

INSTRUCTION MANUAL
COMPU-VISION

CV-5000

INTRODUCTION

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

This instrument is used to measure refractive power of eyes and to test the binocular functions.

This instrument has the following features:

- The compact design enables you to see the patient's face.
 - The target can be controlled by the controller for the main unit.
 - The PD and the anterior eye alignment can be checked even in a dark optometry room.
-

This instruction manual outlines the Compu-Vision CV-5000, including the basic operation, trouble shooting, maintenance and cleaning.

To ensure the best use of the instrument (safely and efficiently), carefully read "DISPLAY FOR SAFE USE" and "SAFETY CAUTIONS" and then use the instrument correctly.

Keep the instruction manual at hand for future reference.

[Warning]

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

[The patient may be injured.]



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.

CAUTIONS FOR USE

Basic caution

When moving the instrument up and down or turning it, be careful not to bump it against the patient's face.

[The patient may be injured.] Handle the CV-5000 using the top covers above the lens banks.

Do not open the covers. Ask the serviceman to repair the instrument.

[Injury may be caused by electric shock.]

Turn off the power switch and unplug the power cord first. Then, replace the fuse with the rated one.

[Injury or fire may be caused by electric shock.]

Disposal

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

ENVIRONMENTAL CONDITIONS FOR USE

Temperature : 10°C ~ 40°C

Humidity : 30% ~ 75% (without dew condensation)

Air pressure : 700hPa ~ 1060hPa

STORAGE, USAGE PERIOD AND OTHERS

1. Environmental conditions for installation (without package)

Temperature : 10°C ~ 40°C

Humidity : 30% ~ 75% (without dew condensation)

Air pressure : 700hPa ~ 1060hPa

2. When storing the instrument, ensure that the following conditions are met:

(1) The instrument should not be splashed with water.

(2) Store the instrument where air pressure, temperature, humidity, ventilation, sunlight, dust, salty/sulfurous air, etc. do not give any negative side effect.

(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.

3. Usage period

8 years from delivery providing regular maintenance is performed (according to the self-certification [Topcon data])

ENVIRONMENTAL CONDITIONS FOR PACKAGING IN TRANSPORTATION

Temperature : -20°C ~ 50°C

Humidity : 10% ~ 95%

CHECKPOINTS FOR MAINTENANCE

Maintenance by user



1. Regularly maintain and check the instrument and its parts.
2. When using the instrument after a prolonged period of inactivity, confirm normal and safe operation beforehand.
3. When the lens is stained, wipe it with the accessory silicone cloth.
4. When this instrument is not in use, apply the dust cover to it.
5. Refer to "MAINTENANCE" on page 43 for details.

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 instruction manual.

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

DISPLAYS









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

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.

SAFETY CAUTIONS

WARNING

Icon	Prevention item	Page
	To avoid electric shock, do not attempt disassembling, rebuilding and/or repairs on your own. Ask your dealer for repairs.	33
	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 vessels containing liquids near the instrument.	—
	To avoid electric shock, do not insert metal objects into any clearances, etc.	—
	To avoid fire and electric shock in case of leakage, connect the power plug to a 3-plug AC outlet with proper grounding.	—
	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.	44
	To avoid fire in the event of an instrument malfunction, use a properly rated fuse.	44
	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. Ask your dealer for repairs.	—

 **CAUTION**

Icon	Prevention item	Page
	To prevent the instrument from tipping over or falling and to avoid injury, do not install the instrument on an uneven or unsteady surface, including a slope.	—
	To avoid electric shock, do not handle the plugs with wet fingers.	—
	To avoid the damaged instrument or an injury caused by electric shock, turn off the power switch and unplug the power cord before cleaning the instrument.	—
	When tilting the head for the near-point test, place the instrument away from the patient to prevent him/her from being injured by colliding against it.	16
	Do not tilt the head for the near-point test while the near-point rod is inclined. The near-point rod may hit the instrument or desk to damage the instrument.	16, 18, 31
	Do not put your hand between the arm and the instrument. Your hand may be pinched to cause injury.	17
	To avoid injury due to contact, do not bring the face close to the near-point rod.	15, 18, 31
	<p>This instrument has been tested (with 120V/230V) and found to comply with IEC60601-1-2: 2001.</p> <p>This instrument radiates radio frequency energy within standard and may affect other devices in the vicinity.</p> <p>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.</p> <p>Please consult the dealer from whom you purchased the instrument if you have any additional questions.</p>	—

USAGE AND MAINTENANCE

USAGE

The CV-5000 Compu-Vision is an electric instrument. Use this instrument according to the instruction manual.

USER 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 task may be done by the user.

For details, see the relevant part of this manual.

Replacing the face shield/forehead rest

The forehead rest and face shield on this instrument may be replaced by the user. Refer to "INSTALLING THE FACE SHIELD AND FOREHEAD REST" on page 15 for handling them.

Replacing the fuse

The fuses on this instrument may be replaced by the user. For details, refer to "REPLACING THE FUSE" on page 44.

Inspecting the instrument

It is recommended to inspect the mounting section for the CV-5000 and the system table about its looseness periodically. Refer to "INSPECTING THE OPTOMETRY UNIT MOUNTING SECTION" on page 46 for details.


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 instruction manual.
- Diagnoses made shall be the responsibility of pertaining doctors and TOPCON shall not take any responsibility for the results of such diagnoses.

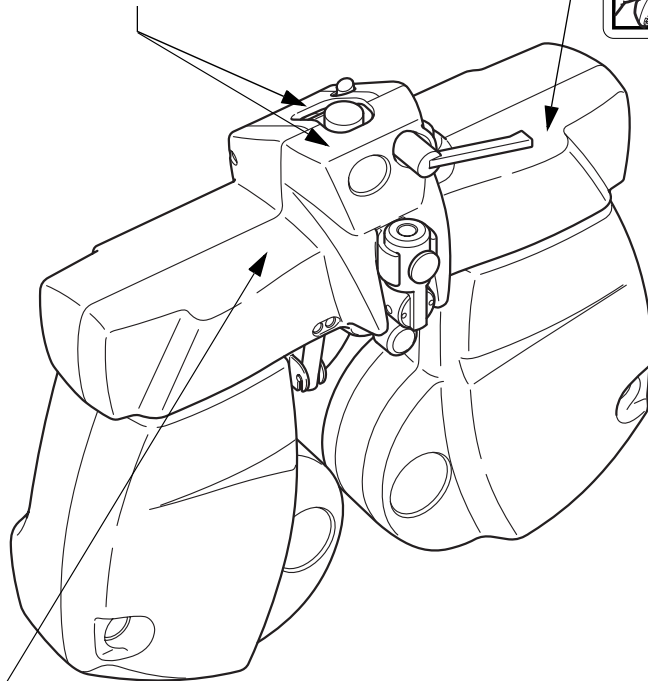
WARNING DISPLAYS AND POSITIONS


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.

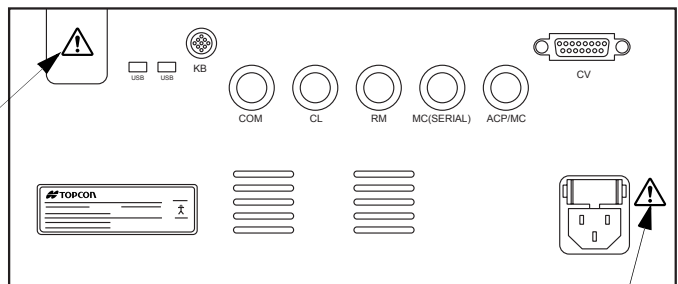
CAUTION
 Do not put your hand between the arm and the instrument. Your hand may be pinched to cause injury.


NOTICE
 Hold the PD unit when moving the head.



CAUTION
 To avoid injury due to contact, do not bring the face close to the near-point rod.

CAUTION
 Do not open the covers. Ask the serviceman to repair the unit. Injury may be caused by electric shock.



CAUTION
 Turn off the power switch and unplug the power cord first. Then, replace the fuse with the rated one.

