

USER MANUAL  
**COMPU-VISION**

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**CV-5000**



# INTRODUCTION

Thank you for purchasing the TOPCON Compu-Vision CV-5000.

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## INTENDED USE / INDICATIONS FOR USE

This instrument is used to measure the refractive power of the eye and to test binocular functionality.

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## FEATURES

This instrument has the following features:

- The compact design enables you to see the patient's face.
- The distance acuity chart can be controlled by a personal computer.
- The PD (pupli distance) and the anterior eye alignment can be checked even in a dark optometry room.
- "Help", "Mouse Navigation" and other functions support the optometrist.

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## PURPOSE OF THIS MANUAL

To ensure safe and effective use of the instrument, carefully read "DISPLAY FOR SAFE USE" and "SAFETY CAUTIONS" and then use the instrument as instructed. Keep the user manual at hand for future reference.

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## INTENDED PATIENT POPULATION

- The patient who undergoes an examination by this instrument must maintain concentration for a few minutes and keep to the following instructions:
  - To fix the face to the forehead rest.
  - To understand and follow instructions when undergoing an examination.

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**CAUTION** : Federal laws restricts this device to the sale by or on the order of a physician.



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1. No part of this manual may be copied or reprinted, in whole or in part, without prior written permission.
  2. The contents of this manual are subject to change without prior notice and without legal obligation.
  3. The contents of this manual are correct to the best of our knowledge. Please inform us of any ambiguous or erroneous descriptions, missing information, etc.
  4. Original Instructions  
This instruction manual was originally written in English.
-

## **DISPOSAL**

Dispose of the instrument according to local disposal and recycling laws.



This symbol is applicable for EU member countries only.  
To avoid potential negative consequences for the environment and possibly human health, this instrument should be disposed of (i) for EU member countries - in accordance with WEEE (Directive on Waste Electrical and Electronic Equipment), or (ii) for all other countries, in accordance with local disposal and recycling laws.

## **ENVIRONMENTAL CONDITIONS FOR USE**

Temperature : 10°C - 40°C  
Humidity : 30% - 90% (non-condensing)  
Air pressure : 700hPa - 1060hPa

## **STORAGE, USAGE PERIOD**

1. Storage (without wrapping (without package))  
\* Temperature: 10°C - 40°C  
Humidity: 10% - 95% (without dew condensation)  
Air pressure: 700hPa - 1060hPa  
\* THIS INSTRUMENT DOES NOT MEET THE TEMPERATURE REQUIREMENTS OF ISO 15004-1 FOR STORAGE. DO NOT STORE THIS INSTRUMENT IN CONDITIONS WHERE THE TEMPERATURE MAY RISE ABOVE 40°C OR FALL BELOW 10°C.
2. Storage (with wrapping (with package))  
Temperature: -20°C - 50°C  
Humidity: 10% - 95%
3. Transportation (with wrapping (with package))  
Temperature: -40°C - 70°C  
Humidity: 10% - 95%
4. When storing the instrument, ensure that the following conditions are met:
  - (1) The instrument should not be splashed with water.
  - (2) Store the instrument away from the environment where air pressure, temperature, humidity, ventilation, sunlight, dust, salty/sulfurous air, etc. could cause damage.
  - (3) Do not store or transport the instrument on a slope or uneven surface or in an area where it is subject to vibrations or instability.
  - (4) Do not store the instrument where chemicals are stored or gas is generated.
5. Usage period  
8 years from delivery providing regular maintenance is performed (according to the self-certification [Topcon data])

## **CHECKPOINTS FOR MAINTENANCE**

### **Maintenance by user**

1. Before use, ensure that the measuring head is installed securely.
2. Regularly maintain and check the instrument and its parts.
3. When using the instrument after a prolonged period of inactivity, confirm normal and safe operation beforehand.
4. When the lens is soiled, wipe it with the accessory silicone cloth.
5. When this instrument is not in use, apply the dust cover to it.
6. Refer to "7. MAINTENANCE" on P.156 for details.

# HOW TO READ THIS USER MANUAL

- Before using the CV-5000 instrument, read the cautions described on P.1 to P.8.
- For connecting to other devices, read "6.1.1 CONNECTING PERIPHERAL DEVICES" on P.120.
- For quick start up, refer to "3. BASIC OPERATIONS" on P.54 first.
- For setup, refer to "6. CONVENIENCE FUNCTIONS" on P.119.
- The following symbols are used in this manual. Please understand these symbols and their meaning and use the instrument correctly.



: Describes the convenience functions and the cautions to ensure safe use.



: Describes the location of supplemental or additional information.

- The following abbreviations indicate the devices relevant to the instrument.



Abbreviation	Device
RM	Auto refractometer
KR	Auto kerato-refractometer
CL	Computerized lensmeter
EZ	EZ meter
ACP	Auto chart projector
MC	Mirror chart
PC	Pixel chart

# DISPLAY FOR SAFE USE







To encourage safe and proper use and to prevent danger to the operator and others or potential damage to property, important cautionary messages are placed on the instrument body and inserted in the user manual.

We suggest that everyone using the instrument understand the meaning of the following displays, icons and text before reading the "SAFETY CAUTIONS" and observe all listed instructions.

## DISPLAYS

Display	Meaning
 <b>WARNING</b>	Incorrect handling by ignoring this display may lead to a risk of death or serious injury.
 <b>CAUTION</b>	Incorrect handling by ignoring this display may lead to personal injury or physical damage.
	<ul style="list-style-type: none"><li>• Injury refers to cuts, bruises, burns, electric shock, etc. which do not require hospitalization or extended medical treatment.</li><li>• Physical damage refers to extensive damage to the building, nearby equipment and/or surrounding furniture.</li></ul>

## ICONS

Icon	Meaning
	Prohibition: Specific content is expressed with words or a picture near the  icon.
	Mandatory Action: Specific content is expressed with words or a picture near the  icon.
	Caution: Specific content is expressed with words or a picture near the  icon.

# GENERAL SAFETY INFORMATION



## WARNING

### Ensuring the Safety of Patients and Operators

Be careful not to bump the patient's eyes or nose with the instrument during operation. The patient may be injured.

### Preventing Electric Shocks and Fires.

To avoid fire and electric shock, install the instrument in a place free of water and other liquids.

To avoid fire and electric shock, do not put cups or other containers with liquids near the instrument.

To avoid electric shock, do not insert metal objects into any openings, etc.

To avoid fire in the event of an instrument malfunction, immediately turn off the power switch and unplug the cable if you see smoke coming from the instrument or if you detect other problems. Don't install the instrument where it is difficult to disconnect the power plug from the outlet. Ask your dealer for repairs.



## CAUTIONS

### Ensuring the Safety of Patients and Operators

This instrument should only be used by skilled operators.

When moving the measuring head up and down, be careful not to bump it against the patient's face.

The patient may be injured.

To prevent the instrument from tipping over or falling and to avoid injury, do not install the instrument on an uneven, unsteady or sloping surface.

### Preventing Electric Shocks and Fires.

To avoid damage to the instrument or an injury caused by electric shock, turn off the power switch and unplug the power cord before cleaning the instrument.

### Electromagnetic Compatibility (EMC)

This instrument has been tested (with 100V/120V/230V) and found to comply with IEC60601-1-2 Ed.3.0: 2007.

This instrument radiates radio frequency energy within standard and may affect other devices in the vicinity.

If you have discovered that turning on/off the instrument affects other devices, we recommend you change its position, keep a proper distance from other devices, or plug it into a different outlet.

Please consult the dealer from whom you purchased the instrument if you have any additional questions.

# MAINTENANCE

To ensure the safety and performance of this instrument, all maintenance work, unless specified in this manual, shall be conducted by trained service engineers.

The following maintenance tasks may be performed by the user.

For details, see the relevant parts of this manual as specified below.

## Replacing the face shield/forehead rest

The forehead rest and face shield on this instrument may be replaced by the user.



: Refer to "INSTALLING AND REMOVING THE FACE SHIELD AND FOREHEAD REST" on P.38 for handling instructions.

## Replacing the fuse

The fuses on this instrument may be replaced by the user.



: For details, refer to "REPLACING THE FUSE" on P.157.

## Inspecting the instrument

It is recommended to inspect the mounting section of the CV-5000 and the system table periodically to ensure they are attached properly.



: Refer to "INSPECTING THE MEASURING HEAD MOUNTING SECTION" on P.159.

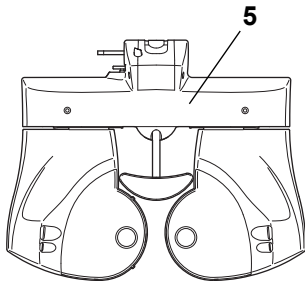
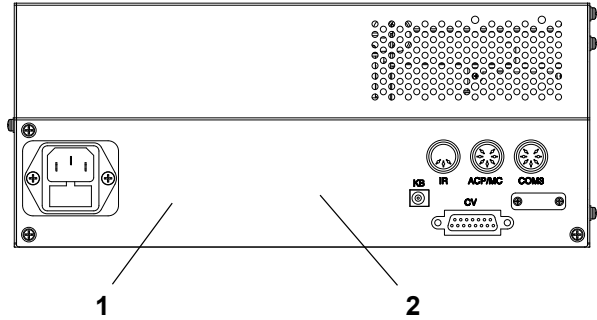
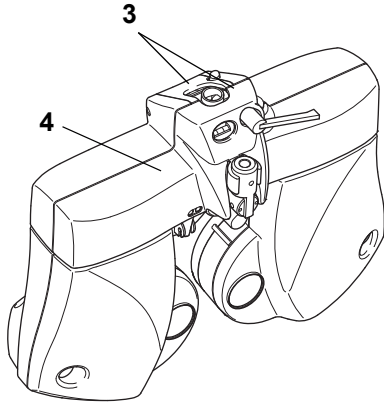
# ESCAPE CLAUSE

- TOPCON shall not take any responsibility for damage due to fire, earthquakes, actions by third persons and other accidents, or damage due to negligence and misuse by the user and any use under unusual conditions.
- TOPCON shall not take any responsibility for damage derived from inability to properly use this instrument, such as loss of business profit and suspension of business.
- TOPCON shall not take any responsibility for damage caused from using this instrument in a manner other than that described in this user manual.
- Diagnoses made shall be the responsibility of the user and TOPCON shall not take any responsibility for the results of such diagnoses.

# WARNING DISPLAYS AND POSITIONS

To ensure safety, the machine provides warning displays.

Use the instrument correctly by observing the display instructions. If any of the following display labels are missing, contact your TOPCON dealer or your local Topcon office listed on the back cover of this manual.



No.	Label	Meaning
1		<b>WARNING</b> Electric shock may cause burns or a possible fire. Turn the power switch OFF and unplug the power cord before replacing the fuses. Replace only with fuses of the correct rating.
2		<b>WARNING</b> To avoid injury caused by electric shock, do not open the cover. Ask your dealer for service.
3		<b>CAUTION</b> Do not put your hand between the mounting arm and the instrument. Your hand may be pinched.
4		<b>CAUTION</b> To avoid injury due to contact, do not bring the patient's face close to the near-point rod.
5		Degree of protection against electric shock : TYPE B APPLIED PART

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# 1. BEFORE USE

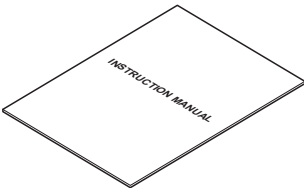
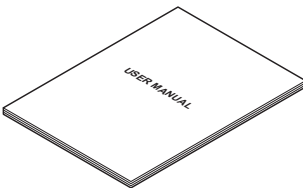

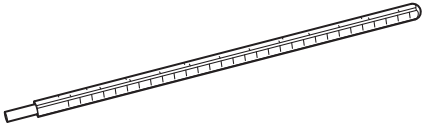

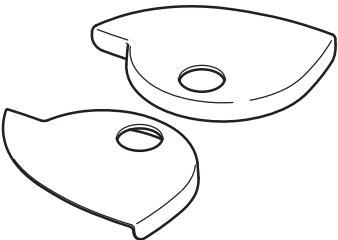
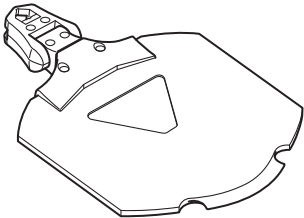
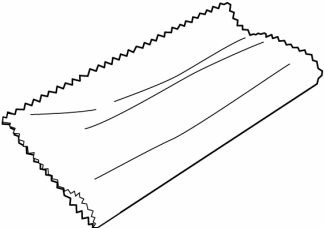
## 1.1 CHECKING THE ACCESSORIES

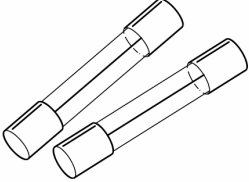
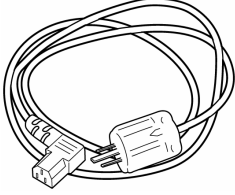
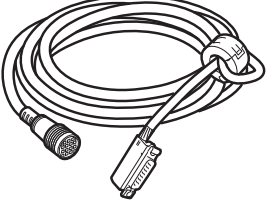
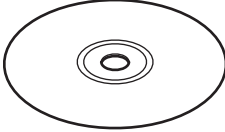


### CAUTION

Install the devices (RM, CL and others), which will be connected with the optional accessories, out of the CV-5000 patient's environment.

Upon unpacking, make sure that all the following standard accessories are included. Figures in ( ) are the quantities.

Instruction manual 	User manual (1) 
Dust cover (1) 	Near-point rod (1) 
Forehead rest (1) 	Face shield (2) 
Near-point card and card holder (1 each) 	Silicone cloth (1) 

<p>Fuses (2)</p> 	<p>Power cord (1)</p>  <p>The shape is different according to the destination.</p>
<p>Measuring head connection cable (1)</p> 	<p>Install CD (1)</p> 



Use the standard accessories except the following units in the patient's environment.

- User manual
- Dust cover
- Silicone cloth

## OPTIONAL ACCESSORIES



The optional accessories must be connected by a service engineer. If you have purchased any optional accessories, contact a service engineer.

- Communication cable (DIN/DIN)  
This cable is used to connect the visual acuity chart.  
Both ends of the cable are the DIN connector type.
- Communication cable (DIN/D-sub)  
This cable is used to connect the power supply unit, KR, CL and others to a personal computer. One end of the cable is the DIN connector type and the other is the D-SUB 9-pin type.
- Infrared communication unit  
This unit is used to perform infrared communication with the visual acuity chart.
- Pixel Chart (PC-50S)  
This visual acuity chart operates in linkage with the CV system.
- Pixel Chart (PC-50SB)  
This visual acuity chart operates in linkage with the CV system.
- Mirror Chart (MC-4S)  
This visual acuity chart operates in linkage with the CV system.

## PRODUCTS SOLD SEPARATELY




The commercial products sold separately are necessary to use the CV system. Use the device complying with UL60950/UL60950-1 or IEC60950/IEC60950-1.


- Personal computer (including the main unit, display, keyboard and mouse)  
Your personal computer must meet the following specifications.  
OS: Windows XP Professional (32 bits)/Windows 7 Professional (32 bits/64 bits)  
CPU: Clock frequency is 1GHz or more.  
Memory: 1GB or more (32-bit OS)/2GB or more (64-bit OS)  
HDD: Free capacity of 500MB or more  
Serial port: 1 or more  
Display: Resolution of SXGA (1280 x 1024) or more



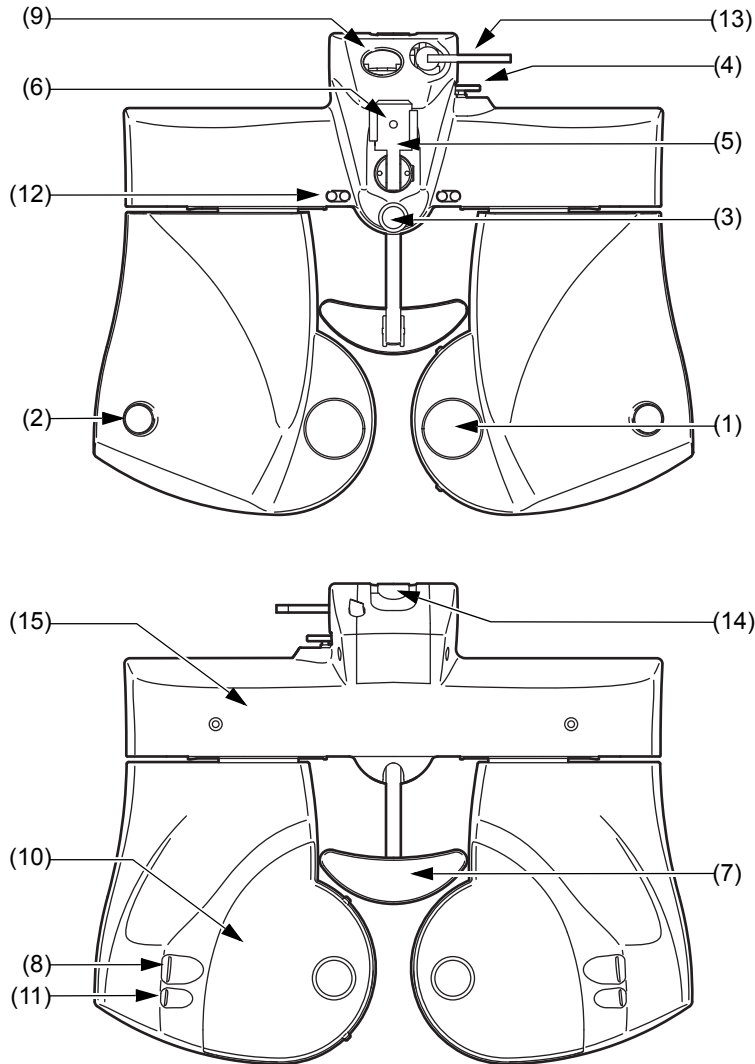
- At least one serial port is necessary to connect to the power supply unit.  
To connect to RM/CL, more serial ports for the connected devices are necessary.
- To connect Pixel Chart or Mirror Chart (optional) as a visual acuity chart, a free DVI connector is necessary.
- To connect another CV-5000 system, the LAN connector is needed.

# 1.2 COMPONENT NAMES AND FUNCTIONS

 <b>CAUTION</b>	To avoid electric shock, do not touch the external connection terminal and the patient at the same time.
--	--

 Use all the components in the patient's environment.

## 1.2.1 MAIN UNIT(Measuring head)



- (1) Examination window ..... The patient's eyes are observed through this window, and the display lenses are set here.
- (2) Corneal vertex distance window..... The position of the patient's cornea can be observed through this window.

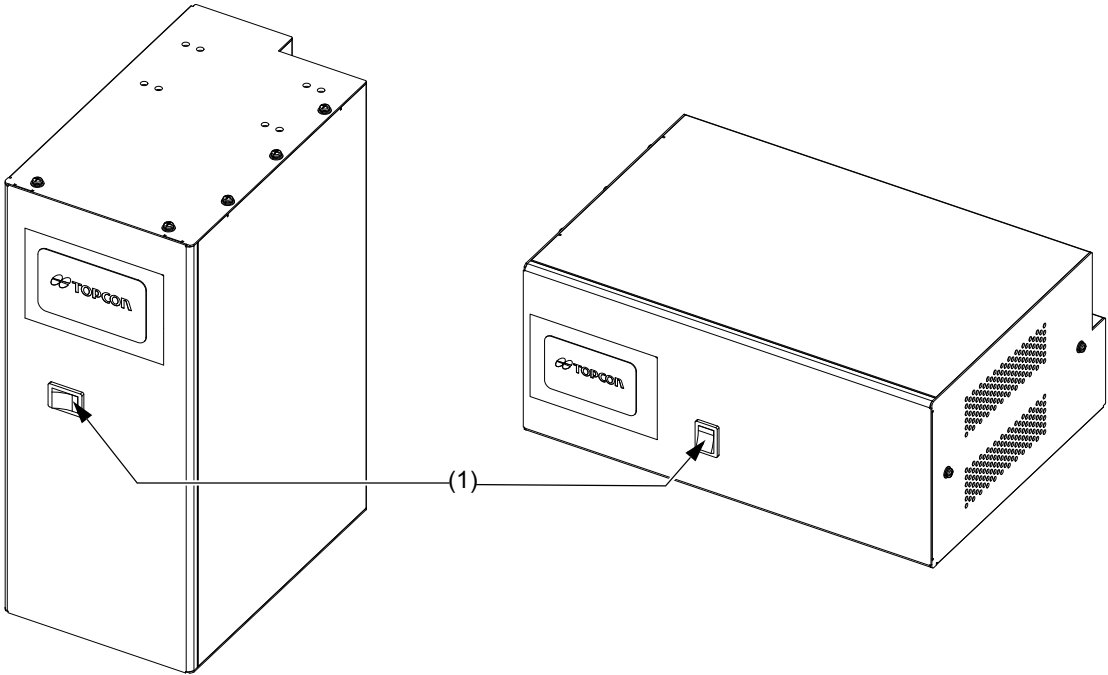
- (3) Forehead rest knob..... The position of the forehead rest can be adjusted by moving this knob backward/ forward.
- (4) Leveling knob..... Levels the measuring head.
- (5) Near-point rod holder..... The near-point rod is inserted and attached here.
- (6) Clamp screw..... Retains the near-point rod.
- (7) Forehead rest..... The patient's forehead rests here.
- (8) Cornea alignment scale..... Measures the corneal vertex position.
- (9) Level..... Indicates the horizontal position for the level adjustment.
- (10) Face shield..... The patient's face rests here. This cover can be removed.
- (11) Cornea illumination..... Illuminates the anterior eye segment to check the PD easily even during examination in a dark room.
- (12) Near-point illumination..... Illuminates the near-point target.
- (13) Tilt locking lever..... Adjusts the angle of the tilted measuring head and fixes it.
- (14) Arm mounting shaft..... Mounts the instrument on the arm, etc.
- (15) PD cover..... The cover for holding when tilting the head.

**COMPOSITION OF PARTS WHICH CONTACT THE HUMAN BODY**

- Forehead rest : Polypropylene resin (Type B applied part)
- Face shield : Polypropylene resin

# 1.2.2 CV POWER SUPPLY UNIT WITH EXTERNAL PERSONAL COMPUTER (POWER SUPPLY UNIT)

Front surface



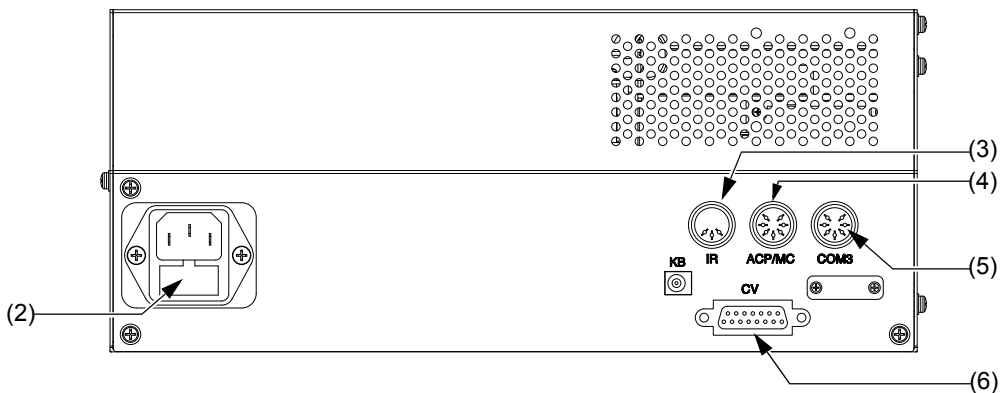
The orientation of the printer should be changed to match the type of installation.

(1) Power switch..... Turns on/off the power.

## Rear panel

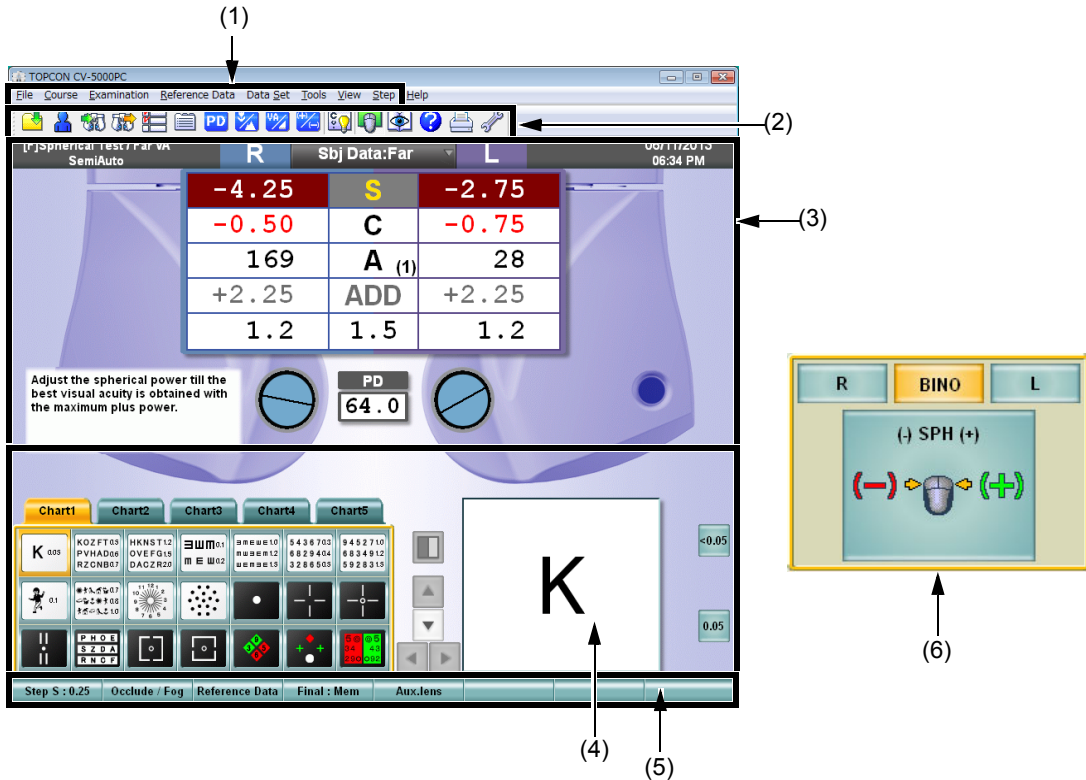


Only use the connector described in this chapter.



- (2) Fuse holder ..... The fuse is set in this holder.
- (3) IR connector ..... Used to connect the infrared communication unit (option).
- (4) ACP/MC connector ..... Used to connect the visual acuity chart with a serial connection.
- (5) COM3 connector ..... Used to connect a personal computer.
- (6) CV connector ..... Used to connect the measuring head.

## 1.2.3 TEST SCREEN



(1) Menu bar

The menu for operation is displayed.



Refer to "MENU BAR/TOOLBAR" on P.23 for details.

(2) Toolbar

The buttons for operation are displayed.



Refer to "MENU BAR/TOOLBAR" on P.23 for details.

(3) Data display unit

The near- and far-point data, subjective and objective data, "Mini Help", etc. are displayed.



Refer to "DATA DISPLAY UNIT" on P.32 for details.

(4) Visual acuity chart operation unit

The chart page, the test chart icon, etc. are displayed.



Refer to "VISUAL ACUITY CHART OPERATION UNIT" on P.36 for details.

(5) Function button

The function selector buttons for the lens changing step, occlusion/fogging, etc. are displayed.



Refer to "FUNCTION BUTTON" on P.36 for details.

(6) Control window

The buttons, mouse navigation and others for operation are displayed.

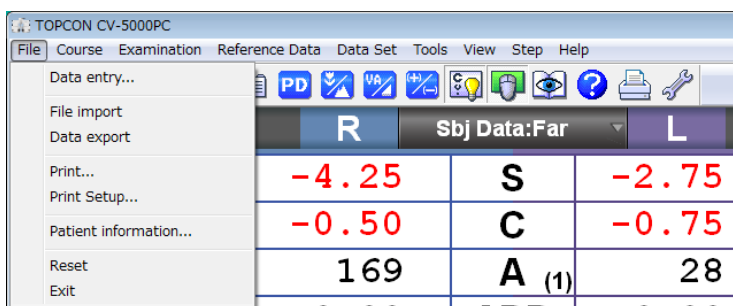


Refer to "FUNCTION BUTTON" on P.36 for details.

## MENU BAR/TOOLBAR


You can access almost all functions from the menu bar. The buttons, which are frequently used in tests, are displayed on the toolbar. Click each button, and you can use the indicated function.

(1) File



- Data entry

The data of the connected device such as RM or CL is input.


This function is the same as the  button ([Data entry] button) on the toolbar.



Refer to "6.1.3 IMPORTING THE DATA FROM OTHER DEVICES" on P.123 for details.


- File import

The file data output from the external database software is captured.

This function is the same as the  button ([File import] button) on the toolbar.

- Data export


Data are output through "Export".

This function is the same as the  button ([Data export] button) on the toolbar.

- Print

The test results are printed.

It is possible to output data according to the setting.


This function is the same as the  button ([Print] button) on the toolbar.


- Print Setup

Use this item to set a printer.

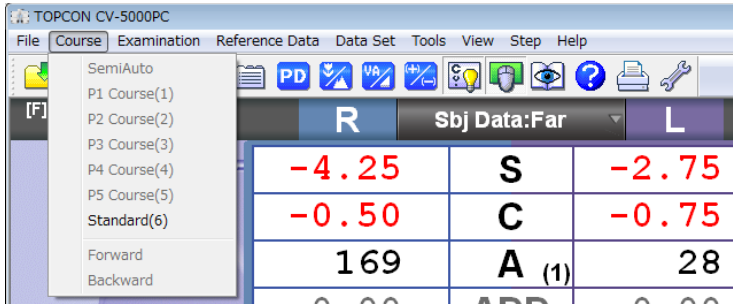
- Patient information

Edits the patient ID No./name/Age.

This function is the same as the  button ([Patient information] button) on the toolbar.


- **Reset**  
Sets the system to the initial test status again.  
This function is the same as the  button ([Reset] button) on the toolbar.
- **Exit**  
Finishes the CV-5000PC software.

## (2) Course

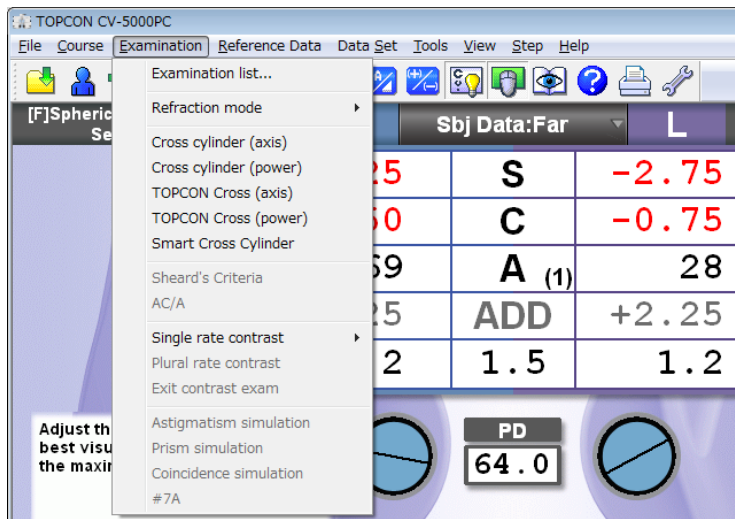







- **SemiAuto**  
The "SemiAuto" mode is accessed.
- **P1 Course (1) - P5 Course (5)**  
The test of P1 - P5 course starts.
- **Standard**  
The test of "Standard" course starts.
- **Forward**  
During the test of P1 - P5 or "Standard" course, the system shifts to the next step.  
This function is the same as the [Forward] button on the control window.
- **Backward**  
During the test of P1 - P5 or "Standard" course, the system returns to the preceding step.  
This function is the same as the [Backward] button on the control window.



Click the  button ([Course list] button) on the toolbar, and the list of the registered courses is displayed. You can select a course from this list and start the test.

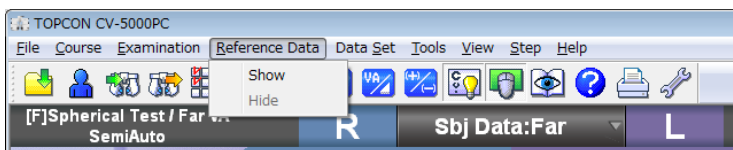
### (3) Examination



- Examination list  
The list of tests is displayed.  
This function is the same as the [  ] button ([Examination list] button) on the toolbar.
- Cross cylinder (axis)  
The cylinder axis measurement mode of cross cylinder test (Jackson cross) is accessed.  
This function is the same as the [  ] button ([Cross cylinder (axis)] button) on the toolbar.
- Cross cylinder (power)  
The cylinder power measurement mode of cross cylinder test (Jackson cross) is accessed.  
This function is the same as the [  ] button ([Cross cylinder (power)] button) on the toolbar.
- TOPCON Cross (axis)  
The cylinder axis measurement mode of cross cylinder test (TOPCON cross) is accessed.  
This function is the same as the [  ] button ([TOPCON cross (axis)] button) on the toolbar.
- TOPCON Cross (power)  
The cylinder power measurement mode of cross cylinder test (TOPCON cross) is accessed.  
This function is the same as the [  ] button ([TOPCON cross (power)] button) on the toolbar.
- Smart Cross Cylinder  
The smart cross test starts.
- Sheard's Criteria  
The Sheard's criteria test starts.  
You can also start this test with the function button after the phoria test.

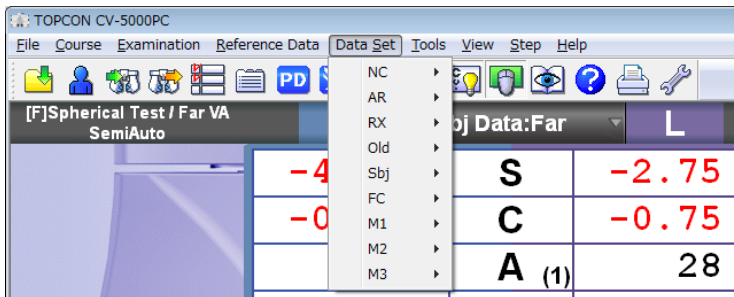
- AC/A  
The AC/A ratio test starts.  
You can also start this test with the function button after the phoria test.
- Single ratio contrast  
When a LC (liquid crystal) visual acuity chart is connected, it is possible to display a contrast chart.  
You can select the contrast from the following values.  
100%, 50%, 25%, 12.5%, 10%, 5% and 2.5%
- Plural ratio contrast  
When you connect a LC visual acuity chart and select a chart of 3 lines and 5 columns, the characters are displayed from the left in the order of contrast 25%, 12.5%, 10%, 5% and 2.5%.
- Exit contrast exam  
Finishes the contrast test.
- Astigmatism simulation  
When a LC visual acuity chart (excluding PC-50SB) is connected and the astigmatism test chart is displayed, the astigmatism simulation is executed.
- Prism simulation  
When a LC visual acuity chart is connected and the phoria test chart is displayed, the phoria simulation is executed.
- Coincidence simulation  
When a LC visual acuity chart is connected and the aniseikonia test chart is displayed, the aniseikonia simulation is executed.

#### (4) Reference Data



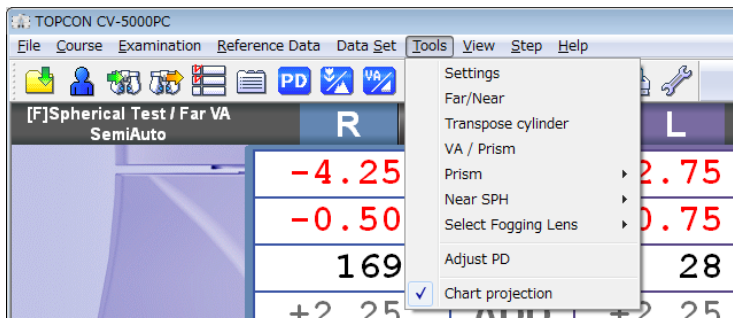
- Show  
The reference data is displayed.
- Hide  
The reference data is hidden.





## (5) Data Set



- NC
  - Set :The unaided eye data is set and you can execute the comparison test.
- RM
  - Set :The objective data is set and you can execute the comparison test.
  - Memory :The selected data is stored as the objective data.
- CL
  - Set :The eyeglass data is set and you can execute the comparison test.
  - Memory :The selected data is stored as the eyeglass data.
- Old
  - Set :The last prescription data is set and you can execute the comparison test.
  - Memory :The selected data is stored as the last prescription data.
- Sbj
  - Set :The subjective data is set and you can execute the comparison test.
  - Memory :The selected data is stored as the subjective data.
- FC
  - Set :The prescription data is set and you can execute the comparison test.
  - Memory :The selected data is stored as the prescription data.
- M1
  - Set :The M1 data is set and you can execute the comparison test.
  - Memory :The selected data is stored as the M1 data.
- M2
  - Set :The M2 data is set and you can execute the comparison test.
  - Memory :The selected data is stored as the M2 data.
- M3
  - Set :The M3 data is set and you can execute the comparison test.
  - Memory :The selected data is stored as the M3 data.

## (6) Tools



- Settings  
The settings menu is displayed.  
This function is the same as the [  ] button ([Settings] button) on the toolbar.
- Far/Near  
Changes the far- and near-point test modes each other.  
This function is the same as the [  ] button ([Far/Near] button) on the toolbar.
- Transpose cylinder  
Changes "+" and "-" of the cylinder power that is displayed on the main data.  
This function is the same as the [  ] button ([Transpose cylinder] button) on the toolbar.
- VA/Prism  
Changes the displayed contents of the main data to the visual acuity/prism.  
This function is the same as the [  ] button ([VA/Prism] button) on the toolbar.
- Prism
  - The side button functions in phoria test are displayed as the side menu.
  - Mem + Clear  
Stores the prism set in the measuring head and cancels the prism temporarily.
  - Restore  
Sets the stored prism data in the measuring head again.
  - All Clear  
Deletes the stored prism data and cancels the prism set in the measuring head.
  - Base/Polar  
Changes the notation of the prism refractive power.
- Near SPH  
Sets the displayed data of the spherical power column on the main data in near-point test mode.
  - Far SPH  
The far-point spherical power is always displayed on the main data in both far- and near-point test modes.
  - Near SPH  
In near-point test mode, the near-point spherical power (far-point spherical power + ADD) is displayed on the main data.  
In far-point test mode, the far-point spherical power is displayed.

- Select Fogging Lens

You can change the occlusion type temporarily. It is possible to select a type from the following items.

Close, +0.75D, +1.50D, +2.00D and Manual Fog

- Adjust PD

The mode to operate PD is accessed.

This function is the same as the [PD] button ([Adjust PD] button) on the toolbar.

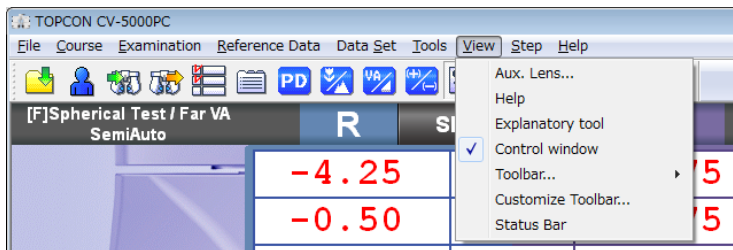
- Chart projection

Turns ON/OFF the illumination of the visual acuity chart.

Test mode	Function
Far-point test	Turns ON/OFF the display of visual acuity chart.
Near-point test	Turns ON/OFF the near-point illumination.

This function is the same as the [💡] button ([Chart projection] button) on the toolbar.

## (7) View



- Aux. Lens

Changes "Show/Hide" of the auxiliary lens list.

- Help

Select the chart button and then this menu. The detailed "Help" is displayed on the chart page.

Select this menu while "Help" is displayed, and the screen returns to the chart page.

This function is the same as the [?] button ([Help] button) on the toolbar.

- Explanatory tool

The explanation tools are displayed.

This function is the same as the [👁️] button ([Explanatory tool] button) on the toolbar.



Refer to "6.4.2 USING THE PATIENT EDUCATION TOOLS FOR THE PATIENT" on P.151 for details.

- Control window

Changes "Show/Hide" of the control window.

This function is the same as the  button ([Control window] button) on the toolbar.



Refer to " CONTROL WINDOW" on P.37 for details.

- Toolbar

- Main

Changes "Show/Hide" of the main toolbar.

- Reset

Changes "Show/Hide" of the reset toolbar.

- Customize Toolbar

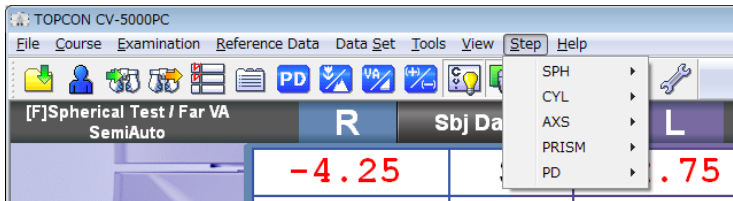


Refer to " CUSTOMIZE TOOLBAR" on P.194 for details.

- Status Bar

Changes "Show/Hide" of the status bar.

## (8) Step



- SPH

Sets the spherical power changing step by operating the mouse. You can select the step from the following items.

0.25D and 3.00D

- CYL

Sets the cylinder power changing step by operating the mouse. You can select the step from the following items.

0.25D and 1.00D

- AXS

Sets the cylinder axis changing step by operating the mouse. You can select the step from the following items.

1° and 5°

In addition, you can set the cylinder axis to one of the following values.

0°, 45°, 90° and 135°

- PRISM

Sets the prism changing step by operating the mouse. You can select the step from the following items.

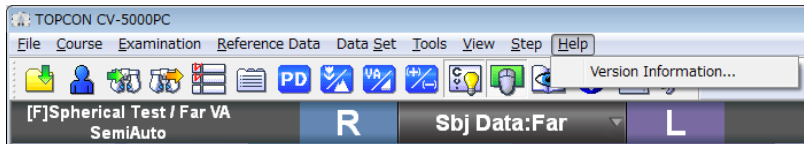
0.1, 0.2, 0.5 and 1.0

- PD

Sets the PD changing step by operating the mouse. You can select the step from the following items.

0.5 and 1.0

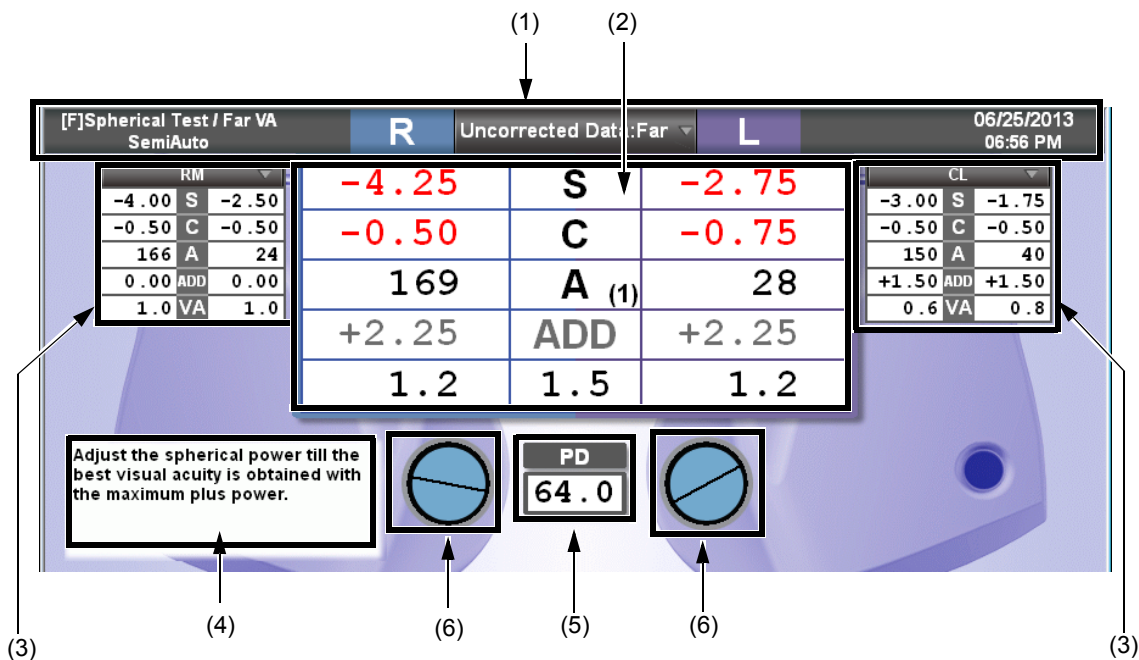
(9) Help



- Version Information

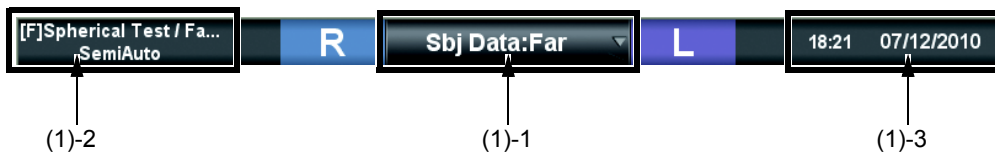
Displays the version number and copyright.

# DATA DISPLAY UNIT



## (1) Title bar

Displays the contents of the main data, test name, date and time.



## (1)-1 Main data title

Displays the values in use and the far or near point test.

By clicking this tab, the list shown below will display.

Click the displayed list to select the data to be set in the measuring head.

Type	Notation
Value in subjective measurement (CV-5000)	Subjective
Objective value measured by RM, KR, etc.	RM data
Eyeglass value measured by CL	CL data
The refined power for the eyeglass that is prescribed according to the value measured subjectively	Final data
The value without the correction lens	Unaided
Last prescription data registered in database	Old data
Data 1 stored in this instrument	Memory1
Data 2 stored in this instrument	Memory2
Data 3 stored in this instrument	Memory3


(1)-2 Test name

Displays the current test and program

There are two types of programs to select from:

- Custom program :Click the [Course list] button to select. The measurements can be performed in the sequence that was programmed .
- Semi-Auto program :By clicking the desired chart on the chart page, it will be displayed. Measurements can be performed using each chart individually.

For the custom program, the charts can be selected and customized by pressing [Settings]


 Refer to "6.3.2 CUSTOMIZE THE TEST PROCEDURE" on P.146 for customizing the program course.

For the "Semi-Auto" course, each chart can be customized by [Settings]. To customize the "Semi-Auto" course, change the test parameters registered in the test chart icons.

 Refer to "6.3.1 CUSTOMIZING THE CHART PAGE" on P.141 for details.

(1)-3 Time and lapse of test

Displays the date, time and lapse time since the test started. Only one of them (date or lapse time since the test started) can be displayed by [Settings].

 Refer to "8.2.7 Screen settings" on P.192.

(2) Main data

Displays the data and visual acuity value set in the measuring head.

(2)-1	(2)-3	(2)-2
R	Sbj Data:Far	L
-4.25	S	-2.75
-0.50	C	-0.75
169	A (1)	28
+2.25	ADD	+2.25
1.2	1.5	1.2
	(2)-4	

(2)-1 Right eye data

Displays the lens data, which are set for the right eye of the measuring head. Fit the mouse cursor to each area, and the value is highlighted. The value can be changed by operating the mouse.

When the value is highlighted, you can enter a value directly through the keyboard.

The colors for the values of the spherical, cylinder and addition refractive powers are changed according to the value or occluding status.

(2)-2 Left eye data

Displays the data in the same way as the right eye.

(2)-3 Data item

The data items are displayed between the right and left eye data.

The changing step quantity of the mouse operation is displayed on [Function button].

The step quantity of axis is displayed here in ( ).

In the far-point test, the addition refractive power item is shadowed, and in the near point test, the spherical power item is shadowed.

The shadowed item cannot be selected.

Fit the mouse cursor to each item, and the both eyes values are highlighted.

The data of both eyes can be changed at the same time by operating the mouse.

(2)-4 Visual acuity/prism

Displays the set visual acuity result or prism data.

If prism is shown by the base direction notation (XY), the refractive power of horizontal/vertical prism is displayed.

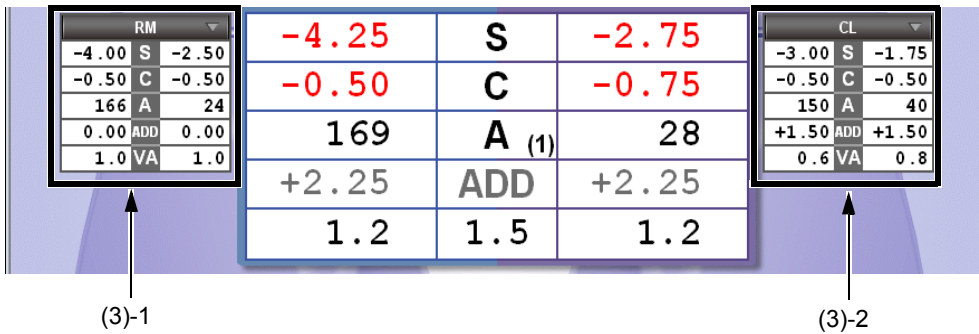
If prism is shown by the polar coordinate notation (r/θ), the refractive power and angle of prism are displayed.



Refer to "8.2.7 Screen settings" on P.192 for changing the prism refractive power notation.

(3) Reference data

The objective data and lens data measured by the external devices are displayed for comparison.



