B Applied Part


Alternating Current Power


Protective Earth Connection


ON / OFF



Date of Manufacture


Manufacturer

REF Catalog Number

S/N 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


Accompanying Documents must be consulted



Authorized Representative in European Community


Fragile Contents in Shipping Container - handle with care


Keep Dry - Package shall be kept away from rain


This Way Up - Indicates correct upright position of package

Introduction

Congratulations on your purchase of the Reichert® 7CR Auto Tonometer + Corneal Response Technology®.

The Reichert 7CR is an auto-aligning, non-contact tonometer used to measure the intraocular pressure of the eye by delivering a very soft air puff or puffs to the eye. The patented Bi-directional applanation process employed in the Reichert 7CR enables the device to quantify the biomechanical properties of the cornea and minimize the impact of these on the IOP measurement. This new IOP measurement, referred to as Corneal Compensated IOP (IOPcc) has been shown to be less affected by corneal properties than other methods of tonometry. Refer to the *Instructions for Use* section for further details on IOPcc.

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. Properly trained eyecare professionals such as ophthalmologists, optometrists, opticians and eye care technicians should operate this instrument.

Please retain this guide for future reference and to share with other users. Additional copies can be obtained from your authorized Reichert Technologies® dealer or contact our Customer Service department directly at:

Tel: 716-686-4500
Fax: 716-686-4555
E-mail: reichert.information@ametek.com

Indications for use

The Reichert 7CR is intended to measure the intraocular pressure of the eye, taking into consideration the biomechanical response of the cornea.

Contraindications

Use of the Reichert 7CR is contraindicated in instances of:

- Ulcerated cornea
- Following keratoplasty
- Following penetrating trauma

Instrument Setup

Great care has been taken to deliver your new Reichert 7CR to you safely. The container and packaging was specially designed to transport this unit. Please retain the packaging if future transportation is required.



Accessories Box


Inner Box


Opened Inner Box

Unpacking Instructions

Please remove the packaging material from the instrument in the following manner (Refer to images on left).

The instrument is packaged in a shipping container to protect the instrument from damage during shipment. Please read the User's Guide before operating the unit. A Quick Reference Card is provided for your convenience and reference during operation of the unit.

1. Remove the accessories from the shipping container.

   Accessories box contains:
   - Printer Paper (P/N 12430-887)
   - Dust Cover (P/N 16050-089)
   - Quick Reference Card (P/N 16060-104)
   - User's Guide (P/N 16060-101)
   - Forehead Rest Pad (Spare) (P/N 16050-170)
   - Power Cord (P/N RCBL10040 - 110V) or (P/N RCBL10041 - 230V)

     Note: Power cord not to exceed 10 ft.

   - Package of Pipe Cleaners - (P/N 16170-004)
   - Package of Cotton Swabs (P/N 16170-005)
2. Remove the Top Foam (4 corners) from the shipping container.
3. Locate the handles on the sides of the inner box and remove the inner box.
4. Lay the inner box on its side and remove the tape.
5. Remove the foam top and bottom inserts from the inner box.
6. Lift the Reichert 7CR out of the inner box.
7. Take the Reichert 7CR out of the plastic bag and set the unit on a secure table.
8. Place the packing material in a safe place so that if transportation is required in the future, it will be available.

Instrument Setup (continued)

Application of Input Power

WARNING: CARE MUST BE TAKEN TO ARRANGE THE CABLES FOR THE ACCESSORIES SUCH THAT THEY DO NOT PRESENT A TRIPPING HAZARD TO THE EXAMINER OR A DANGER TO THE PATIENT.

WARNING: POSITION THIS INSTRUMENT SO THAT IT IS NOT DIFFICULT TO OPERATE THE DISCONNECTION DEVICE (PLUG).

1. After the unit is in its secure location, apply the correct input voltage to the instrument using the Power Cord from the Accessory Tray.
2. Press down on the "|" located on the ON/OFF Switch. The power inlet is located on the underside of the unit (Refer to page 10, item 8, for its location).
3. Read the User's Guide and the Quick Reference Card before operating this instrument.

WARNING: DO NOT REMOVE THE OUTSIDE COVERS OF THE UNIT OR ATTEMPT TO REPAIR ANY INTERNAL PARTS. REPAIR AND SERVICE OF THE UNIT MUST BE PERFORMED BY EXPERIENCED PERSONNEL OR DEALERS THAT ARE TRAINED BY REICHERT.

CAUTION: ENSURE THAT THE VOLTAGE APPLIED TO THE UNIT IS THE SAME AS THE VOLTAGE THAT IS INDICATED ON THE DATA PLATE NEXT TO THE INPUT CORD RECEPTACLE OR DAMAGE TO THE UNIT MAY OCCUR.

CAUTION: FOR CONTINUED PROTECTION AGAINST THE RISK OF FIRE, ANY REPLACEMENT OF DAMAGED FUSES MUST BE IN ACCORDANCE WITH THE RATING AS INDICATED IN THE SPECIFICATIONS SECTION OF THIS MANUAL.

Disconnection of Input Power

1. At any time, the power switch can be set to OFF. The unit does not have a power down sequence. To terminate operation of this instrument, press the ON / OFF switch to the OFF position (O).
2. If this instrument is intended to be OFF for an extended period of time, it can be disconnected from power by detaching the power cord from the its receptacle.

Instrument Setup (continued)











Parts Identification

1. **Operator Display:** Displays measurement data.
2. **Printer Door:** Door (push to open) to access printer paper.
3. **Forehead Rest:** Alignment mechanism that moves right or left for correct patient positioning.
4. **Nosepiece Objective:** Air tube that emits “air puff.”
5. **Canthus Alignment Marks (right and left side):** Alignment mark that indicates the vertical position of the center of the patient’s eye.
6. **ON/OFF Switch:** Switch that controls input power to the unit. “O” indicates OFF, and “ | ” indicates “ON.”
7. **USB Port:** Communication port that transfers data to a computer.