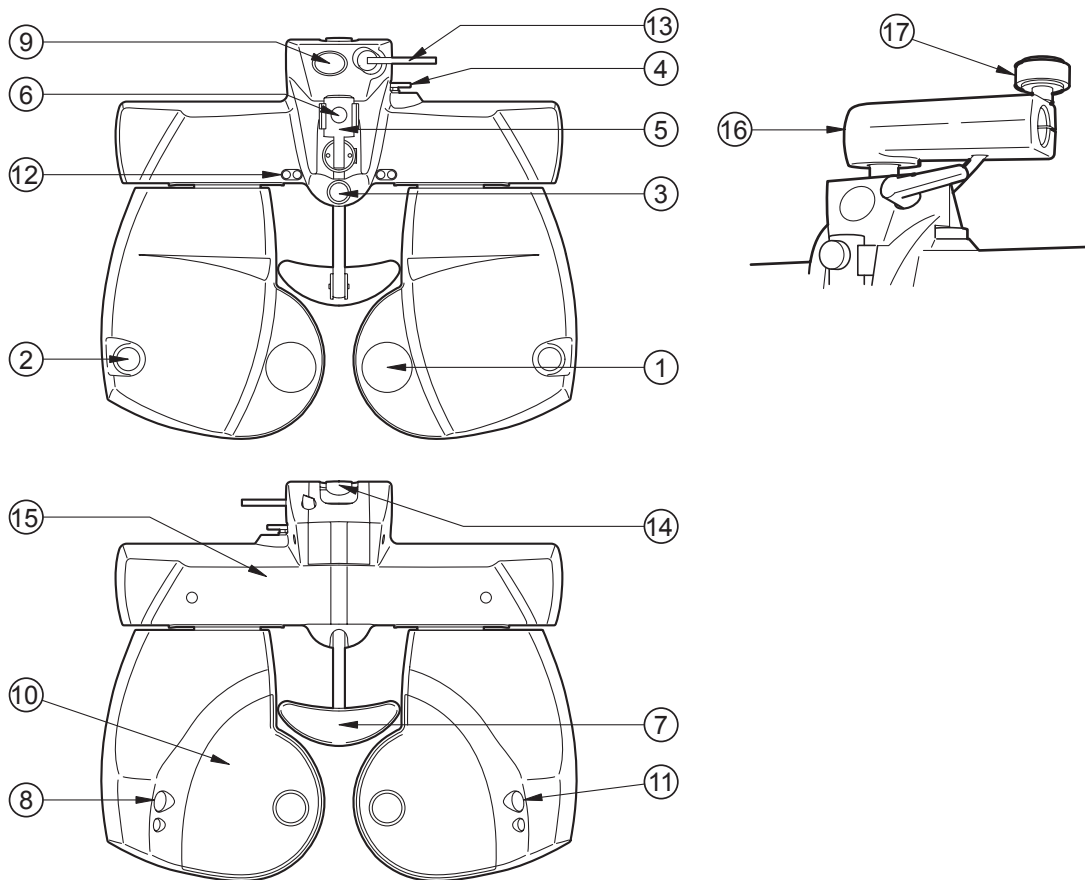
CONTENTS

INTRODUCTION	1
CAUTIONS FOR USE	2
ENVIRONMENTAL CONDITIONS FOR USE	2
STORAGE, USAGE PERIOD AND OTHERS	2
ENVIRONMENTAL CONDITIONS FOR PACKAGING IN TRANSPORTATION	2
CHECKPOINTS FOR MAINTENANCE	2
DISPLAY FOR SAFE USE	3
SAFETY CAUTIONS	4
USAGE AND MAINTENANCE	6
USAGE	6
USER MAINTENANCE	6
ESCAPE CLAUSE	6
WARNING DISPLAYS AND POSITIONS	7
COMPONENT NAMES AND FUNCTIONS	10
MAIN UNIT	10
CV POWER SUPPLY UNIT	11
COMPOSITION OF PARTS WHICH CONTACT THE HUMAN BODY	11
STANDARD ACCESSORIES	12
OPTIONAL ACCESSORIES	14
PREPARATIONS	15
ASSEMBLY/INSTALLATION OF NEAR-POINT ROD AND NEAR-POINT CARD	15
INSTALLING THE FACE SHIELD AND FOREHEAD REST	15
LEVEL ADJUSTMENT	16
FIXING THE TILTED HEAD	16
NEAR-POINT CARD	18
INSTALLING THE INSTRUMENT	19
MEASUREMENT SCREEN (Example: KB-50)	20
OUTPUT OF PRINTER	21
OPTOMETRY	24
OPTOMETRY BY FOGGING METHOD	25
ACCURATE MEASUREMENT OF THE ASTIGMATIC AXIS AND ASTIGMATIC POWER (WHEN USING THE CROSS CYLINDER)	26
ACCURATE MEASUREMENT OF THE SPHERICAL POWER (RED-GREEN TEST)	27
BINOCULAR BALANCE TEST	28
MEASURING PHORIA (FAR-POINT)	29
SUMMING UP MEASUREMENT RESULTS	31
MEASURING PRESBYOPIA	31
OTHER MEASUREMENTS	32
POWER CONVERSION	32
TROUBLE SHOOTING	33
TROUBLE SHOOTING GUIDE	33
SPECIFICATIONS AND PERFORMANCE	34
DIMENSIONS AND WEIGHT	34
PURPOSE OF USE	34
OPERATION PRINCIPLE	34
ELECTRIC RATING	34

ELECTROMAGNETIC COMPATIBILITY	35
SYSTEM CLASSIFICATION	39
REFERENCE MATERIAL	40
SHAPE OF PLUG	40
SYMBOL	40
CORNEAL ALIGNING DEVICE	41
MAINTENANCE	43
DAILY CHECKUPS	43
ORDERING CONSUMABLES	43
REPLACING THE FUSE	44
CLEANING	45
INSPECTING THE OPTOMETRY UNIT MOUNTING SECTION	46
SETTING THE PRINTER PAPER	47
DISPOSAL OF PRODUCT	47

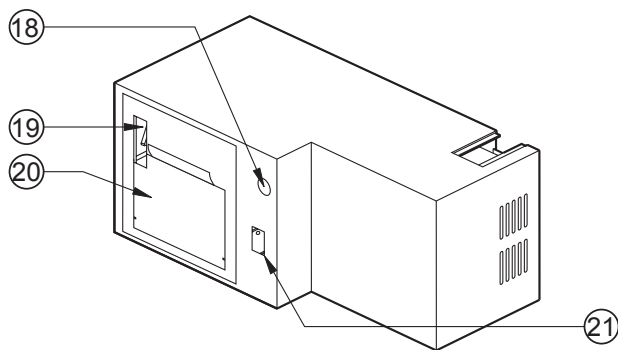
COMPONENT NAMES AND FUNCTIONS

MAIN UNIT

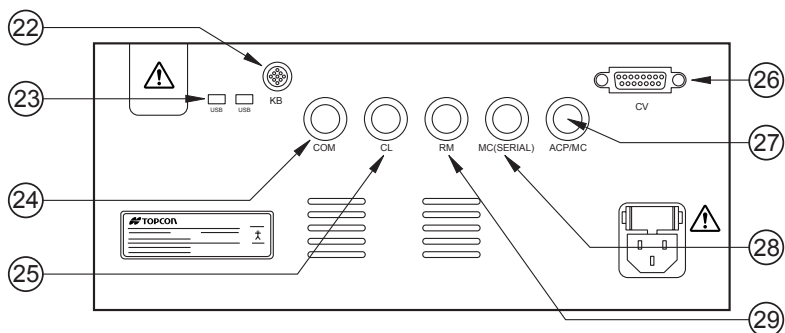


- (1) Examination window The patient's eyes are observed through this window, and the display lenses are set here.
- (2) Corneal aligning window The position of the patient's cornea can be observed through this window.
- (3) Forehead rest knob Adjusts the forehead in the back-and-forth direction.
- (4) Leveling knob Levels the instrument.
- (5) Near-point rod holder The near-point rod is inserted and attached here.
- (6) Near-point rod clamp screw Fixes the near-point rod.
- (7) Forehead rest The patient's forehead rests here.
- (8) Cornea alignment scale Measures the cornea vertex position.
- (9) Level Indicates the standard position for the level adjustment.
- (10) Face shield This cover can be removed.
- (11) Cornea illumination Brightens the anterior eye segment to check the PD easily even during optometry in a dark room.
- (12) Near-point illumination Brightens the near-point target to see it easily.
- (13) Tilt fixing lever Fixes the tilted head.
- (14) Arm mounting shaft Mounts the instrument on the arm, etc.
- (15) PD cover Hold this cover when tilting the head for the near-point test.
- (16) Arm Used to mount the CV-5000 instrument.
- (17) Knob Fixes the arm when it is installed to the table, etc.

CV POWER SUPPLY UNIT



- (18) Connector for connecting KB .. Used to connect the CV 1 Dial Controller.
 (19) Cover switch Opens the printer cover.
 (20) Printer cover
 (21) Power switch



- (22) Connector for connecting KB .. Used to connect the CV 1 Dial Controller.
 (23) USB connector..... Used to connect any USB device such as an external printer.
 (24) COM port connector..... Used to connect a computer.
 (25) CL port connector Used to connect a lens meter.
 (26) Connector for the CV instrument Used to connect the CV instrument.
 (27) ACP/MC port connector Provided for the extended optical emitting unit.
 (28) MC (SERIAL) Used to connect the chart device for serial application.
 (29) RM port connector Used to connect the auto refractometer.