(3)-1 Reference data display area No.1

This data display area is used to compare or refer to data.

Click the title being requested, and the button list for RM Data or CL Data is displayed.

Click the item requested and the corresponding data will be displayed accordingly.

(3)-2 Reference data display area No.2

The function is the same as "Reference data display area No.1".

(4) Mini Help

Displays a simple explanation about the current test.



You can select "Displayed" or "Not displayed" by [Settings]. Refer to "8.2.7 Screen settings" on P.192 for details.

(5) PD

Displays the PD value. When you fit the mouse cursor to the PD value on the test screen, the value is highlighted. You can change the value by operating the mouse.



The status generated by this operation is not the same as when clicking the [Adjust PD] button. The cornea illumination is not turned on and the cross lens is not set in the measuring head.

(6) Auxiliary lens

Displays the status of the auxiliary lens set in the measuring head, the cross cylinder lens or TOPCON cross lens during the cylinder test. In addition, for the lens having the axis in the open status, you can check the cylinder axis.

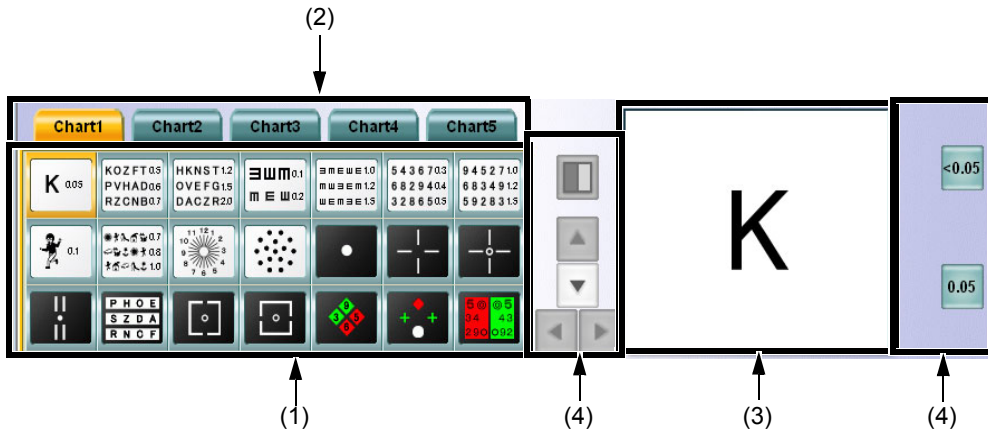


- Click the auxiliary lens on the test screen, and it is possible to change the occlusion.
- Click the right mouse button, and it is possible to change the occlusion type.



- Refer to " CHANGING THE AUXILIARY LENS" on P.130 for changing the auxiliary lens.
- Refer to " SELECTING THE TYPE OF OCCLUSION" on P.131 for changing the occlusion.

## VISUAL ACUITY CHART OPERATION UNIT



### (1) Chart page

Click the test chart icon. The selected test chart will be shown on the test chart check display section and the test relevant to the icon will start.

The mouse operation mode and auxiliary lens used in the test will be set automatically.



Click the right mouse button for the test chart icon. Only the chart is changed without changing the test.

### (2) Chart page selector tab

The test chart icons can be registered for up to five pages. You can change the chart page by clicking the tab.

### (3) Test chart check display

The test chart icon selected on the chart page is also displayed in another larger window once it has been selected. For the operation of the visual acuity test icon, the character mask can be enabled by directly clicking the test chart.

### (4) Side button

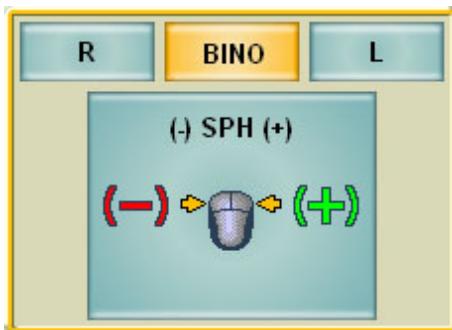
Use these auxiliary buttons, to access the necessary functions for the chart or test.

## FUNCTION BUTTON



The displayed buttons are automatically changed depending on the function.

## CONTROL WINDOW



Click the [Control window] button, and this is displayed.

The displayed buttons are changed to correspond to the functions.

Click the right or left mouse button on the mouse navigation, and it is possible to change the value as displayed.

# 2. INSTALLATION

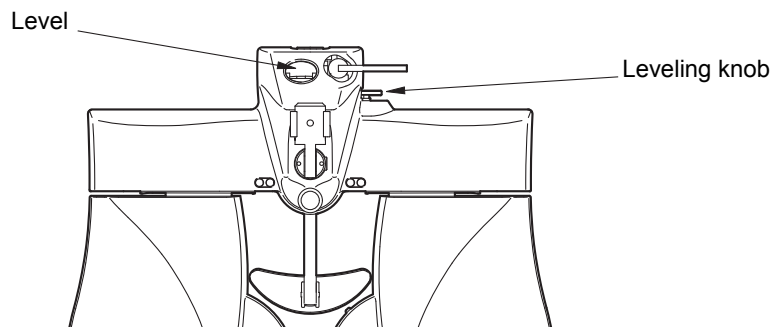
The service engineer must install the instrument. To make any changes or modify the connection, contact your TOPCON dealer or the local TOPCON office listed on the back cover.

## 2.1 INSTALLING THE MEASURING HEAD

---

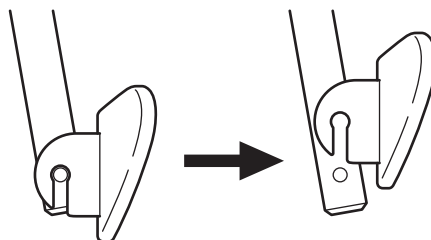
### LEVEL ADJUSTMENT

Before using the instrument, check if it is horizontal, using the level. If the bubble is not between the two red lines, turn the leveling knob to make the instrument horizontal.



### INSTALLING AND REMOVING THE FACE SHIELD AND FORE-HEAD REST

The face shield is attached by putting it on the face shield magnet properly.  
To remove the forehead rest, when viewing from the side, pull it upward.



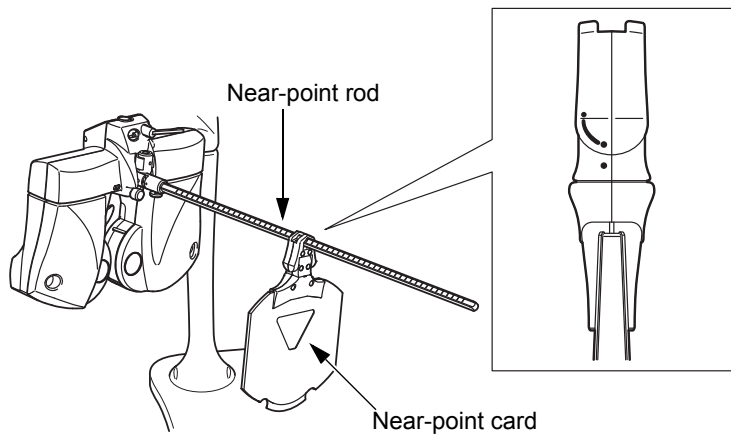
To mount the forehead rest, carry out the removal procedure in reverse.

## ASSEMBLY/INSTALLATION OF NEAR-POINT ROD AND NEAR-POINT CARD

Insert the near-point card into the end of the near-point rod. The near-point card is designed to slide on the near-point rod.

Insert the near-point rod into its holder and tighten the clamp screw securely. When the near-point rod is not in use, set it upright. (Tighten the clamp screw securely.)




<b>CAUTION</b>	To avoid injury due to contact, do not bring the patient's face close to the near-point rod.
<b>NOTICE</b>	The near-point card can be bent to only one direction. Do not bend it forcefully in an other direction. The near-point card may be broken.
<b>NOTICE</b>	Install the near-point card to the near-point rod according to the seal, which is adhered on the card to show its installation direction.



Install the near-point card toward the measuring head in the direction where it can be bent. So that the card will swing downward after placing the near-point rod in the vertical position.

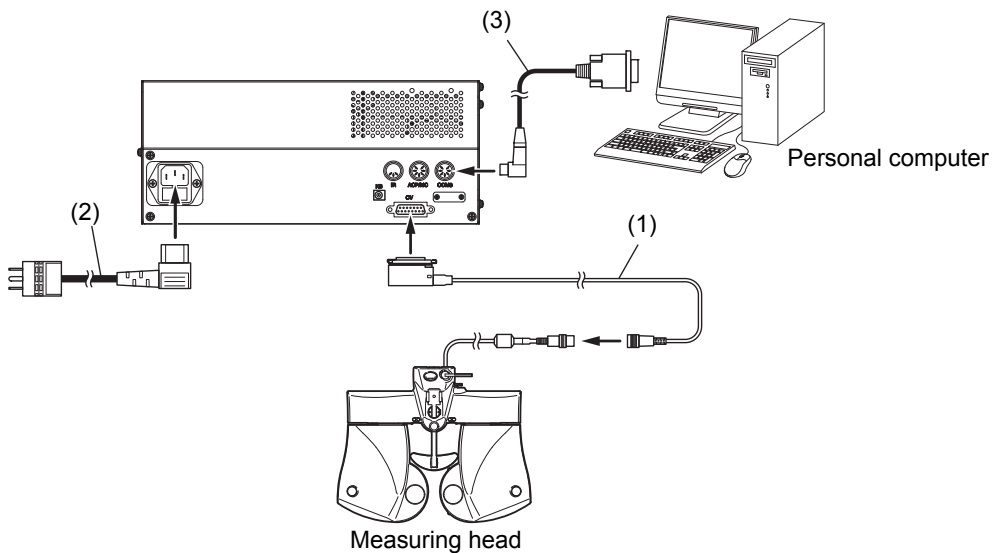
 For the near-point card, refer to "ADJUSTMENT OF NEAR-POINT CARD" on P.139.

## 2.2 CONNECTING THE MEASURING HEAD, PERSONAL COMPUTER


 <b>WARNING</b>	To avoid fire and electric shock in case of leakage, be sure to use a grounded outlet. Do not connect to outlets that are not grounded.
 <b>CAUTION</b>	To avoid electric shock, do not handle the plugs with wet fingers.
 <b>CAUTION</b>	Do not to connect additional a power strip (it shall be not only in patient environment also in outside of patient environment).

This chapter will explain the procedure for connecting the measuring head and the personal computer to the power supply unit.

- 1 Make sure that the power switches of the power supply unit and the personal computer are OFF.
- 2 As shown below, connect the measuring head, the personal computer and power cord to the power supply unit.



	Item
(1)	Measuring head connection cable
(2)	Power cord
(3)	Communication cable (DIN/D-sub)

 Refer to the instruction manual of your personal computer for connecting the communication cable and the personal computer.

- 3 Connect the power cord plug to a grounded outlet.

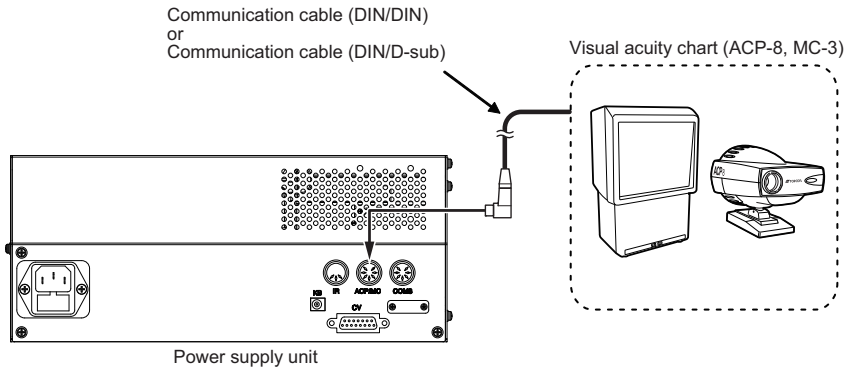
## 2.3 CONNECTING THE VISUAL ACUITY CHART



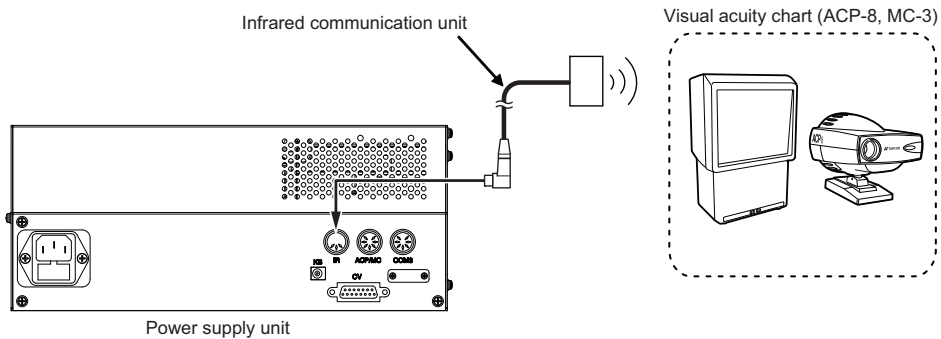
Install the visual acuity chart out of the CV-5000 patient's environment.

There are three types of the methods to connect the visual acuity chart. Use the connection method applicable to the purchased chart.

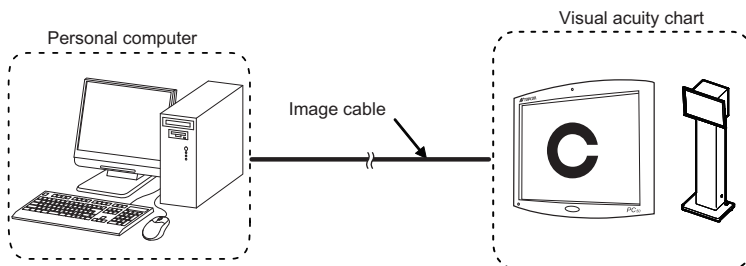
### CONNECTING A DEVICE TO RS-232C (ACP-8, MC-3.)



### CONNECTING A DEVICE TO INFRARED COMMUNICATION (ACP-8, MC-3.)



### CONNECTING A DVI DEVICE (PC-50S, PC-50SB, MC-4S)

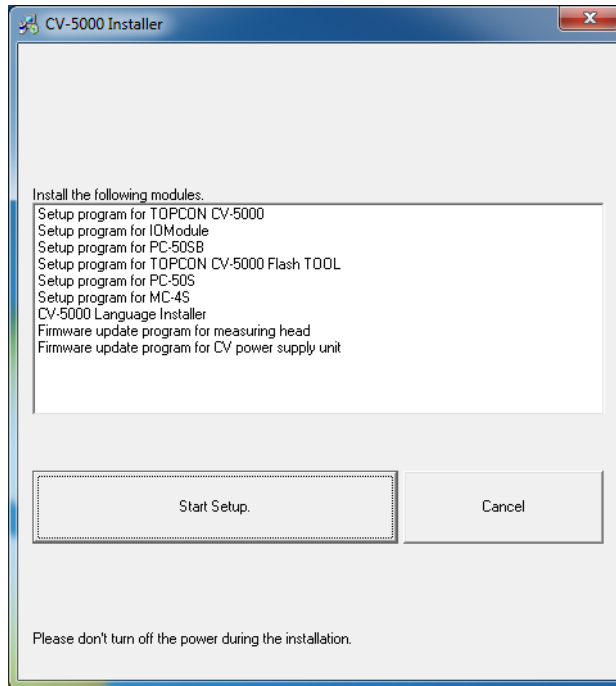


Connect the image cable to the DVI terminal of the personal computer. Refer to the instruction manual of your personal computer for details.

## 2.4 INSTALLATION OF CV-5000 SOFTWARE

---

- 1** Turn on the personal computer.
- 2** Insert the CV-5000 install CD to the optical drive of the personal computer.  
The [CV-5000 Installer] screen starts.
- 3** Click the [Start Setup] button.  
The setup screen of CV-5000 is displayed.



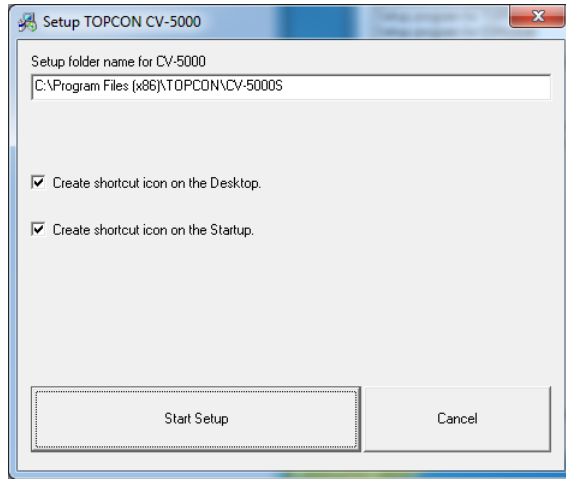
**4** The setup screen of the CV-5000 software appears.

Place a check mark for "Create shortcut icon on the Desktop." The short cut is made on the desktop.

Place a check mark for "Create shortcut icon on the Startup." The short cut is made on "Startup".

Click the [Start Setup] button.

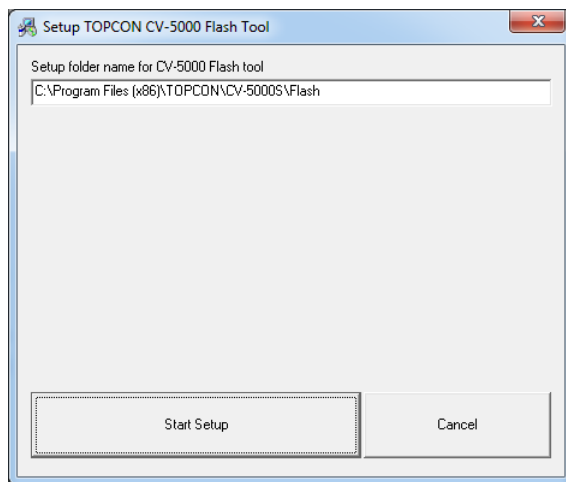
After the installation is completed, the setup screens of "CV-5000 Flash Tool", "IO Module", "PC-50S", "PC-50SB" and "MC-4S" are displayed without observing special order.



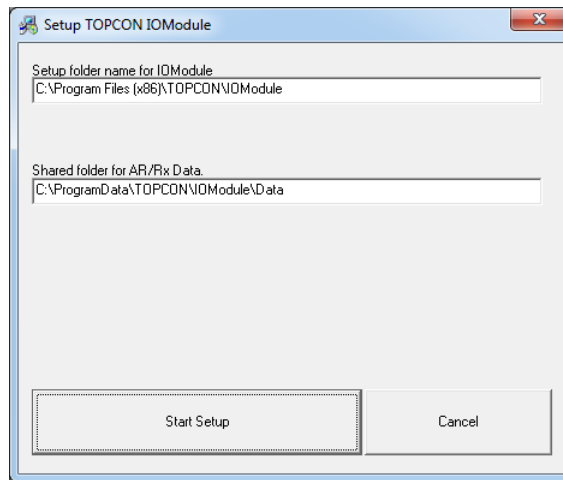
The screens of Step 5 - 9 are displayed without observing special order.

**5** The setup screen of "CV-5000 Flash Tool" appears.

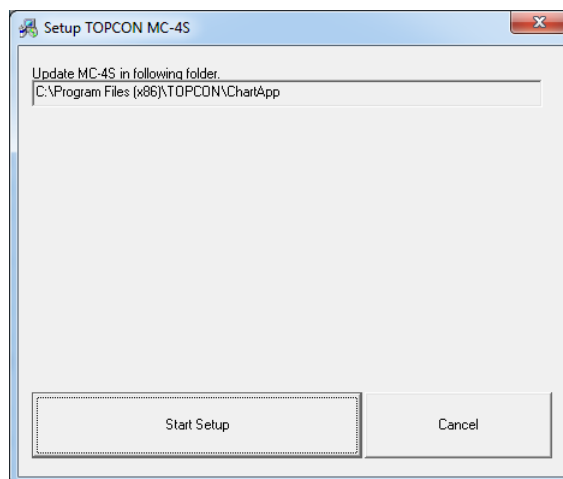
Click the [Start Setup] button.



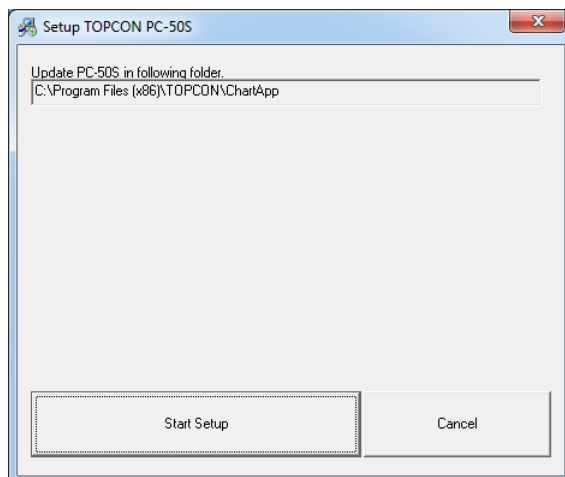
- 6** The setup screen of "IO Module" appears.  
Click the [Start Setup] button.



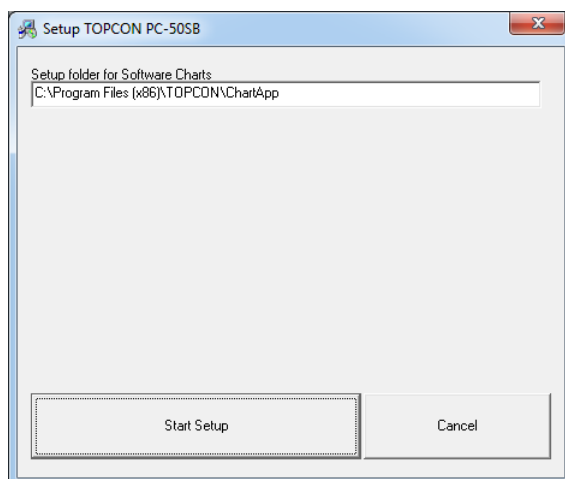
- 7** The setup screen of "MC-4S" appears.  
Click the [Start Setup] button.



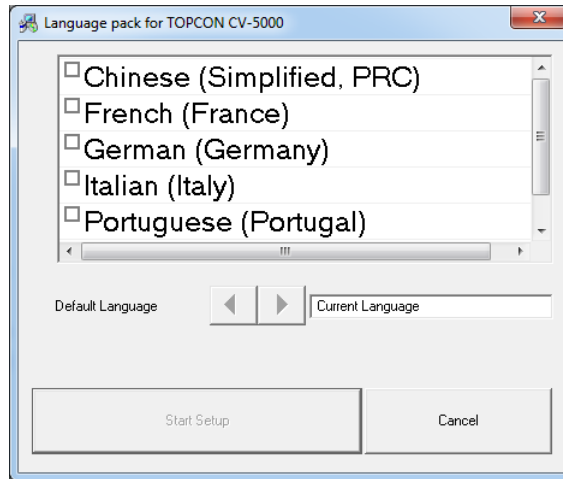
- 8** The setup screen of "PC-50S" appears.  
Click the [Start Setup] button.



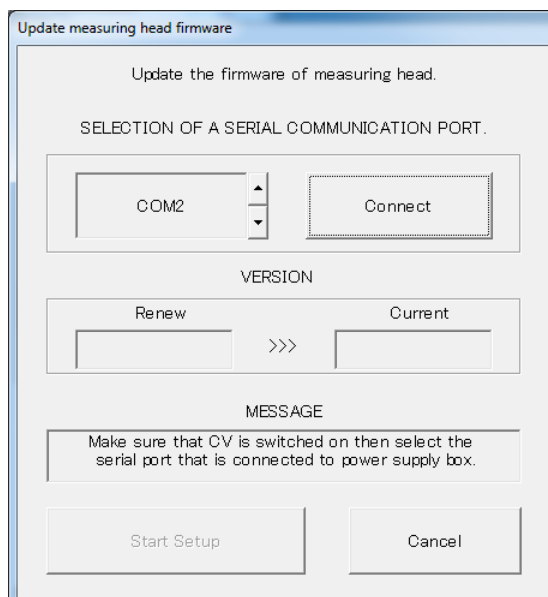
- 9** The setup screen of "PC-50SB" appears.  
Click the [Start Setup] button.



- 10** Place a check mark for the language to be added. Then, click the [Start Setup] button. The installation of the CV-5000 language module is executed. When it is not necessary to add a language, click the [Cancel] button and proceed to the next step. After the installation is completed, the setup screen for updating the measuring head firmware appears.



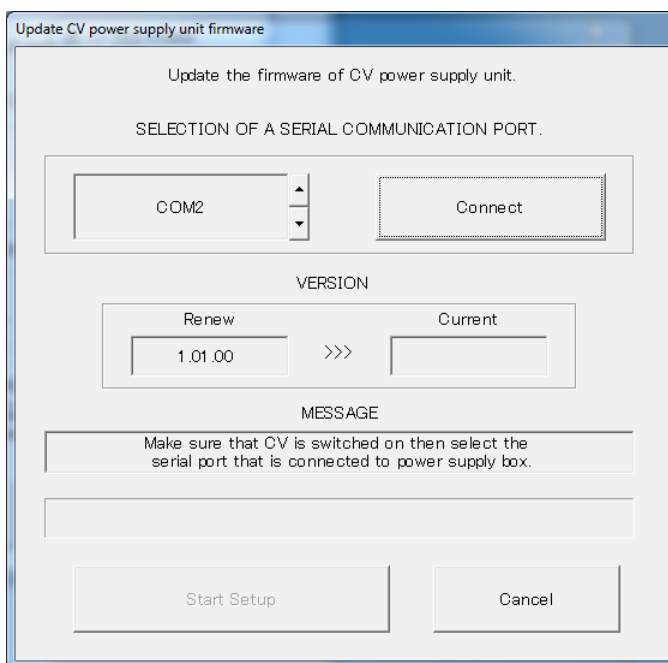
- 11** Select the serial communication port to which the CV power supply unit is connected and click the [Connect] button. Check the version and then click the [Start Setup] button. The firmware of the measuring head is updated. After the installation is completed, the setup screen for updating the CV power supply unit firmware appears.



**12** Select the serial communication port to which the CV power supply unit is connected and click the [Connect] button.

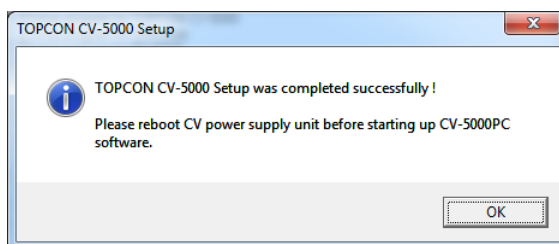
Check the version and then click the [Start Setup] button.

The firmware of the CV power supply unit is updated.



**13** Click the [OK] button.

The installation is completed.

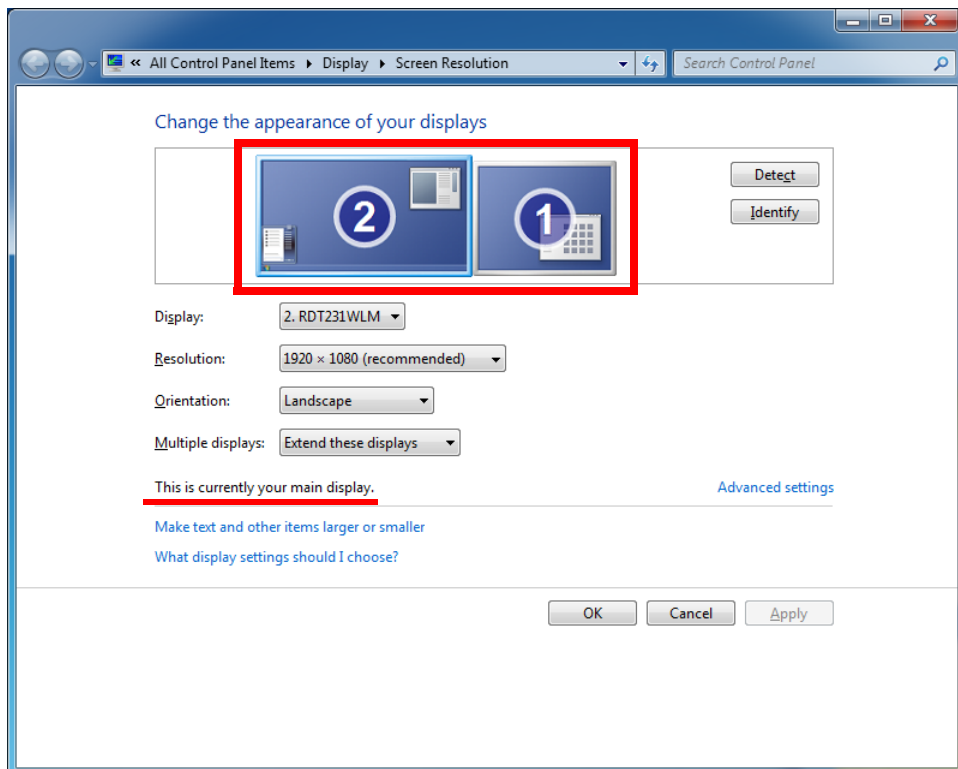


## 2.5 SETTINGS OF DISPLAY PROPERTIES (ONLY WHEN A DVI DEVICE IS USED AS A VISUAL ACUITY CHART)

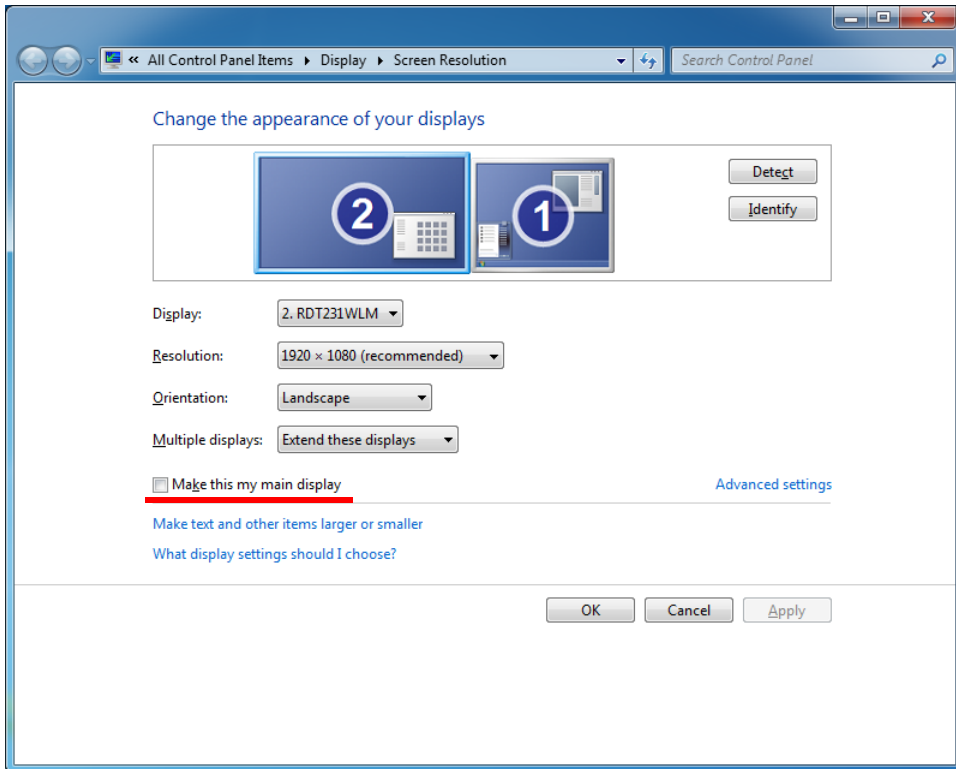
---

Set a display that is not a visual acuity chart as the main display.

- 1 Click the right mouse button on the desktop and select "Screen Resolution".  
The "Change the appearance of your displays" window appears.
- 2 Click the [Identify] button.
- 3 Check the number displayed on the visual acuity chart.
- 4 According to the displayed number, select a display that is not a visual acuity chart from the red frame.
- 5 When the selected display is set as the main display, "This is currently your main display." is shown.



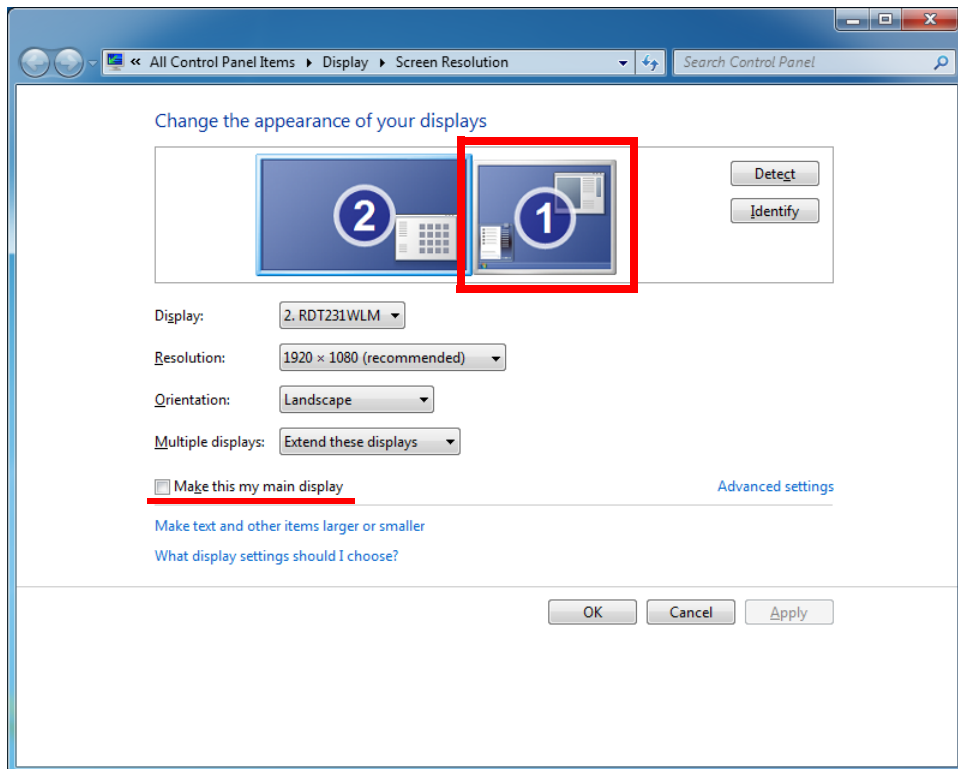
- 6 When the selected display is not the main display, place a check mark for "Make this my main display".



7 Click the [OK] button and close the window.

Example: When "1" is displayed on the personal computer monitor and, "2" on the visual acuity chart:

Set the monitor of "1" as the main display.



The displayed monitor names and others are changed according to the hardware configuration of the personal computer.



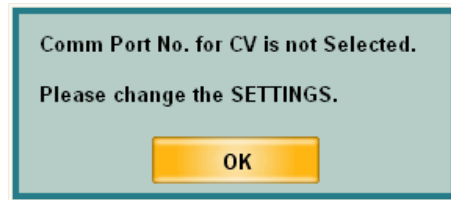
Refer to the instruction manual of the personal computer, graphic board or graphic adapter for details.

## 2.6 INITIAL SETTINGS (REGISTERING THE VISUAL ACUITY CHART OR OTHERS)

- 1 Turn on the power supply unit and start the CV-5000 software through the personal computer.

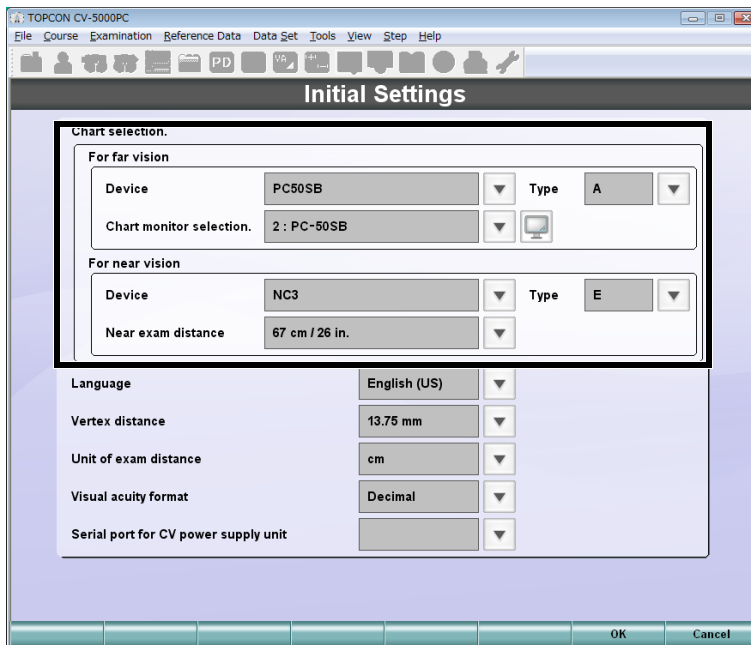
The dialog box, which shows that the number of the COM port to be connected with the CV system is not set, is displayed.

Click the [OK] button, and the "Initial Settings" screen appears.





- 2 Select a visual acuity chart to be connected.

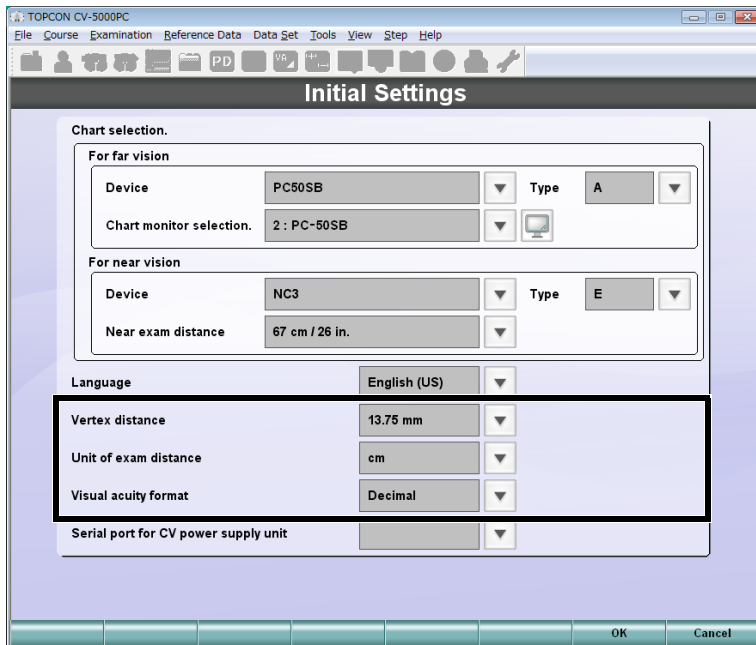
Select "Device" (device name), "Type" (type name) and "Interface" (connection method) of the distance visual acuity chart and "Device" (device name), "Type" (type name) and "Near exam distance" of the near-point visual acuity chart.





- When you select "IR control" as the connection type and click the [  ] button at the right, the test signal is sent to the visual acuity chart. This function is convenient when checking that communication can be executed correctly by the selected channel.
- When you select "PC-50S", "PC-50SB" or "MC-4S" from the far-point chart devices, "Interface" is changed to "Chart monitor selection". Click the [  ] button at the right. You can check the monitor that corresponds to the name in the "Chart monitor selection" list being displayed.

**3** Select proper values for "Vertex distance", "Unit of exam distance" and "Visual acuity format".

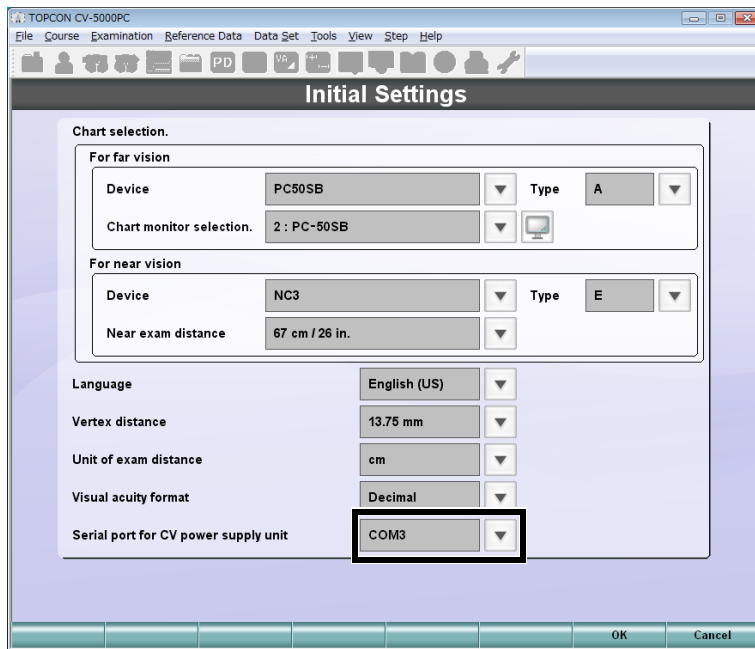



"Vertex distance" and "Unit of exam distance" can also be set by "General settings". For the details of each item, refer to P.167 ("Vertex distance") and P.168 ("Unit of exam distance").



"Visual acuity format" can also be set by "Chart settings". For the details, refer to P.177.

- 4 Select the port number of the connected personal computer on the column of "Serial port for CV power supply unit".



-  Refer to the instruction manual of your personal computer for the port number of the connected personal computer.
- 5 Click the [OK] button.  
The test screen appears.

# 3. BASIC OPERATIONS

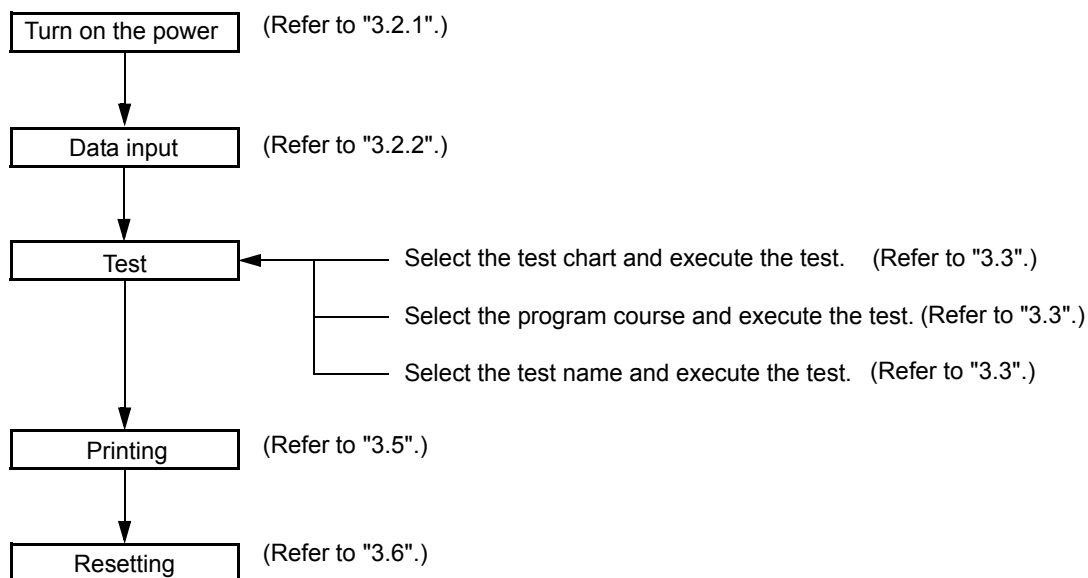


## CAUTION

To avoid electric shock, do not touch the external connection terminal and the patient at the same time.

## 3.1 FLOW OF OPERATIONS

---



## 3.2 PREPARATION BEFORE MEASUREMENT

---

### 3.2.1 PREPARATION FOR TEST

**1** Turn on the power and start the software.

Press the power switches of the power supply unit and personal computer to turn on them and start the CV-5000 software through the personal computer.



When you want to perform the tests on condition that the power is already ON, start the CV-5000 software.

When the CV-5000 software has already started, click the [Reset] button to reset the system.

**2** Set the measuring head in front of the patient.

Wipe the forehead rest, examination window and face shield prior to placing the patient behind the instrument.

### 3 Click the [Adjust PD] button.

The cornea illumination will illuminate the anterior segment of the patient.  
The cross lens is set on the measuring head.  
Have the patient view the far-point visual acuity chart.

### 4 Look into the front of the examination window from the operators side.

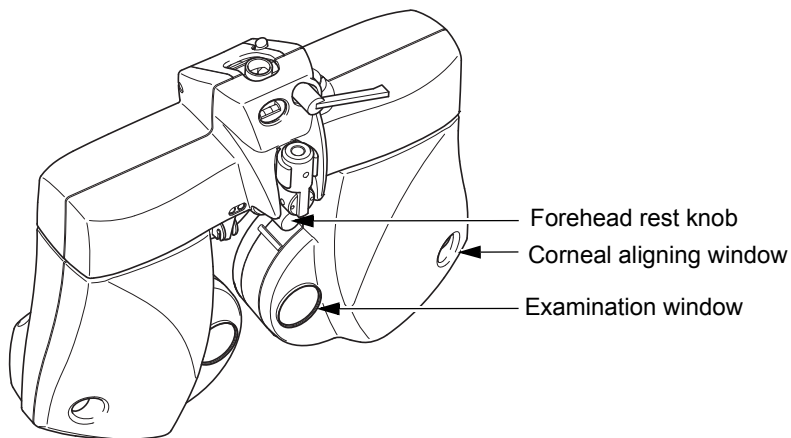
Operate the mouse to adjust the PD so that the pupil center of the patient is aligned with the cross center.

- When the pupil center is not aligned horizontally → Operate the mouse to align the pupil center with the center.
- When one eye is not aligned vertically → Ask the patient to move his/her face vertically.

After aligning, click the [Adjust PD] button again to finish the PD adjustment.

### 5 Adjust the vertex distance (VD).

Look into the corneal aligning window. While watching the corneal alignment scale, turn the forehead rest knob to adjust the distance between the patient's corneal vertex and the lens to the desired value.



Refer to "9.3 CORNEAL ALIGNING DEVICE" on P.204 for details.

## 3.2.2 DATA INPUT

Input the patient's data to add it to the data list.



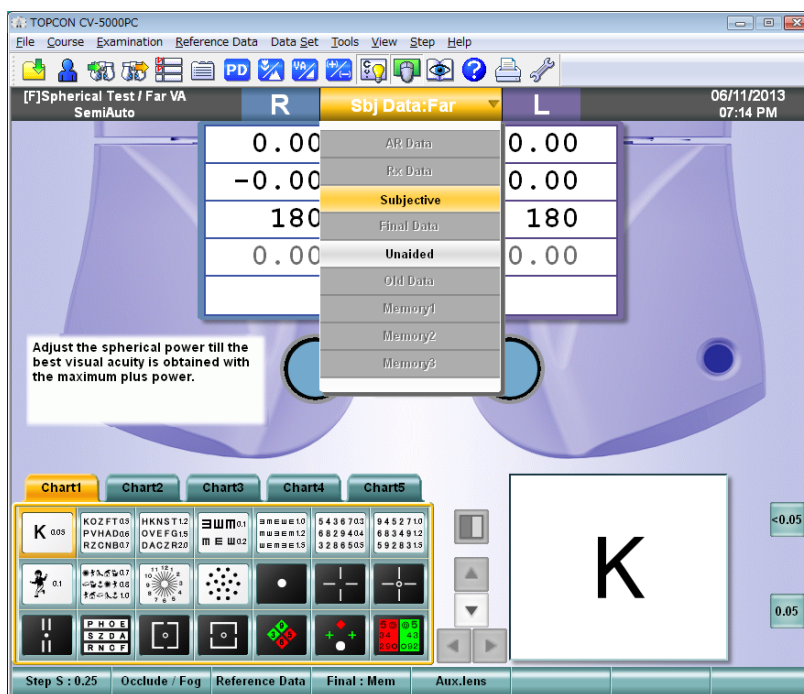
When TOPCON products such as RM, KR or CL are connected to the CV-5000, it is possible to read the data.



Refer to "6.1.3 IMPORTING THE DATA FROM OTHER DEVICES" on P.123 for details.




This chapter will explain how to input the measured values printed from the peripheral device manually.

- 1 Click the right mouse button for the main data title. Then, click the button of the desired data in the data list.





- Click "Memory 1", "Memory 2" and "Memory 3" to save temporarily the current data. To save the data, input them first. Click the right mouse button for the main data title to display the data list and then click the button of the input data.
- The data list (registration mode) displays the following data.

Example	Meaning	Operation by clicking
	This data is being displayed as the main data.	This is the data being displayed.
	This data can be input and saved.	This is displayed as the main data and it is possible to input the data.
	This data cannot be saved.	Inactive

## 2 Input the value obtained from the peripheral device on the test screen.

Fit the mouse cursor to the data to be input and change the value by operating the mouse.



If you want to input other data subsequently, select the desired data from the data list and input it.

## 3 Return the main data to the subjective data.

Click the main data title and click the [Subjective] button in the data list.



If the subjective value is not changed after resetting, the data registered last is copied as the subjective value.

## 4 Display the reference data.

If the reference data is not displayed on the screen, click the [Reference Data] button from the function buttons.