   Note: USB drivers are available on the web page for the Reichert 7CR at: http://www.reichert.com
8. **Main Power Connector and Fuse Holder:** Connection point for input power and the fuses. Press the top tab and bottom tab together on the fuse panel to remove the fuse holder and fuses. It is located on the underside of the unit.
9. **Printer:** Thermal printer supplied with the unit.

Accessories

- Chinrest (P/N 16049)
- Printer Paper (P/N 12430-887)
- Dust Cover (P/N 16050-089)
- Quick Reference Card (P/N 16060-104)
- USB Cable - 6 ft. (1.8m) (P/N 15205-431)
- Forehead Rest Pad (Spare) (P/N 16050-170)
- Power Cord (P/N RCBL10040 - 110V) or
  (P/N RCBL10041 - 230)

Instrument Setup (continued)

Icon Definition

The Reichert 7CR incorporates a user-friendly icon/menu-based operating system that will increase the speed of measurements, training and use. Listed below are the icons that are used during the operation of this instrument.

Icon Description


MENU — Accesses secondary level menus such as setup and help


MEASURE — Initiates a single-puff measurement process


MULTI MEASURE — Initiates a multiple-puff measurement process


DEMO — Allows patient to feel a soft demonstration air puff


CLEAR DATA — Clears both right and left data on the Operator Display and in memory


PRINT — Sends data to the printer


SERVICE — Displays service information


CANCEL — Cancels measurement process


RETURN — Returns to preceding screen


RIGHT ARROW — Use to select the character in Practice name in the Printout Setup


LEFT ARROW — Use to select the character in Practice name in the Printout Setup


PLUS — Changes the character or time in Printout Setup


MINUS — Changes the character or time in Printout Setup


SERVICE HISTOGRAM — Displays a histogram of the last 400 measurements



IOPG — Shows the measurement histogram for the IOPg values



IOPCC — Shows the measurement histogram for the IOPCC values

Instrument Setup (continued)

Default Settings

The Reichert 7CR has default settings that are set at the factory. To view a summary of these settings, refer to page 13. To view a detailed definition and explanation of each setting, refer to pages 14 through 17.

CAUTION: DO NOT USE A POINTED OBJECT TO TOUCH THE SCREEN OR DAMAGE TO THE DISPLAY MAY RESULT.

Follow these steps to customize the default settings:

1. Tap the MAIN MENU icon.
2. Tap the appropriate setup category (e.g., Printout Setup).
3. Tap the desired parameter to select it.
4. Tap the BACK icon to return to the previous menu screen.
5. Tap the BACK icon on the main Settings screen to return to the main screen

Instrument Setup (continued)

Default Settings (continued)

This instrument is sent from the factory with measurement, printer, communication, and miscellaneous parameters set to default settings. These settings can be changed to suit the needs of the individual operator or clinician. A summary of these settings is given below with the default selections shown in bold type. To customize these settings, follow the steps provided on page 12, Instrument Setup, Default Settings.

Customized Options

This instrument has the following default settings:

Tonometer Setup: (page 14)

Pressure:	**mmHg**, kPa
Measurements:	**3,** 4
Averaging:	**Intelligent,** Straight

General Setup: (page 15)

Language:	**Eng,** Fra, Deu, Esp, Por, Ita
Tone:	**On,** Off
Sleep:	**5**, 10, 15, 20, Off
Brightness:	* * * * * ***** * * * * *
Eye Title:	**Right/Left,** OD/OS

Printout Setup: (page 16)

Printer:	**On,** Off
Date Format:	**MDY,** DMY, YMD
Time Format:	**AM/PM,** 24 HR
Date:	01/28/2018
Time:	05:00PM
Practice:	**Reichert**

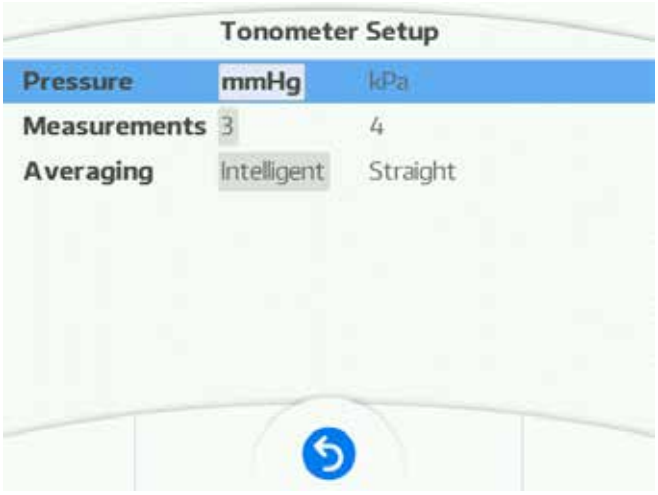
Communication Port Setup: (page 17)

Baud:	2400, 4800, 9600, **19200**
Data Bits:	7, **8**
Parity:	**None,** Odd, Even
Stop Bits:	**1,** 2

Note: Default settings are shown in **Bold** type.

Instrument Setup (continued)

Tonometer Settings



The following options are available in the Tonometer Setup menu:

Parameters	Settings
PRESSURE	Choose either millimeter of mercury (mmHg) or kilo Pascals (kPa).
MEASUREMENTS	Choose either 3 or 4 measurements for the multi-measure button function.
AVERAGING	Choose either Intelligent or Straight averaging. Refer to the Measurement Results section of this manual.

