TOPCON

Installation Manual

Refraction system

Chronos

TOPCON CORPORATION

O-CHR-8-2207-08

Revision history

Ver.	Date of revision Effective Date	Details of revision (Reasons for Revision, Contents of Changes, and Relevant Documents Affecting the Revision)	Author Approver
1.00	2020/10/16	Preparation of first edition	Sugahara Hiyoshi
2.00	2020/10/30	・Added Check sheet for 3 chapter.	Sugahara Hiyoshi
3.00	2020/12/11	・Type miss and added illustration for all chapter. ・Correction for 2.1 chapter. ・Correction for 2.6 chapter. ・Correction 2.7 chapter. ・Correction for 2.8 chapter. ・Added Network connection procedure for 2.9 chapter. ・Correction for 4 chapter. ・Added Appendix for 5 chapter ・P2-14,24,25,28, added attention ・P2-16,20,31,33,34,40,43,47, added reference materials	Sugahara Hiyoshi
4.00	2020/12/25	・Correction Network connection procedure for 2.9 chapter.	Sugahara Hiyoshi
5.00	2021/4/2	・Added Confirmation of forehead detection procedure for 2.9 chapter. ・Added Refractive Power Measurement Accuracy procedure for 2.10 chapter. ・Added PD accuracy of measurement procedure for 2.11 chapter. ・Added Corneal curvature measurement accuracy procedure for 2.12 chapter. ・Added Confirmation of visual acuity chart switch procedure for 2.13 chapter. ・Added Checking subjective 0D procedure for 2.14 chapter. ・Added Cleaning method for 2.15 chapter. ・Correction for 3 chapter. ・Correction for 4 chapter.	Sugahara Hiyoshi
6.00	2021/5/26	・Correction for 2.4 chapter. ・Correction for 2.5 chapter. ・Correction for 3 chapter. ・Correction for 5 chapter	Sugahara Hiyoshi

7.00	**2021/10/15**	**・Correction Procedure 2.1 chapter ・Added Notes and detailed illustrations 2.2 chapter ・Added configuration in bat file 2.3 chapter ・Added Google Chrome Bookmarks Setting 2.4 chapter ・Added Installing Tool Software 2.5 chapter ・Change αβθ confirmation of the OPT_HEAD 2.6 chapter ・Change αβθ adjustment of the OPT_HEAD 2.7 chapter ・Correction Refractive Power Measurement Accuracy 2.12 chapter ・Correction Corneal curvature measurement accuracy 2.14 chapter ・Correction Confirmation of visual acuity chart switch 2.15 chapter ・Correction Checking subjective 0D 2.16 chapter ・Change tha In-hospital network to Chronos 2.18 chapter ・Correction Check sheet 3 chapter ・Added Used Tools 4 chapter ・Added Appendix 5 chapter**	**Sugahara** **Hiyoshi**
8.00	**2022/8/31**	**・Changed chapter 2 Installation procedure ・Described separately for Chapter 2.3 wired and wireless connection ・Changed chapter 2.5 For wireless LAN (Wi-Fi) connection ・Added Note for Chapter 2.8.2 ・Added Note for Chapter 2.9.2 ・Changed chapter 2.20 Network connection procedure ・Changed chapter 5.2.2 Assembling Stereo Camera ・Added chapter 5.3 How to connect CL-300 PDL to Chronos ・Added chapter 5.4 How to connect CV-5000 to Chronos ・Added chapter 5.5 How to connect SOLOS to Chronos ・Added chapter 5.6 How to connect IMAGEnet6 to Chronos**	**Yagioka/ Hoshino** **Hiyoshi**

Table of Contents

1. Overview

1.1 Introduction

This Procedure describes the procedures for Installation at the customer, and Incoming inspection.

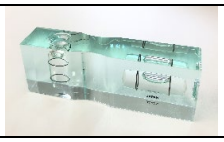
2. Installation procedure

Applications

How to set up the installation and connect with data linkage devices.

NOTE	• Please install and assemble according to TOPCON instruction. • Please be sure to use the tools specified by TOPCON and the tools calibrated. Otherwise, the failure in the measurement, unexpected error, or product damage may occur when installing and assembling.

Necessary Tools and Equipment

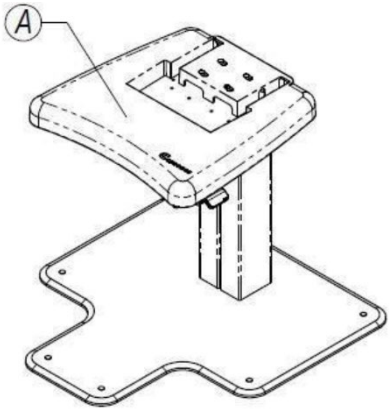
Name of the tool	Tool No.	Appearance
Test eye holder (PD65)	CHR-01	
αβθ diopter telescope *Components: Diopter Telescope (CHR-02), Stereo Camera Screw, Misalignment-preventive metal fitting, Power cable NTSC－USB Converter cable	CHR-32	
Test eye with pupil (-5D) × 2	CHR-03	
Wrench	-	
Level Precision : ±2.5mm/m = Up to ±0.14° Sensitivity : ±0.5mm/m = Up to ±0.03°	-	
PC or tablet PC For PCs Operating system: Windows10 For tablet PCs: iPad OS 13	-	
ipsetting_L_Control_Box.bat	–	
Chronos_Link_20200413_J_html	–	
Calibration tool		

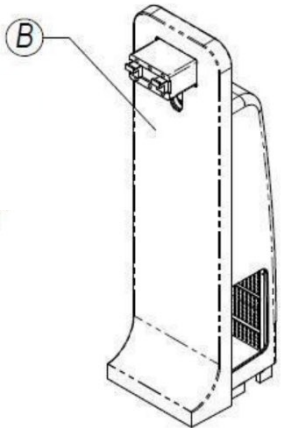
screwdriver	-	
Hex wrench	-	

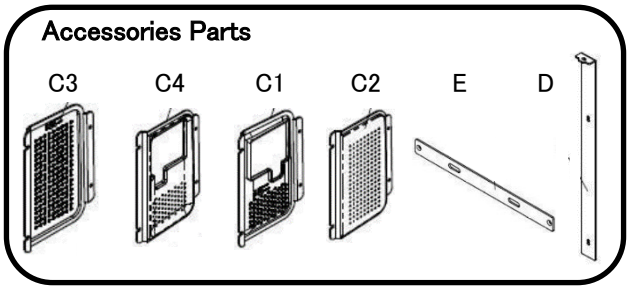
2.1 Assembly the TABLE, and Installing of CONTROL_BOX

⚠ CAUTION	• When unpacking, be careful not to drop or fall the board. • There must be at least two people when taking out the TABLE.

(1) Take out Ⓐ and Ⓑ from the packaging box.

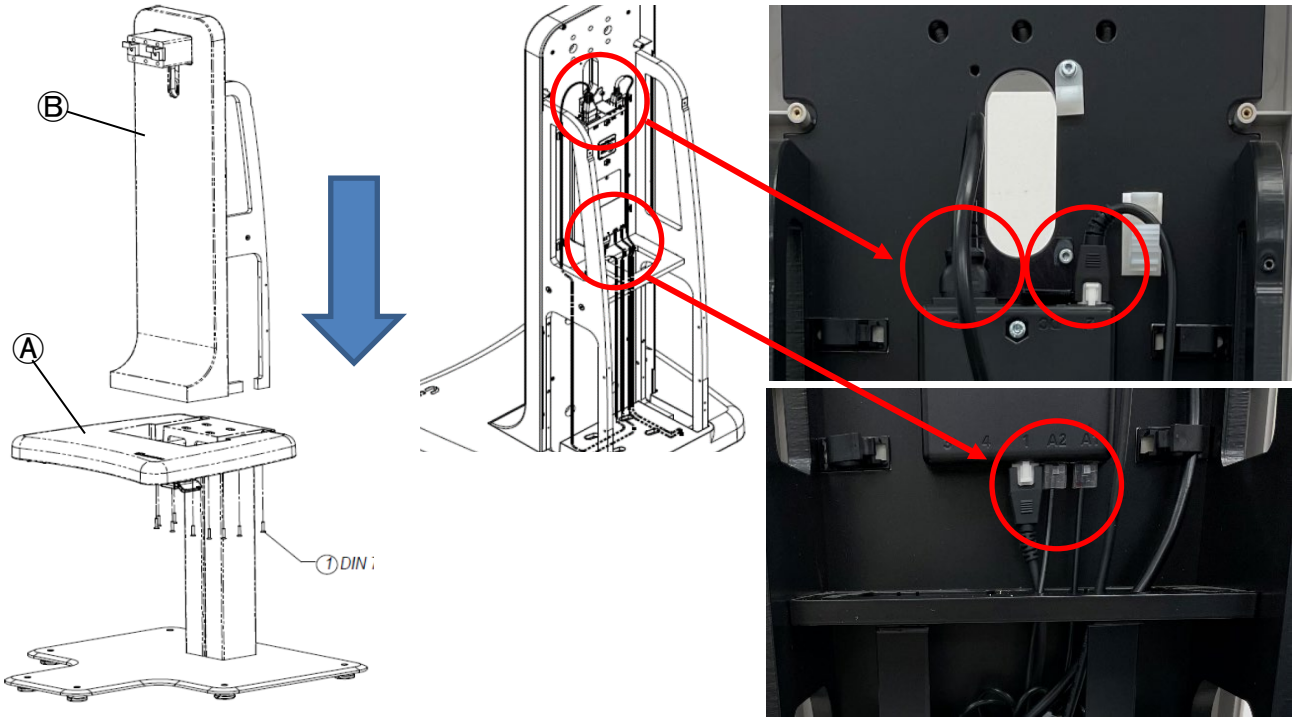




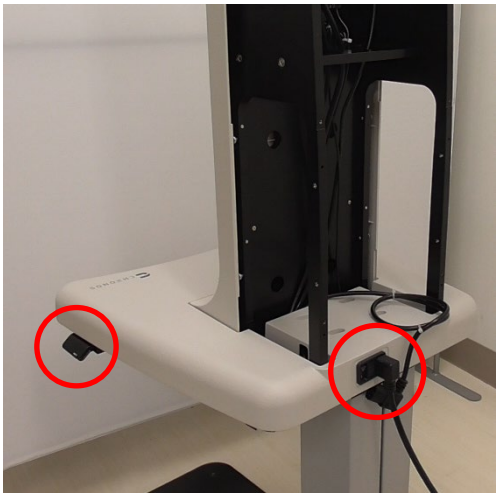


(2) Remove the bundle wire of Ⓐ. Then install it on any place.

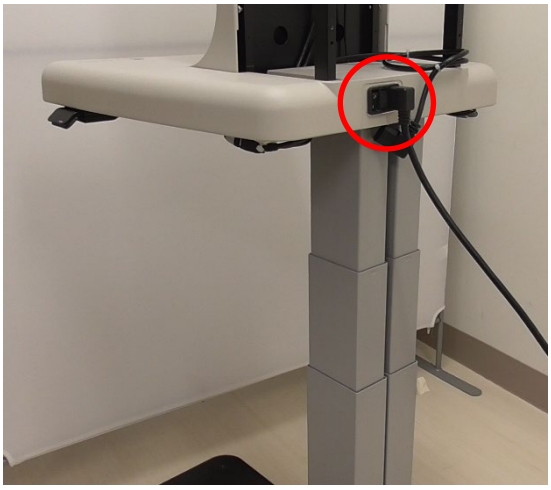
(3) Put Ⓑ on the table of Ⓐ and connect cables.



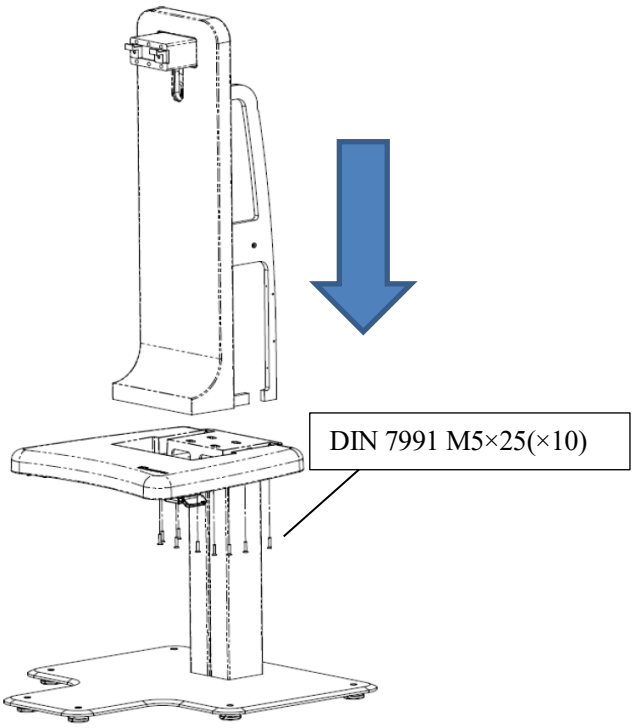
(4) Connect power cable and turn on the power. Then move to the top with the up and down lever.



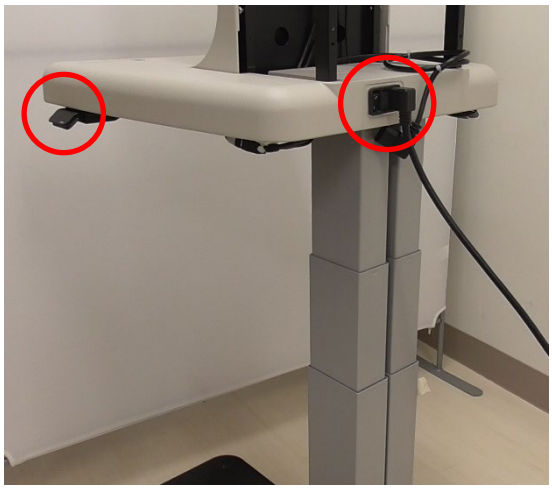
(5) Turn off the power then remove the power cable.



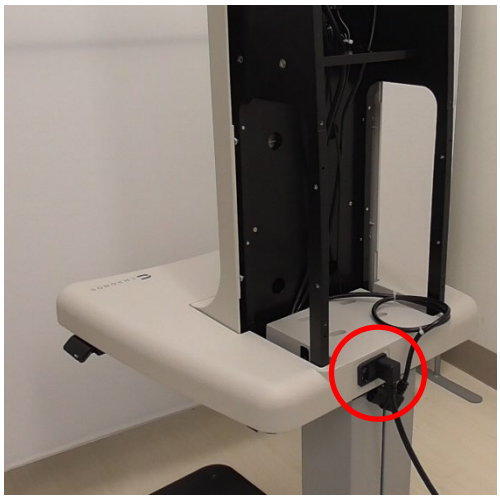
(6) Attach Ⓐ and Ⓑ with 10 hexagon screws.



(7) Connect power cable and turn on the power. Then move to the bottom with the up and down lever.



(8) Turn off the power then remove the power cable.



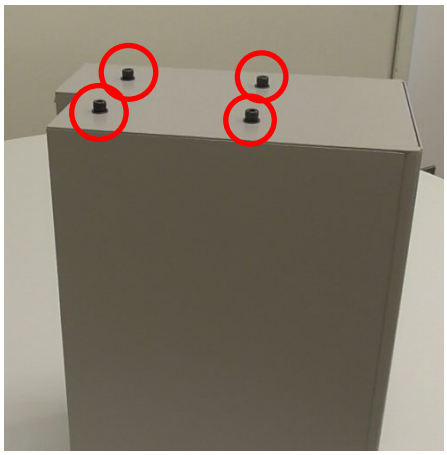
***When attaching CONTROL_BOX to TABLE, the printer position can be attached in either direction. →If the printer position is on the right side, go to step (9). If it's on the left side, go to step（15）**

Right side of the printer

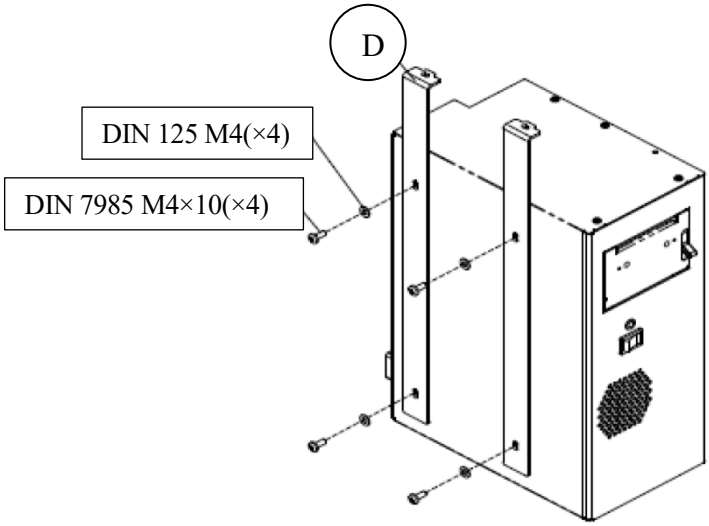
Left side of the printer

***In case that the printer is on the right side.**

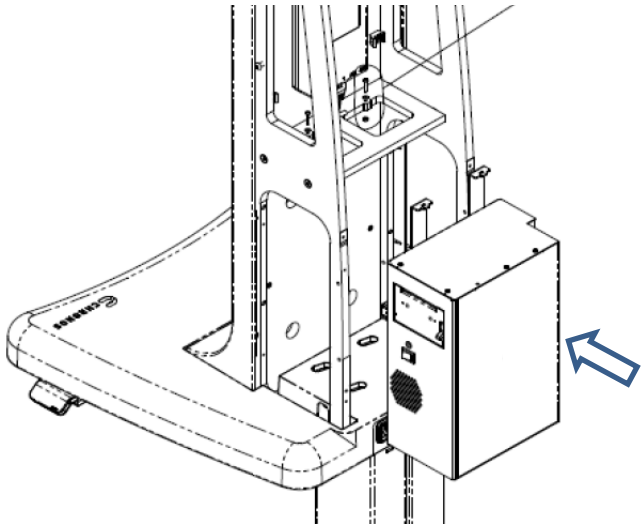
(9) Remove the 4 screws on the bottom of CONTROL_BOX.



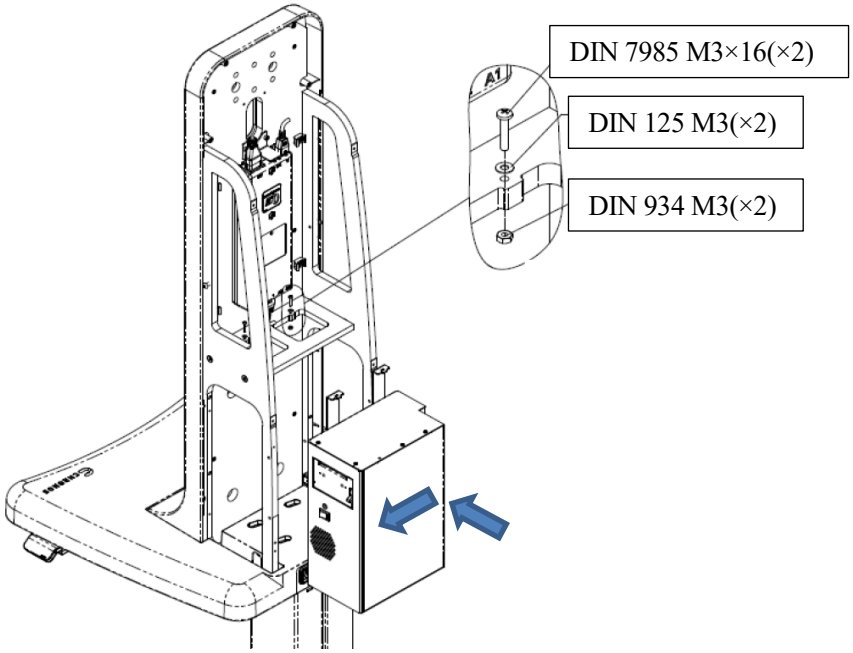
(10) Fix the accessory plate (D) to the CONTROL_BOX with 4 screws.



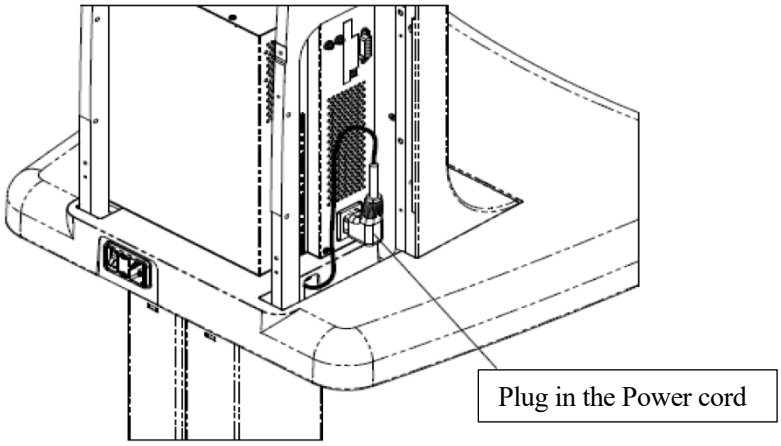
(11) Set the CONTROL_BOX to the back of the TABLE and adjust the height. Then fix it with 4 screws.



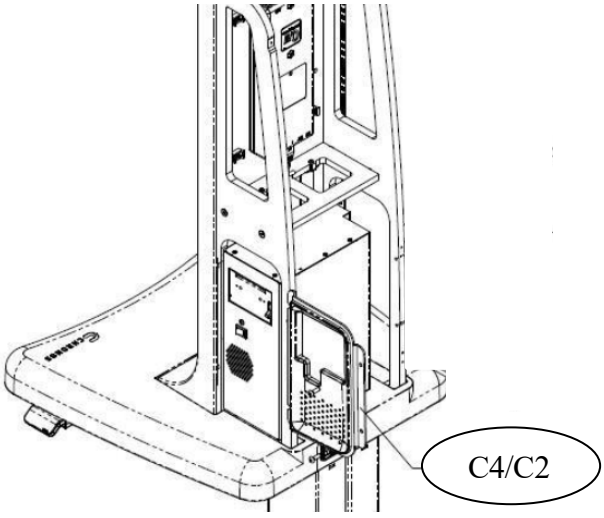
(12) Set the CONTROL_BOX on the back side of TABLE. Then fix it with 2 screws and 2 nuts.



(13) Connect the power cable to the CONTROL_BOX.

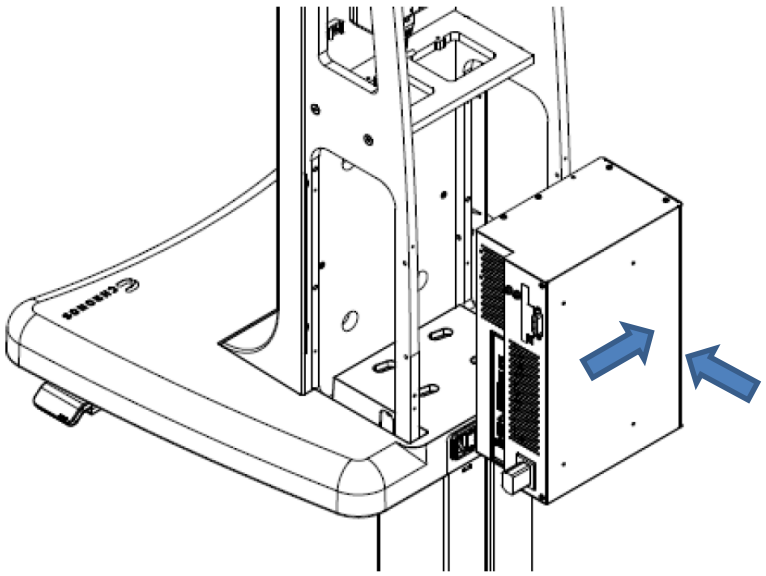


(14) Fasten 2 hexagon screws to fix the side covers (C4/C2 Parts No.9018126) of TABLE

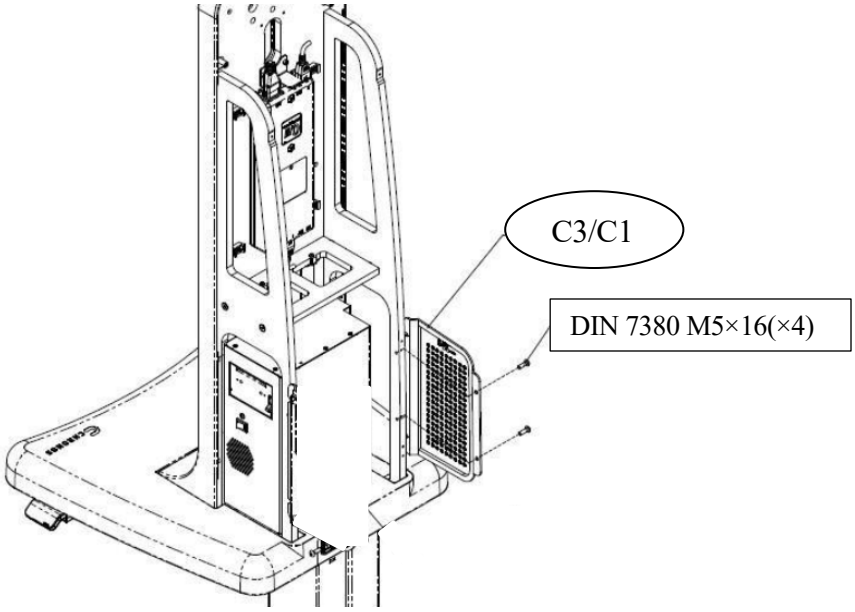


***In case that the printer is on the left side**

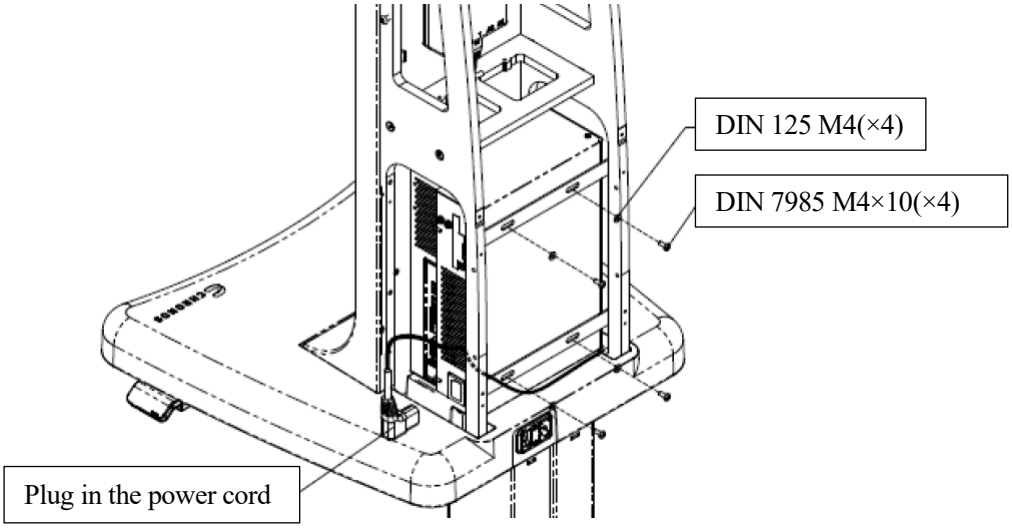
(15) Set the CONTROL_BOX on the back side of TABLE.



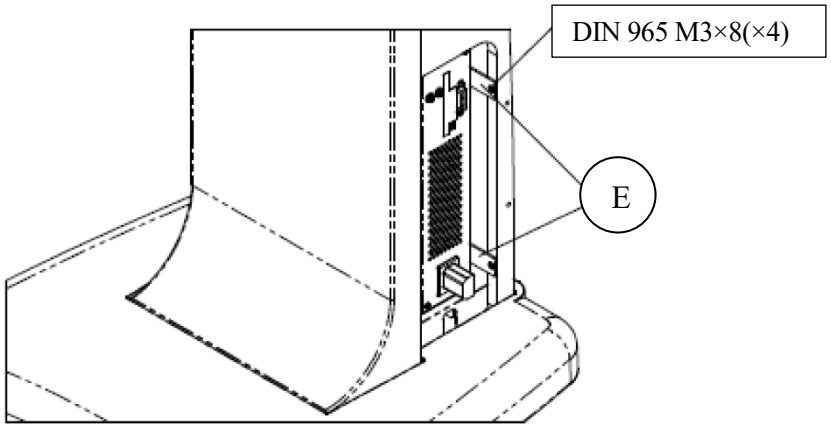
(16) Fasten 2 hexagon screws to fix the side covers (C3/C1 Parts No.9018128) of TABLE



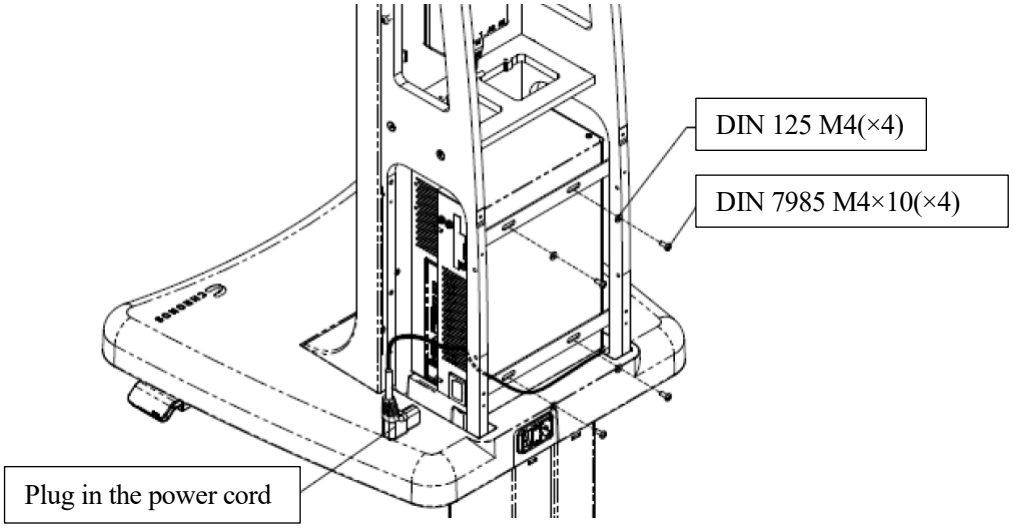
(17) Fasten 4 screws to attach the accessory plate (E) and CONTROL_BOX.



(18) Fix the accessory plate (E) of TABLE to the position shown below with 4 screws.

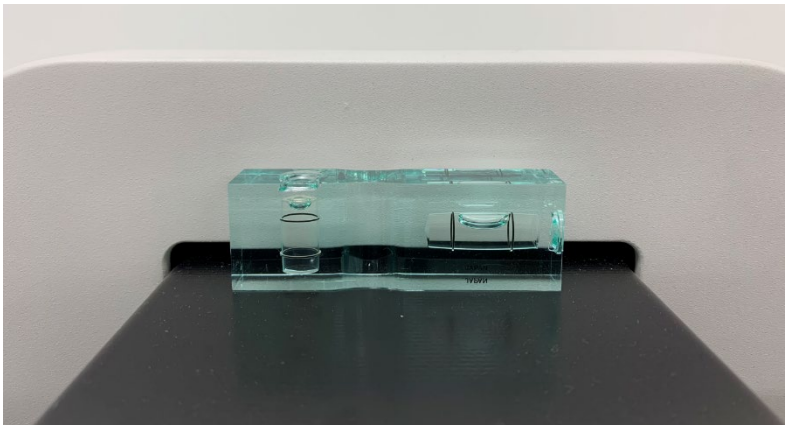


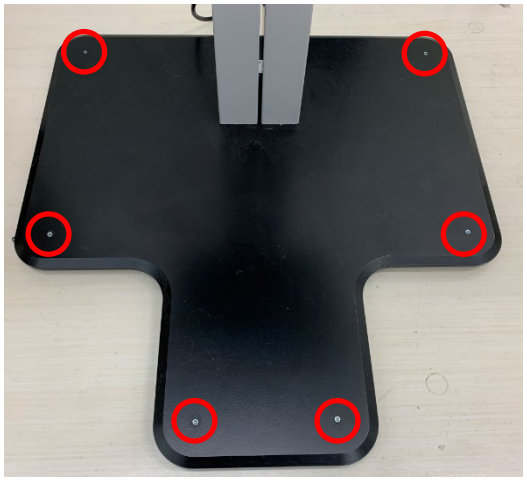
(19) Fasten 4 screws to attach the accessory plate (E) and CONTROL_BOX.



2.2 Installing GADAI_BASE and OPT_HEAD on the TABLE

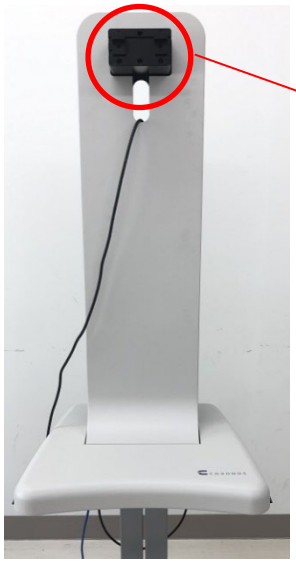
(1) Set the level on the hook at top of the TABLE and check if it is within the standard level. If tilted, adjust the tilt with the adjuster of hexagonal wrench.

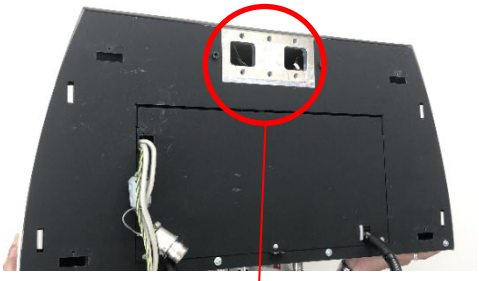


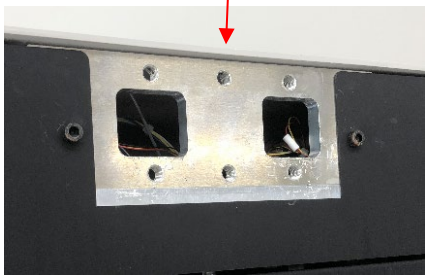


(2) To temporary attach the GADAI_BASE, hang the connection part of the back side of the GADAI_BASE to the hook of the TABLE.

⚠ CAUTION	• To prevent injury, work two or more people as GADAI_BASE is extremely heavy.

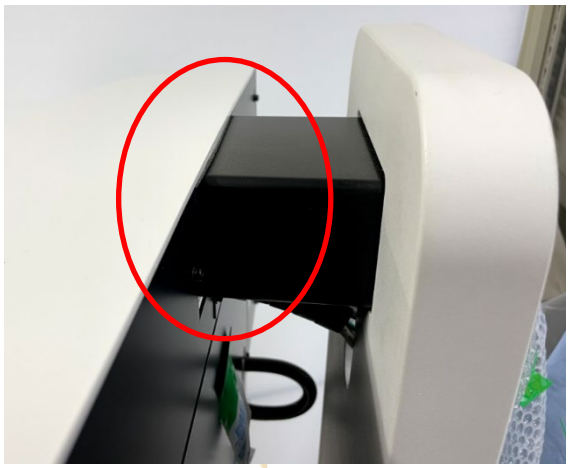


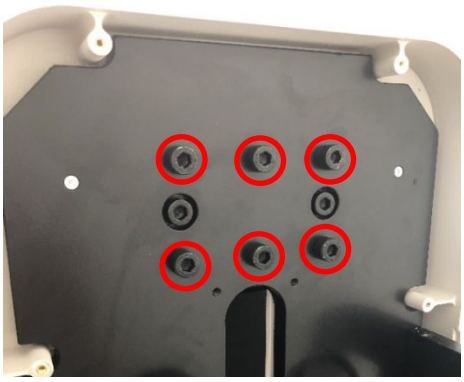




(3) Fasten 6 screws to fix the GADAI_BASE from the back side of TABLE.

NOTE	• If fasten the hexagnal screws in upper middle first, can fix the rest easiely.

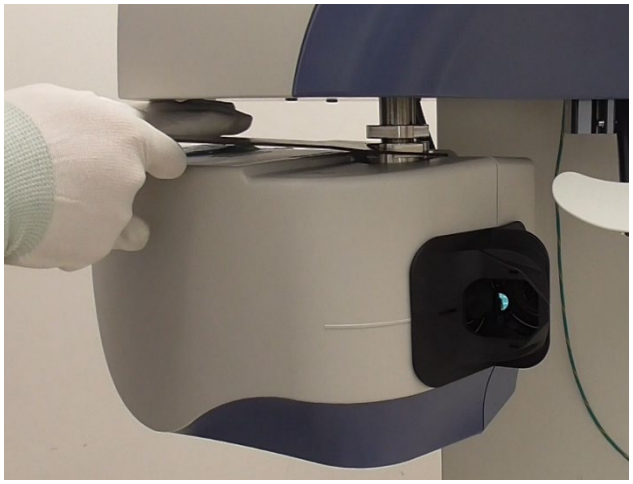


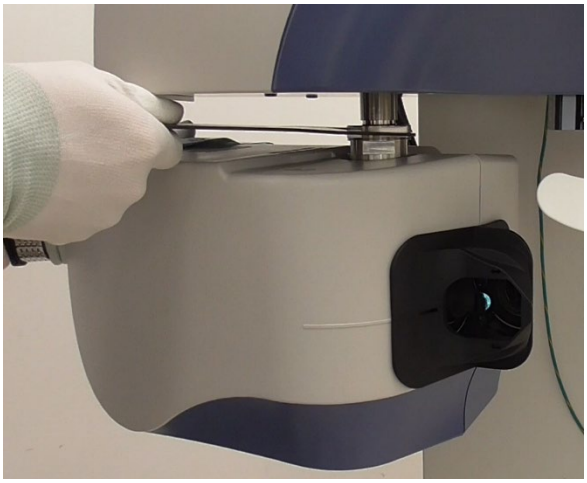


(4) Attach the OPT_HEAD（L/R）while rotating it as follows. Then push it all the way to the end.

(5) Fasten the nut in order ①upper low, ②lower low.

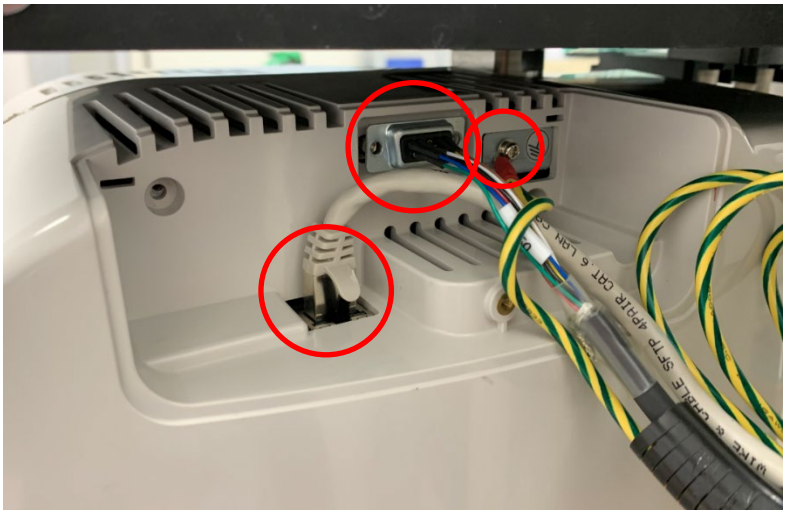
CAUTION	• Make sure to fasten the nut tightly. If not fastened enough, it will affect its accuracy and lose the reproducibility at factory shipment.





(6) Remove the cable cover of OPT_HEAD(L/R).

(7) Connect each LAN junction, BGA junction and ground junction of Left and Right OPT_HEAD from the GADAI_BASE.

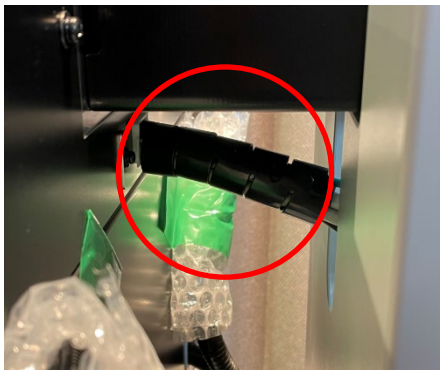


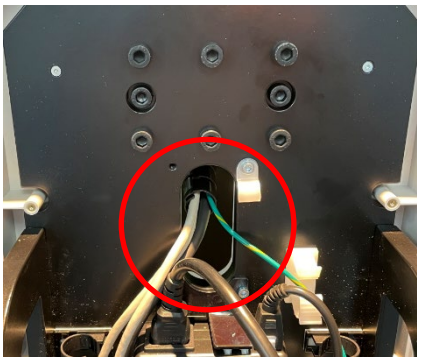
(8) Attach the cable cover of OPT_HEAD(L/R).

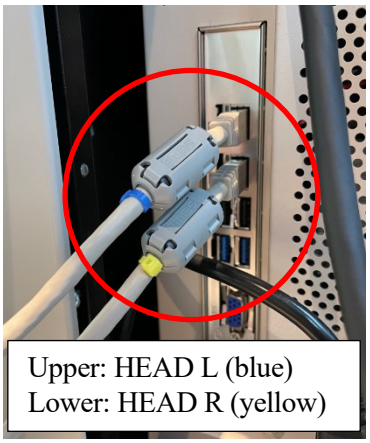
NOTE	• Make sure to attach the cover so as not to put a load to the connecting part as the cable is no length to spare and the hole for cable is narrow.

(9) Put the LAN junction of the CONTROL_BOX and the round shaped connector cable through the back side of the TABLE and connect them for each. Then put them in the back cover.

NOTE	• When connecting the LAN cable to the CONTROL_BOX, make sure to connect the upper parts of the connection to HEAD L side (blue) while the lower parts of the connection is connected to HEAD R side (yellow).

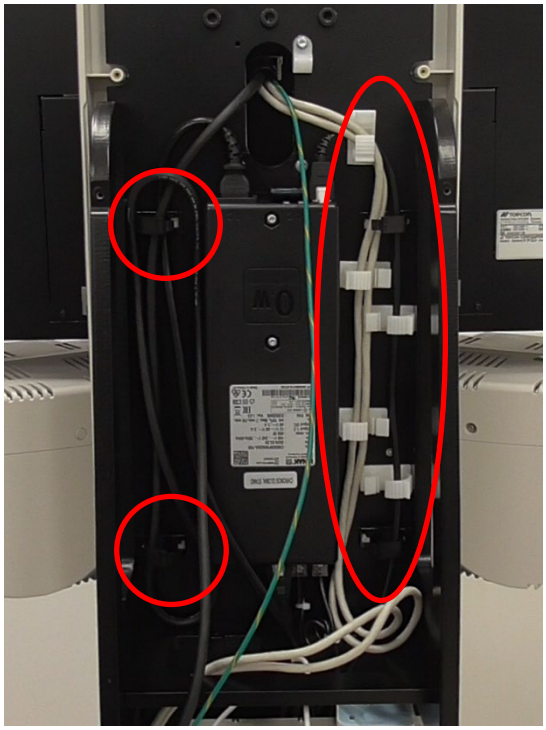






Upper: HEAD L (blue)
Lower: HEAD R (yellow)

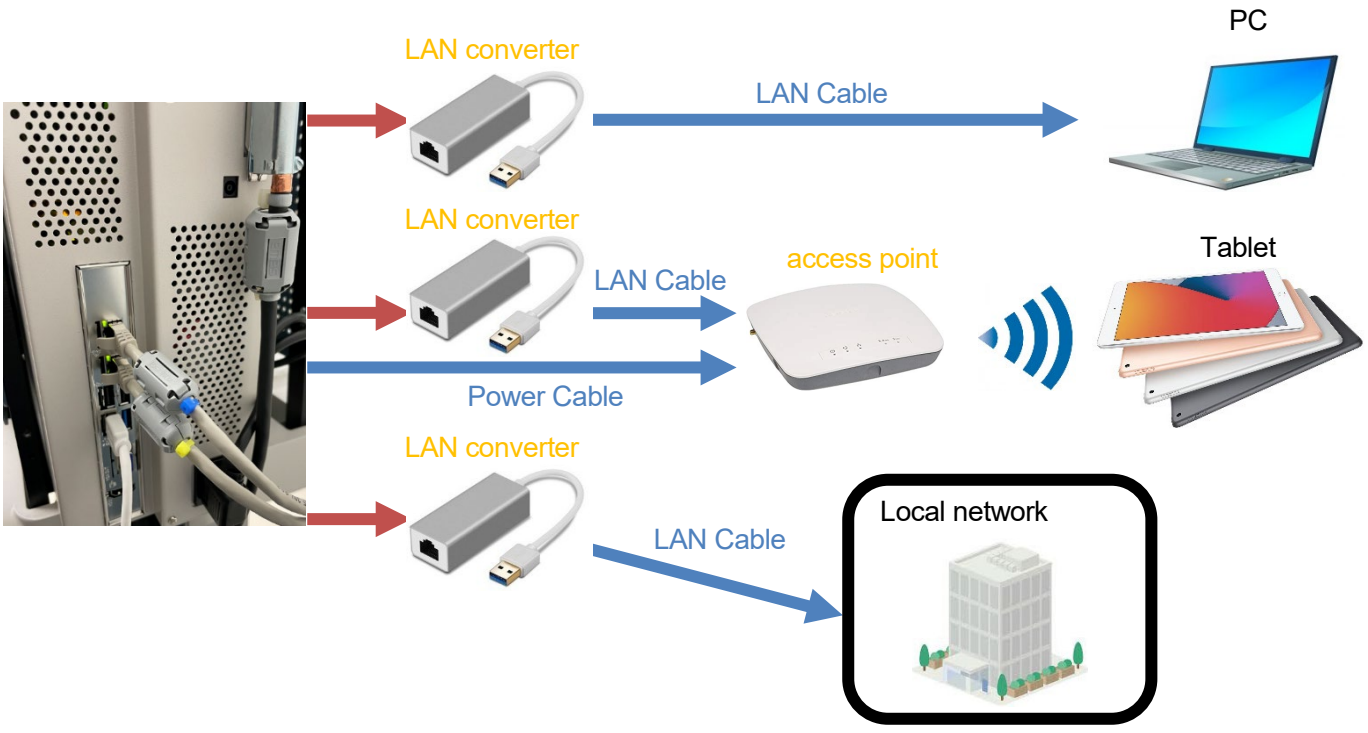
(10) Bundle the cables with cable clamps attached to the back of TABLE.



2.3 Connecting network devices and cables

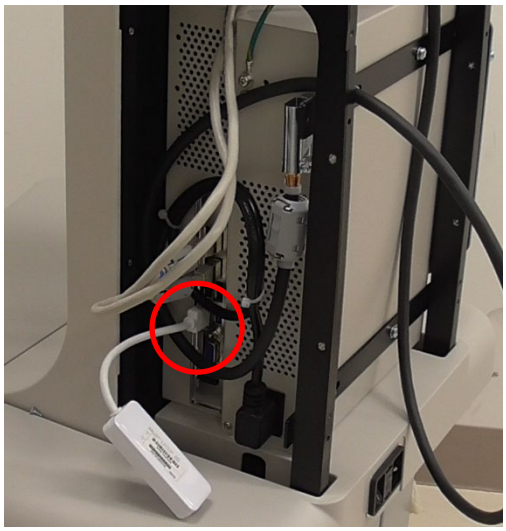
Chronos can be connected with two networks, Network 1 (for operation) and Network 2 (for data linkage).
Network 1 (for operation) is explained in this chapter.
Refer to "2.3.1 For wired LAN connection" or "2.3.2 For wireless LAN connection" to prepare the necessary devices and connect.

Connection method for Chronos-Terminal(example)



2.3.1 For wired LAN connection

(1) Connect the USB-LAN converter to the CONTROL_BOX and connect it to the PC with a LAN cable.