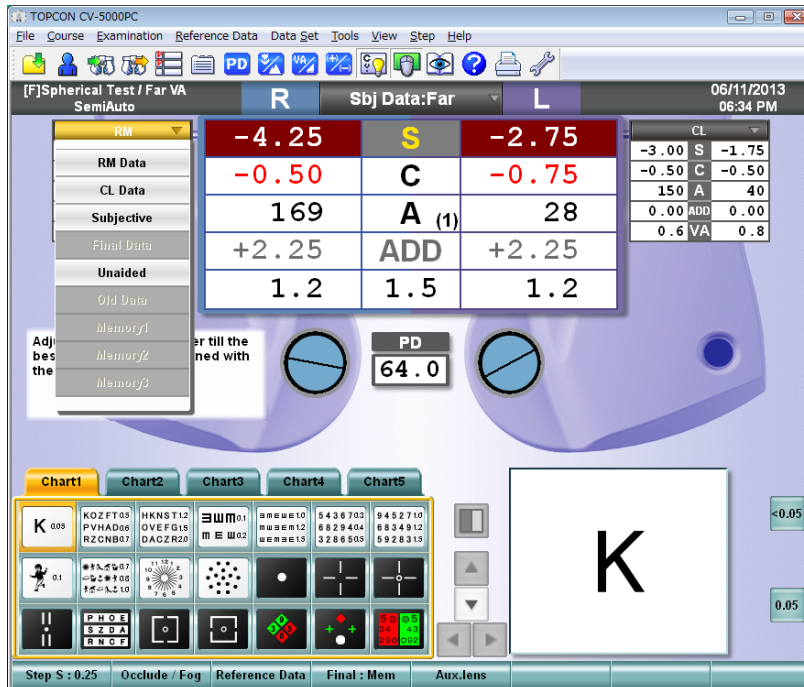
The input data is displayed on the reference data display area.



## 5 Exchange the reference data.

Click the title bar of the reference data display area. Then, click the desired data in the data list.

The selected data is displayed on the reference data display area.



## 3.3 TEST

---

Execute the test applicable to the patient.

### SELECT THE TEST CHART AND EXECUTE THE TEST.

Select the test chart icon on the chart page and execute the test.

Click the test chart icon. The selected chart is displayed on the test chart check display area and the test relevant to the icon starts.

The data, patient's eye and the auxiliary lens to be used in the test are automatically set.

When you select a test chart to execute the test, you can easily change the test order.

Arrange the test chart icons in the desired order from the upper left to the right and select them in a left-to-right sequence. So, you can execute the tests in the desired order.



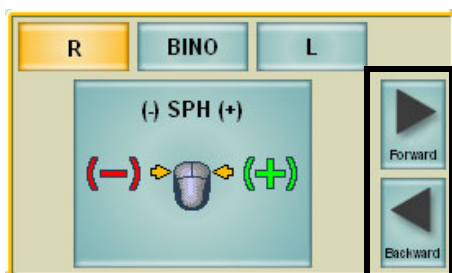
Refer to "6.3.1 CUSTOMIZING THE CHART PAGE" on P.141 for details.

### SELECT THE PROGRAM COURSE AND EXECUTE THE TEST.

Register the test sequence and save it as a course. The tests are executed in the registered order.



Even if you are in the program course, you can randomly execute another test, which is not included in the course, by clicking the test chart icon on the chart page. In this case, click the [Forward] button on the control window to restore the system to the original step in the program course.



- 1 Click the [Course list] button.

The course selection window is displayed on the screen.



You can select the course registered by [Course registrations] on the "Settings" menu.



Refer to "6.3.2 CUSTOMIZE THE TEST PROCEDURE" on P.146 for [Course registrations].

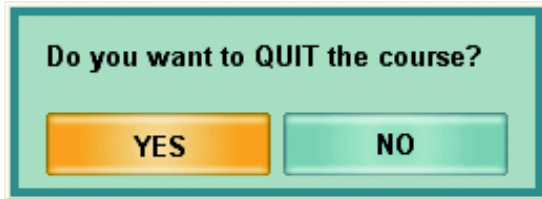
2 Click the course name.

3 Execute the test.

The first test step registered in the selected course is executed.

To advance to the next test, click the [Forward] button on the control window. Click the [Backward] button on the control window, and the system returns to the previous test.

4 When the last test of the program course has been completed, the following message is displayed.



To finish the program course, click the [YES] button.

## SELECT THE TEST NAME AND EXECUTE THE TEST.

The specified test starts.

1 Click the [Examination list] button.

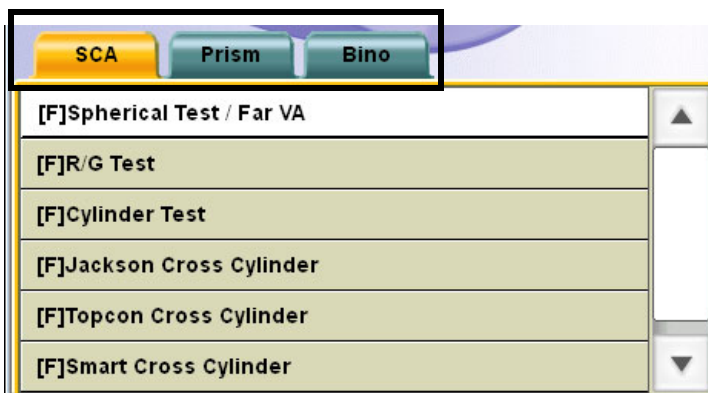
The test name selection window is displayed on the screen.

The test names are classified into three groups, [SCA], [Prism] and [Bino].

The test names can be selected by clicking the tab.

- SCA :Includes the tests to correct the spherical refraction, cylinder refraction and binocular balance.
- Prism :Includes the phoria tests.
- Bino :Includes the binocular function tests excluding the phoria tests.

The displays of far- and near-point tests are changed by clicking the [Far/Near] button.



2 Click the test name.

## 3.4 PRESCRIPTION

---

Click the [Final: Mem] button from the function buttons to copy the subjective data to the Final data and then modify the data if desired.



Refer to " RECORDING AND DISPLAYING THE PRESCRIPTION DATA" on P.137 for setting the prescription data.

After setting the Final data, adjust the power for the final prescription.

## 3.5 OUTPUTTING THE RESULT

---

To print the test results through the printer connected to the personal computer, click the [Print] button.



Refer to "6.4.1 DATA TO BE PRINTED" on P.150 for the output data.

In addition to the printing function, you can assign the following functions to the [Print] button:

- Function to output the data through serial communication;
- Function to output the file data.



Refer to "8.2.2 Function settings" on P.169 for details of the setting method.

## 3.6 RESETTING

---

After the test has been completed, click the [Reset] button.

The test screen, test chart and the measuring head are cleared and re-initialized. The system is ready to conduct an examination for the next patient.



When further testing is not required, shut down the personal computer and turn off the power supply unit.

# 4. GENERAL OPTOMETRY PROCEDURE

By making use of the measured values of RM or CL, you can perform an accurate subjective refractive power measurement efficiently.

This section will explain the flow of the typical subjective refractive power measurement (far-point/near-point) and the binocular (far-point phoria/near-point phoria) measurement.

## 4.1 DATA INPUT

---

Input the measured data of other devices manually or capture them automatically.



- Refer to "3.2.2 DATA INPUT" on P.56 for manual input.
- Refer to "6.1.3 IMPORTING THE DATA FROM OTHER DEVICES" on P.123 for automatic capture.

## 4.2 FAR-POINT REFRACTIVE POWER MEASUREMENT

---

### REFRACTIVE POWER MEASUREMENT BY USING CROSS CYLINDER

Click the [Course list] button, and the list is displayed. The test sequence of the "Standard" course on the list is shown below. The tests for "Checking the corrected visual acuity" are done with the order of "Right eye - Left eye". "Binocular balance test" and after are done with both eyes.

- (1) Checking the spherical power: R/G test ..... Refer to P.66.
- (2) CC test (Cylinder axis/Cylinder power)..... Refer to P.69, P.71 and P.73.
- (3) Checking the spherical power: R/G test ..... Refer to P.66.
- (4) Checking the corrected visual acuity ..... Refer to P.65.
- (5) Binocular balance test ..... Refer to P.75, P.76 and P.78.
- (6) Checking prescription visual acuity/prescription power .. Refer to P.137

## REFRACTIVE POWER MEASUREMENT USING ASTIGMATISM TEST CHART



Clear the cylinder power and set only the spherical power in advance.

- (1) Astigmatism chart test (Cylinder axis/Cylinder power) .... Refer to P.68.
- (2) Checking the spherical power: R/G test ..... Refer to P.66.
- (3) Checking the corrected visual acuity ..... Refer to P.65.
- (4) Binocular balance test ..... Refer to P.75, P.76 and P.78.
- (5) Checking prescription visual acuity/prescription power .. Refer to P.137.

### 4.3 NEAR-POINT REFRACTIVE POWER MEASUREMENT

Click the [Course list] button, and the list is displayed. The test sequence of the "Standard" course on the list is shown below.



Prior to the near tests, conduct the far-point refractive power measurement.

- (1) Binocular ADD measurement with cross grid ..... Refer to P.107.
- (2) Checking the near-point visual acuity ..... Refer to P.65

## 4.4 BINOCULAR MEASUREMENT

---

### FAR-POINT PHORIA



Start the test by using the result of the far-point refractive power refinement.

- (1) Far-point vertical phoria measurement (Polarization cross test/Cross ring test/Prism separation method) ..... Refer to P.80, P.82 and P.83.
- (2) Far-point horizontal phoria measurement (Polarization cross test/Cross ring test/Prism separation method) ..... Refer to P.80, P.82 and P.86.
- (3) Refining the necessary prism power with the Sheard's criteria ..... Refer to P.105.

### NEAR-POINT PHORIA



Start the test by using the result of the near-point refractive power refinement.

- (1) Near-point vertical phoria measurement (Prism separation method) Refer to P.83.
- (2) Near-point horizontal phoria measurement (Prism separation method) .. Refer to P.86.
- (3) Refining the necessary prism power with the Sheard's criteria ..... Refer to P.105.

# 5. OPERATION FOR TESTS

This chapter will explain the tests and operations that can be performed with the CV-5000 instrument.



This manual will explain the operation when the ACP-8 (A) is used as the far-point chart and NC-3 (E), as the near-point chart in the test.

## 5.1 VISUAL ACUITY TEST/SPHERICAL POWER/CYLINDER POWER CORRECTION

### 5.1.1 VISUAL ACUITY MEASUREMENT

Measure the patient's visual acuity.

- 1 Select a visual acuity chart.

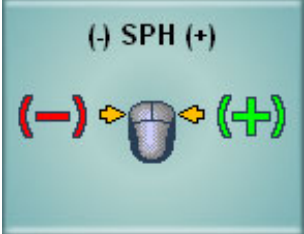
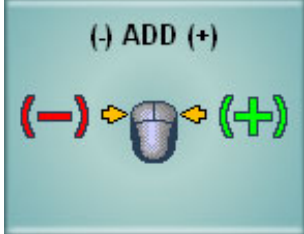
To perform the visual acuity measurement, select the visual acuity chart icon from the chart page.

In near-point test, select a proper target from the near-point card targets manually.

Example of the test chart icons on chart page

Far-point chart	Far-point test chart icon	Near-point chart	Near-point test chart icon
ACP-8(A)		NC-3(E)	

The following items are automatically changed as shown below.

Item	Description
Test eye	The test is performed with right eye, left eye or both eyes. When the test chart is selected, the status of last test is succeeded.
Auxiliary lens	Not set.
Mouse operation mode	In far-point test, the mode to operate the spherical power is set. In near-point test, the mode to operate ADD is set.
Mouse Navigation	<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  <p data-bbox="518 736 875 794">When the mouse operation mode is set to "Spherical power"</p> </div> <div style="text-align: center;">  <p data-bbox="930 736 1204 794">When the mouse operation mode is set to "ADD"</p> </div> </div>

## 2 Measure the visual acuity.

Measure the patient's visual acuity.

To display the visual acuity test chart having the different visual acuity values in far-point test, select a test chart again on the chart page or click [▲] and [▼] buttons. In near-point test, rotate the near-point card targets to select a corresponding acuity chart.

## 3 Record the visual acuity value.

Click the button applicable to the patient's visual acuity among the side buttons. The value is recorded as the patient's visual acuity.

Each time you click the visual acuity button, the recorded value is overwritten for correction purposes.



For the visual acuity value button, refer to "SETTING THE VISUAL ACUITY VALUE DIRECTLY" on P.132.

## 5.1.2 R/G TEST

Measure the spherical refraction for the patient.

### 1 Fog the patient's eye.

To make use of the fogging method, operate the mouse to shift the spherical power to the plus side in the amount of fogging power desired.




It is possible to preset the fogging quantity when the R/G test chart is selected. Set the fogging quantity on the parameter setting screen. To access the parameter setting screen, select "Settings", "Chart settings", "Chart page registration" and click the [Modify] button.



## 2 Select the R/G test chart.

To perform the R/G test, select the R/G test chart icon on the chart page.  
In near-point test, set a proper target from the near-point card targets manually.

Example of the test chart icons on chart page

Far-point chart	Far-point test chart icon	Near-point chart	Near-point test chart icon
ACP-8(A)		NC-3(E)	-

The following items are automatically changed as shown below.

Item	Description
Test eye	The test is performed with right eye, left eye and both eyes. When the test chart is set, the last status is succeeded.
Auxiliary lens	Not set.
Mouse operation mode	In far-point test, the mode to operate the spherical power is set. In near-point test, the mode to operate ADD is set
Mouse Navigation	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>When the mouse operation mode is set to "Spherical power"</p> </div> <div style="text-align: center;">  <p>When the mouse operation mode is set to "ADD"</p> </div> </div>

## 3 Correct the spherical power.

Ask the patient which side the characters are seen better, on the red or green side.  
When the characters on the red side are seen better, click the "R" button for the mouse navigation. When the characters on the green side are seen better, click the "G" button.  
Adjust until the characters on both sides are seen equally.

## 5.1.3 ASTIGMATISM TEST

Search for the approximate astigmatic correction value of the patient.

### 1 Prepare for the test.


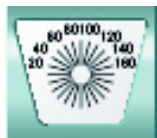
Before beginning this test, carry out the following operation:

Set the cylinder axis "180" and cylinder power "0.00". Perform fogging in the plus direction and then shift the power in the minus direction. Adjust the spherical power to the lowest so that the visual acuity may be 0.5 to 0.6 (20/40 to 20/30, 6/18 to 6/9).

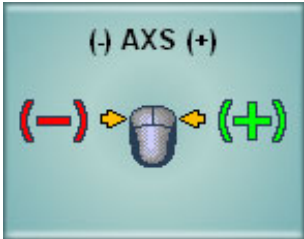
### 2 Select the astigmatism test chart.

To perform the astigmatism test, select the astigmatism test chart icon on the chart page. In the near-point test, select the proper target from the near-point card targets manually.

Example of the test chart icons on chart page

Far-point chart	Far-point test chart icon	Near-point chart	Near-point test chart icon
ACP-8(A)		NC-3(E)	

The following items are automatically changed as shown below.

Item	Description
Test eye	When any other item except "binocular" is the last test object, the status of last test is succeeded. When "binocular" are the last test object, the right eye of the patient is selected.
Auxiliary lens	Not set.
Mouse operation mode	The mode to operate the cylinder axis is set.
Mouse Navigation	

### 3 Correct the cylinder axis.

If the mouse operation mode is not set for "Cylinder axis", click the [Power/Axis] button on the control window to change the mode.

Ask the patient whether he/she sees a darker bolder line than others. If there is no such line, the patient does not have astigmatism. If he/she sees a darker bolder line, have him/her answer with the numerals between 1 and 6. Operate the mouse to set "The numeral of the answer x 30°" to the cylinder axis. The cylinder axis is changed to the positive direction by clicking the "+" button for the mouse navigation and, to the negative direction by clicking the "-" button.

### 4 Correct the cylinder power.

Click the [Power/Axis] button to change the mouse operation mode to "Cylinder power". Change the cylinder power until all the lines are seen with equal clarity. The cylinder power is changed to the positive direction by clicking the "+" button for the mouse navigation and, to the negative direction by clicking the "-" button.

## 5.1.4 CROSS CYLINDER TEST (JACKSON CROSS)

Measure the patient's astigmatism accurately by using the Jackson cross cylinder lens.

### 1 Prepare for the test.

Before beginning this test, adjust the spherical power so that the characters on the red and green sides are seen equally in the R/G test. Additionally, set the cylinder power/axis measured objectively or execute the astigmatism test to set the approximate cylinder power/axis.

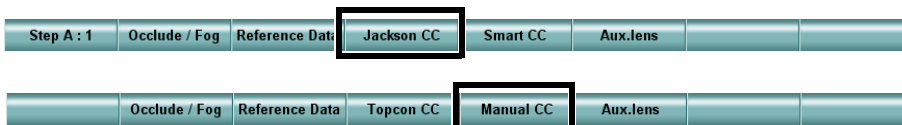


- For the R/G test, refer to "5.1.2 R/G TEST" on P.66.
- For the astigmatism test, refer to "5.1.3 ASTIGMATISM TEST" on P.68.

### 2 Select the cross cylinder test chart.

To perform the cross cylinder (Jackson cross) test, select the cross cylinder test chart icon on the chart page.

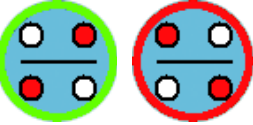

After selecting the test chart, if the test name is not "[F] Jackson Cross Cylinder" at the upper left on the screen, click the [Jackson CC] button or [Manual CC] button from the function buttons.



Example of the test chart icons on chart page

Far-point chart	Far-point test chart icon	Near-point chart	Near-point test chart icon
ACP-8(A)		NC-3(E)	-

The following items are automatically changed as shown below.

Item	Description
Test eye	When any other item except "binocular" is the last test object, the status of last test is succeeded. When "binocular" are the last test object, the right eye of the patient is selected.
Auxiliary lens	 <p>The Jackson cross cylinder lens is selected for the eye being tested. The green and red frames around the lens indicate the front and rear of the cross cylinder.</p>
Mouse operation mode	The mode to operate the cylinder axis is set.
Mouse Navigation	

### 3 Measure the cylinder axis.

Click the [Cross cylinder: Reverse] button on the control window. Have the patient answer which frame he/she can see the chart better, on the red or green side.

When the chart is seen better with the green frame, click the "G" button for the mouse navigation. When the chart is seen better with the red frame, click the "R" button.

Make adjustments until the patient sees the chart almost equally with both red and green frames.



[Cross cylinder: Reverse] button

### 4 Measure the cylinder power.

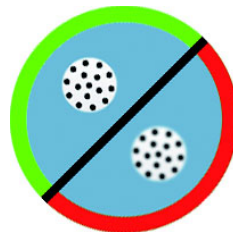
After measuring the cylinder axis, proceed to the cylinder power measurement.

To proceed to this measurement, click the [Power/Axis] button on the control window.

The procedure is the same as the cylinder axis measurement. Make adjustments until the patient sees the chart almost equally through the CC lens having red or green frame. Click the [Power/Axis] button. The system returns to the cylinder axis measurement mode.

## 5.1.5 CROSS CYLINDER TEST (TOPCON CROSS)

Measure the patient's astigmatism accurately by using the TOPCON cross cylinder lens. The TOPCON cross cylinder lens is made so that the front and rear of the Jackson cross cylinder lens can be viewed at the same time. By seeing the green and red in the periphery around the lens, you can check the views of the front and rear at the same time.



### 1 Prepare for the test.

Before beginning this test, adjust the spherical power so that the characters on the red and green sides may be seen equally in the R/G test. Additionally, set the cylinder power/axis measured objectively or execute the astigmatism test to set the approximate cylinder power/axis.



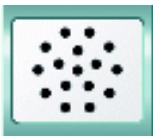
- For the R/G test, refer to "5.1.2 R/G TEST" on P.66.
- For the astigmatism test, refer to "5.1.3 ASTIGMATISM TEST" on P.68.

### 2 Select the cross cylinder test chart.



To perform the cross cylinder (TOPCON cross) test, select the cross cylinder test chart icon on the chart page. Then, click the [Topcon CC] button from the function buttons.



Example of the test chart icons on chart page

Far-point chart	Far-point test chart icon	Near-point chart	Near-point test chart icon
ACP-8(A)		NC-3(E)	-

The following items are automatically changed as shown below.

Item	Description
Test eye	When any other item except "binocular" is the last test object, the last status is succeeded. When "binocular" are the last test object, the right eye of the patient is selected.
Auxiliary lens	 <p>The TOPCON cross cylinder lens is set to the test eye.</p>
Mouse operation mode	The mode to operate the cylinder axis is set.
Mouse Navigation	

### 3 Measure the cylinder axis.

Have the patient answer which frame side on the CC lens he/she can see better, on the red or green side.

When the chart is seen better with the green frame, click the "G" button for the mouse navigation. When the chart is seen better with the red frame, click the "R" button.

Make adjustment until the patient sees the green and red frame sections almost equally.

### 4 Measure the cylinder power.

After measuring the cylinder axis, proceed to the cylinder power measurement.

To proceed to this measurement, click the [Power/Axis] button on the control window.

The procedure is the same as the cylinder axis measurement. Make adjustment until the patient sees the chart almost equally through the CC lens having red and green frames.

Click the [Power/Axis] button. The system returns to the cylinder axis measurement.

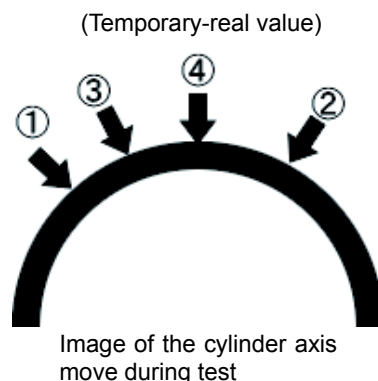
## 5.1.6 SMART CROSS TEST

Measure astigmatism accurately with the Jackson cross cylinder lens semi-automatically.

In general, the cross cylinder test forces the patient to compare the targets having slightly different powers repeatedly. Consequently the patient becomes tired from stress.

In the smart cross test, the cylinder power and axis, which are input as the initial values, are regarded as the "Temporary-real values". By referring to the temporary-real axis value, the system calculates the axis whose view is most different on the front and rear of the cross cylinder lens. First, the patient's comparison begins with this calculated axis. Then, the axis is moved to the opposite side against the temporary real value and the system asks the patient to compare the views of the chart. The axis movement is automatically conducted. As the move width is made smaller, the system searches for the "Real cylinder axis". This test is performed to reduce the fatigue on the patient.

At the final stage of the axis test, the type of the used cross cylinder lens is automatically changed from " $\pm 0.50D$ " to " $\pm 0.25D$ " to reduce uneasiness of the patient. The test finishes with a lower cross-cylinder power resulting in a clearer end result and less fatigue for the patient.



### 1 Prepare for the test.

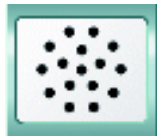
In some cases, measurement cannot be done. Before beginning the test, set the cylinder power and axis measured objectively.

### 2 Select the cross cylinder test chart.

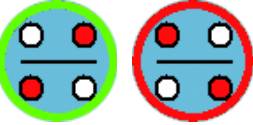

Select the cross cylinder test chart icon on the chart page. Then, click the [Smart CC] button from the function buttons.



Example of the test chart icons on chart page

Far-point chart	Far-point test chart icon	Near-point chart	Near-point test chart icon
ACP-8(A)		NC-3(E)	-

The following items are automatically changed as shown below.

Item	Description
Test eye	When any other item except "binocular" is the last test object, the last status is succeeded. When "binocular" are the last test object, the right eye of the patient is selected.
Auxiliary lens	 <p>The Jackson cross cylinder lens is set to the test eye. The green and red frames around the lens indicate the front and rear of the cross cylinder.</p>
Mouse operation mode	The mode to operate the cylinder axis is set.
Mouse Navigation	

### 3 Perform measurement.

Click the [Cross cylinder: Reverse] button on the control window. Have the patient answer which frame the chart is seen better, red or green.

When the chart is seen better with the green frame, click the [Red<Green] button on the mouse navigation. When the chart is seen better with the red frame, click the [Red>Green] button. When the chart is seen equally with the green and red frames, click the [Red=Green] button.

Repeat the above operation until the test is finished.

The program operates the cylinder axis and power and changes the tests automatically. When the test is finished, the message "This exam has been finished." is displayed.



[Cross cylinder: Reverse] button


## 5.1.7 BALANCE TEST (POLARIZATION)

To make the patient's binocular vision clear, adjust the spherical power according to the visual acuity balance of each eye.

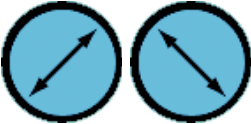
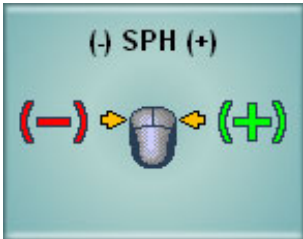
### 1 Select the balance test (polarization) chart.

To perform the balance test (polarization), select the balance test (polarization) chart icon on the chart page.

Example of the test chart icons on chart page

Far-point chart	Far-point test chart icon	Near-point chart	Near-point test chart icon
ACP-8(A)		NC-3(E)	-

The following items are automatically changed as shown below.

Item	Description
Test eye	Changed to the binocular mode.
Auxiliary lens	 The polarized filter is set.
Mouse operation mode	The mode to operate the spherical power is selected.
Mouse Navigation	

## 2 Adjust the balance.

Adjust the visual acuity balance between the right and left eyes.

The patient sees the upper row of letters with the right eye and the lower row of letters with the left eye. Have the patient compare the top and bottom row of letters and answer which row of letters is seen better, upper or lower.

When he/she sees better with the right eye, click the [R] button on the control window.

When he/she sees better with the left eye, click the [L] button. Then, click the "+" button for the mouse navigation to add "+0.25D" to the spherical power.

In this state, have the patient compare the top and bottom row of letters again.

Finish the test in one of the following situations:

- When the upper and lower row of letters are seen equally;
- The test results just before the eye that sees better has been changed.


### 5.1.8 BALANCE TEST (POLARIZATION: 2-COLOR)

To make the patient's binocular vision clear, adjust the spherical power so that the refind end point of each eye will be equal when the patient sees an object with both eyes.



#### 1 Select the balance test (polarization: 2-color) chart.

To perform the balance test (polarization: 2-color), select the balance test (polarization: 2-color) chart on the chart page.

Example of the test chart icons on chart page

Far-point chart	Far-point test chart icon	Near-point chart	Near-point test chart icon
ACP-8(A)		NC-3(E)	-

The following settings are automatically changed as shown below.

Item	Description
Test eye	Changed to the binocular mode.
Auxiliary lens	 The polarized filter is set.
Mouse operation mode	The mode to operate the spherical power is selected.
Mouse Navigation	

## 2 Check the refined status of the right eye.

Adjust the refined status of the right eye on condition that the patient sees the chart binocularly. Click the [R] button on the control window.

The patient sees the squares arranged in the vertical direction with the right eye and, the ones in the horizontal direction with the left eye.

First, have the patient compare the characters of the red and green squares in the vertical direction and answer which square the character is seen better, on the red or green side. When the characters in the red square are seen better, click the "R" button for the mouse navigation. When the characters in the green square are seen better, click the "G" button.

In this state, have the patient compare and answer again.

When the characters in the vertical direction are seen almost equally, the refinement of the right eye is finished.

## 3 Check the adjusted status of the left eye.

Click the [L] button on the control window.

Following the same procedure as the right eye, have the patient compare the characters of the squares arranged in the horizontal direction to check the refined status of the left eye.

When the characters in the horizontal position are seen almost equally, the adjustment of the left eye is finished.

## 4 Check the adjusted status of both eyes.

Click the [BINO] button on the control window.

Following the same procedure as mentioned prior, have the patient compare the characters of the red and green squares in the up-and-down and right-and-left directions to check the adjusted status of both eyes.

When the characters in the green and red squares are seen almost equally through the whole process, the test is finished.

## 5.1.9 BALANCE TEST (PRISM)

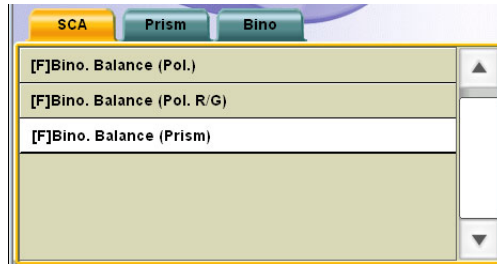
To make the patient's binocular vision clear, adjust the spherical power according to the visual acuity balance of each eye. The only difference compared to the "Balance test (Polarization)" is that a general visual acuity chart is used as the test chart.

- 1 Select "[F] Bino. Balance (Prism)" from "Examination list".


To execute this test, specify the test name from "Examination list".

Click the [Examination list] button to display "Examination list".

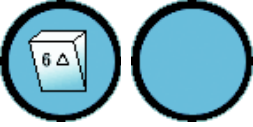
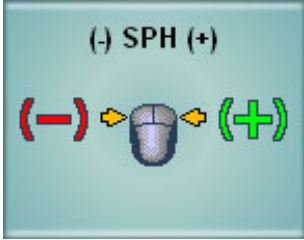
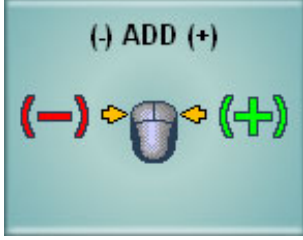
Click the [SCA] tab and select "[F] Bino. Balance (Prism)" from the displayed list.



To perform the near-point test, select the test chart icon shown below.

Far-point chart	Far-point test chart icon	Near-point chart	Near-point test chart icon
ACP-8(A)	-	NC-3(E)	
<p>In the far-point test, the chart where the characters are arranged on one horizontal line or the visual acuity chart to which the horizontal mask is applied is set.            In near-point test, select the corresponding chart from the near-point card targets manually.</p>			

The following settings are automatically changed as shown below.

Item	Description
Test eye	Changed to the binocular mode.
Auxiliary lens	 <p>The base-up prism of "6 prism" is set to the right eye. (The left illustrations are the status as seen from the user side as the CV-5000 software screen.)</p>
Mouse operation mode	<p>In far-point test, the mode to operate the spherical power is selected. In near-point test, the mode to operate ADD is selected.</p>
Mouse Navigation	<div style="display: flex; justify-content: space-around;"> <div data-bbox="526 556 828 794">  <p>When the mouse operation mode is set to "Spherical power"</p> </div> <div data-bbox="911 556 1212 794">  <p>When the mouse operation mode is set to "ADD"</p> </div> </div>

## 2 Adjust the balance.

Adjust the visual acuity balance between the right and left eyes.

The image the patient sees is separated top and bottom because of the prism inserted at the right eye. The patient sees the upper section with the right eye and the lower section with the left eye. Have the patient compare which section is seen better, upper or lower. When he/she sees better with the right eye, click the [R] button on the control window. When he/she sees better with the left eye, click the [L] button. Then, click the "+" button for the mouse navigation to add "+0.25D" to the spherical power.

In this state, have the patient compare the upper and lower sections again.

Finish the test in one of the following situations:

- When the upper and lower sections are seen equally;
- The test results just before the eye that sees better has been changed.


## 5.2 PHORIA TEST

### 5.2.1 PHORIA TEST (POL. CROSS)

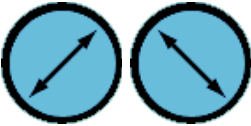

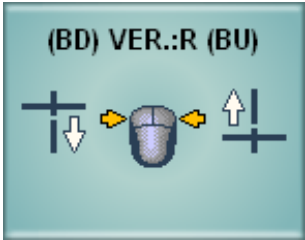
Measure heterophoria of the patient by using the "Pol. Cross" chart.

- 1 Select the "Phoria Test (Pol. Cross)" chart.  
To perform "Phoria Test (Pol. Cross)", select the "Phoria Test (Pol. Cross)" chart icon on the chart page.

Example of the test chart icons on chart page

Far-point chart	Far-point test chart icon	Near-point chart	Near-point test chart icon
ACP-8(A)		NC-3(E)	-

The following settings are automatically changed as shown below.

Item	Description
Test eye	Changed to the binocular mode. When the mouse operation mode is set to "Horizontal prism", the left eye is the object of the mouse operation. When the mouse operation mode is set to "Vertical prism", the right eye is the object of the mouse operation.
Auxiliary lens	 The polarized filter is selected.
Mouse operation mode	In initial status, the mode to operate "Horizontal prism" is set.
Mouse Navigation	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>When the mouse operation mode is set to "Horizontal prism"</p> </div> <div style="text-align: center;">  <p>When the mouse operation mode is set to "Vertical prism"</p> </div> </div>

## 2 Check if the patient has heterophoria.

When the patient sees the test chart through the polarized filter, only the vertical lines are seen with the right eye and only the horizontal lines, with the left eye.

If the patient does not have heterophoria, he/she sees the vertical line crossing the horizontal line at the center.

If the patient has horizontal phoria, the vertical and horizontal lines are disassociated in the horizontal direction in his/her vision.

If the patient has vertical phoria, the vertical and horizontal lines are disassociated in the vertical direction in his/her vision.

## 3 Measure the horizontal phoria value.

If the patient has horizontal phoria, measure its value.

If the mouse operation mode is not set to "Horizontal prism", click the [H/V] button on the control window to change the mode.

Ask the patient which direction the vertical line is in relation to the horizontal line, right or left.

When the vertical line is disassociated to the left, click the left mouse button for the mouse navigation until the vertical line reaches the center.

When the vertical line is disassociated to the right, click the right mouse button for the mouse navigation until the vertical line reaches the center.

## 4 Measure the vertical phoria value.

If the patient has vertical phoria, measure its value.

Click the [H/V] button on the control window to change the mouse operation mode to "Vertical prism".

Ask the patient which direction the horizontal line is in relation to the vertical line, upward or downward.

When the horizontal line is disassociated upward, click the left mouse button for the mouse navigation until the horizontal line reaches the center.

When the horizontal line is disassociated downward, click the right mouse button for the mouse navigation until the horizontal line reaches the center.


## 5.2.2 PHORIA TEST (CROSS RING)

Measure heterophoria of the patient by using the "Cross Ring" chart.

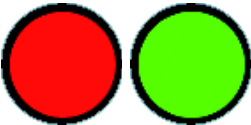

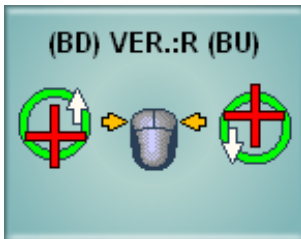
### 1 Select the "Phoria Test (Cross Ring)" chart.

To perform a "Phoria Test (Cross Ring)", select the "Phoria Test (Cross Ring)" chart icon on the chart page.

Example of the test chart icons on chart page

Far-point chart	Far-point test chart icon	Near-point chart	Near-point test chart icon
ACP-8(A)		NC-3(E)	-

The following settings are automatically changed as shown below.

Item	Description
Test eye	Changed to the binocular mode. When the mouse operation mode is set to "Horizontal prism", the left eye is the object of the mouse operation. When the mouse operation mode is set to "Vertical prism", the right eye is the object of the mouse operation.
Auxiliary lens	 The red lens is set to the right eye and the green lens, to the left eye. (The left illustrations are the status as seen from the operator side as the CV-5000 software screen.)
Mouse operation mode	In initial status, the mode to operate "Horizontal prism" is set.
Mouse Navigation	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>(BI) HOR. (BO)</p>  <p>When the mouse operation mode is set to "Horizontal prism"</p> </div> <div style="text-align: center;"> <p>(BD) VER.:R (BU)</p>  <p>When the mouse operation mode is set to "Vertical prism"</p> </div> </div>

## 2 Check if the patient has heterophoria.

When the patient sees the test chart through the red and green lenses, only the cross is seen with the right eye and only the ring, with the left eye.

If the patient does not have heterophoria, the cross center overlaps the ring center in his/her vision.

If the patient has horizontal phoria, the centers of cross and ring are disassociated in the horizontal direction in his/her vision.

If the patient has vertical phoria, the centers of cross and ring are disassociated in the vertical direction in his/her vision.

## 3 Measure the horizontal phoria value.

If the patient has horizontal phoria, measure its value.

If the mouse operation mode is not set to "Horizontal prism", click the [H/V] button on the control window to change the mode.

Ask the patient which direction the cross is in relation to the ring, right or left.

When the cross is disassociated to the left against the ring, click the left mouse button for the mouse navigation until the vertical center lines of cross and ring overlap each other.

When the cross is disassociated to the right against the ring, click the right mouse button for the mouse navigation until the vertical center lines of cross and ring overlap each other.

## 4 Measure the vertical phoria value.

If the patient has vertical phoria, measure its degree.

Click the [H/V] button on the control window to change the mouse operation mode to "Vertical prism".

Ask the patient which direction the cross is disassociated in relation to the ring, upward or downward.

When the cross is disassociated downward in relation to the ring, click the left mouse button for the mouse navigation until the horizontal center lines of cross and ring overlap each other.

When the horizontal line is disassociated upward in relation to the ring, click the right mouse button for the mouse navigation until the horizontal center lines of cross and ring overlap each other.

## 5.2.3 PHORIA TEST (MADDOX)

Measure heterophoria of the patient by using the fixation target and Maddox rod.

### 1 Prepare for the test.

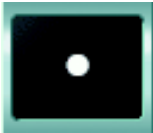
The measurement of this test cannot be conducted correctly in a bright room. Perform this test in a semi-dark room.

When you use the TOPCON visual acuity charts, ACP-8 and MC-3, the fixation target is displayed. The fixation target may not provide the luminance required for the test as the dot light source depending on the lighting of the test room. In this case, utilize a sufficient light source such as a penlight.

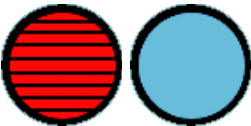
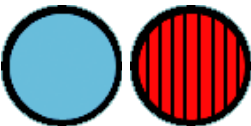


## 2 Select the "Phoria Test (Maddox)" chart.

To perform "Phoria Test (Maddox)", select the fixation target chart icon on the chart page.

Example of the test chart icons on chart page

Far-point chart	Far-point test chart icon	Near-point chart	Near-point test chart icon
ACP-8(A)		NC-3(E)	-

The following settings are automatically changed as shown below.

Item	Description
Test eye	Changed to the binocular mode. When the mouse operation mode is set to "Horizontal prism", the left eye is the object of the mouse operation. When the mouse operation mode is set to "Vertical prism", the right eye is the object of the mouse operation.
Auxiliary lens	 When the mouse operation mode is set to "Horizontal prism", the horizontal Maddox rod lens is set to the right eye.
	 When the mouse operation mode is set to "Vertical prism", the vertical Maddox rod lens is set to the left eye.
Mouse operation mode	In initial status, the mode to operate "Horizontal prism" is set.
Mouse Navigation	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>When the mouse operation mode is set to "Horizontal prism"</p> </div> <div style="text-align: center;">  <p>When the mouse operation mode is set to "Vertical prism"</p> </div> </div>

### 3 Check if the patient has heterophoria.

Click the [H/V] button on the control window. You can change the check procedures for horizontal phoria and vertical phoria.

When checking horizontal phoria, the horizontal Maddox rod lens is set to the right eye and the dot light source is seen as a vertical line by the right eye.

If the patient does not have a horizontal phoria, the luminous point of the dot light source that is seen by the left eye is on the vertical line that is seen by the right eye. If the patient has horizontal phoria, the luminous point of the dot light source that is seen by the left eye is separated from the line seen by the right eye.

When checking vertical phoria, the vertical Maddox rod lens is set to the left eye and the dot light is seen as a horizontal line by the left eye.

If the patient does not have vertical phoria, the luminous point of the dot light source that is seen by the right eye is on the horizontal line that is seen by the left eye. If the patient has vertical phoria, the luminous point of the dot light source that is seen by the right eye is separated from the line seen by the left eye.

### 4 Measure the horizontal phoria value.

If the patient has horizontal phoria, measure its value.

If the mouse operation mode is not set to "Horizontal prism", click the [H/V] button on to change the mode.

Ask the patient which side of the luminous point of the dot light exists, at the right or left of the line.

When the dot light is at the right of the line, click the left mouse button for the mouse navigation until the dot light and line overlap each other.

When the dot light is at the left of the line, click the right mouse button for the mouse navigation until the dot light source and line overlap each other.

### 5 Measure the vertical phoria value.

If the patient has vertical phoria, measure its degree.

Click the [H/V] button to change the mouse operation mode to "Vertical prism".

Ask the patient which side the luminous point of the dot light exists, above or under the line.

When the dot light source is under the line, click the left mouse button for the mouse navigation until the dot light and line overlap each other.

When the dot light source is above the line, click the right mouse button for the mouse navigation until the dot light and line overlap each other.

## 5.2.4 HORIZONTAL PHORIA MEASUREMENT (PRISM SEPARATION)

Measure horizontal phoria of the patient by using the chart where characters are arranged on one vertical line.

1 Select the chart where characters are positioned on one vertical line.


To perform the horizontal phoria measurement (prism separation), select the icon of the chart where characters are positioned on one vertical line on the chart page.

If this icon does not exist on the chart page, click the [Examination list] button to display "Examination list".


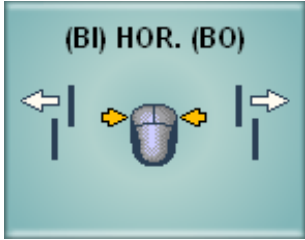
Touch the [Prism] tab and select "[F] Lateral Phoria (Von Graefe) [#8]" from "Exam list".



Example of the test chart icons on chart page

Far-point chart	Far-point test chart icon	Near-point chart	Near-point test chart icon
ACP-8(A)	-	NC-3(E)	
<p>In far-point test, the chart where the characters are arranged on one vertical line or the visual acuity chart to which the vertical mask is applied is set.            In near-point test, set a proper target from the near-point card targets manually.</p>			

The following items are automatically changed as shown below.

Item	Description
Test eye	Changed to the binocular mode. The left eye is the object of the mouse operation.
Auxiliary lens	 <p>The base-up prism of "6 prism" is set to the right eye. (The left illustrations are the status as seen from the operator side as the CV-5000 software screen.)</p>
Mouse operation mode	The mode to operate "Horizontal prism" is set.
Mouse Navigation	

## 2 Check if the patient has heterophoria.

The image the patient sees is separated vertically because of the prism inserted over the right eye. The patient sees the upper section with the left eye and the lower section with the right eye.

If the patient does not have heterophoria, the characters on the upper and lower sections appear aligned.

If the patient has horizontal phoria, the characters of the upper and lower sections are disassociated in the horizontal direction.

## 3 Measure the horizontal phoria value.

If the patient has horizontal phoria, measure its degree.

Ask the patient which direction the upper character line is disassociated against in relation to the lower character line, right or left.

When the upper character line is disassociated to the right, click the left mouse button for the mouse navigation until the upper and lower character lines appear aligned.

When the upper character line is disassociated to the left, click the right mouse button for the mouse navigation until the upper and lower character lines appear aligned.

## 5.2.5 VERTICAL PHORIA MEASUREMENT (PRISM SEPARATION)

Measure vertical phoria of the patient by using the chart where characters are arranged on one horizontal line.

- 1 Select the chart where characters are arranged on one horizontal line.


To perform the vertical phoria measurement (prism separation), select the icon of the chart where characters are arranged on one horizontal line on the chart page.

If this icon does not exist on the chart page, click the [Examination list] button to display "Examination list".

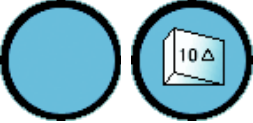
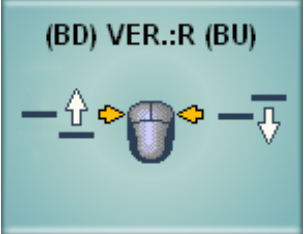
Click the [Prism] tab and select "[F] Vertical Phoria (Von Graefe) [#12A]" from "Exam list".



Example of the test chart icons on chart page

Far-point chart	Far-point test chart icon	Near-point chart	Near-point test chart icon
ACP-8(A)	-	NC-3(E)	
<p>The chart where the characters are arranged on one horizontal line or the visual acuity chart to which the horizontal mask is applied is set. In near-point test, set a proper target from the near-point card targets manually.</p>			

The following items are automatically selected as shown below.

Item	Description
Test eye	Changed to the binocular mode. The right eye is the object of the mouse operation.
Auxiliary lens	 <p>The base-in prism of "10 prism" is set to the left eye. (The left illustrations are the status as seen from the operator side as the CV-5000 software screen.)</p>
Mouse operation mode	The mode to operate "Vertical prism" is set.
Mouse Navigation	

## 2 Check if the patient has heterophoria.

The image the patient sees is separated horizontally because of the prism inserted over the left eye. The patient sees the right section with the right eye and the left section with the left eye.

If the patient does not have heterophoria, the characters on the horizontal sections appear aligned.

If the patient has vertical phoria, the characters of the right and left sections are disassociated in the vertical direction.

## 3 Measure the vertical phoria value.

If the patient has vertical phoria, measure its value.

Ask the patient which direction the right character line is disassociated to in relation to the left character line, upward or downward.

When the right character line is disassociated downward, click the left mouse button for the mouse navigation until the right and left character lines appear aligned.

When the right character line is disassociated upward, click the right mouse button for the mouse navigation until the right and left character lines appear aligned.

## 5.3 OTHER BINOCULAR FUNCTION TESTS

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### 5.3.1 FIXATION DISPARITY TEST (POL. CROSS WITH FIXATION TARGET)

Measure fixation disparity of the patient by using the cross chart with fixation target.

**1** Prepare for the test.

This test must be executed without any disassociation of the eyes. Before this test, correct any disassociation of the eyes by conducting a "Phoria test".




For phoria test, refer to "5.2.1 PHORIA TEST (POL. CROSS)" on P.80.


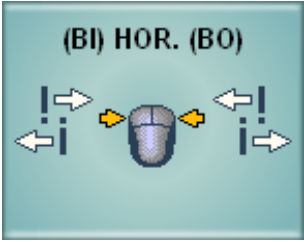
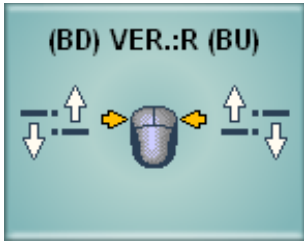
**2** Select the cross chart with fixation target.

To perform the fixation disparity test (cross with fixation target), select the icon for the cross chart with fixation target on the chart page.

Example of the test chart icons on chart page

Far-point chart	Far-point test chart icon	Near-point chart	Near-point test chart icon
ACP-8(A)		NC-3(E)	-

The following items are automatically selected as shown below.

Item	Description
Test eye	Changed to the binocular mode. When the mouse operation mode is set to "Horizontal prism", the left eye is the object of the mouse operation. When the mouse operation mode is set to "Vertical prism", the right eye is the object of the mouse operation.
Auxiliary lens	 The polarized filter is set.
Mouse operation mode	In initial status, the mode to operate "Horizontal prism" is set.
Mouse Navigation	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>(BI) HOR. (BO)</p> <p>When the mouse operation mode is set to "Horizontal prism"</p> </div> <div style="text-align: center;">  <p>(BD) VER.:R (BU)</p> <p>When the mouse operation mode is set to "Vertical prism"</p> </div> </div>



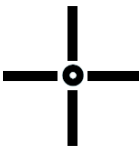
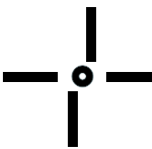
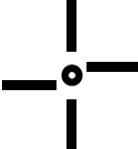
### 3 Check if the patient has fixation disparity.

When the patient sees the test chart through the polarized filter, the following status is his/her vision: The fixation target at the cross center is seen by both eyes. In addition, the reversed "L" shape made by the vertical and horizontal lines is seen by the left eye. The "L" shape is seen by the right eye.

If the patient does not have fixation disparity, he/she sees a cross made by the straight vertical and horizontal lines.

If the patient has fixation disparity in the horizontal direction, the vertical lines are deviated in the horizontal direction in his/her vision.

If the patient has fixation disparity in the vertical direction, the horizontal lines are deviated in the vertical direction in his/her vision.

				
Chart seen by left eye	Chart seen by right eye	Chart seen by both eyes without fixation disparity	Example for the eye having fixation disparity in horizontal direction	Example for the eye having fixation disparity in vertical direction

#### 4 Measure the fixation disparity degree in the horizontal direction.

If the patient has fixation disparity in the horizontal direction, measure its value.

If the mouse operation mode is not set to "Horizontal prism", click the [H/V] button on the control window to change the mode.

Have the patient view the vertical lines. Ask the patient which direction the upper vertical line is compared to the lower vertical line, right or left.

When the upper vertical line is at the left against the lower vertical line, click the left mouse button for the mouse navigation until the upper and lower vertical lines appear aligned.

When the upper vertical line is at the right against the lower vertical line, click the right mouse button for the mouse navigation until the upper and lower vertical lines appear aligned.

#### 5 Measure the fixation disparity value in the vertical direction.

If the patient has fixation disparity in the vertical direction, measure its value.

If the mouse operation mode is not set to "Vertical prism", click the [H/V] button to change the mode.

Have the patient view the horizontal lines. Ask the patient which direction the right horizontal line appears, under or above the left horizontal line.

When the right horizontal line is under the left horizontal line, click the left mouse button for the mouse navigation until the right and left horizontal lines appear aligned.

When the right horizontal line is above the left horizontal line, click the right mouse button for the mouse navigation until the right and left horizontal lines appear aligned.

### 5.3.2 CONVERGENCE/DIVERGENCE

Measure the convergence and divergence of the patient. The result is used as a reference value when the heterophoria of the patient is corrected.