Instrument Setup (continued)

General Settings

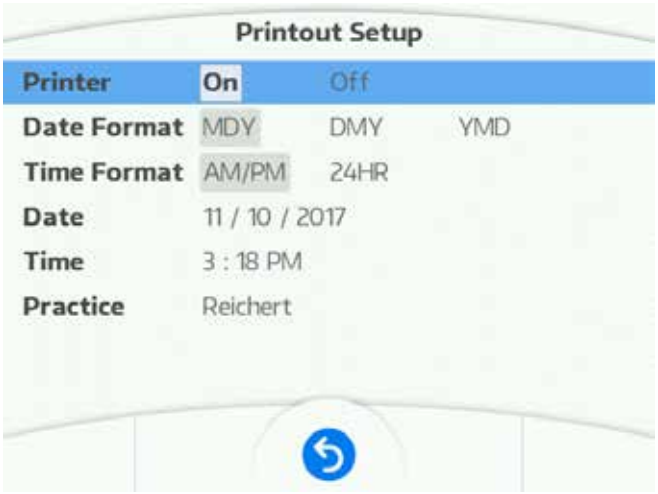


The following options are available in the General Setup menu:

Parameters	Settings
LANGUAGE	Sets the language that appears on the Operator Display.
TONE	Sets the audible tone indicator (“beep”) to be silent (OFF) or audible (ON). **Note:** Any time a selection is made on the touch screen, a beep will sound if the option is set to “ON”.
SLEEP	Sets the duration of time (5, 10, 15, 20 or Off) that the instrument is inactive before it enters the “sleep” mode (the Operator Display goes blank when the “sleep” mode is active). To illuminate (“wake”) the Operator Display after the “Sleep” mode is active, touch the screen. **Note:** When unit comes out of sleep mode, any measurements that were not cleared prior to the activation of the sleep mode will still appear, but the measurement buttons will be disabled in order to prevent accidentally combining data from two different patients. Any previous measurements must be output or cleared before taking new readings.
BRIGHTNESS	Adjusts the brightness of the Operator Display by touching the desired level.
EYE TITLE	Displays the eyes as either Right/Left or OD/OS.

Instrument Setup (continued)

Printout Settings



The following options are available in the Printout Setup menu:

Parameters	Settings
PRINTER	Option that sets the printer to print (ON) or not to print (OFF) when the PRINT icon is touched.
DATE FORMAT	Choose the date format to display on the printer paper: D=Day, M=Month, Y=Year.
TIME FORMAT	Choose the time format: AM/PM or 24 HR.
DATE	Change the current date. Touch to select a date field and use the PLUS (+) or MINUS (-) icons to modify the value.
TIME	Change the current time. Touch to select a time field and use the PLUS (+) or MINUS (-) icons to modify the value.
PRACTICE	Up to 29 characters (letters and numbers) can be printed at the bottom of the printer paper. To change the characters, use the PLUS and MINUS icons to scroll through the alphabet. Once you find the letter you need, touch the RIGHT or LEFT icon to move horizontally to the next letter. To exit, touch the SELECT icon, then the RETURN icon.

Instrument Setup (continued)

Communications Settings



The Reichert 7CR can transfer data to an external device, such as a computer, through the USB port.

The following options are available in the Communications Setup menu:

Parameters	Settings
BAUD	Serial transmission data rate, transfers in bits per second (bps).
DATA BITS	Number of bits that make up data transmission word.
PARITY	Bits added to data transmission used to detect transmission errors. None, Odd, or Even are the available options.
STOP BITS	Number of bits added to the end of the data transmission word to signal the end of transmission.

Instructions For Use

Definitions & Interpretation of Measurement Values

- IOPg - Goldmann-correlated IOP. IOPg agrees, on average, with the results obtained from an expertly executed, properly calibrated Goldmann Applanation Tonometer (GAT).
- IOPcc - Corneal Compensated IOP. IOPcc takes the biomechanical properties of the cornea into consideration providing an indication of intraocular pressure that is less influenced by properties such as corneal visco-elasticity and thickness.
- Score – The score is an indicator of measurement reliability on a scale of 0 to 10 (0 being lowest, 10 being highest). The higher the score, the more reliable the measurement data. If the score is below 3, the measurement will be in orange. It is recommended that you take an additional measurement.

Note: When IOPcc is higher than IOPg, this indicates that the IOP for this patient may be being understated using traditional methods of tonometry.

Note: When IOPcc is lower than IOPg, this indicates that the IOP for this patient may be being overstated when using traditional methods of tonometry.

Alignment and Measurement



When power is applied to the Reichert 7CR, it initially performs a system check. After completion of the system check, the title screen will be displayed.

Alignment and Measurement (continued)

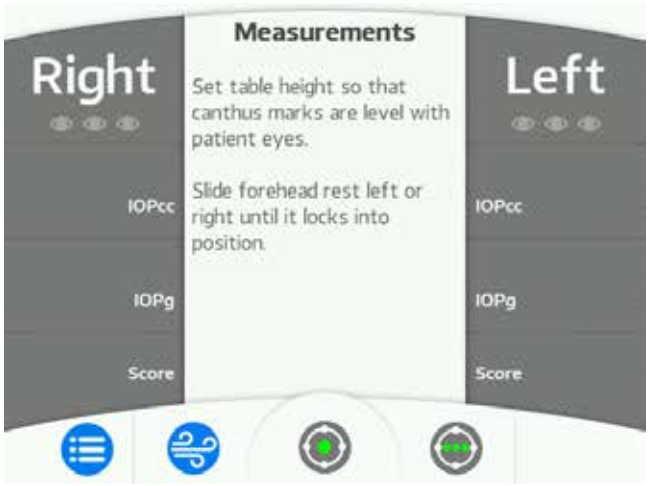
A message will be displayed to move the Forehead Rest fully to the left or right until it locks into position if it is not already in this position. From this screen operators may choose to enter the Menu, demonstrate the airpuff to the patient, or begin the measurement process.

Demo Puff

Touching the DEMO icon initiates a sample air puff. This can be used to demonstrate the air puff to the patient. After each time the DEMO button is pressed and the air puff is delivered, an internal check of the Reichert 7CR's systems is conducted to ensure optimum performance of your instrument.