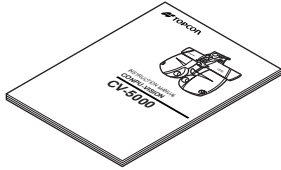

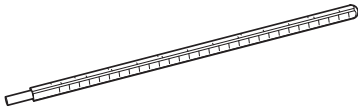

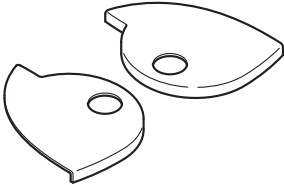
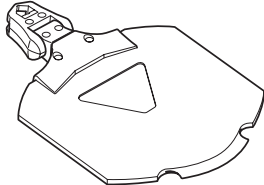
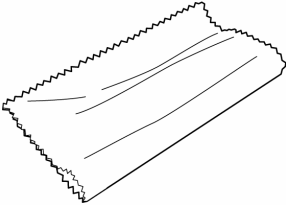
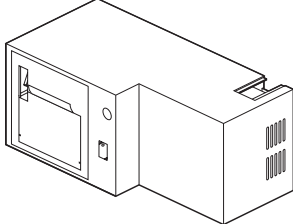
Connect the device complying with UL60950 or IEC60950 to the CV power supply unit. Ask the serviceman to connect the device.

COMPOSITION OF PARTS WHICH CONTACT THE HUMAN BODY

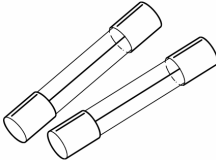
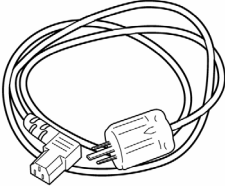
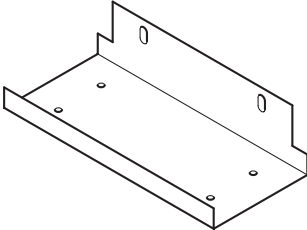
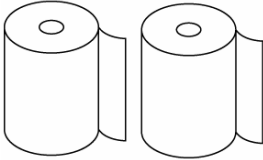
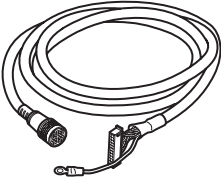
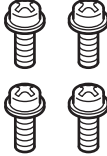
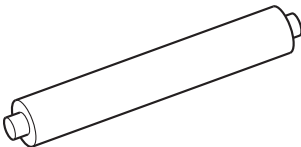
Forehead rest: Polypropylene resin
 Face shield : Polypropylene resin

STANDARD ACCESSORIES

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

<p>Instruction manual (1)</p> 	<p>Dust cover (1)</p> 
<p>Near-point rod (1)</p> 	<p>Forehead rest (2)</p> 
<p>Face shield (2)</p> 	<p>Near-point card (1)</p> 
<p>Silicone cloth (1)</p> 	<p>CV power supply unit (1)</p> 

The standard accessories for the CV power supply unit are shown below.

<p>Fuse (2)</p> 	<p>Power cord (1)</p> 
<p>Fixing metal fixture (1)</p> 	<p>Printer paper (2)</p> 
<p>CV connection cable (1)</p> 	<p>Screw (4)</p> 
<p>Printer shaft (1)</p> 	

OPTIONAL ACCESSORIES

- CV 1 Dial Controller KB-1DS
Controls the operation of the Compu-Vision CV-5000 when combined with it.
- CV 1 Dial Controller KB-50
Controls the operation of the Compu-Vision CV-5000 when combined with it.
- Cables for input, output, MC-3 (for serial application) and for connecting two or more instruments
Used to connect the auto refractometer, lens meter and the visual acuity test device (for serial application) and to connect two or more instruments.
* Ask the serviceman to connect the devices.
- Wireless connection device
Used to perform the wireless serial communication. It is possible to connect the refractometer or lens meter without wires.
* Ask the serviceman to connect the devices.
- Connector for the extended optical emitting unit
Used to connect the extended optical emitting unit for the target setting device.
- Connector for the CV instrument
Used to connect the CV instrument.

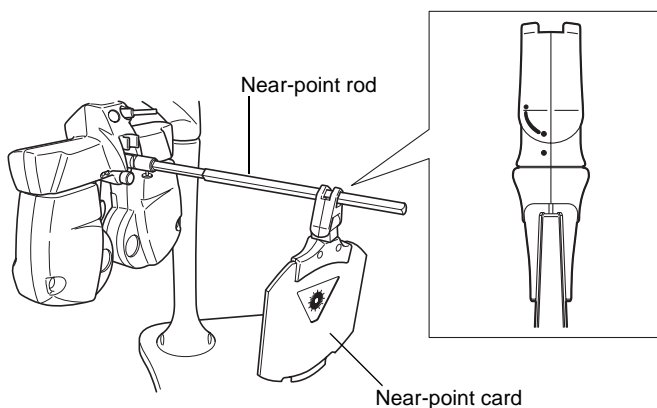
PREPARATIONS

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.)

CAUTION	To avoid injury due to contact, do not bring the face close to the near-point rod.
NOTICE	The near-point card must be bent in the set direction. Do not bend it forcedly in the opposite direction. The near-point card may be broken.
NOTICE	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.

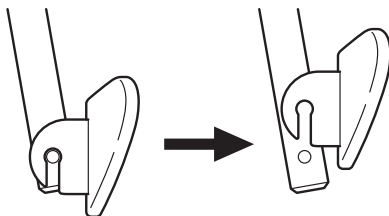


Install the near-point card toward the CV instrument in the direction where it can be bent.

INSTALLING THE FACE SHIELD AND FOREHEAD REST

The face shield is fixed by putting it on the face shield magnet properly.

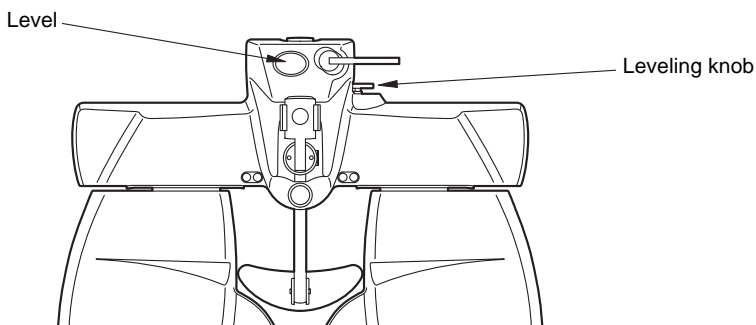
To remove the forehead rest, as viewing from its side, pull it upward.



To mount the forehead rest, carry out the removing procedure reversely.

LEVEL ADJUSTMENT

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



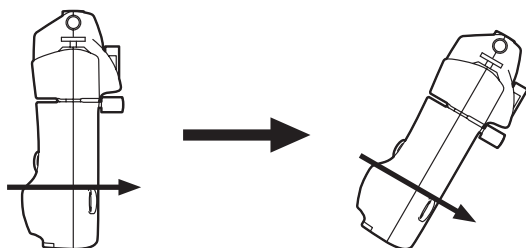
FIXING THE TILTED HEAD

By tilting the head in the near-point test, the instrument can be set in the proper position for the real near-point test.

NOTICE	Hold the PD unit when moving the head.
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CAUTION	Do not tilt the head for the near-point test while the near-point rod is inclined. The near-point rod may hit the instrument or desk to damage the instrument.
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CAUTION	When tilting the head for the near-point test, place the instrument away from the patient to prevent him/her from being injured by colliding against it.
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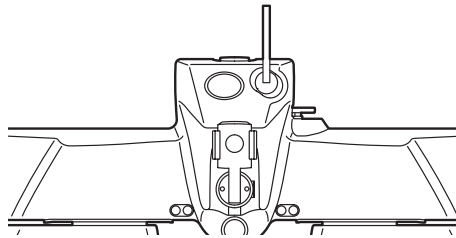
To tilt the head, loosen the tilt fixing lever of the instrument.

NOTICE

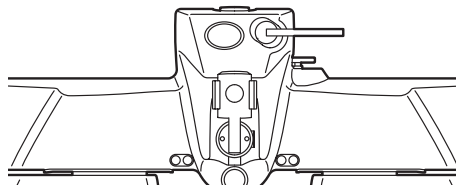
Do not rotate the instrument while the tilt fixing lever is loosened. The tilt fixing lever may hit the mounting arm to damage the instrument.