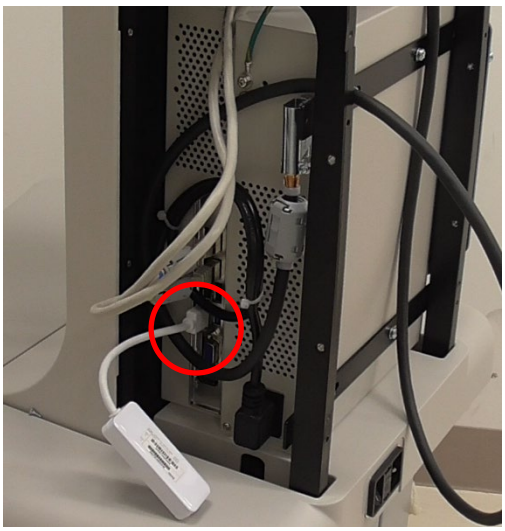


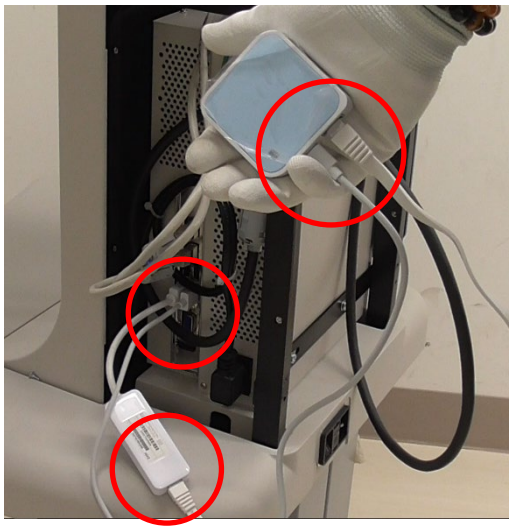
Stretch the cable to connect it to PC from the bottom of the TABLE

2.3.2 For wireless LAN (Wi-Fi) connection

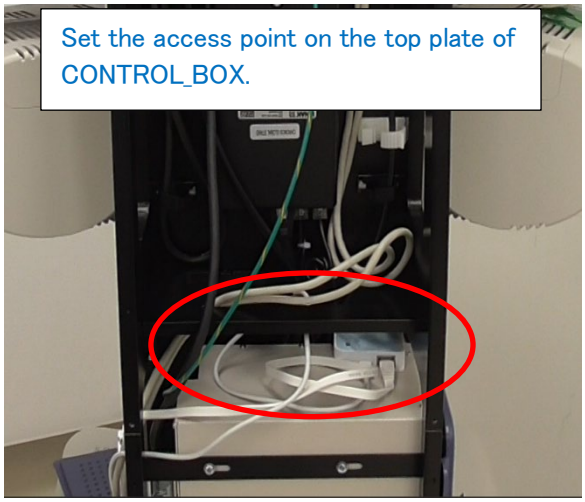
(1) Connect USB-LAN converter to the CONTROL_BOX then connect to the access point with the LAN cable.

(2) Connect the access point power cable to the CONTROL_BOX.



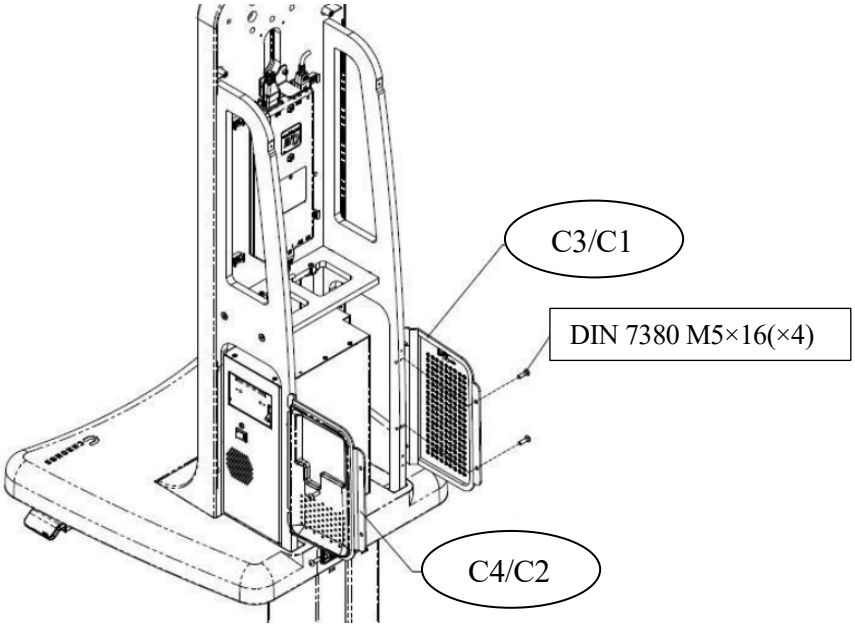


Set the access point on the top plate of CONTROL_BOX.



2.4 Attaching cover parts

(1) Fasten 2 hexagon screws to fix the side covers (C3/C1 Parts No.9018127 or C4/C2 Parts No.9018129) of TABLE



(2) Attach the back cover of the TABLE using 8 hex screws.

(3) Connect the power cable to the back side of TABLE.

(4) Turing on the CONTROL_BOX.

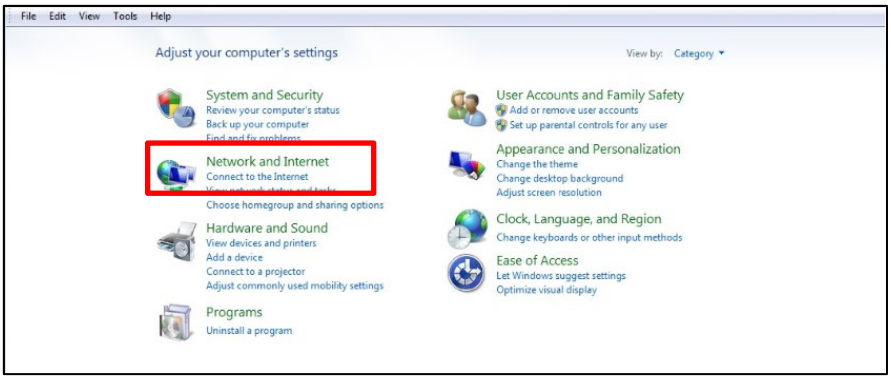
2.5 Connecting Tool PC/Operation PC to Chronos' network

This section describes how to connect the tool PC and operation PC to the network prepared in Chapter 2.3 Connecting network device and cables.

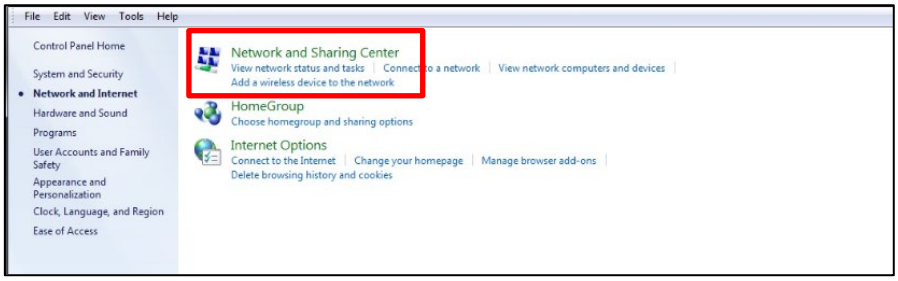
2.5.1 For wired LAN connection

(1) Connect the LAN cable from CONTROL_BOX to operation PC.

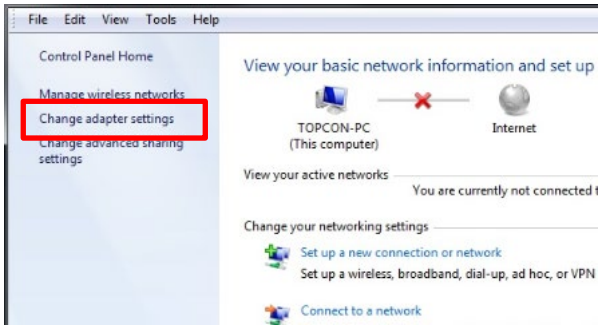
(2) Open [Control Panel] of PC. Then click [Network and Internet].



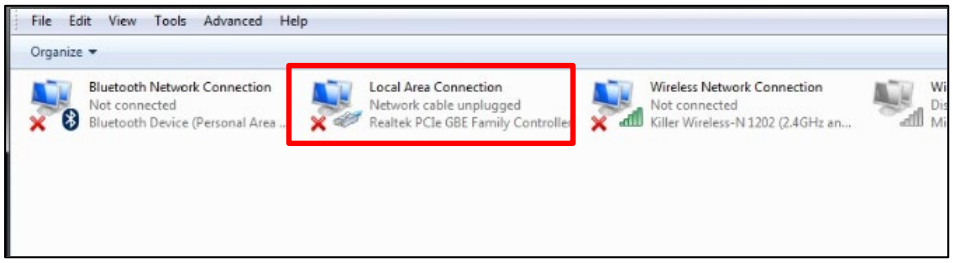
(3) Click [Network and Sharing Center].



(4) Click [Change adapter settings].

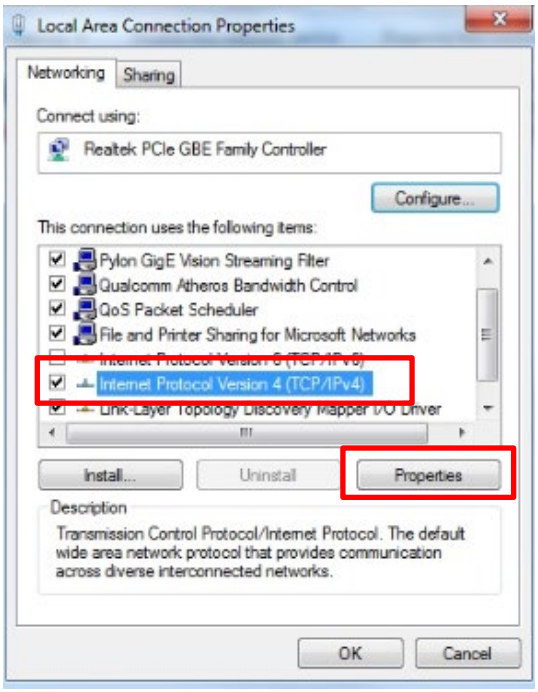


(5) Right-click [Local Area Connection] that connects to the CONTROL_BOX. Then select [Property].



(6) Select [Internet Protocol version 4]. Then click [Property].

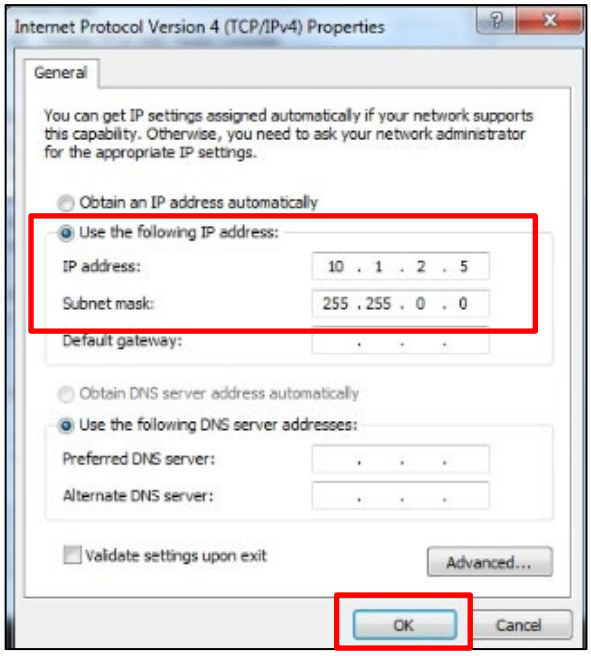
NOTE	• Make sure to uncheck “Internet Protocol version 6”.



(7) Select [Use the following IP address]. Then enter the IP address and Subnet mask as shown below.

Adjusting HEAD	IP address	Subnet mask
HEAD L/R	10. 1. 2. 5	255. 255. 0. 0

*Use same IP address and Subnet mask for HEAD L/R.

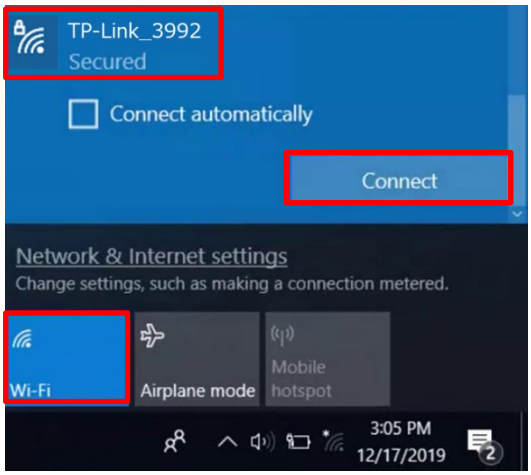


(8) Click [OK]. The network setting has completed.

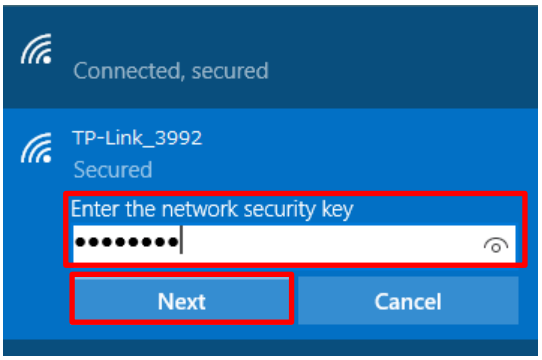
2.5.2 For wireless LAN (Wi-Fi) connection

(1) Turn on the power of CONTROL_BOX.

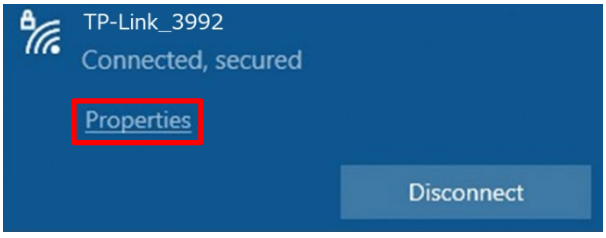
(2) Enable Wi-Fi on operation PC, select the SSID of wireless LAN router from the Wi-Fi list, and click "Connect".



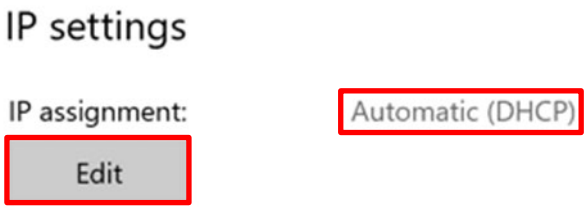
(3) Enter the network security key and click "Next".



(4) Click Properties.



(5) Confirm that the IP assignment in the IP settings is set to "Automatic (DHCP)". If it is not "Automatic (DHCP)", click "Edit" and change it to "Automatic (DHCP)".



(6) Set up the wireless LAN router. *The explanation below is for when [tp-link TL-WR802N] is used. If you use another wireless LAN router, refer to the instruction manual.)

(7) Start up your browser and connect to "http://tplinkwifi.net".

(8) Set the Username and password.

Username：admin

Password: Enter admin

(9) Select "Quick Setup" from the left menu

(10) Click [Next].

(11) Click "Next" without checking "Login password".

(12) Quick setup-mode of operation：Select [Bridge mode] and click [Next].

(13) Quick setup-wireless 2.4GHz：Keep the default settings and click [Next].

(14) Quick Setup-Network Settings：

LAN type：static IP

IP address：10.1.2.4

sub-net mask：255.0.0.0

DHCP server－：To enable

After setting as above, click "Next".

(15) Quick Setup-Review Settings: Click “Finish” to complete.

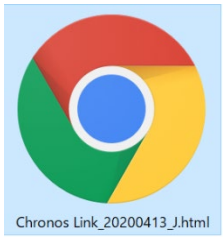
(16) When using a tablet PC such as iPad, select the SSID of the wireless LAN router to be used from the Wi-Fi list and enter the network security key.

2.6 Google Chrome Bookmark Setting

NOTE	• Bookmark the URL which is needed when installing Chronos or using as a user.

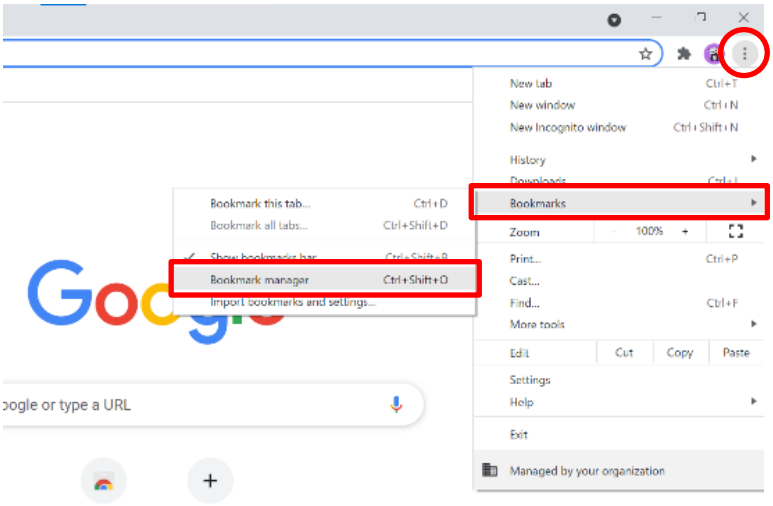
CAUTION	• Do not import the data to the customer's PC, as it contains a URL where the correction values can be changed.

(1) Save［Chronos_Link_20200413_J_html］to the location on the Client PC.

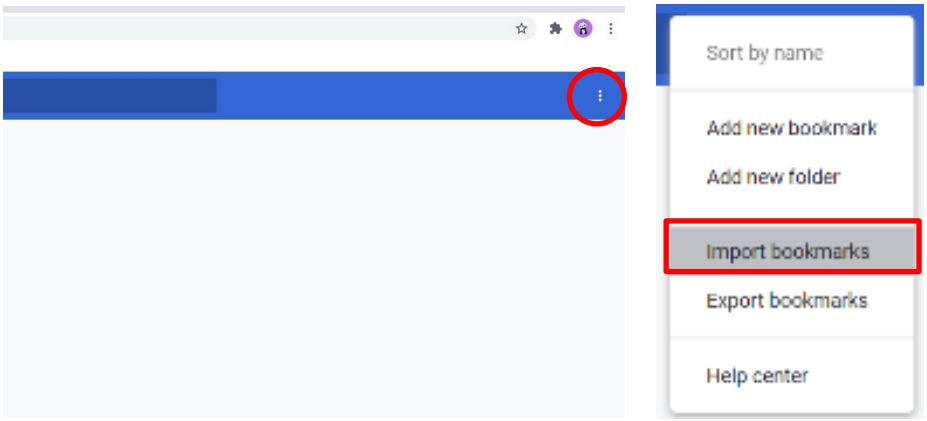


(2) Boot up Google Chrome.

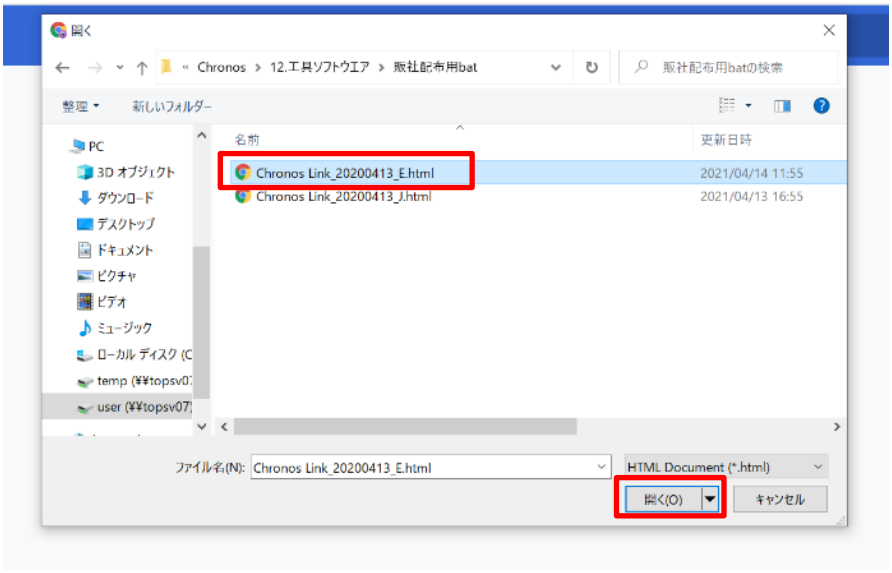
(3) Open “Setting” in the upper right and click [Bookmark],[Bookmark Manager]



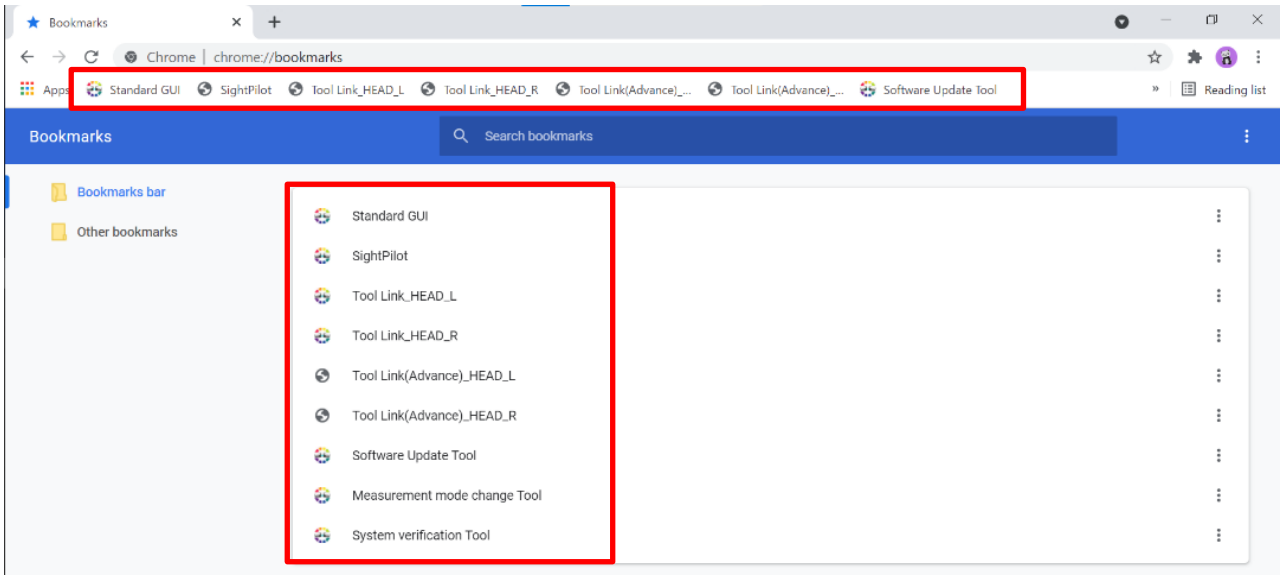
(4) Open “Management” in the upper right and click [Import Bookmark]



(5) Select［Chronos_Link_20200413_E_html］and click [Open].



(6) Confirm all items as shown below are added in Bookmark.



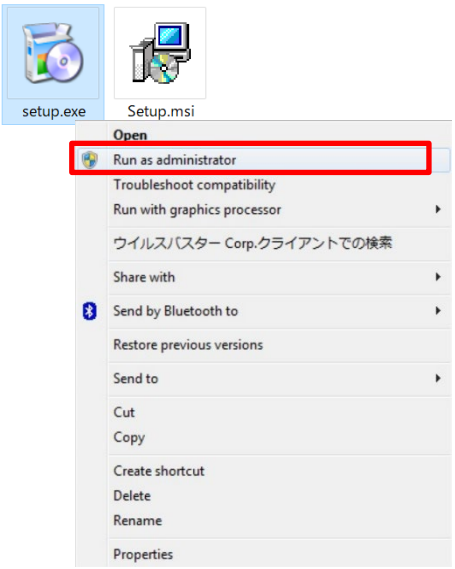
2.7 Installing Tool Software

NOTE	• Install tool software to use for checking and adjusting αβθ axis of OPT_HEAD.

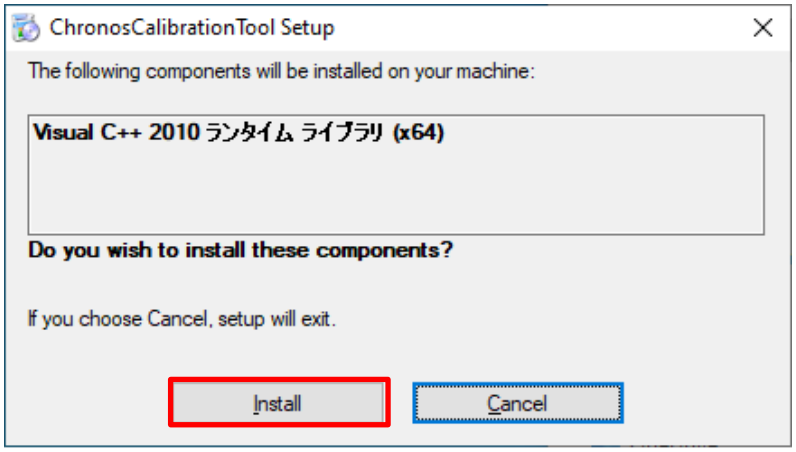
CAUTION	• Do not import the data to the customer's PC.

Installing Microsoft Visual C++ 2010 x64 Redistributable

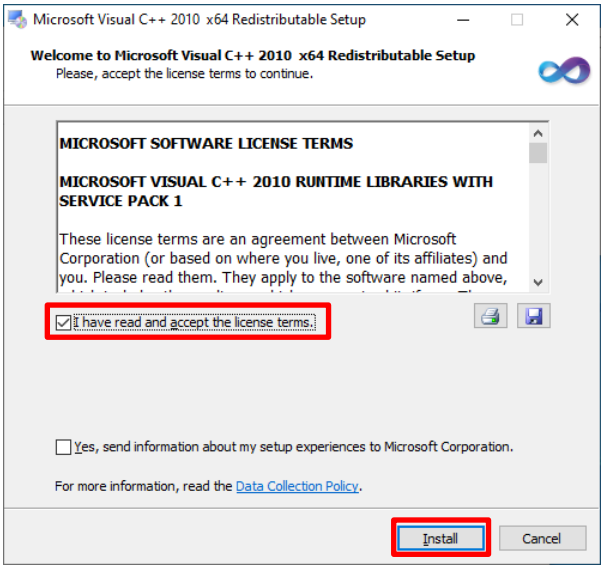
(1) Right-click “setup.exe” and click [Execute as an administrator].



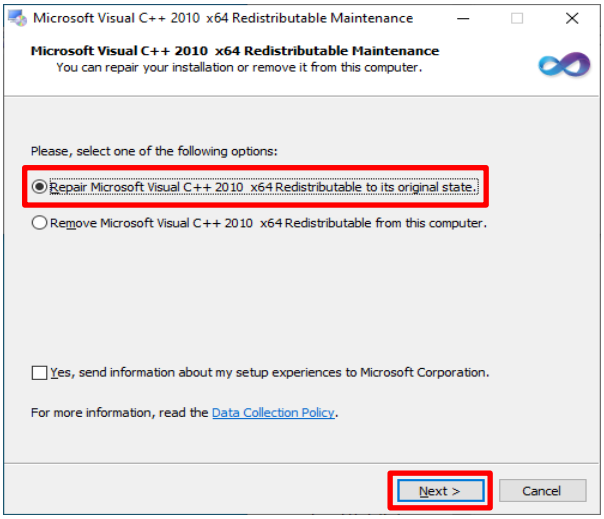
(2) Click［Install］



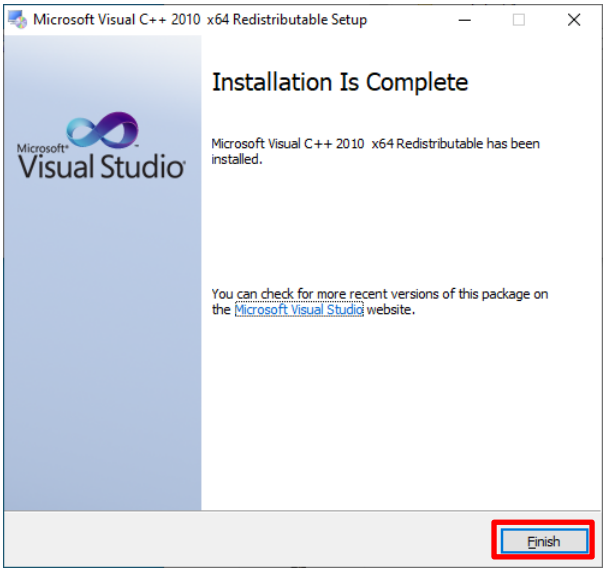
(3) If "Microsoft Visual C++ 2010 x64 Redistributable" has not been installed, check [Agree] then click[Install]as the shown screen below.



(4) If "Microsoft Visual C++ 2010 x64 Redistributable" has been already installed, the screen as below will be shown. Check "Restore Microsoft Visual C++ 2010 x64 Redistributable to its original state" then click [Next]

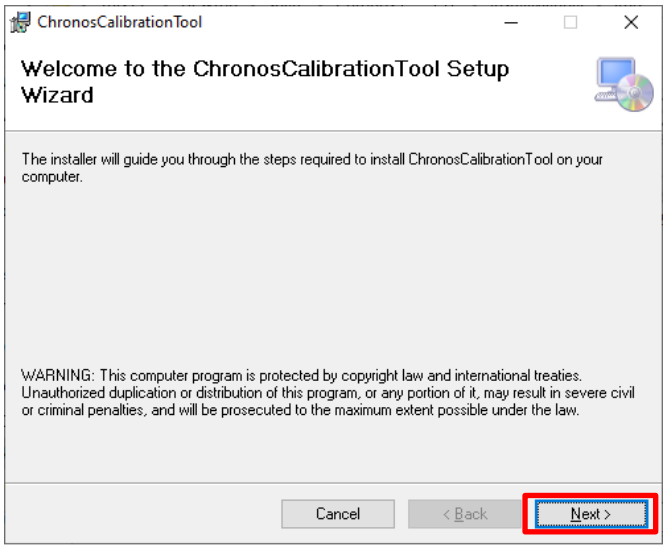


(5) Confirm that installing has been completed.

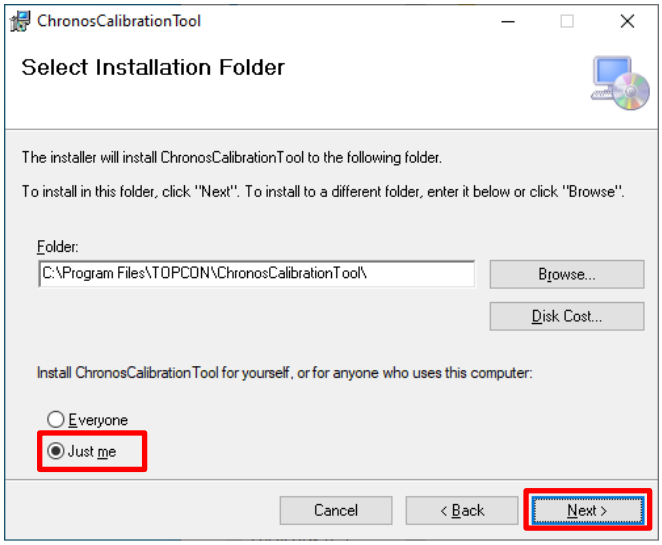


Installing Calibration tool

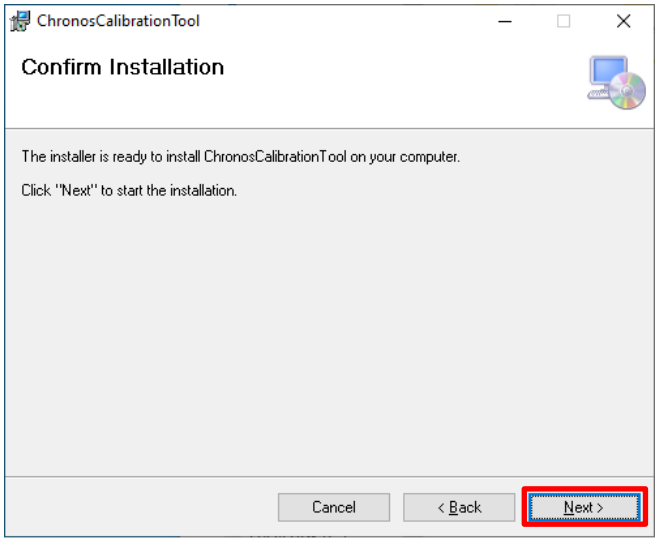
(6) Click [Next]



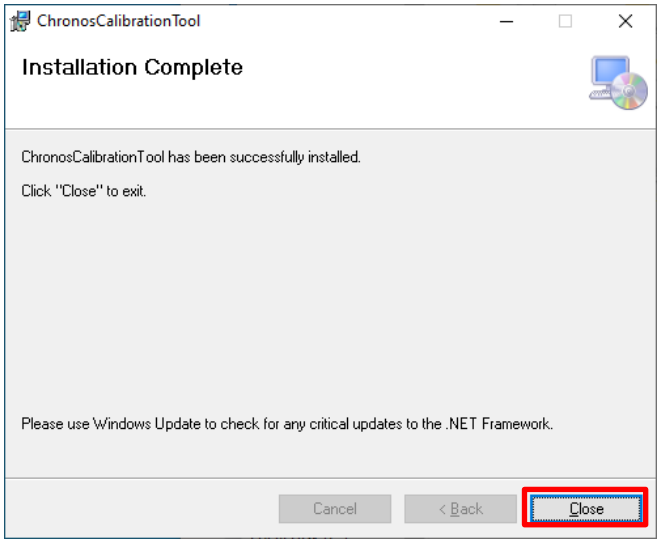
(7) Select a folder for installation then click [Next].



(8) Click [Next]



(9) Once the installation is completed, click [Close].



(10) Make sure the shortcut icon is appeared on the desktop.

2.8 αβθ axis confirmation of the OPT_HEAD.

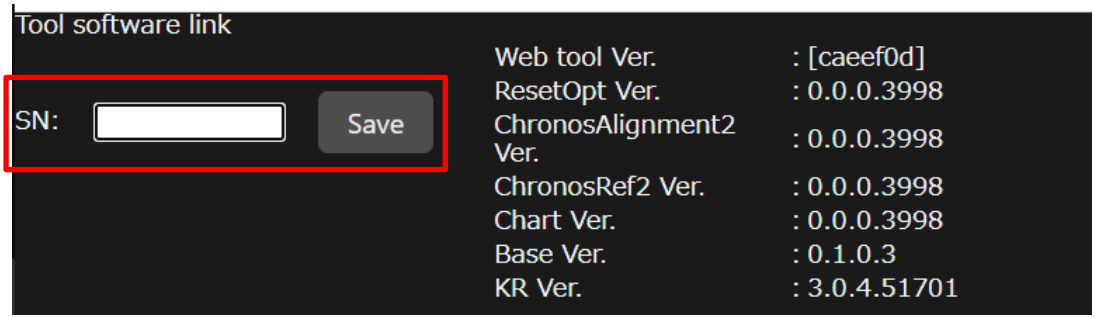
2.8.1 Preparation before confirmation

(1) Boot up the “Tool software link” by URL below.

NOTE	• Use Google Chrome when booting up. • Please note that URLs have "uppercase" and "lowercase" letters.

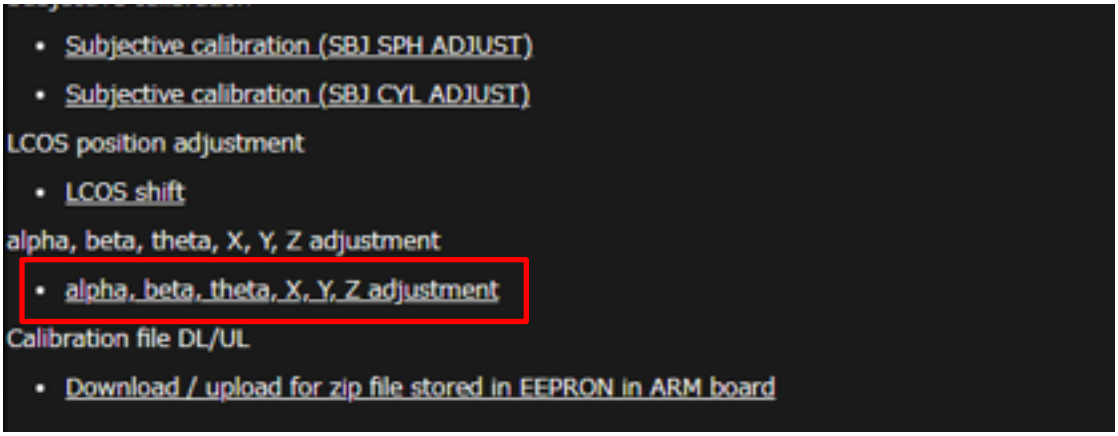
Adjust OPT_HEAD	URL	Remark
OPT_HEAD L	http://10.1.2.3/headL/topcon/sub/factoryLinks.html	Access to the CONTROL_BOX
OPT_HEAD R	http://10.1.2.3/headR/topcon/sub/factoryLinks.html	

(2) Enter the serial number on [Tool software link] Then click [Save].

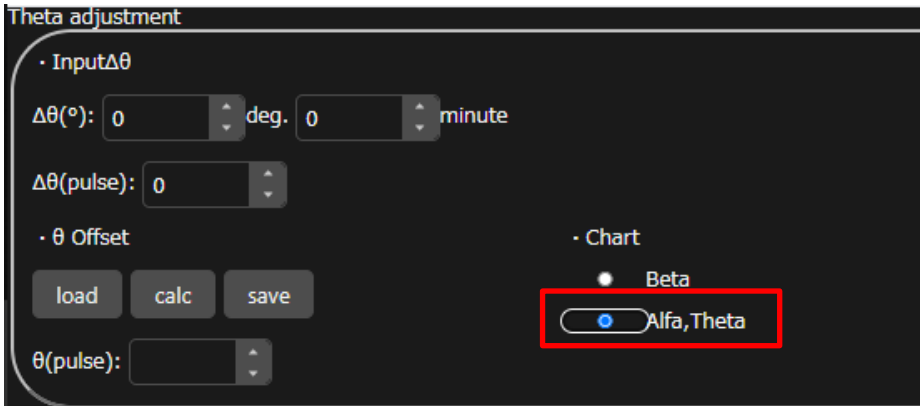


(3) Click [OK]

(4) Select [alpha, beta, theta, X, Y, Z adjustment] on "Tool software link" menu.



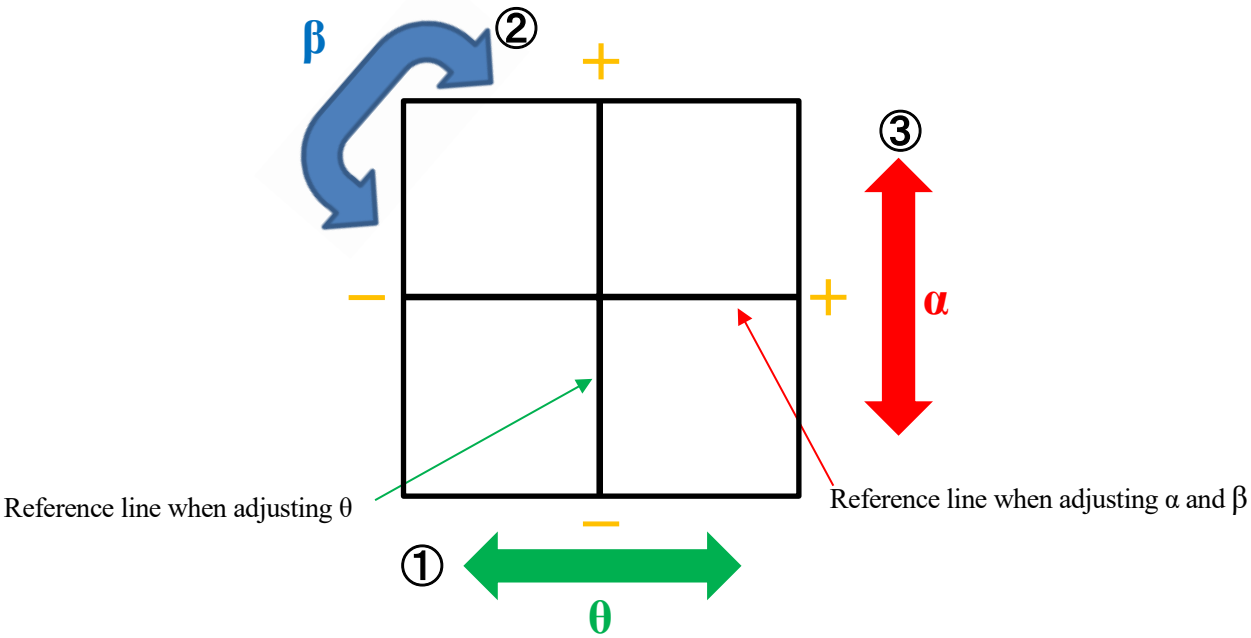
(5) Select [Alfa, Theta]on the chart and change the display chart to the crosshair.



(6) Make sure that the cross chart is displayed when looking through the measurement window.

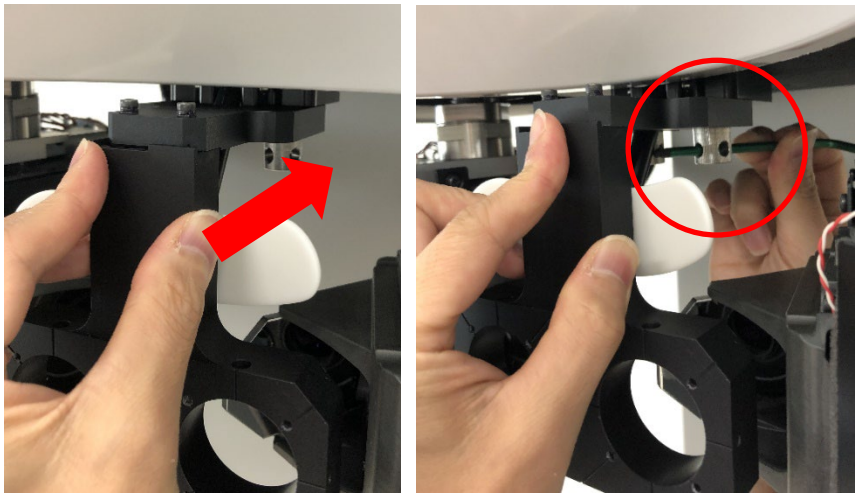
NOTE	• The horizontal line of the cross hair which is displayed in the center is the reference line of α adjustment, and the vertical line is the reference line of θ adjustment.

NOTE	• Confirmation is performed by ① θ axis confirmation ② β axis confirmation, ③ α axis confirmation. • Same as XY coordinate, the directions of "＋"and "－" are as shown below.

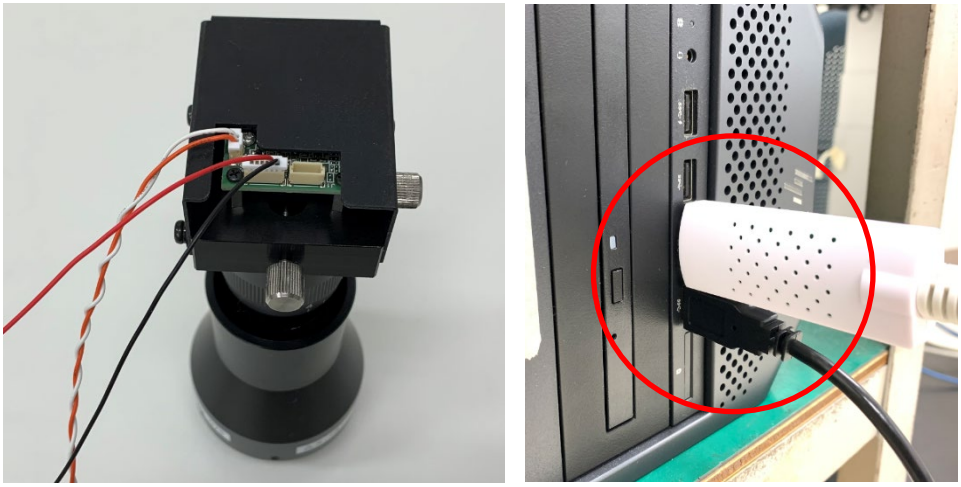


(7) Loosen the screw of the _BASE. Then insert the Test Eye all the way to attach it to the GADAI_BASE.

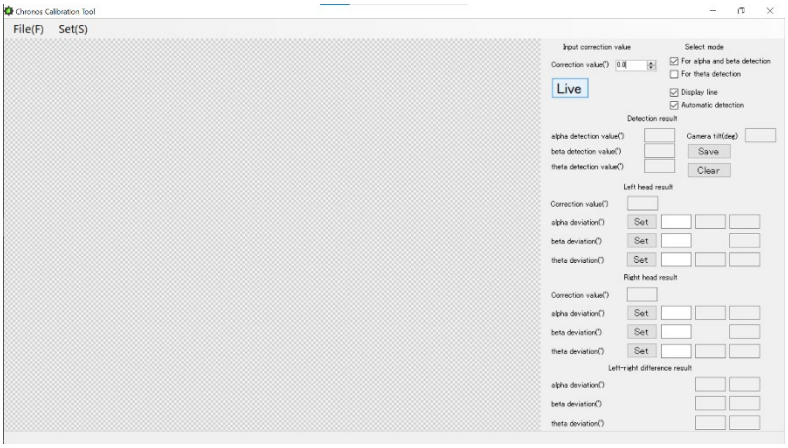
⚠ CAUTION	• Please insert it to all the way to the end and fasten the screw tightly. Otherwise, the error may occur in the adjustment value.



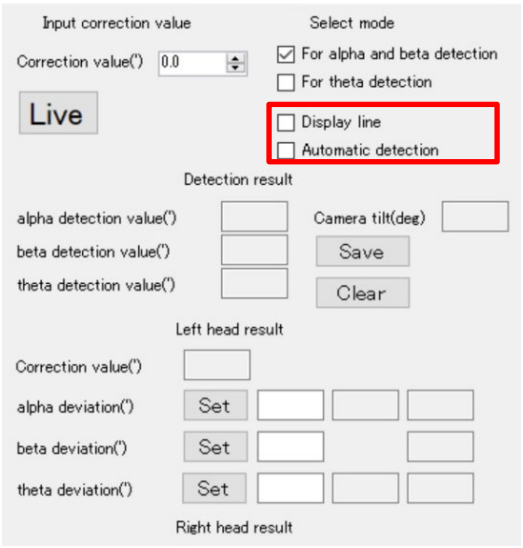
(8) Connect αβθ diopter telescope power cable and NTSC─USB convertor cable to the PC.



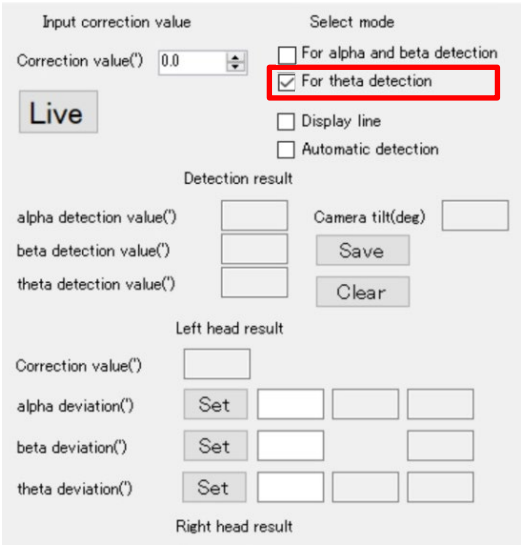
(9) Boot up by double-clicking [Calibration tool].