The result of the test is recorded by clicking the function buttons.

#### 1 Prepare for the test.

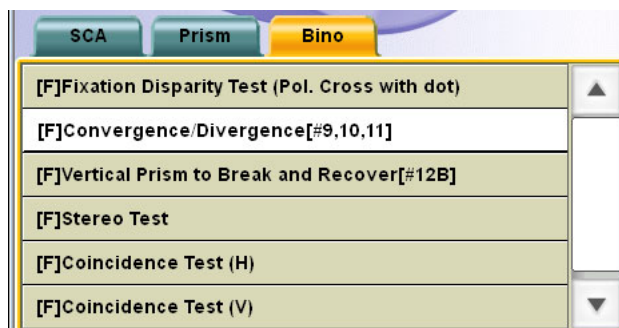
This test must be executed in the condition that abnormal refraction has been completely corrected. If abnormal refraction is not corrected yet, correct it before this test.

#### 2 Select "Convergence/Divergence" from "Examination list".


To perform this test, specify the test name from "Examination list".

Click the [Examination list] button to display "Examination list".

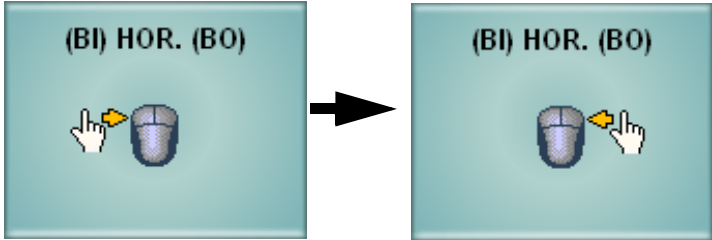

Click the [Bino] tab and select "[F] Convergence/Divergence[#9, 10, 11]" from the list.



To perform the near-point test, select the test chart icon shown below.

Far-point chart	Far-point test chart icon	Near-point chart	Near-point test chart icon
ACP-8(A)	-	NC-3(E)	
<p>In far-point test, the chart where the characters are arranged on one vertical line or the visual acuity chart to which the vertical mask is applied is set.          In near-point test, set a proper target from the near-point card targets manually.</p>			

The following items are automatically changed as shown below.

Item	Description
Test eye	Changed to the binocular mode.
Auxiliary lens	Not set.
Mouse operation mode	The mode to operate "Horizontal prism" is set.
Mouse Navigation	<p>According to the progress of the test, the following two types are alternately displayed.</p> 
Function button	 <p>In far-point test, blur is not generated in the case of divergence. So, the [Blurred (BI)] button at the leftmost of the function buttons is displayed in the invalid status.</p>

### 3 Measure divergence.

First, measure the divergence of the patient.

Have the patient view the chart where characters are arranged on one vertical line.

[Checking the blur point] (Only for near point)

Instruct the patient to respond whenever he/she sees the blurred characters on the chart. Using the indicated button, operate the mouse navigation slowly by one click.

When the patient says "I see the blurred characters", stop the mouse operation. Check if the patient still sees the blurred characters though the user tries to adjust the focus correctly. When the patient says positively "I see the blurred characters", click the [Blurred (BI)] button to record the measured value.

[Checking the break point]

Instruct the patient to respond whenever he/she sees the characters on two lines, which are, in fact, arranged vertically on one line in the chart. Using the indicated button, operate the mouse navigation slowly by one click.

When the patient says "I see the characters on two lines", click the [Break (BI)] button to record the measured value.

[Checking the recovery point]

Instruct the patient to respond whenever he/she sees the characters on one line again. Using the indicated button, operate the mouse navigation slowly by one click.

When the patient says "I see the characters on one line", click the [Recovery (BI)] button to record the measured value.

### 4 Measure convergence.

Measure the convergence of the patient.

Before proceeding to the convergence measurement, click the [Clear] button to cancel the prism set currently.

[Checking the blur point]

Instruct the patient to respond whenever he/she sees the blurred characters on the chart. Using the indicated button, operate the mouse navigation slowly by one click.

When the patient says "I see the blurred characters", stop the mouse operation. Check if the patient still sees the blurred characters while the operator tries to adjust the focus correctly. When the patient says positively "I see the blurred characters", click the [Blurred (BO)] button to record the measured value.

[Checking the break point]

Instruct the patient to respond whenever he/she sees the characters on two lines, which are, in fact, arranged on one line horizontally in the chart. Using the indicated button, operate the mouse navigation slowly by one click.

When the patient says "I see the characters on two lines", click the [Break (BO)] button to record the measured value.

[Checking the recovery point]

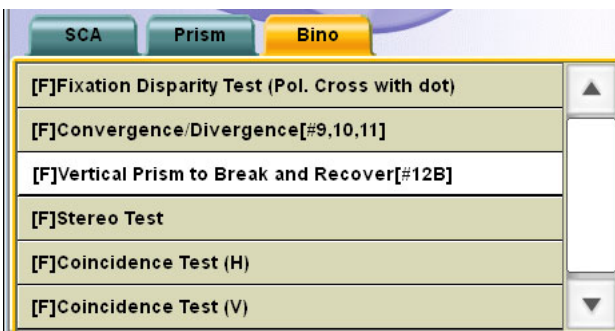
Instruct the patient to respond whenever he/she sees the characters on one line again. Using the indicated button, operate the mouse navigation slowly by one click.

When the patient says "I see the characters on one line", click the [Recovery (BO)] button to record the measured value.


### 5.3.3 Vertical vergence

Measure the vertical vergence of the patient. The result of the test is recorded by pressing the function buttons.

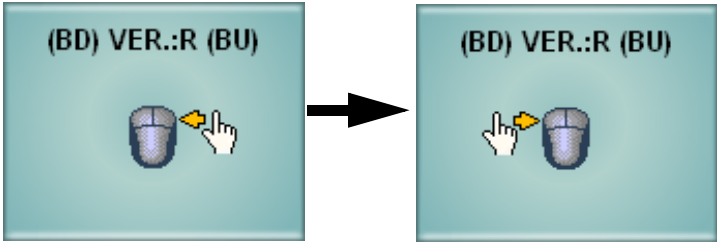

- 1 Prepare for the test.  
This test must be executed in the condition that refractive error has been completely corrected. If refractive error is not corrected yet, correct it before this test.
- 2 Select "[F] Vertical Prism to Break and Recover [#12B]" from "Examination list".  
To perform this test, specify the test name from the "Examination list".  
Click the [Examination list] button to display "Examination list".  
Click the [Bino] tab and then select "[F] Vertical Prism to Break and Recover [#12B]" from the list.



To perform the near-point test, select the test chart icon shown below.

Far-point chart	Far-point test chart icon	Near-point chart	Near-point test chart icon
ACP-8(A)	-	NC-3(E)	
<p>In far-point test, the chart where the characters are arranged on one horizontal line or the visual acuity chart to which the horizontal mask is applied is set. In near-point test, set a proper target from the near-point card targets manually.</p>			

The following items are automatically selected as shown below.

Item	Description
Test eye	Changed to the binocular mode. The right eye is the object of the mouse operation.
Auxiliary lens	Not set.
Mouse operation mode	The mode to operate "Vertical prism" is set.
Mouse Navigation	According to the progress of the test, the following two types are alternately displayed. 
Function button	

### 3 Measure the upper divergence of the left eye.

First, measure the upper divergence of the left eye for the patient.

Have the patient view the chart where characters are arranged on one horizontal line.

[Checking the break point]

Instruct the patient to respond whenever he/she sees the characters on two lines, which are, in fact, arranged horizontally on one line in the chart. Using the indicated button, operate the mouse navigation slowly by one click.

When the patient says "I see the characters on two lines", click the [Break (BU)] button to record the measured value.

[Checking the recovery point]

Instruct the patient to respond whenever he/she sees the characters on one line again. Using the indicated button, operate the mouse navigation slowly by one click.

When the patient says "I see the characters on one line", click the [Recovery (BU)] button to record the measured value.

#### 4 Measure the upper divergence of the right eye.

Measure the upper divergence of the right eye for the patient.

Before proceeding to the upper divergence measurement of the right eye, click the [Clear] button to cancel the prism set currently.

[Checking the break point]

Instruct the patient to respond whenever he/she sees the characters on two lines, which are, in fact, arranged horizontally on one line in the chart. Using the indicated button, operate the mouse navigation slowly by one click.

When the patient says "I see the characters on two lines", click the [Break (BD)] button to record the measured value.

[Checking the recovery point]

Instruct the patient to respond whenever he/she sees the characters on one line again. Using the indicated button, operate the mouse navigation slowly by one click.

When the patient says "I see the characters on one line", click the [Recovery (BD)] button to record the measured value.


### 5.3.4 STEREO TEST

Check if the patient has the stereoscopic vision.

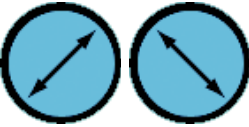
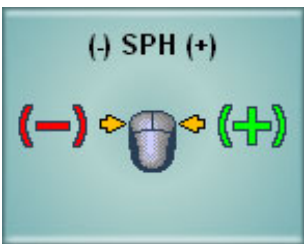

#### 1 Select the stereoscopic vision test chart.

To perform the stereoscopic vision test, select the icon for the stereoscopic vision test on the chart page.

Example of the test chart icons on chart page

Far-point chart	Far-point test chart icon	Near-point chart	Near-point test chart icon
ACP-8(A)		NC-3(E)	-

The following items are automatically changed as shown below.

Item	Description
Test eye	Changed to the binocular mode.
Auxiliary lens	 The polarized filter is set.
Mouse operation mode	The last status is succeeded.
Mouse Navigation	 The display is changed according to the contents of the last test.
Function button	

## 2 Check the stereoscopic vision.

When the patient sees the test chart through the polarized filter, the center point and upper and lower lines are seen on two different planes.

If the patient recognizes the different planes, he/she can see a solid body of parallax 13'12".

To record the test result, click the [13'12"] button.

When the patient cannot recognize the relief and sunk status, click the [Unknown] button.

## 3 Reverse the polarized filter angle and check the stereoscopic vision again.

When the mouse operation mode is set anything except "Prism", the polarization auxiliary lens reverse button is displayed as a side button. Click this button. The polarized filter is reversed and the orientation of the two planes are reversed.

If the patient recognizes the two different planes, he/she can see a solid body of parallax 13'12".

To record the test result, click the [13'12"] button.

When the patient cannot recognize the two different planes, click the [Unknown] button.



### 5.3.5 COINCIDENCE TEST (H) (Only for ACP-8)

When the patient sees the image in the horizontal direction after correction, the image size seen by the right eye may be different from the image seen by the left eye. In this test, check if the image size is different between the right and left eyes. If there is a difference of one line (7%) or more, it is recommended to recheck the correction value.

**1** Prepare for the test.

If heterophoria is not corrected, the patient's eye may not be refined properly. Before this test, correct heterophoria.



For phoria test, refer to "5.2.1 PHORIA TEST (POL. CROSS)" on P.80.




**2** Select the horizontal aniseikonia test chart.

To perform the horizontal aniseikonia test, select the icon for the horizontal aniseikonia test on the chart page.

Example of the test chart icons on chart page

Far-point chart	Far-point test chart icon	Near-point chart	Near-point test chart icon
ACP-8(A)		NC-3(E)	-

The following items are automatically changed as shown below.


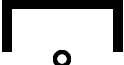
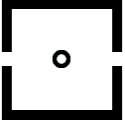
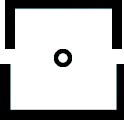
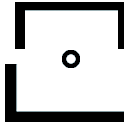
Item	Description
Test eye	Changed to the binocular mode. The left eye is the object of the mouse operation.
Auxiliary lens	 The polarized filter is set.
Mouse operation mode	The mode to operate "Horizontal prism" is set.
Mouse Navigation	
Function button	

### 3 Check the horizontal aniseikonia.

When the patient sees the test chart through the polarized filter, the center fixation target is seen by both eyes as shown below. In addition, the upper half is seen by the right eye and the lower half, by the left eye.

When the patient does not have horizontal aniseikonia, he/she sees the upper and lower images in the same size.

When the patient has horizontal aniseikonia, he/she sees the upper and lower images in different sizes.

				
Chart seen by left eye	Chart seen by right eye	Chart seen by the eyes without horizontal aniseikonia	Disparity by half a line (Example of "U<D")	Disparity by one line (Example of "U<D")

### 4 Record the horizontal aniseikonia degree.

Have the patient answer whether the upper and lower images are different in size. If yes, have the patient view the opening of the upper and lower images and answer how much the lines are different in relation to each other.

When the disparity at one side is about half a line, the patient should answer "half a line".

When it is about one line, the patient should answer "one line".

When the upper image is larger than the lower one by one line, click the [U>D 1.0] button to record the value.

When the upper image is larger than the lower one by half a line, click the [U>D 0.5] button to record the value.

When the lower image is larger than the upper one by one line, click the [U<D 1.0] button to record the value.

When the lower image is larger than the upper one by half a line, click the [U<D 0.5] button to record the value.

When the upper and lower images are the same size, click the [U=D] button to record the value.

When disparity of half a line is recognized, the magnification is different by 3.5% between the images of the right and left eyes. When disparity of one line is recognized, it is different by 7.0%.

## 5.3.6 COINCIDENCE TEST (V)

When the patient sees the image in the vertical direction after correction, the image size seen by the right eye may be different from the image seen by the left eye. In this test, check if the image size is different between the right and left eyes.

If there is a difference of one line (7%) or more, it is recommended to recheck the correction value.

### 1 Prepare for the test.

If heterophoria is not corrected, the patient's eye may not be refined properly. Before this test, correct heterophoria.



For phoria test, refer to "5.2.1 PHORIA TEST (POL. CROSS)" on P.80.




### 2 Select the vertical aniseikonia test chart.

To perform the vertical aniseikonia test, select the icon for the vertical aniseikonia test on the chart page.

Example of the test chart icons on chart page

Far-point chart	Far-point test chart icon	Near-point chart	Near-point test chart icon
ACP-8(A)		NC-3(E)	-

The following items are automatically changed as shown below.

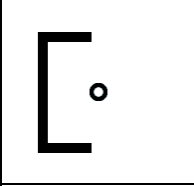
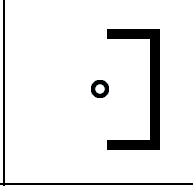
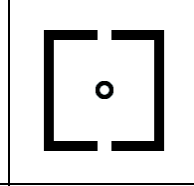
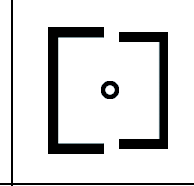
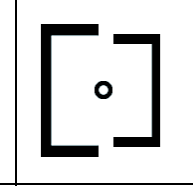
Item	Description
Test eye	Changed to the binocular mode. The right eye is the object of the mouse operation.
Auxiliary lens	 The polarized filter is set.
Mouse operation mode	The mode to operate "Vertical prism" is set.
Mouse Navigation	
Function button	

### 3 Check the vertical aniseikonia.

When the patient sees the test chart through the polarized filter, the center fixation target is seen by both eyes as shown below. In addition, the left half is seen by the left eye and the right half, by the right eye.

When the patient does not have vertical aniseikonia, he/she sees the right and left images appear same size.

When the patient has vertical aniseikonia, he/she sees the right and left images in different sizes.

				
Chart seen by left eye	Chart seen by right eye	Chart seen by the eyes without vertical aniseikonia	Disparity by half a line (Example of " $L>R$ ")	Disparity by one line (Example of " $L>R$ ")

### 4 Record the vertical aniseikonia degree.

Have the patient answer whether the right and left images are different in size. If so, have the patient view the opening of the right and left images and answer how much the lines are disparate to each other.

When the disparity at one side is about half a line, the patient should answer "half a line".

When it is about one line, the patient should answer "one line".

When the left image is larger than the right one by one line, click the [ $L>R$  1.0] button to record the value.

When the left image is larger than the right one by half a line, click the [ $L>R$  0.5] button to record the value.

When the right image is larger than the left one by one line, click the [ $L<R$  1.0] button to record the value.

When the right image is larger than the left one by half a line, click the [ $L<R$  0.5] button to record the value.

When the right and left images have same size, click the [ $L=R$ ] button to record the value.

When disparity of half a line is checked, the magnification is different by 3.5% between the images of right and left eyes. When disparity of one line is checked, it is different by 7.0%.


## 5.3.7 WORTH 4 DOTS TEST

Check if the patient has strabismus and suppression.

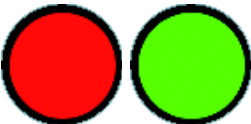
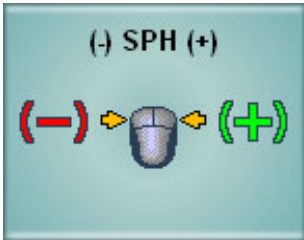

### 1 Select the Worth 4 dots test chart.

To perform the Worth 4 dots test, select the icon for the Worth 4 dots test on the chart page.

Example of the test chart icons on chart page

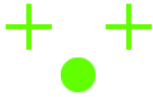

Far-point chart	Far-point test chart icon	Near-point chart	Near-point test chart icon
ACP-8(A)		NC-3(E)	-

The following items are automatically changed as shown below.

Item	Description
Test eye	Changed to the binocular mode.
Auxiliary lens	 <p>The red lens is set to the right eye and the green lens, to the left eye. (The left illustrations are the status as seen from the operator side as the CV-5000 software screen.)</p>
Mouse operation mode	The last status is succeeded.
Mouse Navigation	 <p>The display is changed according to the contents of the last test.</p>
Function button	

## 2 Check how the chart is seen.

When the patient sees the test chart by each eye through the red and green auxiliary lenses, the three green shapes are seen by the left eye and the two red shapes are seen by the right eye.

	
Chart seen by left eye	Chart seen by right eye

When the patient sees the chart with both eyes at the same time, there are five types of the conditions as described below.

[4 Dots]

When the patient sees the four shapes, he/she does not have strabismus or he/she has abnormal concordance.

The lowest white shape is seen in red, green or a mix of red and green. When the lowest shape is seen in red, the right eye is superior. When it is seen in green, the left eye is superior. When it is seen in the mixed color, the right and left eyes are balanced.

[2 Red]

When the patient sees the two red shapes, the left eye is suppressed if he/she sees an object with both eyes.

[3 Green]

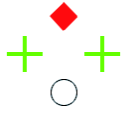

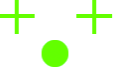
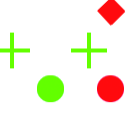
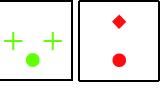
When the patient sees the three green shapes, the right eye is suppressed if he/she sees an object with both eyes.

[5 Dots]

When the patient sees the two red shapes and three green shapes, the patient has strabismus.

[2R 3G Alter]

When the patient sees the red and green shapes alternately, he/she has alternating suppression.

				
4 Shapes (Normal/ Abnormal concordance)	2 Red (Sup- pression on left eye)	3 Green (Suppression on right eye)	5 Shapes (Strabismus)	2R 3G alter (Alternating suppression)

## 3 Record the result.

Ask the patient how he/she sees the chart and click the function button meeting his/her answer to record the result.

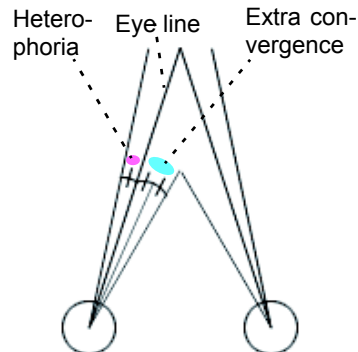
## 5.3.8 SHEARD'S CRITERIA

Sheard's criteria is a theory that, to keep normal binocular function, the extra convergence or divergence that is twice as large as heterophoria or more is necessary.

In this test, check if the patient has extra convergence or divergence that meets Sheard's criteria according to the measured heterophoria.

If there is extra convergence or divergence that meets Sheard's criteria, it is judged that prism prescription is not necessary.

If this isn't the case, the program calculates the prism quantity that makes up for the insufficiency automatically.



### 1 Prepare for the test.

This test must be executed after the horizontal phoria has already been measured. Before this test, measure horizontal phoria.



For the horizontal phoria test, refer to "5.2.4 HORIZONTAL PHORIA MEASUREMENT (PRISM SEPARATION)" on P.86.


### 2 Click the [Sheard] button.

While the phoria test is being executed, the [Sheard] button is displayed as a function button.

This [Sheard] button is valid when horizontal phoria is measured. After the horizontal phoria has been measured, click this button.



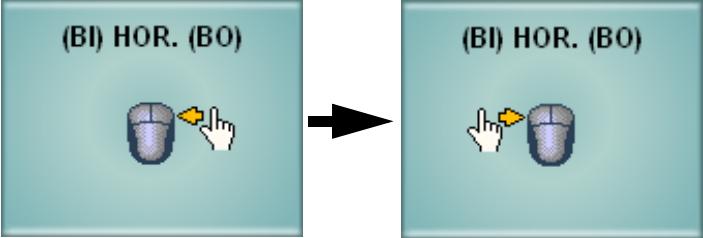

To perform the near-point test, select the test chart icon shown below.

Far-point chart	Far-point test chart icon	Near-point chart	Near-point test chart icon
ACP-8(A)	This test is conducted at near only.	NC-3(E)	

In far-point test, the chart where the characters are arranged on one vertical line or the visual acuity chart to which the vertical mask is applied is set.

In near-point test, set a proper target from the near-point card targets manually.

The following settings are changed automatically as shown below.

Item	Description
Test eye	Changed to the binocular mode.
Auxiliary lens	Not set.
Mouse operation mode	The mode to operate "Horizontal prism" is set.
Mouse Navigation	<p>According to the initial results of the test, the following two types are alternately displayed.</p> 
Function button	

### 3 Measure convergence or divergence.

The program automatically judges that the system should measure divergence if the measured heterophoria is esophoria and convergence if it is exophoria. The program guides measurement.

**Measure the prism power recommended according to the Sheard standard.  
Recommended 4.0 BI**

Have the patient view the chart where characters are arranged on one vertical line. Instruct the patient to respond when the blurred characters are seen or when the characters are seen on two lines. Using the indicated button, operate the mouse navigation slowly by one click.

Each time you click, the recommended prism value is changed in "Mini Help" as shown in the right example.

If the prism value is "0" and the patient does not say "I see the blurred characters" or "I see the characters on two lines", there are extra convergence or divergence that meets Sheard's criteria.

The measurement is finished.

However, if the patient says "I see the blurred characters" or "I see the characters on two lines" before the recommended prism value is "0", return the mouse to the preceding status and finish the measurement.

The recommended prism value displayed in "Mini Help" is the prism correction value required to meet Sheard's criteria.

### 4 Record the result.

After the measurement, click the [Record] button to record the result. The Sheard's criteria test is finished.

## 5.4 NEAR-POINT TEST

### 5.4.1 ADD TEST

Search for the ADD power required for near vision by using the cross cylinder lens and grid chart.


#### 1 Select the grid chart.

To perform the ADD test, select the grid test chart icon on the chart page. Set the grid target from the near-point card manually. Set the near-point card for the desired near-point distance.

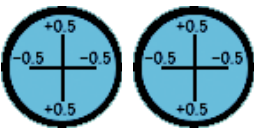
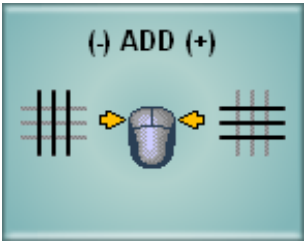


For setting the near-point card targets, refer to "ADJUSTMENT OF NEAR-POINT CARD" on P.139.

Example of the test chart icons on chart page

Far-point chart	Far-point test chart icon	Near-point chart	Near-point test chart icon
ACP-8(A)	This test is conducted at near only.	NC-3(E)	

The following settings are automatically changed as shown below.

Item	Description
Test eye	Changed to the binocular mode.
Auxiliary lens	 The cross cylinder lens of $\pm 0.5D$ is set.
Mouse operation mode	The mode to operate "ADD" is set.
Mouse Navigation	

## 2 Search for the necessary ADD power.

Have the patient compare the vertical lines with the horizontal ones and answer which are seen more clearly, vertical or horizontal lines.

When the patient answers "The horizontal lines are seen more clearly", click the right mouse button for the mouse navigation.

When the patient answers "The vertical lines are seen more clearly", click the left mouse button for the mouse navigation.

Adjust the ADD power until the vertical lines are seen as clearly as the horizontal ones or until the horizontal lines are seen a little more clearly.

## 5.4.2 MONOCULAR ADD TEST

Search for the ADD power required for near vision of each eye by using the cross cylinder lens and grid chart.

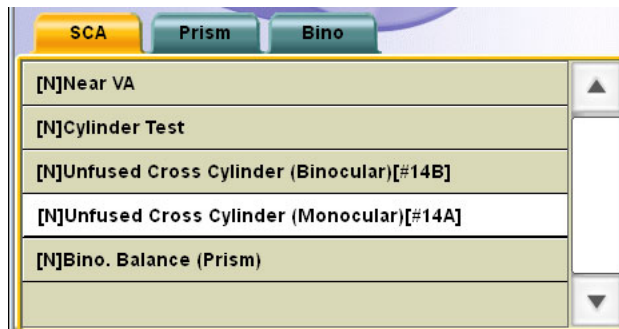
### 1 Select "[N] Unfused Cross Cylinder (Monocular) [#14A]" from "Examination list".

To perform this test, specify the test name from "Examination list".

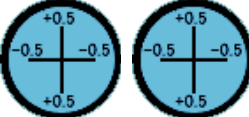
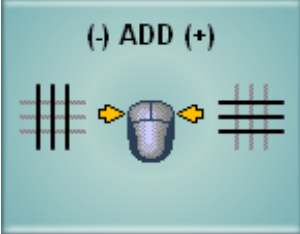
Click the [Examination list] button to display "Examination list".

Click the [Far/Near] button to display the near-point test list.

Select "[N] Unfused Cross Cylinder (Monocular) [#14A]" in the [SCA] tab.




The following settings are automatically changed as shown below.

Item	Description
Test eye	When any other item except "binocular" is the last test object, the last status is succeeded. When "binocular" are the last test object, the right eye of the patient is set.
Auxiliary lens	 The cross cylinder lens of $\pm 0.5D$ is set.
Mouse operation mode	The mode to operate "ADD" is set.
Mouse Navigation	

## 2 Set the chart.

Set the following target from the near-point card manually. Set the near-point card at the aimed near-point distance.

Example of the test chart icons on chart page

Far-point chart	Far-point test chart icon	Near-point chart	Near-point test chart icon
ACP-8(A)	This test is conducted at near only.	NC-3(E)	

## 3 Search for the necessary ADD power.

Have the patient compare the vertical lines with the horizontal ones and answer which are seen more clearly, vertical or horizontal lines.

When the patient answers "The horizontal lines are seen more clearly", click the right mouse button for the mouse navigation.

When the patient answers "The vertical lines are seen more clearly", click the left mouse button for the mouse navigation.

Adjust the ADD power until the vertical lines are seen as clearly as the horizontal ones or until the horizontal lines are seen a little more clearly.

## 5.4.3 MINUS LENS AMPLITUDE MEASUREMENT

Place the near-point visual acuity target that meets the maximum near-point visual acuity of the patient at 33cm in front of his/her eyes. Have the patient view this target. When adding the concave spherical lenses, check to what degree the patient can see the target clearly. In this way, measure the accommodation power for the patient.

### 1 Prepare for the test.

This test must be done by using the visual acuity target that meets the maximum near-point visual acuity of the patient. Before this test, perform the near-point visual acuity test.



For the visual acuity test, refer to "5.1.1 VISUAL ACUITY MEASUREMENT" on P.65.

### 2 Select "[N] Minus Lens Amplitude [#19B]" from "Examination list".

To perform this test, specify the test name from "Examination list".

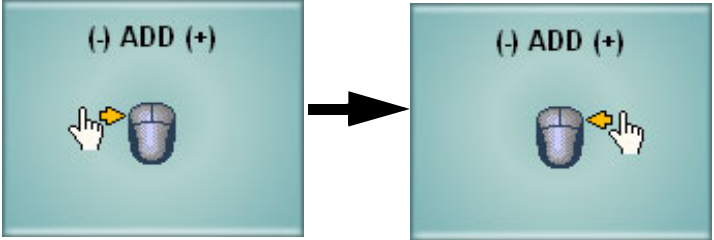

Click the [Examination list] button to display "Examination list".

Click the [Far/Near] button to display the near-point test list.

Click the [Bino] tab and select "[N] Minus Lens Amplitude [#19B]" from the list.



The following settings are automatically changed as shown below.

Item	Description
Test eye	Changed to the binocular mode.
Auxiliary lens	Not set.
Mouse operation mode	The mode to operate "ADD" is set.
Mouse Navigation	<p>According to the progress of the test, the following two types are alternately displayed.</p> 
Function button	

- 3** Set the target.  
 Set the near-point card at 33cm.  
 From the near-point card, set the target that meets the maximum near-point visual acuity of the patient manually.
- 4** Measure the "Blur" point.  
 Have the patient view the target. Instruct the patient to respond whenever he/she sees the blurred target once the test is started. Using the indicated button, operate the mouse navigation slowly by one click.  
 When the patient says "I see the blurred target", stop the mouse operation.
- 5** Record the result for the "Blur" point.  
 Click the [Blurred (-)] button to record the result.  
 The value displayed in "ADD" shows the adjustment needed to compensate for "Blur".  
 When the patient sees the target set at 33cm, the adjustment of 3.00D is required. The value to be recorded is the value obtained by adding 3.00D to the value, which is displayed in "ADD", with the reversed sign.
- 6** Measure the "Recovery" point.  
 Instruct the patient to respond whenever he/she sees the target clearly again. Using the indicated button, operate the mouse navigation slowly by one click.  
 When the patient says "I see the target clearly", stop the mouse operation.

**7** Record the result for the "Recovery" point.

Click the [Recovery (-)] button to record the result.

As the "Blur" point, the value to be recorded is the value obtained by adding 3.00D to the value, which is displayed in "ADD", with the reversed sign.

## 5.4.4 POSITIVE RELATIVE ACCOMMODATION MEASUREMENT

Place the near-point visual acuity target that meets an visual acuity of approx. 0.7 (20/30, 6/9) at 40cm in front of the patient's eyes. Have the patient view this target. As adding the concave spherical lenses, check to what degree the patient can see the target clearly. By conducting this test, you are measuring the positive accommodative power for the patient.

**1** Select "[N] Positive Relative Accommodation [#20]" from "Examination list".

To perform this test, specify the test name from "Examination list".

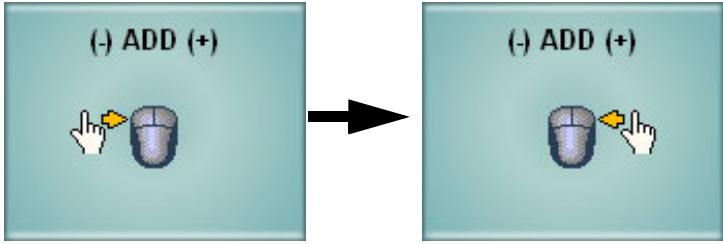

Click the [Examination list] button to display "Examination list".

Click the [Far/Near] button to display the near-point test list.

Click the [Bino] tab and select "[N] Positive Relative Accommodation [#20]" from the list.



The following items are automatically changed as shown below.

Item	Description
Test eye	Changed to the binocular mode.
Auxiliary lens	Not set.
Mouse operation mode	The mode to operate "ADD" is set.
Mouse Navigation	<p>According to the progress of the test, the following two types are alternately displayed.</p> 
Function button	

## 2 Set the target.

Set the near-point card at 40cm.

Set the target for vision acuity 0.7(20/30, 6/9) manually from the near-point cards.

## 3 Measure the "Blur" point.

Have the patient view the target. Instruct the patient to respond whenever he/she sees the target blur. Using the indicated button, operate the mouse navigation slowly by one click.

When the patient says "I see the blurred target", stop the mouse operation.

## 4 Record the result for the "Blur" point.

Click the [Blurred (-)] button to record the result.

The value displayed in "ADD" shows the adjustment required to compensate for "Blur".

In the "Positive Relative Accommodation" test, the object is to measure the degree the patient's eye can be adjusted from the status where he/she sees the target at 40cm ahead clearly. The value to be recorded is the value displayed in "ADD" whose sign is reversed.

## 5 Measure the "Recovery" point.

Instruct the patient to respond whenever he/she sees the target clearly again. Using the indicated button, operate the mouse navigation slowly by one click.  
When the patient says "I see the target clearly", stop the mouse operation.

## 6 Record the result for the "Recovery" point.

Click the [Recovery (-)] button to record the result.  
As the "Blur" point, the value to be recorded is the value displayed in "ADD" whose sign is reversed.

### 5.4.5 NEGATIVE RELATIVE ACCOMMODATION MEASUREMENT

Set the target for vision acuity 0.7 (20/30, 6/9) manually from the near-point cards at 40cm in front of the patient's eyes. Have the patient view this target. When adding the convex spherical lenses, check to what degree the patient can see the chart clearly. By conducting this test, you are measuring the negative accommodative power that is really used by the patient to see the chart at 40cm.

#### 1 Select "[N] Negative Relative Accommodation [#21]" from "Examination list".

To perform this test, specify the test name from "Examination list".

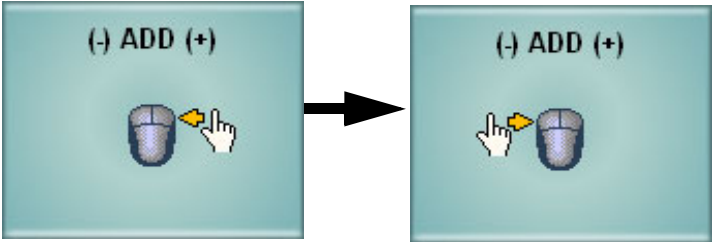

Click the [Examination list] button to display "Examination list".

Click the [Far/Near] button to display the near-point test list.

Click the [Bino] tab and select "[N] Negative Relative Accommodation [#21]" from the list.



The following settings are automatically changed as shown below.

Item	Description
Test eye	Changed to the binocular mode.
Auxiliary lens	Not set.
Mouse operation mode	The mode to operate "ADD" is set.
Mouse Navigation	<p>According to the progress of the test, the following two types are alternately displayed.</p> 
Function button	

## 2 Set the target.

Set the near-point card at 40cm.

From the near-point card, set the target that meets the visual acuity of approx. 0.7 (20/30, 6/9) manually.

## 3 Measure the "Blur" point.

Have the patient view the target. Instruct the patient to respond whenever he/she sees the blurred target. Using the indicated button, operate the mouse navigation slowly by one click.

When the patient says "I see the blurred target", stop the mouse operation.

## 4 Record the result for the "Blur" point.

Click the [Blurred (+)] button to record the result.

The value displayed in "ADD" shows that the patient has cancelled the adjustment equal to this value.

In the "Negative Relative Accommodation" test, the object is to measure the degree the patient has used his/her adjusting power to watch the target at 40cm. The value to be recorded is the value obtained by subtracting the ADD power of the patient from the value displayed in "ADD".

## 5 Measure the "Recovery" point.

Instruct the patient to respond whenever he/she sees the target clearly again. Using the indicated button, operate the mouse navigation slowly by one click.  
When the patient says "I see the target clearly", stop the mouse operation.

## 6 Record the result for the "Recovery" point.

Click the [Recovery (+)] button to record the result.  
As the "Blur" point, the value to be recorded is the value obtained by subtracting the ADD power of the patient from the value displayed in "ADD".

### 5.4.6 AC/A

For human eyes, the adjustment and convergence work at the same time under the correlated status.

The AC/A ratio is the value to indicate how much convergence will occur when the adjustment of 1.00D has occurred.

In this test, measure the AC/A ratio by gradient.

## 1 Prepare for the test.

This test must be conducted with the near-point horizontal phoria result that has already been measured. Before this test, measure near-point horizontal phoria.



For the near-point horizontal phoria test, refer to "5.2.4 HORIZONTAL PHORIA MEASUREMENT (PRISM SEPARATION)" on P.86.

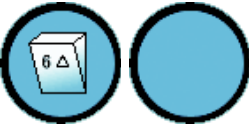


## 2 Click the [AC/A] button.

While the near-point horizontal phoria test is being executed, the [AC/A] button is displayed as a function button.

This button is functional after near-point horizontal phoria is measured. When horizontal phoria has been measured, click this button.




The following items are changed automatically as shown below.

Item	Description
ADD	The value after shifting by "+1.00D" is set to both eyes.
Test eye	Changed to the binocular mode. The left eye is the object of the mouse power refinement.
Auxiliary lens	 The base-up prism of "6 prism" is set to the right eye. (The left illustrations are the status as seen from the operator side as the CV-5000 software screen.)
Mouse operation mode	The mode to operate "Horizontal prism" is set.
Mouse Navigation	
Function button	

### 3 Set the target.

From the near-point card, set the following target manually.

Example of the test chart icons on chart page

Far-point chart	Far-point test chart icon	Near-point chart	Near-point test chart icon
ACP-8(A)	This test is conducted at near only.	NC-3(E)	

#### 4 Measure the changed convergence.

When the ADD power is shifted by "+1.00D", the adjustment equal to 1.00D is cancelled in the patient's eye and the convergence is changed.

Measure the changed convergence in the same way as the horizontal phoria measurement.

The image the patient sees is separated vertically because of the prism inserted at the right eye. The patient sees the upper section with the right eye and the lower section, with the left eye.

Because the adjustment of 1.00D is cancelled, possibly divergence will occur in the patient's eye. Therefore, as the illustration at the right of "Mouse Navigation", the upper character line is disassociated rightward and the lower character line, leftward in the patient's vision initially.

Ask the patient how the upper and lower character lines are positioned in his/her vision. Then, operate the mouse according to "Mouse Navigation" until the upper and lower character lines are aligned.

At the same time, as the example shown at the right, the AC/A ratio value is calculated and displayed in "Mini Help".



Measure the AC/A ratio by the gradient method. AC/A ratio: 3.0 BI/D

#### 5 Record the result.

After the measurement, click the [Record] button to record the result.

The AC/A ratio measurement is finished.

# 6. CONVENIENCE FUNCTIONS



- For normal operation refer to the "Settings" menu, refer to "8.1 BASIC OPERATION FOR "SETTINGS" MENU" on P.160.
- For the details of the "Settings" menu items, refer to "8.2 "SETTINGS" MENU LIST" on P.163.

## 6.1 USING THE DATA OF PERIPHERAL DEVICES

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This chapter will explain the connection and setting of the peripheral devices to capture the objective data or eyeglass data.



- For displaying the subjective or objective data, refer to " DATA DISPLAY UNIT" on P.32.
- When the TOPCON products such as RM, KR or CL is not connected, input the data manually. Refer to "3.2.2 DATA INPUT" on P.56 for details.

## 6.1.1 CONNECTING PERIPHERAL DEVICES



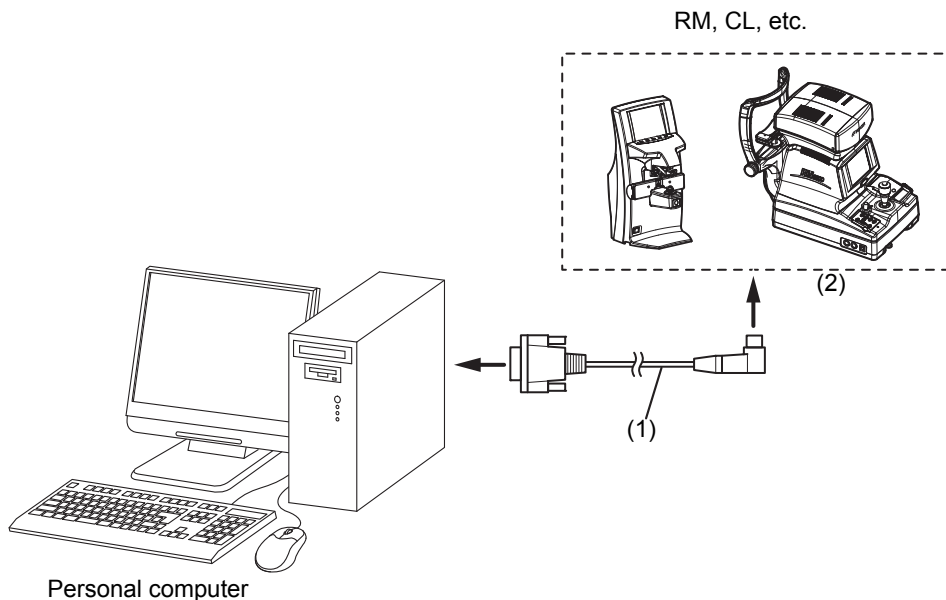
### CAUTION

Install the devices (RM, CL and others) to be connected out of the CV-5000 patient's environment.

Connect the peripheral devices as shown below.



- Connect devices complying with UL60950/UL60950-1, UL60601-1 or IEC60950/IEC60950-1 to the CV system. Ask the authorized Topcon representative service engineer to connect the device.
- Connect the communication cable to the serial terminal of the personal computer. Refer to the instruction manual of your personal computer for details.



	item
(1)	Communication cable (DIN/D-sub)

To connect two or more CV-5000, connect the personal computer to which CV-5000 is connected through the LAN cable. To connect the devices in any other configuration except the above figure, contact the service engineer.

## 6.1.2 SETTING FOR CONNECTION

When you connect the device by serial use, you must set the port. If not, you cannot use the device. Check the connection and verify setting is correct.



For the connection method not described in this chapter (e.g. connection through network (LAN), having the data common to two or more CV systems or connection in a link with database), contact the service engineer.

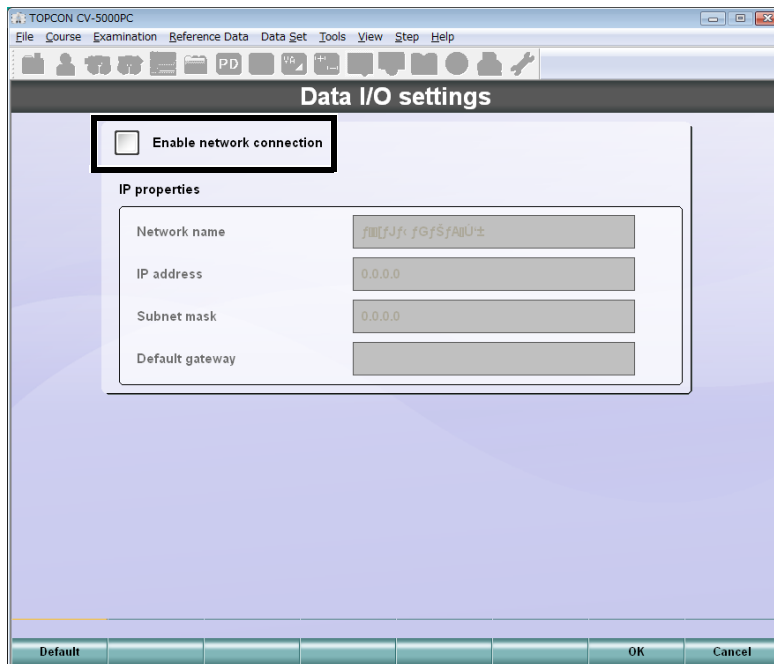


For the details of the set items, refer to "8.2.6 Data I/O settings" on P.185.

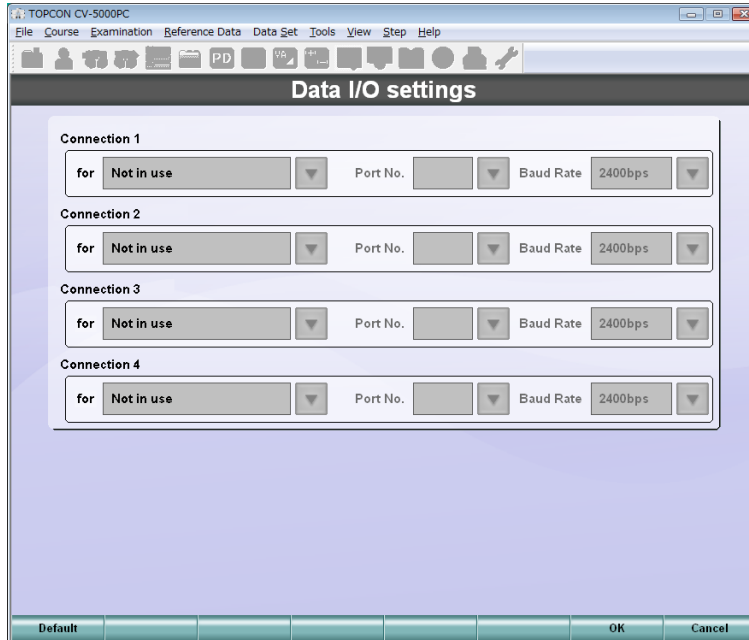
## SETTING FOR SERIAL CONNECTION



When you connect a serial device, use the settings shown below.

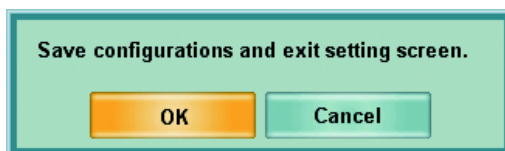
- 1 Click the [Settings] button.  
The "Settings" menu is displayed.
- 2 Click the [Data I/O settings] button.  
The data input/output setting screen appears.
- 3 Click the [System configurations] button.  
The network setting screen appears.
- 4 If a check mark is placed for "Enable network connection", remove the check mark.



- 5 Click the [Serial config.] button from the function buttons.  
The serial setting screen appears.



- 6 Select "[In] RM/CL data receive" from the "for" list.  
 One device can only be used per port. When connecting two or more devices, set "Connection 1" to "Connection 3" for each connected device.
- 7 Check the port connected to the device and set the "Port No." corresponding to it.  
 Refer to the instruction manual of your personal computer for the port.
- 8 Select "Baud Rate".  
Select the same baudrate as the connected device. For the correct baudrate of the connected device, refer to its instruction manual.
- 9 After setting all of the connections to be used, click the [OK] button.  
The data input/output setting screen appears again.
- 10 Click the [OK] button.  
The "Settings" menu screen appears again.
- 11 Click the [Exit] button.  
The check screen to finish the "Settings" menu appears.



To save the set data and finish the "Settings" menu, click the [OK] button.  
To return to the "Settings" menu without saving the set data, click the [Cancel] button.

## 6.1.3 IMPORTING THE DATA FROM OTHER DEVICES

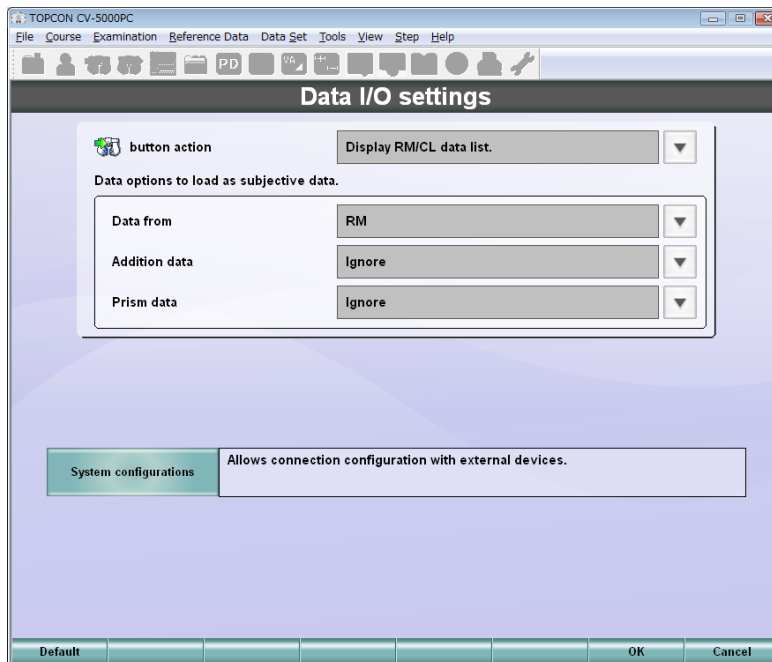


To transfer the data, it is necessary to output the data from RM, KR and CL to CV-5000. For the data output method, refer to the instruction manuals of RM, KR and CL.

### SETTING THE DATA CAPTURING METHOD

The [Data entry] button is used to import data from other devices. Set the operation of this button. Change the setting as shown below.

- 1 Click the [Settings] button.  
The "Settings" menu is displayed.
- 2 Click the [Data I/O settings] button.  
The data input/output setting screen appears.
- 3 Click the [▼] button for "[] button action" to set the data capturing method.



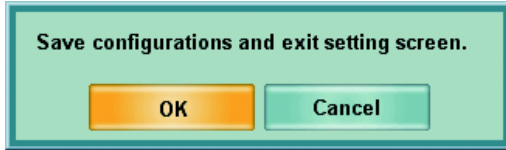
When you select the "[] button action", you can select one of the following four items. For each data capturing method, refer to the page shown below.

- Display RM/CL data list. .... P. 124
- Load last data from RM/CL ..... P. 126
- Load last data from selected source. .... P. 126
- Import data file. .... P. 126

- 4 Click the [OK] button.  
The "Settings" menu appears again.

5 Click the [Exit] button.

The check screen to finish the "Settings" menu appears.