CAUTION

Do not put your hand between the arm and the instrument. Your hand may be pinched to cause injury.



When the head is tilted to a desired angle, fix the lever.





The tilt fixing lever is a serration type. If the tilt fixing lever hits the instrument or the mounting arm while it is loosened, adjust its position.

NEAR-POINT CARD

When the patient wears the 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".

Incline the near-point rod until it stops. If the near-point rod is almost horizontal, the position is the measuring position.

 CAUTION	To avoid injury due to contact, do not bring the face close to the near-point rod.
 CAUTION	Do not tilt the head for the near-point test while the near-point rod is inclined. The near-point rod may hit the instrument or desk to damage the instrument.
NOTICE	The near-point card must be bent in the set direction. Do not bend it forcibly in the opposite direction. The near-point card may be broken.

The scale of the near-point rod is graduated by the "cm" unit (15 ~ 70).

Values matching both end lines of the card holder indicate the distance between the eye and the card.

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 by your fingers. The target appears in the sight window.

Target numbers of the near-point card and the contents are shown below.

- (1) 40cm target VA 20/50-20/20
- (2) Target for presbyopia
- (3) Target for horizontal line
- (4) Target for horizontal line (40cm target VA 20/20)
- (5) Target for presbyopia (thin lines)
- (6) 40cm target VA 20/200-20/60
- (7) Target for astigmatism
- (8) 40cm for VA 20/20
- (9) Target for vertical line
- (10) 67cm target VA 20/200-20/20

Target name on the patient side

When you stop turning the rotary part of the card at the position displayed as "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.)

INSTALLING THE INSTRUMENT

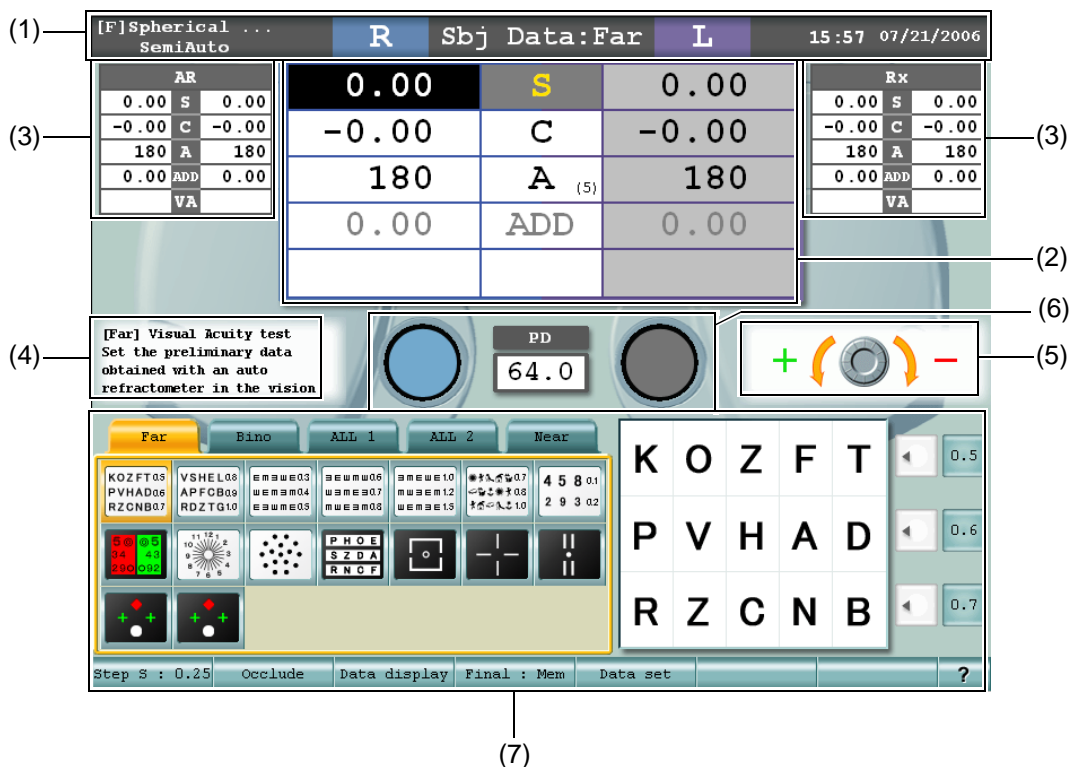
- 1** Press the main switch on the console. The instrument is reset.
- 2** Perform the objective measurement by an auto refractometer and set the measurement data in the instrument. In this case, optometry by fogging method and others can be omitted. So, the examination time can be effectively shortened.
- 3** Let the patient sit at the optometry table.



- 4** Press either the table up/down switch or electric chair up/down switch to adjust the instrument to the patient's posture.
- 5** Operate the lock switch or lock lever of the vision arm to unlock and move the instrument to the patient's position. Operate its lock switch or lock lever again to fix the vision arm.
- 6** Set the previously measured PD (interpupillary distance) in the instrument.
- 7** Let the patient place his/her forehead on the forehead rest.
- 8** Looking at the level, turn the leveling knob to bring the bubbles between the two lines.
- 9** Set the distance between the cornea vertex and instrument. (For adjusting the distance between the cornea vertexes, refer to "CORNEAL ALIGNING DEVICE" on page 41.)
- 10** When you want to measure the right eye first, press "right eye" and occlude the left eye.

MEASUREMENT SCREEN

(Example: KB-50)



- (1) Displays the type of the displayed main data, the test name, the time, the lapse of test time, etc.
- (2) Displays the data set in the CV-5000 instrument, displays the set visual acuity, etc. Only the astigmatic axis is displayed by steps in ().
- (3) When you want to compare the main data with the objective data or lens data measured by an external device, those data sets are displayed in small areas near the main data. One of those data sets are fixed, and the other is used for exchanging with the main data or displaying.
- (4) Displays a simple guide about the current test.
- (5) Displays the dial information about the current test.
- (6) Displays the auxiliary lens set in the CV-5000 instrument. When you select the astigmatic lens or cross cylinder, you can check the lens axis status. The PD value set in the CV-5000 instrument is displayed.
- (7) On KB-50, you can operate the device not only by keyboard but also by touching the screen directly. The touching operation is possible on the lower half of the screen. You can access a variety of functions such as step numbers, etc. with the function buttons.

Refer to the instruction manual of the CV 1 dial controller KB-50 for details.

OUTPUT OF PRINTER

Press [PRINT] of KB-50, and the data are printed.
 * The unmeasured data are not printed.

ID	1	ID number
NAME	01_01_2006	Column for name
	10:20	Date and time of measurement
	(TEST TIME 2:15)	Test time
	(VD = 12.0)	Distance between cornea vertexes
	----- UNCORRECTED VA -----	Uncorrected visual acuity
<FAR VA>		Uncorrected visual acuity for far point
	R R+L L	
	0.4 0.5 0.4	
<NEAR VA>		Uncorrected visual acuity for near point
	R R+L L	
	0.5 0.6 0.5	
	----- RM DATA -----	Input data of auto refractometer
<R>	SPH CYL AXS	
	+0.12 -1.00 171	
<L>	-1.37 -0.00 180	
<FAR VA>		
	R R+L L	
	0.9 1.0 0.9	
	----- KRT DATA -----	Input data of keratometer
<R>	D MM AXS	
H	43.87 7.69 157	
V	45.37 7.44 67	
AVE	7.57	
	CYL -1.50 157	
<L>	D MM AXS	
H	43.75 7.71 8	
V	44.50 7.59 98	
AVE	7.65	
	CYL -0.75 8	
	----- CL DATA -----	Input eyeglass data
<R>	SPH CYL AXS	
	-0.00 -1.00 180	
<L>	-1.25 -0.00 180	
<FAR VA>		Visual acuity measured by setting the eyeglass data
	R R+L L	
	0.9 1.0 0.9	
<ADD>		Near-point addition refractive power data of eyeglasses
	R L	
	0.00 0.00	
<NEAR VA>		Near-point visual acuity measured by setting the eyeglass data
	R R+L L	

	PREVIOUS DATA		
	SPH	CYL	AXS
<R>	-0.25	-1.00	180
<L>	-1.25	-0.25	180
<FAR VA>	R	R+L	L
	0.9	1.0	0.9
<ADD>	R	R+L	L
	0.00	0.00	0.00
<NEAR VA>	R	R+L	L
<PRISM (FAR)>			
	HORIZ	VERTI	
<R>	0.5 BO	0.5 BD	
<L>	0.5 BO	0.5 BU	
	PRISM	ANGLE	
<R>	0.7	225	
<L>	0.7	45	
<PRISM (NEAR)>			
	HORIZ	VERTI	
<R>	0.0 BO	0.0 BU	
<L>	0.0 BO	0.0 BU	
	PRISM	ANGLE	
<R>	0.0	0	
<L>	0.0	0	