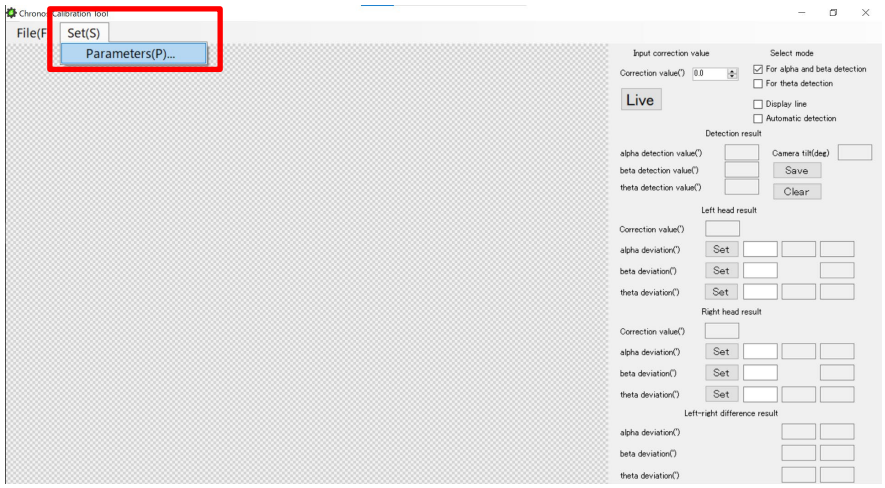
(10) Un-check [Display line] and [Automatic detection] on “Select mode”.



(11) Check［For theta detection］on “Select mode”

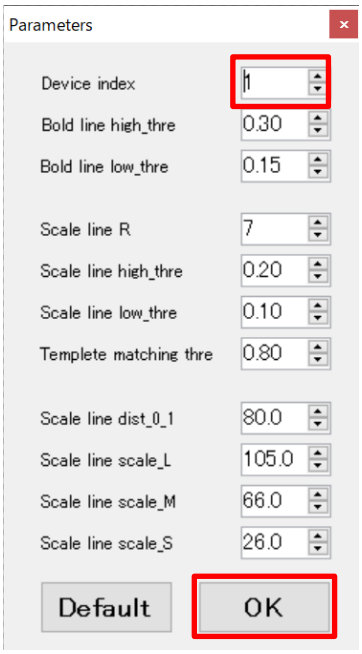


(12) Select [Parameters] on “Set”.

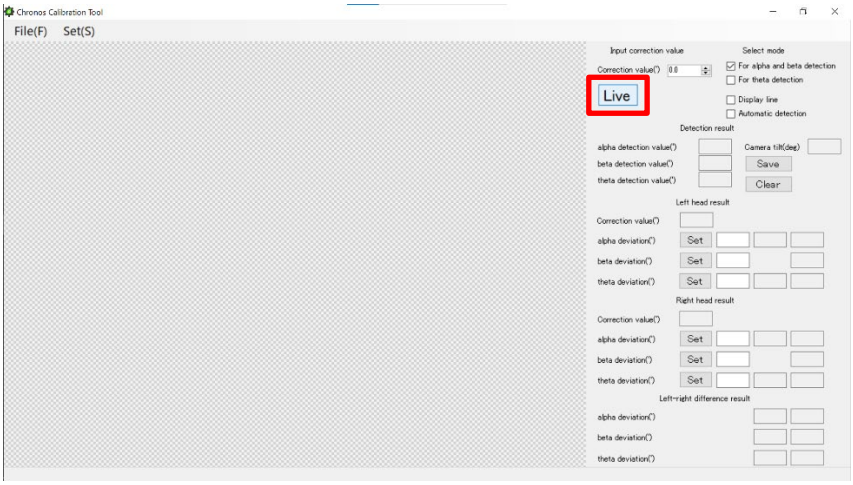


(13) Select Device number assigned to αβθ diopter telescope camera and click [OK].

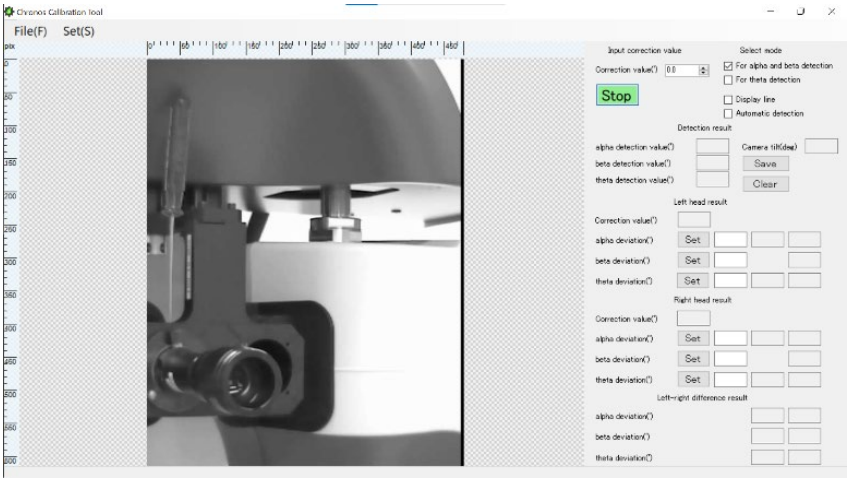
NOTE	• The Device number differs depending on PC specification.



(14) Click [Live]



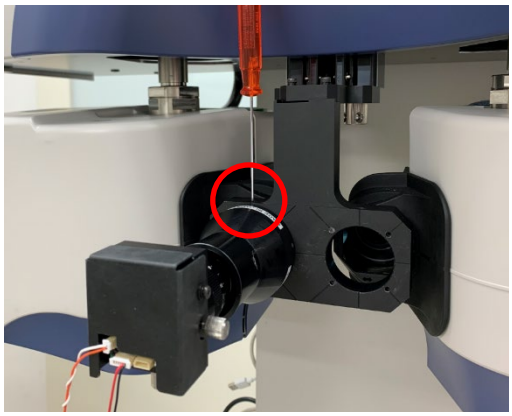
(15) Make sure the camera image is displayed.

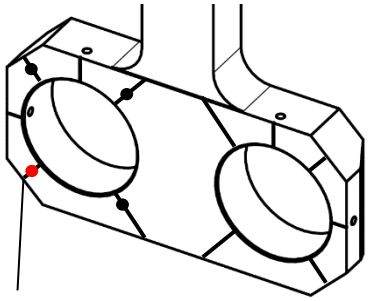


2.8.2 θ axis confirmation

(1) Attach the αβθ diopter telescope to model eye holder then fix it with screws.

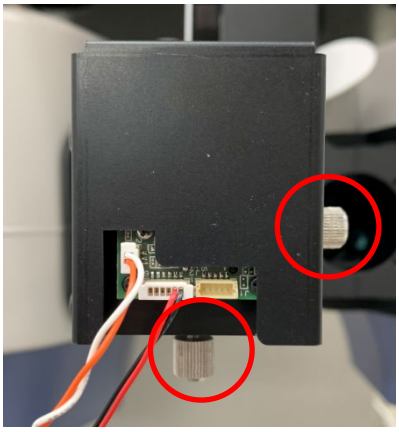
CAUTION	• Make sure not to misplace the pin position as it causes inacculate measurements.

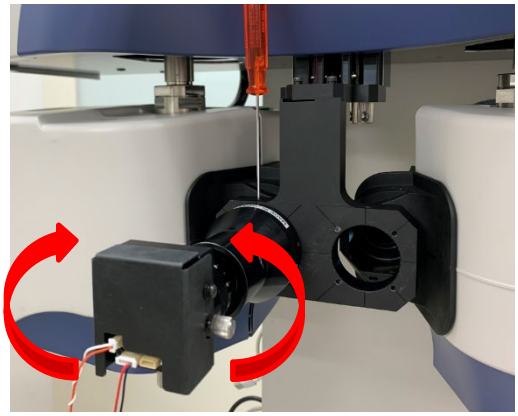




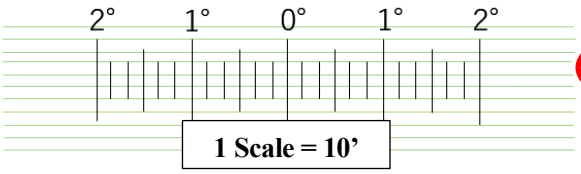
A pin of αβθ diopter telescope is marked as a red dot in the image.

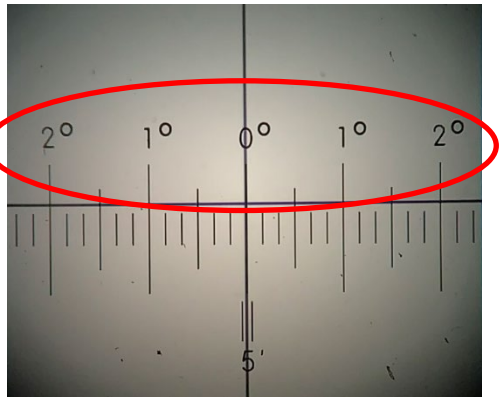
(2) Loosen 2 screws fixing the αβθ diopter telescope camera then set the scale as to be horizonal. (0°on the top).





αβθ diopter telescope

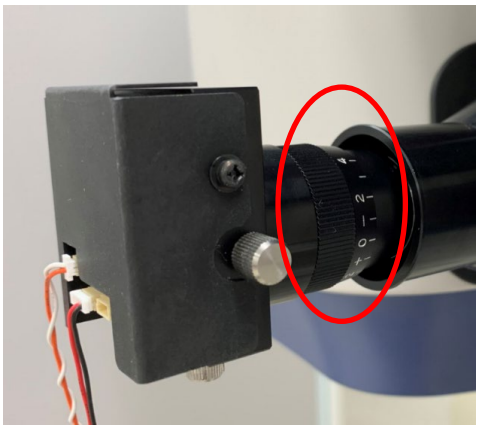


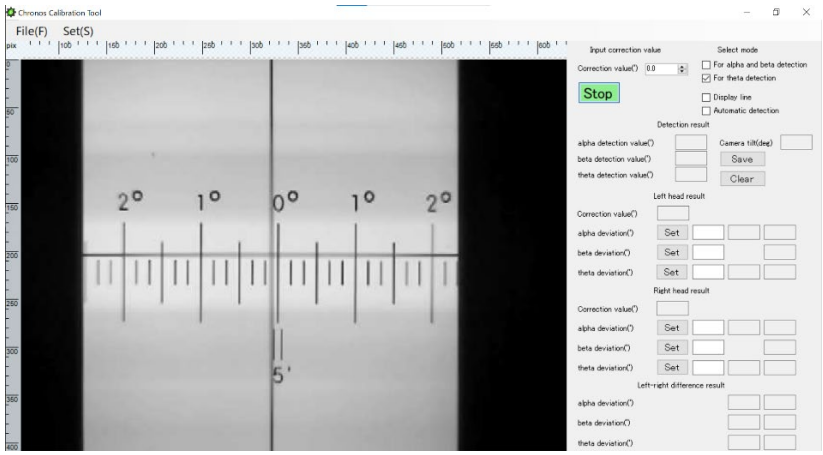


NOTE	• Adjust the camera so that Numbers of scale are on upward, even in case that the camera is not settled as the pictures above.

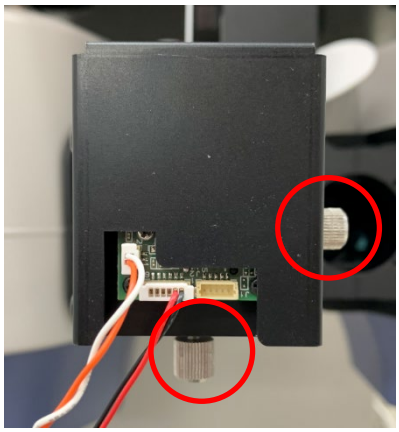
(3) Adjust the scale of αβθ diopter telescope and adjust the diopter focus on the chart.

CAUTION	• Make sure to focus acculately as it causes inacculate measurements.

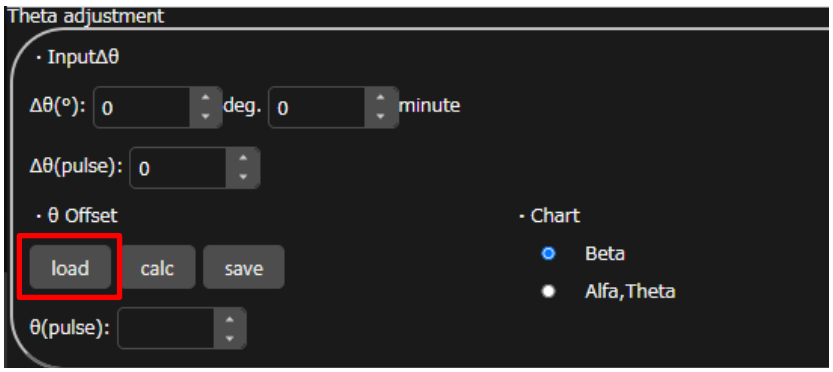




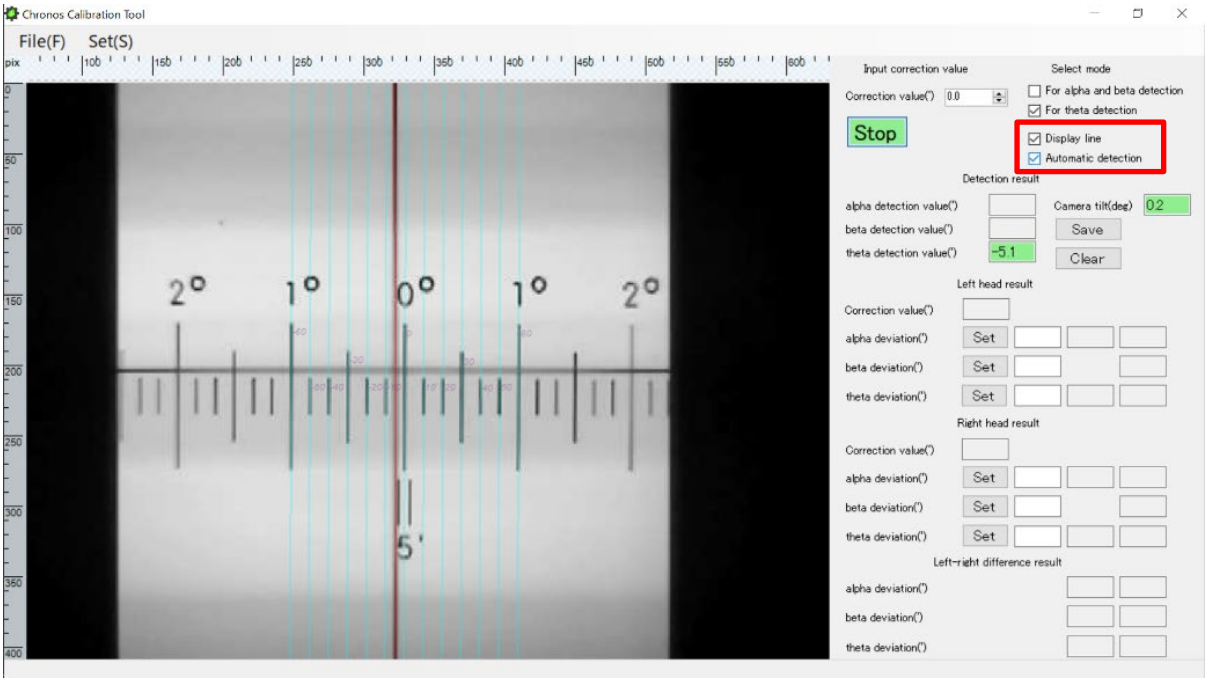
(4) Fasten the αβθ diopter telescope camera with 2 screws.



(5) Click [load], and shift θ axis to the initial position.

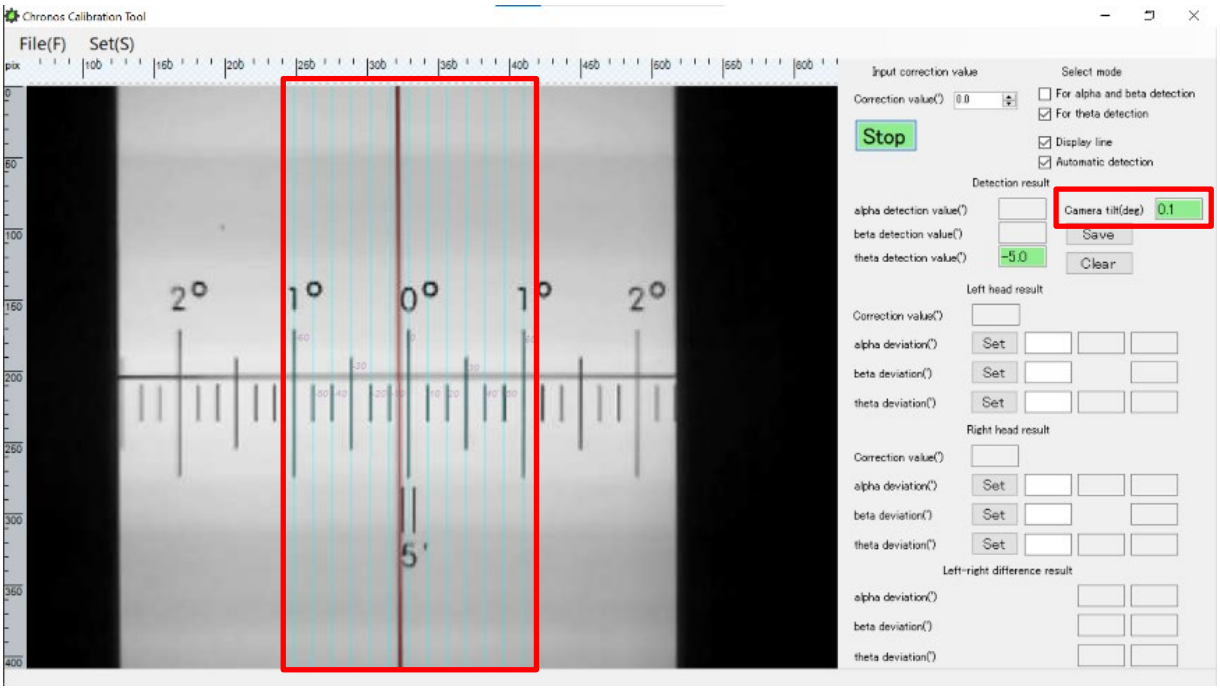


(6) Check [Display line] and [Automatic detection] on “Select mode”

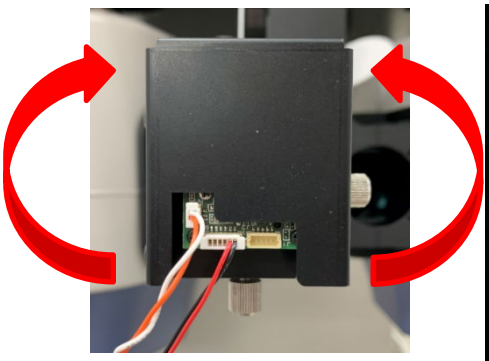


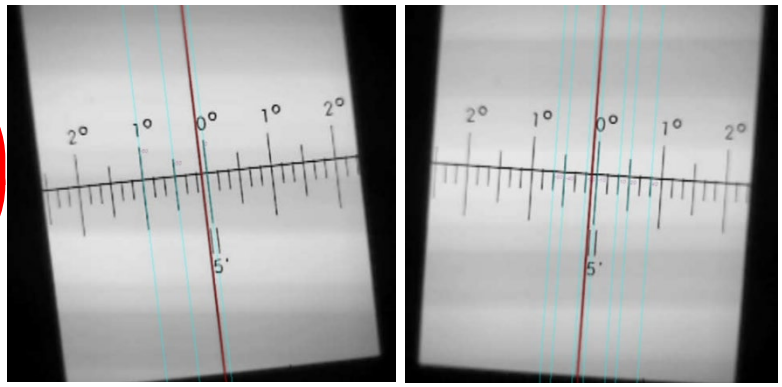
(7) Make sure the camera tilt is ±1°and 13 detection lines (blue lines) are all displayed.

NOTE	• Text box will be highlighted in green when it comes within ± 1°. • Make sure 13 detection lines are all displayed between -1°and 1°on the scale, otherwise cannot be measured accurately.



NOTE	• Diopter may rotate when ratating camera, but there is no problem if it rotates a little .

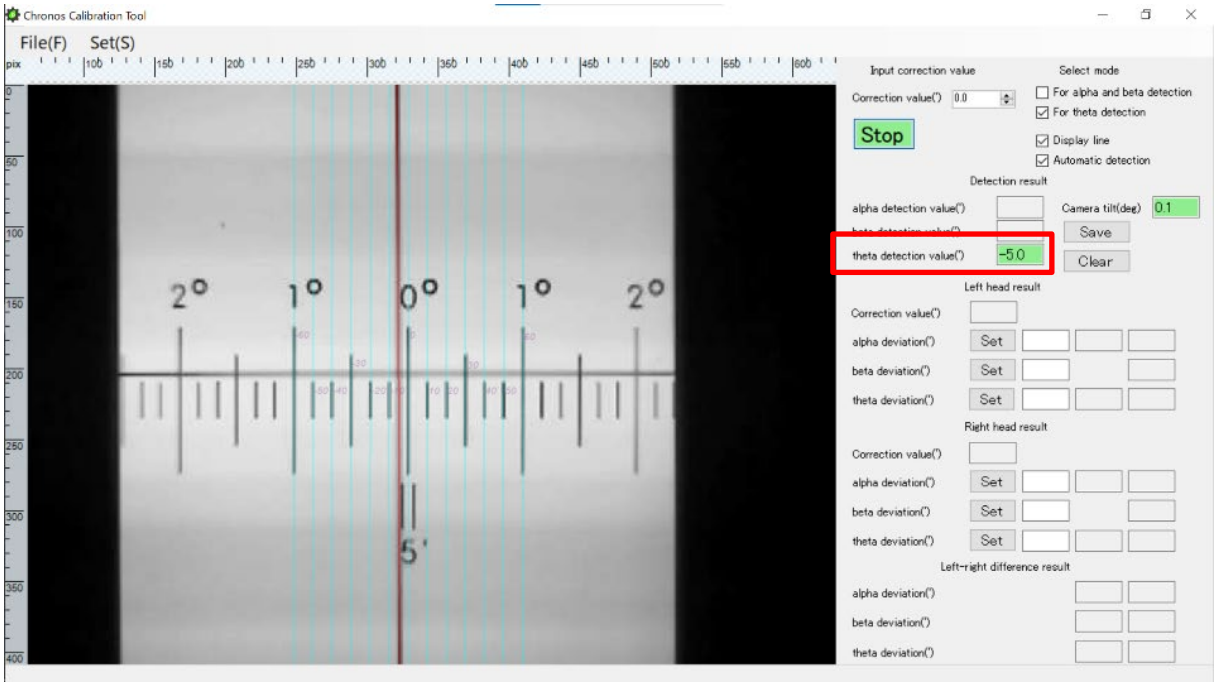




Bad example

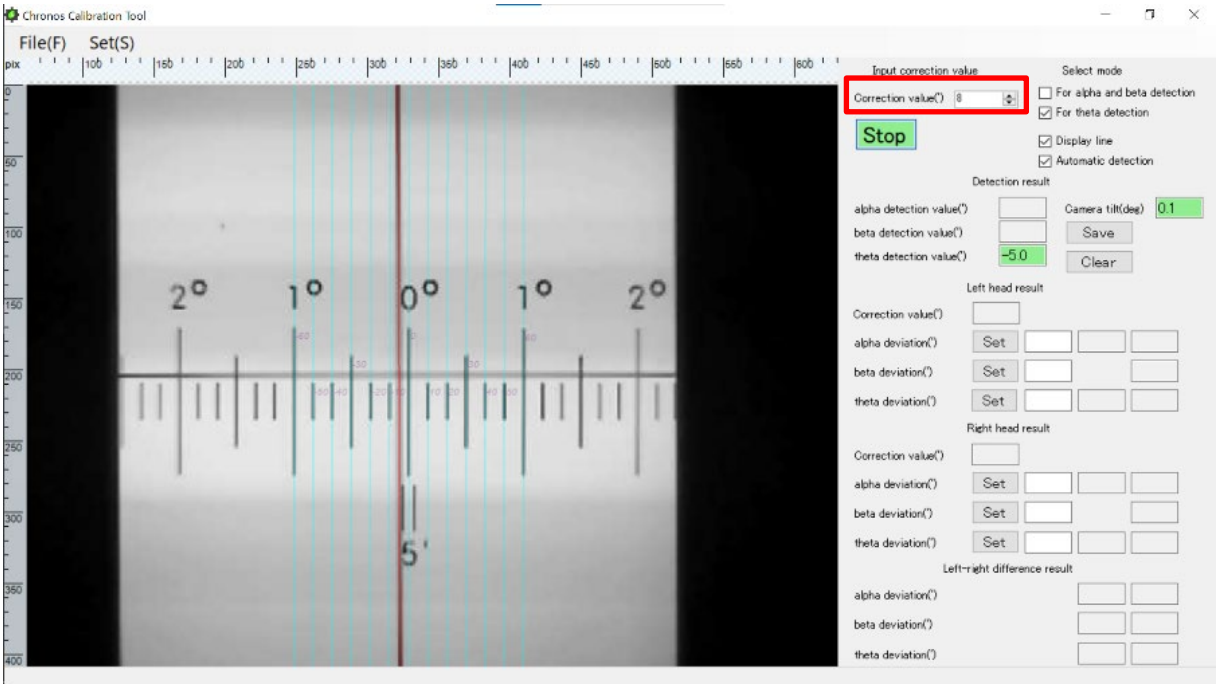
(8) Confirm that the value is displayed in “theta detection value”

NOTE	• Text box will be highlighted in green when it comes within ±30’.

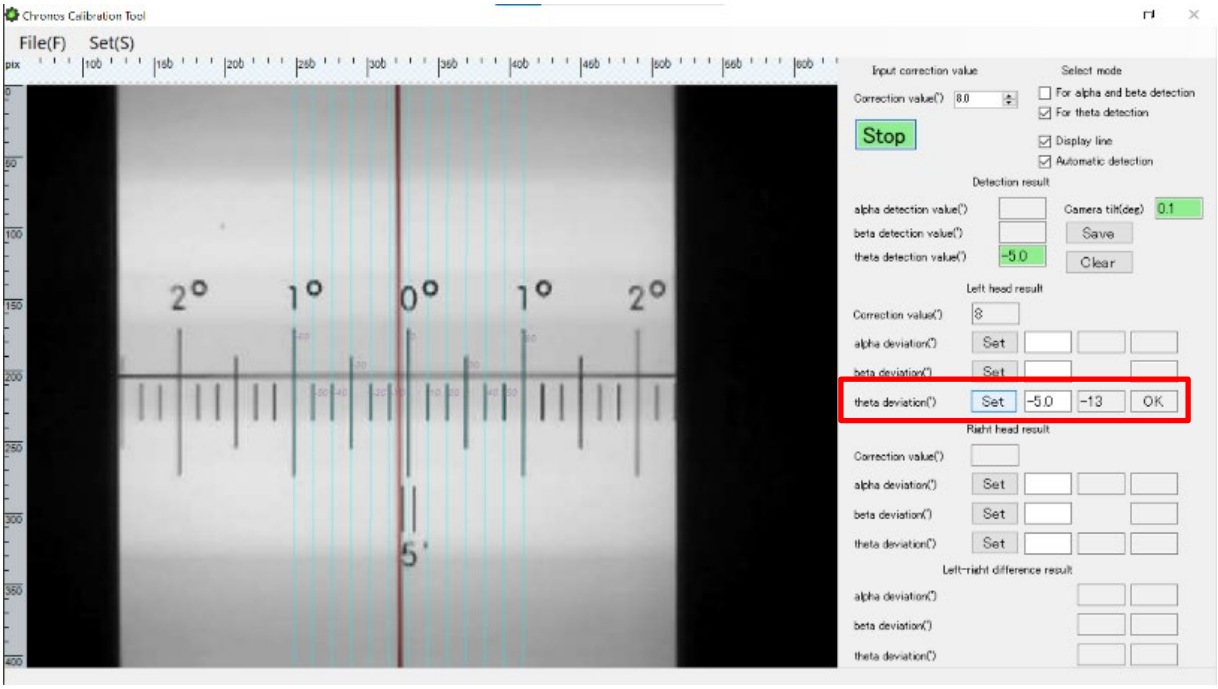


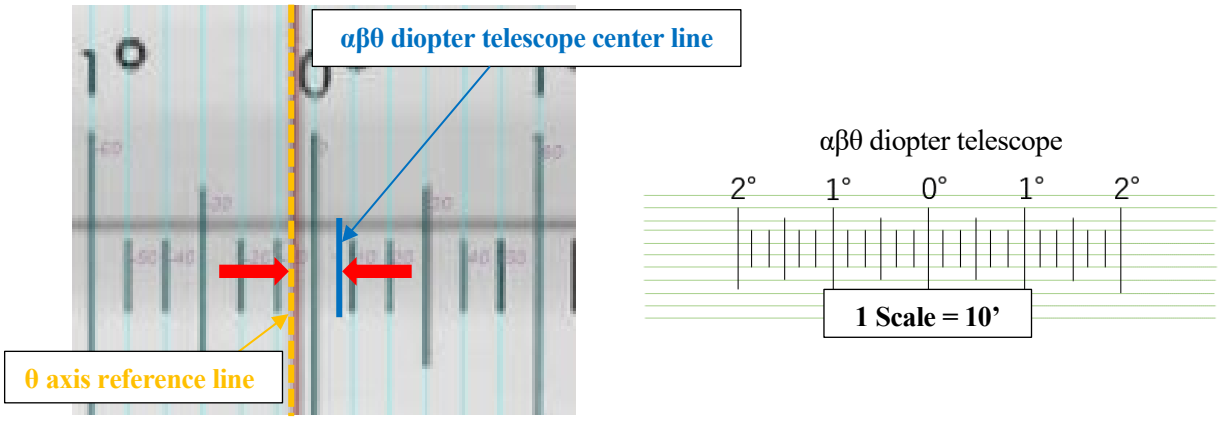
(9) Enter the correction value of αβθ diopter telescope into[Correction Value].

NOTE	• This is a value attached on the side of αβθ diopter telescope（center value on the scale）



(10) Click [SET]button of “theta deviation” on OPT HEAD (L/R) with αβθ diopter telescope set. Deviation amount considering the correction value will be displayed and it judges “OK” or “NG”.





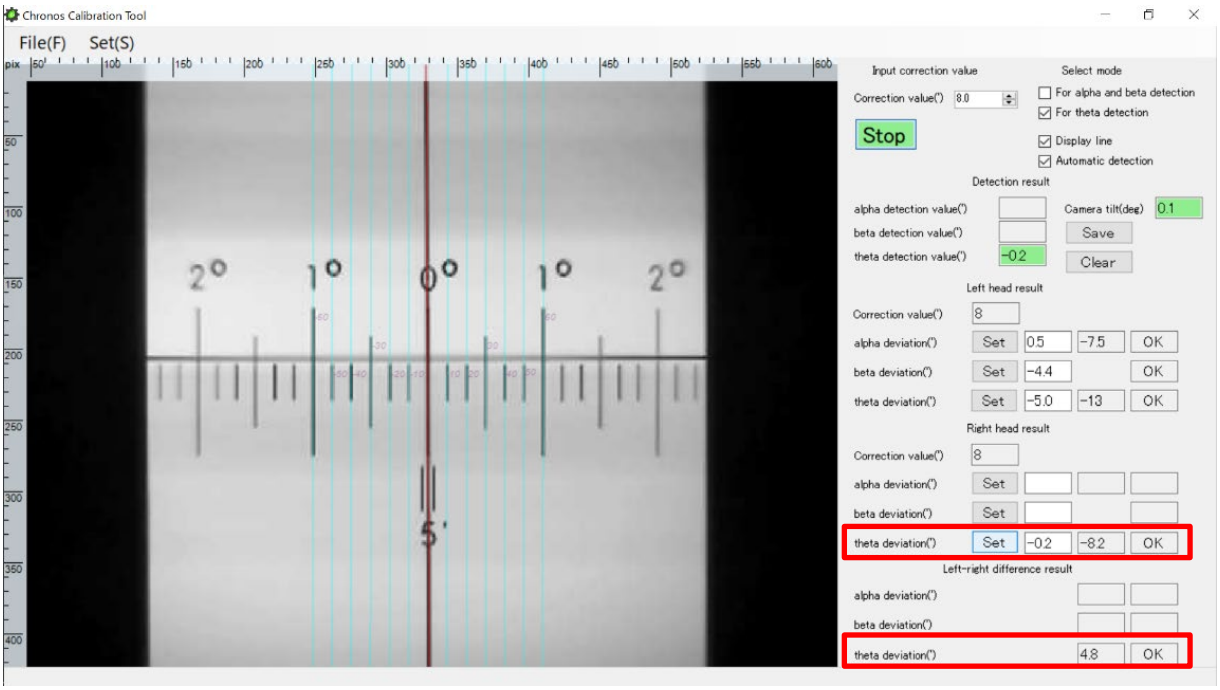
Example as above: Deviation amount is -13'which is within the standard as the θ axis reference line of the chart is at the position of -5' against the αβθ diopter telescope center line(8').
Deviation amount = (θ axis reference line value) – (diopter telescope center line)

(11) Confirm the value is within the standard below.

Standard

Item	Standard value	Remarks
θ axis	±30'	The θ difference between the left and right OPT_HEAD is within 10'

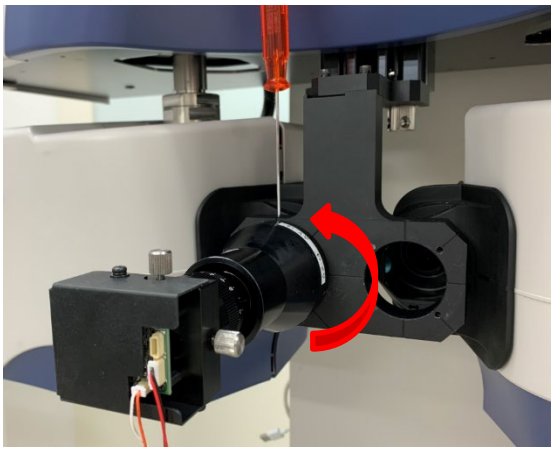
(12) Do the same for the opposite OPT HEAD and confirm the gap between L/R Head.

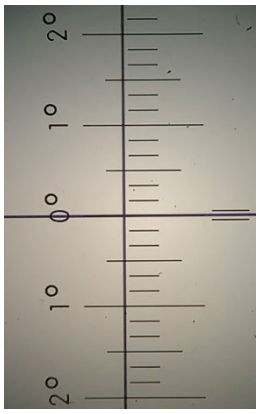


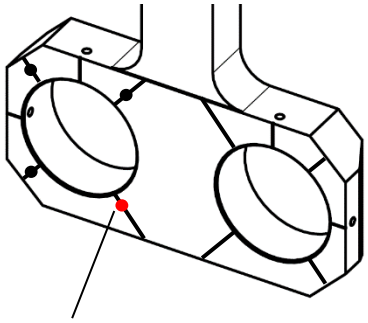
2.8.3 β axis confirmation

(1) As shown below, rotate the αβθ diopter telescope for 90 degrees. Make sure the scale is set vertically.

CAUTION	• When rotating the αβθ diopter telescope, rotate the attachment part so as not to put a load on the gluing point.

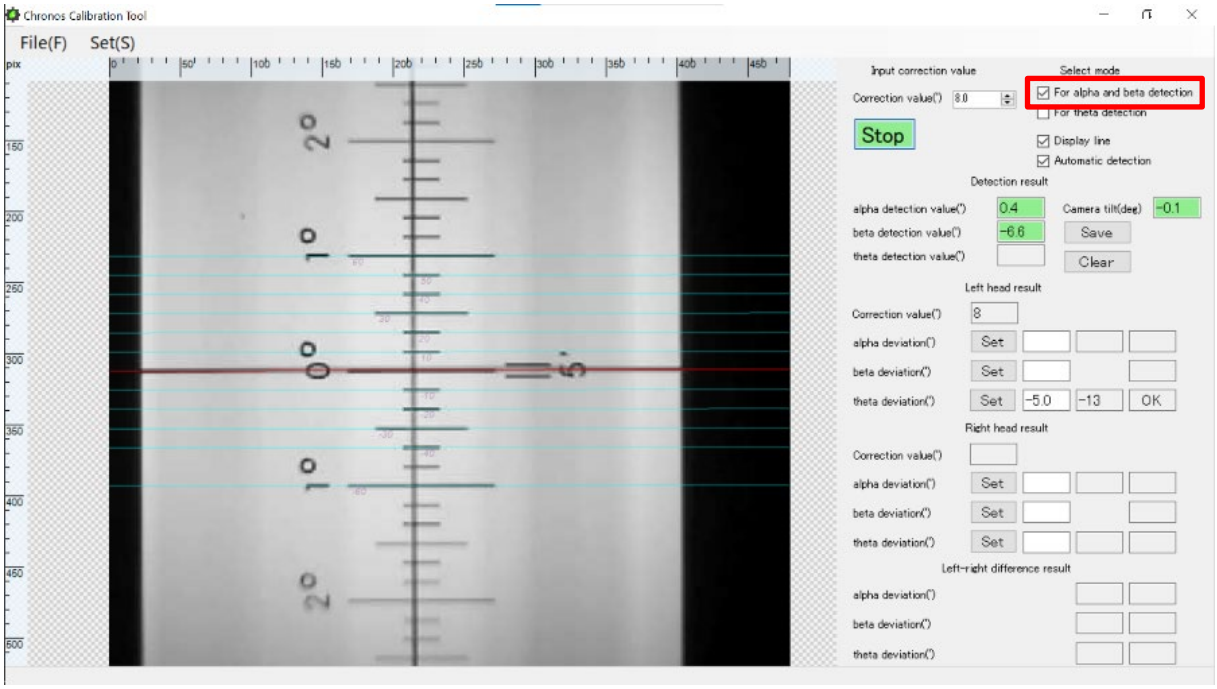






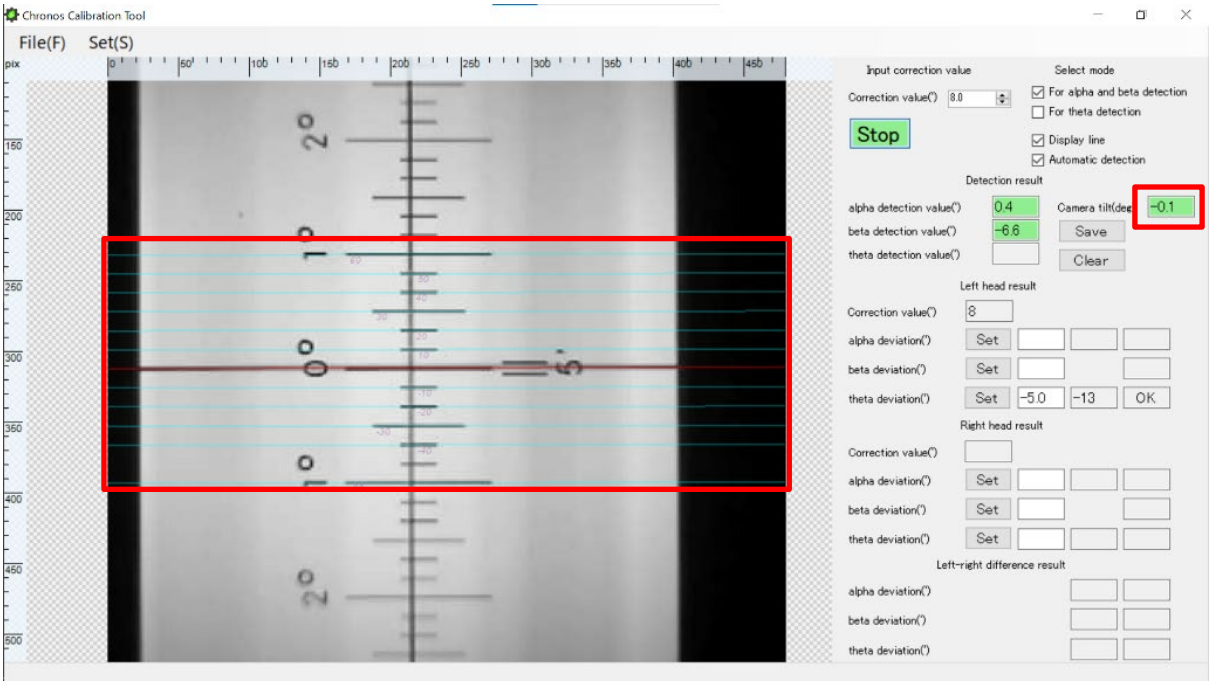
A pin of αβθ diopter telescope is marked as a red dot in the image.

(2) Check [For alpha beta detection] on "Select mode"

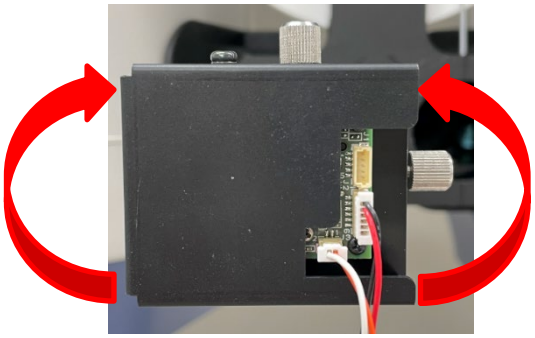


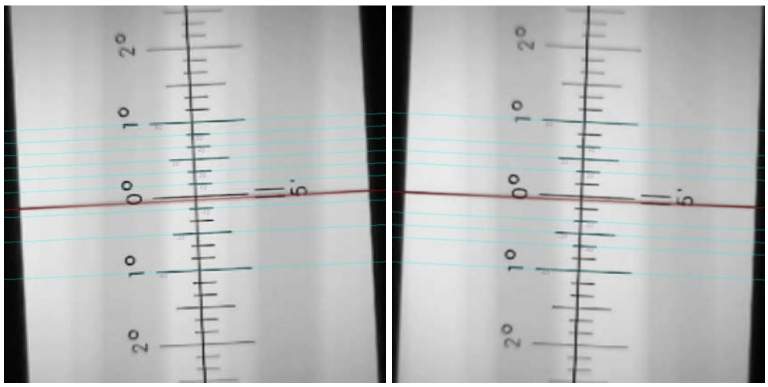
(3) Make sure the camera tilt is ±1°and 13 detection lines (blue lines) are all displayed.

NOTE	• Text box will be highlighted in green when it comes within ± 1°. • Make sure 13 detection lines are all displayed between -1°and 1°on the scale, otherwise cannot be measured accurately.



NOTE	• Diopter may rotate when ratating camera, but there is no problem if it rotates a little .

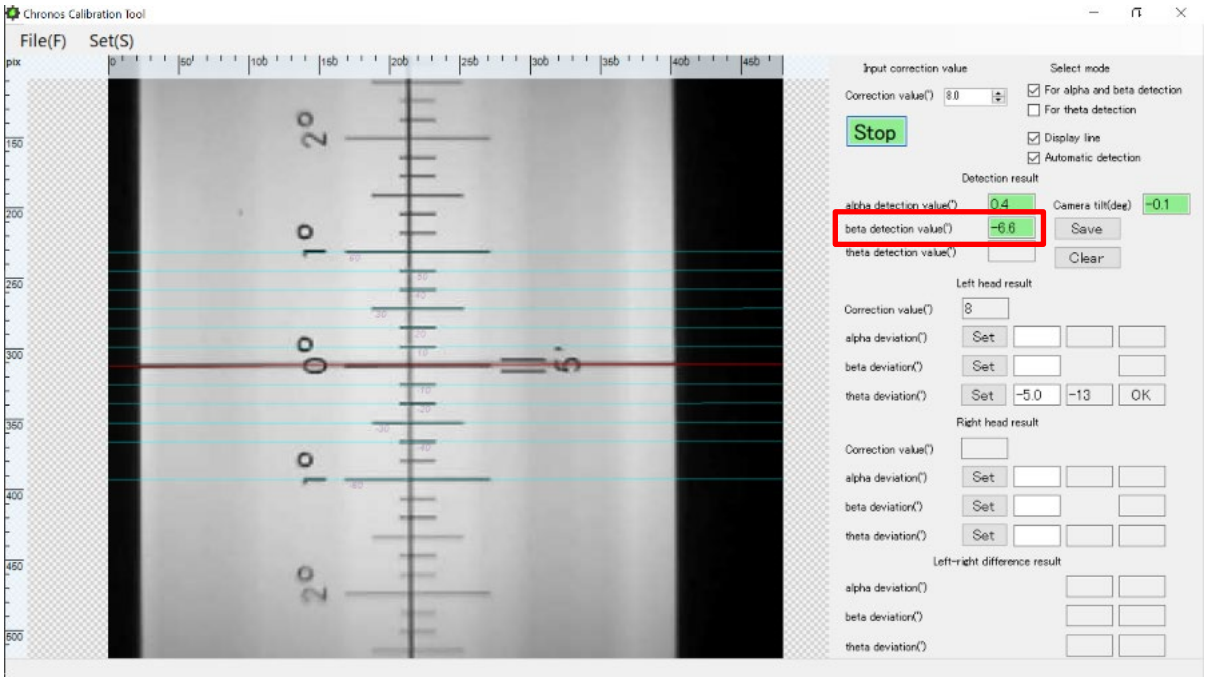




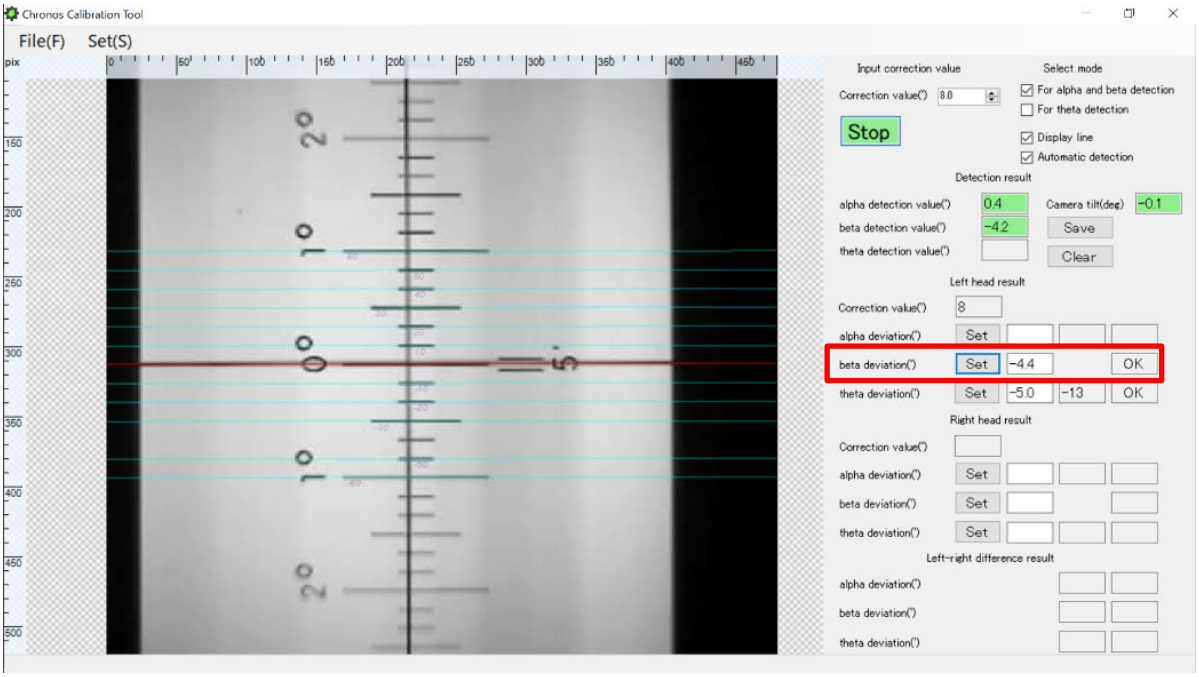
Bad example

(4) Confirm that the value is displayed in “beta detection value”

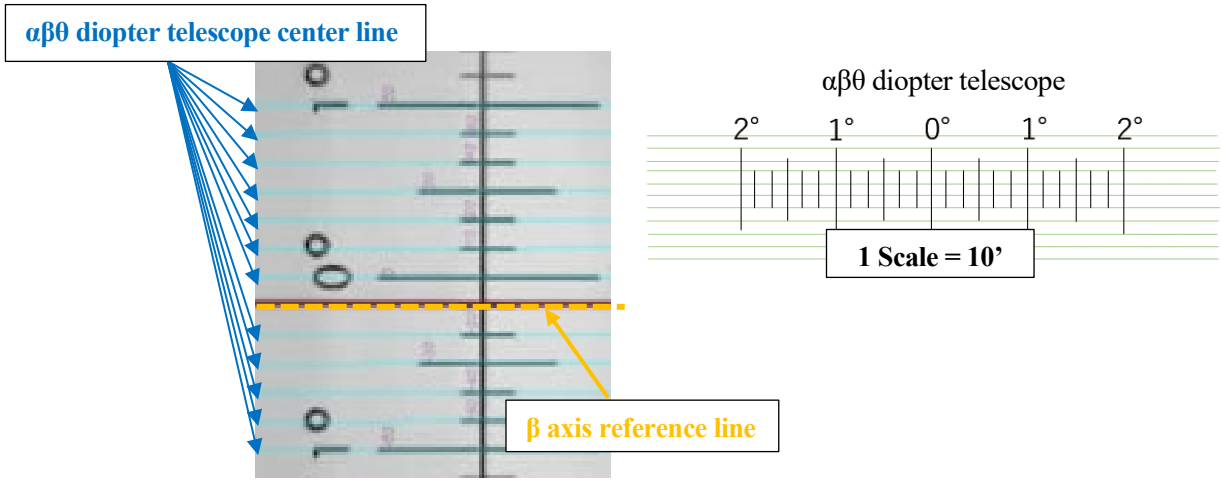
NOTE	• Text box will be highlighted in green when it comes within ±30’.