Note: The DEMO icon will not display if there are measurements displayed on the screen.

If the forehead rest is not in position, the icons will be inactive, and the message in the image below will appear.



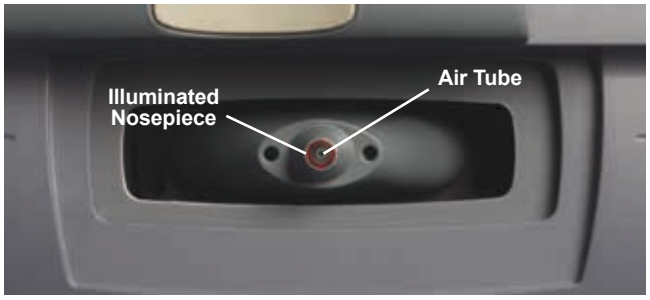
The side that is ready to measure will become blue, indicating the unit is ready to measure that eye.



Alignment and Measurement (continued)

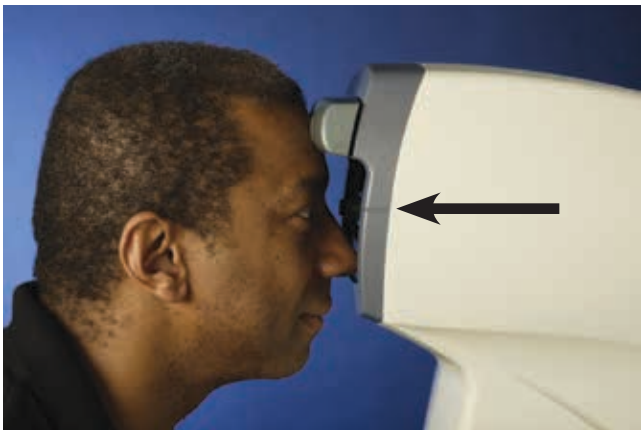


The Reichert 7CR features a left/right sliding forehead rest that enables the instrument to automatically determine which eye is being measured. It must be positioned completely to one side or to the other in order to take a measurement. Position the forehead rest to the desired position before beginning the measurement process.



A properly-positioned patient will easily see the fixation cues. The fixation target is a green light, located inside the air tube, surrounded by a ring of red lights. In order to take a measurement, patients must be fixating on the green light. If a patient is unable to see the green light, the operator should ask if the patient can see any of the red lights. If any red lights can be seen, the automatic alignment system will bring the green fixation target into view.

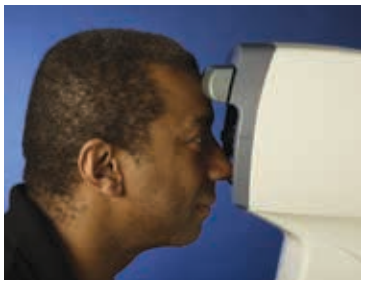
Alignment and Measurement (continued)



Correct Patient Positioning

Set the height of the table so the canthus marks on the sides of the instrument are level with the patient's eyes.

Patients should lean forward slightly so that the center of their forehead rests in the middle of the rubber forehead pad. The patient's head should contact the headrest straight-on; perpendicular to the front of the instrument (not turned to the side). In addition, the patient's nose and chin should be inward, towards the front surface of the unit.



Proper Patient Alignment
(Chin Close to Unit)



Improper Patient Alignment
(Chin Moved Away From Unit)

Observe the photo on the right. Notice the distance between the patient's chin and the front of the instrument. The instrument is too low, causing the patient to rest his head in a downward-facing manner. In this instance, the patient may not be able to see the fixation target, and the alignment system may not be able to find the patient's eye.

Alignment & Measurement (continued)

To take a measurement, simply touch one of the measurement icons.

- Touching the MEASURE icon (one puff) will initiate a measurement with one puff.
- Touching the MULTI MEASURE icon will initiate a measurement with multiple rapid puffs.



Note: To ensure fast and accurate results operators should instruct the patient to blink a few times and hold both eyes open immediately before measurement. Remind the patient to look directly at the green light and hold steady.

Alignment & Measurement (continued)



During the alignment and measurement process, the Operator Display will show the position of the airtube with respect to the center of the patient's cornea. As the positioning system aligns to the apex of the eye, the measuring icon will move to the middle of the screen and align over the center alignment mark (+). Once the positioning system is aligned the air "puff" or "puffs" are delivered to the eye and the IOP measurement is automatically displayed.

Note: If the instrument is unable to properly align to the patient's eye and take a measurement (e.g., it keeps aligning but never takes a reading), it may be necessary to ask the patient to:

- Remain still and try not to move or blink frequently
- Open his/her eyes wider
- Reposition his or her head per the instructions indicated above.

Alignment & Measurement (continued)



Measurement Count
The eye icons below the eye titles (Right and Left, or OD and OS) will be filled in to indicate the number of measurements that have been made.

When using the single measurement function, an eye icon will become filled after each measurement. If more than 3 individual measurements are made on the same eye, all three eye icons will remain filled and the measurement results will continue to be updated based on the averaging methodology described in the Measurement Results section of this manual.

When using the multi measure function, all eye icons will appear filled after the measurement process is complete.

Pressing the multi measure icon again will result in a new set of measurements, replacing any data displayed for the eye being measured.

Alignment & Measurement (continued)

Score

An advanced signal “scoring” process is employed in the Reichert 7CR to objectively determine the reliability of the measurement data. On a scale of 0 to 10, the higher the score, the more reliable the measurement data.

Note: The IOP measurements (IOPcc, IOPg) and the Score are related but not directly linked. The IOPcc and IOPg are pressure readings. The Score is an indication of the ***reliability*** of the measurement. IOPcc compensates for the biomechanical properties of the cornea and has been shown to be less affected by corneal properties than other methods of tonometry. IOPg is essentially equivalent to the measurement a Goldmann type tonometer would provide, and does not account for the biomechanical properties of the cornea.