Data input from database

Visual acuity measured last, which was input from database

Addition refractive power data, which was input from database

Near-point visual acuity, which was input from database

Far-point phoria data, which was input from database

Near-point phoria data, which was input from database

	MANIFEST		
	SPH	CYL	AXS
<R>	-0.25	-1.00	180
<L>	-1.25	-0.25	180
<FAR VA>	R	R+L	L
	0.9	1.0	0.9
<ADD>	R	R+L	L
	0.00	0.00	0.00
<NEAR VA>	R	R+L	L
<PRISM (FAR)>			
	HORIZ	VERTI	
<R>	0.5 BO	0.5 BD	
<L>	0.5 BO	0.5 BU	
	PRISM	ANGLE	
<R>	0.7	225	
<L>	0.7	45	
<PRISM (NEAR)>			
	HORIZ	VERTI	
<R>	0.0 BO	0.0 BU	
<L>	0.0 BO	0.0 BU	
	PRISM	ANGLE	
<R>	0.0	0	
<L>	0.0	0	

Final correction data

Visual acuity in final correction data

Near-point addition refractive power data

Near-point visual acuity

Far-point phoria data in final correction data

Near-point phoria data in final correction data

	FINAL	CORRECTED	
	SPH	CYL	AXS
<R>	-0.25	-1.00	180
<L>	-1.25	-0.25	180
<FARVA>			
	R	R+L	L
<ADD>	0.9	1.2	0.9
	R	L	
<NEAR VA>	+0.25	+0.25	
	R	R+L	L
<PRISM (FAR)>	0.9	1.0	0.9
	HORIZ	VERTI	
<R>	0.5 BO	0.5 BD	
<L>	0.5 BO	0.5 BU	
	PRISM	ANGLE	
<R>	0.7	225	
<L>	0.7	45	
<PRISM (NEAR)>			
	HORIZ	VERTI	
<R>	0.0 BO	0.0 BU	
<L>	0.0 BO	0.0 BU	
	PRISM	ANGLE	
<R>	0.0	0	
<L>	0.0	0	
	BINO.	TEST	
STEREO (F)			
	13'12		
STEREO (N)			
	13'12		
WORTH 4 DOTS			
	4 DOTS		
		FAR PD = 61.0 mm	
		NEAR PD = 58.0 mm	
		TOPCON	CV-5000

Prescription data

Near-point addition refractive power data in prescription data

Near-point visual acuity in prescription data

Far-point phoria data in prescription data

Near-point phoria data in prescription data

Result of binocular function test
Result of stereoscopic vision test

Result of Worth 4 dots test

Far-point interpupillary distance
Near-point interpupillary distance

OPTOMETRY

This chapter will describe an example of optometry by using CV-5000.

A manual optometry procedure, without using the optometry program, will be described.

Before examining the patient's eye with this instrument, it is necessary to check the current visual acuity, history, PD and convergence near point of the patient's eye and perform the occlusion test, and besides, the knowledge of optometry is required to make the best use of the instrument.

For this purpose, refer to professional literature for VISION specialists. For details about the use of the TOPCON CV 1 Dial Controller (KB-50) and Communication System, refer to each instruction manual.

Here, a model patient is taken up to describe the procedure clearly.

Mr. A, an adult aged 25 wearing eyeglasses comes to the store. He complains about his insufficient visual acuity.

After we have checked the refractive power of his glasses with the TOPCON lens meter, the following results are obtained.

PD : 64mm

R : S-1.00D C-0.50D A90°

L : S-1.25D C-0.50D A180°

Interpupillary distance: 64mm

Right eye: Spherical power -1.00D Astigmatic power -0.50D Astigmatic axis 90°

Left eye : Spherical power -1.25D Astigmatic power -0.50D Astigmatic axis 180°

After examining the visual acuity with eyeglasses, the result is 0.7 for both right and left eyes. By performing preliminary checks, including a verbal diagnosis, it is found that Mr. A has normal visual functions without ocular pathology. Then, measure the optimal refractive power of the eyeglasses with this instrument.

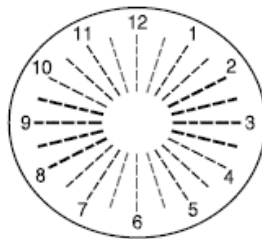
Be sure to refer to this manual and perform optometry.

OPTOMETRY BY FOGGING METHOD

- 1** For the right eye, add +3.00D to the expected spherical power. Since the current eyeglass refractive power is -1.00D, the right spherical power is +2.00D.
- 2** His eyesight fails to almost 0.1. (Adding +3.00D to the spherical power enables to drop his visual acuity to almost 0.1. In the fogging method, the visual acuity is gradually raised from this level. It is evaluated as a good method of optometry because the eye is little affected by accommodation.)
Let Mr. A relax to remove the influence of accommodation.

Next, with the [Spherical power selector dial], reduce the spherical power by -0.25D as "2.00 → 1.75 → 1.50" until his visual acuity rises to 0.5. Now the spherical power is -1.00.

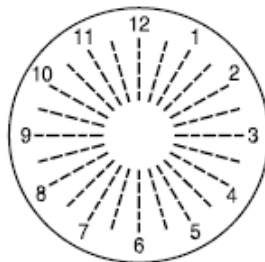
- 3** Show him an astigmatic chart and ask how it looks.



Mr. A answers it looks as shown above. Adjust the astigmatic axis of the right eye to be perpendicular (90°) to the clearly visible line.

If the lines are uniformly unclear to him, it indicates there is no astigmatism. So, it is not necessary to adjust the astigmatic axis.

- 4** Change the astigmatic power of the right eye as 0.00 → -0.25 → -0.50 until every line is uniformly visible. When -0.50 is reached, lines are evenly visible as shown below.



* Astigmatic power is given as minus value because of the fogging method.

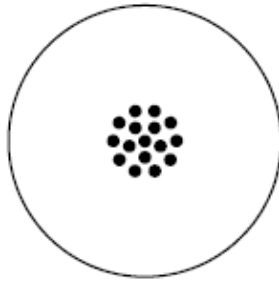
- 5** Change the spherical power by -0.25D until the best visual acuity is obtained, as -1.00 → -1.25 → -1.50, etc. Note down the visual acuity at each spherical power.
-1.00 0.7 -1.75 1.5
-1.25 0.9 -2.00 1.5
-1.50 1.2 -2.25 1.5

In the case of myopia, the optimal eyeglasses are determined by the lowest refractive power generating the best visual acuity. Since Mr. A has myopia, his spherical power is -1.75D. Thus, a general measurement of his right eye is finished.

Next, accurate measurement will be done.

ACCURATE MEASUREMENT OF THE ASTIGMATIC AXIS AND ASTIGMATIC POWER (WHEN USING THE CROSS CYLINDER)

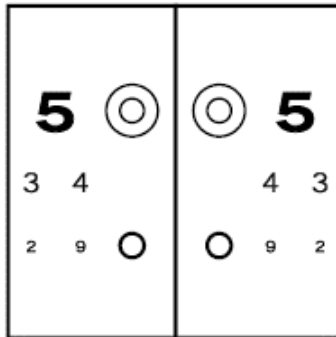
- 1** Set the dot chart as the target. The cross cylinder status "1" is set for the right eye (dial mode A) and the accurate measurement mode of the astigmatic axis is accessed.