(5) Click [SET]button of “bata deviation” on OPT HEAD (L/R) with αβθ diopter telescope set. Deviation amount considering the correction value will be displayed and it judges “OK” or “NG”.



NOTE	• It detects how much the β reference line is tilted against the scale of αβθ diopter telescope.

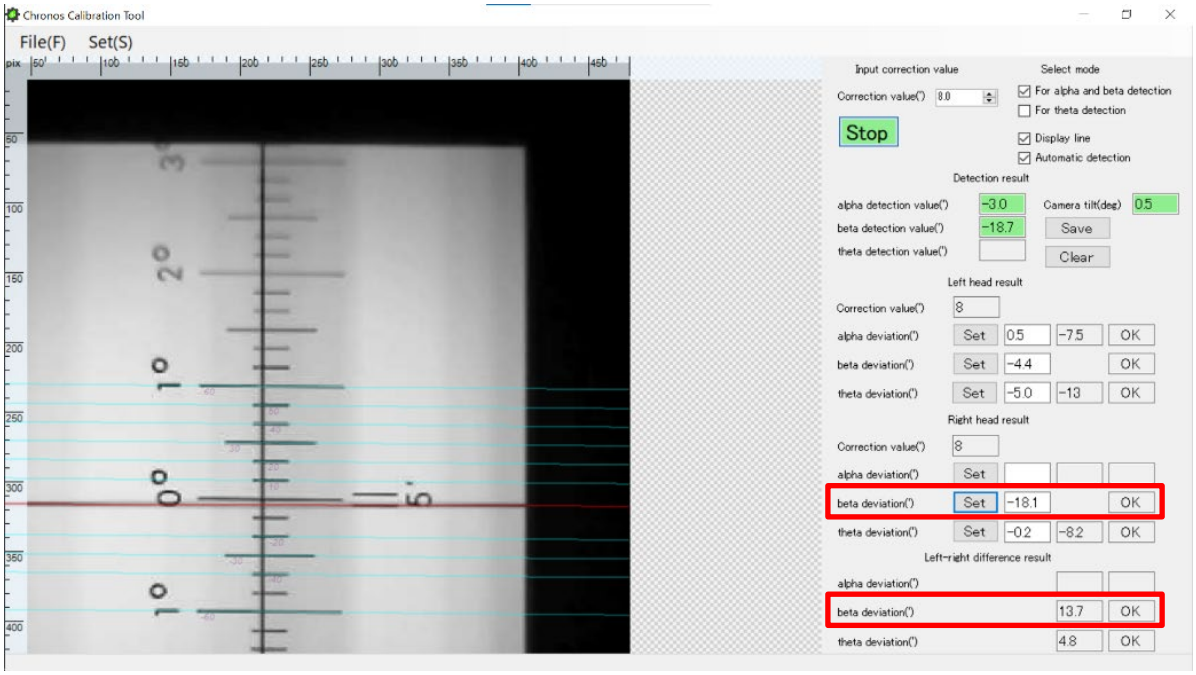


(6) Confirm the value is within the standard below.

Standard

Item	Standard value	Remark
β axis	±30'	The β difference between the left and right OPT_HEAD is within 30'

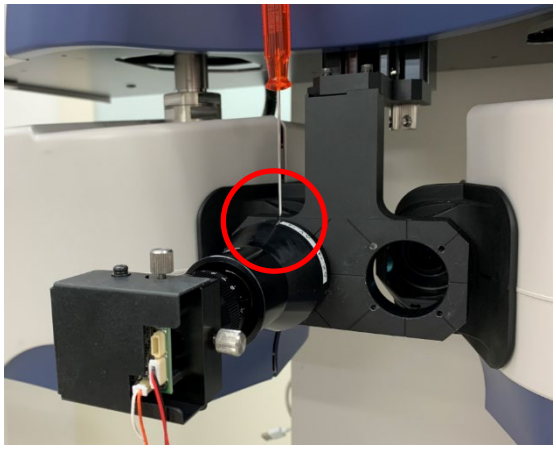
(7) Do the same for the opposite OPT_HEAD. Then confirm the gap between L/R Head.

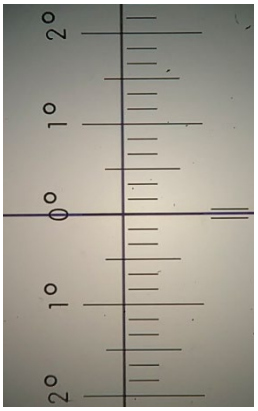


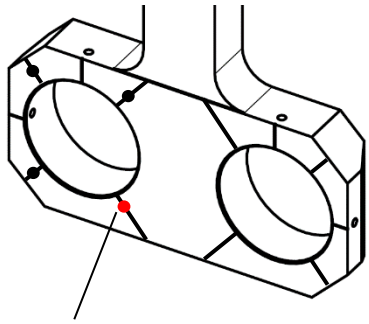
2.8.4 α axis confirmation

(1) As shown below, fix the αβθ diopter telescope so as the scale is vertical.

CAUTION	• When rotating the αβθ diopter telescope, rorate the attachment part so as not to put a load on the glue point.

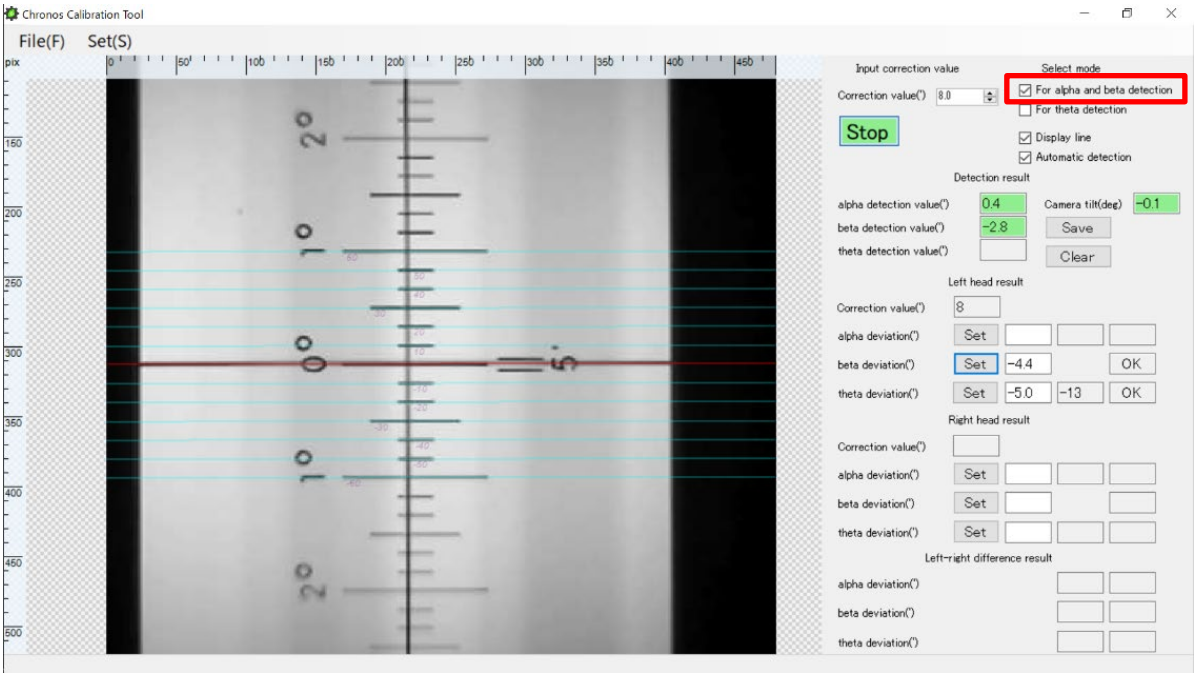






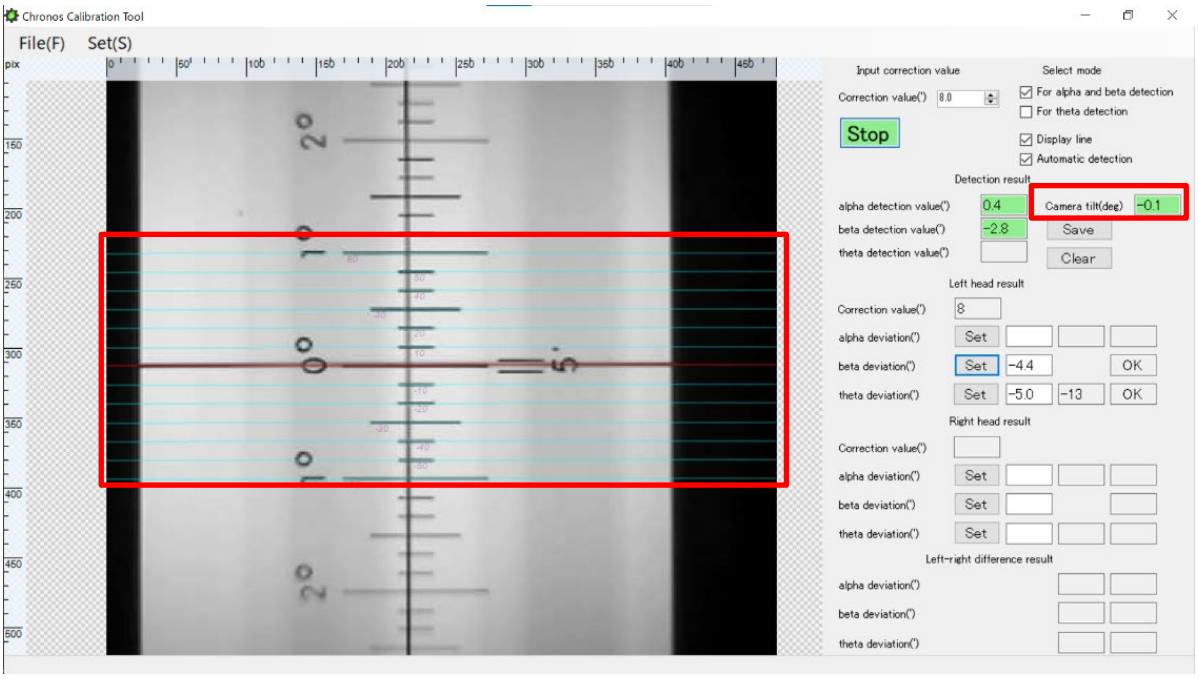
A pin of αβθ diopter telescope is marked as a red dot in the image.

(2) Check [For alpha beta detection] on “Select mode”.

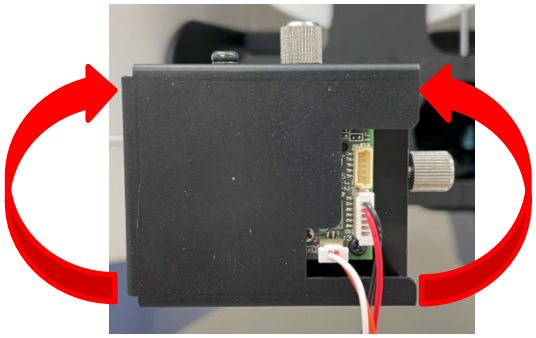


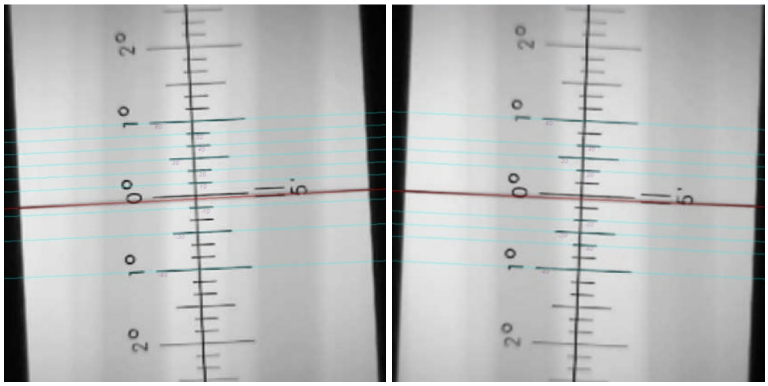
(3) Make sure the camera tilt is ±1°and 13 detection lines (blue lines) are all displayed.

NOTE	• Text box will be highlighted in green when it comes within ± 1°. • Make sure 13 detection lines are all displayed between -1°and 1°on the scale, otherwise cannot be measured accurately.



NOTE	• Diopter may rotate when ratating camera, but there is no problem if it rotates a little .

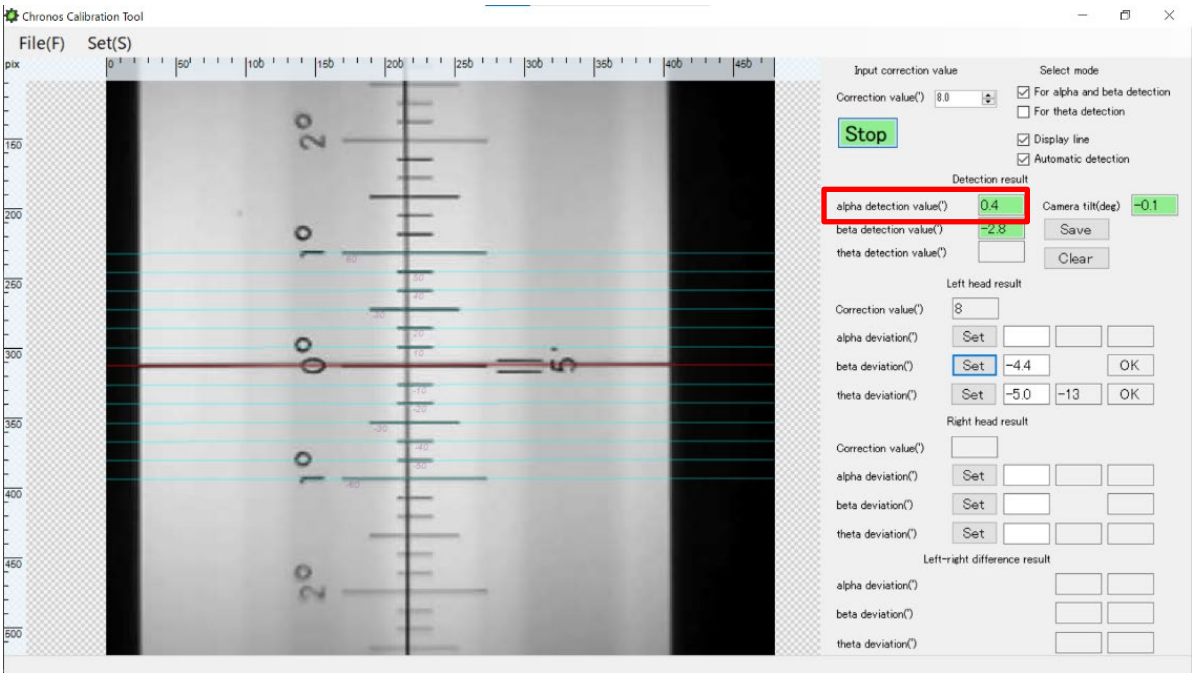




Bad example

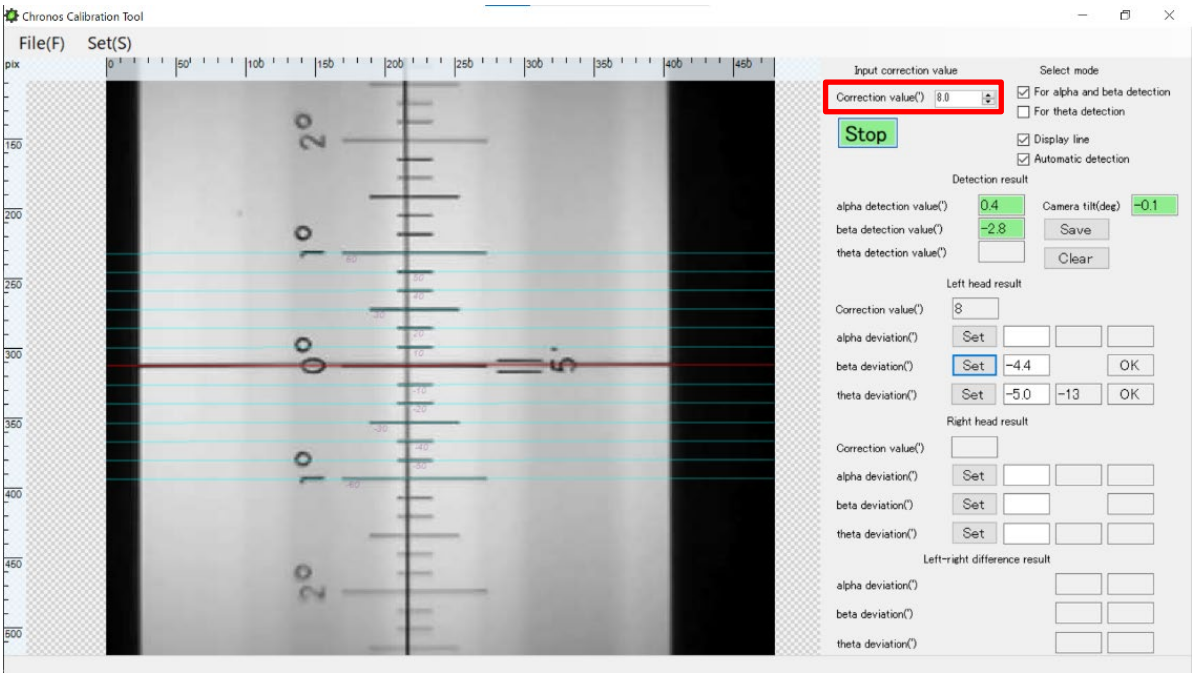
(4) Confirm that the value is displayed in “alpha detection value”.

NOTE	• Text box will be highlighted in green when it comes within ±30’.

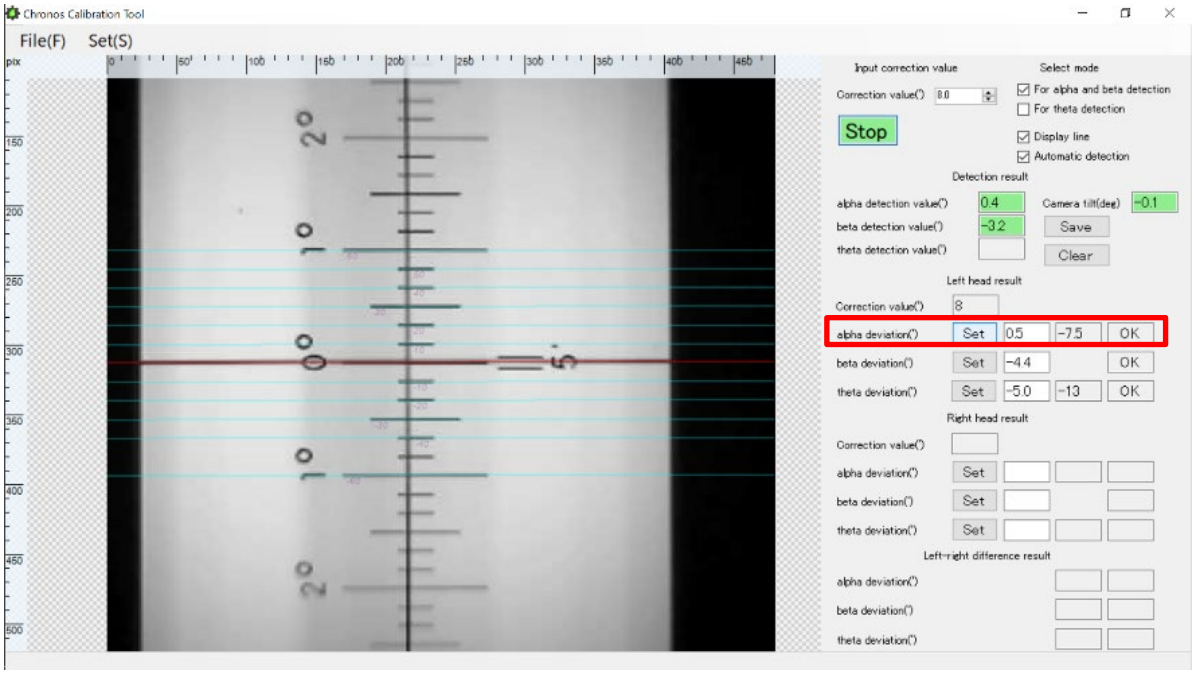


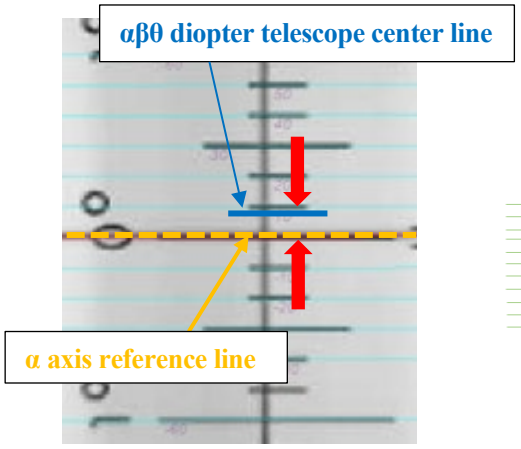
(5) Enter the correction value of αβθ diopter telescope in [Correction Value].

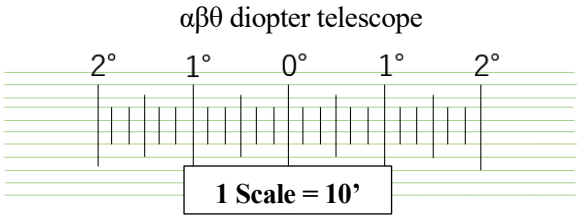
NOTE	• This is the value on the sticker attached the side of αβθ diopter telescope.(center of the scale)



(6) Click [SET]button of "alpha deviation" on OPT HEAD (L/R) with αβθ diopter telescope set. Deviation amount considering the correction value will be displayed and it judges "OK" or "NG".







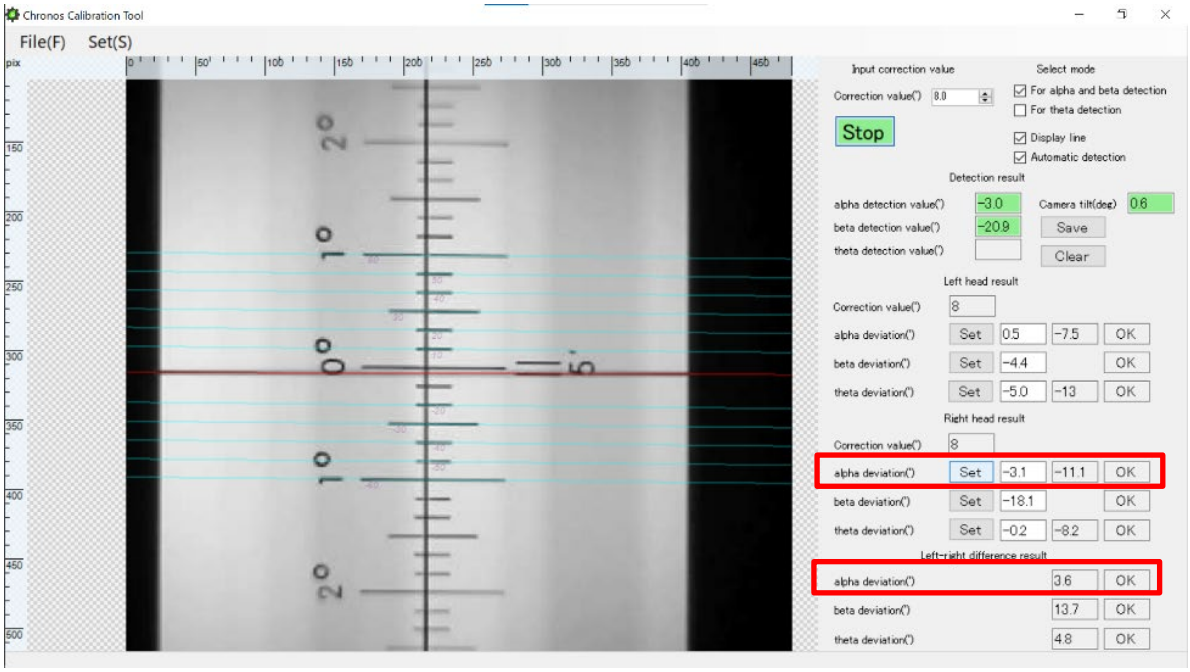
Example as above: Deviation amount is -7.5' which is within the standard as the θ axis reference line of the chart is at the position of 0.5' against the αβθ diopter telescope center line(8').
Deviation amount = (θ axis reference line value) – (diopter telescope center line)

(7) Confirm that the value is within the standard below.

Standard

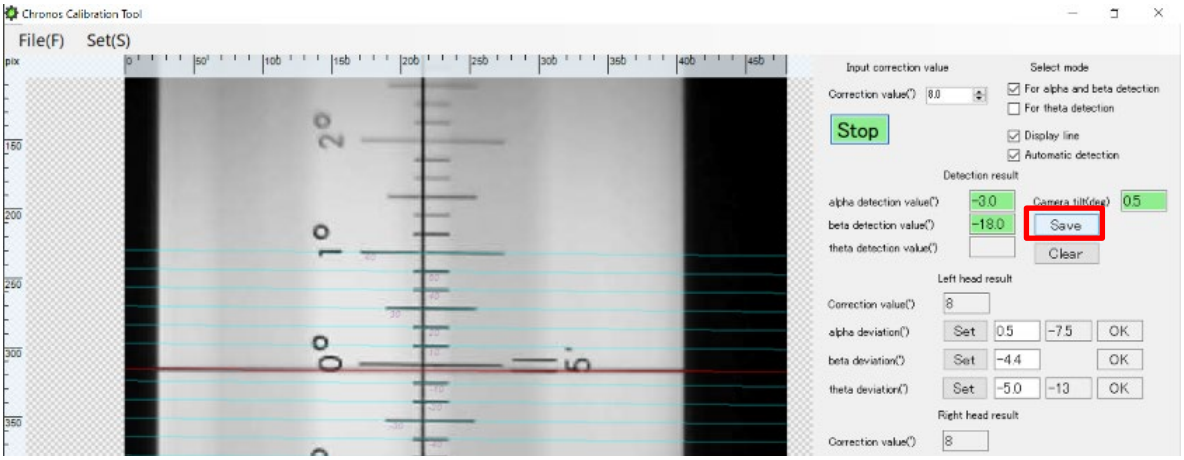
Item	Standard value	Remark
α axis	±30'	The α difference between the left and right OPT_HEAD is within 10'

(8) Do the same for the opposite OPT_HEAD. Then confirm the gap between L/R Head.

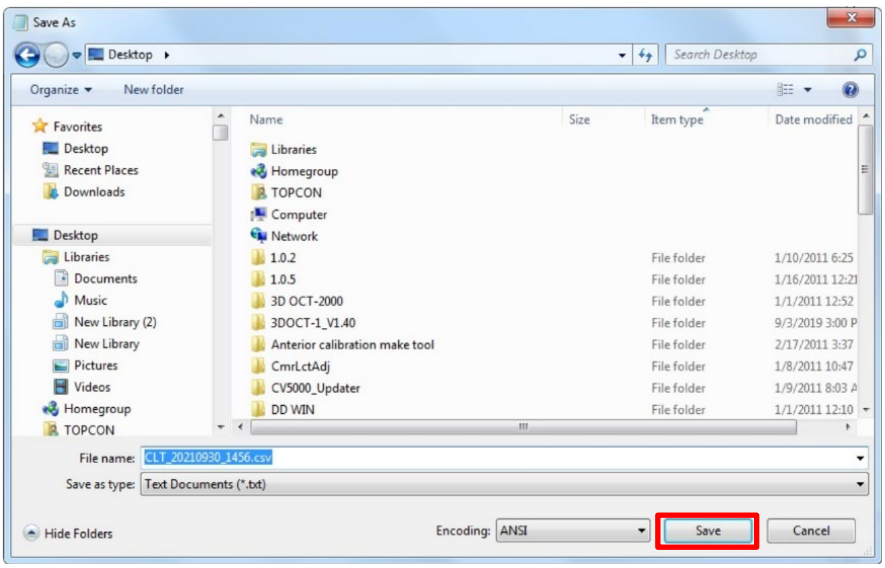


***Export the measured value.**

(9) Click [Save]



(10) Select any preferred place to save. then click［Save］

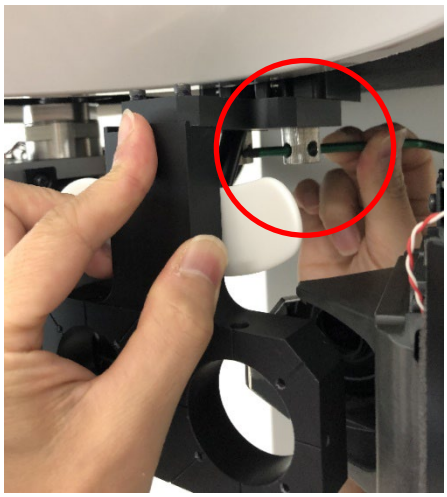


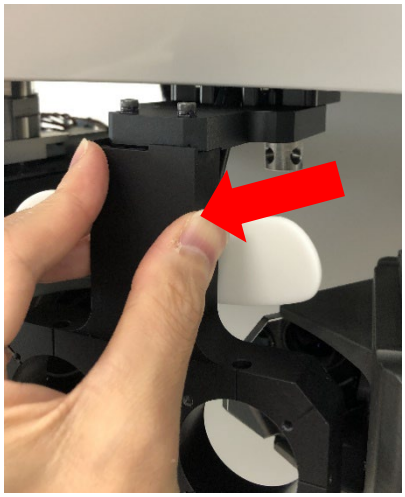
2.9 αβθ adjustment of the OPT_HEAD

2.9.1 Preparing before

(1) Remove the Test eye holder.

CAUTION	• Please make sure that the test eye was removed when setting to the packing mode. Otherwise, it may cause the damage in the mirror.

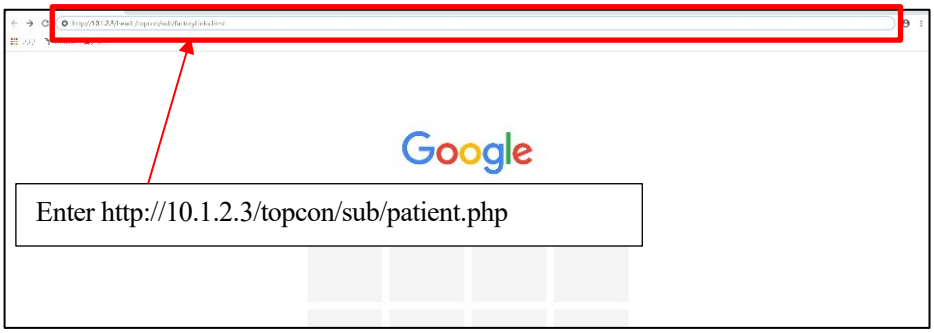




(2) Start the Standard GUI screen from the following URL.

NOTE	• Use Google Chrome for activation.

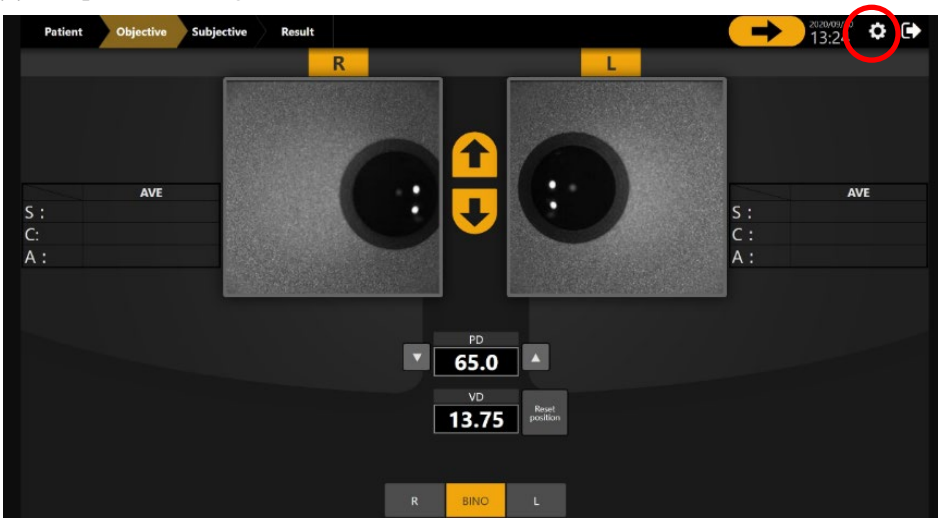
Content	URL	Remarks
Standard GUI	http://10.1.2.3/topcon/sub/patient.php	—



(3) Enter the Username and Password.

Username	**********
Password	**********

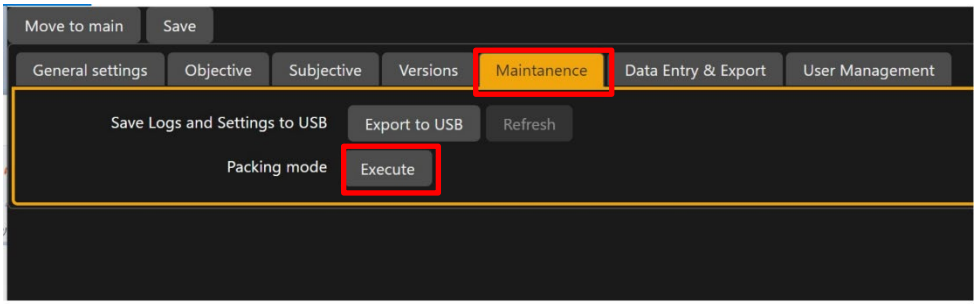
(4) Open the setting screen.



(5) Select [Maintenance] tab, click the[Execute] in [Packing mode].

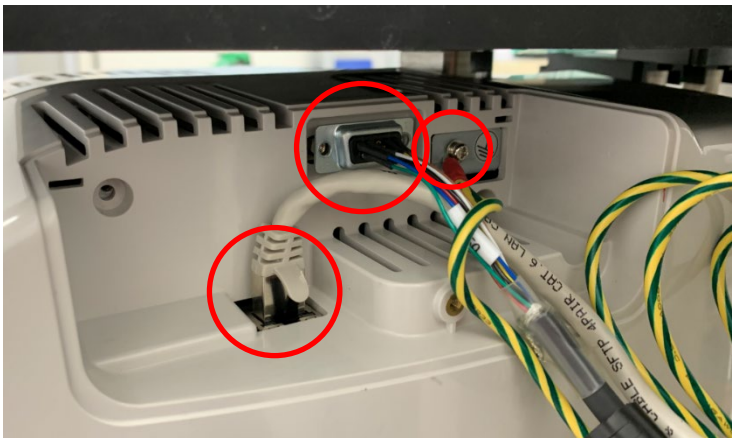
***Please make sure that the OPT_HEAD was moved to the both edges.**

CAUTION	• Be sure to set the OPT_HEAD to the packing mode before removing it. Otherwise, it may break the mirror.



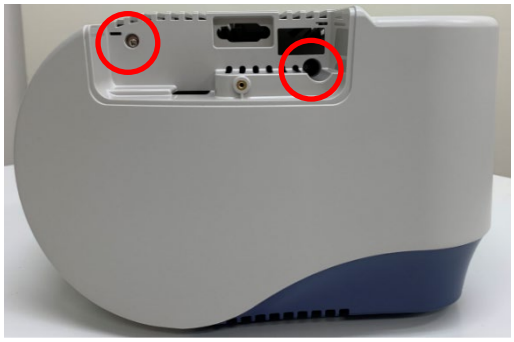
(6) When the OPT_HEAD (L/R) has moved to both ends, turn the power off.

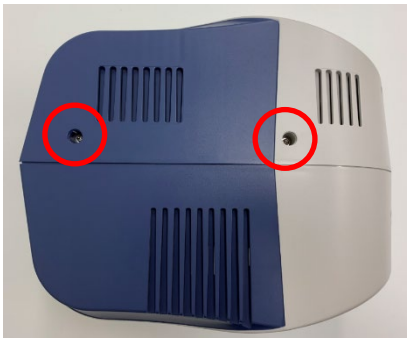
(7) Disconnect the cable connected to the OPT_HEAD.

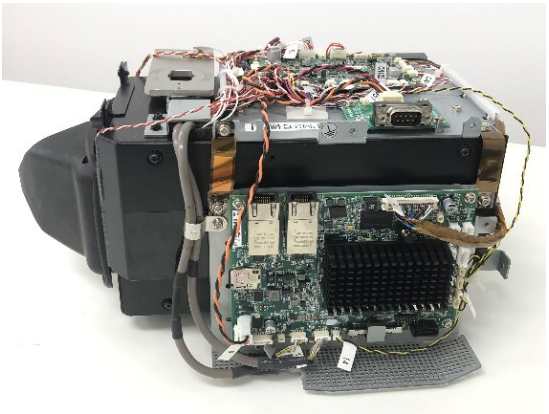


(8) Remove the OPT_HEAD (L/R).

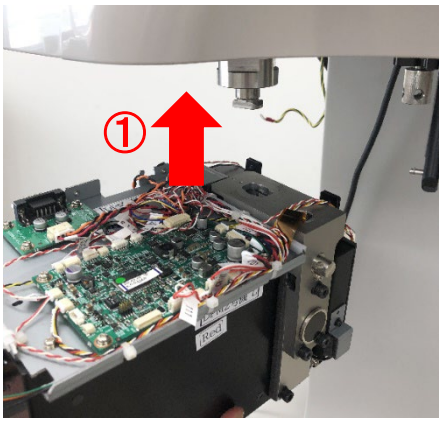
(9) Remove 6 screws of Light (L) and Right (R) OPT_HEAD for each. Then remove HEAD covers.

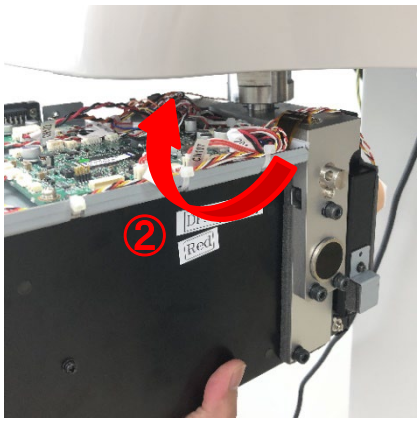






(10) Attach the OPT_HEAD (L/R) to the GADAI_BASE.



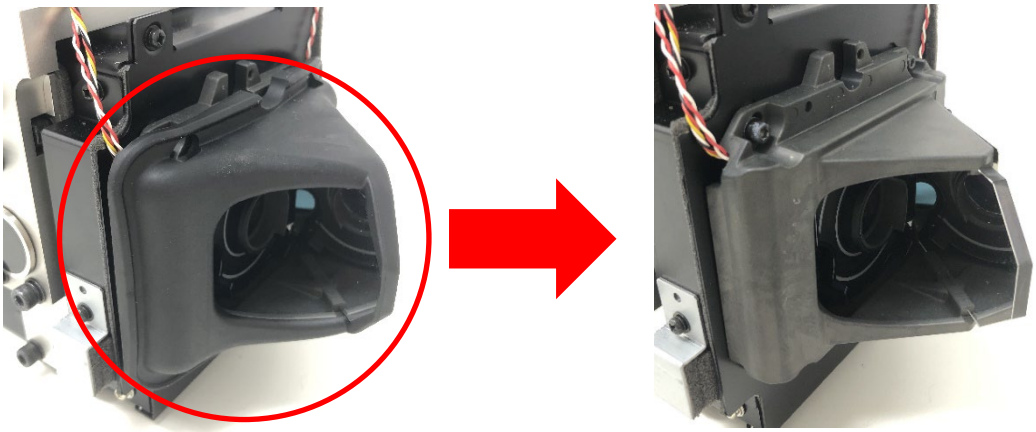


(11) Fasten the nut in order ①lower low, ②upper low.

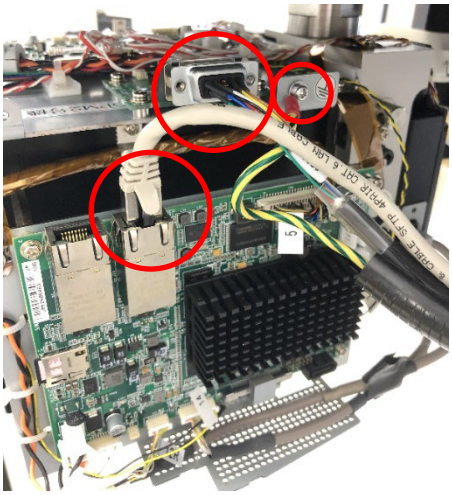
NOTE	• Make sure to fasten the nut tightly. If not fastened enough, it will affect its accuracy and lose the reproducibility at factory shipment.

(12) Remove the folding mirror cover of Left (L) and Right (R) OPT_HEAD for each.

NOTE	• Please be careful not to scrach the folding mirror.



(13) Connect each LAN junction, BGA junction and ground junction of Left and Right OPT_HEAD from the GADAI_BASE.

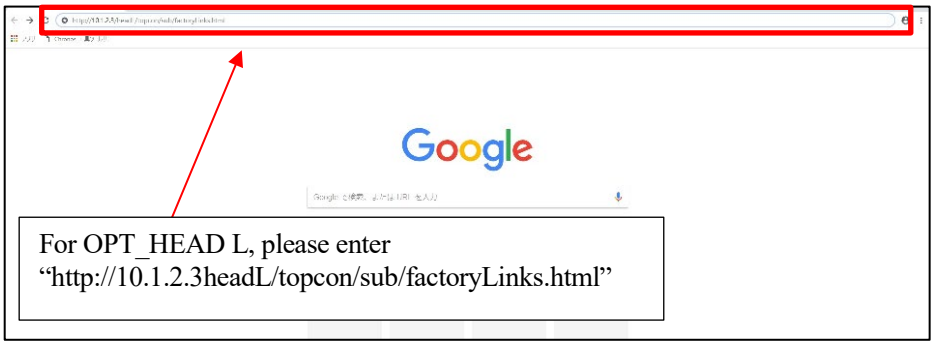


(14) Turn on the CONTROL_BOX.

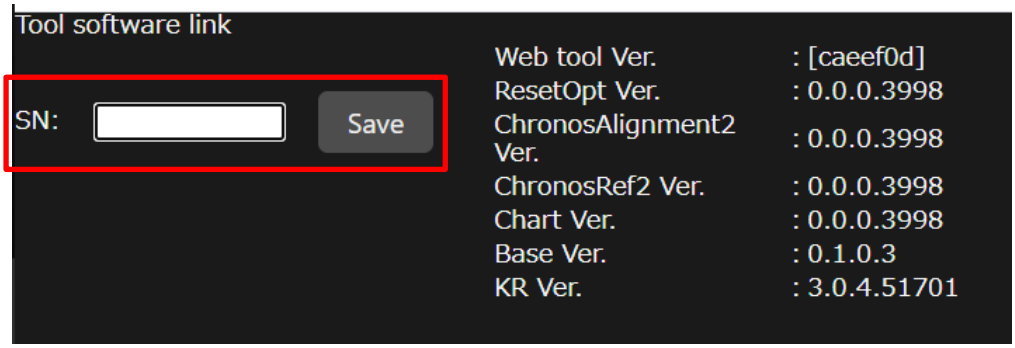
(15) Boot up the “Tool software link” by URL below.

NOTE	• Use Google Chrome when booting up. • Please note that URLs have "uppercase" and "lowercase" letters.

Adjust OPT_HEAD	URL	Remark
OPT_HEAD L	http://10.1.2.3/headL/topcon/sub/factoryLinks.html	Access to the CONTROL_BOX
OPT_HEAD R	http://10.1.2.3/headR/topcon/sub/factoryLinks.html	

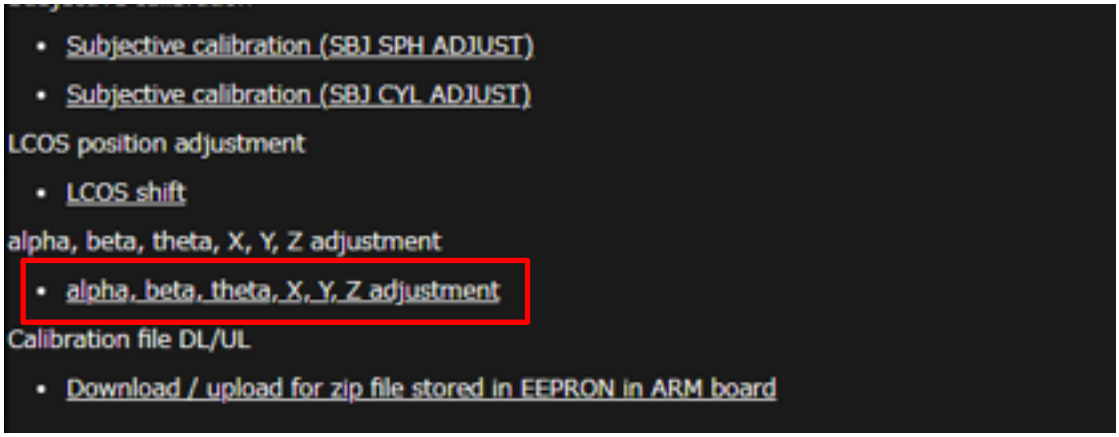


(16) Enter the serial number on “Tool software link” Then click [Save].

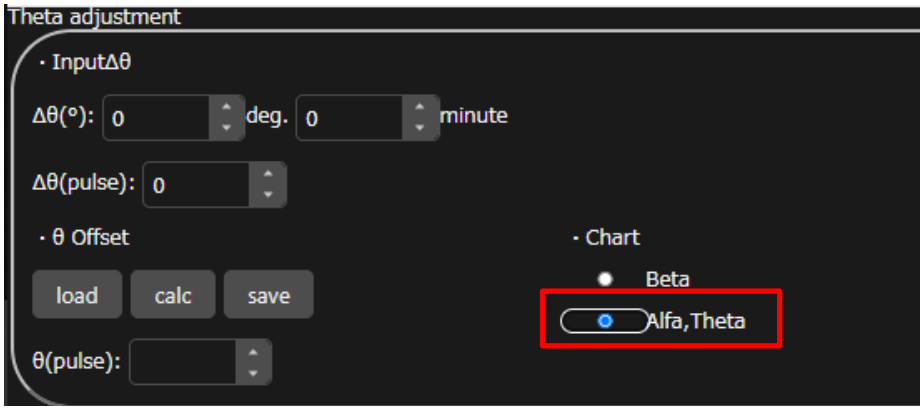


(17) Click [OK]

(18) Select [alpha, beta, theta, X, Y, Z adjustment] on "Tool software link" menu.