Intelligent Averaging of Data

The Reichert 7CR features an intelligent averaging system, based on the waveform score, to help ensure the most reliable measurements are displayed. The system works in the following manner:

Single Measurements

If a single measurement is taken on an eye, the IOPcc, IOPg and Score for that measurement will be displayed regardless of the Score. If the Score is low, another measurement should be taken.

Multiple Measurements in Intelligent Averaging Mode

If multiple measurements are made on an eye, the displayed result will be an average of the measurements with Scores that are within 1 number of the highest score obtained. Any measurement in a series of measurements with a Score more than 1 below the highest Score will be discarded. Results from any measurement that produces a score more than 1 number higher than all other measurements obtained will be displayed based on this result alone.

Note: The intelligent averaging process updates the displayed results in “real time.” Results from each measurement in a series of measurements are not displayed individually.

Straight Averaging of Data

When the straight averaging option is selected in the setup menu, the displayed result will be an average of all measurements regardless of the score.

Multiple Measurements Using the Multi Measurement Button

When using the multi measurement mode the displayed result will be a straight average. If the multi measurement button is pressed again, the process will start over, clearing the previous measurements, and replacing any stored values for that eye.

Multiple Measurements Using the Single Measurement Button

When taking multiple measurements using the single measurement button the displayed results will continue to be updated based on a straight average of all measurements made, up to the amount of measurements selected in the tonometer setup menu (3 or 4).

Once the maximum number of measurements have been made (3 or 4), an additional measurement will replace the measurement with the lowest Score, so that only 3 or 4 measurements are averaged together. Each following measurement will continue to replace the measurement with the lowest Score.

Alignment & Measurement (continued)

Examples - Intelligent Averaging

Please refer to the table below for some scenarios that demonstrate how the intelligent averaging process determines the displayed result

	Measurement A	Measurement B	Measurement C	Measurement D
Individual IOPcc	17.5	11.0	16.0	16.5
Individual IOPg	13.0	8.0	12.0	12.7
Individual Score	9.5	3.0	9.0	8.5
Displayed IOPcc	17.5	17.5	16.8	16.7
Displayed IOPg	13.0	13.0	12.5	12.6
Displayed Score	9.5	9.5	9.3	9.0

Measurement A - A single measurement taken

A good score is taken. Since it was the only measurement taken the displayed results are based on this measurement.

Measurement B - An additional measurement taken after Measurement A

A second measurement is taken that resulted in an individual score more than 1-number lower than measurement A. As such, the intelligent averaging system disregards this value and the displayed results do not change.

Measurement C - A third measurement taken after Measurement B

A third measurement is taken that resulted in an individual score that is within 1 of the highest Score taken (measurement A). The displayed results are now an average of measurement A and measurement C. The displayed values are updated in real time, such that the operator never sees the individual results from measurement C.

Measurement D - A fourth measurement taken after Measurement C

A fourth measurement is taken that resulted in a score that is within 1 of the highest Score taken (measurement A). The displayed result is now an average of measurements A, C, and D. The displayed values are updated in real time, such that the operator never sees the individual results from measurement D.

Note: If the triple measurement function were used to obtain results A, B, and C, the process would end after result C. An additional press of the triple measurement button would clear the results and start the process over. An additional single measurement would continue to update the results based on the averaging technique.

Note: It is important to clear on-screen results after concluding with a patient to prevent “blending” of measurement results from patient to patient.

Note: If the unit goes into sleep mode, any measurements that were not cleared out prior to sleep mode must be printed, transferred, or cleared before taking new readings.

Alignment & Measurement (continued)

Examples - Straight Averaging

Please refer to the table below for some scenarios that demonstrate how the straight averaging process determines the displayed result

	Measurement A	Measurement B	Measurement C	Measurement D
Individual IOPcc	17.5	11.0	16.0	16.5
Individual IOPg	13.0	8.0	12.0	12.7
Individual Score	9.5	3.0	9.0	8.5
Displayed IOPcc	17.5	14.3	14.8	15.3
Displayed IOPg	13.0	10.5	11.0	11.4
Displayed Score	9.5	6.3	7.2	7.5

Measurement A - A single measurement taken
The first measurement results in a good score. Since it was the only measurement taken the displayed results are based on this measurement.

Measurement B - An additional measurement taken after Measurement A
A second measurement is made. The two measurements are averaged and displayed.

Measurement C - A third measurement taken after Measurement B
A third measurement is made. All three measurements are averaged and displayed.

Measurement D - A fourth measurement taken after Measurement C
A fourth measurement is made. All four measurements are averaged and displayed.

Note: It is important to clear on-screen results after concluding with a patient to prevent “blending” of measurement results from patient to patient.

Note: If the unit goes into sleep mode, any measurements that were not cleared out prior to sleep mode must be printed, transferred, or cleared before taking new readings.

Note: Once the maximum number of measurements have been made (3 or 4), an additional measurement will replace the measurement with the lowest Score, so that only 3 or 4 measurements are averaged together. Each following measurement will continue to replace the measurement with the lowest Score.

Alignment & Measurement (continued)

Measuring the Next Eye
There are several options available at this point:

a. The Forehead Rest may be slid to the opposite side to continue taking measurements on the other eye.
b. All data may be cleared and additional measurements taken on the same eye (touch the CLEAR icon).
c. The data can be printed by touching the PRINT icon.

Note: The instrument will print out the data from both eyes if the PRINT icon is touched after both eyes are measured.

Note: Measurement data should always be printed or cleared after a patient is completed. Leaving readings on the screen can result in “mixing” of data when the next patient is measured.

Sleep Mode



The unit will go into sleep mode after the specified amount of time selected in the Setup Menu. When the unit comes out of sleep mode, any measurements that were not cleared out prior to sleep mode will appear on the screen, but the measurement buttons will be disabled in order to prevent accidentally combining data from two different patients.