- 2** Press "1" or "2" to reverse the cross cylinder. (As Lens "1" is bordered in green, and Lens 2 in red, the patient can answer with the color.) As the cross cylinder is reversed each time the switch is pressed, let the patient compare how the chart looks. Stop reversing when the patient tells the chart is seen better. The screen displays the "+" or "-" status. If it is "+", add 5° to the astigmatic axis to make it 95° with the [+] switch or dial.
- 3** Reverse the lens again and let the patient compare how the chart looks. He says the "+" status is better. Increase the astigmatic axis by 5° to make it 100°.
- 4** Reverse the lens again. Mr. A is hesitating to tell which chart surface is seen better. If judgment is difficult or if each surface of chart looks almost the same, a correct astigmatic axis is obtained. (The axis is set as 100°.)
- 5** Next, measure the accurate astigmatic power. Press [C]. The dial operation display is "C" and the accurate measurement mode of the astigmatic power is accessed. In the cross cylinder measurement, when changing the astigmatic power by -0.50D, the spherical power is automatically changed by +0.25D to keep the equivalent spherical power constant.
- 6** Use the same dot chart. Reverse the cross cylinder as Step 2 and let the patient compare how the chart looks. Mr. A answers the "-" status is seen better. Increase the astigmatic power by -0.25D with the [-] switch or dial. (The astigmatic power of Mr. A is -0.75D.)
- 7** Reverse the lens again and let the patient compare how the chart looks. Mr. A answers the "+" status is seen better. Decrease the astigmatic power. (The astigmatic power of Mr. A is -0.50D.)
If his answer is "-", -0.25D should be added.
- 8** Reverse the lens again. Mr. A answers the "-" status is seen better. The astigmatic power is to be increased by -0.25D but it makes the astigmatic power 0.75D again.
By the above results, it is judged that -0.50D is not enough and -0.75D is excessive. So, the accurate astigmatic power is -0.62D. However, such a lens needs to be specially ordered. In general, the weaker -0.50D is applied.
- 9** The accurate measurement of the astigmatic axis and astigmatic power is finished. Remove the cross cylinder.

ACCURATE MEASUREMENT OF THE SPHERICAL POWER (RED-GREEN TEST)

- 1** Next, make an accurate measurement of spherical power. Set the red-green chart, and the spherical movable mode is automatically set. Ask the patient which side is seen better, red or green. He answers the green side is seen a little better. Since this means that myopia is a little strong (or hyperopia is a little weak), increase the spherical power by +0.25D.

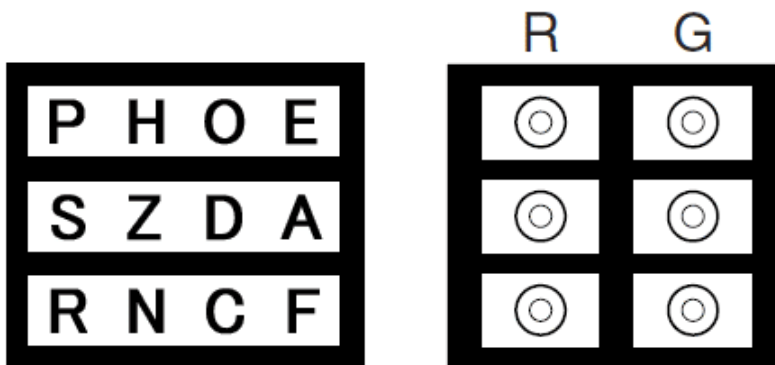


- 2** Ask the patient again which side is more clearly visible. He answers the red side is seen a little better. This means that myopia is a little weak (or hyperopia is a little strong). -0.25D is to be added to the spherical power but the condition will return to the original status. This means that the spherical power of Mr. A lies between -1.50D and -1.75D, namely -1.62D. Such a lens should be specially ordered. In general, the weaker spherical power for myopia (or stronger spherical power for hyperopia) is applied.
- 3** The measurement of the right eye is finished. Sum up the lens refractive power. The displayed measured values for the right eye are shown below.
- Spherical (spherical power) : -1.50
Astigmatism (astigmatic power): -0.50
Axis (astigmatic axis) : 100
- The above values are summed up as:
Right eye : S-1.50D C-0.50D A100°
- 4** Next, measure the left eye. Occlude the right eye and make the left eye uncovered. The movable mode of the left eye is accessed. In the same way as the right eye, carry out the procedure from "OPTOMETRY BY FOGGING METHOD" to "ACCURATE MEASUREMENT OF THE SPHERICAL POWER (RED-GREEN TEST)".
- The values for the left eye of Mr. A are summed up as:
Left eye : S-2.00D C-0.50D A170°
- 5** The measurement of the right and left eyes is completed. As each eye is measured independently, the balance of both eyes will be examined by "binocular balance test".

BINOCULAR BALANCE TEST

Measurement by using the polarizing filter

- 1 Set the binocular balance target. Apply the polarizing filters to both eyes and access the binocular spherical movable mode.



- 2 Mr. A sees the upper line with the right eye and the lower line with the left eye. If he can read up to the same place on both lines, the binocular balance is obtained. If not, add +0.25D to the spherical power of the eye which can see better. Make sure that the binocular mode is OFF, and add the spherical power to the eye which can see better.

Left eye of Mr. A:

Left eye : S-1.75D C-0.50D A170°

- 3 Access the binocular mode and add +1.00D to the spherical powers of both eyes at the same time with the dial.

At this time, the refractive powers of eyeglasses for Mr. A are as follows.

Right eye : S-0.50D C-0.50D A100°

Left eye : S-0.75D C-0.50D A170°

- 4 Increase the spherical powers of both eyes by -0.25D at the same time until a desired binocular visual acuity is obtained. The result is as follows.

Right eye : S-1.25D C-0.50D A100°

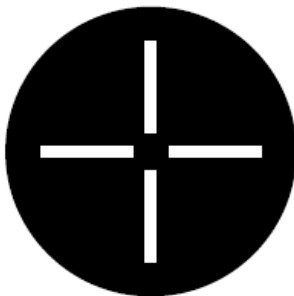
Left eye : S-1.50D C-0.50D A170°

- 5 Make both eyes uncovered.

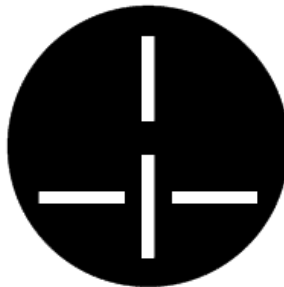
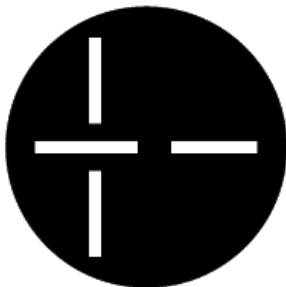
MEASURING PHORIA (FAR-POINT)

Measurement by using the polarizing filter

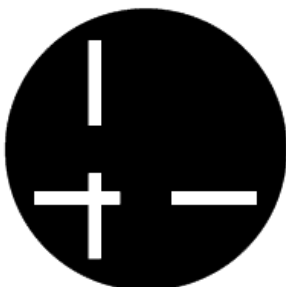
- 1** Set the cross target. Apply the polarizing filters to both eyes and access the binocular prism movable mode-horizontal (H).



- 2** If no phoria is found in the patient, four lines are seen as a cross.
If the patient has phoria, the four lines are seen differently.
- 3** If only the vertical lines are deviated in the right-and-left direction, gradually apply prism to the left eye with the Prism [BI] or [BO] switch.
- 4** If only the horizontal lines are deviated in the up-and-down direction, gradually apply prism to the right eye with the Prism [BU] or [BD] switch.

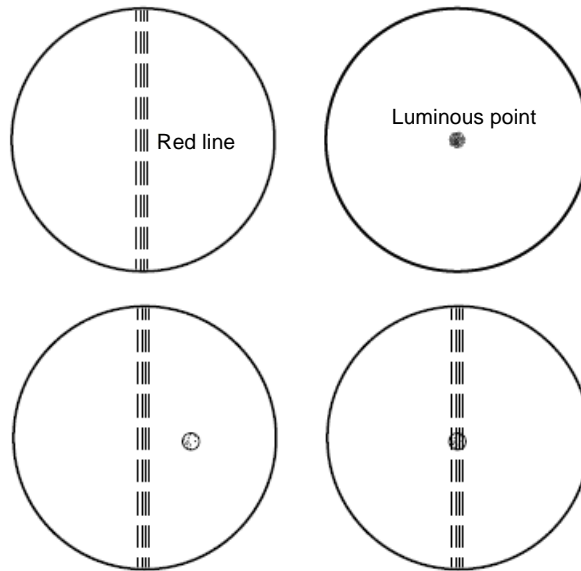


- 5** If all the lines are deviated, adjust them horizontally and vertically.
First, apply prism to the left eye with the Prism [BI] or [BO] switch until the vertical lines are positioned at the center of the horizontal lines. Then, apply prism to the right eye with the Prism [BU] or [BD] switch until the four lines are a cross.



Measurement by using Maddox rod and rotary prism

- 1** Measure horizontal phoria first. Access the binocular mode. Apply the red horizontal Maddox rod to the right eye with the right auxiliary lens selector switch, and make the left eye uncovered. Turn on the fixation target (small dot of light) at the target position. Mr. A sees the red vertical line with the right eye and the luminous point with the left eye. The line and point are seen as any of the following figures. Move the luminous point to the right and left with the Prism [BI] or [BO] switch. Tell the patient to signal when the red line overlaps the luminous point. The quantity of esophoria/exophoria is shown in the prism value display section of [BI] or [BO].