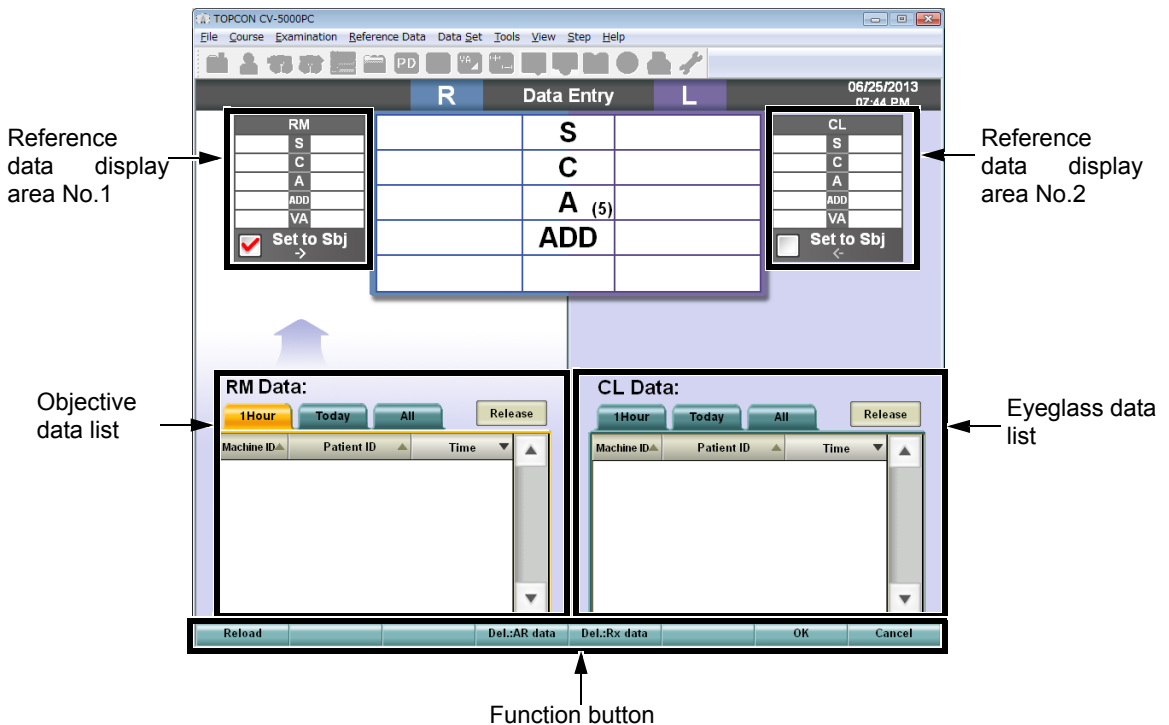


To save the set data and finish the "Settings" menu, click the [OK] button.

To return to the "Settings" menu without saving the set data, click the [Cancel] button.

## DISPLAY RM/CL DATA LIST

When you select "Display RM/CL data list" for "[Data entry] button action" and click the [Data entry] button, the Data input screen to specify the data to be input appears.



The function buttons operate as described below.

[Reload] button: Updates the list to the newest status.

- [Del: RM data] button :Deletes the data in the objective data list. Set the data to be deleted with "Function settings" in the "Settings" menu.
- [Del: CL data] button :Deletes the data in the eyeglass data list. Set the data to be deleted with "Function settings" in the "Settings" menu.

[OK] button: Validates the setting.

[Cancel] button: Returns to the test screen without validating the setting.

## Selecting the objective data

The ID's of the data measured by RM and KR are displayed in the objective data list. Select the ID of the data to be displayed.

**1** Click the tab where the data to be displayed is shown.

Then, the following list is displayed.

- 1Hour : Data captured in the past (till 1 hour before)
- Today : Data for today
- All : All the captured data

**2** Click the desired data.

"Machine ID", "Patient ID" and "Time" are displayed in the list. Specify the data to be captured and click the button.

The data selected from the list are displayed on the reference data area No.1.



- Use the [Release] button, and the selection for the objective data is canceled. The data on the reference data display area No.1 is cleared.
- Place a checkmark for "Set to Sbj.". The selected objective data will be copied on the main data area.

## Selecting the eyeglass data

The ID's of the data measured by CL are displayed in the eyeglass data list. Select the ID of the data to be displayed.

**1** Click the tab where the data to be displayed exists.

Then, the following list is displayed.

- 1Hour : Data captured in the past (till 1 hour before)
- Today : Data for today
- All : All the captured data

**2** Click the desired data.

"Machine ID", "Patient ID" and "Time" are displayed in the list. Specify the data to be captured and click the corresponding button.

The data selected from the list is displayed on the reference data area No.2.



- Use the [Release] button, and the selection for the eyeglass data is cancelled. The data on the reference data display area No.2 is cleared.
- Place a checkmark for "Set to Sbj.". The selected eyeglass data are copied on the main data area.


After selecting the data to be captured, click the [OK] button.

The test screen appears.

The selected data are displayed on the reference data area.

When you place a checkmark for "Set to Sbj.", the marked data are copied as the subjective data and the lens on the measuring head is updated.


## LOAD LAST DATA FROM RM/CL

When you select "Load last data from RM/CL." for "[] button action" and click the [Data entry] button, the system captures the final output value measured by RM, KR and CL automatically.

When only one of the RM/KR data and CL data exists, the system captures the existing data. After registering, the reference data is automatically displayed. The registered objective data is displayed.

When the data, which is set to be copied as the subjective value, is import, the data is copied as the subjective value and the lens on the measuring head is automatically updated.

## LOAD LAST DATA FROM SELECTED SOURCE

When you set "Load last data from selected source." for "[] button action" and click the [Data entry] button, the following function buttons are displayed.



Select the measurement data of the lens to be set in the measuring head.

### When you select [RM]

The final measurement data of the RM and KR is registered as the objective data.

After registering, the registered data is automatically displayed for reference. The registered objective data is displayed.

When the RM data is selected as the data to be copied as the subjective value, the captured objective data is copied as the subjective value and the lens on the measuring head is automatically updated.

### When you select [CL]

The measurement data of CL is registered as the eyeglass data.

After registering, the reference data is automatically displayed. The registered eyeglass data is displayed.


When the CL data is selected as the data to be copied as the subjective value, the captured eyeglass data is copied as the subjective data and the lens on the measuring head is updated.

### When you select [RM+CL]

The measurement data of RM and KR is registered as the objective data and the final measurement data of CL is done so as the eyeglass data. After registering, the registered data is automatically displayed for reference. The registered objective data and eyeglass data are displayed.

When the data, which is set to be copied as the subjective value, is captured, the data is copied as the subjective value and the lens on the measuring head is automatically updated.

## IMPORT DATA FILE

When you set "Import data file." for "[] button action" and click the [Data entry] button, the data output as a file from the external database is captured.



This function does not work in the case of RS-232C connection.

## 6.1.4 INPUTTING OTHER DATA EXCEPT "SUBJECTIVE" MANUALLY

When RM or CL is not connected to the CV system, you can input the measured value printed from the peripheral device manually.



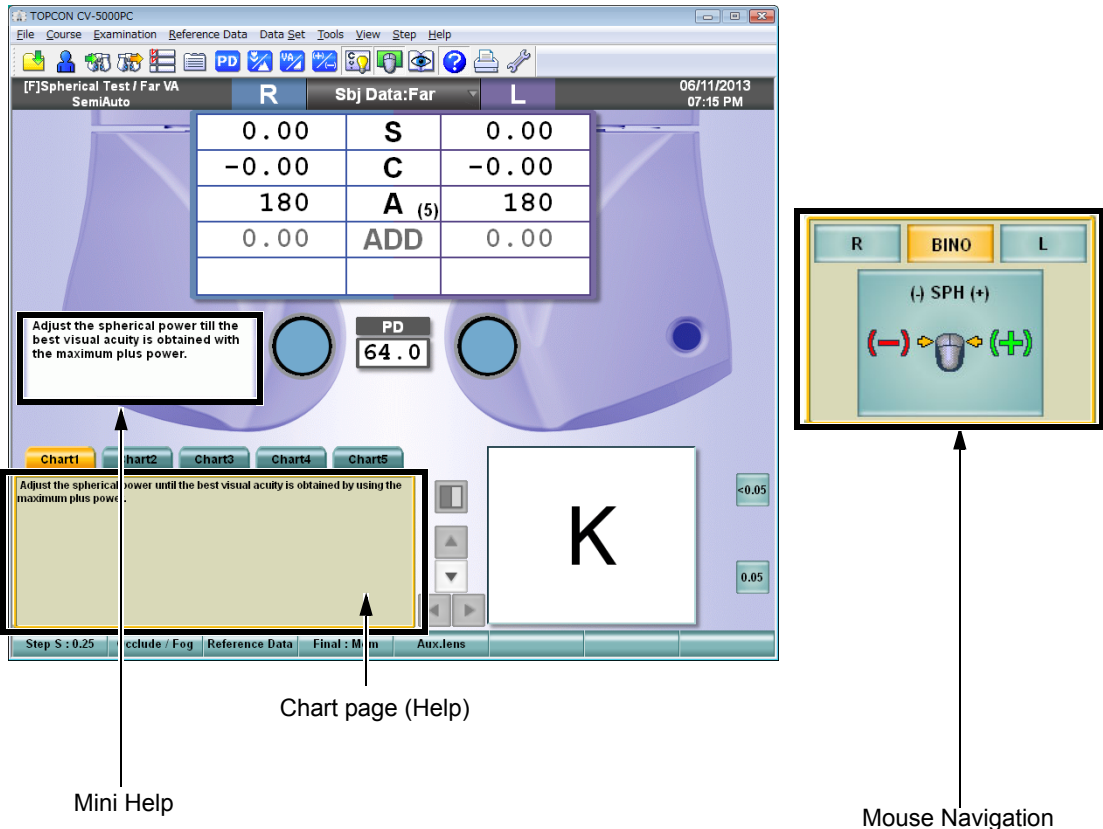
For the manual input method, refer to "3.2.2 DATA INPUT" on P.56.

## 6.2 TESTS

This chapter will explain the functions required to perform the tests.

### 6.2.1 CHECKING THE TEST METHOD

You can use the "Help" and "Mini Help" functions that explain the test charts, the test contents, basic operation and the "Mouse Navigation" function to indicate the mouse operation.



## HELP/MINI HELP UTILITY

### "Help" utility

Click the test chart icon and then click the [Help] button on the toolbar. The more detailed "Help" function is displayed on the chart page (Help).

To return from "Help" message to the normal chart page, click the [Help] button on the toolbar again.

## "Mini Help" function

The simple explanation about the executed test is displayed.



- In the Sheard's criteria test, the recommended prescription prism value is displayed.
- In the AC/A test, the AC/A ratio value is displayed.



For setting "Display/Not display", refer to "8.2.7 Screen settings" on P.192.

## MOUSE NAVIGATION UTILITY

The explanation about mouse operation is displayed.

The mouse operation information about the current test is displayed.

The picture and symbol indicate which mouse button should be clicked for each test, right or left.

The operator should click the mouse button for the direction shown by the picture where the patient sees the chart better.

## 6.2.2 CONVENIENCE FUNCTIONS DURING TEST

This chapter will explain the convenience functions to perform the tests.

### SELECTING THE CHANGING STEP FOR LENS

Click the following place from the function buttons.



Operate the mouse, and the step to change the values in the data is changed.

Data to be changed	Example of display	Operation by clicking
Spherical power	<b>Step S : 0.25</b>	Changes the step in order, "0.25D" → "1.00D" → "2.00D" → "3.00D".
Cylinder power	<b>Step C : 0.25</b>	Changes the step in order, "0.25D" → "1.00D".
Cylinder axis	<b>Step A : 5</b>	Changes the step in order, "1°" → "5°".
Prism	<b>Step P : 0.5</b>	Changes the step in order, "0.1Δ" → "0.2Δ" → "0.5Δ" → "1.0Δ".

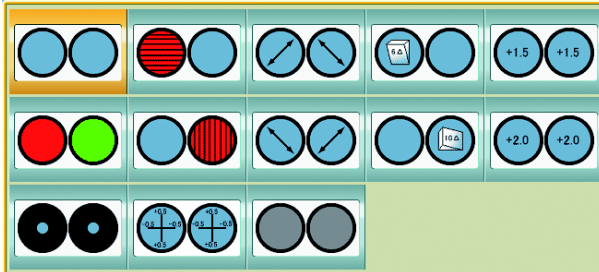
When the data to be changed is changed, the displayed button is also changed.

## CHANGING THE AUXILIARY LENS

Click the [Aux. lens] button from the function buttons.



Click the [Aux. lens] button, and the auxiliary lens selection screen appears.



Open	Horizontal Maddox	Polarization (45°)	6ΔBU	Retino- (+1.5)
Red/green filter	Vertical Maddox	Polarization (135°)	10ΔBI	Retino- (+2.0)
Pinhole	Cross cylinder (±0.5)	Occlusion		

When the polarization auxiliary lens to be utilized on the measuring head is a linearly polarized lens, the above specifications apply.

The selected auxiliary lens is set to the measuring head and the auxiliary lens information is changed. The auxiliary lens set here is used until an other test is executed.



For the auxiliary lens list, refer to "AUXILIARY LENS" on P.199.

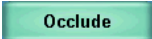
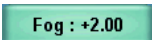
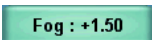


## SELECTING THE TYPE OF OCCLUSION

The occlusion plate is used when the program performs occlusion automatically. The type of occlusion can be changed.

The type of occlusion that has just been changed will remain until resetting is done. After resetting, the value saved by setting is set again.

Click the [Occlude/Fog] button, and the menu is displayed.



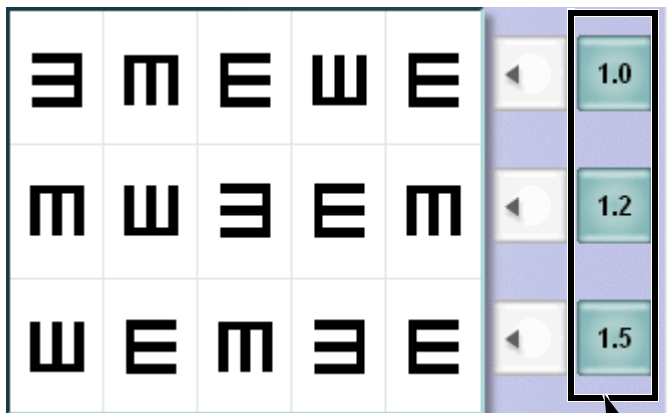
Button	Example of display	Operation by clicking
[Occlude]		The occlusion plate is used.
[Fog: +2.00]		The spherical lens of "+2.00D" is used.
[Fog: +1.50]		The spherical lens of "+1.50D" is used.
[Fog: +0.75]		The spherical lens of "+0.75D" is used.
[Fog: Manual]		Disables the occlusion controlled automatically by the program. To control occlusion, the operator must set and cancel the fog of the occluded eye manually.



Click the right mouse button for the auxiliary lens area on the test screen. The type of occlusion is changed in order.

## SETTING THE VISUAL ACUITY VALUE DIRECTLY

The following buttons are displayed for some visual acuity test charts.



- [Visual acuity value] button

You can input the visual acuity value indicated on the button.

In related visual acuity test charts, the [VA] button is displayed.

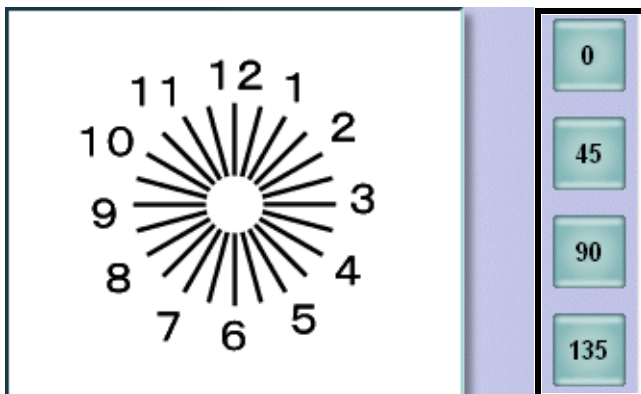


Click the [VA] button, and the list of [Visual acuity value] buttons is displayed.

Click the desired visual acuity value button from the list, and the value is automatically input into the main data.

## SETTING THE CYLINDER AXIS DIRECTLY

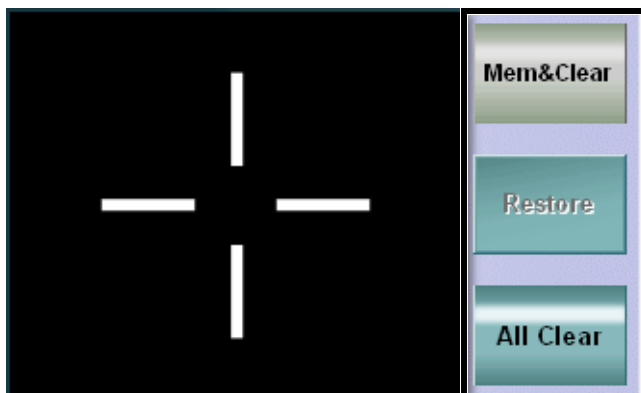
Displayed when the mouse operation function is set for "cylinder axis".



Click each button, and the cylinder axis power is set at the angle displayed on the button.

## CANCELLING THE PRISM TEMPORARILY

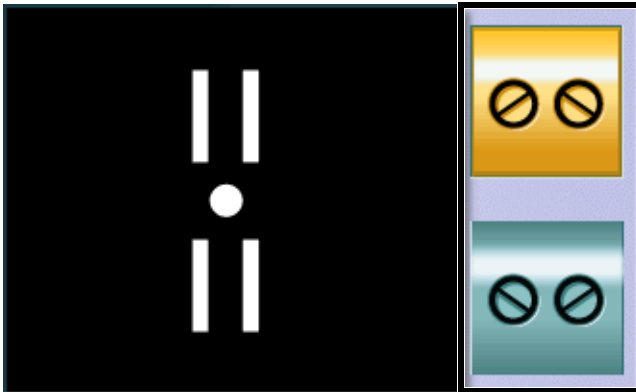
Displayed when a prism is set to the measuring head while the phoria or fixation disparity test is being executed.



- [Mem & Clear]  
The prism set in the measuring head is stored and it is temporarily removed.
- [Restore]  
The stored prism data value is reset to the measuring head.
- [All Clear]  
The stored prism data values are deleted and the prism set in the measuring head is removed.

## SELECTING THE POLARIZATION LENS

Displayed when the test requiring the change of polarization is being executed.



Click the [polarization selector] button, and the polarized lens angle of the measuring head is changed.

## DISPLAYING/HIDING THE REFERENCE DATA

Click the [Reference Data] button from the function buttons.



When the reference data is not displayed, it is displayed.

When the reference data is displayed, it is hidden.

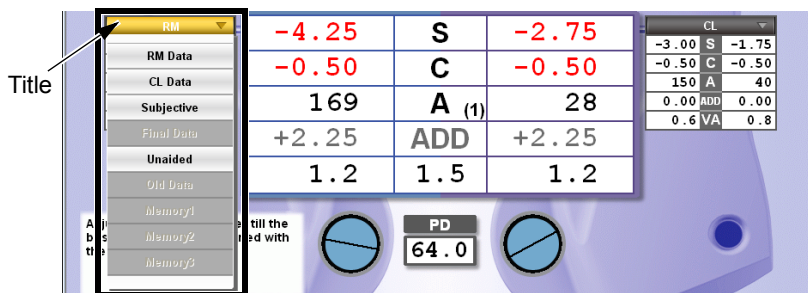


For the data input method, refer to "3.2.2 DATA INPUT" on P.56.

## CHANGING THE REFERENCE DATA

Click the title of the reference data display area No. 1. The list of the buttons that can be displayed on this area is shown.

Click the desired item, and the selected data are displayed on the reference data display area No. 1. You can perform the same operation in the reference data display for area No. 2.



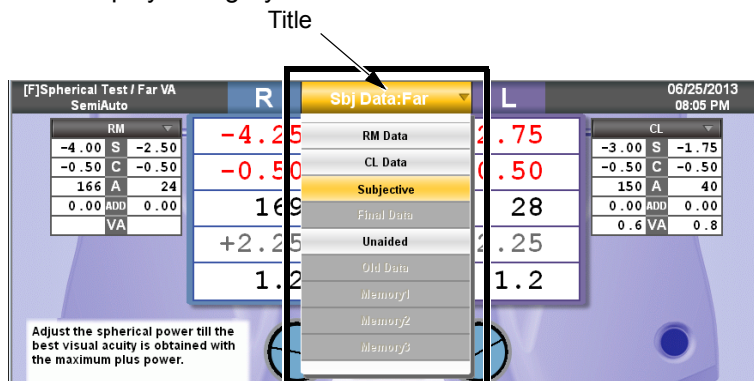
You can select only the items for which data has been input.

## CHANGING THE MAIN DATA

Click the title of the main data area. The data list (normal mode) is displayed.

Click the desired item, and the selected data are displayed in the main data area.

When you select the item displayed on the reference data display areas No. 1 and No. 2, these areas are displayed in gray.



The data list (normal mode) displays the following data.

Example	Meaning	Operation by clicking
<b>Subjective</b>	This data is being displayed as the main data.	This is the data being displayed.
Unaided	There is data and it can be displayed.	The selected data is displayed as the main data.
RM Data	There is no data.	Inactive



Click the right mouse button for the title of main data and then click each item. The values input on the main data area are overwritten by the clicked data.

## CHANGING THE MAIN DATA AND REFERENCE DATA TO EACH OTHER

Click other parts except the title on the reference data display area No. 1 or No. 2. The values of the main data area are changed with the values of the clicked reference data area.

RM				CL
-4.00 S	-2.50	-4.25	S	-2.75
-0.50 C	-0.50	-0.50	C	-0.50
166 A	24	169	A (1)	28
0.00 ADD	0.00	+2.25	ADD	+2.25
VA		1.2	1.5	1.2

## TRANSPOSING THE SYMBOL OF CYLINDER POWER (POWER CONVERSION)

Click the [Transpose cylinder] button on the toolbar. The displayed cylinder power symbol will be transposed.



R	Sbj Data:Far	L
-4.25	S	-2.75
-0.50	C	-0.75
169	A (1)	28
+2.25	ADD	+2.25
1.2	1.5	1.2



By resetting, the cylinder power symbol is returned to the initial status. The initial cylinder power symbol can also be changed in the initial setting menu.

## RECORDING AND DISPLAYING THE PRESCRIPTION DATA

After adjusting all data, click the [Final: Mem] button to record the prescription data. Click the [Final: Set] button to set the recorded data in the main data area. Then, input the value to be corrected for the correction tool such as eyeglasses.

Display	Status	Operation by clicking
	The prescription data is not recorded.	The main data is recorded as the prescription data.
	The prescription data is recorded.	The prescription data is set as the main data. The data in the main data area is moved to the data reference area.

## CANCELING THE NEAR-POINT CORRECTION TEMPORARILY

Click the [#7A] button from the function buttons.

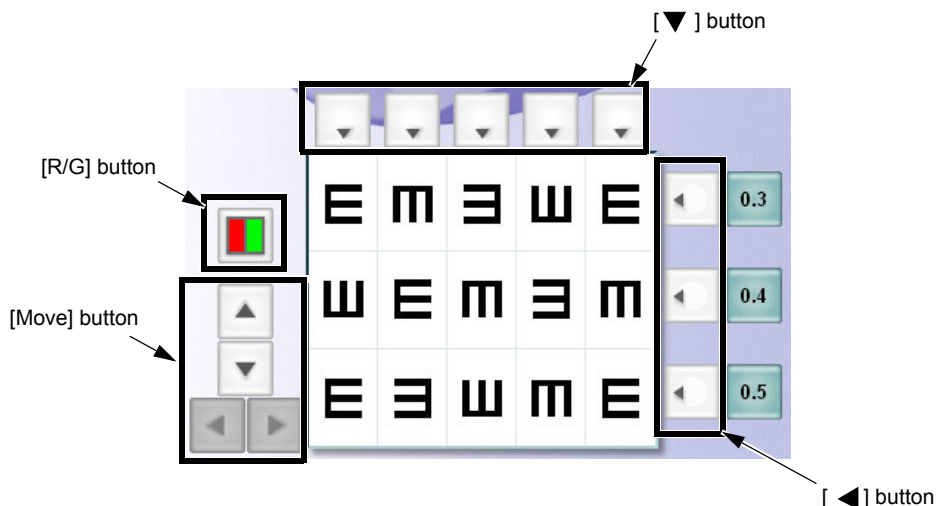


While one of the near-point tests\* mentioned below is being executed, you can cancel the near-point correction temporarily and return the system to the far-point correction status. Click the [#7A] button again, and the system is in the near-point correction status again.

\* "[N] Near VA", "[N] R/G Test", "[N] Cylinder Test", "[N] Bino. Balance (Prism)", "[N] Bino. Balance (Pol.)", and "[N] Bino. Balance (Pol. R/G)"

## 6.2.3 OPERATING THE VISUAL ACUITY CHART

Click the test target check display or side button. You can operate the visual acuity chart.



### APPLYING THE MASK TO THE TEST CHART

When the test chart where the horizontal or vertical mask can be applied is set, click the [◀] or [▼] button of the line to be highlighted. The mask is set to other lines. To remove the mask, click the [◀] or [▼] button of the highlighted line.

Click the test target check display, and the character mask can be applied. You can move the selected mask with the [Move] button.



The instrument operation is different depending on the visual acuity chart or the test target.

When the visual acuity test chart is used and the cursor reaches the end, you can change the target to the next by the [Move] button on the controller unit.

### SETTING THE R/G FILTER TO THE TEST CHART

Click the [R/G] button, and the R/G filter is set.



This operation is valid when the visual acuity test chart is used.

### CHANGING THE TEST CHART WITHOUT CHANGING THE TEST



During the test, click the right mouse button for an optional test chart icon in the chart page. Only the test chart is changed while the other settings remain.



The assignment of mouse button for this function can be changed by setting. Refer to " Mouse Operation" on P.170 for details.

## ADJUSTMENT OF NEAR-POINT CARD

When the patient wears multi-focal lenses, measure the eyeglass refractive power at near distance. For installing the near-point rod and near-point card, refer to " ASSEMBLY/INSTALLATION OF NEAR-POINT ROD AND NEAR-POINT CARD" on P.39.

 <b>CAUTION</b>	To avoid injury due to contact, do not bring the user's face close to the near-point rod.
 <b>CAUTION</b>	Do not tilt the instrument downward while the near-point rod is pulled down. The near-point rod may hit the instrument or desk and damage the instrument.
<b>NOTICE</b>	The near-point card must be positioned in the correct direction. Do not bend it incorrectly in any other direction. The near-point card may be broken.

The scale of the near-point rod is metric and measured in CM (15 - 70), yard and measured INCH (6 - 27), measured DIOP (7 - 1.5).

Values matching both end lines of the card holder indicate the distance between the eye and the card.

The setting procedure is shown below.

- 1** Gently pull down the near-point rod until it stops.  
When the near-point rod is horizontal, it is in the measuring position.
- 2** Set the desired target on the near-point card attached to the card holder.  
To set the target, turn the rotary part at the bottom of the card using your fingers. The target appears in the sight window.

Target numbers of the near-point card and the contents are shown below.

- (1) 40cm Character target VA20/200-20/60
- (2) 67cm Character target VA20/200-20/20
- (3) Target of one vertical line
- (4) 40cm Character target VA20/20
- (5) Target for astigmatism
- (6) 40cm Character target VA20/50-20/20
- (7) Target for measuring presbyopia (thin lines)
- (8) 40cm Character target VA20/20, one horizontal line
- (9) Target of one horizontal line
- (10) Target for measuring presbyopia

### Target name on the patient side

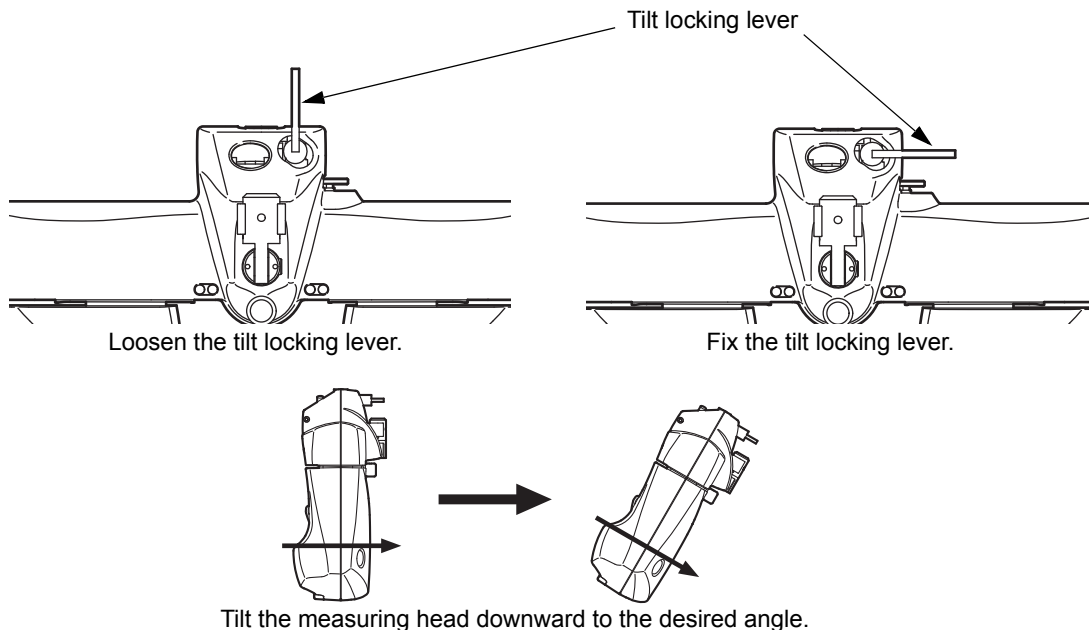
When "Astigmatic chart" is shown on the operators side the patient will see the correct astigmatic chart, the patient sees the target for astigmatism (astigmatic chart). (The target for astigmatism (astigmatic chart) is displayed in the sight window at the back side.)

## 6.2.4 TILTING DOWNWARD

By tilting the measuring head, the instrument can be set in the proper position for the true near-point testing.

<p><b>CAUTION</b></p>	<p>Do not tilt the instrument downward while the near-point rod is pulled down. The near-point rod may hit the instrument or desk and damage the instrument.</p>
<p><b>CAUTION</b></p>	<p>When tilting the instrument downward, place the measuring head away from the patient to prevent him/her from being injured by colliding against it.</p>
<p><b>CAUTION</b></p>	<p>Do not put your hand between the mounting arm and the instrument. Your hand may be pinched.</p>
<p><b>NOTICE</b></p>	<p>Do not rotate the measuring head while the tilt locking lever is loosened. The tilt locking lever may hit the mounting arm to damage the instrument.</p>
<p><b>NOTICE</b></p>	<p>Hold the PD cover unit when holding the measuring head.</p>

To tilt the instrument downward, loosen the tilt locking lever and tilt the measuring head downward to the desired angle. Then, fix the tilt rotate clockwise lever to fix the measuring head.



The tilt locking lever is an adjustable position type. If the tilt locking lever hits the measuring head or the mounting arm while it is loosened, re-adjust its position.

## 6.3 REGISTRATION

You can register the test procedure or the test chart, which is used frequently, on the chart page.

### 6.3.1 CUSTOMIZING THE CHART PAGE


You can customize the chart page.

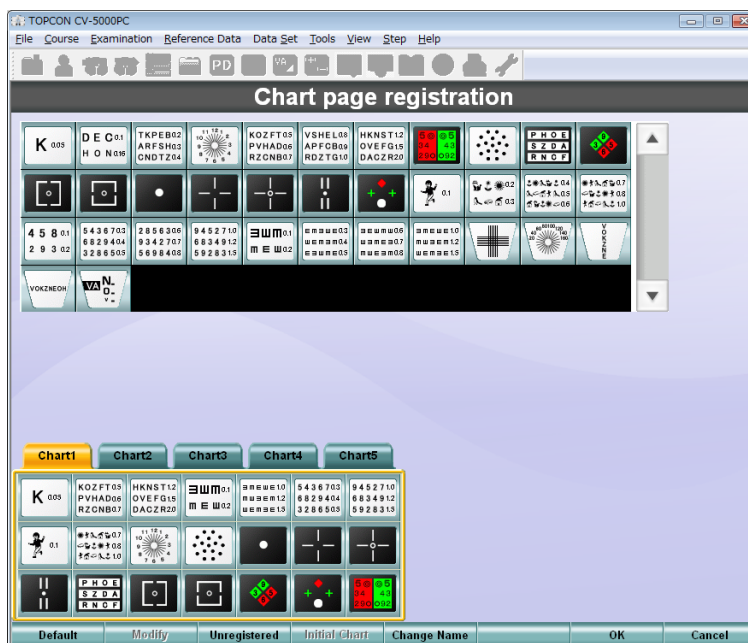


For the explanation of screen, refer to "8.2.4 Chart settings" on P.176.

### CHANGING THE TEST CHART LAYOUT ON THE CHART PAGE

You can change the test chart layout on the chart page.

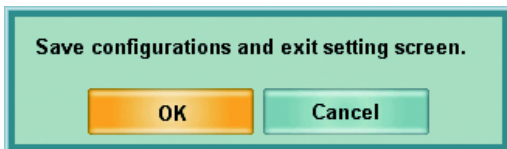
- 1 Click the [Settings] button.  
The "Settings" menu is displayed.
- 2 Click the [Chart settings] button.  
The chart setting screen appears.
- 3 Click the [Chart page registration] button.  
The chart page registration screen appears.
- 4 Drag the desired test chart icon from the chart list to an optional position in the chart page for registration and drop it.
  -  You can change the layout in the chart page in the similar way.
  - Drag the test chart icon in the chart page to the outside of the page and drop it.  
The icon is deleted from the chart page.



**5** Click the [OK] button.  
The visual acuity setting screen appears again.

**6** Click the [OK] button.  
The "Settings" menu appears again.

**7** Click the [Exit] button.  
The check screen to finish the "Settings" menu appears.



To save the set data and finish the "Settings" menu, click the [OK] button.  
To return to the "Settings" menu without saving the set data, click the [Cancel] button.

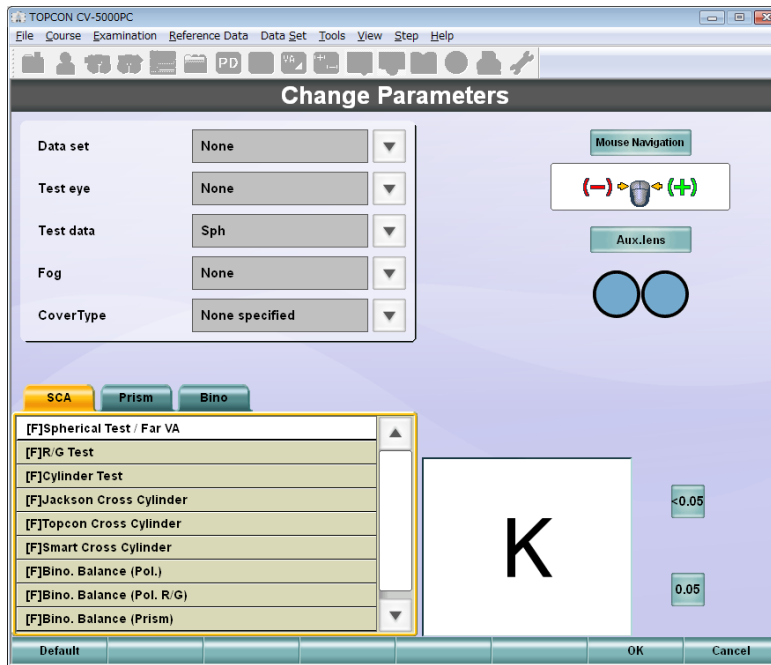
## CHANGING THE TEST RELATED TO THE TEST CHART

You can program the status where an optional test is executed for that test chart.

- 1** Click the [Settings] button.  
The "Settings" menu is displayed.
- 2** Click the [Chart settings] button.  
The chart setting screen appears.
- 3** Click the [Chart page registration] button.  
The chart page registration screen appears.
- 4** Click the desired test chart in the chart page.
- 5** Click the [Modify] button from the function buttons.



## 6 Change the test to be executed and the test parameters.



Data set	Click the test chart icon, and the values in the main data area are changed with those of the selected data. When "None specified" is selected, the last main data setting will be the default.
Test eye	Decides the automatic occlusion control and the object of the mouse operation when clicking the chart icon. None specified :The last occlusion status and the object for mouse operation are the default. Mono (R) :The right eye is the object of the mouse operation. The left eye is occluded. Mono (L) :The left eye is the object of the mouse operation. The right eye is occluded. Mono :The last object of the mouse operation is the default. The other eye is occluded. When both eyes are the last objects of the mouse operation, the right eye is its object. Bino :Both eyes are the objects of the mouse operation. The occlusion is canceled for both eyes. Bino (R) :The right eye is the object of the mouse operation. The occlusion is canceled for both eyes. Bino (L) :The left eye is the object of the mouse operation. The occlusion is canceled for both eyes.
Test data	Select the data to be operated by the mouse in the test that should be executed when clicking the chart icon. When "None specified" is selected, the last mouse operation data is succeeded. Only "AXS" can be selected for the "Smart Cross Cylinder" chart.

Fog	Sets the positive shift quantity of the spherical power that should be automatically set to the test eye (the object of the mouse operation) when clicking the chart icon.
Cover Type	Select a lens or occlusion plate to be used for occlusion in the test that should be executed when clicking the chart icon. When "None specified" is selected, the last occlusion type setting will be the default. When "Manual fog (open)" is selected, the occlusion controlled automatically by the program is invalidated.
Test to be executed	When clicking a chart icon, the test selected from the test selection window is executed.
Mouse Navigation	Select "Mouse Navigation" to be displayed when clicking the chart icon. Select a test to be executed from "Examination list", and the "Mouse Navigation" used generally is automatically selected. Set the optional navigation when you want to customize it.
Aux. lens	Select an auxiliary lens to be used in the test that should be executed when clicking the chart icon. Select a test to be executed from "Examination list", and the auxiliary lens used generally is automatically selected. Set the optional auxiliary lens when you want to customize it.
Mask	With regard to the visual acuity test chart, set the mask status to be preset when clicking the chart icon.

**7** After setting all the items, click the [OK] button.

The chart page registration screen appears again.

**8** Click the [OK] button.

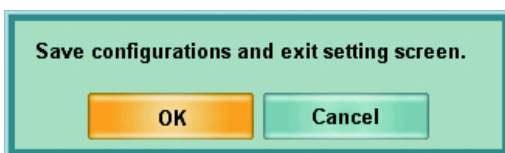
The chart setting screen appears again.

**9** Click the [OK] button.

The "Settings" menu appears again.

**10** Click the [Exit] button.

The check screen to finish the "Settings" menu appears.



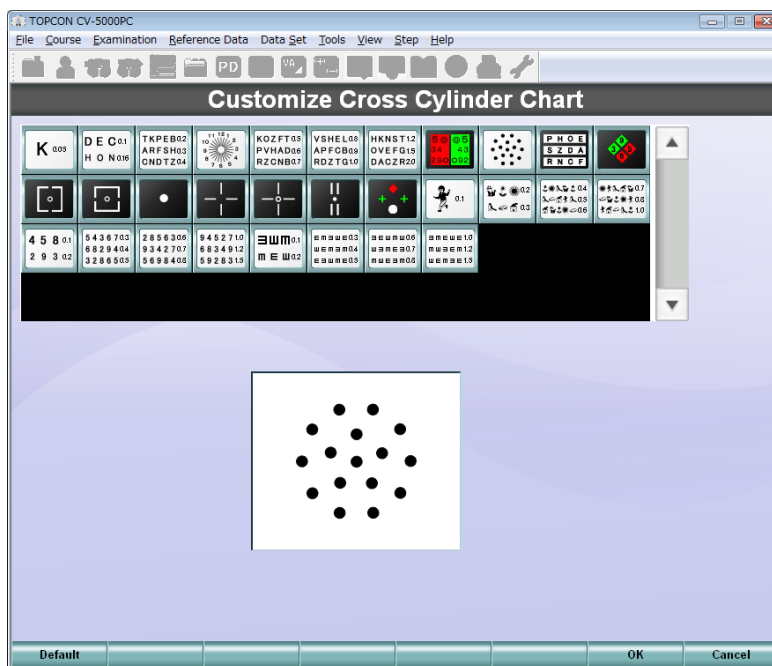
To save the set data and finish the "Settings" menu, click the [OK] button.

To return to the "Settings" menu without saving the set data, click the [Cancel] button.

## CHANGING THE TEST CHART USED IN CROSS CYLINDER TEST

Click the [Examination list] button, and "Examination list" is displayed. When you select "[F] Jackson Cross Cylinder", "[F] Topcon Cross Cylinder" or "[F] Smart Cross Cylinder" from "Examination list" and execute each cross cylinder test, you can change the chart to an optional one.

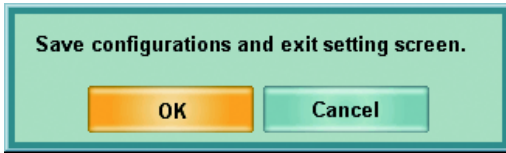
- 1 Click the [Settings] button.  
The "Settings" menu is displayed.
- 2 Click the [Chart settings] button.  
The chart setting screen appears.
- 3 Click the [Cross cylinder chart reg.] button.  
The cross cylinder chart changing screen appears.
- 4 Click the chart to be used on the chart list.



- 5 Click the [OK] button.  
The chart setting screen appears again.
- 6 Click the [OK] button.  
The "Settings" menu appears again.

7 Click the [Exit] button.

The check screen to finish the "Settings" menu appears.



To save the set data and exit the "Settings" menu, click the [OK] button.

To return to the "Settings" menu without saving the set data, click the [Cancel] button.

## 6.3.2 CUSTOMIZE THE TEST PROCEDURE

You can register the test procedure by using the course registration function.

Register the test procedure that is used generally by the user. You can execute the tests in the registered order without clicking the icon on the chart page during the test.



While a test sequence is being executed, you can click any icon on the chart page and execute another test that is not included in the course. In this case, click the [Forward] button on the control window to return to the registered course.



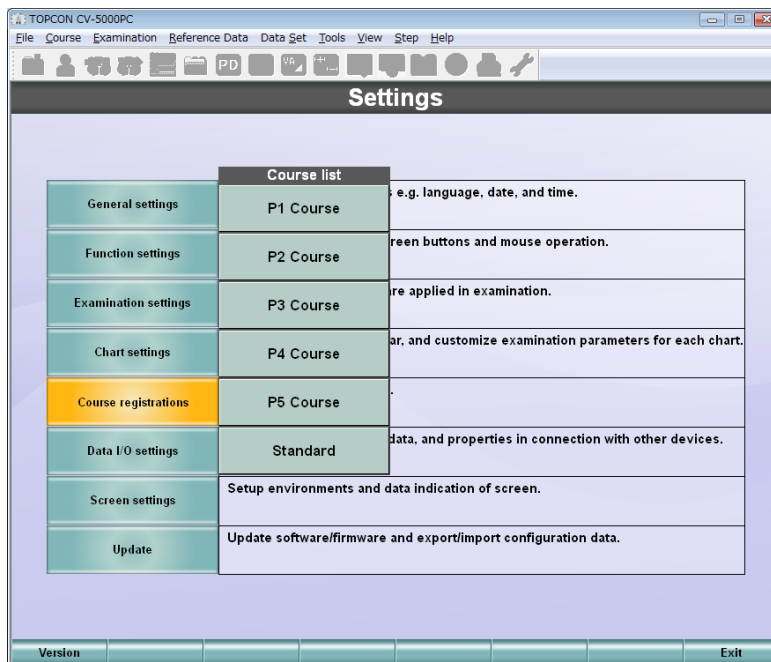
For the explanation of screen, refer to ""8.2.5 Course registrations" on P.182.

1 Click the [Settings] button.

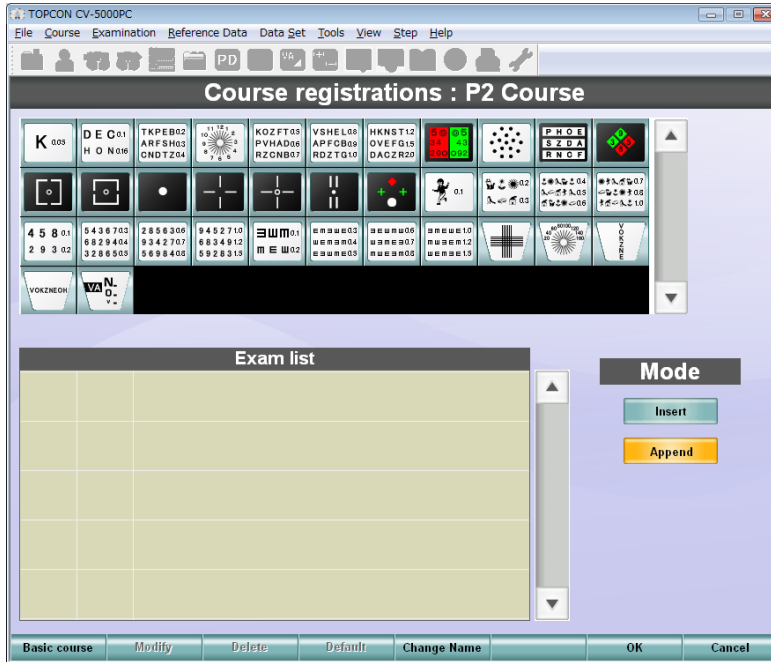
The "Settings" menu is displayed.

2 Click the [Course registrations] button.

The course list is displayed.



- 3 Click the course to be customized.  
The course registration screen appears.



- To copy the registered course and make a new course, click the [Basic course] button from the function buttons and select a course to be copied.
- Click the [Change Name] button from the function buttons. You can change the course name to an optional one by using the alphabet letters, numerals and/or symbols through the keyboard of personal computer.

- 4 Select the chart icons according to the test procedure from the chart icon list displayed at the upper section of the screen.

If a test is to be conducted monocularly, register the test once. It is not necessary to register the test for each eye.

For example, register the tests as shown below. The tests of "1/3" and "2/3" are executed for the right eye first and then they are executed for the left eye. Next, the test of "3/3" is conducted.

1/3	R/G test (one eye)
2/3	Astigmatism test (one eye)
3/3	Binocular balance (both eyes)

When the "Append" mode is selected, the selected chart icon is added to the last of the "Examination list".

To insert a test in "Examination list", select the "Insert" mode. Click the desired position in "Examination list" and then select the chart icon.



- To delete the test registered in "Examination list", select the test to be deleted from "Examination list" and then click the [Delete] button from the function buttons.

- 5 Click the [Default] button to set the default test parameters to the chart icons registered in "Examination list".



Select the [Selected] button, and the default test parameters are set to only the tests selected from "Examination list". Select the [All] button, and the default test parameters are set to all the tests registered in "Examination list".

- 6 Select the chart icon for the test whose contents should be changed from the "Examination list". Click the [Modify] button from the function buttons.

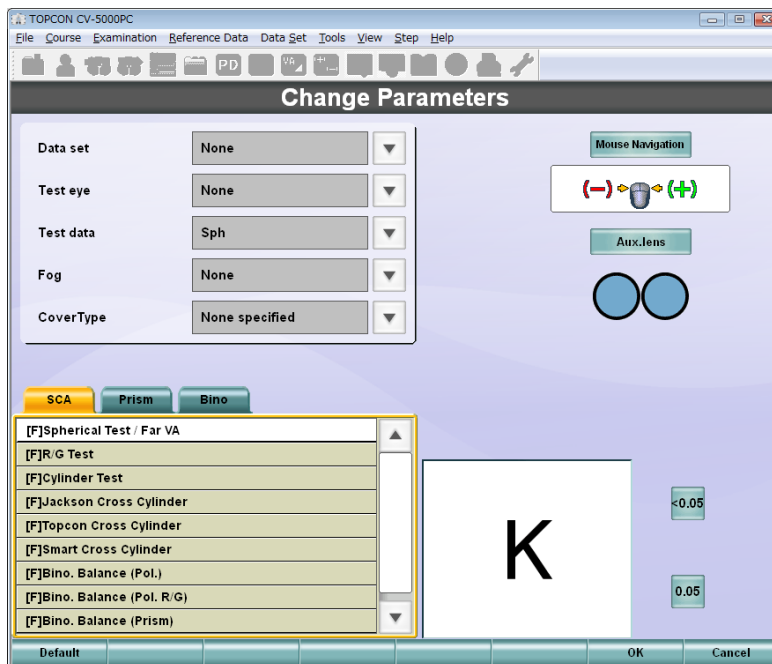
The parameter changing screen appears.



- 7 Customize the parameters and click the [OK] button.



- Touch the [Default] button, and the parameters are returned to the factory initial values when shipped.
- You can select the patient's eye from "Mono", "Bino", "Bino (R)" and "Bino (L)". Select "Mono", and the test is executed for each eye. Other parameters are the same as those on the parameter changing screen registered in the chart page. For the details, refer to Step 6 of " CHANGING THE TEST RELATED TO THE TEST CHART" on P.142.

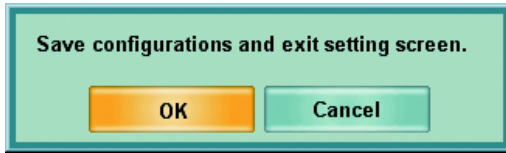


- 8 Once all of the data has been entered correctly and registered in the "Examination list" and click the [OK] button.