While the measurement buttons are disabled, the Analysis button is still functional, so that the data can be viewed.

If disabled measurement buttons appear, the data must be printed, transferred, or cleared before taking new readings.

Low Confidence Readings

Any measurement values identified as “Low Confidence” will be indicated in orange text. Take additional measurements to replace the low confidence values.



Note: It is possible that post refractive surgery eyes, eyes with corneal pathologies, and glaucomatous eyes will produce consistently low measurement scores. The IOP values based on the highest obtainable scores should be considered reliable.

Positioning Error Messages

During the measurement process, the Reichert 7CR may detect a situation where the patient's eye is too far from the nosepiece. Should this occur, the instrument will return to the home position, and the screen will change to that shown below.

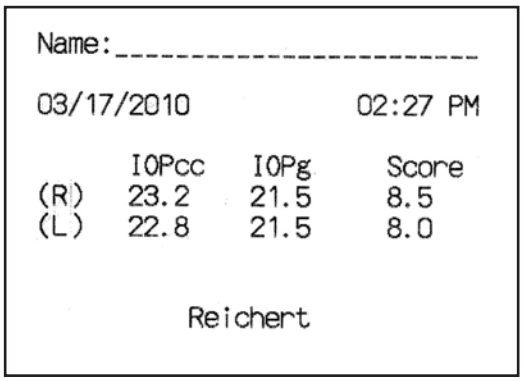


Should this situation arise, ask the patient to move away from the instrument, then reposition the patient and proceed with the next measurement.

Printing Measurement Data

To print the measurement data, touch the PRINT icon.

A sample printout is shown below.



Sample Printout

If you decide not to make a printout, touch the CLEAR DATA icon. This will clear all data from the memory and the screen. The instrument is now ready for the next patient.

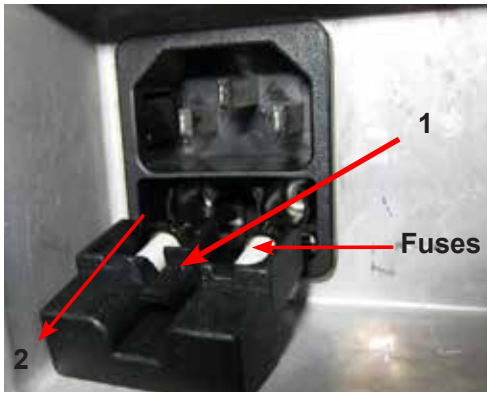
Cleaning & Maintenance

Fuses

WARNING: DISCONNECT POWER BEFORE ATTEMPTING TO REMOVE THE FUSES OR SERIOUS INJURY OR DEATH MAY OCCUR.

Replace the fuses in the Power Input Module with the fuses indicated in the Specifications section of this manual.

1. Remove input power to the instrument.
2. Press down on the tab in the middle of the Power Input Module to release the Fuse Holder. Refer to item 1.
3. Pull the fuse holder out of the input module. Refer to item 2.
4. Install new fuses that are indicated in the Specification section of this manual into the Fuse Holder.
5. Push the Fuse Holder into the Power Input Module until it snaps into place.



Fuse Location

External Cleaning

Clean the external surfaces of this instrument using a clean, soft cloth moistened with a mild detergent solution (1 cc of liquid dish soap to one liter of clean, filtered water (filtered below 5 microns)).

Forehead Rest Cleaning

For hygienic reasons, the Forehead Rest may be cleaned with a clean cloth moistened with a mild detergent solution (1 cc of liquid dish soap to one liter of clean, filtered water (filtered below 5 microns)).

Note: If the Forehead Rest Pad must be sanitized, a sterile wipe may be used occasionally.

Note: Replacement Forehead Rest Pads can be purchased through your local authorized Reichert dealer under P/N 16050-170.

Operator Display Cleaning

Use a clean, soft cloth with neutral detergent or ethanol to clean the operator display. Do not use any chemical solvent, acidic, or alkali solution.

Printer Paper

To change the printer paper, remove the printer paper door to expose the printer paper compartment. Remove the cardboard roll and place a new roll of thermal printer inside the printer paper compartment as shown below. To order replacement thermal paper, call your local dealer and ask for Reichert replacement paper.


Printer Paper Replacement

Cleaning & Maintenance (continued)

Positioning Windows and Airtube Cleaning

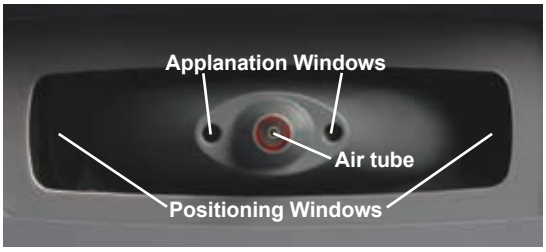
When the Positioning Windows or the Applanation Windows become occluded with contaminants, degradation of the positioning signal occurs. When signal degradation occurs, the system may not recognize or position at the center of the eye. Consequently, the instrument will not find the center of the eye or align off center, which may prevent the unit from taking a measurement or can cause asterisk readings.

Select Cleaning Procedure in the Main Menu. When this is selected, the screen to the right will appear. Press the Select icon to advance the nosepiece for easier cleaning. The nosepiece will move forward.



Cleaning Screen

CAUTION: DO NOT USE ALCOHOL, SOLVENTS OR STRONG CLEANING SOLUTIONS ON THE ALIGNMENT WINDOWS OR DAMAGE TO THE WINDOWS WILL OCCUR.



Positioning Windows

1. Locate the Positioning Windows and the Applanation Windows and wipe the outside surfaces with a clean, long handle cotton-tip swab moistened with a lens cleaner that is safe for plastic lenses.
2. Remove any remaining dust or foreign particles using only clean, dry, compressed air at less than 90 psig (620 kPa).
3. Using a Pipe Cleaner, slide it in and out of the Airtube a few times to remove any contaminants inside the Airtube.