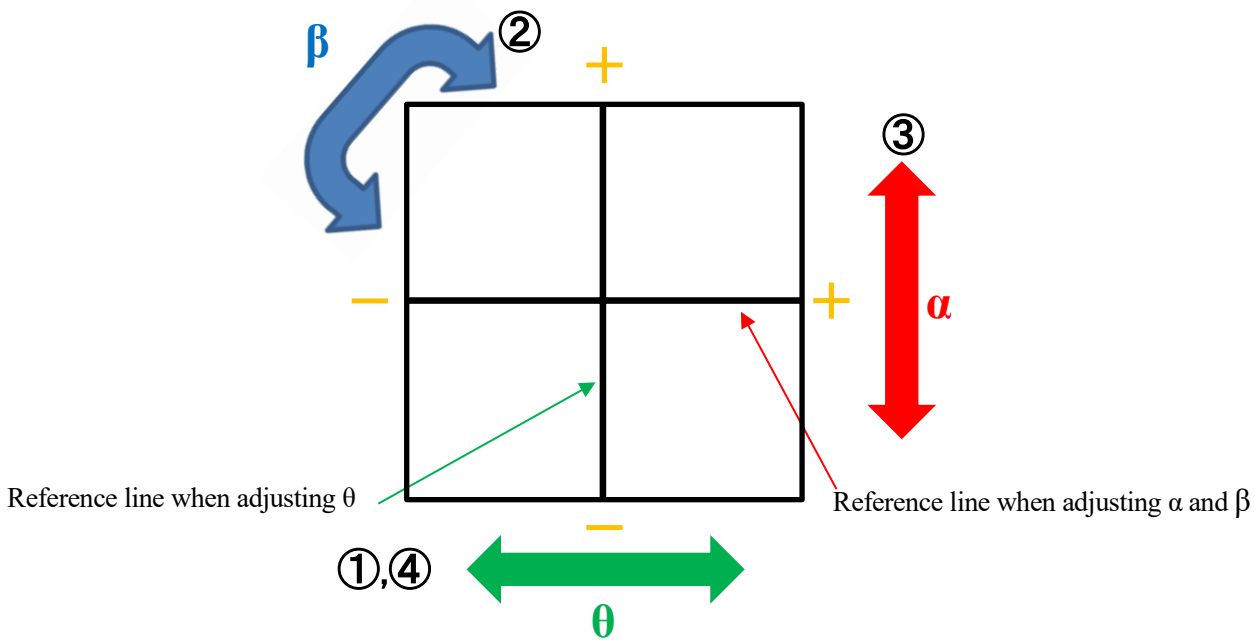
(19) Select "Alfa, Theta" of "Chart" to change the display to a cross hair chart.



(20) Confirm that a cross chart is displayed when looking through the measurement window.

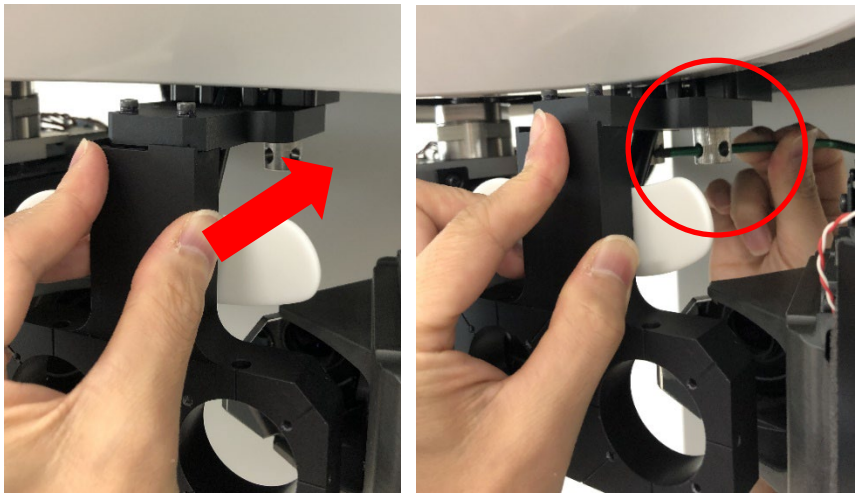
NOTE	• The horizontal line of the cross hair which is displayed in the center is the reference line of α adjustment, and the vertical line is the reference line of θ adjustment.

NOTE	• Please implement the adjustment in order of ①θ axis rough adjtment ②β axis adjtment③α axis adjtment then, ④θaxis adjustment. • Same as XYcoordinate, the directions of "＋" and "－" are as shown below.

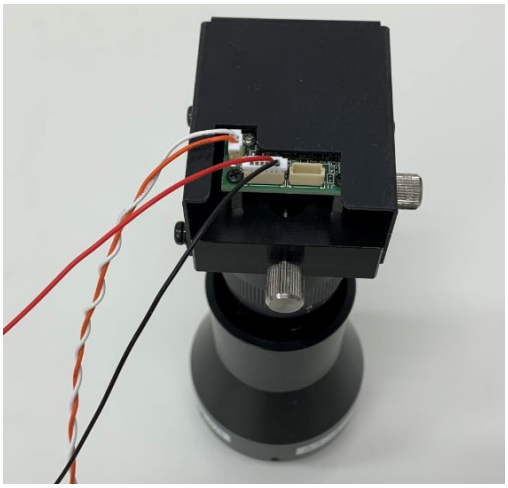


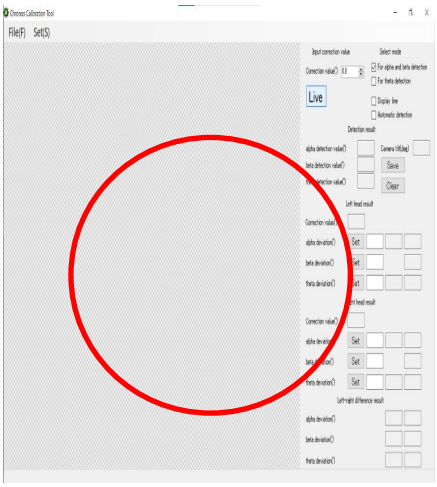
(21) Loosen the screw of the _BASE. Then insert the Test Eye all the way to attach it to the GADAI_BASE.

CAUTION	• Please insert it to all the way to the end and fasten the screw tightly. Otherwise, the error may occur in the adjustment value.

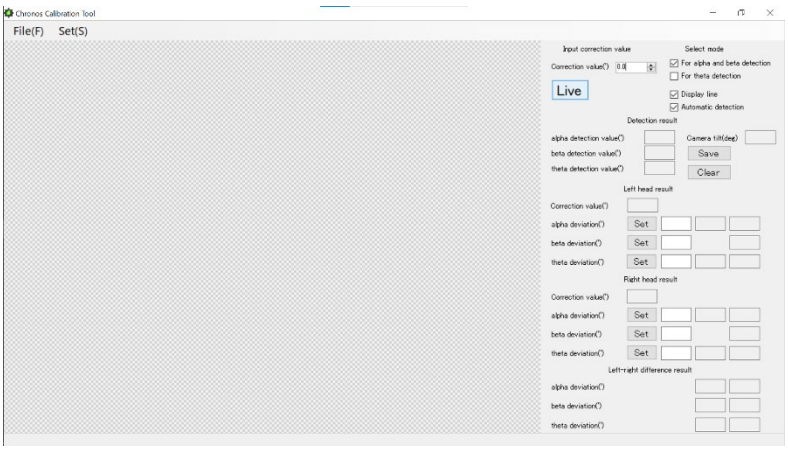


(22) Connect αβθ diopter telescope power cable and NTSC－USB convertor cable to the PC..

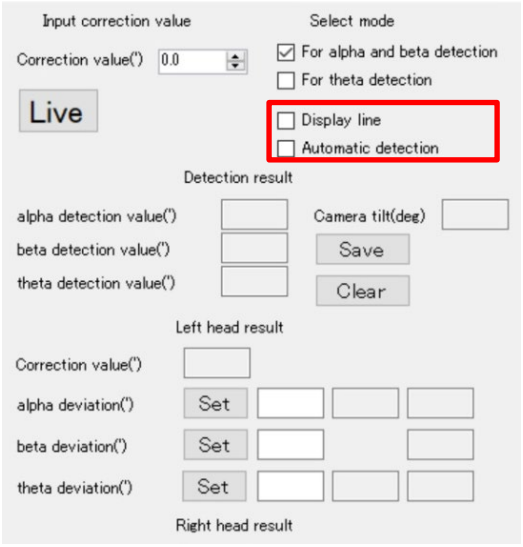




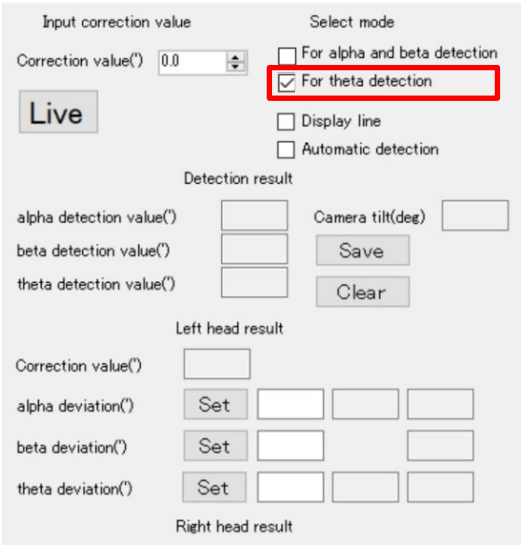
(23) Boot up by double-clicking［Calibration tool］.



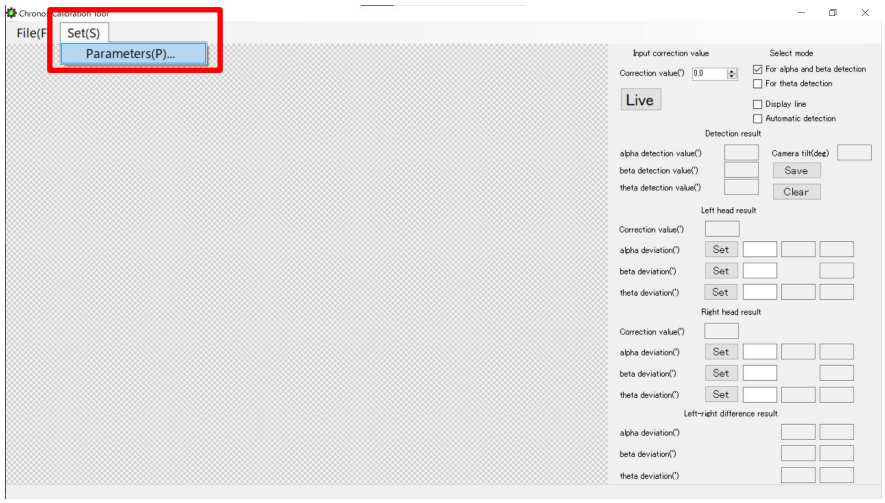
(24) Uncheck［Display line］and［Automatic detection］of Select mode.



(25) Check［For theta detection］on “Select mode”

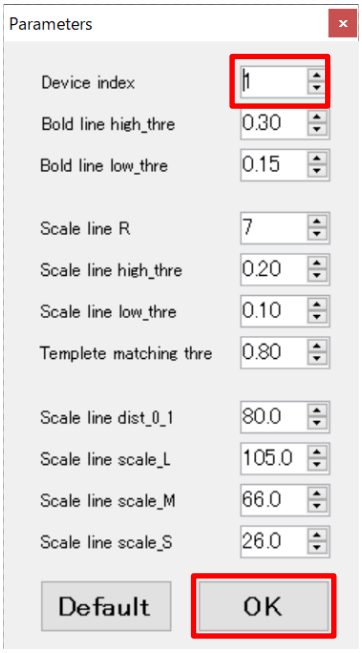


(26) Select［Parameters］in［Set］tab.

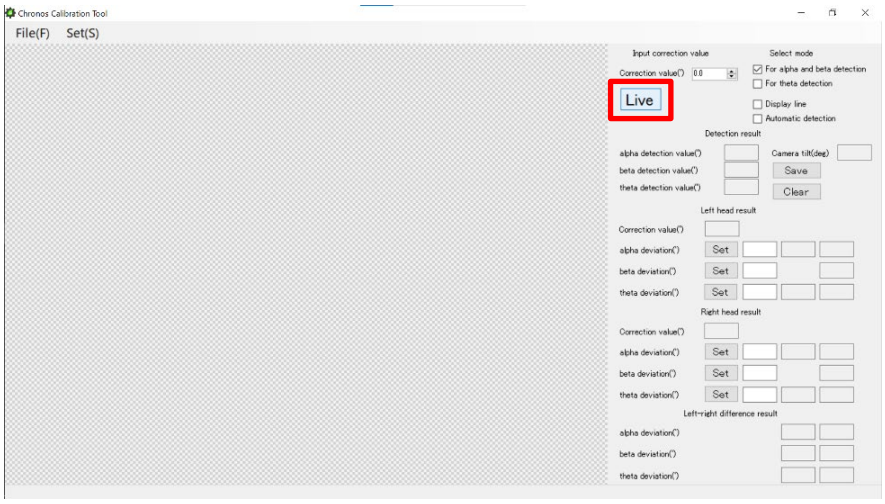


(27) Select the Device number that is assigned to αβθ diopter telescope camera. Then, click［OK］.

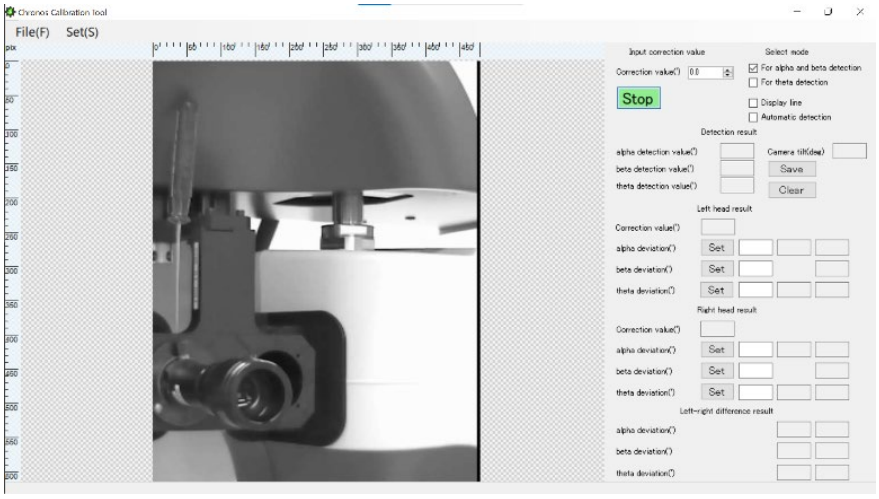
NOTE	• Device number differs depending on the PC specification.



(28) Click［Live］.



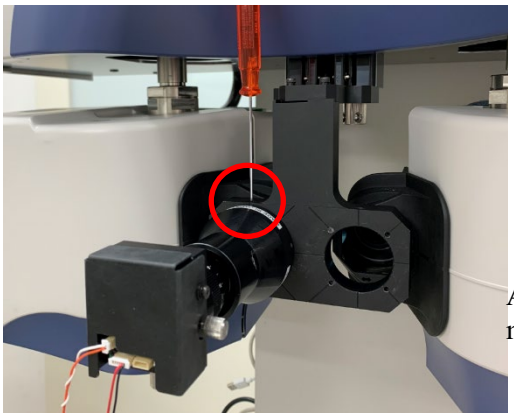
(29) Confirm that the movie captured by camera is displayed.

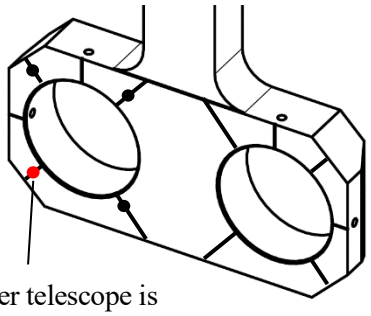


2.9.2 θ axis roughly adjustment

(1) Attach αβθ diopter telescope to Test eye holder. Then, fasten screws to fix.

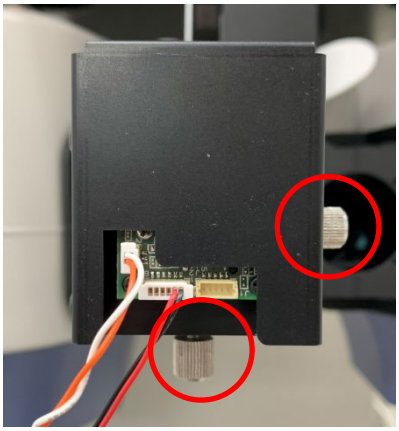
CAUTION	• If a pin is on the incorrect position, it may fail to measure accurately.

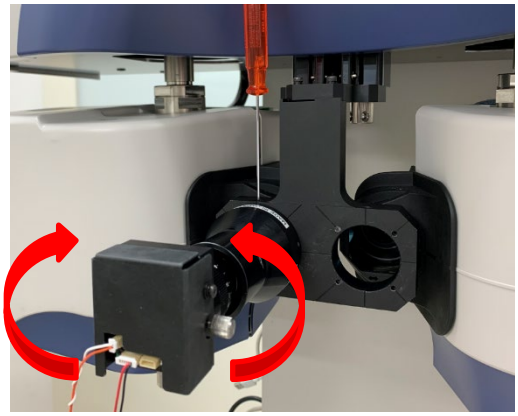




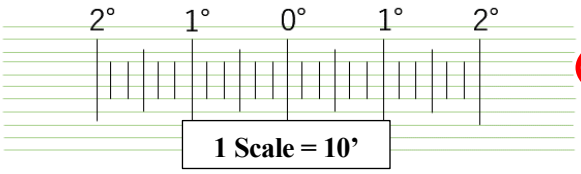
A pin of αβθ diopter telescope is marked as a red dot in the image.

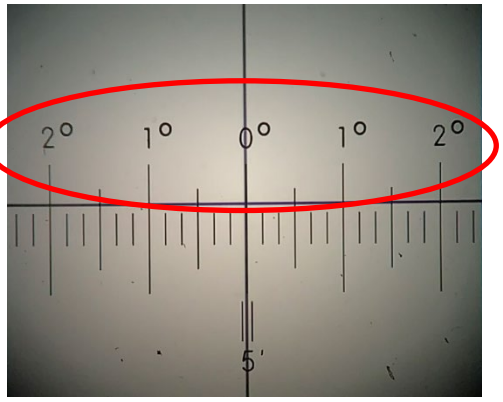
(2) Loosen two screws which fix the αβθ diopter telescope camera. Then, rotate it to set scale horizontally ("0°" on scale is shown on top).





αβθ diopter telescope

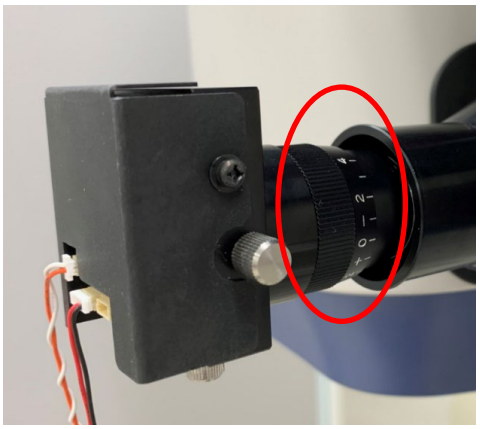


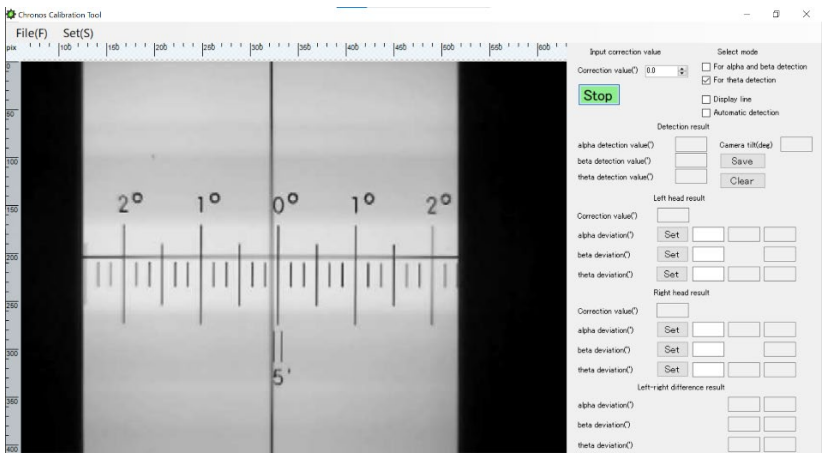


NOTE	• Adjust the camera so that Numbers of scale are on upward, even in case that the camera is not settled as the pictures above.

(3) Adjust the diopter until the scale of αβθ diopter telescope and chart are focused.

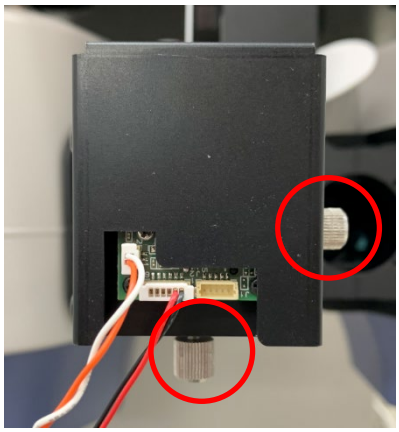
CAUTION	• If the scale and chart are out of focus, it cannot accurately measure.



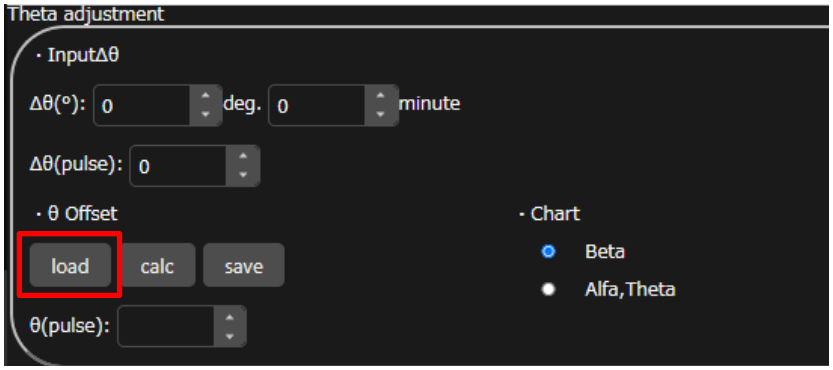


(4) Attach αβθ diopter telescope camera and fix it by two screws.

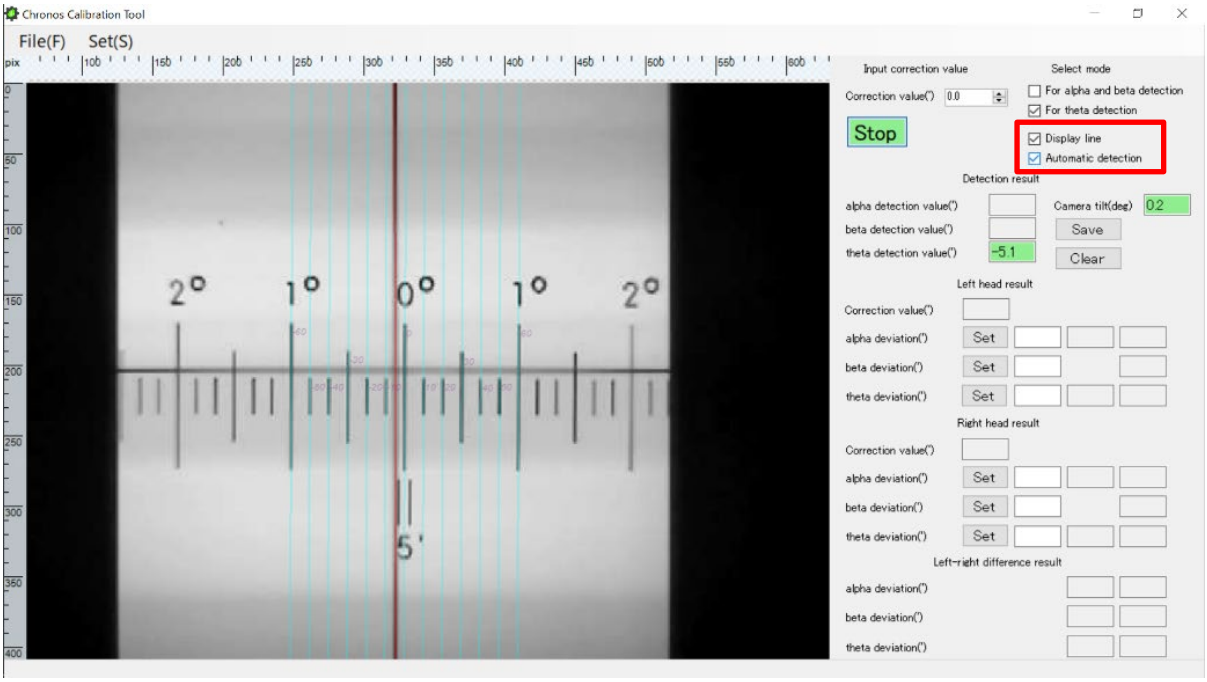
NOTE	• Please be sure that the connector is fixed downwards.



(5) Click [load], and shift θ axis to the initial position.

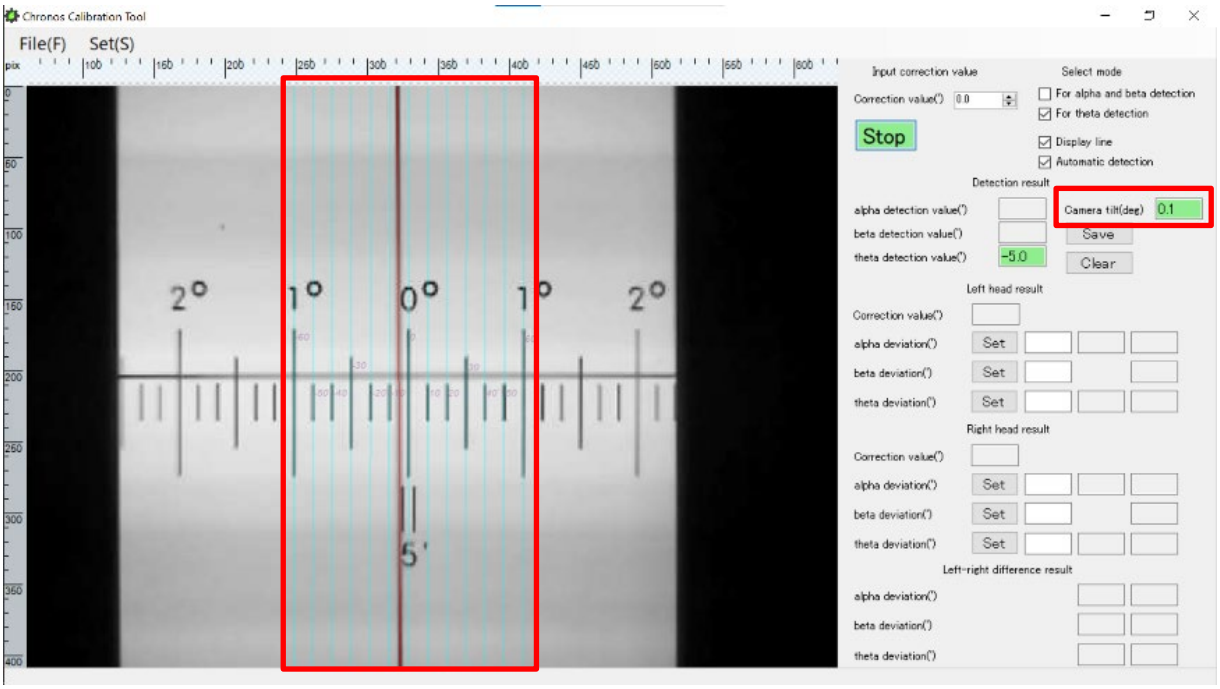


(6) Check［Display line］and［Automatic detection ］of Select mode.”

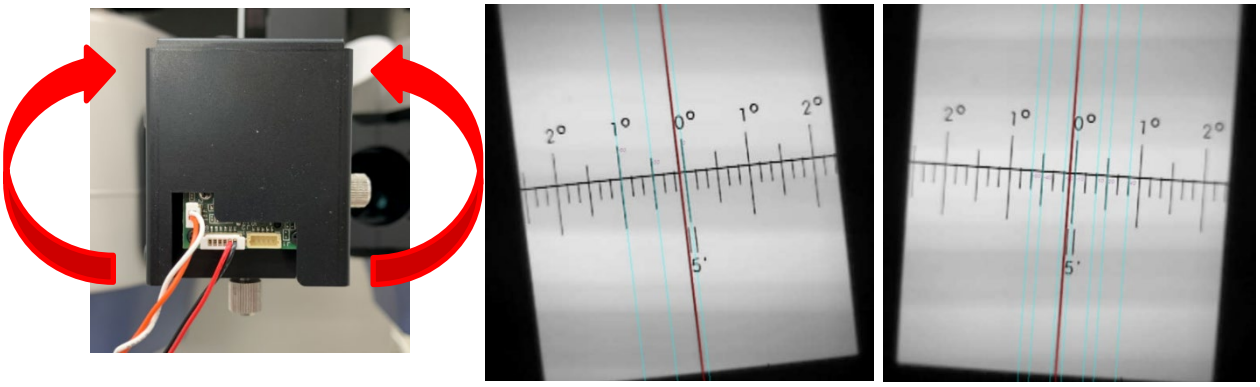


(7) Confirm that Camera tilt(deg) is ±1°and all 13 detect lines are displayed.

NOTE	• Text box will be highlighted in green when Camera tilt is within ±1°. • Please be sure that all 13 detect lines are displayed between -1 and 1°on the scale. Otherwise, it cannot accurately measure.



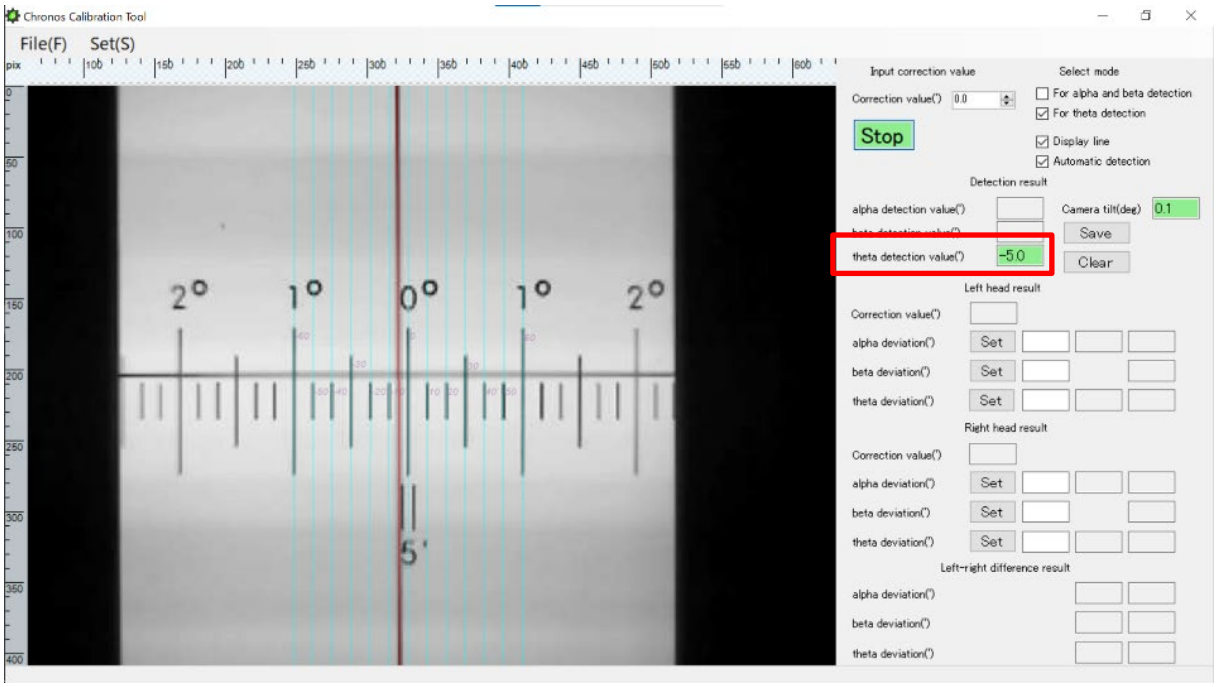
NOTE	• Diopter may rotate when ratating camera, but there is no problem if it rotates a little .



Bad example

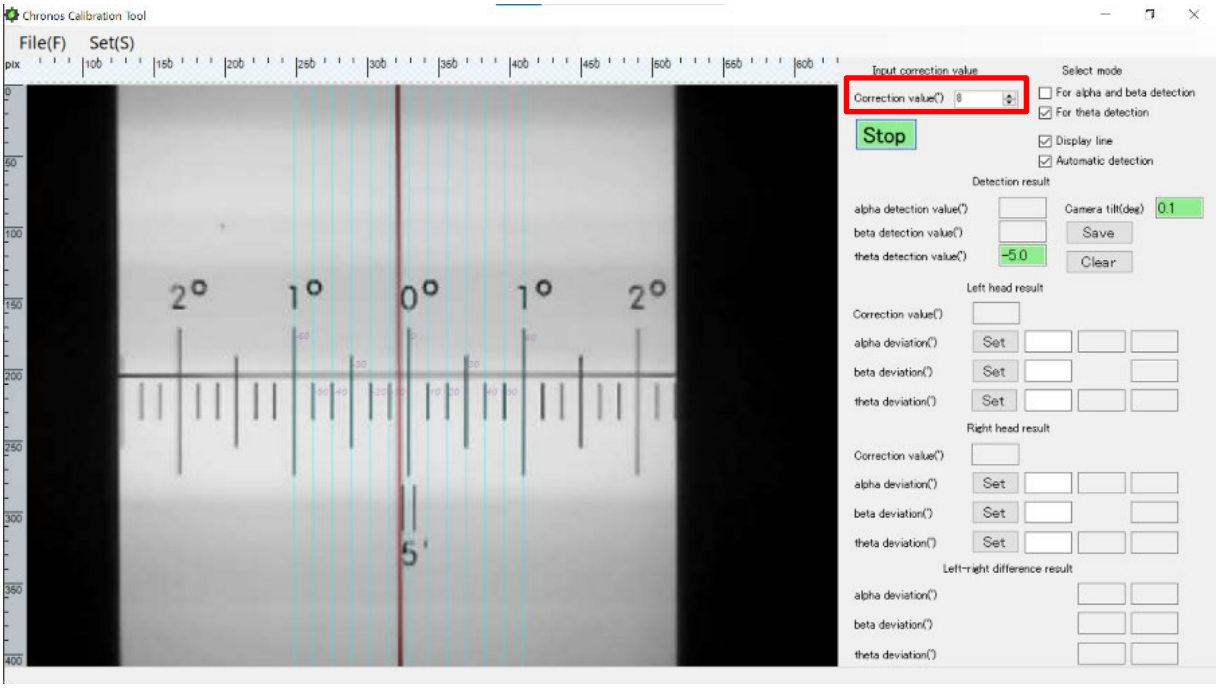
(8) Confirm that the value is displayed in “theta detection value”.

NOTE	• Text box will be highlighted in green when it comes within ±30’.

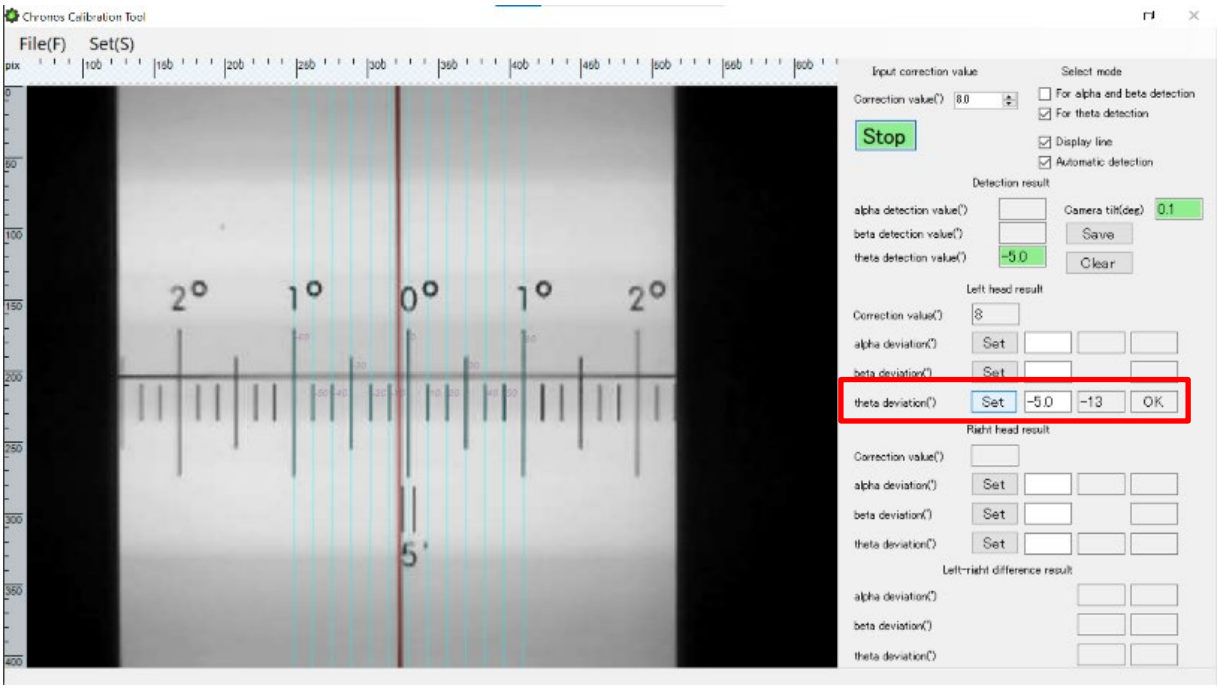


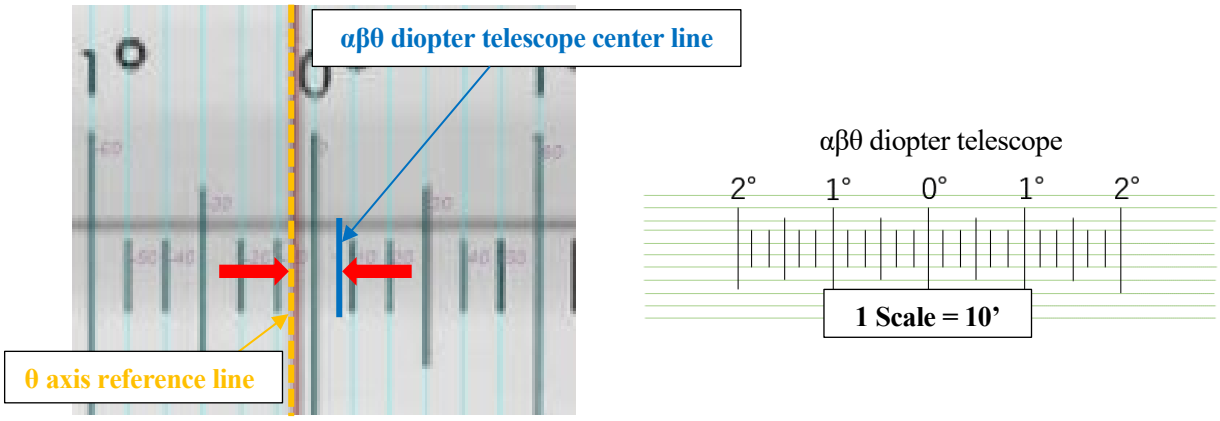
(9) Enter the correction value of αβθ diopter telescope of “Correction Value”.

NOTE	• It means the numetic value mentionend on sticker placed on the side of αβθ diopter telescope. (Center of scale)



(10) Click［Set］of［theta deviation］on OPT HEAD (L/R) with αβθ diopter telescope set. Deviation amount considering the correction value will be displayed and it judges “OK” or “NG”.





Example as above: Deviation amount is -13' which is within the standard as the θ axis reference line of the chart is -5' against the αβθ diopter telescope center line(8').
Deviation amount = (θ axis reference line value) － (diopter telescope center line)

(11) Confirm that the value is within the standard below.

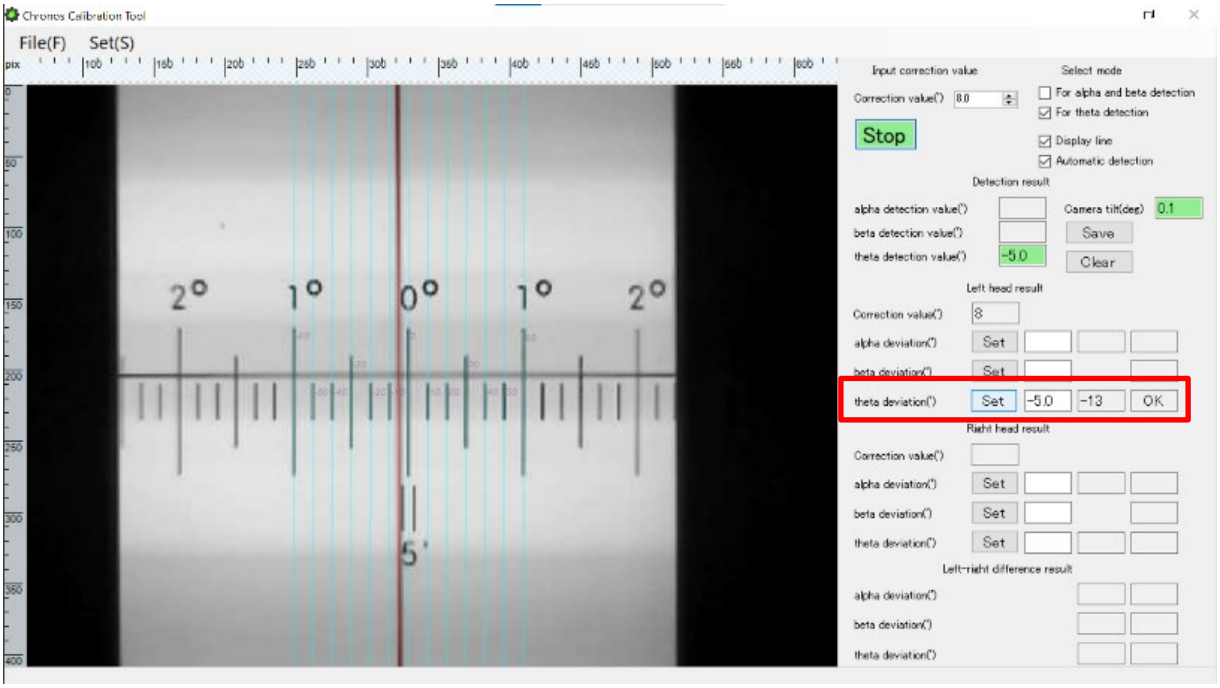
Standard

Item	Standard value	Remarks
θ axis	±30'	The θ difference between the left and right OPT_HEAD is within 10'

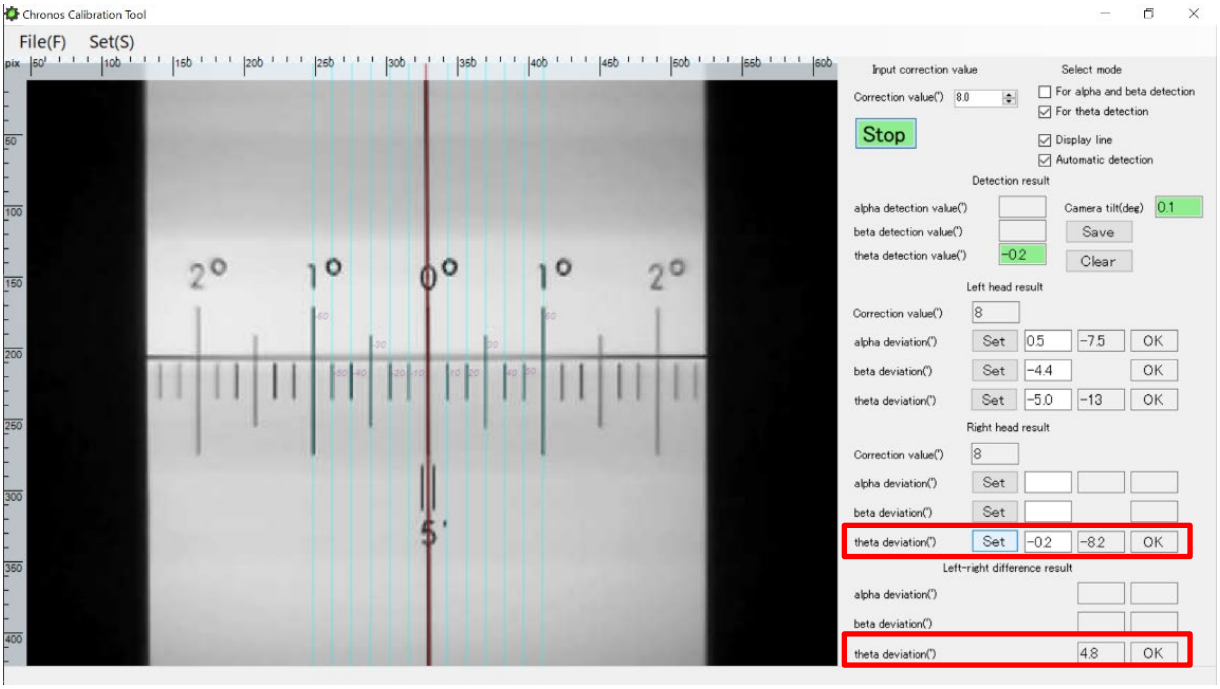
(12) In case that it judged "NG", enter the movement quantity into "deg" and "minute" of "・Input△θ". Then, click［calc］→［Save］in order.

NOTE	• Please enter a mark in "deg". • Mark always needs to be entered even though only "minute" was entered.

(13) Adjust θ axis reference line within the standard. Then , click［Set］of “theta deviation” . Please make sure that the Deviation amount is within the standard and “OK” is displayed.



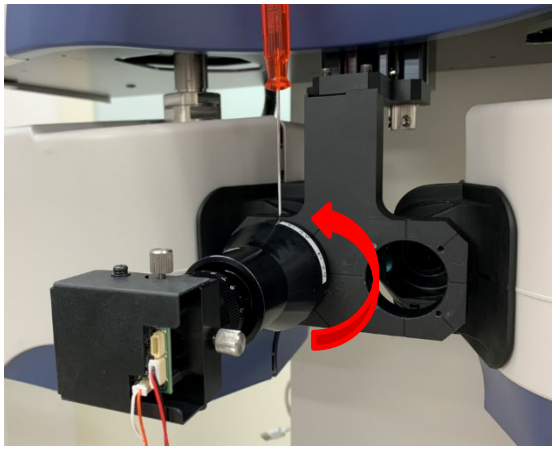
(14) Please do the same for the opposite OPT_HEAD. Confirm the gap between L/R Head.

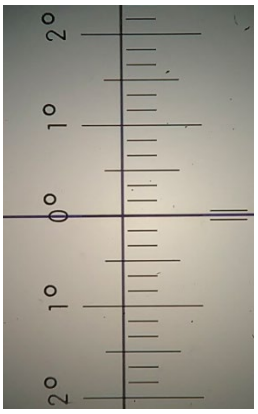


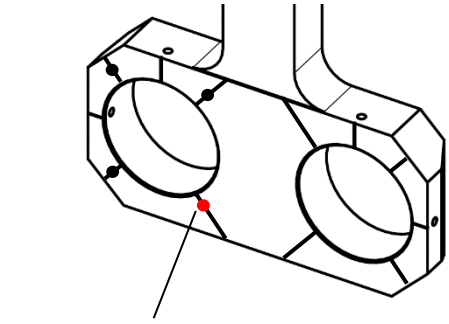
2.9.3 β axis adjustment

(1) As shown below, rotate the αβθ diopter telescope for 90 degrees. Make sure the scale is set vertically.