The "Settings" menu is displayed.

**9** Click the [Exit] button.

The check screen to finish the "Settings" menu appears.



To save the set data and finish the "Settings" menu, click the [OK] button.

To return to the "Settings" menu without saving the set data, click the [Cancel] button.

# 6.4 EXPLANATION

## 6.4.1 DATA TO BE PRINTED

### CV-5000 Examination Results

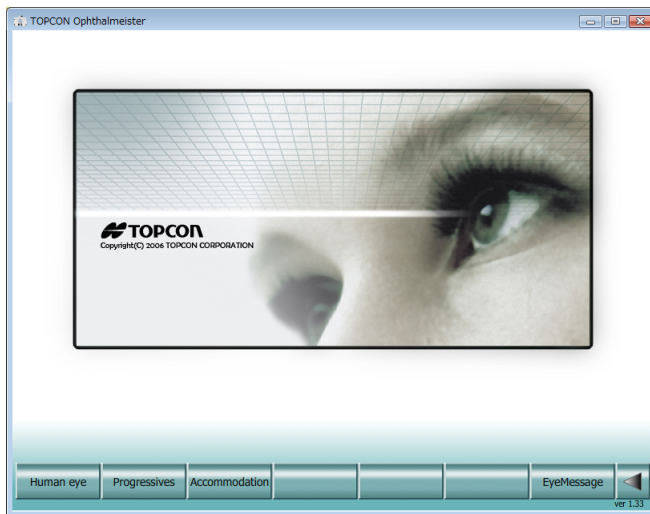
Examination Information															
PatientID				8172				ExamID				1			
Name								Age							
Date				2013/12/01 10:30				ExamTime				28:30			
VD				12.00				ExamDistance (Far/Near)				64.0/60.5			
Uncorrected VA															
Far						Near									
R	0.05			0.2			0.2			0.9					
L	0.15						0.8								
Manifest															
		SPH	CYL	AXS	ADD	VA	H	V	Prism	Angle					
Far	R	-4.25	-0.50	169	+2.25	1.2	0.0	0.5BD	0.5	270					
	L	-2.75	-0.75	28	+2.25	1.2	2.5BI	0.0	2.5	180					
Near	R	-2.00	-0.50	169		1.0	0.0	0.5BD	0.5	270					
	L	-0.50	-0.75	28		1.0	2.5BI	0.0	2.5	180					
Final Corrected															
		SPH	CYL	AXS	ADD	VA	H	V	Prism	Angle					
Far	R	-4.00	-0.50	169	+2.00	1.0	0.5BI	0.0	0.5	0					
	L	-2.50	-0.50	28	+2.00	1.0	0.5BI	0.0	0.5	180					
Near	R	-2.00	-0.50	169		1.0	0.5BI	0.0	0.5	0					
	L	-0.50	-0.50	28		1.0	0.5BI	0.0	0.5	180					
Bino Test															
Stereo (Floating)	Far	1'				Coincidence (H)	Far	L>R (3.5%)							
	Near	13' 12"					Near	L>R (3.5%)							
Stereo (Sinking)	Far	1'				Coincidence (V)	Far	L>R (3.5%)							
	Near	13' 12"					Near	L>R (3.5%)							
Fixation Disparity	Far	2.5BI				Sheard's Criteria	Far	0.0							
	Near	2.5BI					Near	0.0							
Worth 4Dots	Far	4dots				AC/A	3.0BI/D								
21 Test															
#3	2.0BI				#8										
#9,10	19.0BO/25.0BO/22.0BO				#11	-----/10.0BI/9.0BI									
#12A					#12B	SUPRA	2.5BU/2.0BU								
						INFRA	2.5BD/1.5BD								
#13A	2.0BI				#13B	9.5BI									
#14A	R	+2.00			#14B	R									
	L	+2.00				L									
#15A	9.5BI				#15B										
#16	11.0BO/20.0BO/13.0BO				#17	-----/24.0BI/22.0BI									
#18A	0.0				#18B	SUPRA	+3.5BU/2.0BU								
						INFRA	+2.5BD/1.5BD								
#19B	+2.00/+1.50				#20	-1.25/-0.75									
#21	+0.75/+0.25														
AR Data															
		SPH	CYL	AXS	VA										
R	-4.00			-0.50	166	1.0									
L	-2.50			-0.50	24	1.0	1.2								
Kerato Data															
		Weak meridian			Strong meridian			Average		Corneal Astigmatism					
		R	D	AXS	R	D	AXS	R	D	CYL	AXS				
R	42.75			7.89	175	43.75	7.73	85	43.25	7.81	-1.00	175			
L	42.25			7.99	180	42.75	7.87	90	42.50	7.93	-0.50	180			
Rx Data															
		SPH	CYL	AXS	ADD	VA	H	V	Prism	Angle					
Far	R	-3.00	-0.50	150	+1.50	0.6	0.5BI	0.0	0.5	0					
	L	-1.75	-0.50	40	+1.50	0.8	0.5BI	0.0	0.5	180					
Near	R	-1.50	-0.50	150		1.0									
	L	-0.25	-0.50	40		1.0									
Previous Data															
		SPH	CYL	AXS	ADD	VA	H	V	Prism	Angle					
Far	R	-3.00	-0.50	150	+1.50	1.0	0.5BI	0.0	0.5	0					
	L	-1.75	-0.50	40	+1.50	1.0	0.5BI	0.0	0.5	180					
Near	R	-1.50	-0.50	150		1.0	0.5BI	0.0	0.5	0					
	L	-0.25	-0.50	40		1.0	0.5BI	0.0	0.5	180					

## 6.4.2 USING THE PATIENT EDUCATION TOOLS FOR THE PATIENT

These tools are used to explain the eye structure, eye accommodation, etc. Click the [Human eye] button. The explanation tools are displayed. To return to the test screen, click the test screen.

### OPERATIONS ENABLED BY THE EXPLANATION TOOLS

Start the explanation tools function. The explanation tools main screen appears. Click the function buttons on the main screen. The explanation of each tool is displayed.



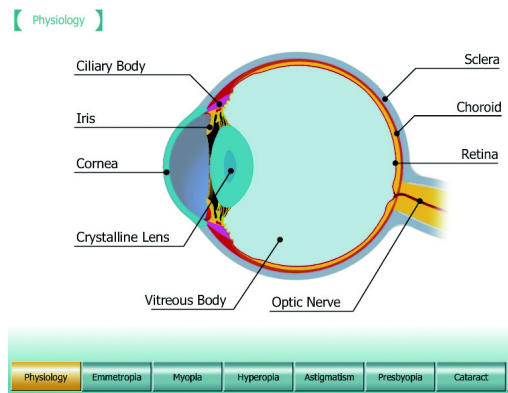
#### Human eye

Click the [Human eye] button on the main screen. The screen displaying eye structure and focal points and refractive error appears. Click the rightmost [◀] button. The main screen appears again. Each item is explained below.

- Physiology

Click the [Physiology] button, and the eye structure screen appears.

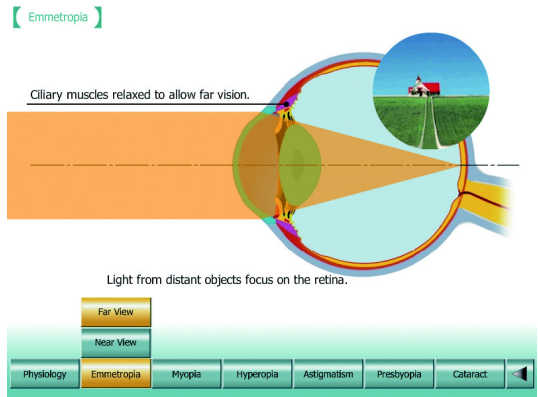
This screen describes the structure of the eye.



- Emmetropia

Click the [Emmetropia] button, and the emmetropia screen appears. This screen explains how the eye is focused when refraction is normal.

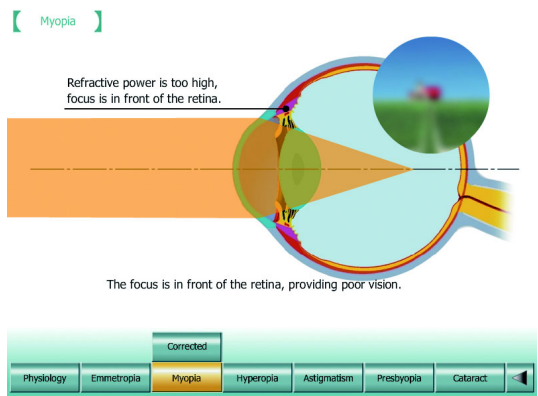
Click the [Far View] button. The animation explains how light is refracted in the eye when seeing a far object. Click the [Near View] button. The animation explains how light is refracted in the eye when seeing a near object.



- Myopia

Click the [Myopia] button, and the myopia screen appears. This screen explains the refractive error of myopia.

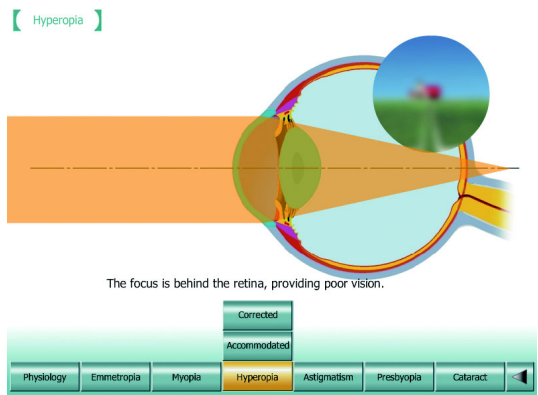
Click the [Corrected] button. The animation explains how the refractive error is corrected by using a concave lens.



- Hyperopia

Click the [Hyperopia] button, and the hyperopia screen appears. This screen explains the refractive error of hyperopia. Click the [Accommodated] button. The animation explains what has happened in the eye when the person having hyperopia sees an object with the uncorrected eyes.

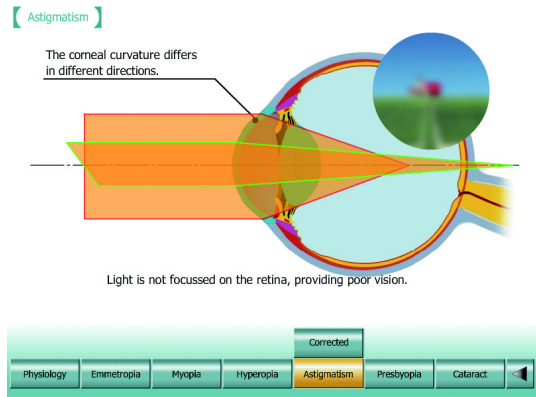
Click the [Corrected] button. The animation explains how the refractive error is corrected by using a convex lens.



- Astigmatism

Click the [Astigmatism] button, and the astigmatism screen appears. This screen explains the refractive error of astigmatism.

Click the [Corrected] button. The animation explains how the refractive error is corrected by using a cylinder lens.



- Presbyopia

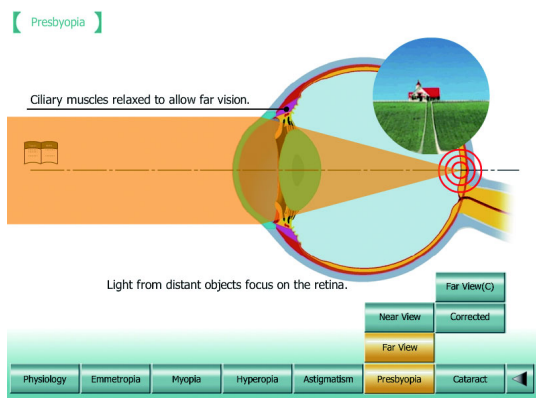
Click the [Presbyopia] button, and the presbyopia screen appears. This screen explains the status of presbyopia.

Click the [Far View] button. The screen explains the eye refraction status when the person who has emmetropia for far point and presbyopia for near point sees a far object.

Click the [Near View] button. The screen explains the eye refraction status when the person who has emmetropia for far point and presbyopia for near point sees a near object.

Click the [Corrected] button. The animation explains how a person having presbyopia sees a near object by using a single-focal lens.

Click the [Far View (C)] button. The animation explains how a person, who is wearing the single-focal lens for near point, sees a far object.

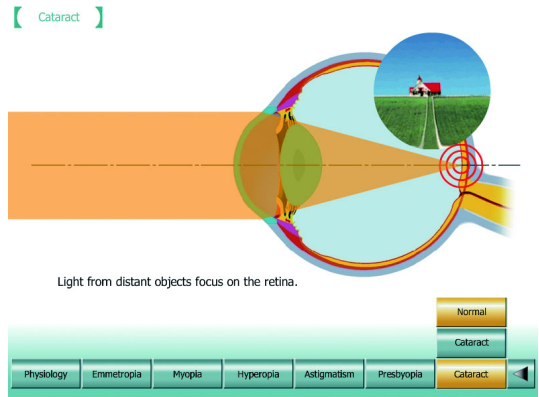


- Cataract

Click the [Cataract] button, and the cataract screen appears. This screen explains a cataract.

Click the [Normal] button. The animation explains the eye status of the person without a cataract.

Click the [Cataract] button. The animation explains the eye status of the person having a cataract and his/her vision.

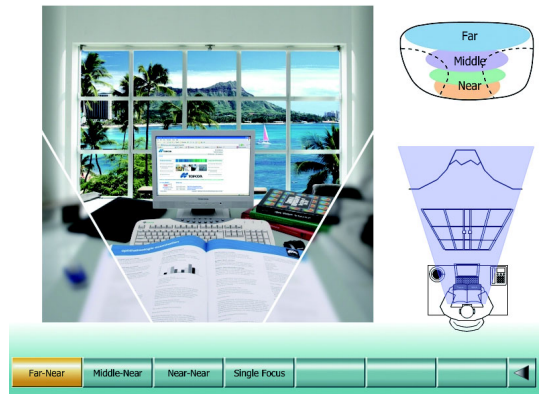


## Progressives

Click the [Progressives] button on the main screen, and progressive lens screen appears. You can select one of the four function buttons, [Far-Near], [Middle-Near], [Near-Near] and [Single Focus].

Click each button. The screen, which shows the rough structure of each lens, the focus range and the lens features about visual field, appears.

Click the far right [◀] button. The main screen appears again.



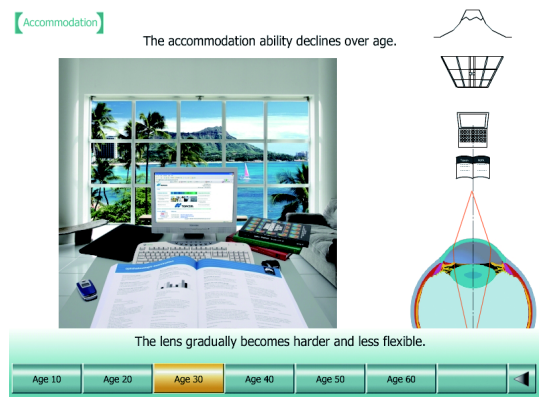
## Accommodation

Click the [Accommodation] button on the main screen, and the accommodation screen appears.

You can select one of the six function buttons about teens to sixties.

Click each button. The figure showing the range where accommodation is valid for each age is displayed.

Click the far right [◀] button. The main screen appears again.



## Eye Message

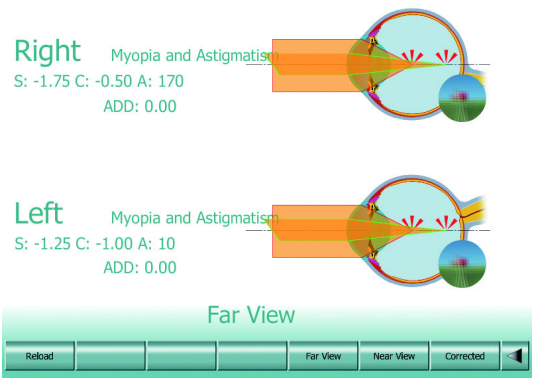
Click the [EyeMessage] button on the main screen. The refractive error of the patient is displayed on the screen according to the examination results in the CV-5000.

When you return to the test screen and change the data while the explanation tools are starting, the data on the "Eye Message" screen are updated by clicking the [Reload] button.

Click the [Far View] button. The screen shows how light is refracted when a person sees a far object with uncorrected eyes.

Click the [Near View] button. The screen shows how light is refracted when a person sees a near object with uncorrected eyes.

Click the [Corrected] button. The animation shows how the abnormal refraction of far-point sight is corrected. Click the far right [◀] button. The main screen appears again.



# 7. MAINTENANCE

## DAILY CHECKUPS

- Dust is potentially harmful to the instrument. When not in use, place the dust cover over the instrument.
- When not in use, turn off the power.

## ORDERING CONSUMABLES

When ordering consumables, contact your dealer or TOPCON office (listed on the back cover) and tell them the item name, item code and quantity.

Item name	Item code
Fuse T4AL 250V	42038 9004
Forehead rest	43221 3054
Face shield (left)	43226 4010
Face shield (right)	43226 4020

## USER MAINTENANCE ITEMS

Item	Inspection time	Contents
Inspection	Before using	<ul style="list-style-type: none"><li>• The instrument must operate correctly.</li><li>• The examination window and corneal aligning window must be free of stain or flaw.</li></ul>
Cleaning	When the part is stained	<ul style="list-style-type: none"><li>• Examination window and corneal aligning window</li><li>• Cover, switch and others</li></ul>
Replacement	As required	<ul style="list-style-type: none"><li>• Fuse</li></ul>

## REPLACING THE FUSE



### WARNING

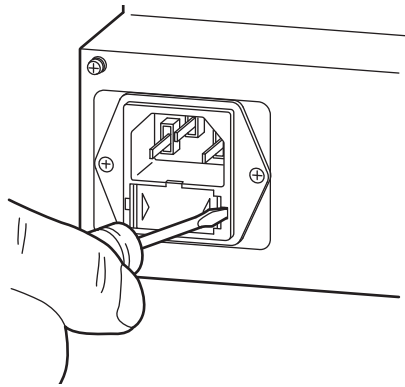
To avoid electric shock, be sure to remove the power cable from the instrument body before removing the fuse cover for replacement. Also, do not connect the power cable to the instrument body with the fuse cover left unfixed.



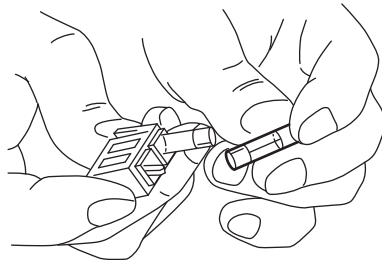
### WARNING

To avoid fire in the event of an instrument malfunction, use a properly rated fuse.

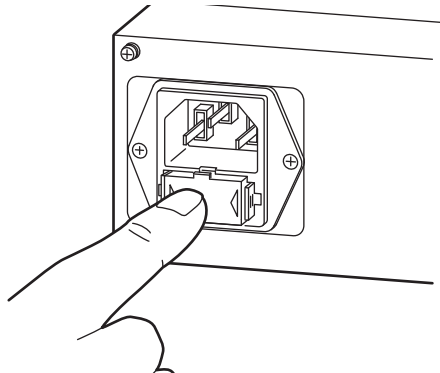
- 1 Make sure that the power of the instrument is OFF and then unplug the power cord.
- 2 Push the tabs at both ends of the fuse holder with a slotted screwdriver and remove the fuse holder.



- 3 Replace the fuse with a new accessory fuse.



- 4 Push in the fuse holder until a "click" is heard.



## CLEANING

<b>NOTICE</b>	Do not wipe the forehead rest, face shield and other resin parts with volatile solvent. To prevent the resin parts from discoloring or deteriorating, do not use benzine, thinner, ether or gasoline.
---------------	---

When the external cover, monitor, etc. are stained, wipe with a dry cloth.

If the external cover is badly stained, prepare a tepid solution of neutral kitchen detergent.

Moisten the cloth with the aforementioned solution and wring it thoroughly. Then, wipe the external cover with it.

### Cleaning parts which contact the patient

If the forehead rest, face shield and operation switches are stained, prepare a tepid solution of neutral kitchen detergent. Moisten a cloth with the aforementioned solution and wring it thoroughly. Then, wipe these parts with the cloth.

### Cleaning the lens

<b>NOTICE</b>	Do not wipe the lens with the gauze held by tweezers, etc. The glass surface may be damaged.
---------------	---

If the lens is stained, wipe it with the accessory silicone cloth. If the stain is not removed, moisten a worn-out cotton cloth a little with a mixed solution (the ratio of ether 4 to alcohol 1) and wipe the lens with it.

## INSPECTING THE MEASURING HEAD MOUNTING SECTION

If the mounting section for the measuring head is loosened, an unexpected accident such as falling could occur.

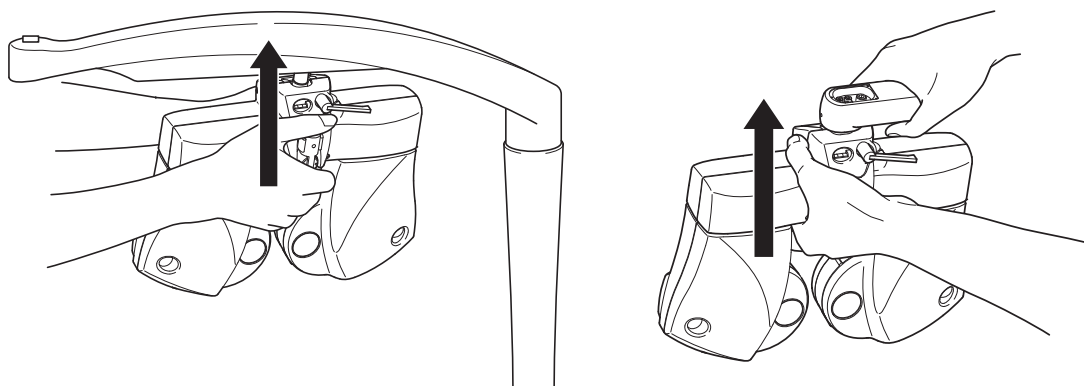
To use the instrument safely, it is recommended to inspect it every day.

### Point for inspection

Inspect the connecting section between the measuring head and the arm

<b>NOTICE</b>	Hold the PD cover unit when holding the measuring head.
---------------	---

Raise the measuring head as shown below. If an abnormal noise is heard or any part is not secure between the arm and the arm mounting shaft, immediately contact the TOPCON offices listed on the back cover and ask them to repair your instrument.



Raise the measuring head vertically. If you raise it slantwise, it is difficult to check if any part is unsteady because the arm mounting shaft moves horizontally.

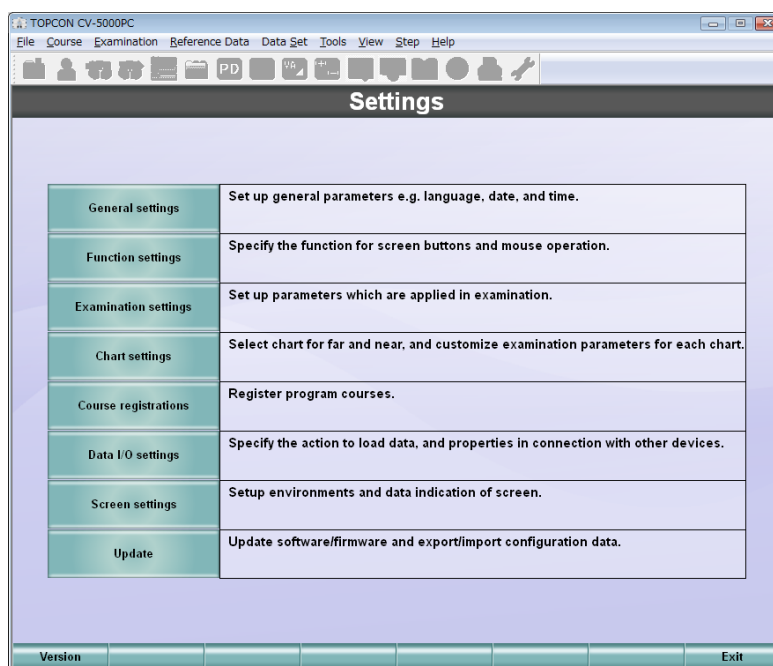
# 8. SETTING

## 8.1 BASIC OPERATION FOR "SETTINGS" MENU

---

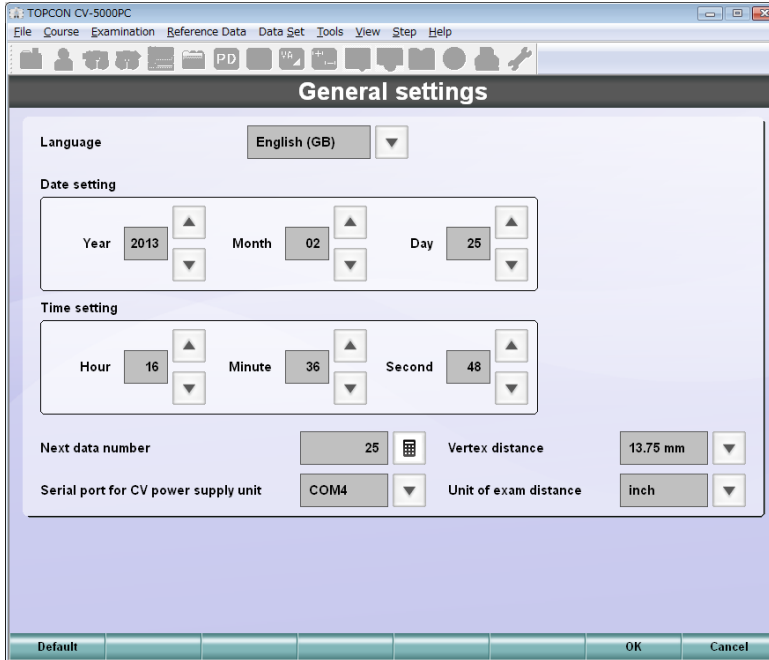
To customize the chart page or change a variety of settings, start from the "Settings" menu. This chapter will explain the basic procedure for changing the settings.

- 1 Click the [Settings] button.  
The "Settings" menu is displayed.
- 2 Click the corresponding buttons for the set items to change the data.



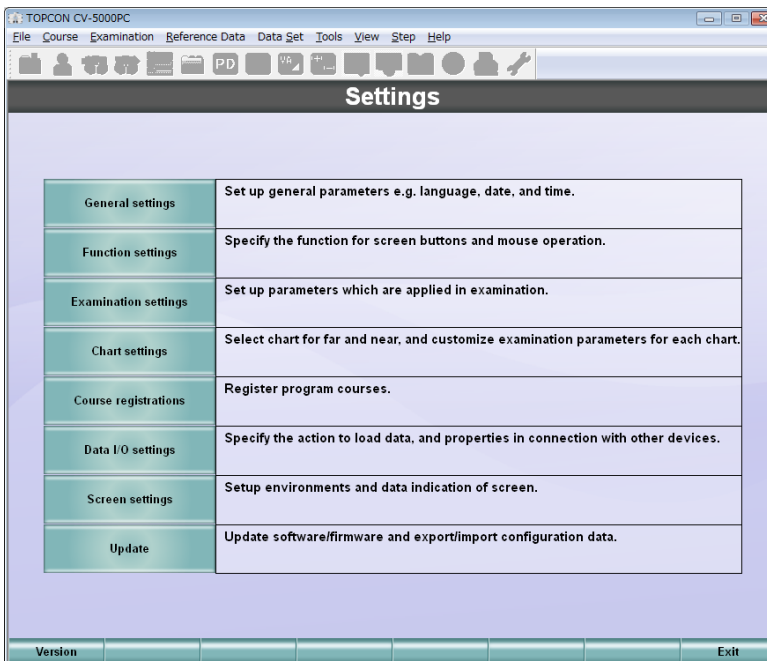
Do not make any changes not described in this manual as the system may not operate properly.

- 3 After changing, click the [OK] button.  
The "Settings" menu appears again.



The screen is different according to the setting of each item.

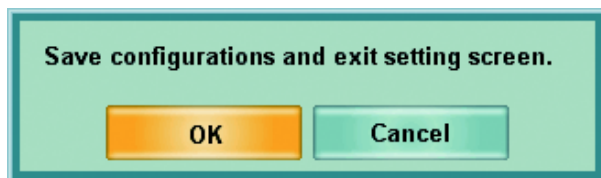
- 4 Click the [Exit] button.



The check screen to finish the "Settings" menu appears.

To save the set data and finish the "Settings" menu, click the [OK] button.

To return to the "Settings" menu without saving the set data, click the [Cancel] button.

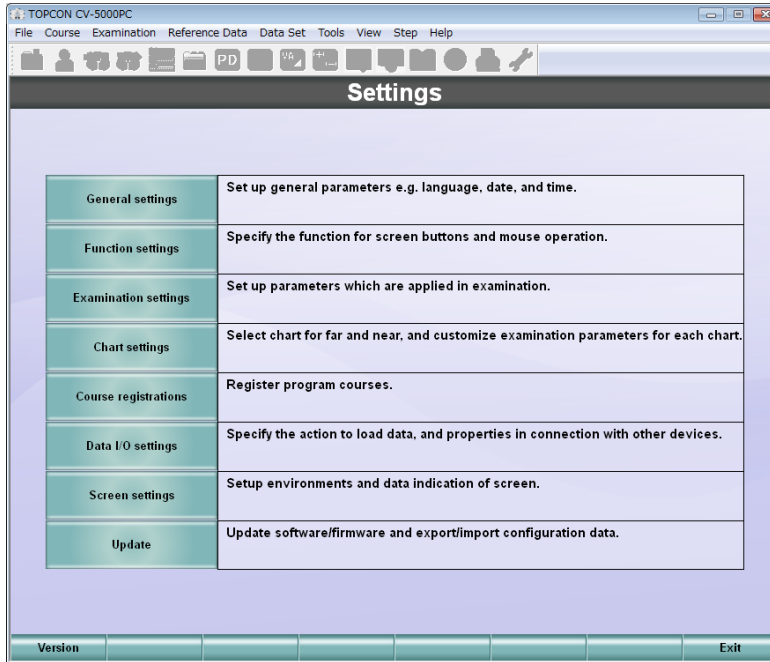


The test screen appears again.

## 8.2 "SETTINGS" MENU LIST

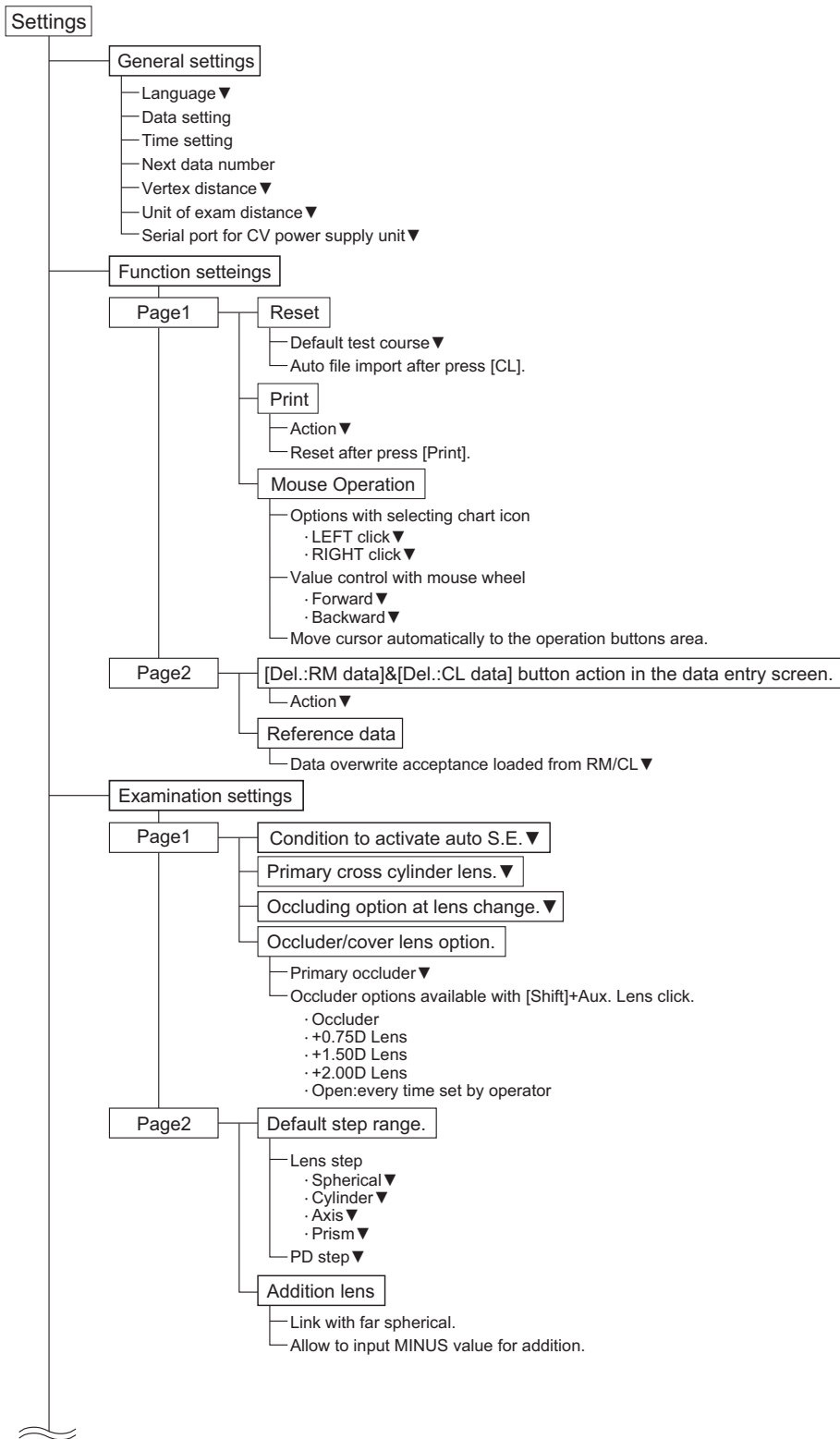
---

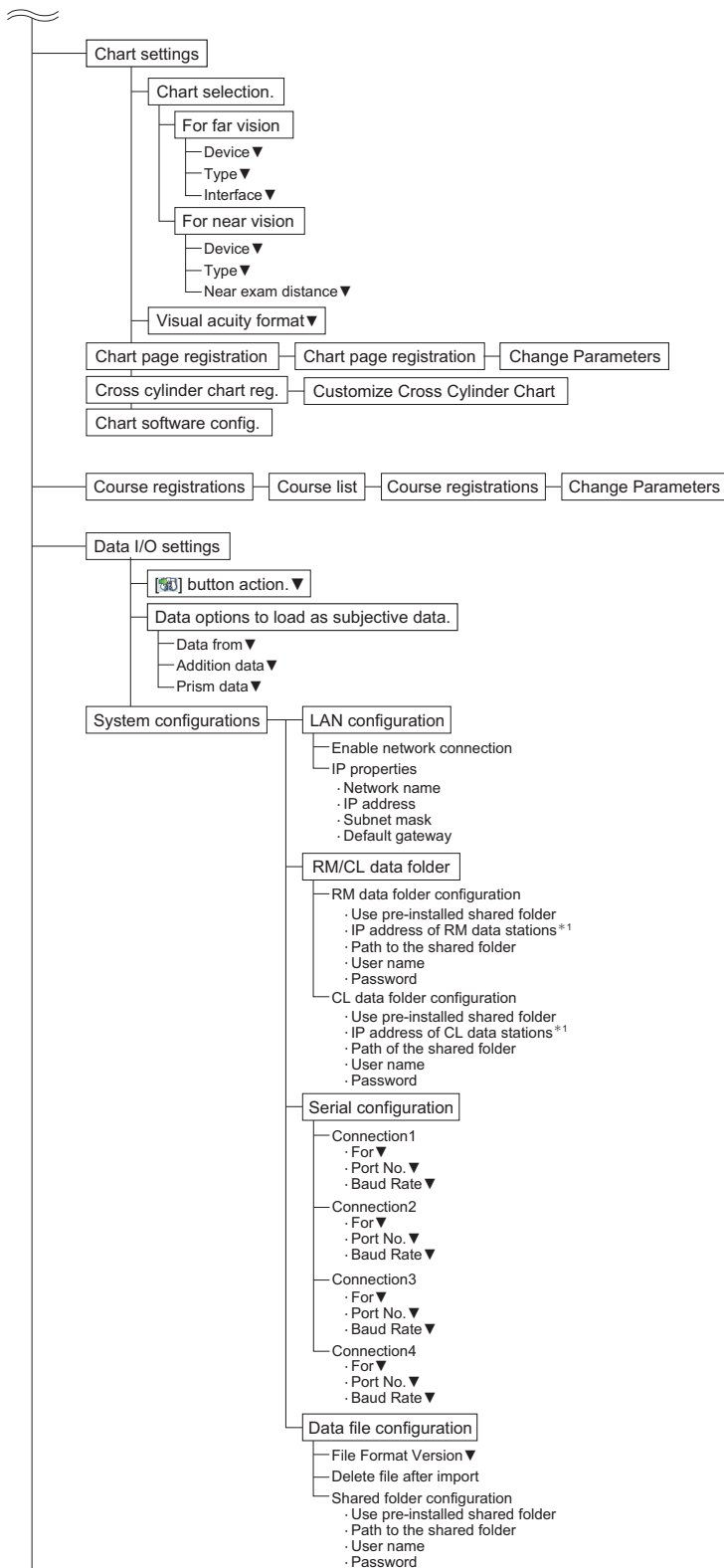
This chapter will explain the function of the "Settings" menu.



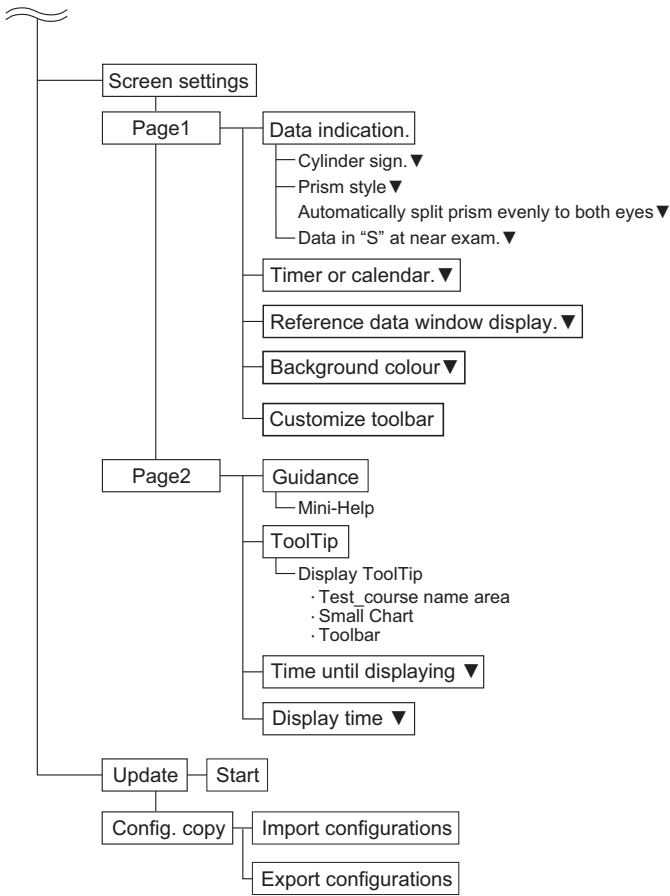
For the basic operation common to the items of the "Settings" menu, refer to "8.1 BASIC OPERATION FOR "SETTINGS" MENU" on P.160.

The configuration of the "Settings" menu is shown below.



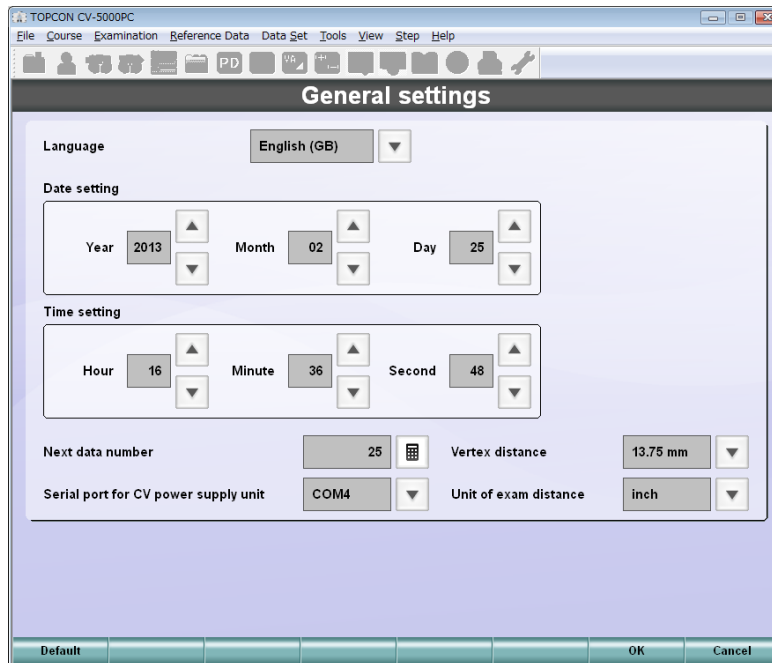


\*1 This is displayed when a check mark is placed for "Use pre-installed shared folder".



## 8.2.1 General settings

Select a language and set the date, connection, etc.



### Language

Set the language to be used.

### Date setting

Set the date.


### Time setting

Set the time.

### Next data number

Set the data ID to be assigned to the next refraction patient in the range of 0 - 999999. Each time the system is reset, the ID number will increment.



Click the [  ] button, and the input screen appears. You can input a value through the keyboard of the personal computer.

### Vertex distance

To perform the test accurately, select the distance between the patient's eye and lens from the following selections.

- 12.0mm
- 13.75mm
- 16.0mm
- 18.0mm
- 20.0mm

#### Unit of exam distance

Select the unit of distance from the following items. The values of "cm" and "inch" are displayed together on "Near exam distance" of "Chart settings" regardless of the selected unit.

- cm
- inch

#### Serial port for CV power supply unit

Select the port number of the personal computer that is connected to the CV power supply unit with the external PC. The displayed port number is changed according to the serial port number on the personal computer.

#### Default

This button returns the system to the factory initial settings when shipped.

#### OK/Cancel

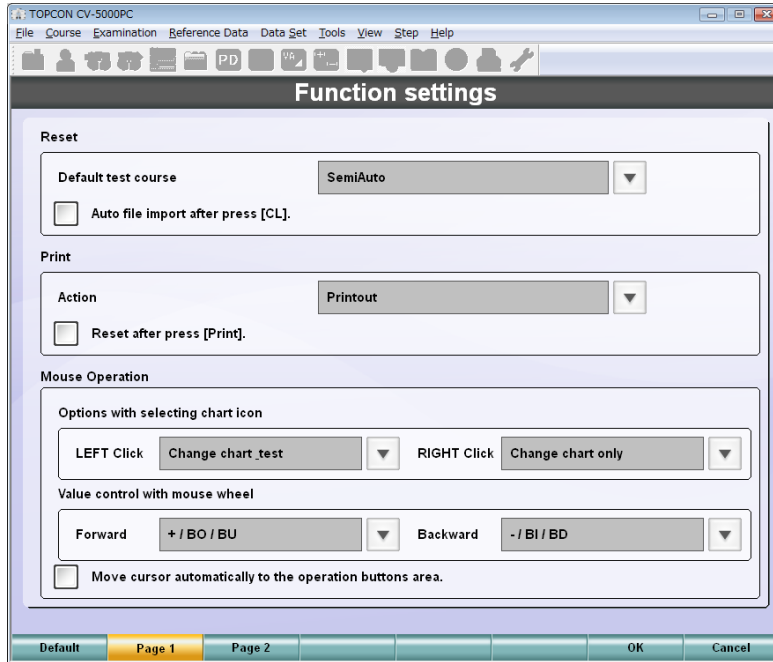
Click the [OK] button. The changed data is saved and the "Settings" menu appears again.

Click the [Cancel] button. The changed data is canceled and the "Settings" menu appears again.

## 8.2.2 Function settings

Assign the functions to the switches and buttons and set the rules to reset the data. Use the [Page 1] and [Page 2] buttons from the function buttons. The display is changed.

Page 1



### Reset

Set the operation after resetting.

- Default test course

Select the test mode that will start automatically after clicking the [Reset] button from the following selections.

- SemiAuto
- P1 - P5 course
- Standard course



The customer can set "P1 - P5 course". For registering the course, refer to "6.3.2 CUSTOMIZE THE TEST PROCEDURE" on P.146.

- Auto file Import after press [CL].

Place a check mark for this item. After clicking the [Reset] button, the output file from the customer's external software will be automatically imported.

## Print

Set the [Print] button operation.

- Action

You can set "Print", "Output data" or "Print and output data" by clicking the [Print] button.

- Printout
- Data export
- Printout & data export

- Reset after press [Print].

Place a check mark for this item. After clicking the [Print] button, the system is automatically reset.

## Mouse Operation

Set the action of mouse operation.

- Options with selecting chart icon

Set the action for "LEFT Click" and "RIGHT Click".

- Change chart\_test
- Change chart only

- Value control with mouse wheel

Set the action for "Forward" and "Backward".

- +/BO/BU
- -/BI/BD

- Move cursor automatically to the operation buttons area.

Place a check mark for this item. When you select a test chart icon from the chart page, the mouse cursor moves to the operation buttons area automatically.

## Default

This button returns the system to the factory initial setting when shipped.

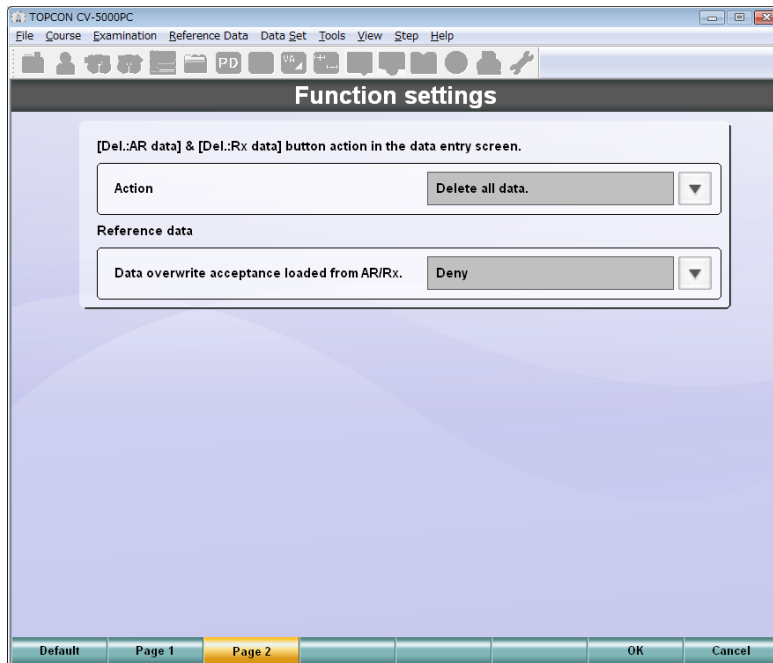
## Page 1/Page 2

These buttons are used to switch the page1/ page2.

## OK/Cancel

Click the [OK] button. The changed data is saved and the "Settings" menu appears again.

Click the [Cancel] button. The changed data is canceled and the "Settings" menu appears again.



[Del.:RM data]&[Del.:CL data] button action in the data entry screen.

Set the operation of the [Delete: RM] and [Delete: CL] buttons displayed on the data entry screen.

- Action

Select a time frame for the previous data to be deleted.

- Delete except today's data.
- Delete data older than a week.
- Delete data older than a month.
- Delete all data.

Reference data

Set the data captured from the peripheral devices.

- Data overwrite acceptance loaded from RM/CL.

Select whether the operator should have the capability to change the objective data and eyeglass data that are registered by others except for the manual input.

- Accept
- Deny

Default

This button returns the system to the factory initial setting when shipped.

Page 1/Page 2

These buttons change the page for changing the setting.

OK/Cancel

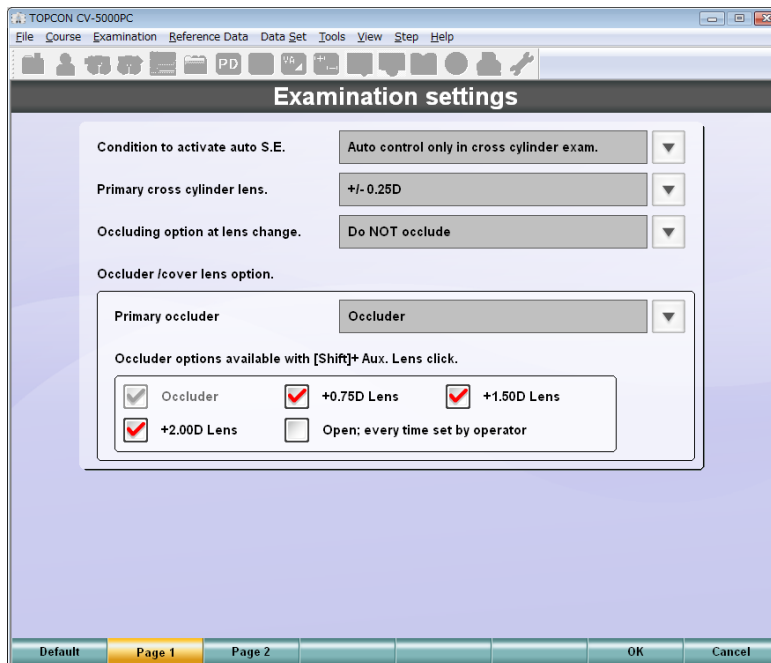
Click the [OK] button. The new setting will be saved and the "Settings" menu appears again. Click the [Cancel] button. The new changes will be canceled and the "Settings" menu appears again.