Pipe Cleaners

When the cleaning procedure is done, press the Select icon to have the unit puff several times and retract the nosepiece.

Note: At anytime during the cleaning procedure, the Demo Puff icon can be touched to puff the unit. This is helpful when cleaning the airtube, to remove and loosened debris.



Cleaning Screen - Done

Cleaning & Maintenance (continued)

Forehead Rest Pad Replacement

The Reichert 7CR tonometer has a removable Forehead Rest Pad, to allow for easier replacement of the pad.

On the bottom part of the Forehead Rest Pad, there is a small indent, which is to allow room to grip the pad with your finger. Refer to Figure CL-1.

1. Grip the Forehead Rest Pad with your fingers at the Indent at the bottom of the pad. Refer to Figure CL-2.
2. Gently remove the Forehead Rest Pad by peeling it away from the Headrest. Refer to Figure CL-3.
3. Install a new Forehead Rest Pad by pressing it onto the grooves of the Headrest. Refer to Figure CL-4.

Note: Be sure the new Forehead Rest Pad is completely and firmly pressed down. If it is not, it could fall off.

Note: If you have the old style Headrest Assembly and need to replace the Headrest, please contact Reichert.

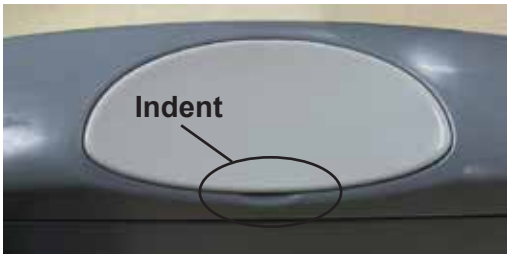


Figure CL-1. Forehead Rest Pad Indent



Figure CL-2. Grip Forehead Rest Pad



Figure CL-3. Remove Forehead Rest Pad



Figure CL-4. Install Forehead Rest Pad

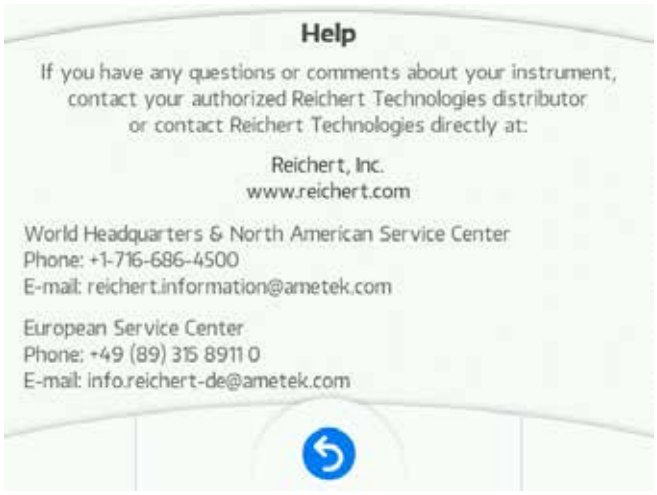
Troubleshooting

Help Screens

The Reichert 7CR includes HELP screens, which provide useful information and tips on its operation. These screens are intended to be used as a quick reference to a selection of operations.

To access the HELP menu, touch the MENU icon. Press the DOWN ARROW icon until the cursor box is positioned on HELP. Then touch the SELECT icon to access the HELP screen.





Troubleshooting (continued)

Chart of Common Errors

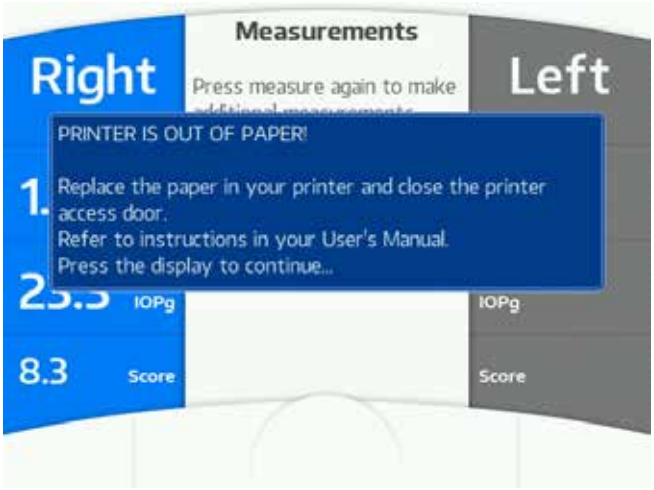
The following chart provides details of common problems and solutions for the Reichert 7CR.

Definition	Probable Cause	Solution
Screen blank.	Unit is in Sleep Mode.	Touch any icon.
	ON/OFF Switch is set to OFF.	Press the "|" on the ON/OFF Switch.
	Contrast is set too low.	Adjust contrast in Setup menu.
	Fuse(s) are blown.	Replace the blown fuse(s) (Refer to page 28). Press the ON/OFF Switch to OFF, wait two minutes, then press it to ON.
Instrument not responding to icon touch.	Instrument is "locked up." Touch screen needs recalibrating. (Re-boot unit while touching the screen to initiate calibration of the touch screen.)	Press the "blue dot" displayed on the screen at different locations to re-calibrate the touch screen.
"Position Patient" message shown.	Patient not looking at the green fixation LED.	Instruct patient to look for the green LED, then move in toward headrest.
Does not find the eye (moves straight out, then goes straight back).	Dirty Positioning Windows.	Clean the Positioning Windows (Refer to the Maintenance section of this manual).
	External light is confusing the positioning system.	Isolate sources of external light (e.g., incandescent or infrared light) and remove light source.
Finds one eye not the other. Infrared interference.	Light interference on measuring side.	Remove interference (e.g., infrared light source).
Will not take a reading.	Patient not holding still.	Encourage patient to remain still.
	Patient's eye too far from the Patient Window.	Ask patient to move toward the nosepiece.
	Patient not focusing on the target (eye moving around).	Ask patient to look only at target.
	Patient has dry eye.	Ask patient to blink their eyes.
	Dirty Positioning Windows.	Clean the Positioning Windows (Refer to the Maintenance section of this manual).
Low confidence readings or No Applanation readings shown.	Unit needs reboot of hardware.	Unplug unit, wait 2 minutes then apply input power.
	Dirty Positioning Windows.	Clean the Positioning Windows (Refer to the Maintenance section of this manual).
Printer is not printing.	Printer is out of paper.	Replace the paper with Reichert P/N 12241.
	Printer paper is installed backwards.	Reverse the printer paper.
	Not using Reichert thermal paper.	Replace the paper with Reichert P/N 12241.
Forehead Rest Pad fell off.	The Forehead Rest Pad has become loose and separated from the Headrest.	Replace the Forehead Rest Pad with P/N 16050-170. (Refer to the Maintenance section of this manual).