- 2** Measure vertical phoria. Access the binocular mode. Apply the red vertical Maddox rod to the left eye with the lens selector switch and make the right eye uncovered. Mr. A sees the red horizontal line with the left eye and the luminous point with the right eye. As Step 1, move the luminous point up and down with the Prism [BU] or [BD] switch. Tell the patient to signal when the horizontal line overlaps the luminous point. The quantity of hyperphoria/hypophoria is shown in the prism value display section of [BU] or [BD].

SUMMING UP MEASUREMENT RESULTS


The visual acuity test of Mr. A is finished. If much phoria is found in phoria measurement, the visual acuity needs to be corrected with eyeglasses. For the visual acuity of Mr. A, correction is not necessary.


Therefore, his eyeglasses will be prepared according to the following data:

PD : 64mm
Right eye : S-1.25D C-0.50D A100°
Left eye : S-1.50D C-0.50D A170°

MEASURING PRESBYOPIA

- 1** This measurement is performed to determine the refractive power of the eyeglasses for the aged, and is applied to people who generally are 45 years of age and older. Measure the far-point eyeglasses and set the refractive power to the instrument. Then, start the measurement.
Bring down the near-point rod, which was set by "ASSEMBLY / INSTALLATION OF NEAR-POINT ROD AND NEAR-POINT CARD", to the horizontal position.

 CAUTION	To avoid injury due to contact, do not bring the face close to the near-point rod.
--	--

 CAUTION	Do not tilt the head for the near-point test while the near-point rod is inclined. The near-point rod may hit the instrument or desk to damage the instrument.
--	--

NOTICE	The near-point card must be bent in the set direction. Do not bend it forcibly in the opposite direction. The near-point card may be broken.
---------------	--

- 2** Press the [F/N] switch to make the instrument ready for near-point measurement.
- 3** Access the binocular mode.
Apply the $\pm 0.50D$ cross cylinder to both eyes with the auxiliary lens selector switch.
- 4** Hang the target No. 7 (cross hairs) of the near-point card to face the patient at 40cm apart. Ask the patient how the vertical and horizontal lines look. If the patient has presbyopia, the horizontal line is seen clearly and the vertical line looks unclear.
If both lines are seen clearly and evenly, the eyeglasses for add power (near vision) is not necessary.
- 5** Using the dial, add 0.25D to the spherical powers of both eyes at the same time toward the plus region until the vertical line is seen evenly or a little more clearly than the horizontal line. If the patient is less than 45 year old, decrease by 0.25D. If he/she is the age of 45 or older, keep the spherical power as it is.
- 6** Remove the $\pm 0.50D$ cross cylinder from both eyes with the lens selector switch. Turn the rotary part of the near-point card and set the target No. (1) or (2). The patient sees small letters. Let the patient compare how the letters look. Sometimes it is necessary to adjust the spherical power a little. The measurement of presbyopia is finished.

OTHER MEASUREMENTS

Convergence and divergence

To measure convergence of a far point (5m), press the Prism [BO] switch to add prism for "base out" to both eyes. When a vertical letter target of a visual acuity chart is seen double first (where diplopia occurs first), record the value. This shows the convergence capacity of both eyes.

With the rotary prism alone, the convergence of 40Δ (approx. 22°) can be measured.

To measure divergence, press the prism [BI] switch to add prism for "base in" to both eyes. When diplopia occurs at the target first, record the value.

Vertical vergence

To measure vertical vergence for a far point (5m), use the target of a horizontal letter line. Press the prism [BU] or [BD] switch to add prism to both eyes. When a horizontal letter is seen double first (where diplopia occurs first), record the value. This means the value of vertical vergence.

POWER CONVERSION

Setting the measurement method by using the convex astigmatic lens

Since TOPCON designs instruments applied to the visual acuity measurement based on the fogging method, this instrument contains the concave astigmatic lenses. If convex astigmatic lenses are necessary, press [TRANSDIOPTRIC] of the controller. You can perform optometry by using a convex astigmatic lens.

Power conversion

If the result of the visual acuity measurement based on the fogging method is hyperopic astigmatism, perform power conversion because the astigmatic power of eyeglasses is displayed as a plus value.

S (spherical power) C (astigmatic power) A (astigmatic axis)

→ S (spherical power + astigmatic power) C (astigmatic power $\times (-1)$) A (astigmatic axis ± 90)

This is the power conversion formula. That is,

S : Add the astigmatic lens power to the spherical lens power.

C : Change the symbols (+, -) of the astigmatic lens power.

A : Add 90° when the astigmatic axis is smaller than 90° .

Decrease 90° when the astigmatic axis is larger than 90° .

(Example) When "S" is +3.00D, "C" is -1.00D and "A" is 175° :

S : $(+3.00) + (-1.00) = +2.00$


C : $-(-1.00) = +1.00$

A : $175^\circ - 90^\circ = 85^\circ$

Therefore, "S" is +2.00D, "C" is +1.00D and A is 85° .

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.
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If a problem has occurred, check the instrument conditions following the 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	Page
The instrument is not reset.	The power cord plug is not inserted to the outlet.	Insert the power cord plug into the outlet securely.	—
The lens to be set does not appear in the examination window.	The controller's connector comes off.	Insert the connector securely.	—
	Any other switch is pressed except the specified switches on the controller.	Press the specified switch.	20
A paper comes out but letters are not printed.	The printer paper is rolled reversely.	Set the printer paper correctly.	47
Paper does not come out.	The paper is used up.	Supply paper.	47

SPECIFICATIONS AND PERFORMANCE

Spherical power	Measuring range	+27.00 ~ -27.00D
	Measuring step	0.25D/3.00D
Astigmatic power	Measuring range	+8.00 ~ -8.00D
	Measuring step	0.25D/1.00D
Cylinder axis	Measuring range	0 ~ 180°
	Measuring step	1°/5°/15°
Prism	Measuring range	0 ~ 20Δ (all direction)
	Measuring step	0.1Δ /0.5Δ /1.0Δ
Pupillary distance adjustment range	Adjustment range	48 ~ 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, Polarized filter (45°/135°), Prism (6Δ /10Δ), Red Maddox (horizontal/vertical), Lens for retinoscopy (+1.5D/+2.0D), Cross cylinder for measuring presbyopia (±0.50D), Occluding plate (right/left), Pinhole, and Cross hairs glass (right/left).	
Cornea alignment scale (on optical axis)	12mm, 13.75mm, 16mm, 18mm, 20mm	
Convergence	Near-point distance 40/67cm (Minimum papillary distance at 40cm convergence : 53mm)	
Forehead rest adjustment range	15mm	
Tightening torque condition of knob	300Ncm	

* Specifications and appearance are subject to change without advance notice for the product improvement.

DIMENSIONS AND WEIGHT

Dimensions: 312 (W) × 115 (D) × 261 (H) mm

Weight : 4kg

PURPOSE OF USE

Used to measure the refractive power of eyes and perform the binocular function test.

OPERATION PRINCIPLE

On a disk built in the instrument, the lenses with a variety of refractive power are arranged. By turning the disk, the lenses are changed to each other. There are two or more disks in the instrument. So, measurement of different types can be carried out by selecting and combining the disks.

ELECTRIC RATING

Power supply voltage : AC100V-240V, 50Hz/60Hz

Power supply input : 90VA

ELECTROMAGNETIC COMPATIBILITY

This product conforms to the EMC standard (IEC 60601-1-2 : 2001).

- a) MEDICAL ELECTRICAL EQUIPMENT needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided in the ACCOMPANYING DOCUMENTS.
- 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	Model No.	Length (m)
CV RS-232C DIN (RS-232C CABLE)	43214 0006	—	5.0
KR7P PC RSCABLE (RS-232C CABLE)	41812 0002	—	5.0

Guidance and manufacturer's declaration - electromagnetic emissions		
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.		
Emissions test	Compliance	Electromagnetic environment - guidance
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. 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.
RF emissions CISPR 11	Class B	
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 differential mode ± 2 kV common mode	± 1 kV differential mode ± 2 kV common mode	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 or 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, ^a should be less than the compliance level in each frequency range. ^b 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 W	Separation distance according to frequency of transmitter m		
	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.

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.