## 8.2.3 Examination settings

Set the status and values during the test.

Use the [Page 1] and [Page 2] buttons from the function buttons. The display is changed.

Page 1



Condition to activate auto S.E.

Determine the spherical equivalent operation.

- Manual
- Auto control when changing cylinder power.
- Auto control only in cross cylinder examination mode.

Primary cross cylinder lens.

Select the cross cylinder power to be used during normal operation.

- +/-0.25D
- +/-0.50D

Occluding option at lens change.

When you change the spherical power or cylinder power, the internal lenses are being changed. You can select whether the eye being tested should be occluded during the lens movement or left open while the refinement is conducted.

- Do NOT occlude
- ALWAYS occlude
- Do NOT occlude when moving to next lens.

## Occluder/cover lens option.

Set the occluder (cover lens).

- Primary occluder

Set the occlusion type to be controlled automatically by the program or operated by the operator during the test. This set data is used as the initial value.



Selecting "Open (The operator must set it manually)" invalidates the occlusion controlled automatically by the program. Use this setting when the operator decides a fog power should be added to the occluded eye and sets it manually.

- Occluder
  - +0.75D Lens
  - +1.50D Lens
  - +2.00D Lens
  - Open; every time set by operator
- Occluder options available with [Shift] + Aux. Lens click.  
Click the right mouse button for the auxiliary lens area, and you can change the occlusion type to be used temporarily. When you perform this operation, place a check mark for the selected type.
    - Occluder
    - +0.75D Lens
    - +1.50D Lens
    - +2.00D Lens
    - Open; every time set by operator

## Default

This button returns the system to the factory initial setting when shipped.

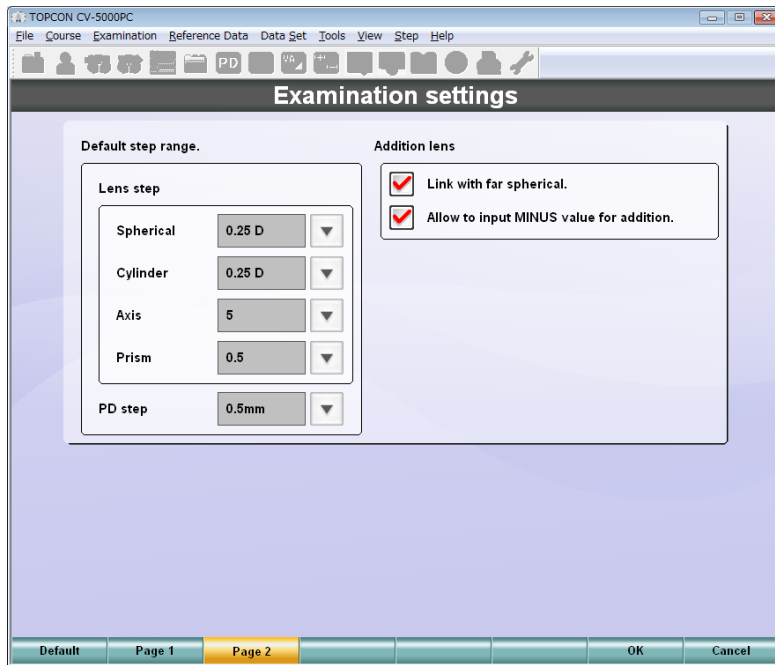
## Page 1/Page 2

These buttons change the page for changing the setting.

## OK/Cancel

Click the [OK] button. The new setting will be saved and the "Settings" menu appears again.

Click the [Cancel] button. The new changes will be canceled and the "Settings" menu appears again.



Default step range.

Set the step quantity when changing the refractive power or others.

- Lens step
  - Spherical
    - Set the changing step of the spherical refractive power.
    - 0.25D
    - 1.00D
    - 2.00D
    - 3.00D
  - Cylinder
    - Set the changing step of the cylinder refractive power.
    - 0.25D
    - 1.00D
  - Axis
    - Set the changing step of the cylinder axis.
    - 1
    - 5
  - Prism
    - Set the changing step of the prism refractive power.
    - 0.1
    - 0.2
    - 0.5
    - 1.0
- PD step
  - Set the changing step of PD.
  - 0.5mm
  - 1.0mm

### Addition lens

Set the input and change of ADD.

- Link with Far spherical.

Set whether ADD should be linked with the change of the far-point spherical power after inputting ADD. Place a check mark for this item, and the link operation is done.

- Allow to input MINUS value for addition.

Select whether it should be permitted to set 0.00D or less for the ADD power. Place a check mark for this item, and it will be functional in the minus direction.

### Default

This button returns the system to the factory initial setting when shipped.

### Page 1/Page 2

These buttons change the page for changing the setting.

### OK/Cancel

Click the [OK] button. The new setting will be saved and the "Settings" menu appears again.

Click the [Cancel] button. The new changes will be canceled and the "Settings" menu appears again.

## 8.2.4 Chart settings

Set the data about the visual acuity charts.

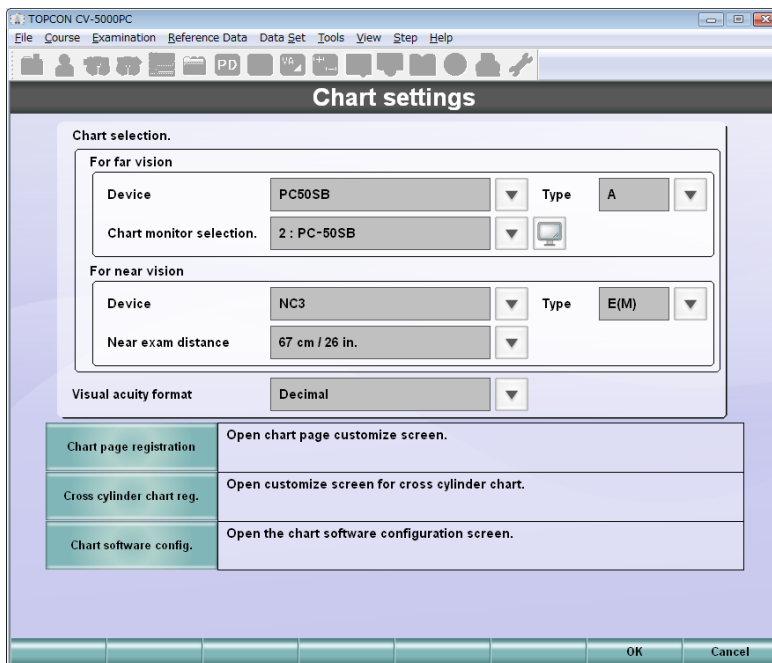


Chart selection.

Set the visual acuity chart to be used.

- For far vision

- Device

Select the chart device will be used for far-point test.

- Type



Select the type of the chart to be used for far-point test.

- Interface

Select the connection method of the chart to be used for far-point test.

IR control: CH1	Select one of these items when connecting with the infrared communication unit. "CH1 - CH4" means the infrared communication channel. Select one of them according to the set channel of the connected chart.
IR control: CH2	
IR control: CH3	
IR control: CH4	
RS-232C	Select this when connecting with the RS-232C cable.



- When you select "IR control" as the connecting method and click the [  ] button at the right, the test signal is sent to the visual acuity chart. This function is convenient when checking whether communication can be executed correctly by the selected channel.
- When you select "PC-50S", "PC-50SB" or "MC-4S" from the far-point chart devices, "Interface" is changed to "Chart monitor selection". Click the [  ] button at the right. You can check the monitor that corresponds to the name in the "Chart monitor selection" list being displayed.

- For near vision
  - Device  
Select the name of the chart to be used for near-point test.
  - Type  
Select the type of the chart to be used for near-point test.
  - Near exam distance  
Select the distance to be used in the near-point measurement. The convergence of measuring head is changed in the near-point test in relation to the distance set here. The values of "cm" and "inch" are displayed together regardless of the setting on "Unit of exam distance" of "General settings".
    - 40 cm/16 in.
    - 67 cm/26 in.
- Visual acuity format  
Select the visual acuity display type of the chart to be used in the test.

Decimal	1.0, etc.
Meter	6/6, etc. Only the denominator is displayed on the test screen.
Feet	20/20, etc. Only the denominator is displayed on the test screen.
LogMAR	0.0, etc.
Monoyer	10.0, etc.

#### Chart page registration

You can change the chart icon to be displayed on the chart page of the test screen or the test setting related to the chart icons.



- For the screen to customize the chart page, refer to " Chart page registration" on P.178.

#### Cross cylinder chart reg.

Access the test selection window and select the type of cross-cylinder desired of "Jackson Cross Cylinder", "Topcon Cross Cylinder" or "Smart Cross". In this case, you can select an optional chart to be used when executing the test.



- For the screen to change the cross cylinder test chart, refer to " Cross cylinder chart reg." on P.181.

#### Chart software config.

Set the data of the software chart installed additionally to the system. For the setting method and screens, refer to the software chart's instruction manual.

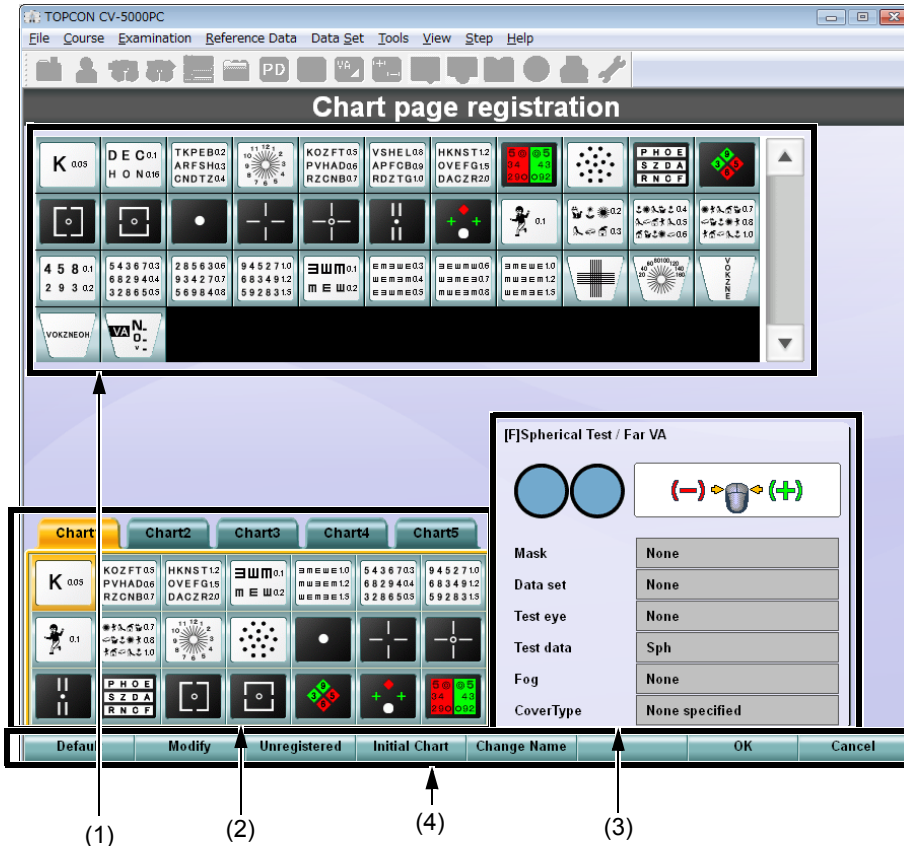
#### OK/Cancel

Click the [OK] button. The changed data is saved and the "Settings" menu appears again.  
Click the [Cancel] button. The changed data is canceled and the "Settings" menu appears again.

## Chart page registration

CV-5000 is equipped with the capability to customize the chart icons to be displayed on the chart page.

For changing the setting, refer to "6.3.1 CUSTOMIZING THE CHART PAGE" on P.141.



(1) List of test chart icons

Displays the list of charts contained in the chart device to be used.

(2) Chart page

The charts registered here are usable.

(3) Registered parameter information

Displays the test parameters related to the chart icons on the chart page.

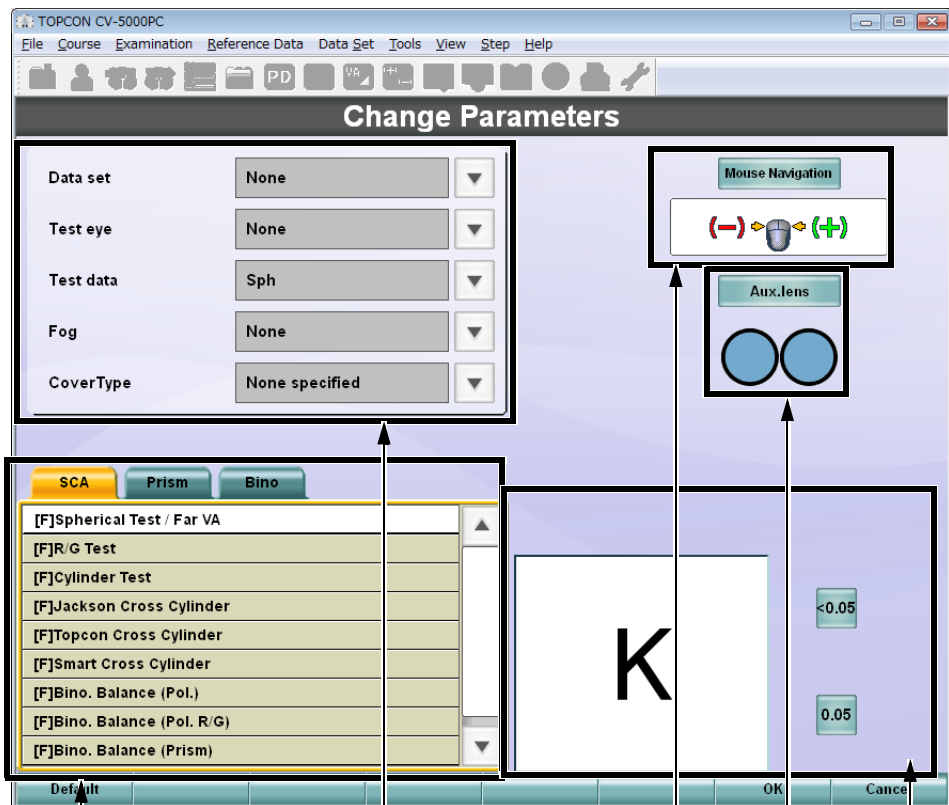
- Test name  
Displays the test name related to the chart icon.
- Auxiliary lens  
Displays the auxiliary lens to be automatically set when starting the test.
- Mouse Navigation  
Displays the mouse navigation to be displayed when starting the test.
- Mask  
Displays the status of the mask to be automatically inserted when starting the test.

- Data set  
Displays the type of the data to be set when starting the test.
- Test eye  
Displays the eye to be tested.
- Test data  
Displays the data to be changed when operating the mouse.
- Fog  
Displays the fog quantity to be automatically set to the test eye when starting the test.
- Cover Type  
Displays the lens which should be used to occlude (cover) the untested eye during the test.

(4) Chart page registration menu function

Displays the command buttons to be used when registering the chart page.

- Default  
Return all the chart pages to the default setting.
- Modify  
You can edit the tests and functions related to the test icon selected from the chart page.



List of tests

Setting the test information

Setting the mouse navigation

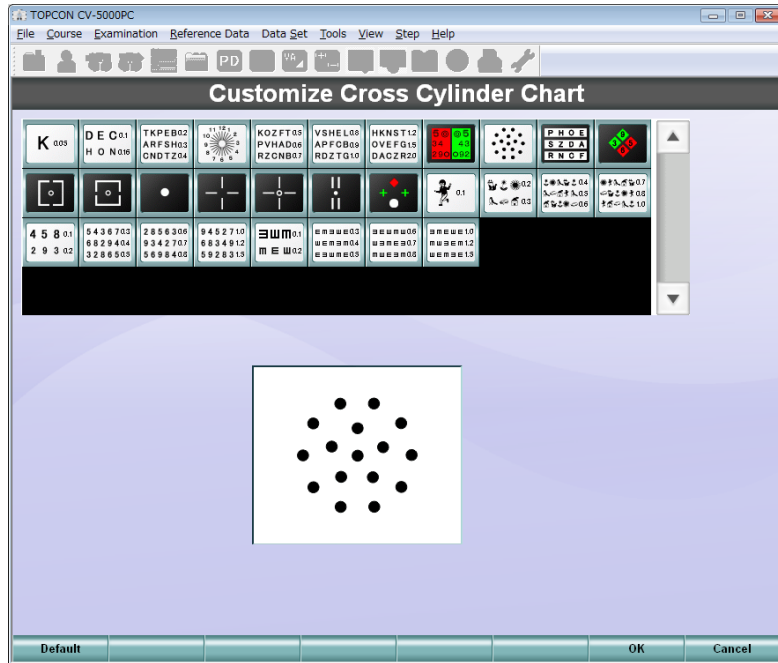
Setting the auxiliary lens

Test icon check display and setting the mask

- List of tests  
Displays the list of tests.  
Specify the test to be executed when clicking the test chart icon as changing the tab.
- Setting the test information  
Displays the parameters of the test to be executed when clicking the test chart icon.  
Select parameters to be set.
- Setting the mouse navigation  
Displays the mouse navigation to be used in the test to be executed when clicking the test chart icon.  
To change the mouse navigation, click the [Mouse Navigation] button. Then, the list of the mouse navigation is displayed. Select the proper navigation.
- Setting the auxiliary lens  
Displays the auxiliary lens to be used in the test to be executed when clicking the test chart icon.  
Click the [Aux. lens] button, and the list of auxiliary lenses is displayed.  
When you want to select an auxiliary lens prior to the start of the test, select it.
- Test icon check display and setting the mask  
Displays the test chart selected on the [Chart page registration] screen.  
When you want to apply a mask and then execute the test by clicking the test chart icon, set the mask here.
- Unregistered  
You can see the unregistered charts in the list of charts. The registered chart is displayed in the greyed out status.
- Initial Chart  
Specify [Initial Chart]. So you can specify the chart and test to be started when the instrument starts or is reset.
- Change Name  
You can edit the chart page name by using the alphabet letters, numerals and symbols through the keyboard of personal computer.
- OK  
Store the changed data and finish the procedure.
- Cancel  
Cancel the changed data and finish the procedure.

## Cross cylinder chart reg.

Change the test chart to be used in the cross cylinder test.  
The cross cylinder chart changing screen appears.



The mask button is displayed when a mask can be applied to the chart.



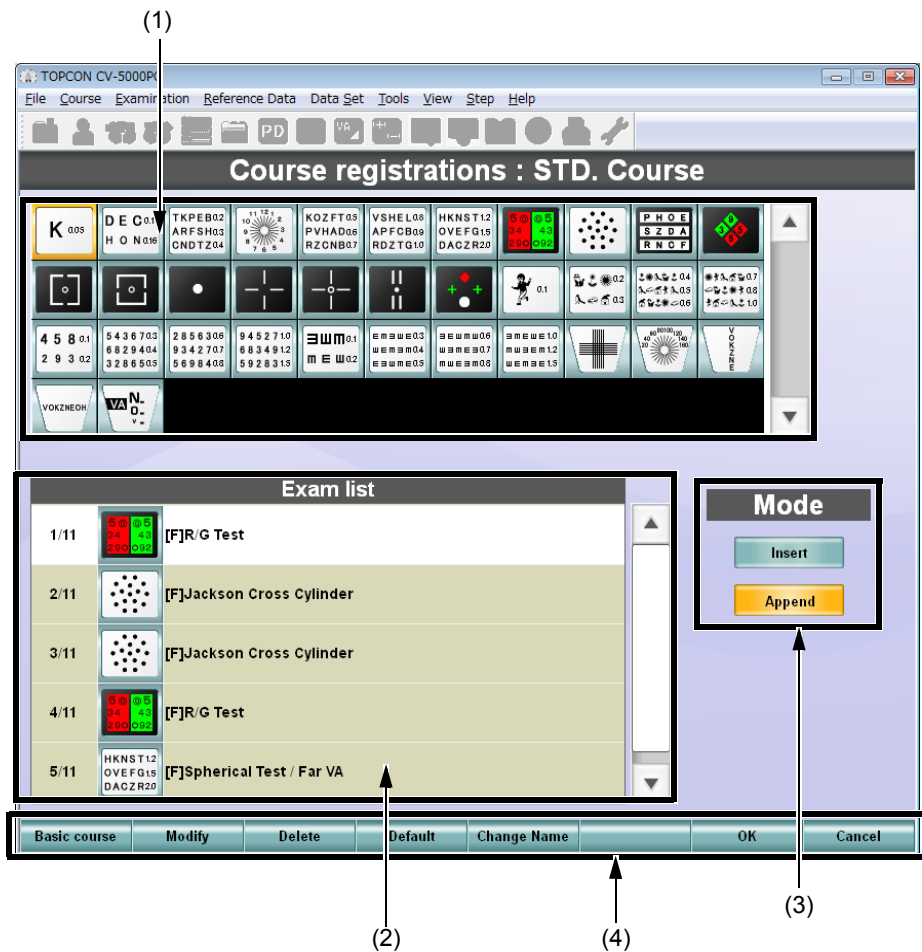
Refer to " CHANGING THE TEST CHART USED IN CROSS CYLINDER TEST" on P.145.

## 8.2.5 Course registrations

Set the data to customize and register the tests.



For the changing procedure, refer to "6.3.2 CUSTOMIZE THE TEST PROCEDURE" on P.146.



### (1) List of test chart icons

Displays the list of the test charts contained in the visual acuity cart device to be used. Click a test chart icon, and it is registered to "Exam list".

### (2) Test list

Registers the test to be performed. The sequence of the test, the chart to be used and test name are displayed.

You can distinguish the far-point test from the near-point test by the chart icon frame's shape.

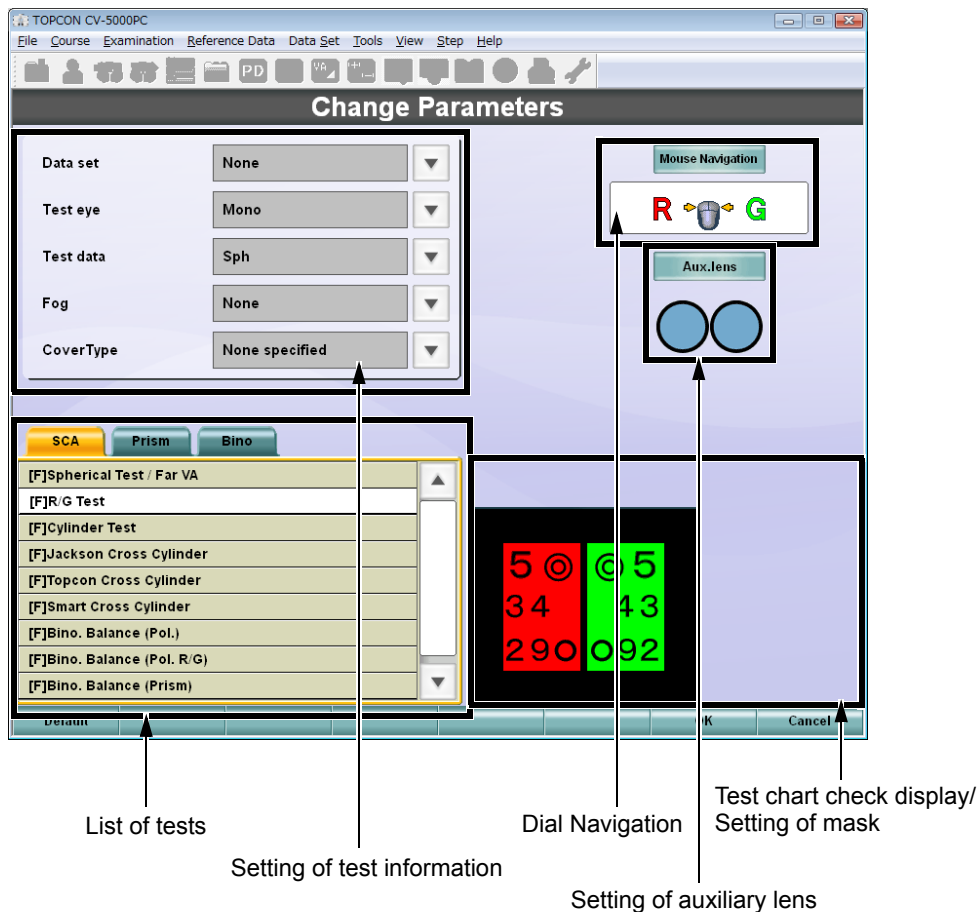
### (3) Mode

When registering a test chart, you can select whether the chart should be inserted before the selected test or be added at the end of the tests.

#### (4) Test procedure registration function button

Displays the command buttons to be used when registering the test procedure.

- Basic course  
Reads the course registered already.
- Modify  
You can edit the tests of the course selected from the "Exam list".



#### - List of tests

The list of test names is displayed.

When changing the tab, specify the test to be executed when the chart registered on the list of tests is displayed.

#### - Setting of test information

The parameters for the test to be executed when the chart registered in the list of tests is displayed are displayed. Select a parameter to be set.

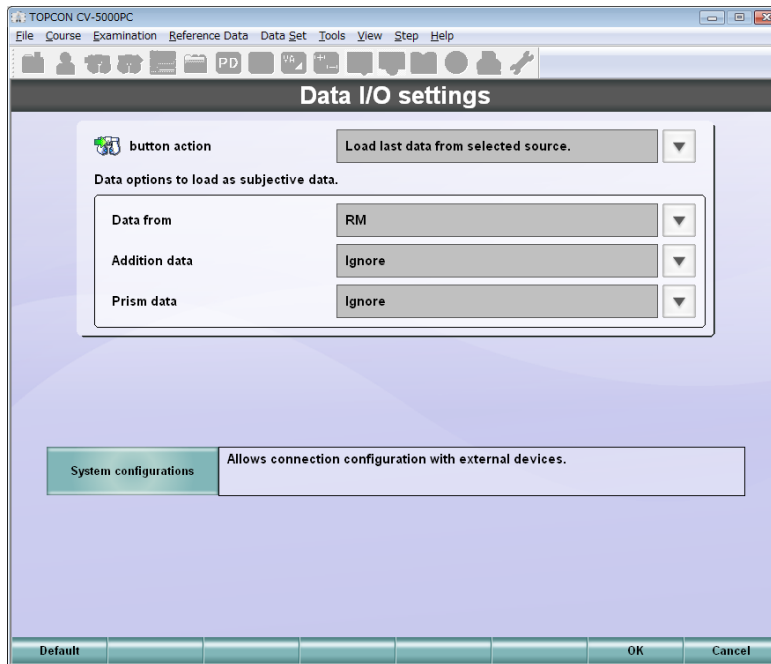


For the set items, refer to " Chart page registration" on P.178.

- Mouse Navigation
  - The type of "Mouse Navigation" to be used in the test related to the chart, which is registered in the list of tests, is displayed.
  - To change it, click the [Mouse Navigation] button. The list of "Mouse Navigation" is displayed. Select a desired "Mouse Navigation".
- Setting of auxiliary lens
  - The auxiliary lens for the test to be executed when the chart registered in the list of tests is displayed is displayed.
  - Click the [Aux. lens] button, and the auxiliary lens list is displayed.
  - When an auxiliary lens should be set before starting the test, select an auxiliary lens from the list.
- Test chart check display/Setting of mask
  - The chart registered in the list of tests is displayed. When a mask should be applied before executing the test related to the chart, set the mask here.
- Delete
  - You can delete the chart registered in the list of tests.
- Default
  - Register the parameters set as default for the selected chart.
  - When you have registered the test chart first, set the default parameters and then edit them.
- Change Name
  - You can edit the course name by using the alphabet letters, numerals and symbols through the keyboard of personal computer.
- OK
  - Save the changed data and finish the course registration.
- Cancel
  - Discard the changed data and finish the course registration.

## 8.2.6 Data I/O settings

Set the parameters when exchanging data with other models.



[] button action.

Set how data will be imported when clicking the [Data entry] button.

Display RM/CL data list.	When RM or CL is connected to the CV system through the serial method or LAN, the measured data is selected from the list and is imported into the CV-5000.
Load last data from RM/CL.	When RM or CL is connected to the CV system through the serial method or LAN, the data measured last is imported into the CV-5000.
Load last data from selected source.	When RM or CL is connected to the CV system through the serial method or LAN, the data measured last is selected and imported into the CV-5000.
Import data file.	The data file output from the external database software is imported into the CV-5000.

Data options to load as subjective data.

When the selected data is imported into the CV-5000, it is validated in the main data.

- Data form

When the selected data is input from an external device, the data is copied for the subjective value (main data).

- RM
- CL

- Addition data

Set how to manage the ADD power when copying a value for the subjective value (main data).

- Load and set
- Ignore

- Prism data

Set how to manage the prism value when copying a value for the subjective value (main data).

- Load and set
- Load only
- Ignore

System configurations

Set the connection for the device or software connected to CV-5000.



For details, refer to " System configurations" on P.187.

Default

Returns to the setting when shipped.

OK/Cancel

Click the [OK] button. The new setting will be saved and the system returns to the "Settings" menu.

Click the [Cancel] button. The new changes will be canceled and the system returns to the "Settings" menu.

## System configurations

Set the port to which the device connected to CV-5000 through the serial method or LAN will be connected to.

Use the function buttons to change the setting.



The authorized service engineer must conduct this setting. Please contact the authorized service engineer to change the setting.

### LAN configuration

Set the data to connect the CV system to LAN.

LAN configuration

Enable network connection

IP properties

Network name	Local Area Connection
IP address	0.0.0.0
Subnet mask	0.0.0.0
Default gateway	

LAN config. Data folder Serial config. Data file config. OK Cancel

#### Enable network connection

Place a check mark here to connect the CV system to LAN.



To make the RM/CL data common to two or more CV systems, the CV systems must be connected to LAN.

#### IP properties

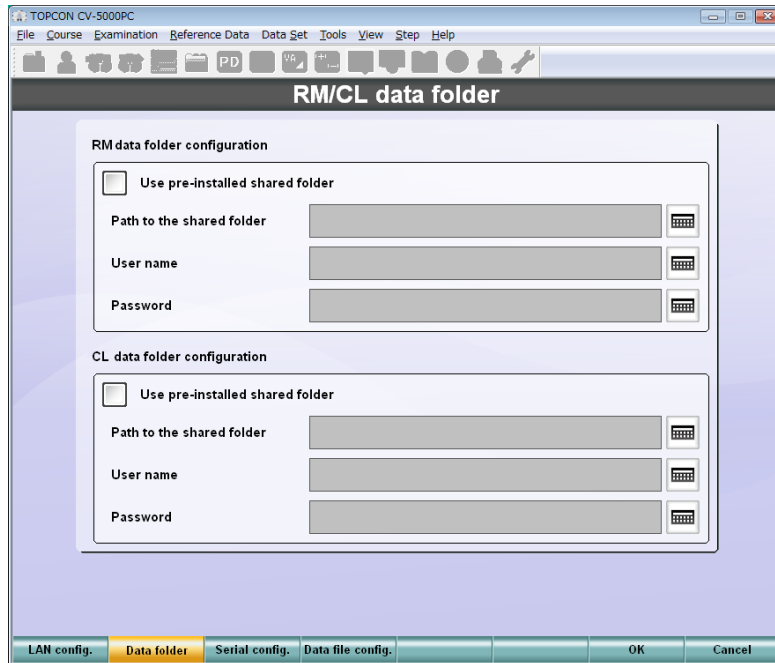
You can check the necessary setting to connect the CV system with LAN.

- Network name  
Check the network assigned to the CV system.
- IP address  
Check the IP address assigned to the CV system.
- Subnet mask  
Check the subnet mask that is set by the environment of LAN to be connected.
- Default gateway  
Check the default gateway that is set by the environment of LAN to be connected.

## RM/CL data folder

Set the data folder when capturing the data from RM or CL.

You can select this button when a check mark is placed for "Enable network connection" on "LAN configuration".



### RM data folder configuration

Set the RM data folder.


- Use pre installed shared folder  
Place a check mark for this item when capturing the RM data to the common folder in the CV system itself or in an other CV system within the same network.



The common folder is provided as a standard equipment in the CV system.

- IP address of RM data stations  
When a check mark is placed for "Use pre-installed shared folder in CV system", this item is validated.  
When using the common folder in the CV system itself, input its IP address.  
When using the common folder in an other CV system within the network, input the IP address of the CV system.
- Path to the shared folder  
When a check mark is not placed for "Use pre-installed shared folder", this item is validated.  
Specify the network path of the common folder where the RM data is saved.
- User name  
When a check mark is not placed for "Use pre-installed shared folder", this item is validated.  
Specify the user name to access the common folder where the RM data is saved.
- Password  
When a check mark is not placed for "Use pre-installed shared folder", this item is validated.  
Specify the password to access the common folder where the RM data is saved.



Click the [] button, and the input screen appears. You can input a value by using the alphabet letters, numerals and symbols through the keyboard of the personal computer.

#### CL data folder configuration

Set the CL data folder.

- Use pre-installed shared folder

Place a check mark for this item when capturing the CL data to the common folder in the CV system itself or in other CV system within the same network.



The common folder is provided as a standard equipment in the CV system.

- IP address of CL data stations

When a check mark is placed for "Use pre-installed shared folder", this item is validated.

When using the common folder in the CV system itself, input its IP address.

When using the common folder in another CV system within the network, input the IP address of the CV system.

- Path to the shared folder

When a check mark is not placed for "Use pre-installed shared folder", this item is validated.

Specify the network path of the common folder where the CL/EZ data is saved.

- User name

When a check mark is not placed for "Use pre-installed shared folder", this item is validated.


Specify the user name to access the common folder where the CL/EZ data is saved.

- Password

When a check mark is not placed for "Use pre-installed shared folder", this item is validated.

Specify the password to access the common folder where the CL/EZ data is saved.



Click the [] button, and the input screen appears. You can input a value by using the alphabet letters, numerals and symbols through the keyboard of the personal computer.

## Serial configuration

Set the devices that will be connected to the serial port on the personal computer connected with the CV system and their application.



Set "Connection 1" to "Connection 4".



The quantity of the settable connection destination is changed according to the number of serial ports on the personal computer.

Refer to the instruction manual of your personal computer for the serial ports.

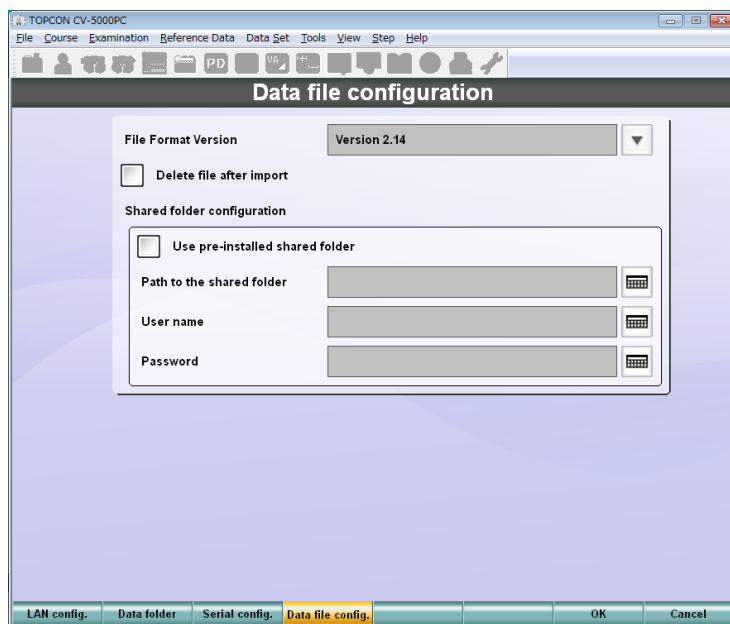
- for  
Set the application for connection.

Not in use	When any device is not connected, select this item.
[In] RM/CL data receive	When connecting RM or CL through the serial method, select this item.
[Out] RM/CL data transfer	When transferring the RM/CL data to other CV systems connected through the serial method, select this item.
[I/O] Database connection	When connecting an external personal computer database software, select this item.

- Port No.  
Set the port to which a peripheral device is connected.
- Baud Rate  
Select the baudrate from the following items.
  - 2400bps
  - 9600bps

## Data file configuration

When the data link is configured with an external personal computer database software through files, set data for this item.



### File Format Version

Select the version of the file format to be used for link.

- Version 2.14
- Version 1.00 (KB-1D Ver.1.40 compatible)
- XML file format


### Delete file after import

Place a check mark here. After importing the data, the data file is deleted.

### Shared folder configuration

- Use pre-installed shared folder  
When using the shared folder in the CV system itself, place a check mark for this.
- Path to the shared folder  
When you do not place a check mark for "Use pre-installed shared folder", this item is validated.  
Specify the network path for the file link folder.
- User name  
When you do not place a check mark for "Use pre-installed shared folder", this item is validated.  
Specify the user name to access the file link folder.
- Password  
When you do not place a check mark for "Use pre-installed shared folder", this item is validated.  
Specify the password to access the file link folder.



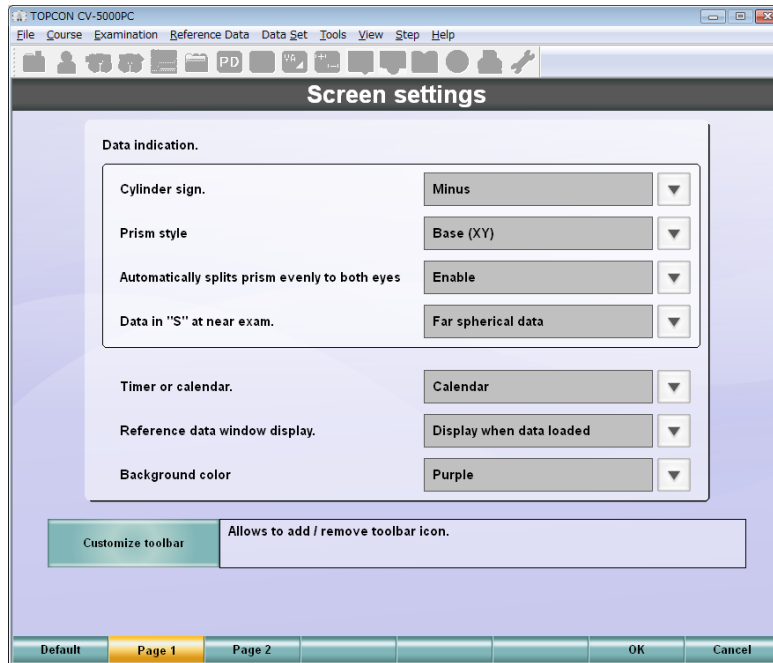
Click the [  ] button, and the input screen appears. You can input a value by using the alphabet letters, numerals and symbols through the keyboard of the personal computer.

## 8.2.7 Screen settings

Select settings for the screen display.

Use the [Page 1] and [Page 2] buttons from the function buttons. The display is changed.

Page 1



Data indication.

- Cylinder sign.  
Select the symbol of the cylinder refractive power.
  - Minus
  - Plus
- Prism style  
Select the notation of the prism refractive power.
  - Base (XY)
  - Polar (r/theta)
- Automatically splits prism evenly to both eyes  
Select one of the two operations:
  - The prism refractive power after the prism test will be automatically divided into both eyes evenly;
  - The status when the test has finished will be kept.
    - Enable
    - Disable
- Data in "S" at near exam  
Select which data should be used to display the spherical power in the near-point measurement, the spherical power in far-point measurement or the value obtained by adding the ADD refractive power.
  - Far spherical data
  - Near spherical data

Timer or calendar.

Select the type of "Time" to be displayed at the upper right corner on the test screen.

- Calendar
- Refraction timer

Reference data window display.

Select whether the data from the external device should be displayed constantly or after capturing.

- Always
- Display when data loaded

Background colour

Select the background color on the screen from the following four items.

- Purple
- Aqua
- Light green
- Pink

Customize toolbar

Show/hide the buttons on the toolbar.



Refer to "CUSTOMIZE TOOLBAR" on P.194 for details.

Default

This button returns the system to the setting when shipped.

Page 1/Page 2

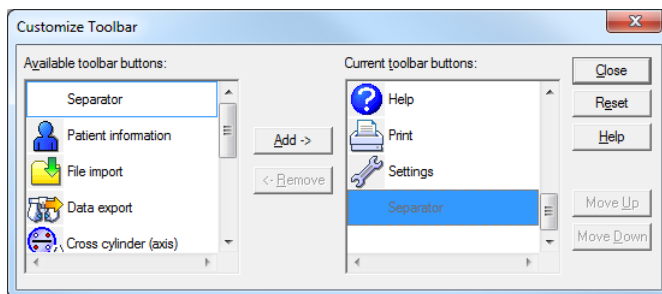
These buttons change the page for changing the setting.

OK/Cancel

Click the [OK] button. The changed data is saved and the "Settings" menu appears again.  
Click the [Cancel] button. The changed data is canceled and the "Settings" menu appears again.

## CUSTOMIZE TOOLBAR

Click the [Customize toolbar] button, and this screen appears.



The usable toolbar buttons are displayed in the left column and, the current toolbar buttons, in the right column.

Select a toolbar button in the usable button column and click the [Add->] button. The selected button is added to the current toolbar button column.

Select a toolbar button in the current button column and click the [<-Remove] button. The selected button is deleted from the current toolbar button column.

Select a toolbar button in the current button column and click [Move Up] or [Move Down] button. The selected button is moved up or down. You can change the display order of the buttons.



Refer to " MENU BAR/TOOLBAR" on P.23 for the displayed toolbar buttons.

Page 2



Guidance

- Mini-Help

Set "Displayed" or "Not displayed" of "Mini-Help". Place a check mark, and it is displayed.

## ToolTip

- Display ToolTip  
Show/hide "ToolTip". Place a check mark, and "ToolTip" is displayed.
  - Test\_course name area
  - Small Chart
  - Toolbar
- Time until displaying  
Set the time until "ToolTip" is displayed since you fitted the mouse cursor to it.  
You can select one of "Short", "Normal" and "Long".
- Display time  
Set the time until "ToolTip" is hidden since it was displayed.  
You can select one of "Short", "Normal" and "Long".

## Default

This button returns the system to the setting when shipped.

## Page 1/Page 2

These buttons change the page for changing the setting.

## OK/Cancel

Click the [OK] button. The changed data is saved and the "Settings" menu appears again.  
Click the [Cancel] button. The changed data is canceled and the "Settings" menu appears again.

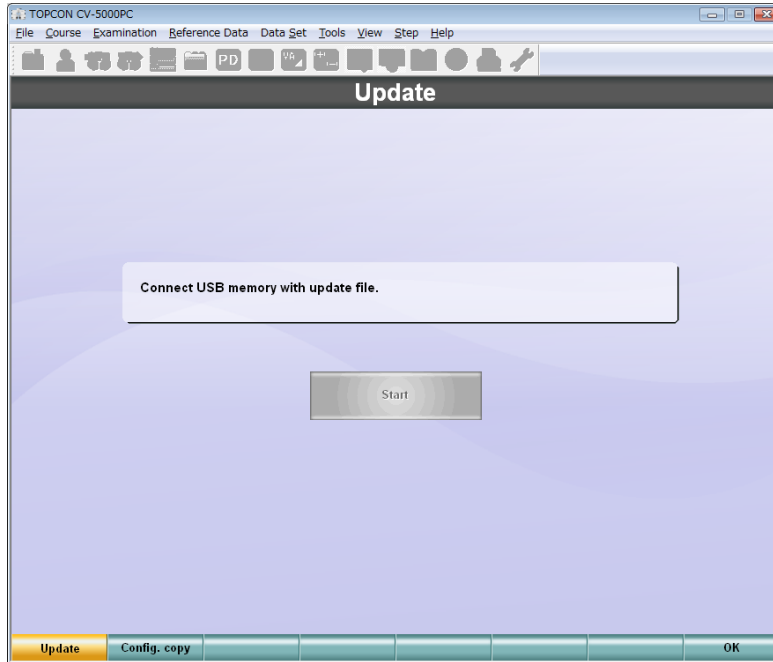
## 8.2.8 Update

Update the system software and copy the setting.

The displayed contents are changed by the [Update] button and [Config. copy] button.

### Update

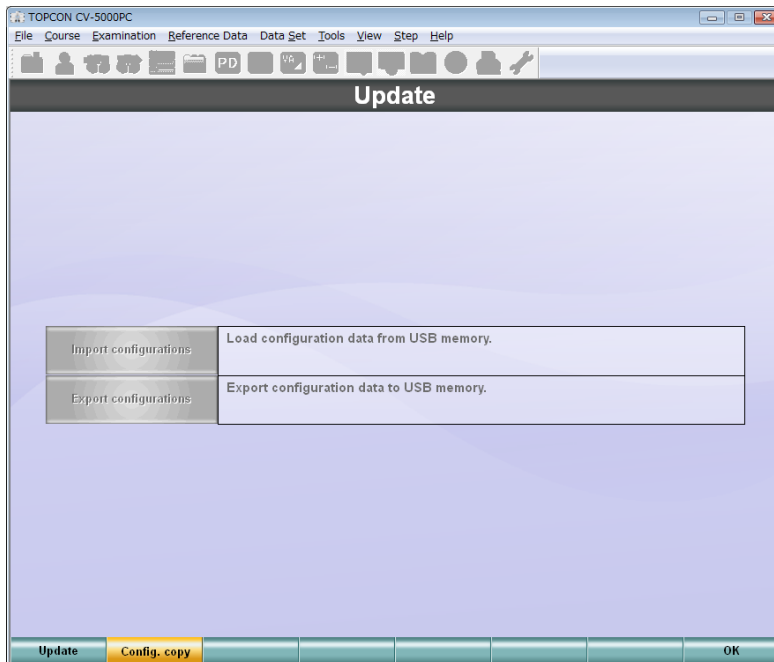
Update the CV system software.



The authorized service engineer must update the CV system software. The user must not use this function.

## Config. Copy.

You can copy the setting parameters of one CV system to another CV system.



Connect the USB memory to the USB connector on condition that this screen is displayed. The buttons are validated.

### Import configurations

Capture the setting parameters from the USB memory.

Connect the USB memory that saves the setting parameters of CV system, and this button is valid.

Click this button. The window showing "Configuration files have been updated. Please restart CV software to apply new configurations." is displayed.

Click the [OK] button, and the CV software is finished. Start the CV software again.

### Export configurations

Write the setting parameters to the USB memory.

Connect the USB memory, and this button is valid.

Click this button, and the window showing "Just a moment, please." is displayed. Then, when the window showing "Configuration files have been successfully exported" is displayed, the procedure is finished.



- When the setting file is output on condition that two or more user accounts are set, the setting of the account that has executed the output is written.
- The following items are not copied by "Import configurations" and "Export configurations":

Date setting, Time setting, Next data number, Chart selection, IP address, Serial configuration, etc.

## 8.3 SETTING ON Windows

---

Setting on Windows is needed depending on the functions used by the CV software.

### 8.3.1 SETTING WHEN USING THE PRINT FUNCTION

Set the size of the paper, which is usually used by the printer, to "A4" or "Letter".



Refer to the instruction manual of your printer for the paper size.

#### Setting of IE (Internet Explorer)

- IE6 and IE7

Place a check mark for "Tools", "Internet Options" and then the "Advanced" tab in this order. Then, place a check mark for "Print background and image".

- IE8 and IE9

Place a check mark for "File", "Page Setup" and then "Paper Options". Then, place a check mark for "Print background and image".



If the menu bar is not displayed, press the [Alt] key on the keyboard. It will be displayed.

### 8.3.2 WHEN USING THE PRE-INSTALLED SHARED FOLDER

When you place a check mark for "Use pre-installed shared folder" on "Shared folder configuration" after selecting "Settings", "Data I/O settings" and "System configurations", it is necessary to set the following items.

- In the case of Windows XP

Click "Start", "Control panel", "User account" and "Guest account" in this order. Then, click the [Set Guest account to ON] button.

- In the case of Windows 7

Click "Start", "Control panel", "Safety for user account and family" and "Add or delete user account". Then, click "Guest account" and the [ON] button.

Click "Start", "Control panel", "Network and Internet", "Network and shared center" and "Change the shared setting" in this order. Then, select "Invalidate the shared protection for password" on "Shared protection for password".

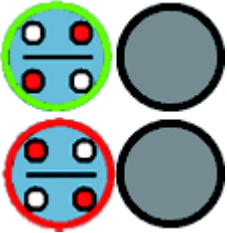
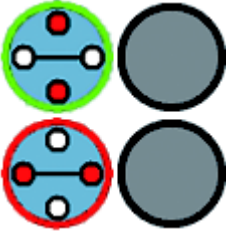
# 9. APPENDICES

## 9.1 LIST OF AUXILIARY LENS AND MOUSE NAVIGATION

### AUXILIARY LENS

The following table shows the icons of the auxiliary lens that are displayed on the test screen.