CAUTION	• When rotating the αβθ diopter telescope, rotate the attachment part so as not to put a load on the gluing point.

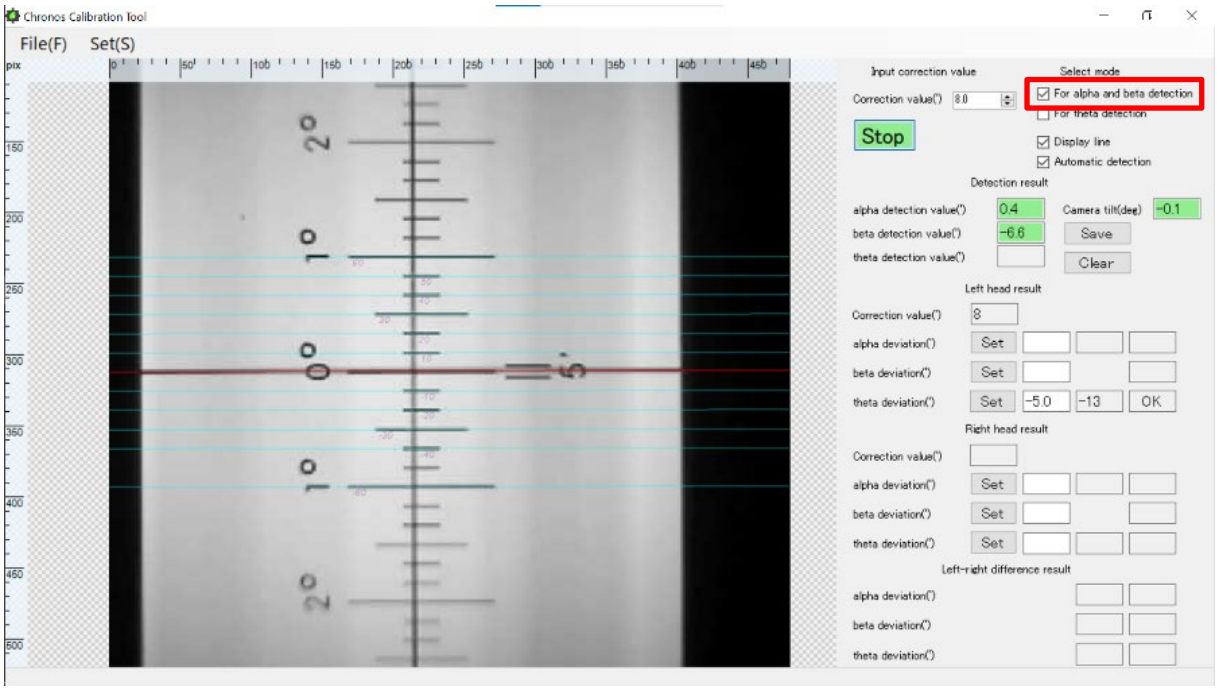






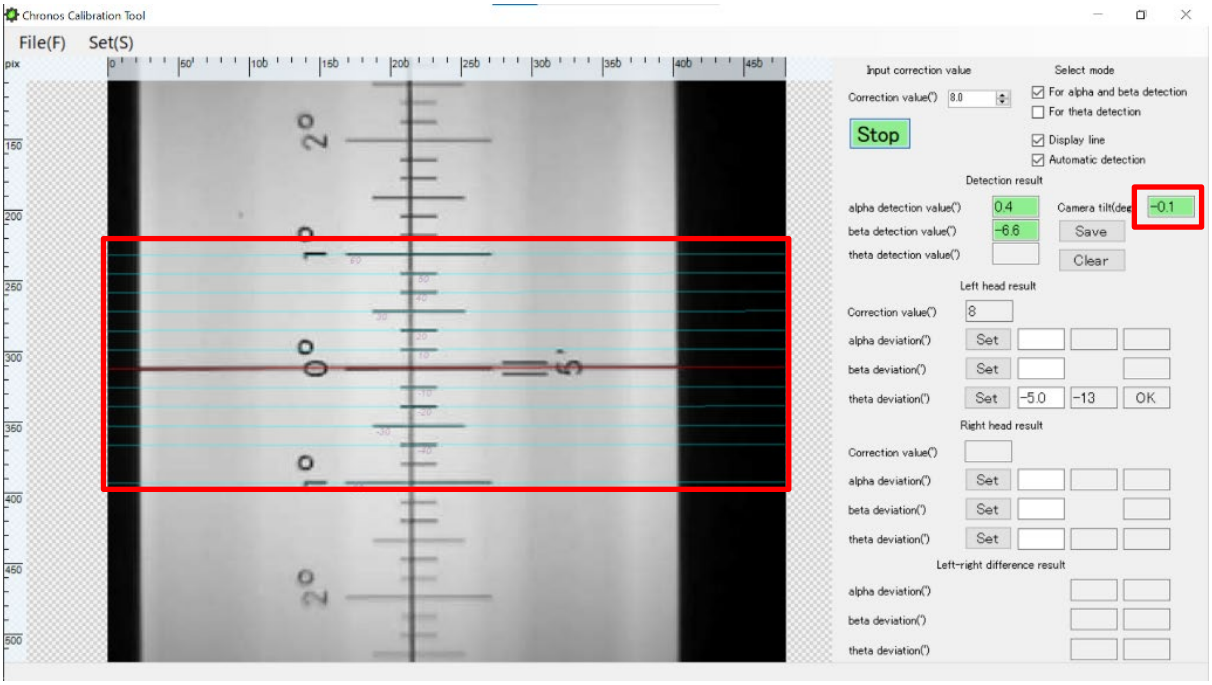
A pin of αβθ diopter telescope is marked as a red dot in the image.

(2) Check［For alpha beta detection］of "Select mode".

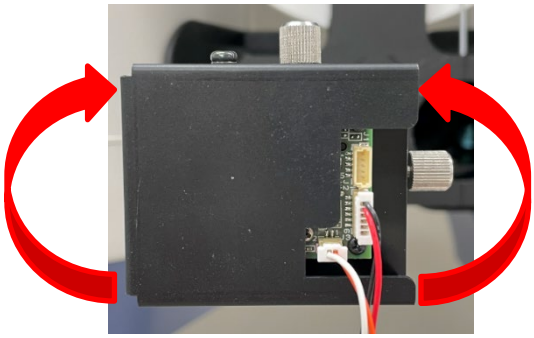


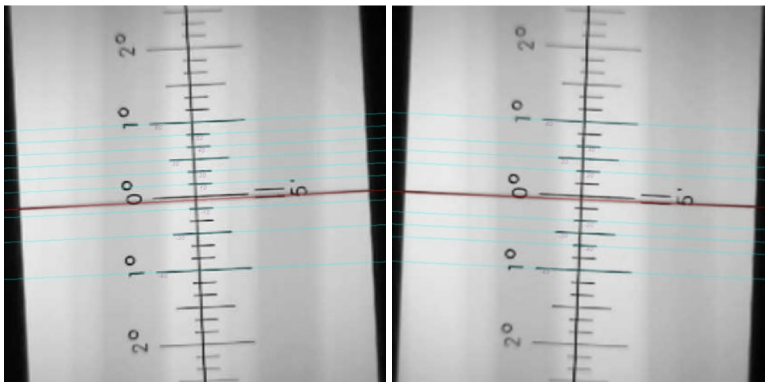
(3) Confirm that Camera tilt(deg) is ±1°and all 13 detect lines are displayed.

NOTE	• Text box will be highlighted in green when Camera tilt is within ±1°. • Please be sure that all 13 detect lines are displayed between -1 and 1°on the scale. Otherwise, it cannot accurately measure.



NOTE	• Diopter may rotate when ratating camera, but there is no problem if it rotates a little.

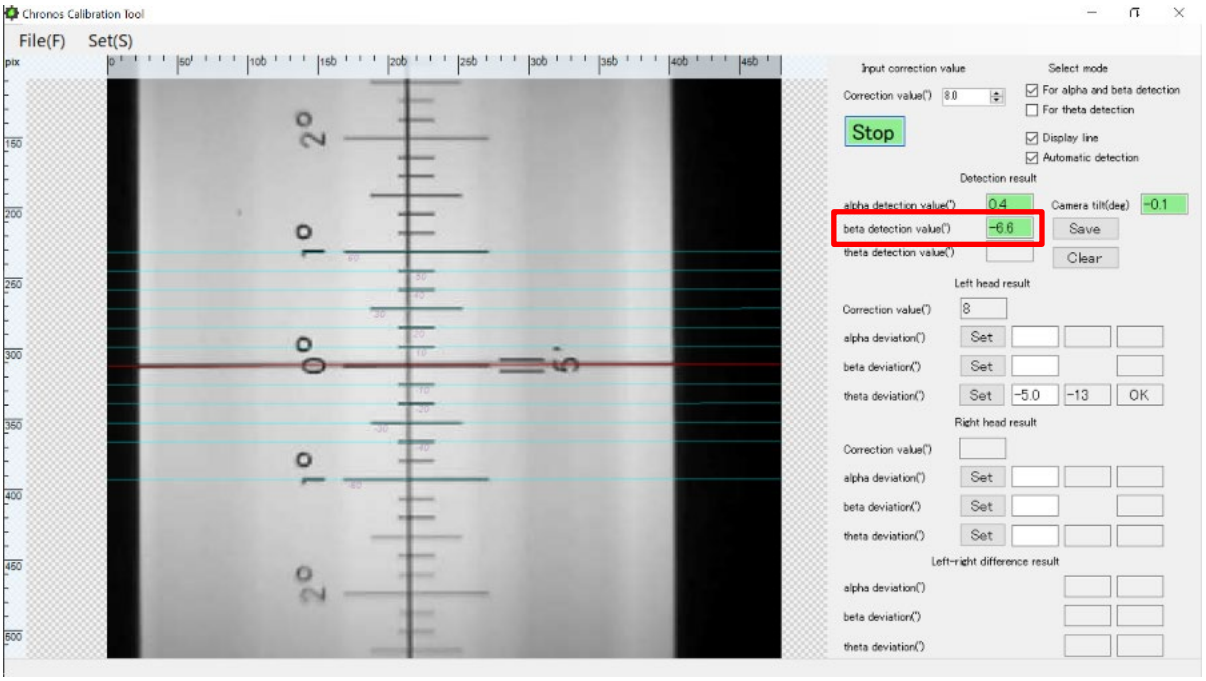




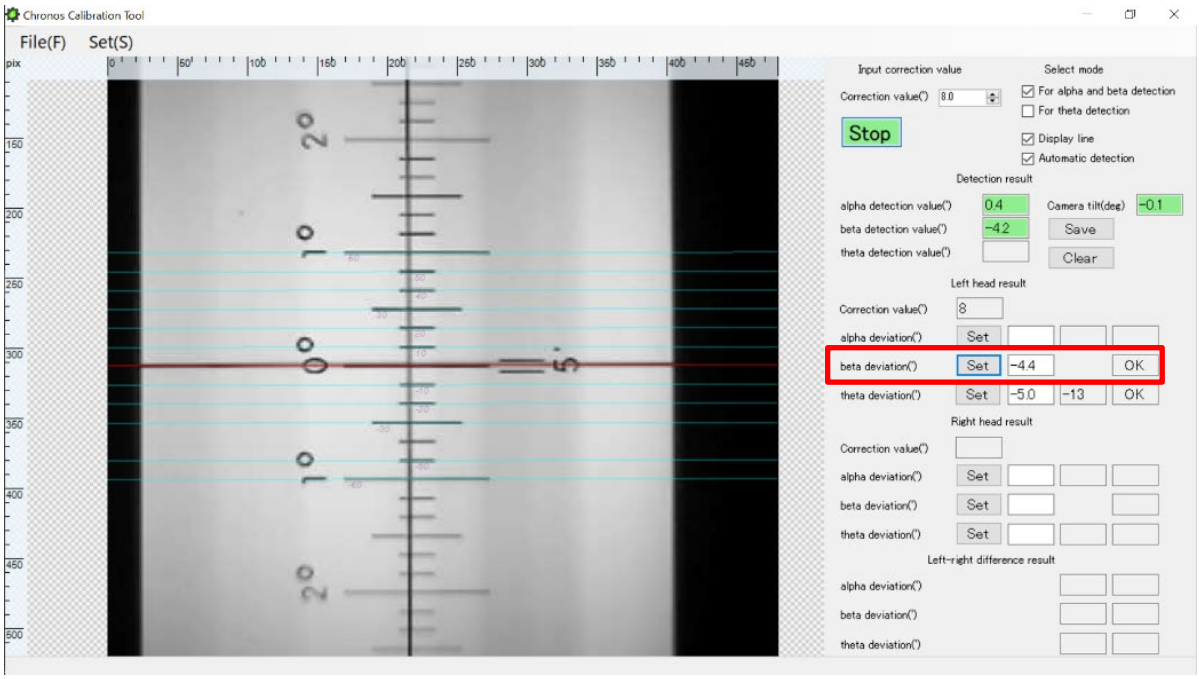
Bad example

(4) Confirm that the value is displayed in the box of "beta detection value".

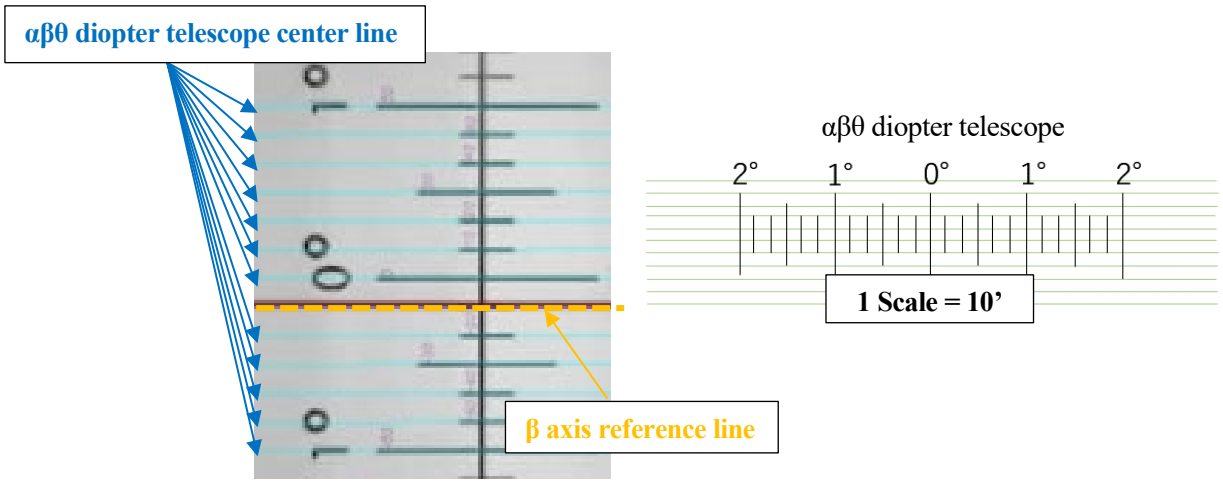
NOTE	• Text box will be highlighted in green when it comes within ±30'.



(5) Click［Set］on "beta deviation" on OPT HEAD (L/R) with αβθ diopter telescope set. Deviation amount considering the correction value will be displayed and it judges "OK" or "NG".



NOTE	• It detects an inclining degree of β axis reference line against the scale of αβθ diopter telescope.



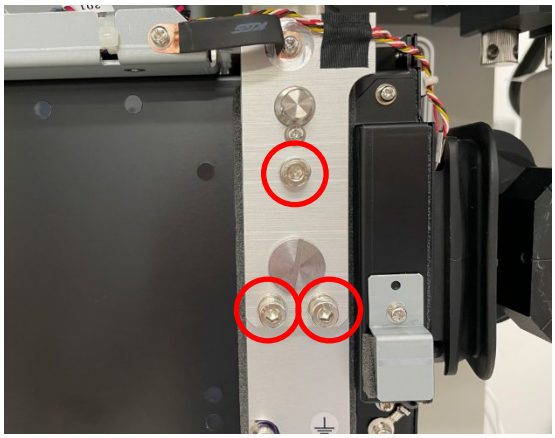
(6) Confirm that the value is within the standard.

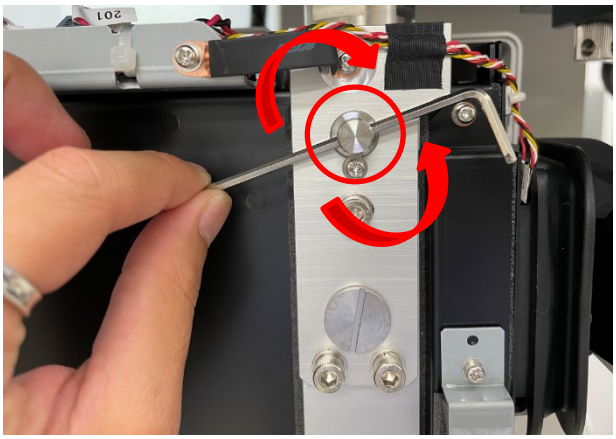
Standard

Item	Standard value	Remark
β axis	±30'	The β difference between the left and right OPT_HEAD is within 30'

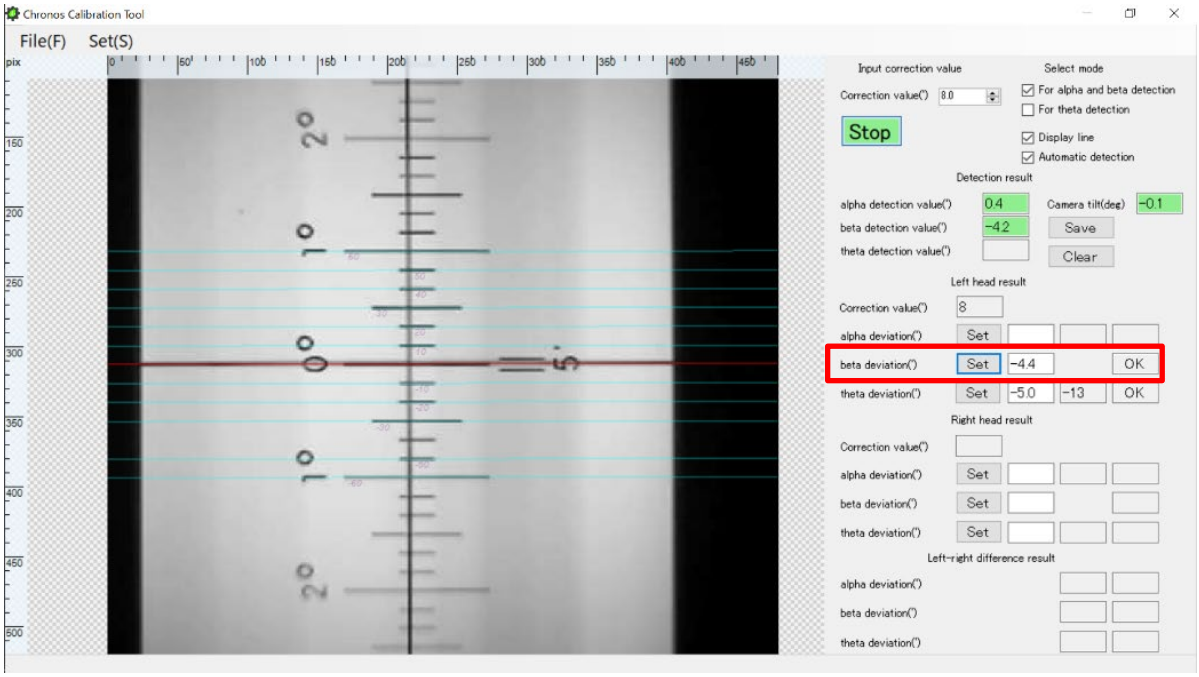
(7) In case it judged "NG", please loosen three Hexagon screws as shown in the below picture and put Hex wrench or so through the hole. Then, rotate it to lean the OPT_HEAD.

NOTE	• When fastening tempolary, fasten the upper of the 3 hex screws only.

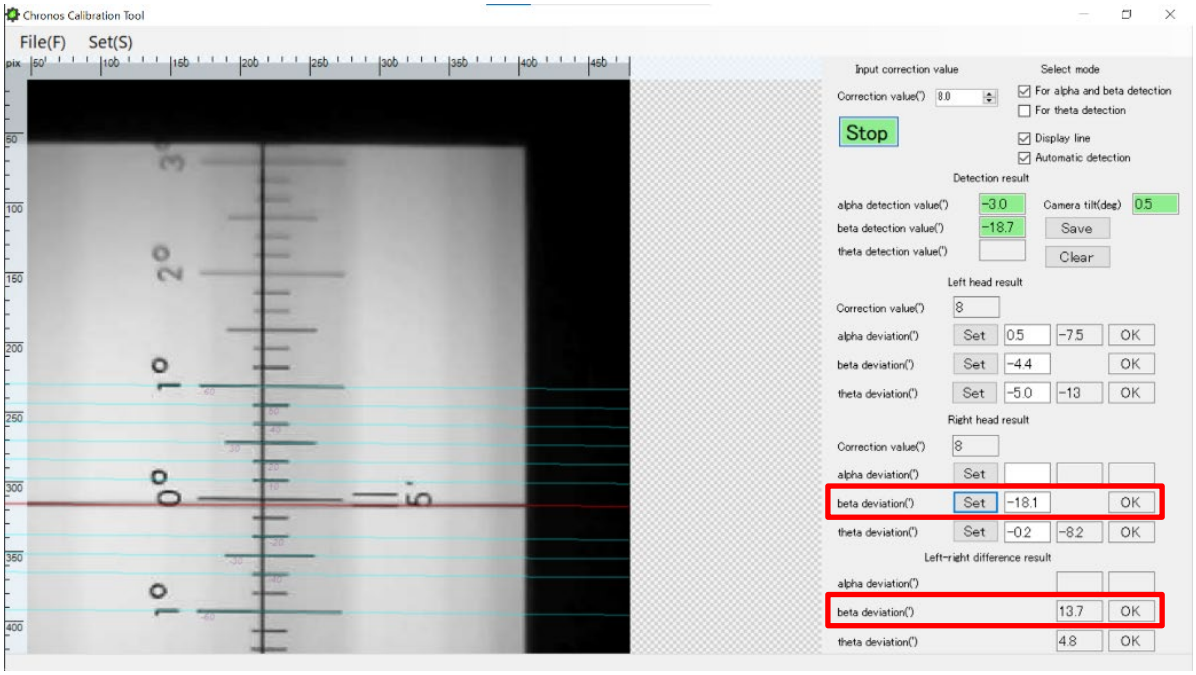




(8) Adjust it within the standard. Then, click [Set] of “beta deviation”. Confirm that the deviation amount is within the standard and “OK” is displayed.



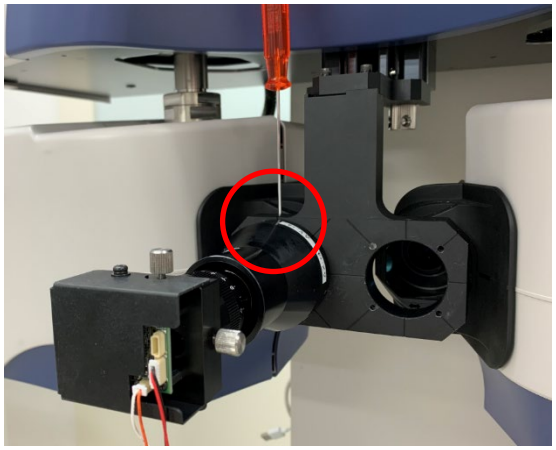
(9) Please do the same for the opposite OPT_HEAD. Confirm the gap between L/R Head.

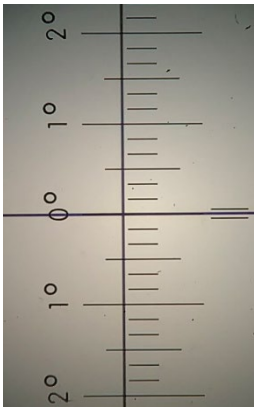


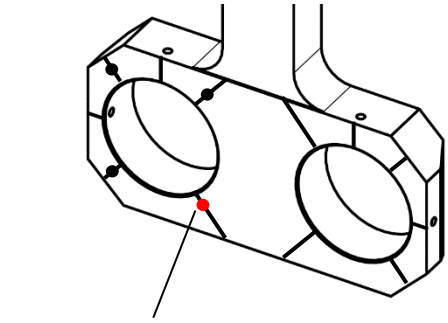
2.9.4 α axis adjustment

(1) As shown below, rotate the αβθ diopter telescope until the scale is set vertically.

CAUTION	• When rotating the αβθ diopter telescope, rotate the attachment part so as not to put a load on the gluing point.

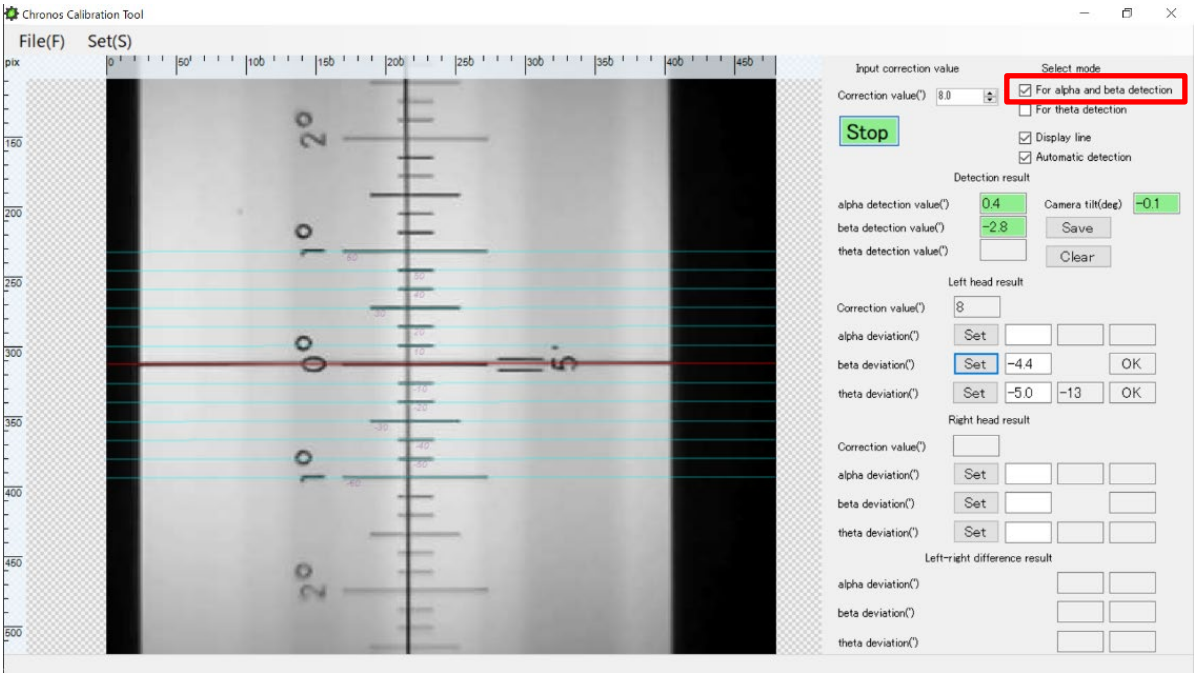






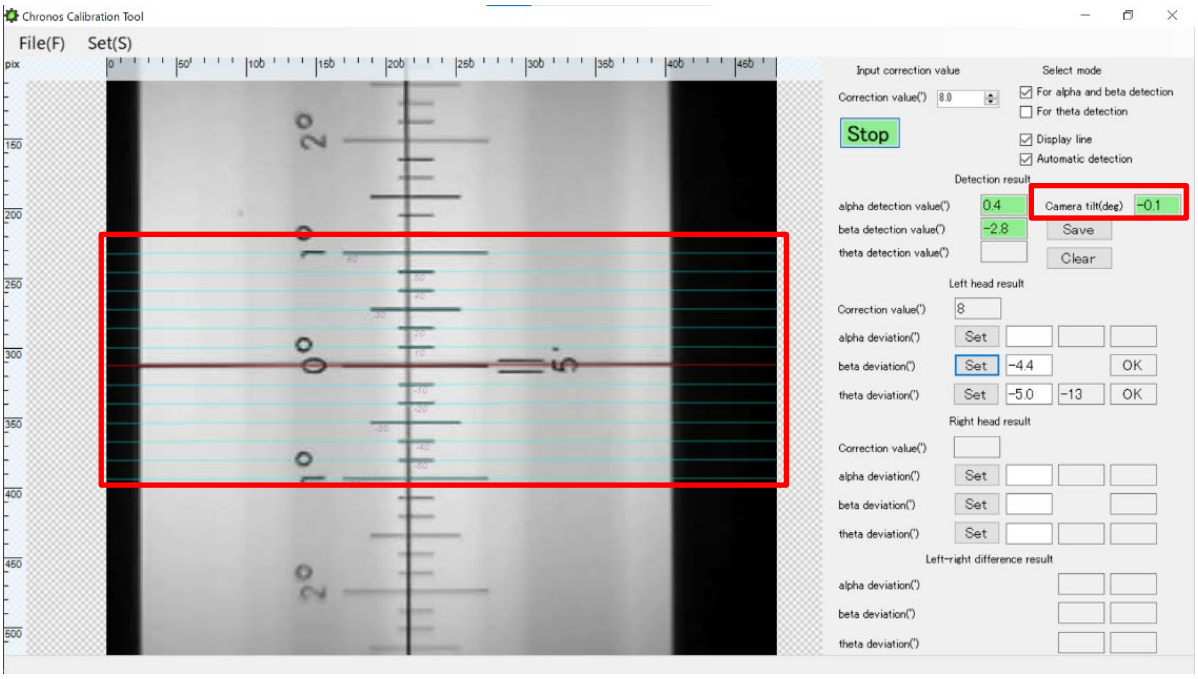
A pin of αβθ diopter telescope is marked as a red dot in the image.

(2) Check［For alpha beta detection］of "Select mode".

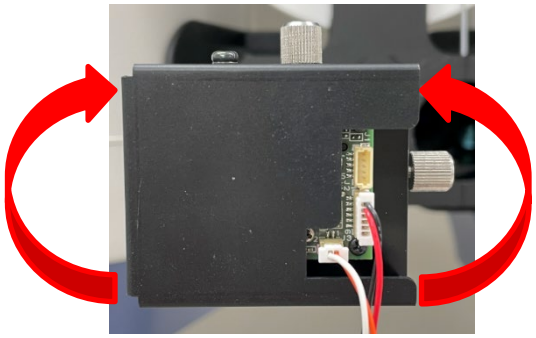


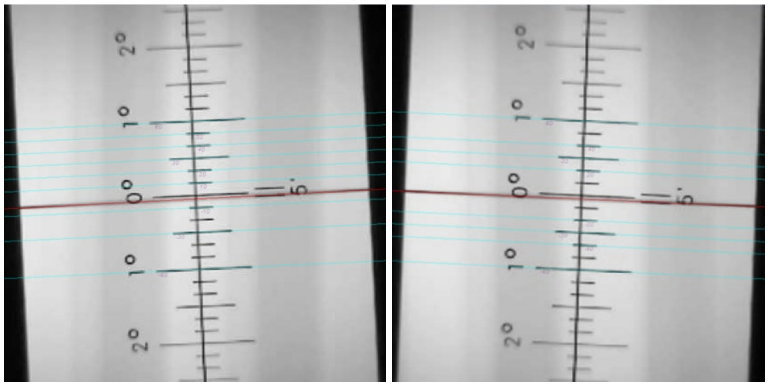
(3) Confirm that Camera tilt(deg) is ±1°and all 13 detect lines are displayed.

NOTE	• Text box will be highlighted in green when Camera tilt is within ±1°. • Please be sure that all 13 detect lines are displayed between -1 and 1°on the scale. Otherwise, it cannot accurately measure.



NOTE	• Diopter may rotate when ratating camera, but there is no problem if it rotates a little.

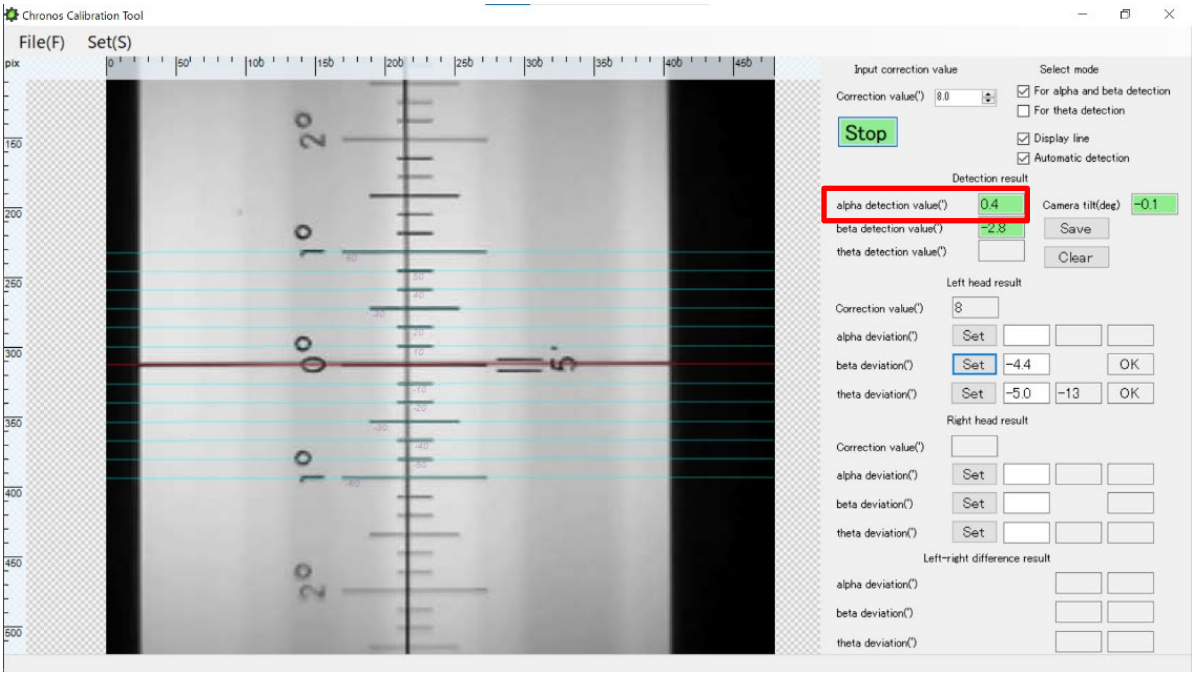




Bad example

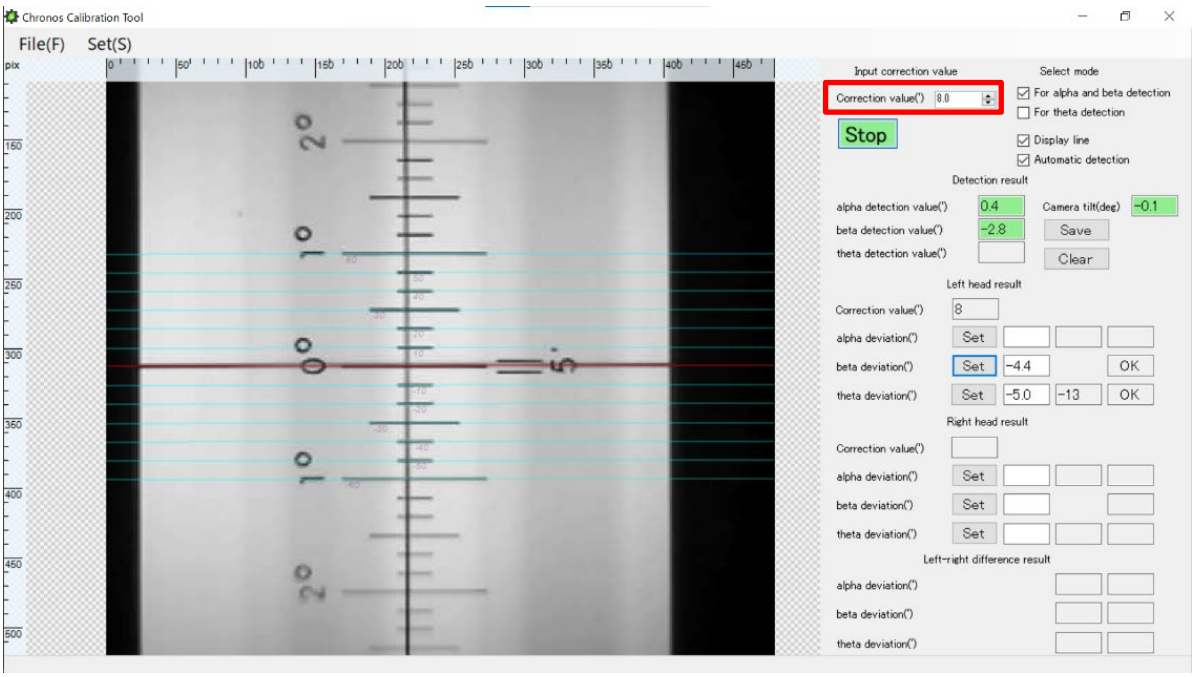
(4) Confirm that the value is displayed in the box of “alpha detection value”.

NOTE	• Text box will be highlighted in green when it comes within ±30’.

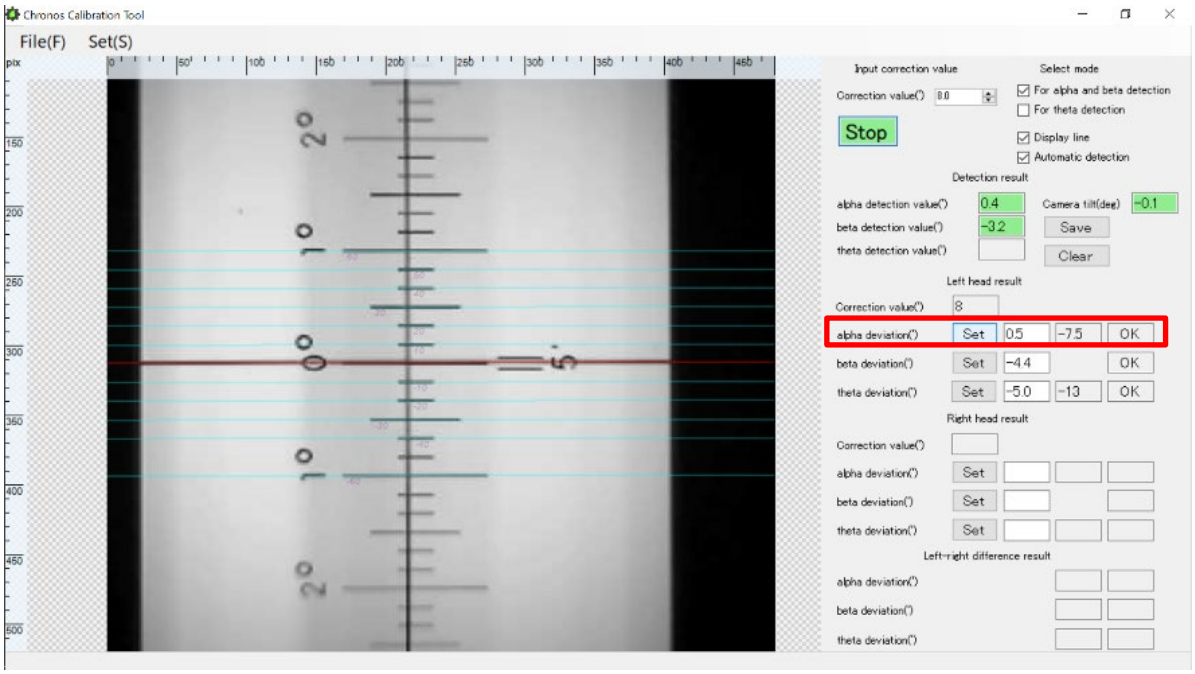


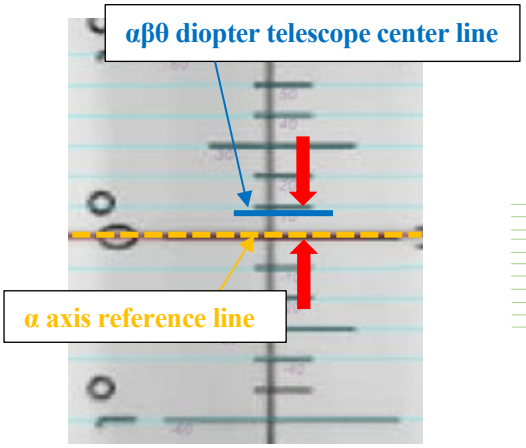
(5) Enter the correction value of αβθ diopter telescope in “Correction Value”.

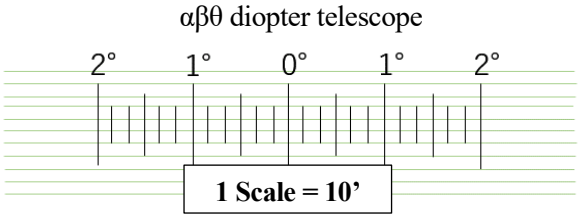
NOTE	• It means the numetic value mentionend on the sticker on the side of an αβθ diopter telescope. (Center of scale)



(6) Click［Set］of "alpha deviation" on OPT HEAD (L/R) with αβθ diopter telescope set. Deviation amount considering the correction value will be displayed and it judges "OK" or "NG".







Example as above: Deviation amount is -7.5'which is within the standard as the α axis reference line of the chart is at the position of 0.5' against the αβθ diopter telescope center line(8').
Deviation amount = (α axis reference line value) － (diopter telescope center line)

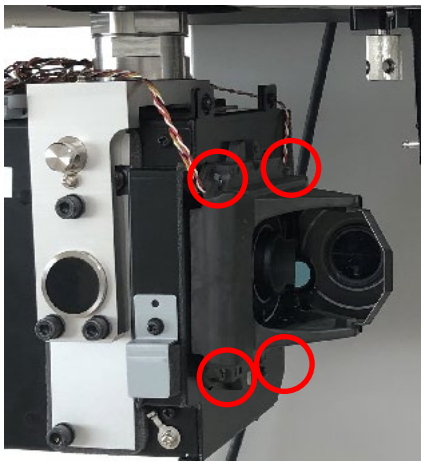
(7) Confirm that the value is within the standard below.

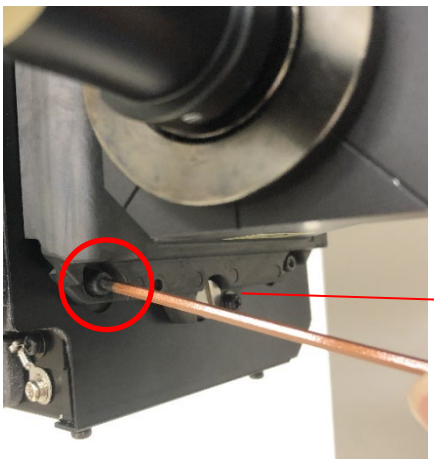
Standard

Item	Standard value	Remark
α axis	±30'	The α difference between the left and right OPT_HEAD is within 10'

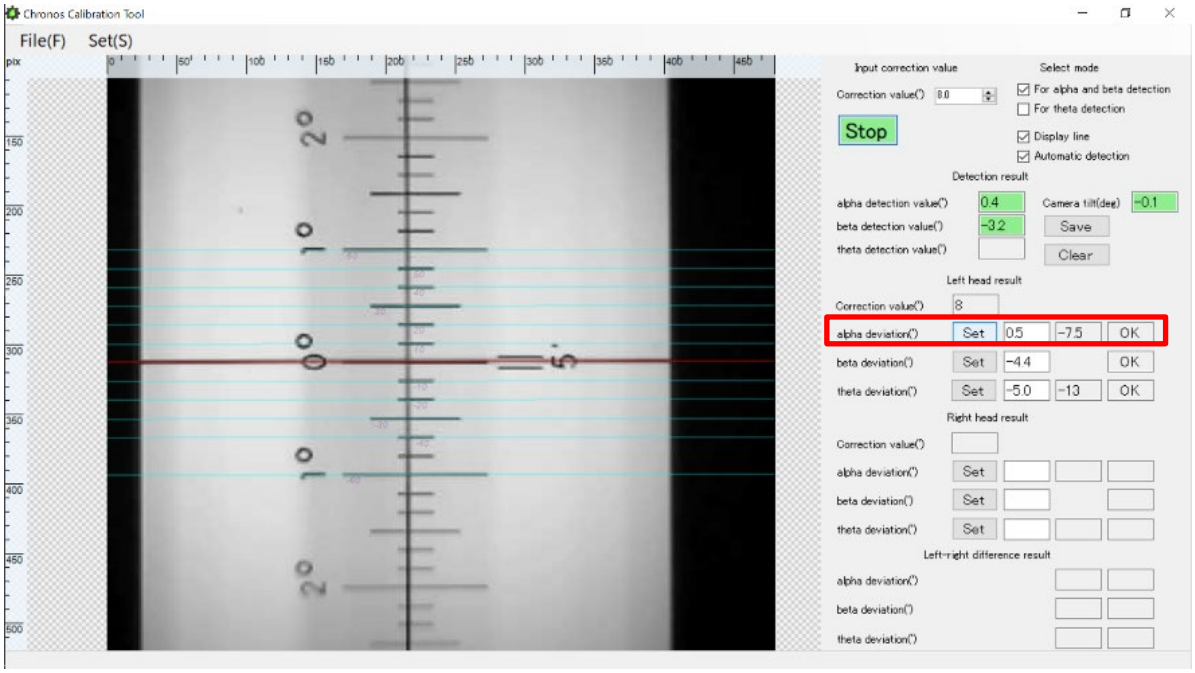
(8) In case it judged “NG”, adjust it as shown below.

NOTE	• Loosen 4 screws as shown below image, chart will move up and down by turning the eccentric pin left and right.

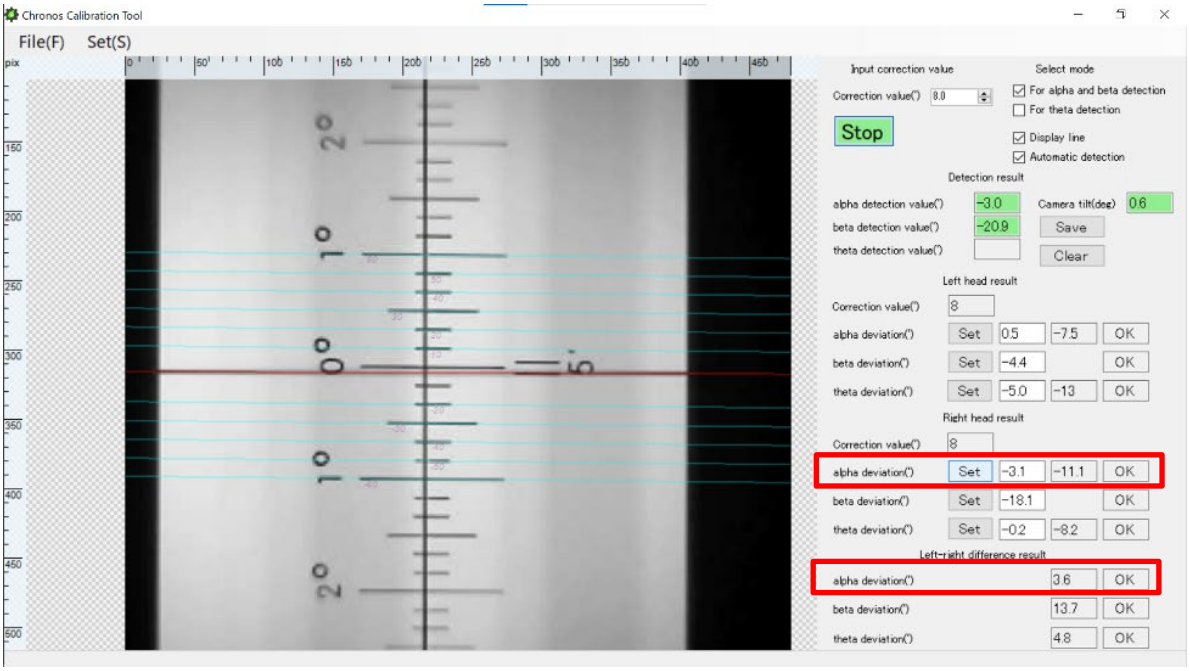




(9) Move the chart within the standard. Then, click [Set] of “alpha deviation”. Confirm the deviation amount is within the standard and “OK” is displayed.