REFERENCE MATERIAL

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 Publication	Description	Description (French)
	60417-5032	Alternating current	Courant alternatif
	60348	Attention, consult accompanying documents	Attention, consulter les documents d'accompagnement
	60417-5008	Off (power: disconnection from the mains)	Éteint (courant: coupure avec le secteur)
	60417-5007	On (power: connection of the mains)	Allumé (courant: raccordement sur le secteur)
	60878-02-02	Type B applied part	Partie appliquée du Type B

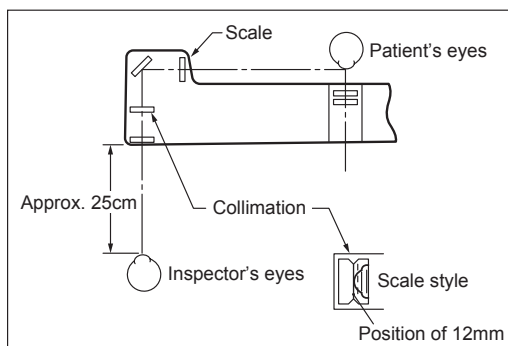
CORNEAL ALIGNING DEVICE

The forehead rest moves back and forth by turning the forehead rest knob.

With the patient's forehead set on the forehead rest, look through the corneal aligning window from the position about 25cm apart from its front.

Look at the patient's eye (cornea surface) so that the long lines of the collimation and scale are aligned.

If the eye (cornea surface) is on the long line, the eyeglass refractive power can be measured at the position 12mm away from the surface of cornea. The short lines are given at 2mm intervals from the long line. The dotted line is 13.75mm away from the cornea surface.



For example, if the cornea 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 is different from the measuring distance, correction is to be made according to 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 correction, 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 correction values on the intersections of "-10.00D" and "-11.00D" with "3mm" on Table 2, 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 astigmatic power of -6.00D:

On Table 2, the intersection of "-14.00D" and "6mm" is the correction value "+1.08D".

Therefore, the lens refractive power at 12mm from the eye is " $(-14.00) + (+1.08) = -12.92D$ ".

For the astigmatic power, perform the calculation " $(-14.00) + (-6.00) = -20.00D$ ".

The intersection of "-20.00D" and "6mm" is the correction 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 astigmatic power "-4.94D" are obtained.

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)

Correction value (When the measured refractive power is in plus region)

<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

Correction value (When the measured refractive power is in minus region)

<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

MAINTENANCE

DAILY CHECKUPS

- Dust is a formidable foe to the instrument. When not in use, apply the dust cover to 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 article name, article code and quantity.

Article name	Article code
Printer paper	44800 4001
Fuse T 4A 250V	42038 9004
Forehead rest	43221 3054
Face shield (left)	43221 4010
Face shield (right)	43221 4020

REPLACING THE FUSE

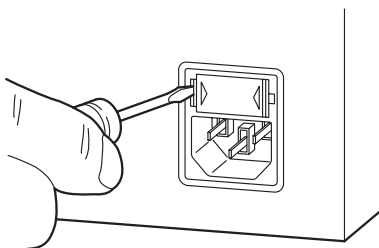


To avoid electric shock, be sure to remove the power cable from the instrument body before removing the fuse cover for replacement. Also, do not connect the power cable to the instrument body with the fuse cover left unfixed.

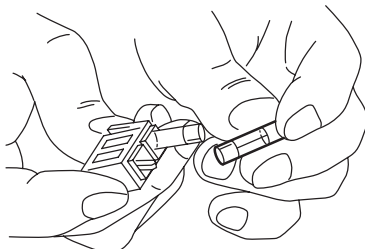


To avoid fire in the event of an instrument malfunction, use a properly rated fuse.

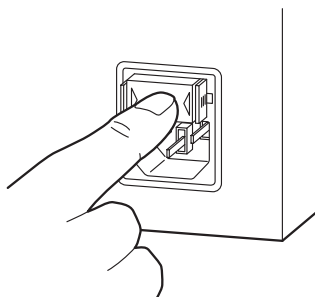
- 1** Make sure that the power of the instrument is OFF and then unplug the power cord.
- 2** Push the claws at the both ends of fuse holder with a slotted screwdriver and remove the fuse holder.



- 3** Replace the fuse with a new accessory fuse.



- 4** Push in the fuse holder until "click" is heard.



CLEANING

NOTICE	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.
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Cleaning the parts which contact the patient

If the forehead rest or face shield is stained, prepare a tepid solution of the neutral detergent for kitchenware. Moisten the cloth with the aforementioned solution and wring it thoroughly. Then, wipe the forehead rest or face shield with it at regular interval.

Cleaning the lens

NOTICE	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 at regular interval. 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.

Cleaning the external cover and operation panel

When the external cover or operation panel is stained, wipe it with a dry cloth at regular interval.

If the external cover is badly stained, use a neutral cleanser.

INSPECTING THE OPTOMETRY UNIT MOUNTING SECTION

If the mounting section for the CV-5000 and the optometry unit, which are in use, is loosened, an unexpected accident may be caused.

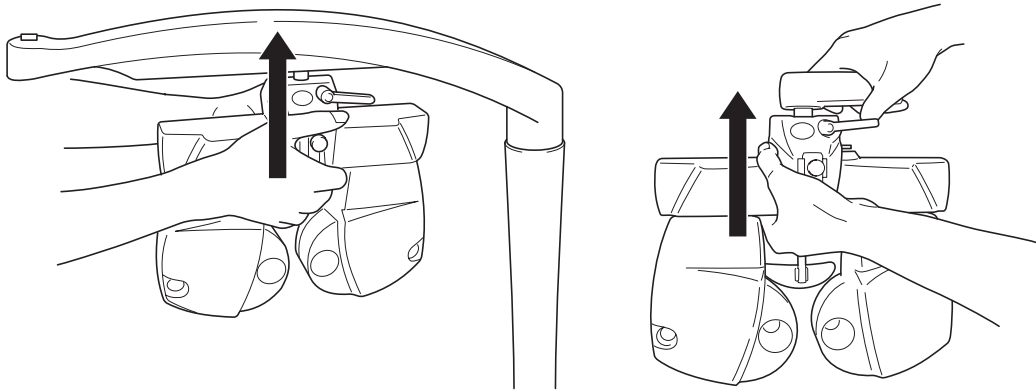
To use the instrument safely, it is recommended to inspect it every day.

Point for inspection

Inspect the connecting section between the CV-5000 and the arm.

NOTICE	Hold the PD unit when moving the head.
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Raise the CV-5000 instrument as shown below. If an abnormal noise is heard or any part is unsteady 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.



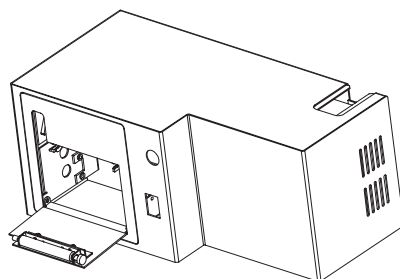
Raise the instrument vertically. If you raise it slantwise, it is difficult to check if any part is unsteady because the arm mounting shaft moves horizontally.

SETTING THE PRINTER PAPER

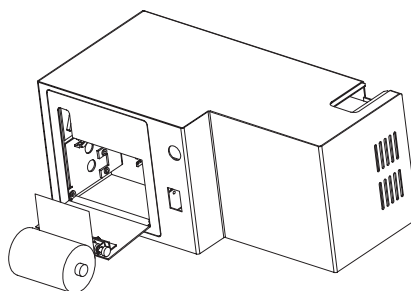
NOTICE	The paper has its front and rear. If the paper is reversely set, printing is impossible.
NOTICE	Insert the paper to the innermost of the printer. If not, the paper may not be fed.

Use the printer paper of width 58mm.

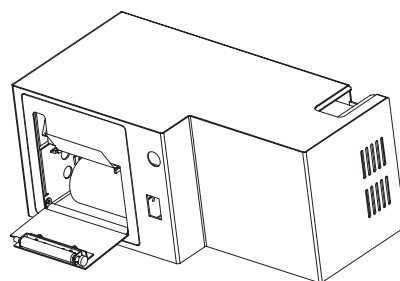
- 1** Push the printer release lever to open the cover.



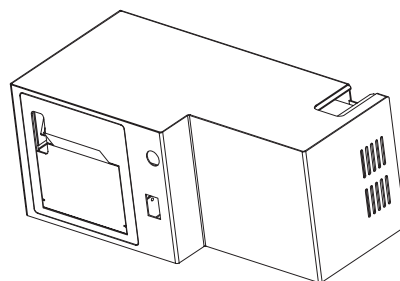
- 2** Insert the printer paper to the printer shaft and load the paper to the printer.



- 3** Pull out the paper end to the outside of the ejection port.



- 4** Close the cover. You can make sure by a "click" sound that the cover is locked.



DISPOSAL OF PRODUCT

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

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.

COMPU-VISION CV-5000

INSTRUCTION MANUAL
2006 version (2006.10-100TH[®])
Date of issue: October 20, 2006

Published by TOPCON CORPORATION

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