Status/lens	Image	Status/lens	Image
Open		Red/green filter	
Right eye: Horizontal Maddox		Left eye: Vertical Maddox	
Linearly polarized filter (Right: 45°, Left: 135°)		Linearly polarized filter (Right: 135°, Left: 45°)	
Circularly polarized filter (Normal rotation)		Circularly polarized filter (Reverse rotation)	
Right eye 6-prism: Base up		Left eye 10-prism: Base in	
Retino: +1.50D		Retino: +2.00D	
Pinhole (1.5mm)		±0.5D Cross cylinder (for measuring ADD)	
Close (Occluding plate)		TOPCON cross cylinder lens	




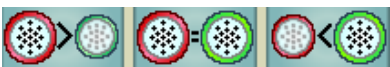








Status/lens	Image	Status/lens	Image
Jackson cross cylinder lens (for cylinder axis test)		Jackson cross (for cylinder power test)	


















Only when the measuring head having the circularly polarized filter is connected, this filter is displayed on the list. At this time, the linearly polarized filter (Right: 135°, Left: 45°) is not installed in the measuring head and will not be displayed on the list.

# MOUSE NAVIGATION

To change the mouse operation display image, refer to the following table for the corresponding setting.










Test	Image
<ul style="list-style-type: none"> <li>• Visual acuity test</li> <li>• Astigmatism test</li> <li>• Balance test (Polarization)</li> <li>• Balance test (Prism)</li> </ul>	
<ul style="list-style-type: none"> <li>• R/G test</li> <li>• Cross cylinder test (TOPCON cross)</li> <li>• Balance test (Polarization: 2-color)</li> </ul>	
<ul style="list-style-type: none"> <li>• Cross cylinder test (Jackson cross)</li> </ul>	
<ul style="list-style-type: none"> <li>• Smart cross test</li> </ul>	
<ul style="list-style-type: none"> <li>• Phoria test (Pol. Cross)</li> </ul>	
<ul style="list-style-type: none"> <li>• Phoria test (Pol. Cross)</li> </ul>	
<ul style="list-style-type: none"> <li>• Phoria test (Cross ring)</li> </ul>	
<ul style="list-style-type: none"> <li>• Phoria test (Cross ring)</li> </ul>	
<ul style="list-style-type: none"> <li>• Phoria test (Maddox)</li> </ul>	
<ul style="list-style-type: none"> <li>• Phoria test (Maddox)</li> </ul>	
<ul style="list-style-type: none"> <li>• Horizontal phoria measurement (Prism separation)</li> </ul>	
<ul style="list-style-type: none"> <li>• Vertical phoria measurement (Prism separation)</li> </ul>	

Test	Image
<ul style="list-style-type: none"> <li>Fixation disparity test (Pol. cross with fixation target)</li> </ul>	
<ul style="list-style-type: none"> <li>Fixation disparity test (Pol. cross with fixation target)</li> </ul>	
<ul style="list-style-type: none"> <li>Fixation disparity test (Pol. scale cross with pol. tilted fixation target)</li> </ul>	
<ul style="list-style-type: none"> <li>Fixation disparity test (Pol. scale cross with pol. tilted fixation target)</li> </ul>	
<ul style="list-style-type: none"> <li>Convergence/divergence</li> <li>Sheard's criteria</li> </ul>	
<ul style="list-style-type: none"> <li>Convergence/divergence</li> <li>Sheard's criteria</li> </ul>	
<ul style="list-style-type: none"> <li>Vertical vergence</li> </ul>	
<ul style="list-style-type: none"> <li>Vertical vergence</li> </ul>	
<ul style="list-style-type: none"> <li>Stereo test</li> <li>Stereo test (Fine)</li> <li>Worth 4 dots test</li> </ul>	
<ul style="list-style-type: none"> <li>Coincidence test (H)</li> </ul>	
<ul style="list-style-type: none"> <li>Coincidence test (V)</li> </ul>	
<ul style="list-style-type: none"> <li>ADD test</li> <li>Monocular ADD test</li> </ul>	
<ul style="list-style-type: none"> <li>Minus lens amplitude measurement</li> <li>Positive relative accommodation measurement</li> <li>Negative relative accommodation measurement</li> </ul>	
<ul style="list-style-type: none"> <li>Minus lens amplitude measurement</li> <li>Positive relative accommodation measurement</li> <li>Negative relative accommodation measurement</li> </ul>	
<ul style="list-style-type: none"> <li>AC/A</li> </ul>	

## 9.2 SHAPE OF PLUG

Country	Voltage/frequency	Shape of plug
Mexico	110V/50Hz	Type C&E
Argentina	220V/60Hz	Type A
Peru	220V/60Hz	Type A
Venezuela	110V/50Hz	Type C&E
Bolivia & Paraguay	220V/60Hz	Type A (Most common) Type H (Infrequently)
Chile	220V/60Hz	Type A
Colombia	110V/50Hz	Type C
Brazil	220V/60Hz 127V/60Hz	Type A Type C
Ecuador	110V/50Hz	Type C&E
USA	120V/60Hz	Type A (Hospital Grade)
Canada	120V/60Hz	Type A (Hospital Grade)

## SYMBOL

Symbol	IEC/ISO Publication	Description	Description (French)
	IEC 60417-5032	Alternating current	Courant alternatif
	IEC 60417-5031	Direct current	Courant continu
	IEC 60348	Attention, consult accompanying documents	Attention, consulter les documents d'accompagnement
	IEC 60417-5008	Off (power: disconnection from the mains)	Éteint (courant: coupure avec le secteur)
	IEC 60417-5007	On (power: connection of the mains)	Allumé (courant: raccordement sur le secteur)
	IEC 60878-02-02	Type B applied part	Partie appliquée du Type B
	ISO 7010-M002	Refer to Instruction manual/booklet	Voir le manuel/la brochure
	ISO 7000-2497	Date of manufacture	Date de fabrication
	ISO 7000-2498	Serial number	Numéro de série

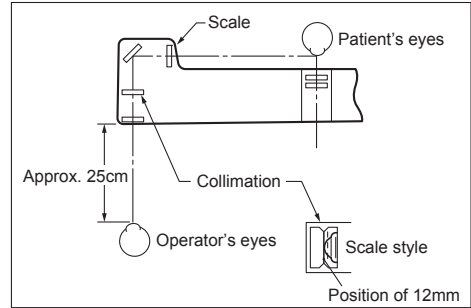
## 9.3 CORNEAL ALIGNING DEVICE

The forehead rest moves back and forth by turning the forehead rest knob.

With the patient's forehead resting on the forehead rest, the user look through the corneal aligning window with their eye positioned 25 cm from the corneal aligning window.

Look at the patient's eye (corneal surface) so that the long lines of the collimation and scale are aligned.

If the eye (corneal surface) is on the long line, the eyeglass refractive power will be measured at a distance of 12mm away from the surface of cornea. The short lines are given at 2mm steps from the long line. The dotted line is 13.75mm away from the corneal surface.



For example, if the corneal surface is 4mm away (on the second short line from the long line), the eyeglass refractive power is measured at the position of "12+4=16mm".

If the eyeglass wearing distance defers from the measuring distance, a conversion should be made referencing Tables 1 and 2.

Example 1:

When the measuring distance is 4mm from the long line (on the second short line) and the prescription is the spherical power of +8.00D:

On Table 1, the intersection of "+8.00D" and "4mm" is the correction value "+0.26D".

Therefore, the lens refractive power at 12mm from the eye is "(+8.00) + (+0.26) = +8.26D".

After the conversion, the value needs to be rounded by either 0.25D or 0.12D.

In this case, the value is +8.25D.

Example 2:

When the measuring distance is 3mm from the long line (between the first and second short lines) and the prescription is the spherical power of -10.50D:

When an intermediate value of the conversion values on the intersections of "-10.00D" and "-11.00D" with "3mm" on Table 2 is calculated, it is 0.32. This value should be regarded as the correction value. Therefore, the lens refractive power at 12mm from the eye is calculated as follows.  
 (-10.50) + (+0.32) = -10.18D

Example 3:

When the measuring distance is 6mm from the long line (on the third short line) and the prescription is the spherical power of -14.00D and the cylinder power of -6.00D:

On Table 2, the intersection of "-14.00D" and "6mm" is the conversion value "+1.08D".

Therefore, the lens refractive power at 12mm from the eye is "(-14.00) + (+1.08) = -12.92D". For the cylinder power, perform the calculation "(-14.00) + (-6.00) = -20.00D".

The intersection of "-20.00D" and "6mm" is the conversion value "+2.14D".

Therefore, the lens refractive power at 12mm from the eye is "(-20.00) + (+2.14) = -17.86D". Perform the calculation "(-17.86) - (-12.92) = -4.94D".

The spherical power "-12.92D" and the cylinder power "-4.94D" would be calculated.

If the difference between the measured refractive power or measuring distance and the eyeglass wearing distance is odd, use the formula below:

$$D' = \pm \frac{L \times D^2}{1000 - L \times D}$$

D = Measured power (D)

D' = Corrected power (D)

L = Difference between the measuring distance and eyeglass wearing distance (mm)

**Conversion value (When the measured refractive power is plus notation)**

**<Table 1>**

L mm	1	2	3	4	5	6	7	8	9	10
D dptr										
+1.00	0.001	0.002	0.000	0.004	0.005	0.006	0.007	0.008	0.009	0.01
+2.00	0.004	0.008	0.01	0.02	0.02	0.02	0.03	0.03	0.04	0.04
+3.00	0.01	0.02	0.03	0.04	0.05	0.06	0.06	0.07	0.08	0.09
+4.00	0.02	0.03	0.05	0.07	0.08	0.10	0.12	0.13	0.15	0.17
+5.00	0.03	0.05	0.08	0.10	0.13	0.15	0.18	0.21	0.24	0.26
+6.00	0.04	0.07	0.11	0.15	0.19	0.22	0.26	0.30	0.34	0.38
+7.00	0.05	0.10	0.15	0.20	0.25	0.31	0.36	0.42	0.47	0.53
+8.00	0.06	0.13	0.20	0.26	0.33	0.40	0.47	0.55	0.62	0.70
+9.00	0.08	0.16	0.25	0.34	0.42	0.51	0.61	0.70	0.79	0.89
+10.00	0.10	0.20	0.31	0.42	0.53	0.64	0.75	0.87	0.99	1.11
+11.00	0.12	0.25	0.38	0.51	0.64	0.78	0.92	1.06	1.21	1.36
+12.00	0.15	0.30	0.45	0.61	0.77	0.93	1.10	1.27	1.45	1.64
+13.00	0.17	0.35	0.53	0.71	0.90	1.10	1.30	1.51	1.72	1.94
+14.00	0.20	0.40	0.61	0.83	1.05	1.28	1.52	1.77	2.02	2.28
+15.00	0.23	0.46	0.71	0.96	1.22	1.48	1.76	2.05	2.34	2.65
+16.00	0.26	0.53	0.81	1.09	1.39	1.70	2.02	2.35	2.69	3.05
+17.00	0.29	0.60	0.91	1.24	1.58	1.93	2.30	2.68	3.07	3.48
+18.00	0.33	0.67	1.03	1.40	1.78	2.18	2.59	3.03	3.48	3.95
+19.00	0.37	0.75	1.15	1.56	1.99	2.44	2.91	3.41	3.92	4.46
+20.00	0.41	0.83	0.13	1.74	2.22	2.73	3.26	3.81	4.39	5.00

**Conversion value (When the measured refractive power is minus notation)**

**<Table 2>**

L mm	1	2	3	4	5	6	7	8	9	10
D dptr										
-1.00	0.001	0.002	0.000	0.004	0.005	0.006	0.007	0.008	0.009	0.01
-2.00	0.004	0.008	0.01	0.02	0.02	0.02	0.03	0.03	0.04	0.04
-3.00	0.009	0.02	0.03	0.04	0.04	0.05	0.06	0.07	0.08	0.09
-4.00	0.02	0.03	0.05	0.06	0.08	0.09	0.11	0.12	0.14	0.15
-5.00	0.02	0.05	0.07	0.10	0.12	0.15	0.17	0.19	0.22	0.24
-6.00	0.04	0.07	0.11	0.14	0.17	0.21	0.24	0.27	0.31	0.34
-7.00	0.05	0.10	0.14	0.19	0.24	0.28	0.33	0.37	0.41	0.46
-8.00	0.06	0.13	0.19	0.25	0.31	0.37	0.42	0.48	0.54	0.59
-9.00	0.08	0.16	0.24	0.31	0.39	0.46	0.53	0.60	0.67	0.74
-10.00	0.10	0.20	0.29	0.38	0.48	0.57	0.65	0.74	0.83	0.91
-11.00	0.12	0.24	0.35	0.46	0.57	0.68	0.79	0.89	0.99	1.09
-12.00	0.14	0.28	0.42	0.55	0.68	0.81	0.93	1.05	1.17	1.29
-13.00	0.17	0.33	0.49	0.64	0.79	0.94	1.08	1.22	1.36	1.50
-14.00	0.19	0.38	0.56	0.74	0.92	1.08	1.25	1.41	1.57	1.72
-15.00	0.23	0.44	0.65	0.85	1.05	1.24	1.43	1.61	1.78	1.96
-16.00	0.25	0.50	0.73	0.96	1.19	1.40	1.61	1.82	2.01	2.21
-17.00	0.28	0.56	0.82	1.08	1.33	1.57	1.81	2.04	2.26	2.47
-18.00	0.32	0.63	0.92	1.21	1.49	1.75	2.01	2.27	2.51	2.75
-19.00	0.35	0.70	1.02	1.34	1.65	1.94	2.23	2.51	2.77	3.03
-20.00	0.39	0.77	1.13	1.48	1.82	2.14	2.46	2.76	3.05	3.33

# 10. TROUBLE SHOOTING

## TROUBLE SHOOTING GUIDE



### **WARNING**

To avoid electric shock, do not attempt disassembling, rebuilding and/or repairs on your own. Ask your dealer for repairs.

If a problem has occurred, check the instrument troubleshooting check list shown below.

If the problem is not resolved after following the instructions below, or if there is no relevant check item in the list, contact Topcon authorized dealer or TOPCON offices at the address stated on the back cover.

### CHECK LIST

Trouble	Condition	Remedial measure
The measuring head is not reset.	The power cord plug is not inserted to the outlet.	Insert the power cord plug into the outlet securely.
	The measuring head connection cable connector comes off.	Insert the connector securely.
The lens to be set does not appear in the examination window.	The connection cable connector for the personal computer and the power supply unit comes off.	Insert the connector securely.
	The measuring head connection cable connector comes off.	Insert the connector securely.
The visual acuity chart is not displayed correctly.	The communication cable connector comes off.	Insert the connector securely.
	The infrared communication unit connector comes off.	Insert the connector securely.
	The image cable connector comes off.	Insert the connector securely.

Application message and remedial measure

Message	Phenomena and remedial measure
Amount of data files in *** folder is almost full. Please delete old files.	The data folder can save up to 1000 data files. The saved RM or CL data exceeds 900. Delete unnecessary data.
Can NOT execute chart software. It is thought that the chart software is not installed correctly. Please call our support line.	The instrument malfunctions. Contact the TOPCON support section.
Can NOT execute chart software. Please switch off and restart CV system. In case this error happens frequently, please call our support line.	Make sure that the chart is powered. Then, turn off and restart the CV system. If the error is displayed continuously, the instrument may malfunction. Contact the TOPCON support section.
Can't initialize exam/course list!!	Reading the examination list has failed. Update the CV software to the newest version.
Can't show the course list. No course is registered.	The course list cannot be displayed because the course optometry is not registered. Register the course when the course optometry is performed.
Can't show the examination list. No examination is registered.	The examination list cannot be displayed because there is not the examination list in the DLL file of the chart being used. Update the CV software to the newest version.
CC2.dll was not found.	The application program is not set up correctly. Re-install the application program.
Chart is not selected yet. Please select chart.	When the chart to be used is not selected, this error is displayed. <ul style="list-style-type: none"> <li>• Open the chart setting screen and set the chart to be used.</li> </ul>
Chart setting is not completed.	When the connection method of the selected far-point chart is not set, this error is displayed. Open the chart setting screen and set the connection method for the far-point chart.
Chart/Mask : Communication ERROR.	<ul style="list-style-type: none"> <li>• Try to set the chart/mask again.</li> <li>• Open the "Chart settings" screen and check the connection method for the far-point visual acuity chart.</li> </ul>
CL data folder is not found. Please confirm the system is online which has CL data folder.	When the CL data folder is not found, this error occurs. The probable causes are that the system having the CL folder is not connected to LAN and that the system does not start yet. Make sure that the system having the CL folder is connected to the network and operates correctly.

Message	Phenomena and remedial measure
Communication ERROR (Timeout SERIAL IMPORT).	The data sent from the device connected through the serial method cannot be acquired correctly within the set time. <ul style="list-style-type: none"> <li>• Try to import the data again. If the problem is not solved, switch on the CV system again.</li> <li>• Make sure that the device is connected to the personal computer through the serial cable correctly.</li> <li>• Make sure that the device's software operates correctly.</li> </ul>
Communication error at the port "[I/O] Database connection". Please confirm the cable connection and the serial configuration.	An error has occurred in the serial communication with the external database software. Check the cable connection. If the trouble is not solved, the cable may be disconnected. Contact the TOPCON support section.
Communication error at the port "[In] LensMeter data receive". Please confirm the cable connection and the serial configuration.	An error has occurred in the serial communication with RM/CL. Check the cable connection. If the problem is not solved, the cable may be disconnected. Contact the TOPCON support section.
Communication error at the port "[In] REF data receive (00)". Please confirm the cable connection and the serial configuration.	An error has occurred in the serial communication with RM/CL. Check the cable connection. If the problem is not solved, the cable may be disconnected. Contact the TOPCON support section.
Communication error at the port "[In] REF data receive (01)". Please confirm the cable connection and the serial configuration.	An error has occurred in the serial communication with RM/CL. Check the cable connection. If the problem is not solved, the cable may be disconnected. Contact the TOPCON support section.
Communication error at the port "[In] RM/CL data receive". Please confirm the cable connection and the serial configuration.	An error has occurred in the serial communication with RM/CL. Check the cable connection. If the problem is not solved, the cable may be disconnected. Contact the TOPCON support section.
Communication error at the port "[Out] RM/CL data transfer". Please confirm the cable connection and the serial configuration.	An error has occurred in the RM/CL data transfer. Check the cable connection. If the problem is not solved, the cable may be disconnected. Contact the TOPCON support section.
Communication ERROR.	An error has occurred in the communication with the device connected through the serial method. <ul style="list-style-type: none"> <li>• The personal computer is connected to the device through the cable. Check whether the cable is connected correctly.</li> <li>• Check whether the setting is correct for the serial port on the personal computer, which is connected to the device.</li> </ul>

Message	Phenomena and remedial measure
<p>Could NOT execute the I/O module software.</p> <p>It is possible to use CV but all the functions around data import and export are not available.</p> <p>In case this error happens frequently, please call our support line.</p>	<p>The function to communicate with RM/CL or external database software does not work correctly.</p> <ul style="list-style-type: none"> <li>• Restart the CV system.</li> <li>• If the problem is not solved, the instrument may malfunction. Contact the TOPCON support section.</li> </ul>
<p>Could NOT find the chart monitor.</p>	<p>When selecting the software chart as the far-point chart on the setting screen and clicking the monitor check button without connecting the chart monitor to the CV system, this error is displayed.</p> <p>Connect the chart monitor to the CV system.</p>
<p>Could NOT find the I/O module software.</p> <p>It is thought of as the chart software is not installed correctly.</p> <p>Please call our support line.</p>	<p>The instrument malfunctions. Contact the TOPCON support section.</p>
<p>Could NOT find the selected chart monitor.</p> <p>Please confirm the chart monitor setting and the connection.</p>	<p>When the chart software cannot find the monitor, which is set to display the chart, on the system, this error is displayed.</p> <ul style="list-style-type: none"> <li>• Open the chart setting screen and check whether the monitor to display the chart is set correctly.</li> <li>• Make sure that the monitor is connected correctly.</li> </ul>
<p>Could NOT open the device connection setting screen.</p>	<p>When "System configurations" cannot be opened normally, this error is displayed.</p> <ul style="list-style-type: none"> <li>• Switch on the CV system again.</li> <li>• If the error is displayed continuously, the instrument may malfunction. Contact the TOPCON support section.</li> </ul>
<p>Could NOT open the software chart configuration screen.</p>	<p>When the "Chart software config." screen cannot be opened normally, this error is displayed.</p> <ul style="list-style-type: none"> <li>• Switch on the CV system again.</li> <li>• If the error is displayed continuously, the instrument may malfunction. Contact the TOPCON support section.</li> </ul>
<p>Course data load ERROR.</p> <p>Maybe, course is not registered.</p> <p>Start Semi Auto mode.</p>	<p>When the course optometry is about to be executed, reading the course file has failed. Register the course when the course optometry method is used.</p>
<p>Create Mutex Error.</p> <p>Error Code : XXXX</p>	<p>Switch on the CV system again.-</p>
<p>Data file folder is not found.</p> <p>Please confirm the system is online which has data file folder.</p>	<p>When the file link folder is not found, this error occurs.</p> <p>The probable causes are that the system having the file link folder is not connected to LAN and that the system does not start yet.</p> <p>Make sure that the system having the file link folder is connected to the network and operates correctly.</p>

Message	Phenomena and remedial measure
ERROR! Can't Open Volume List.	The memory of the CV system may be damaged. Contact the TOPCON support section.
Error! Couldn't get CPS-ROM version.This software may not run correctly.	<ul style="list-style-type: none"> <li>• The power supply unit is connected to the personal computer through the cable. Check whether this cable is connected correctly.</li> <li>• Update the version of the power supply unit to the newest one.</li> </ul>
Error! Couldn't get Head-ROM version.This software may not run correctly.	<ul style="list-style-type: none"> <li>• The power supply unit is connected to the measuring head through the cable. Check whether this cable is connected correctly.</li> <li>• Update the version of the measuring head to the newest one.</li> </ul>
ERROR! Invalid Handle Value.	The memory of the CV system may be damaged. Contact the TOPCON support section.
ERROR: Language DLL is not correct version.	The file, which should display the set language, cannot be used in the CV system of the current version. Update the language file to the newest version.
Ewfapi.dll was not found.	The application program is not set up correctly. Re-install the application program.
Fail to access the CL data folder. Please confirm the data folder settings in system configuration.	When login to the CL data folder is not possible, this error occurs. Check if the CL data folder is set correctly on "RM/CL data folder" of "System configurations".
Fail to access the data file folder. Please confirm the "Shared folder configuration" in data file configuration.	When login to the file link folder is not possible, this error occurs. Check if the file link folder is set correctly on "Data file configuration" of "System configurations".
Fail to access the RM data folder. Please confirm the data folder settings in system configuration.	When login to the RM data folder is not possible, this error occurs. Check if the RM data folder is set correctly on "RM/CL data folder" of "System configurations".
Fail to access the RM/CL data folder. Please confirm the data folder settings in system configuration.	When login to the specified data folder is not possible, this error occurs. Check if the RM/CL data folder is set correctly on "RM/CL data folder" of "System configurations".
Fail to access to the CL data folder. Please confirm the LAN cable connection and network settings in system configuration.	When the CV system is not connected to LAN, this error occurs. Check if IP is set correctly on "LAN configuration" of "System configurations". Make sure that the LAN cable is connected to the CV system.
Fail to access to the data file folder. Please confirm the LAN cable connection and network settings in system configuration.	When the CV system is not connected to LAN, this error occurs. Check if IP is set correctly on "LAN configuration" of "System configurations". Make sure that the LAN cable is connected to the CV system.

Message	Phenomena and remedial measure
Fail to access to the RM data folder. Please confirm the LAN cable connection and network settings in system configuration.	When the CV system is not connected to LAN, this error occurs. Check if IP is set correctly on "LAN configuration" of "System configurations". Make sure that the LAN cable is connected to the CV system.
Fail to access to the RM/CL data folder. Please confirm the LAN cable connection and network settings in system configuration.	When the CV system is not connected to LAN, this error occurs. Check if IP is set correctly on "LAN configuration" of "System configurations". Make sure that the LAN cable is connected to the CV system.
Fail to change chart language setting because the other task is in progress.	Wait for a while and change the language again.
Fail to change chart type because the other task is in progress. Please try again.	Wait for a while and change the chart type again.
Fail to connect to the chart monitor. Please switch off and restart CV system. In case this error happens frequently, please call our support line.	Make sure that the chart is powered. Then, turn off and restart the CV system. If the error is displayed continuously, the instrument may malfunction. Contact the TOPCON support section.
Fail to delete *** file(s).	Delete the data again. If the data is not deleted yet, access the data folder from outside and delete it.
Fail to delete file(s).	Delete the data again. If the data is not deleted yet, access the data folder from outside and delete it forcibly.
Fail to execute chart software with selected chart type. Please select different chart type. (Error Code **)	When the chart software is not applied to the specified chart type, this error is displayed. Open the chart setting screen and change the type of the far-point visual acuity chart to any other type.
Fail to execute chart software. Please switch off and restart CV system. In case this error happens frequently, please call our support line.	Turn off the power. Then, restart the CV system. If the error is displayed continuously, the instrument may malfunction. Contact the TOPCON support section.
Fail to execute chart software. (Error Code **)	Starting the setting screen of the chart software has failed. <ul style="list-style-type: none"> <li>• Check whether the connection monitor for the chart software is set correctly.</li> <li>• Restart the CV system.</li> <li>• If the problem is not solved, the instrument may malfunction. Contact the TOPCON support section.</li> </ul>

Message	Phenomena and remedial measure
Fail to execute the I/O module software. It is possible to use CV but all the functions around data import and export are not available. In case this error happens frequently, please call our support line.	The function to communicate with RM/CL or external database software does not work correctly. <ul style="list-style-type: none"> <li>• Restart the CV system.</li> <li>• If the problem is not solved, the instrument may malfunction. Contact the TOPCON support section.</li> </ul>
Fail to get XXX character set information.	Switch on the CV system again. If the problem is not solved, it is necessary to update the Operating System of the CV system.
Fail to get XXX language information.	Switch on the CV system again. If the problem is not solved, it is necessary to update the Operating System of the CV system.
Fail to import data from file. File access denied.	Any other system may access the file to be imported. Wait for a while and import the file again.
Fail to initialize the serial port for CV. Please switch off and restart CV system.	Switch on the CV system again. If the error is still displayed, the instrument may malfunction. Contact the TOPCON support section.
Fail to load chart DLL Please switch off and restart CV system. In case this error happens frequently, please call our support line.	When access to the resource file of the set chart has failed, this error is displayed. <ul style="list-style-type: none"> <li>• Switch on the CV system again.</li> <li>• If the error is displayed continuously, the instrument may malfunction. Contact the TOPCON support section.</li> </ul>
Fail to load chart resources. Please update CV software.	When the resource file of the set chart cannot be used in the CV system of the current version, this error is displayed. <ul style="list-style-type: none"> <li>• Contact the TOPCON support section. Update the CV software to the newest version.</li> </ul>
Fail to open chart software configuration screen because the other task is in progress. Please try again.	Wait for a while and display the setting screen of the chart again.
Fail to open chart software configuration screen. (Error Code **)	Displaying the setting screen of the chart software has failed. <ul style="list-style-type: none"> <li>• Display the setting screen again.</li> <li>• Restart the CV system.</li> <li>• If the problem is not solved, the instrument may malfunction. Contact the TOPCON support section.</li> </ul>
Fail to open system configuration screen because the other task is in progress. Please try again.	When "System configurations" cannot be opened, this error is displayed. Wait for a while and click [Retry].

Message	Phenomena and remedial measure
Fail to open the serial port for CV. Please switch off and restart CV system. In case this error happens frequently, please call our support line.	When the communication unit for the measuring head does not operate correctly, this error is displayed. <ul style="list-style-type: none"> <li>• Switch on the CV system again.</li> <li>• If the error is displayed continuously, the instrument may malfunction. Contact the TOPCON support section.</li> </ul>
Fail to open the serial port selected as "[I/O] Database connection". Please confirm the port is already occupied by other software.	<ul style="list-style-type: none"> <li>• Open "System configurations" on the data input/output setting screen. Check whether the correct data are set on "Serial configuration".</li> <li>• Check whether the cable is connected correctly.</li> </ul>
Fail to open the serial port selected as "[In] LensMeter data receive". Please confirm the port is already occupied by other software.	<ul style="list-style-type: none"> <li>• Open "System configurations" on the data input/output setting screen. Check whether the correct data are set on "Serial configuration".</li> <li>• Check whether the cable is connected correctly.</li> </ul>
Fail to open the serial port selected as "[In] REF data receive (00)". Please confirm the port is already occupied by other software.	<ul style="list-style-type: none"> <li>• Open "System configurations" on the data input/output setting screen. Check whether the correct data are set on "Serial configuration".</li> <li>• Check whether the cable is connected correctly.</li> </ul>
Fail to open the serial port selected as "[In] REF data receive (01)". Please confirm the port is already occupied by other software.	<ul style="list-style-type: none"> <li>• Open "System configurations" on the data input/output setting screen. Check whether the correct data are set on "Serial configuration".</li> <li>• Check whether the cable is connected correctly.</li> </ul>
Fail to open the serial port selected as "[In] RM/CL data receive". Please confirm the port is already occupied by other software.	<ul style="list-style-type: none"> <li>• Open "System configurations" on the data input/output setting screen. Check whether the correct data are set on "Serial configuration".</li> <li>• Check whether the cable is connected correctly.</li> </ul>
Fail to open the serial port selected as "[Out] RM/CL data transfer". Please confirm the port is already occupied by other software.	<ul style="list-style-type: none"> <li>• Open "System configurations" on the data input/output setting screen. Check whether the correct data are set on "Serial configuration".</li> <li>• Check whether the cable is connected correctly.</li> </ul>
Fail to read data from the port "[I/O] Database connection". Please confirm that the database sends the data with STD-1 format.	Check whether the format of the data sent from the external database through the serial method is the STD-1 format. Check whether the baudrate meets the setting of the CV system.
Fail to read data from the port "[In] LensMeter data receive". Please confirm that the device sends the data in correct format.	When the format received from the connected device is not correct, this error is displayed. Check the data format setting of the device.
Fail to read data from the port "[In] REF data receive (00)". Please confirm that the device sends the data in correct format.	When the format received from the connected device is not correct, this error is displayed. Check the data format setting of the device.
Fail to read data from the port "[In] REF data receive (01)". Please confirm that the device sends the data in correct format.	When the format received from the connected device is not correct, this error is displayed. Check the data format setting of the device.

Message	Phenomena and remedial measure
Fail to read data from the port "[In] RM/CL data receive". Please confirm that the device sends the data with STD-1 format.	Change the format of the RM/CL output data to "STD-1 format". Make sure that the baudrate meets the setting of the CV system.
Fail to read the selected data. Please press [Reload] button on the screen.	The data selected from the list may be deleted. Click the [Reload] button to update the data list.
Fail to read the selected data. File access denied.	The system cannot read a value from the data selected in the list. Select other data.
Fail to read the selected data. Data file format is not correct.	The system cannot read a value from the data selected in the list. Select other data.
Fail to save chart software configurations. The changed parameters are canceled. (Error Code **)	Saving the setting of the chart software has failed. <ul style="list-style-type: none"> <li>• Restart the CV system.</li> <li>• If the trouble is not solved, the instrument may malfunction. Contact the TOPCON support section.</li> </ul>
Fail to save received data from the port "[In] LensMeter data receive". Please confirm the data folder settings in system configuration.	The data folder cannot be accessed. Check whether the data folder is set correctly.
Fail to save received data from the port "[In] REF data receive (00)". Please confirm the data folder settings in system configuration.	The data folder cannot be accessed. Check whether the data folder is set correctly.
Fail to save received data from the port "[In] REF data receive (01)". Please confirm the data folder settings in system configuration.	The data folder cannot be accessed. Check whether the data folder is set correctly.
Fail to save received data from the port "[In] RM/CL data receive". Please confirm the data folder settings in system configuration.	The data folder cannot be accessed. Check whether the data folder is set correctly.
Fail to save system configurations. The changed parameters will be canceled after restart.	Saving the data input/output module setting has failed. <ul style="list-style-type: none"> <li>• Restart the CV system.</li> <li>• If the problem is not solved, the instrument may malfunction. Contact the TOPCON support section.</li> </ul>
Fail to transfer the last RM/CL data because of the file format error.	When the RM/CL data of XML format is output to the CV system but the data file is not correct, this error is displayed. Make sure that the system writes the data with the specified format.
Failed to ○○○ because another task is in progress. Please retry later.	This message is displayed when you perform data entry or other communication processing just after the CV system has started or the network setting has been changed. Wait for about 10 seconds. Then, perform your desired processing again.

Message	Phenomena and remedial measure
Failed to convert data received in "[In] LensMeter data receive" port. Please resend the data.	When the data received from the connected device does not have the necessary data, this error is displayed. Perform measurement by using the device again and send the data.
Failed to convert data received in "[In] REF data receive (00)" port. Please resend the data.	When the data received from the connected device does not have the necessary data, this error is displayed. Perform measurement by using the device again and send the data.
Failed to convert data received in "[In] REF data receive (01)" port. Please resend the data.	When the data received from the connected device does not have the necessary data, this error is displayed. Perform measurement by using the device again and send the data.
Failed to convert data received in "[In] RM/CL data receive" port. Please confirm that either "real ID" or "serial ID" is included in the received data.	When the data sent from RM/CL does not include the serial number, this error is displayed. Check the setting of RM/CL so that the CV system can receive the data with the serial number.
Fatal error has happened. Please reboot the system to start the examination over again. Please report to our support engineers the operation performed just before getting this error.	When an error that cannot be reset has occurred in the software, this error is displayed. When this error has occurred, it is necessary to turn on the power again and start the test from the first again. To improve the software, report to the TOPCON support section about the operation performed just before this error is displayed.
File export Error.	Outputting the data file has failed. Output the data file again.
File format error.	Open "System configurations" on the data input/output setting screen. Check whether the format set on "Data file configuration" meets the format of the data file output from the external database.
Initialize error. Please confirm configurations.	The contents of setting are not correct. Check whether all settings are done correctly.
It is necessary to connect chart monitor to use chart software. Please confirm the monitor connection and setting.	The monitor for the chart software is not connected to the CV system. Connect a proper monitor.
Need to set the parameters to each chart.	When the test name is not displayed on the course list in the course optometry registration display, the parameters for the test are not set. Set the parameters for the test.
No response from chart software. Restart chart software?	Click the [YES] button on the displayed message. If the error is displayed continuously, the instrument may malfunction. Contact the TOPCON support section.

Message	Phenomena and remedial measure
No response from I/O module software. Restart I/O module software?	The function to communicate with RM/CL or external database software does not work correctly. <ul style="list-style-type: none"> <li>Click the [YES] button in the displayed message to restart the data input/output module.</li> <li>If the problem is not solved, restart the CV system.</li> </ul>
Old data files in *** folder are deleted because the amount of data files came to full.	The data saved in the data folder have reached 1000 data files. The oldest 200 data files will be deleted.
Receive unknown command from the port "[I/O] Database connection".	The system cannot recognize the command sent from the external database through the serial method. Update the CV software to the newest version.
Register at least 1 chart. No chart is registered in the chart page.	Register one chart at least.
Reset error. Please confirm the cable connection between CV and power supply unit.	<ul style="list-style-type: none"> <li>The power supply unit is connected to the measuring head through the cable. Check whether this cable is connected correctly.</li> <li>Switch on the CV system again.</li> </ul>
RM data folder is not found. Please confirm the system is online which has RM data folder.	When the RM data folder is not found, this error occurs. The probable causes are that the system having the RM folder is not connected to LAN and that the system does not start yet. Make sure that the system having the RM folder is connected to the network and operates correctly.
RM/CL data transfer function is failed because the RM/CL data folder is not found. Please confirm the shared folder of RM/CL data is online.	This message is displayed when the RM/CL data folder is not found on LAN on condition that two or more CV systems are connected through the serial communication. Make sure that the RM/CL data folder is on LAN.
RM/CL data transfer function is failed because the system cannot access to the RM/CL data folder. Please check the LAN cable connection and "LAN configuration" settings in "System Configurations".	This message is displayed when it is not possible to connect with the RM/CL data folder due to the LAN setting failure on condition that two or more CV systems are connected through the serial communication. Make sure that "LAN configuration" in "System configurations" is set correctly and that the LAN cable is connected correctly.
RM/CL data transfer function is failed because the system cannot access to the RM/CL data folder. Please check "Data folder" settings in "System Configurations".	This message is displayed when it is not possible to access the RM/CL data folder on condition that two or more CV systems are connected through the serial communication. Make sure that the user name and password, which are necessary to access the folder, are correctly set on "RM/CL data folder" in "System configurations".
Save Examination Data ERROR.	The memory of the CV system may be damaged. Contact the TOPCON support section.

Message	Phenomena and remedial measure
Save program course date ERROR.	The memory of the CV system may be damaged. Contact the TOPCON support section.
Save settings parameters ERROR.	The memory of the CV system may be damaged. Contact the TOPCON support section.
Selected chart monitor is used as primary monitor. Please change setting.	When the monitor set for the chart operates as the primary monitor, this error is displayed. The primary monitor cannot be used as the chart monitor. Open the chart setting screen and select a monitor to display the chart again.
The font for XXX character is not found on this system.	The font, which should display the set language, is not installed in the CV system. It is necessary to update the Operating System of CV system.
This application setup was not completed successfully.	The application program may not be set up correctly or the file may be damaged. Re-install the application program.
This software doesn't run correctly because the ROM version of the CV-5000 is not compatible with this KB-50/CV-5000PC. Please update the CV-5000 ROM software to version XX.XX or later.	Update the version of the measuring head to the specified one.
This software doesn't run correctly because the ROM version of the power supply is not compatible with this KB-50/CV-5000PC. Please update the power supply software to version XX.XX or later.	Update the version of the power supply unit to the specified one.
Xpepm.dll was not found.	The application program is not set up correctly. Re-install the application program.

# 11. SPECIFICATIONS AND PERFORMANCE

## MEASURING HEAD

Spherical power	Measuring range	+27.00 to -27.00D
	Measuring step	0.25D/1.00D/2.00D/3.00D
Cylinder power	Measuring range	+8.00 to -8.00D
	Measuring step	0.25D/1.00D
Cylinder axis	Measuring range	0 to 180°
	Measuring step	1°/5°/15°
Prism	Measuring range	0 to 20Δ (all direction)
	Measuring step	0.1Δ /0.2Δ /0.5Δ /1.0Δ
Pupillary distance	Adjustment range	48 to 80mm
	Adjustment step	0.5mm/1.0mm
Cross cylinder	Jackson Cross cylinder	±0.25D/±0.50D
	Auto Cross cylinder	±0.25D
Test lens (Aux lens)	Red-Green filter, Polarizing filter (45°/135°, Circular Polarizing filter <sup>1)</sup> ), Prism (6Δ /10Δ), Red Maddox (horizontal/vertical), Lens for retinoscopy (+1.5D/ +2.0D), Cross cylinder for measuring presbyopia (±0.50D), Occluding plate, Pinhole, and Cross hairs glass.	
Reference eyeglass wearing distance	12mm, 13.75mm, 16mm, 18mm, 20mm	
Convergence	Near-point distance 40/67cm (Minimum papillary distance at near-point 40cm convergence : 53mm)	
Forehead rest adjustment range	15mm	

1) The combination of the polarizing filter must be one of the following: 45°/135° and 135°/45° or 45°/135° and circular polarizing filter.

\* Specifications and appearance are subject to change without advance notice for the product improvement.

## DIMENSIONS AND WEIGHT

### Measuring head (Non-arm mounted type)

Dimensions : 294 - 328mm (W) x 115mm (D) x 261mm (H)

Weight : 4kg

### Measuring head (Arm-mounted type)

Dimensions : 294 - 328mm (W) x 115mm (D) x 324mm (H)

Weight : 4.6kg

### Power supply unit

Dimensions: 276mm (W) x 197mm (D) x 117mm (H)

Weight: 2.7kg

## PURPOSE OF USE

Used to measure the refractive power of eyes and perform all or any portion of a 21 point examination test.

## OPERATING PRINCIPLE

There are two or more automated lens banks that operate independently of each other and depending on the lens requirement will align to provide the correct value and/or task.

## PATIENT'S ENVIRONMENT

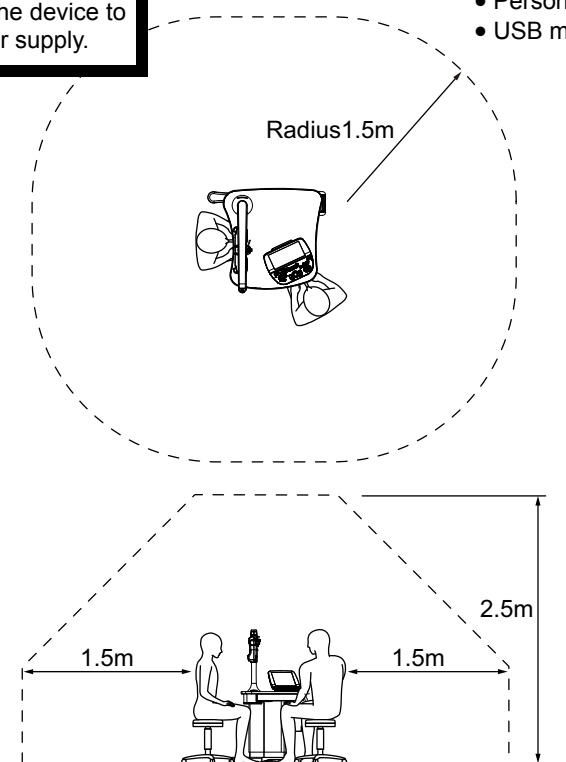
When the patient or operator may touch the devices (including the connected devices) or when the patient or operator may touch the person contacting the devices (including the connecting devices), the patient's environment is shown below.

In the patient's environment, use the device conforming to IEC60601-1. If you are compelled to use any device not conforming to IEC60601-1, use an insulation transformer or make the common protective earth system.

Do not use a power strip in the patient's environment. Connect the power supply of the device to the commercial power supply.

Devices applicable to the use in patient's environment

- Personal computer
- USB memory



For the units to be used in the patient's environment, refer to "STANDARD ACCESSORIES" (P. 16) and "OPTIONAL ACCESSORIES" (P. 16).

## ELECTRIC RATING

Power supply voltage : AC100-240V, 50-60Hz

Frequency : 50-60Hz

Power supply input : 150VA

Essential performance  
Lens changing function

## **ELECTROMAGNETIC COMPATIBILITY**

This product conforms to the EMC standard (IEC60601-1-2 Ed.3.0: 2007).

- a) MEDICAL ELECTRICAL EQUIPMENT requires special precautions regarding EMC and needs to be installed and operated according to the EMC information provided in the ACCOMPANYING DOCUMENTS.
- b) Portable and mobile RF communications equipment can affect MEDICAL ELECTRICAL EQUIPMENT.
- c) The use of ACCESSORIES, transducers and cables other than those specified, with the exception of transducers and cables sold by the manufacturer of the EQUIPMENT or SYSTEM as replacement parts for internal components, may result in increased EMISSIONS or decreased IMMUNITY of the EQUIPMENT or SYSTEM.
- d) The EQUIPMENT or SYSTEM should not be used adjacent to or stacked with other equipment. 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.
- e) The use of the ACCESSORY, transducer or cable with EQUIPMENT and SYSTEMS other than those specified may result in increased EMISSION or decreased IMMUNITY of the EQUIPMENT or SYSTEM.

Item	Article code	Cable Shielded	Ferrite Core	Length (m)
CV power supply unit with external personal computer	43224 9202	—	—	—
Measuring head connection cable	43221 5790	Yes	Yes	0.6
CV power supply relay cable	43221 5780	Yes	Yes	8.0
Power cord	44804 7018	No	No	3.0
DVI cable	42428 5001	Yes	Yes	10.0
Communication cable	41812 0002	Yes	No	5.0

<b>Guidance and manufacturer's declaration - electromagnetic emissions</b>		
The CV-5000 is intended for use in the electromagnetic environment specified below. The customer or the user of the CV-5000 should assure that it is used in such an environment.		
<b>Emissions test</b>	<b>Compliance</b>	<b>Electromagnetic environment - guidance</b>
RF emissions CISPR 11	Group 1	The CV-5000 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.
RF emissions CISPR 11	Class B	The CV-5000 is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC61000-3-2	Class A	
Voltage fluctuations/ flicker emissions IEC61000-3-3	Complies	


### Guidance and manufacturer's declaration - electromagnetic immunity

The CV-5000 is intended for use in the electromagnetic environment specified below. The customer or the user of the CV-5000 should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Electrostatic discharge (ESD) IEC 61000-4-2	± 6 kV contact ± 8 kV air	± 6 kV contact ± 8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	± 2 kV for power supply lines ± 1 kV for input/output lines	± 2 kV for power supply lines ± 1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	± 1 kV line(s) to line(s) ± 2 kV line(s) to earth	± 1 kV line(s) to line(s) ± 2 kV line(s) to earth	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and Voltage variations on power supply input lines IEC 61000-4-11	<5% $U_t$ (>95% dip in $U_t$ ) for 0.5 cycle 40% $U_t$ (60% dip in $U_t$ ) for 5 cycles 70% $U_t$ (30% dip in $U_t$ ) for 25 cycles <5% $U_t$ (>95% dip in $U_t$ ) for 5 sec	<5% $U_t$ (>95% dip in $U_t$ ) for 0.5 cycle 40% $U_t$ (60% dip in $U_t$ ) for 5 cycles 70% $U_t$ (30% dip in $U_t$ ) for 25 cycles <5% $U_t$ (>95% dip in $U_t$ ) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the CV-5000 requires continued operation during power mains interruptions, it is recommended that the CV-5000 be powered from an uninterruptible power supply or battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE $U_t$ is the a.c. mains voltage prior to application of the test level.			

### Guidance and manufacturer's declaration - electromagnetic immunity

The CV-5000 is intended for use in the electromagnetic environment specified below. The customer or the user of the CV-5000 should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Conducted RF IEC 61000-4-6	3 Vrms 150kHz to 80MHz	3 V	Portable and mobile RF communications equipment should be used no closer to any part of the CV-5000, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.  Recommended separation distance $d = 1.2 \sqrt{P}$
Radiated RF IEC 61000-4-3	3 V/m 80MHz to 2.5GHz	3 V/m	$d = 1.2 \sqrt{P}$ 80MHz to 800MHz $d = 2.3 \sqrt{P}$ 800MHz to 2.5GHz  where $P$ is the maximum 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 RF transmitters, as determined by an electromagnetic site survey, <sup>a</sup> should be less than the compliance level in each frequency range. <sup>b</sup>  Interference may occur in the vicinity of equipment marked with the following symbol:  

NOTE 1 At 80 MHz and 800 MHz, 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.

a 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. If the measured field strength in the location in which the CV-5000 is used exceeds the applicable RF compliance level above, the CV-5000 should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the CV-5000.

b Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

**Recommended separation distance between portable and mobile RF communications equipment and the CV-5000**

The CV-5000 is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the CV-5000 can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the CV-5000 as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter <b>W</b>	Separation distance according to frequency of transmitter <b>m</b>		
	150kHz to 80MHz $d = 1.2 \sqrt{P}$	80MHz to 800MHz $d = 1.2 \sqrt{P}$	800MHz to 2.5GHz $d = 2.3 \sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance  $d$  in metres (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.

## REQUIREMENT TO THE EXTERNAL CONNECTION DEVICES

The accessory devices that are connected to the analog and digital interface must comply with the relevant IEC standard.

(Example: IEC60950-1 for the data processing devices and IEC60601-1 for the medical devices)

All of configuration must comply with IEC60601-1.

Those who connect the additional device to the signal input/output units should make a medical system and therefore take total responsibility to obey the requirements of IEC60601-1 about their system. If someone has a question, he/she must contact the TOPCON authorized dealer or TOPCON office at the address on the back cover.

## **SYSTEM CLASSIFICATION**

### **Types of protection against electric shocks: This instrument is classified as Class I equipment.**

Class I equipment does not depend only on basic insulation for protection against electric shocks, but also provides a means of connection to a protective earth system of facilities so that metal parts that come into contact do not become conductive while the basic insulation is in failure.

### **Degree of protection against electric shocks: Type B applied part**

Type B applied part is the applied part complying with the specified requirements of the Standard IEC 60601-1 to provide protection against electric shock, particularly regarding allowable LEAKAGE CURRENT.

The forehead rest of this instruments is "Type B applied part".

### **Degree of protection against harmful ingress of water: IPx0**

CV-5000 has no protection against ingress of water. (The degree of protection against harmful ingress of water defined in IEC60529 is IPx0.)

### **Classification according to the method(s) of sterilization or disinfection recommended by the manufacturer: not applicable.**

CV-5000 has no part to be sterilized or be disinfected.

### **Classification according to the degree of safety of application in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide: Equipment not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.**

CV-5000 should be used in environments where no flammable anesthetics and/or flammable gases are present.

### **Classification according to the mode of operation: Continuous operation.**

Continuous operation is the operation under normal load for an unlimited period, without the specified limits of temperature being exceeded.

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Please provide the following information when contacting us regarding questions about this instrument:

- Model name: CV-5000
- Serial No.: This is described on the rating nameplate on the top surface of the instrument.
- Period of use: Please inform us of the date of purchase.
- Defective condition: Please provide us with as much detail as possible on the problem.

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COMPU-VISION CV-5000

USER MANUAL

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COMPU-VISION

**CV-5000**

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