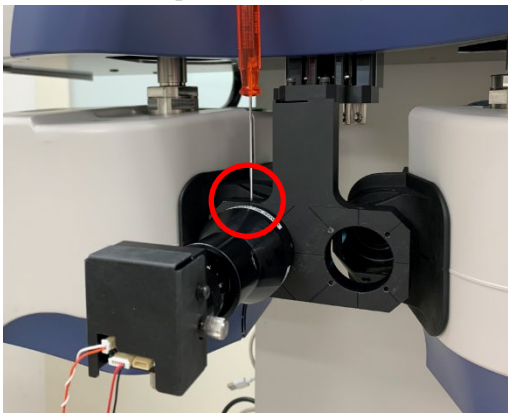


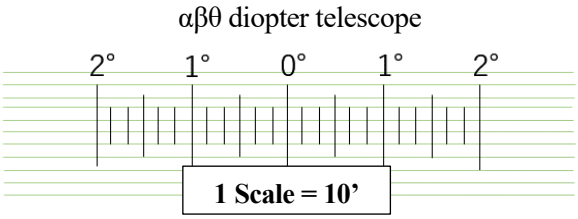
(10) Please do the same for the opposite OPT HEAD. Confirm the gap between L/R head.

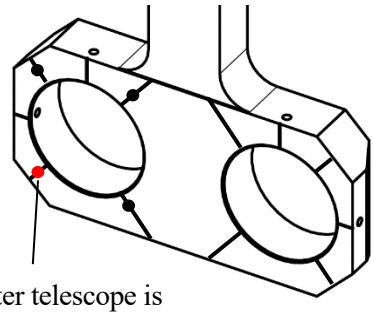


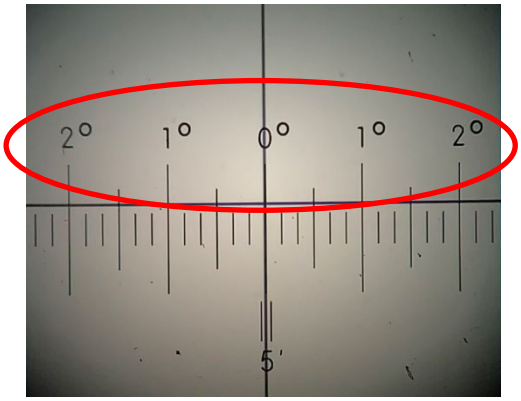
2.9.5 θ axis adjustment

(1) As shown below, rotate the αβθ diopter telescope for 90 degrees to set the scale vertically ("0°" is shown on top). Then, fix it by screws.



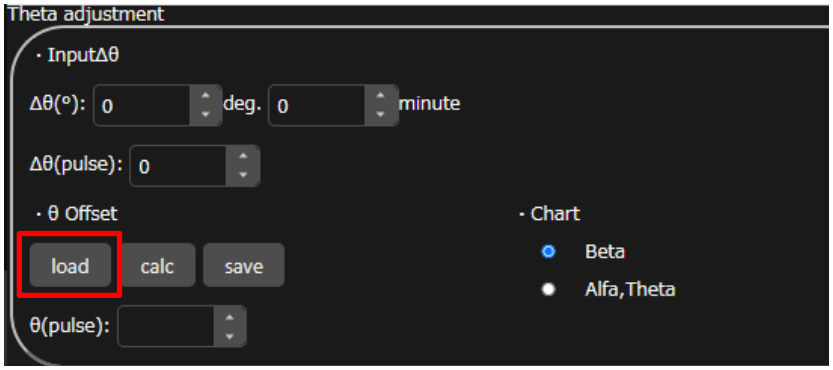




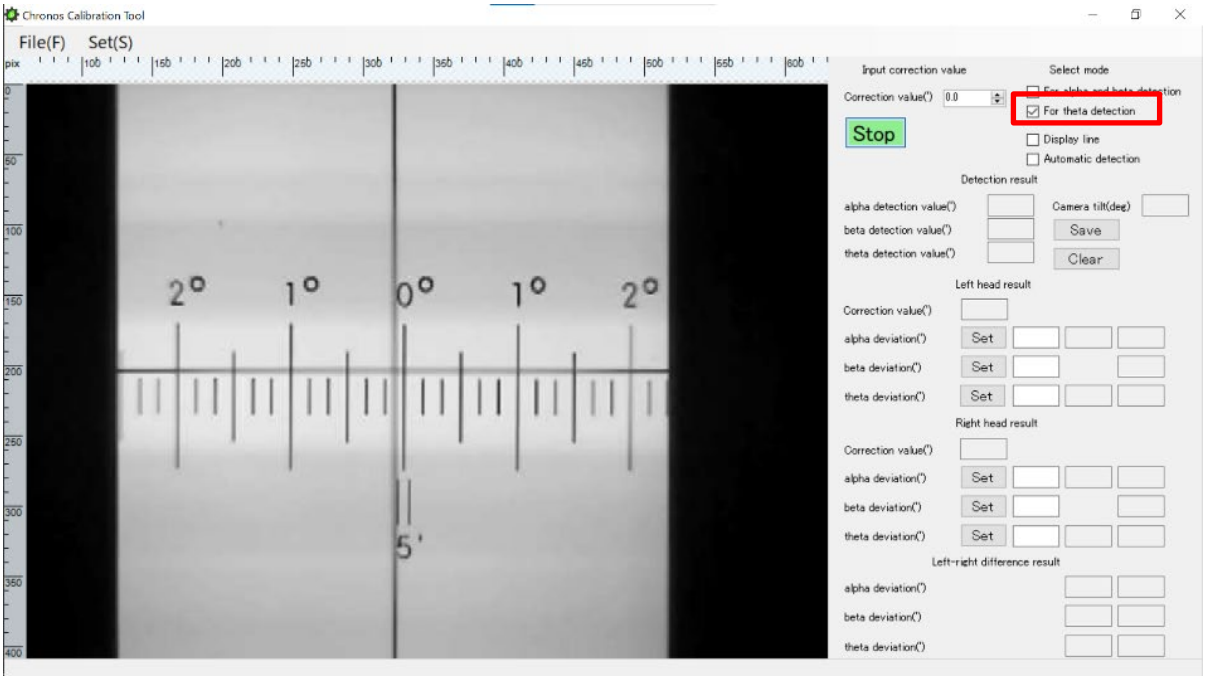


A pin of αβθ diopter telescope is marked as a red dot in the image.

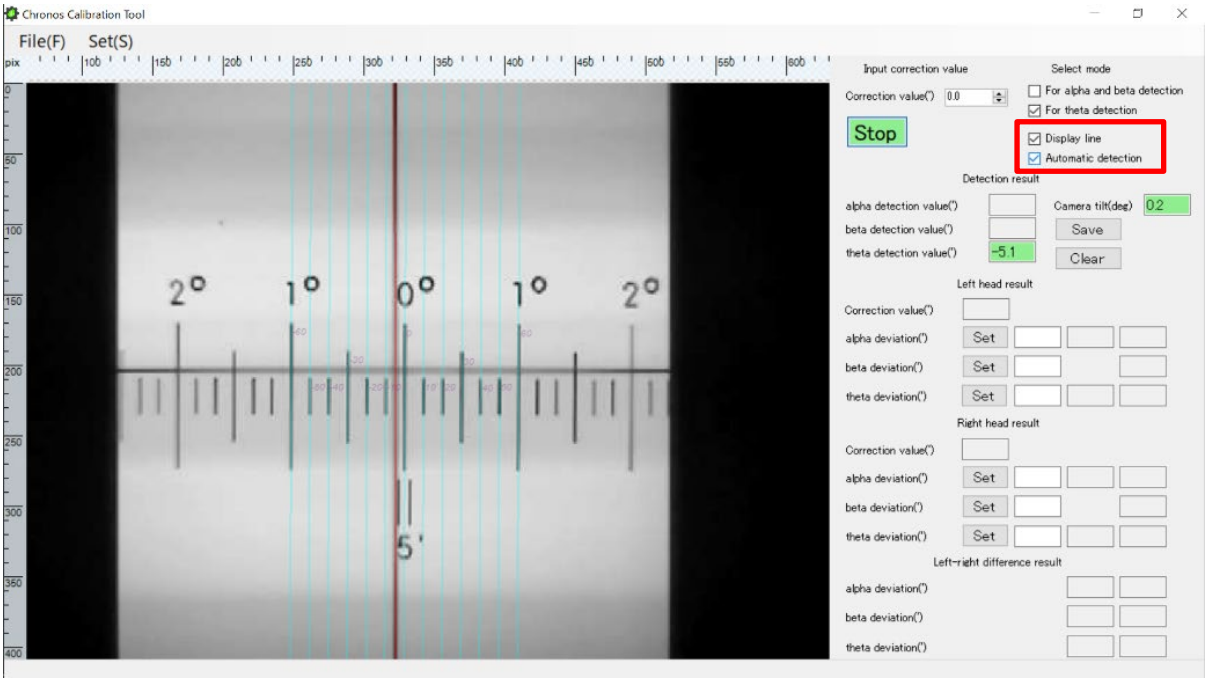
(2) Click [load], and shift θ axis to the initial position.



(3) Check［For theta detection］of "Select mode".

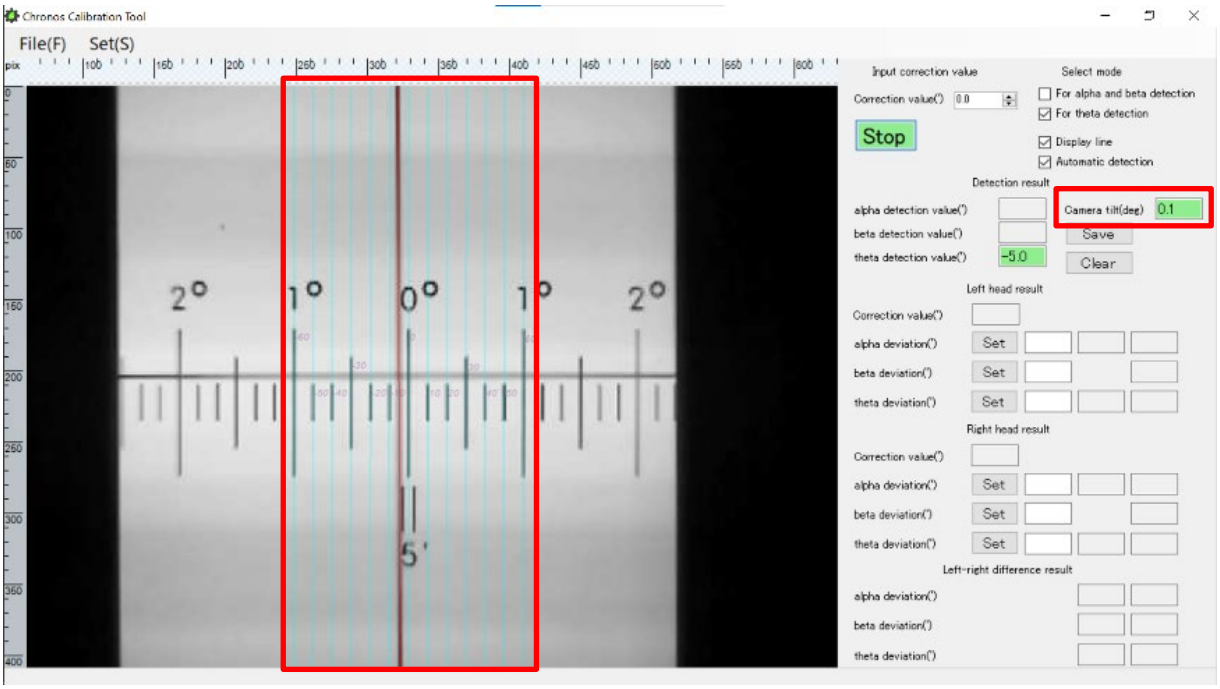


(4) Check［Display line］and［Automatic detection］of "Select mode".

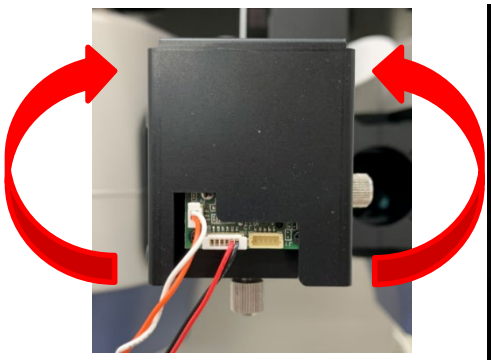


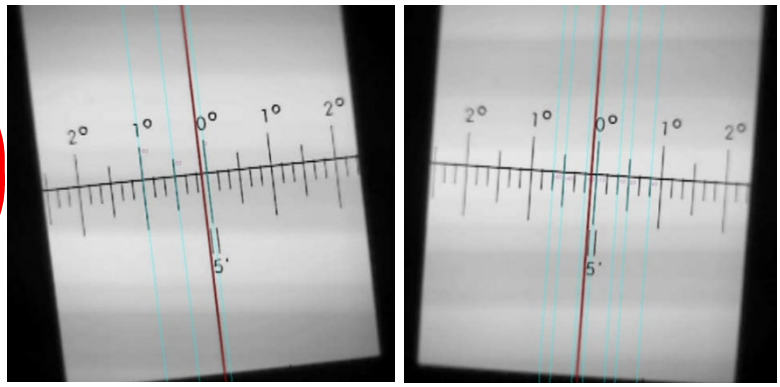
(5) Confirm that Camera tilt(deg) is ±1°and all 13 detect lines are displayed.

NOTE	• Text box will be highlighted in green when Camera tilt is within ±1°. • Please be sure that all 13 detect lines are displayed between -1 and 1°on the scale. Otherwise, it cannot accurately measure.



NOTE	• Diopter may rotate when ratating camera, but there is no problem if it moves a littile.

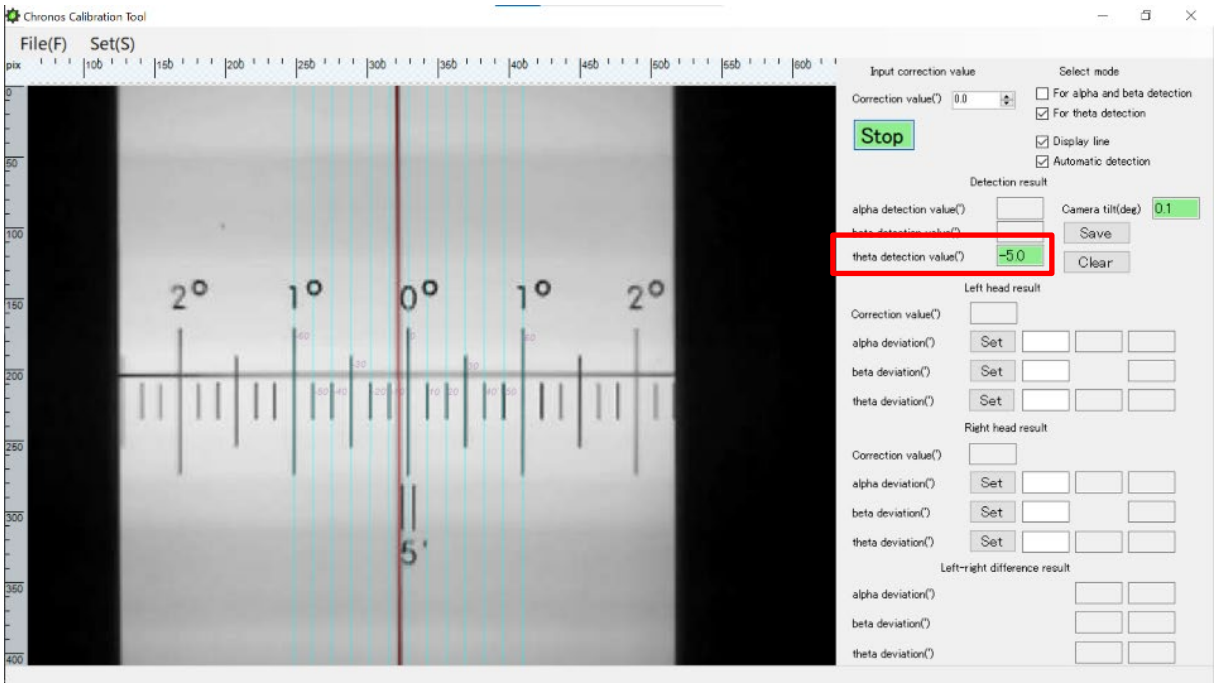




Bad example

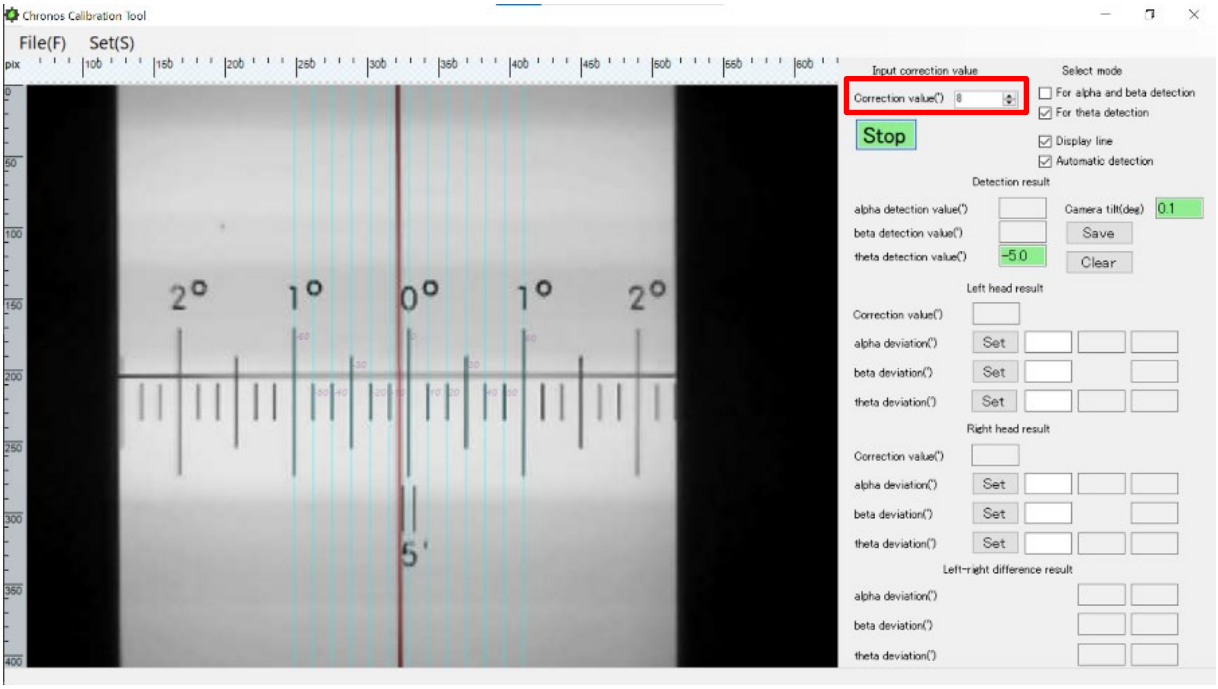
(6) Confirm that the value is displayed in the box of “theta detection value”.

NOTE	• Text box will be highlighted in green when it comes within ±30’

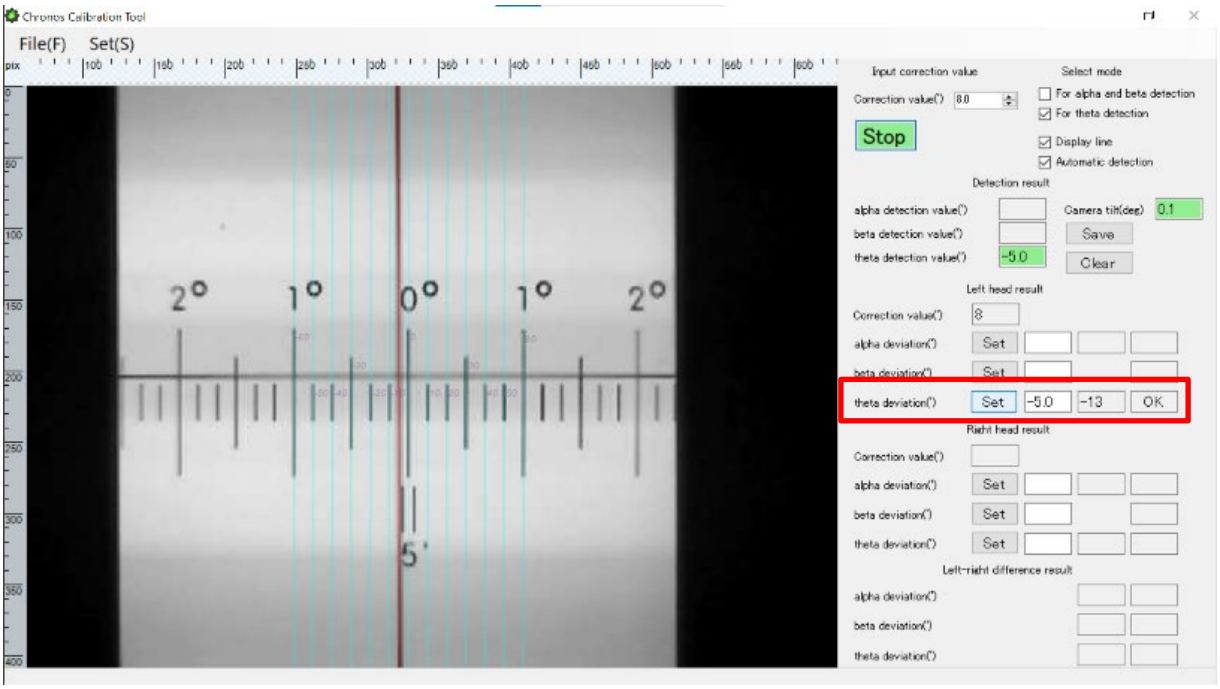


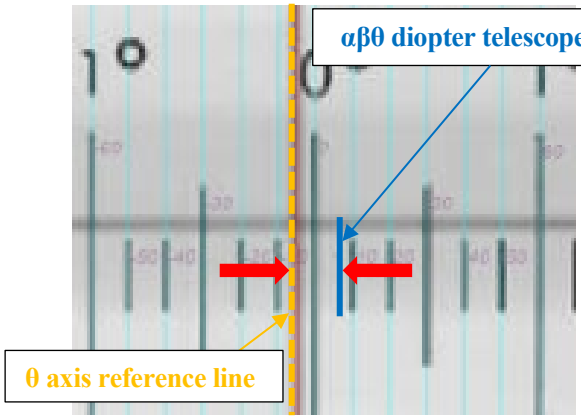
(7) Enter the correction value of αβθ diopter telescope in “Correction Value”.

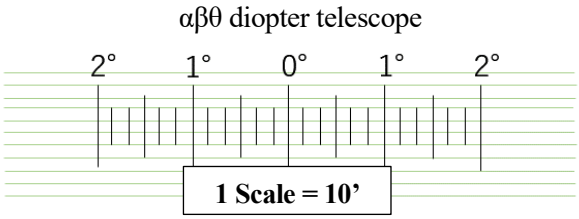
NOTE	• It means the numetic value mentionend on sticker placed on the side of an αβθ diopter telescope. (Center of scale)



(8) Click［Set］of “theta deviation” on OPT HEAD (L/R) with αβθ diopter telescope set. Deviation amount considering the correction value will be displayed and it judges “OK” or “NG”.







Example as above: Deviation amount is -13’which is within the standard as the θ axis reference line of the chart is at the position of -5’ against the αβθ diopter telescope center line(8’).
Deviation amount = (θ axis reference line value) – (diopter telescope center line)

(9) Confirm that the value is within the standard below.

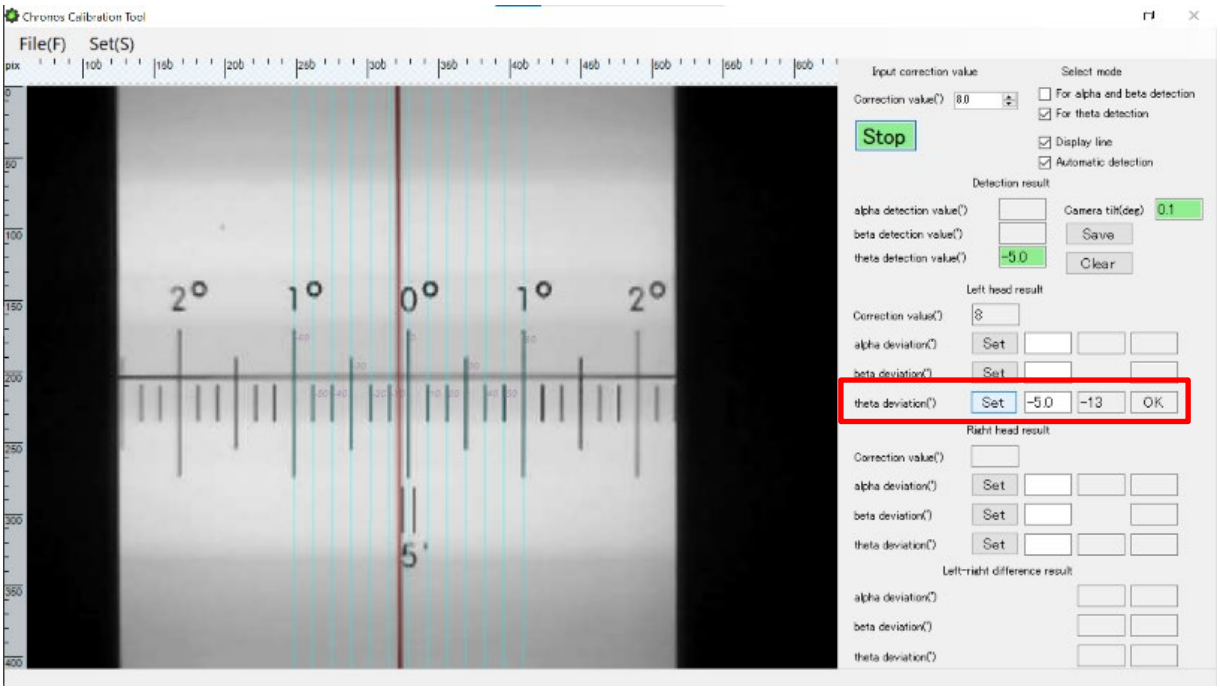
Standard

Item	Standard value	Remarks
θ axis	±30’	The θ difference between the left and right OPT_HEAD is within 10'

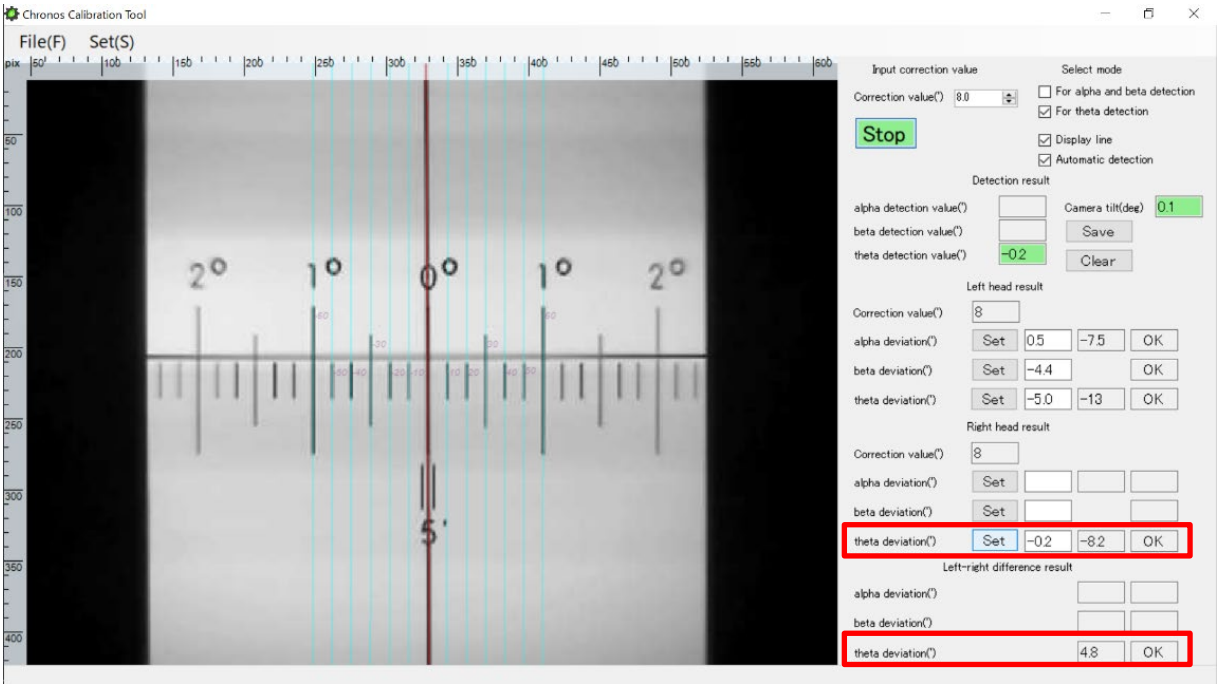
(10) In case that it judged “NG”, enter the movement quantity into［deg］and［minute］of［・Input△θ］on “θ adjustment”. Then, click［calc］→［Save］in order.

NOTE	• Please enter a mark in [deg]. • Mark always needs to be entered even though only [minute] was entered.

(11) Adjust θ axis reference line within the standard. Then , click［Set］of “theta deviation” . Please make sure that the Deviation amount is within the standard and “OK” is displayed.

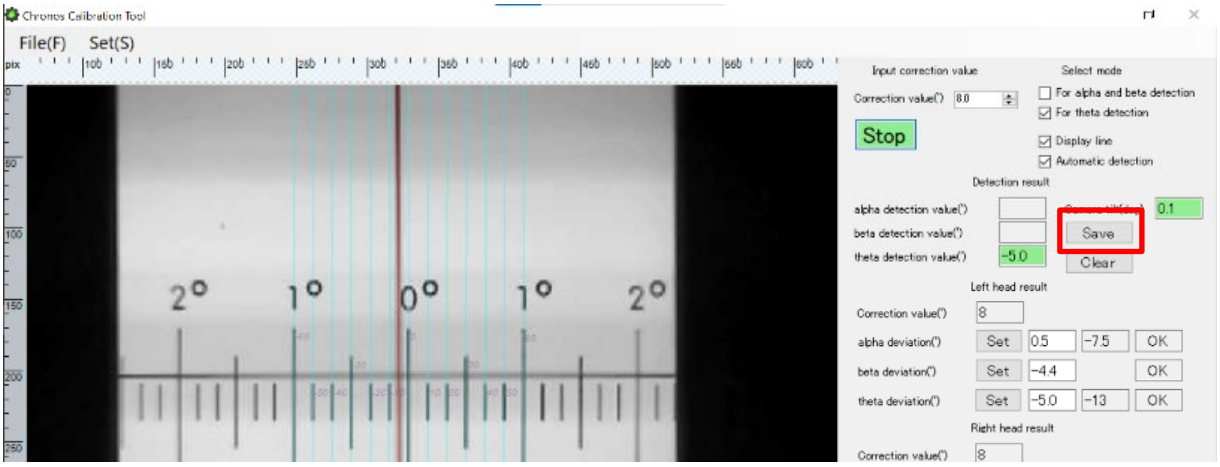


(12) Please do the same for the opposite OPT_HEAD. Confirm the gap between L/R Head.

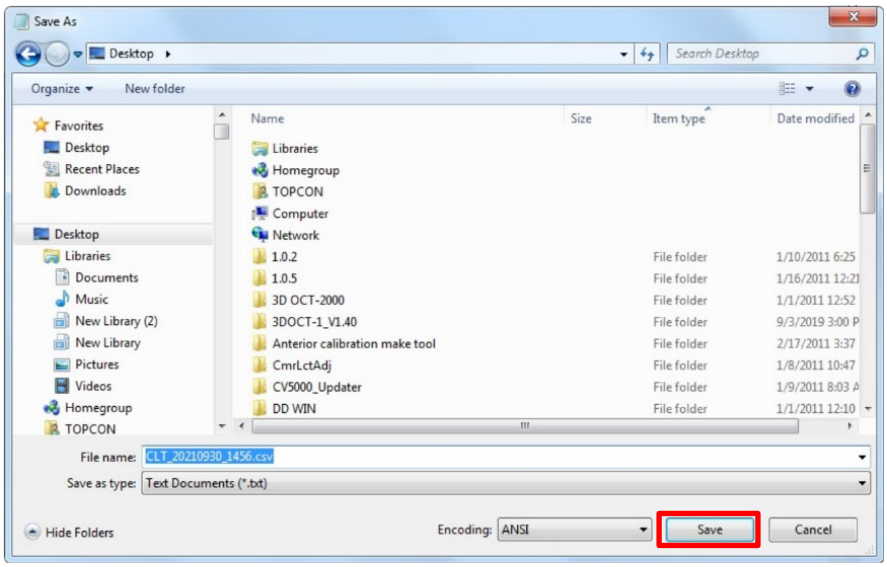


***Export the measured values.**

(13) Click [Save].

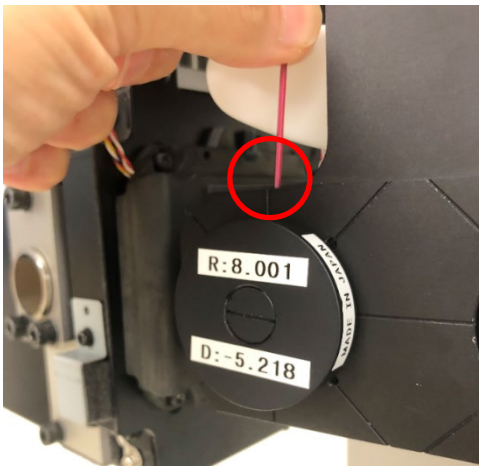


(14) Select any preferred place to save. Then click［Save］.



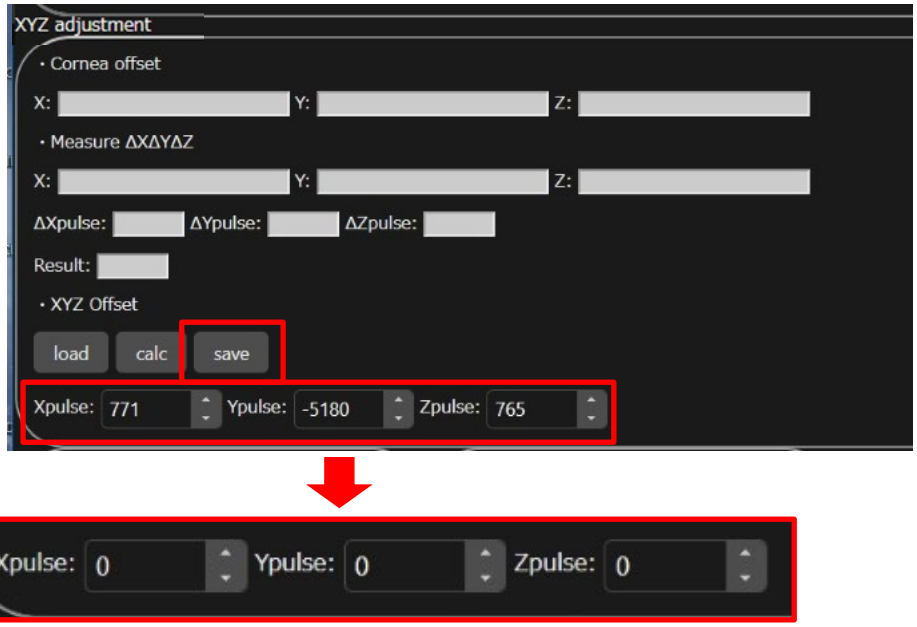
2.10 XYZ Adjustment

(1) Attach Test Eye with pupil (-5D) to the Test Eye holder. Then fix it with screw.



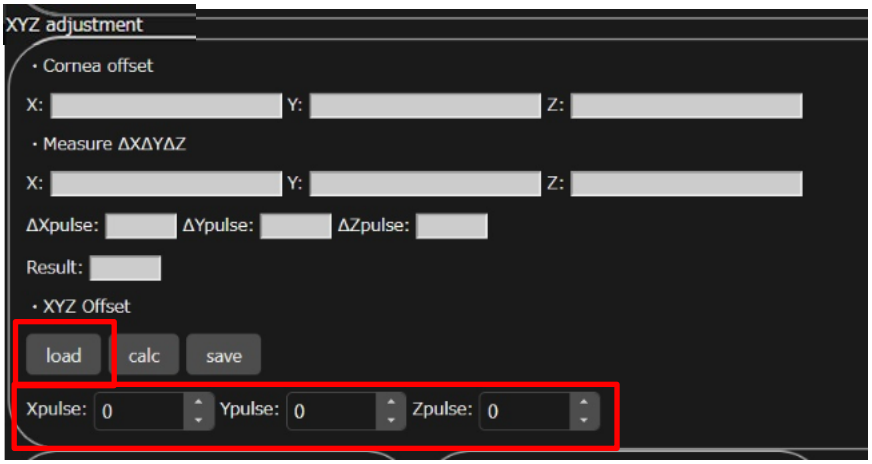
(2) Click [load] to display the current correction value.

(3) Confirm the correction values of X, Y and Z. When it is not 0, enter 0. Then click [save].

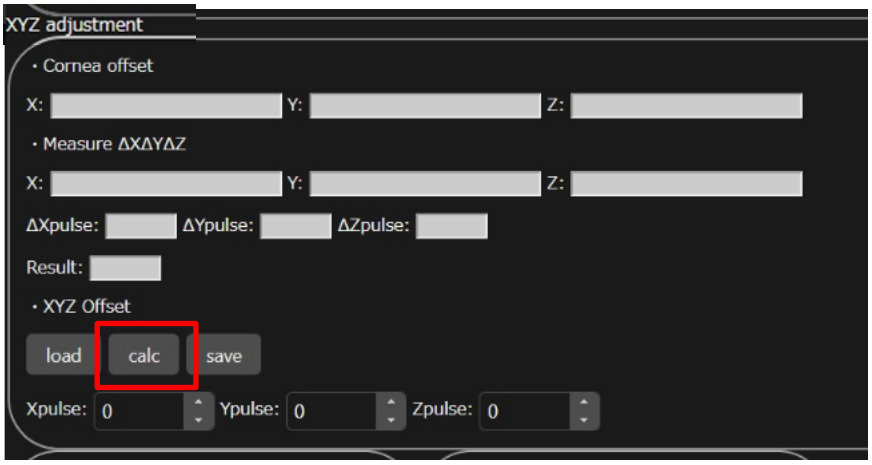


(4) Click [OK].

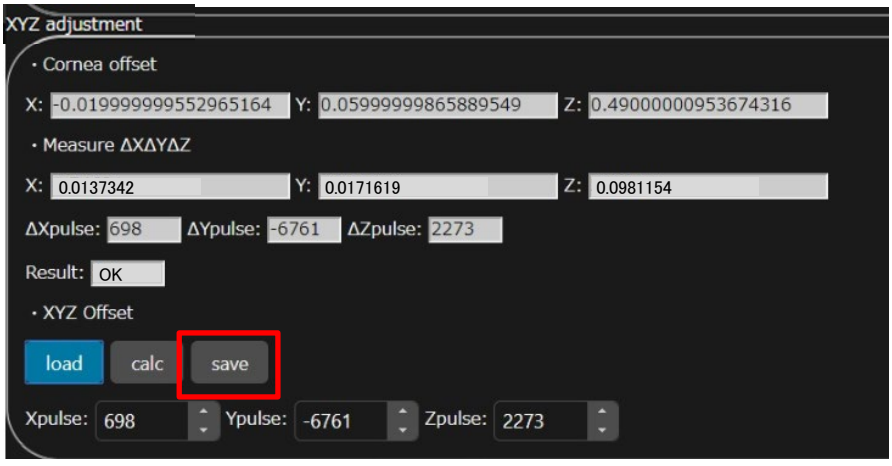
(5) Click [load] to confirm if 0 is saved.



(6) Click [calc] to measure the cornea alignment.

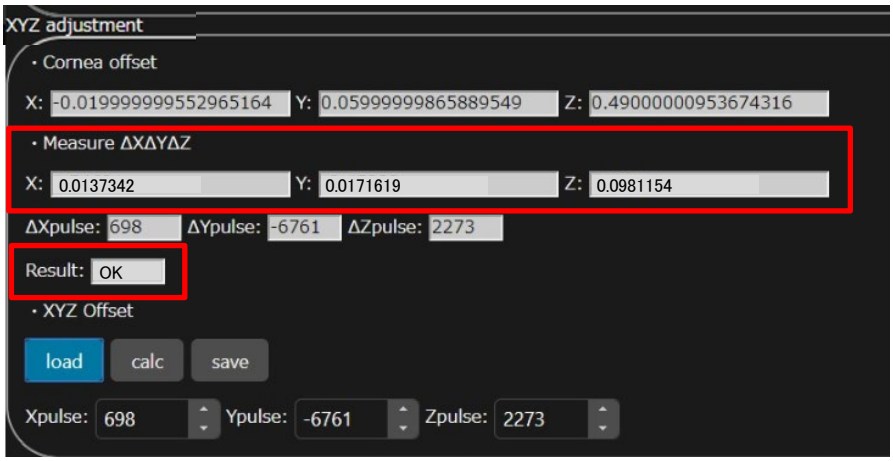


(7) Click [save] to save the measured correction value to EEPROM.



(8) Check whether the following standards are met.

NOTE	• If "NG" is displayed or the value becomes 0.1 or more, please try the procedure again from (6) until the result meets the standard.



Standard

Item	Standard value	Remarks
Result	OK	[Result], [Measure△X△Y△Z] Both need to meet the standard
Measure △X△Y△Z	Less than 0.1	

(9) Adjust the opposite side of OPT_HEAD in the same way.

2.11 Confirming XYZ adjustment

(1) Attach Test Eye with pupil (-5D) to the Test Eye holder for both eyes. Then fix it with screw.

(2) Boot up the System Evaluation Screen by URL below.

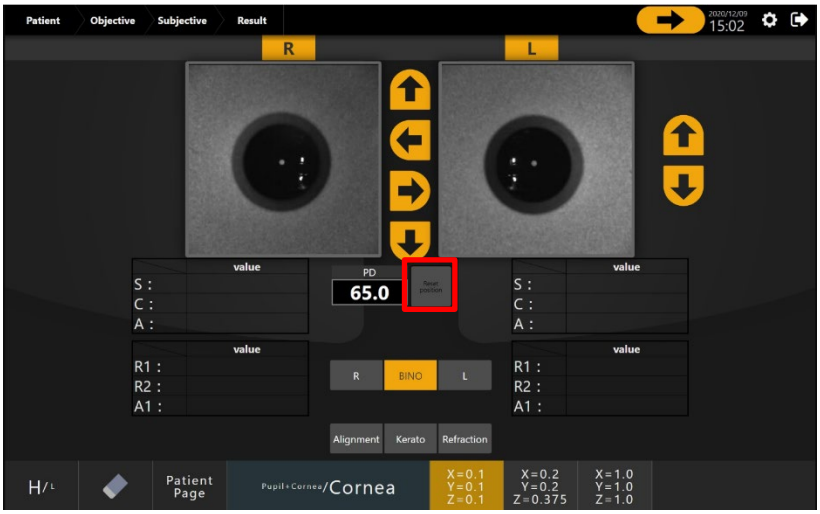
NOTE	• Use Google Chrome when booting up. • Please note that URLs have "uppercase" and "lowercase" letters.

Adjust OPT_HEAD	URL	Remark
OPT_HEAD L/R	http://10.1.2.3/topcon/sub/systemVarification.php	—

(3) Enter the Username and Password.

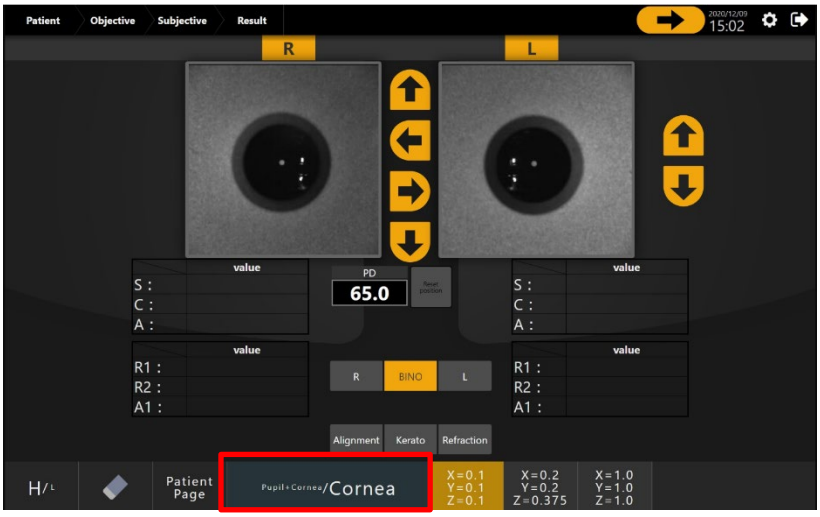
Username	**********
Password	**********

(4) Click [Reset position].

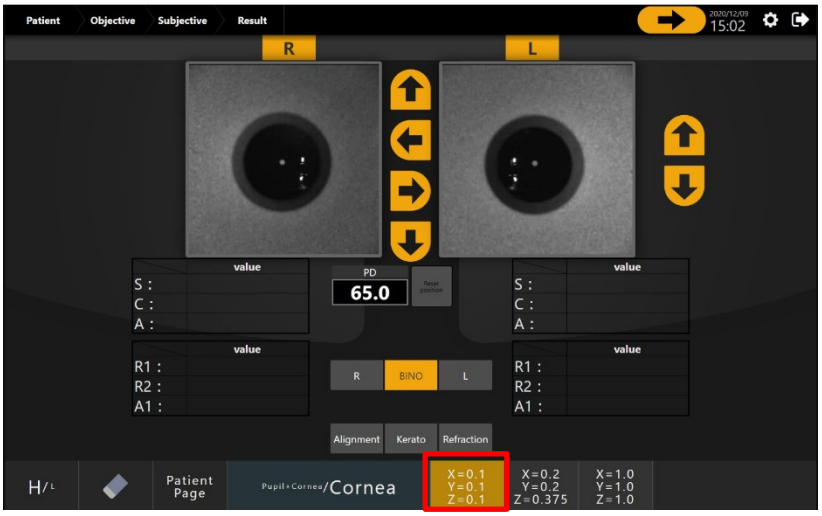


(5) Click [BINO].

(6) Click [Alignment mode]. Then select [Cornea].

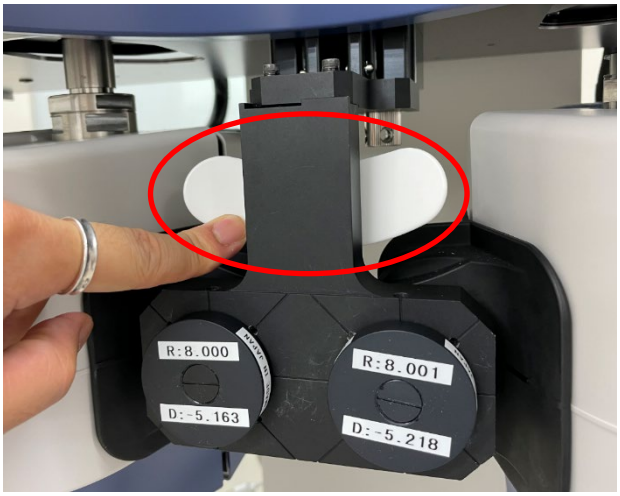


(7) Click the [X=0.1 Y=0.1 Z=0.1].