Troubleshooting (continued)

Print-Related Errors

If your printer runs out of paper during a print cycle, the following message will appear:



Note: If the printer paper runs out before printing all the measurement data, the data will be stored. Once the printer paper is replaced, a complete print out of all measurement data will start.

General Specifications

Model: 16060 - Reichert 7CR

Physical Dimensions

Size:
Height: 19.8 in. (50.2 cm)
Width: 10.5 in. (26.7 cm)
Depth: 14.0 in. (35.6 cm)

Weight, unpacked: 23.0 lbs. (10.4 Kg)

Electrical

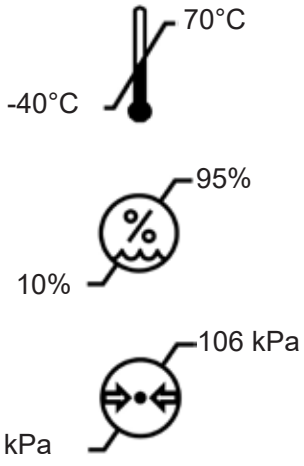
Voltage: 100-240 VAC
Power: 60-85 VA
Frequency: 50/60 Hz
Fuses: Time-Lag (2.5A, 250V), 5 X 20mm, RoHS

Measurement Range:
7 – 60 mmHg
Measurement Accuracy:
Accuracy by NIST traceable pressure transducer (95% Confidence)

IOPg: ± 1.0 mmHg (7 - 60 mmHg)
IOPcc: ± 1.0 mmHg (7 - 60 mmHg)

Operational Conditions

Environmental:
The environmental conditions are as follows:
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)
Transportation & Storage:
Temperature: -40° C (-40° F) to +70° C (158° F)
Relative Humidity: 10% to 95%
Atmospheric Pressure: 50 (14.8 in. Hg) to 106 kPa (31.3 in. Hg)



Disposal

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

Software Revision

The software revision can be obtained by contacting Reichert Technologies. The serial number identifies the manufacture date and will provide access to the software version.

Classifications

The Reichert 7CR is classified as Class I Equipment.

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

The Reichert 7CR is classified as Type B Equipment for patient contact per IEC 60601-1.

The Reichert 7CR is classified as IPX0 Equipment.

IPX0 Equipment is ordinary equipment enclosed without protection against ingress of water.

According to the mode of operation, the Reichert 7CR is a Continuous Operation instrument.

Guidance Tables

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 Reichert 7CR is intended for use in the electromagnetic environment specified below. The customer or user of the Reichert 7CR 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 Reichert 7CR 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 Reichert 7CR 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.

Guidance Tables (continued)

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 Reichert 7CR is suitable for use in electromagnetic environment specified below. The customer or user of the Reichert 7CR 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 Reichert 7CR requires continued operation during power mains interruptions, it is recommended that the Reichert 7CR 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.

Guidance Tables (continued)

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 Reichert 7CR is intended for use in the electromagnetic environment specified below. The customer or user of the Reichert 7CR 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 Reichert 7CR, 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	(E1) = 10 V/m 80 MHz to 2.7 GHz 80% AM at 1kHz	

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.

Guidance Tables (continued)

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 Reichert 7CR

The Reichert 7CR is intended for use in the electromagnetic environment in which radiated RF disturbances are controlled. The customer or user of the Reichert 7CR can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF Communications Equipment and the Reichert 7CR 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 Reichert 7CR 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-
	Test Frequency (MHz)	Band (MHz)	Service (MHz)	Modulation	Maximum Power (W)	Distance (m)	Immunity Test Level (V/m)	Compliance Level	
Radiated RF IEC 61000-4-3	385	380-390	TETRA 400	Pulse Modulation 18 Hz	1,8	0,3	27	27 V/m at 0,3 m	d = 6/E √P where d = Minimum separation distance in meters E = Immunity test level in V/m P = Maximum power in Watts (W)
	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								

Warranty

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

This warranty applies to new products and does not apply to a product that has been tampered with, altered in any way, misused, damaged by accident or negligence, or 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 the 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 the product.

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

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

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

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

Manufactured By
Reichert, Inc.
3362 Walden Ave
Suite 100
Depew, NY 14043
USA

Toll Free 888-849-8955
Phone: 716-686-4500
Fax: 716-686-4555
Email: reichert.information@ametek.com
www.reichert.com

Authorized European Representative
Emergo Europe
Prinsessegracht 20
2514 AP The Hague
The Netherlands
Tel: (31) (0) 70 345-8570
Fax: (31) (0) 70 346-7299
Email: EmergoVigilance@ul.com

ISO 13485 Certified

CE
1639

16060-101 Rev. N

2020-03-05

AMETEK®
ULTRA PRECISION TECHNOLOGIES