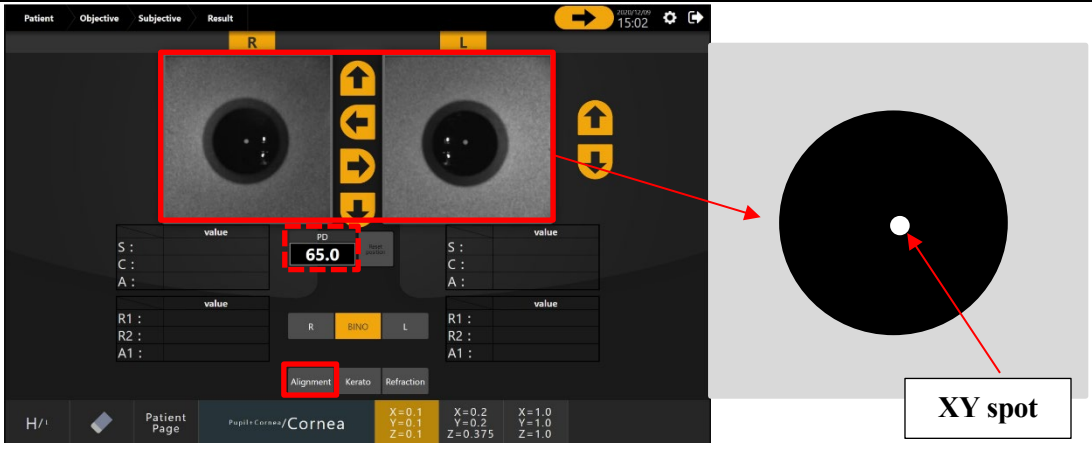
(8) Lightly push the forehead rest part of GADAI_BASE.

NOTE	• Alignment is activated by pushing in the forehead rest.



(9) Click [Alignment] to visually check that the XY spot does not move.

NOTE	• If the XY spot moves even slightly, repeat Chapter 6 "XYZ Adjustment". • If XY spot moves again and again, it is OK as long as the PD value is “65.0”.

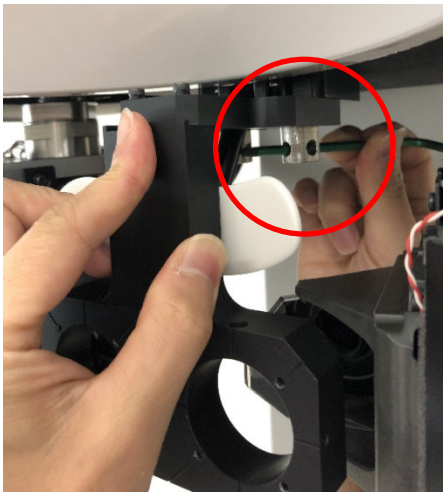


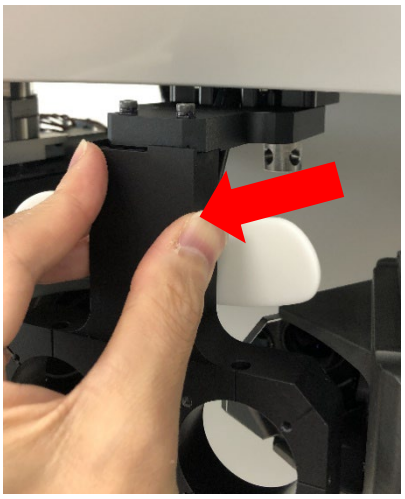
2.12 Attach the OPT_HEAD cover

(1) Turn the power off.

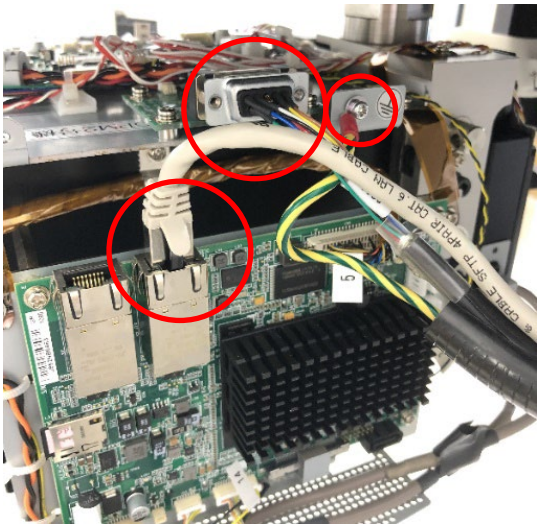
⚠ CAUTION	• When installing the OPT_HEAD cover (L/R), make sure that the OPT_HEAD is attached to the GADAI_BASE. If removing it from the main body, it needs to be readjusted αβθ and XYZ.

(2) Remove the Test eye holder.

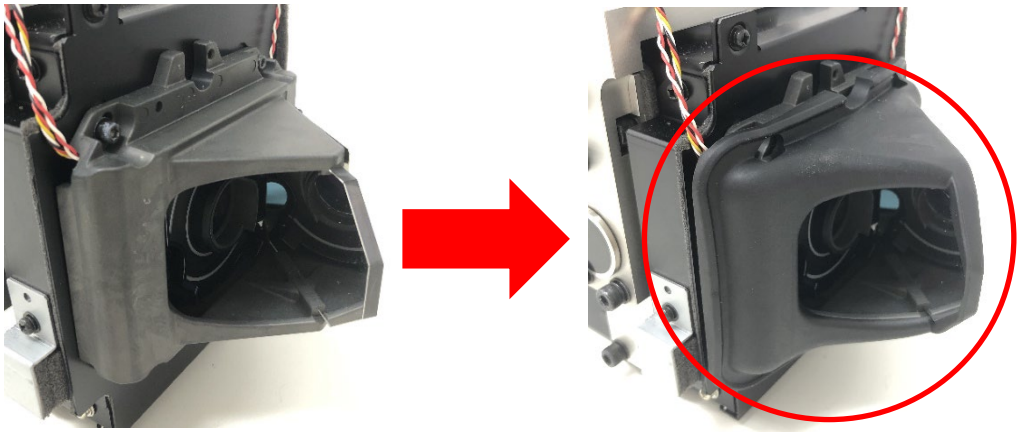




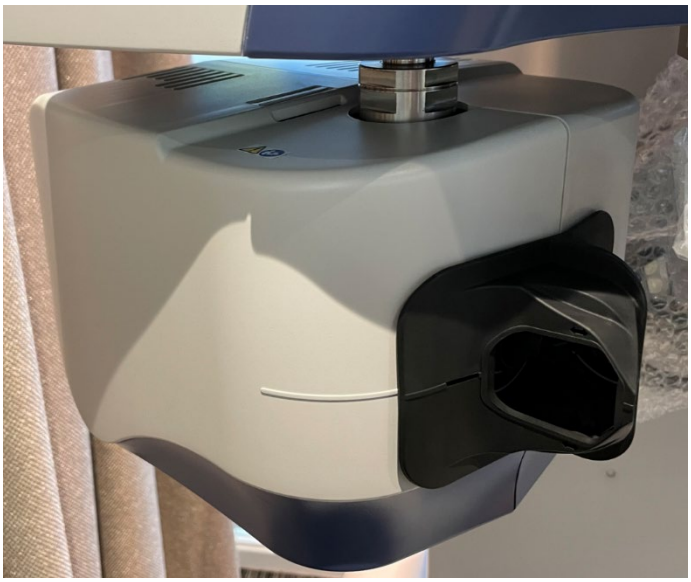
(3) Remove the cables.



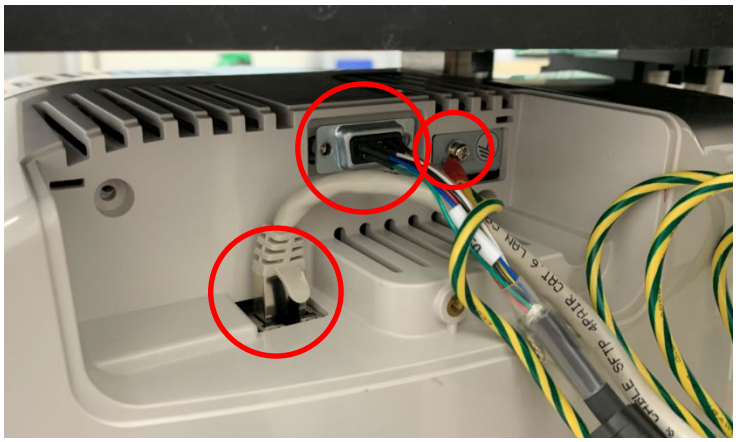
(4) Attach the mirror cover.



(5) Attach the OPT_HEAD cover (L/R) with 6 screw.



(6) Connect the cables.



(7) Attach the connecter cover with a screw.

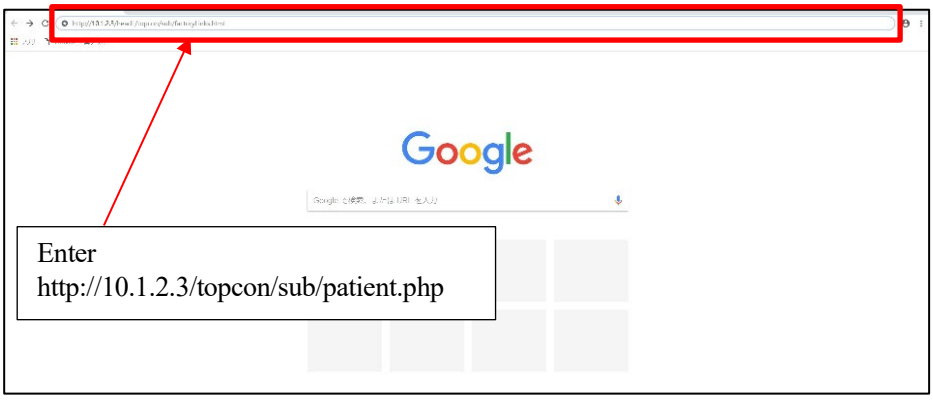
(8) Do the same for the opposite side of OPT_HEAD.

2.13 Confirmation of forehead detection

(1) Start the Standard GUI screen from the following URL.

NOTE	• Use Google Chrome for activation.

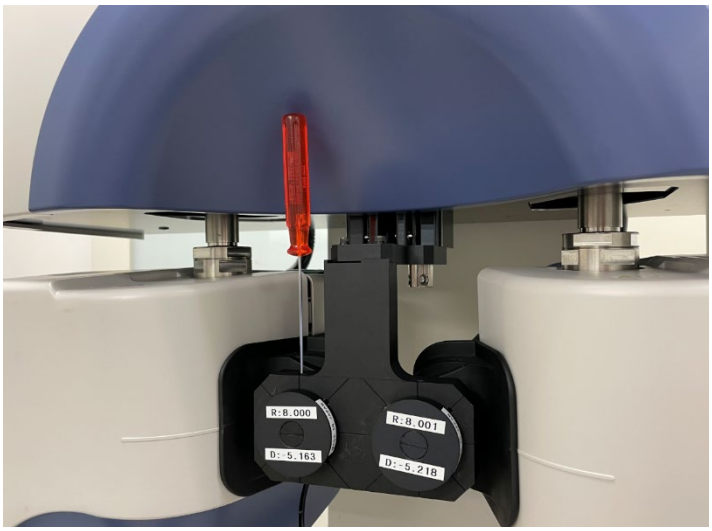
Content	URL	Remarks
Standard GUI	http://10.1.2.3/topcon/sub/patient.php	—



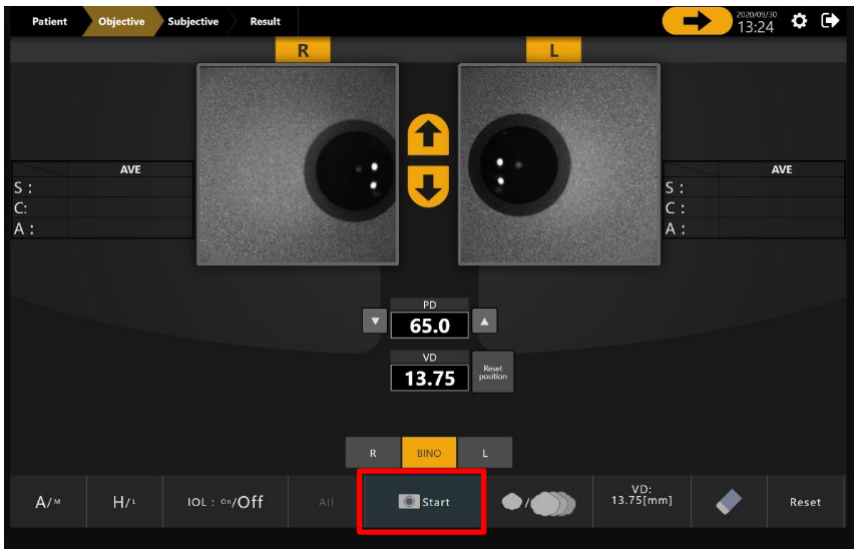
(2) Enter the Username and Password.

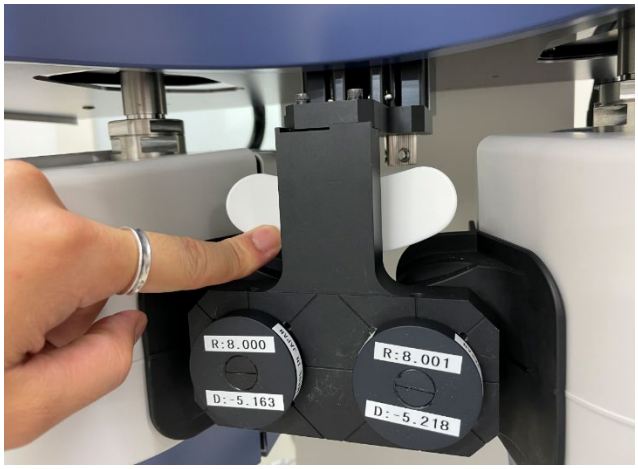
Username	**********
Password	**********

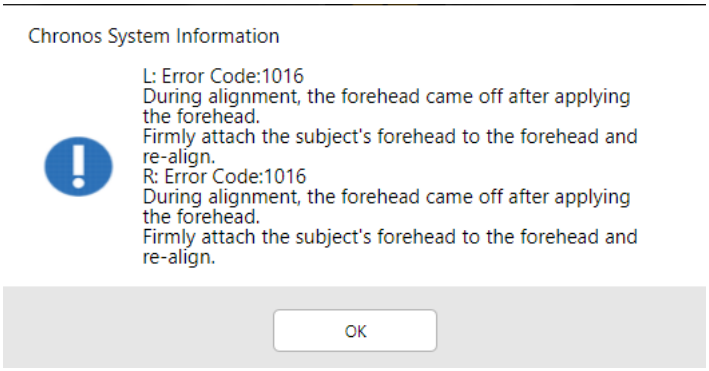
(3) Place the model eye with the pupil (-5D) in the model eye owners.



(4) On the Objective Measurement screen, start auto-alignment measurement while pushing the forehead pad in by hand. Ensure that error messages are displayed when the hand is removed from the forehead during measurement.





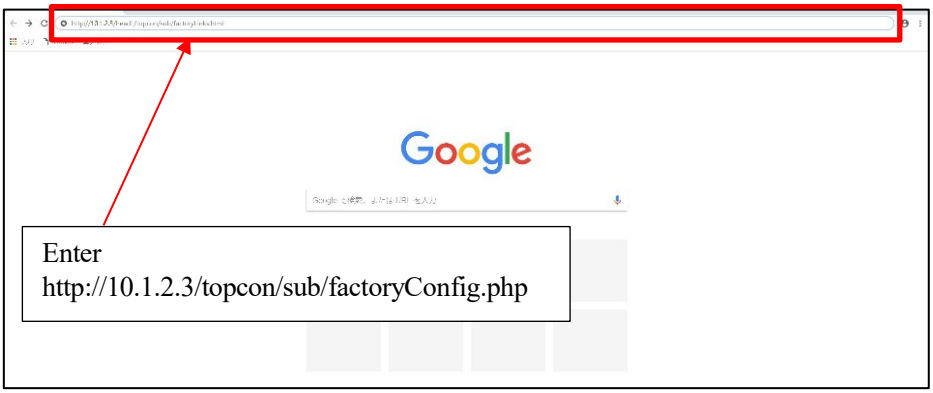


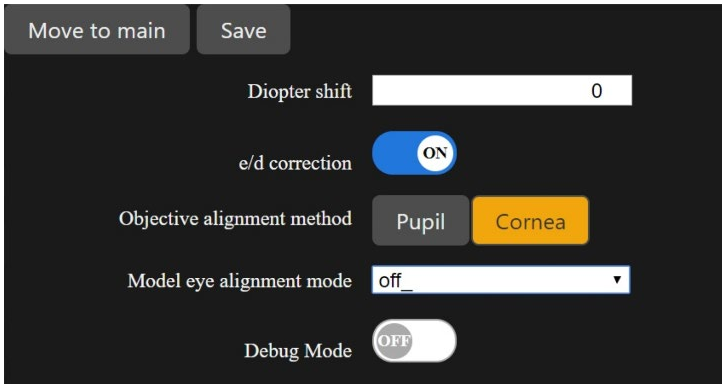
2.14 Refractive Power Measurement Accuracy

(1) Start the Measurement mode changeover tool from the following URL.

NOTE	• Use Google Chrome when booting up. • Please note that URLs have "uppercase" and "lowercase" letters.

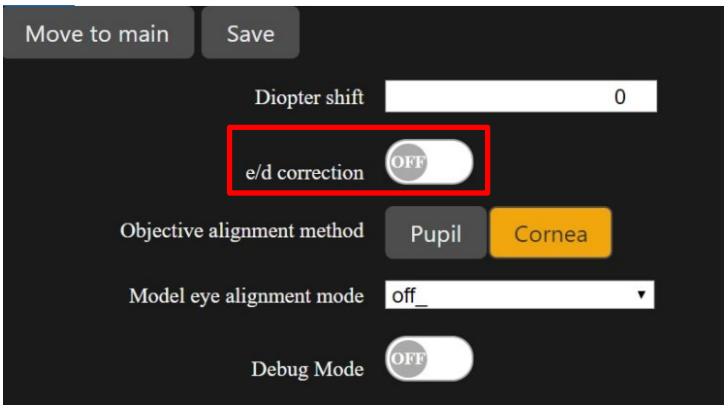
Adjusting Head	URL	Remark
Measurement mode changeover tool	http://10.1.2.3/topcon/sub/factoryConfig.php	—



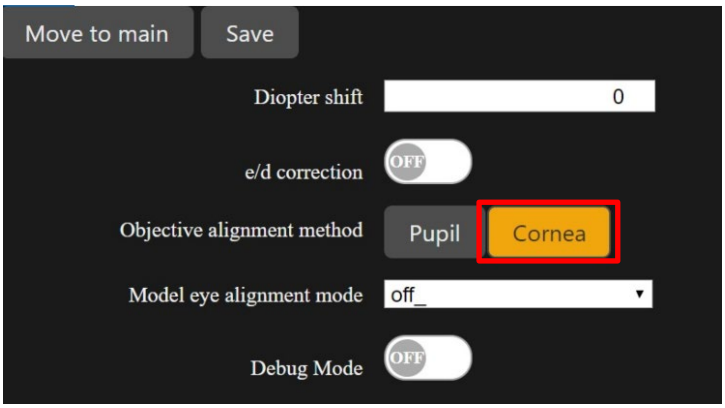


(2) Set “e→d line correction” to [OFF] to switch setting to “e line correction.”

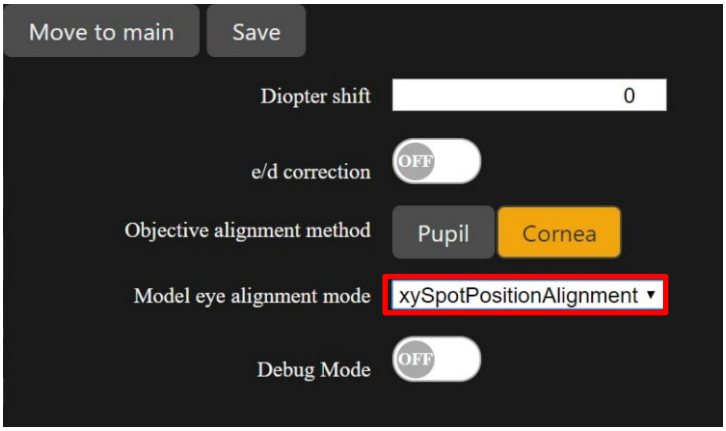
NOTE	• Product default setting is [ON (d line correction)]. • Test eye is made with “e line correction”. Thus, please be sure to switch it to “[OFF (e line correction)].”



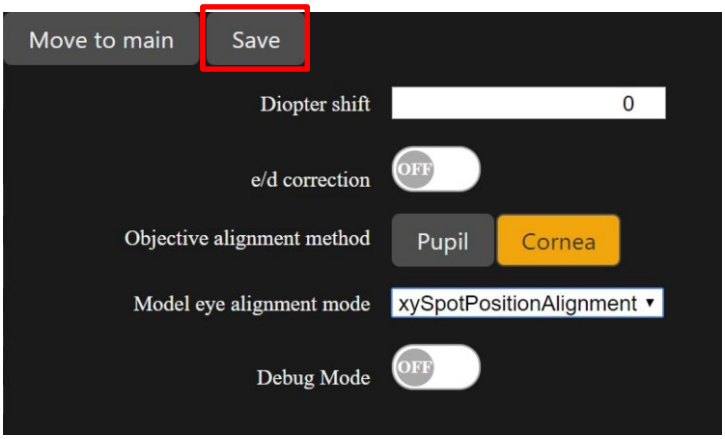
(3) Select to[Cornea]for “Objective alignment mode”.



(4) Select to[xySpotPositionAlignment]for “Model eye alignment mode”.



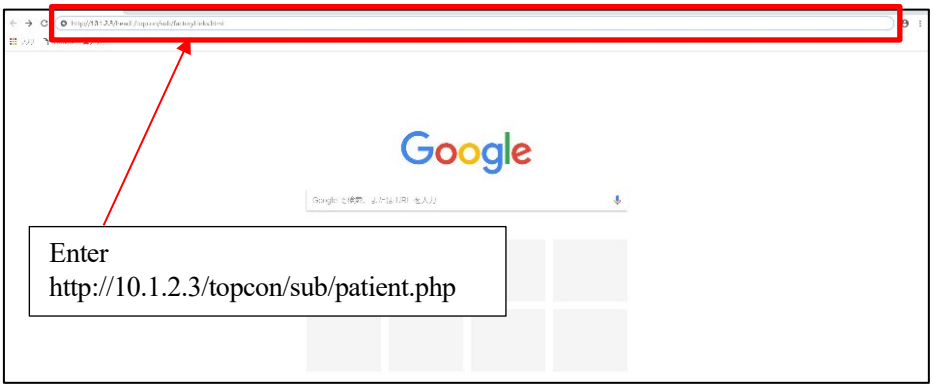
(5) Click [Save].



(6) Start the Standard GUI from the following URL.

NOTE	• Use Google Chrome when booting up.

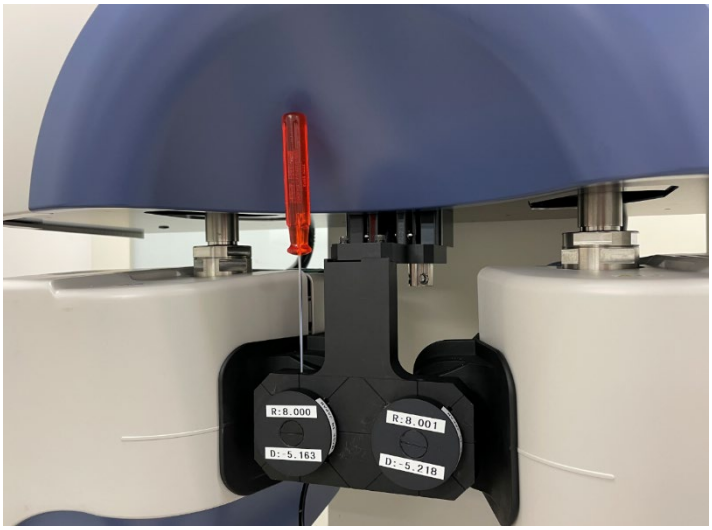
Content	URL	Remarks
Standard GUI	http://10.1.2.3/topcon/sub/patient.php	—



(7) Enter the Username and Password.

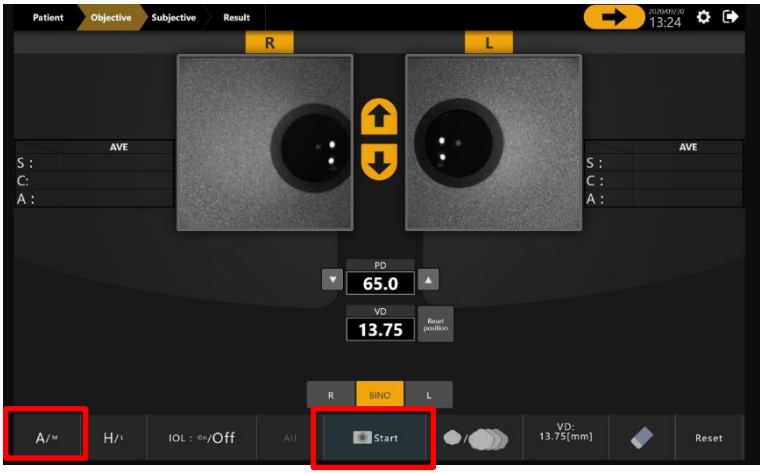
Username	**********
Password	**********

(8) Place the model eye with the pupil (-5D) in the model eye owners.

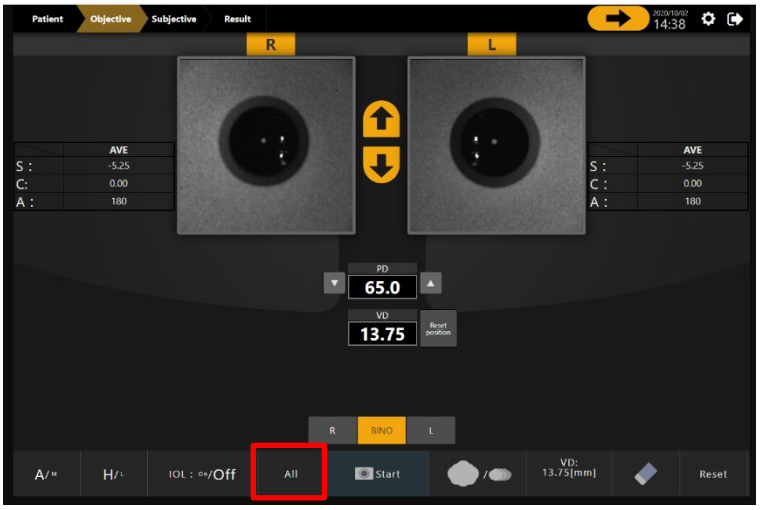


(9) Click the［Auto Alignment］and［Start］to measure the model eye (-5D) with pupil.

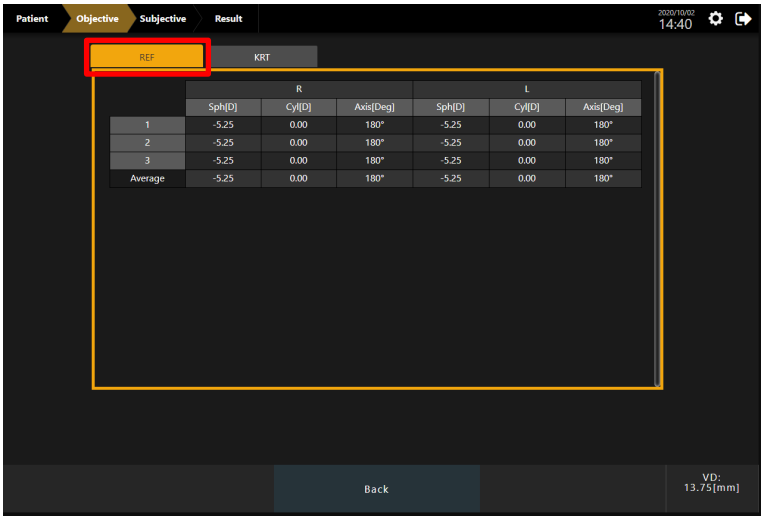
NOTE	• Push the forehead in with your hand during measurement.



(10) Click［All］to check the measurement results.



(11) ［REF］Click the tab to verify that the standard values are met.



Standard

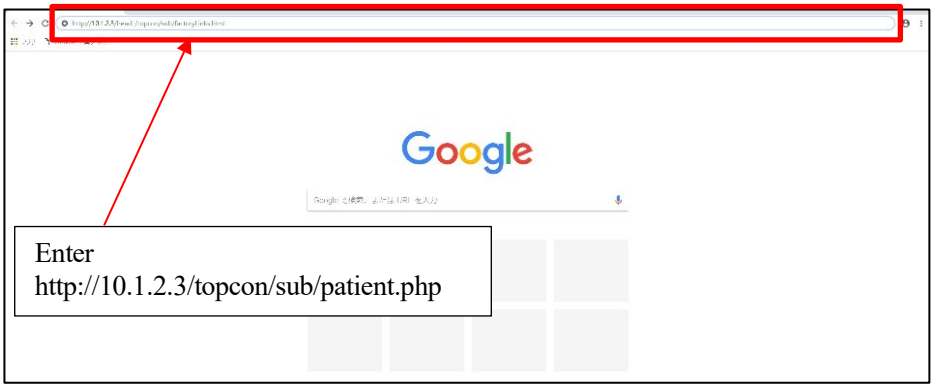
Item	Standard value	Remarks
S value	-5D	±0.25D

2.15 PD accuracy of measurement

(1) Start the Standard GUI from the following URL.

NOTE	• Use Google Chrome when booting up.

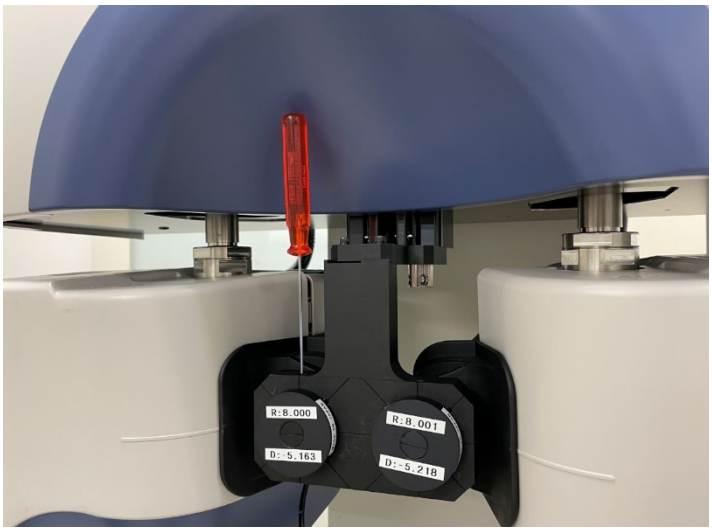
Content	URL	Remarks
Standard GUI	http://10.1.2.3/topcon/sub/patient.php	—



(2) Enter the Username and Password.

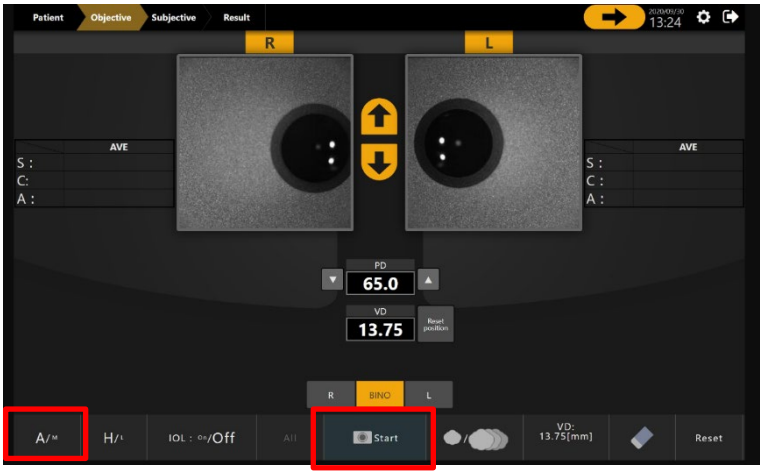
Username	**********
Password	**********

(3) Place the model eye with the pupil (-5D) in the model eye owners.



(4) Click the［Auto Alignment］and［Start］to measure the model eye (-5D) with pupil.

NOTE	• Push the forehead in with your hand during measurement.



(5) Check that the PD measurement value meets the following standards.

Standard

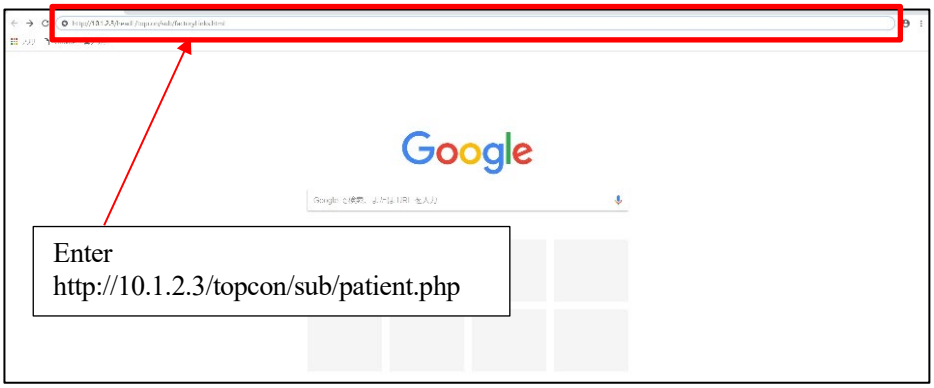
Item	Standard value	Remarks
PD values	65mm	±1mm

2.16 Corneal curvature measurement accuracy

(1) Start the Standard GUI from the following URL.

NOTE	• Use Google Chrome when booting up.

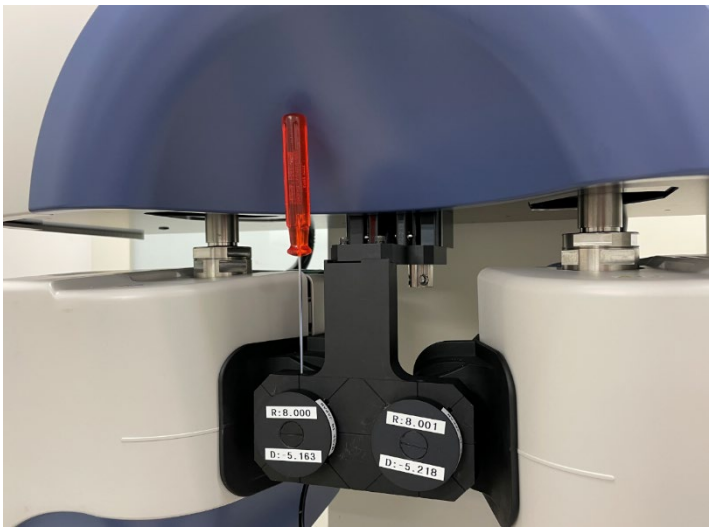
Content	URL	Remarks
Standard GUI	http://10.1.2.3/topcon/sub/patient.php	—



(2) Enter the Username and Password.

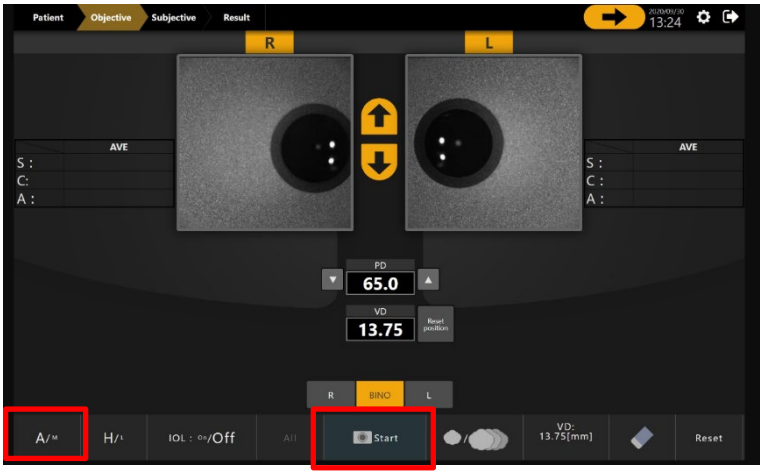
Username	**********
Password	**********

(3) Place the model eye with the pupil (-5D) in the model eye owners.



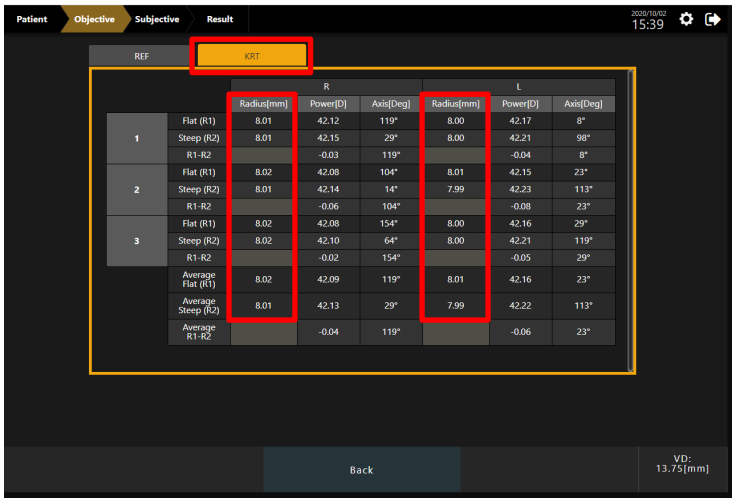
(4) Click the［Auto Alignment］and［Start］to measure the model eye (-5D) with pupil.

NOTE	• Push the forehead in with your hand during measurement.



(5) Click［All］to check the measurement results.

(6) ［KRT］Click the tab to verify that the standard values are met.



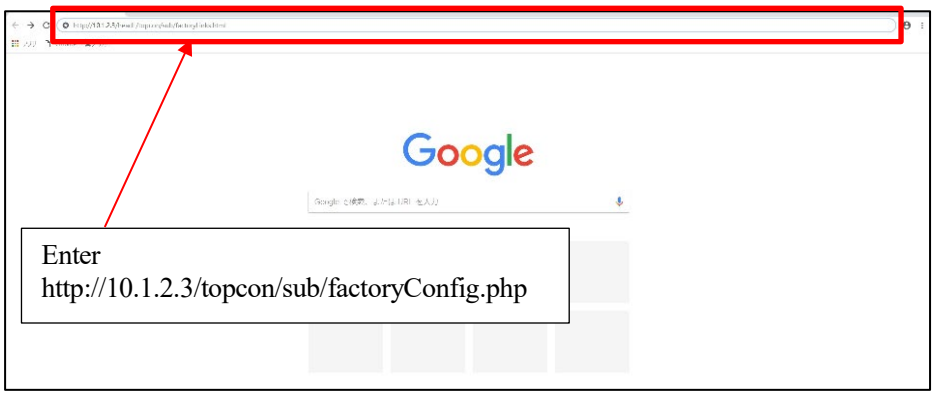
Standard

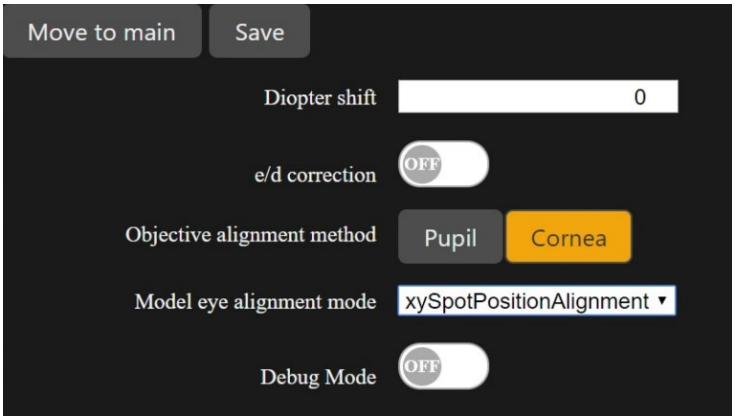
Item	Standard value	Remarks
AVE	R: 8.0	±0.05mm

(7) Start the Measurement mode changeover tool from the following URL.

NOTE	• Use Google Chrome when booting up. • Please note that URLs have "uppercase" and "lowercase" letters.

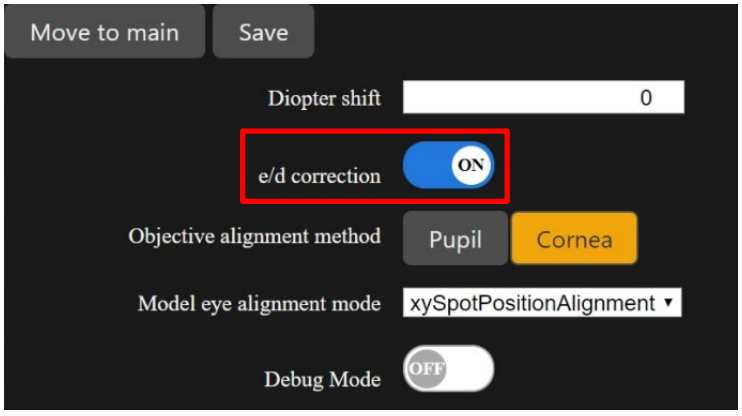
Adjusting Head	URL	Remark
Measurement mode changeover tool	http://10.1.2.3/topcon/sub/factoryConfig.php	—



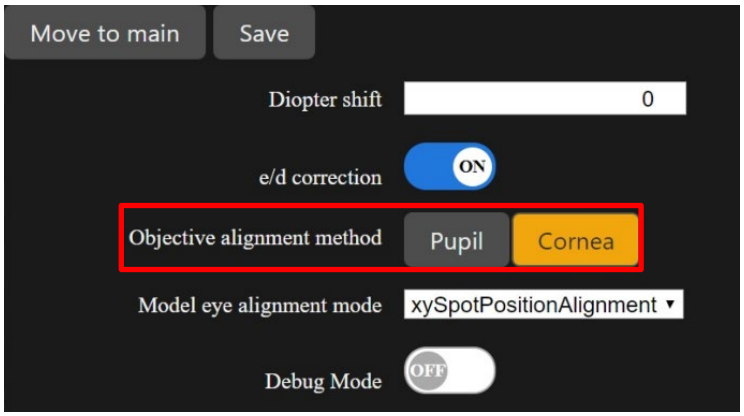


(8) Change "e→d line correction" to customer's setting.

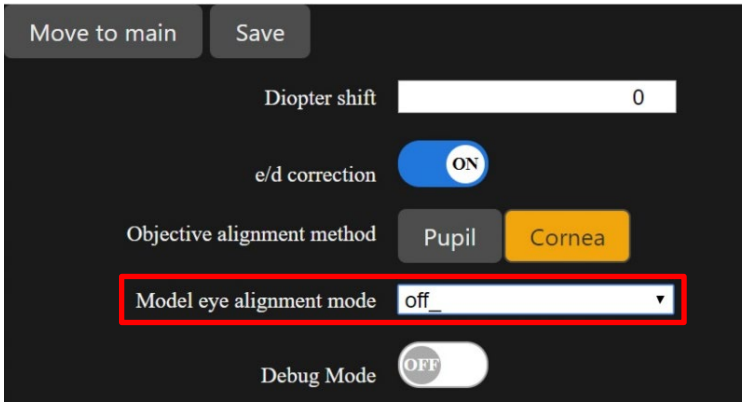
NOTE	• Product default setting is [ON (d line correction)]. *e line: Ref measurement value can be obtained as usual. *d line: Ref measurement value which the gap is small compared with conventional products (*KR series.) *Please refer to the Quality Case Collection ver.200.



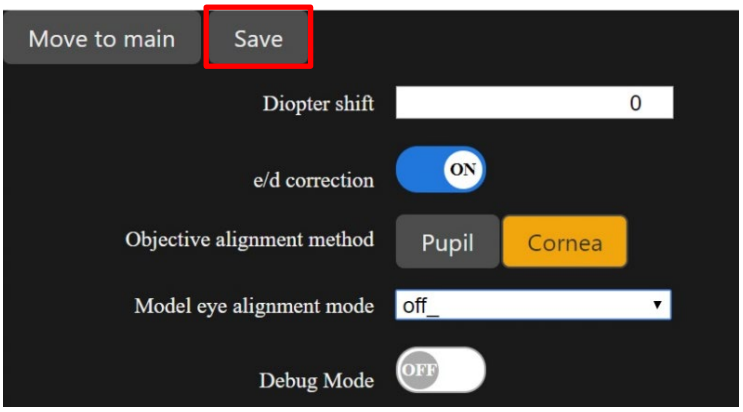
(9) Select to[Corneal]for “Objective alignment mode”.



(10) Select to[off]for “Model eye alignment mode”.



(11) Click [Save].

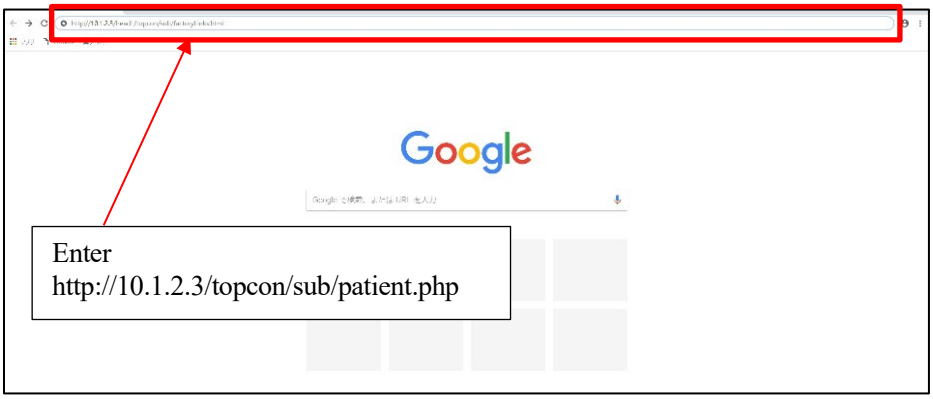


2.17 Confirmation of visual acuity chart switch

(1) Start the Standard GUI from the following URL.

NOTE	• Use Google Chrome for activation.

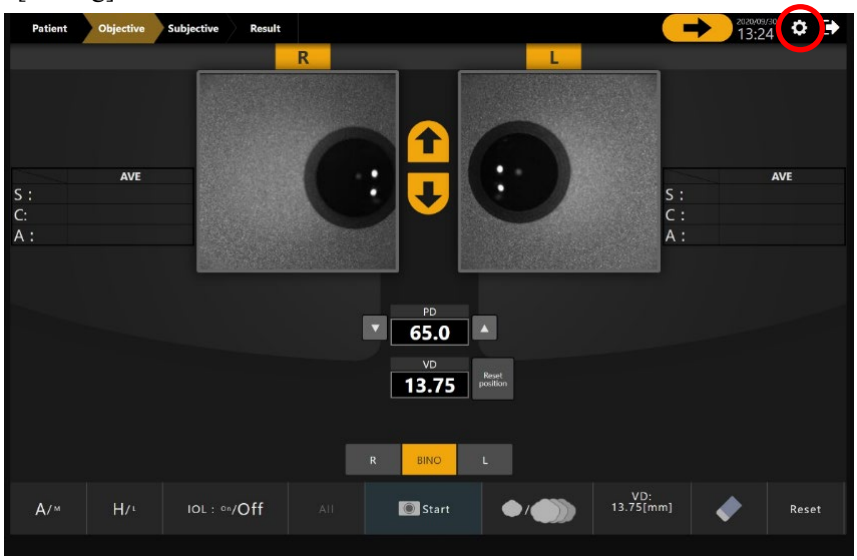
Content	URL	Remarks
Standard GUI	http://10.1.2.3/topcon/sub/patient.php	—



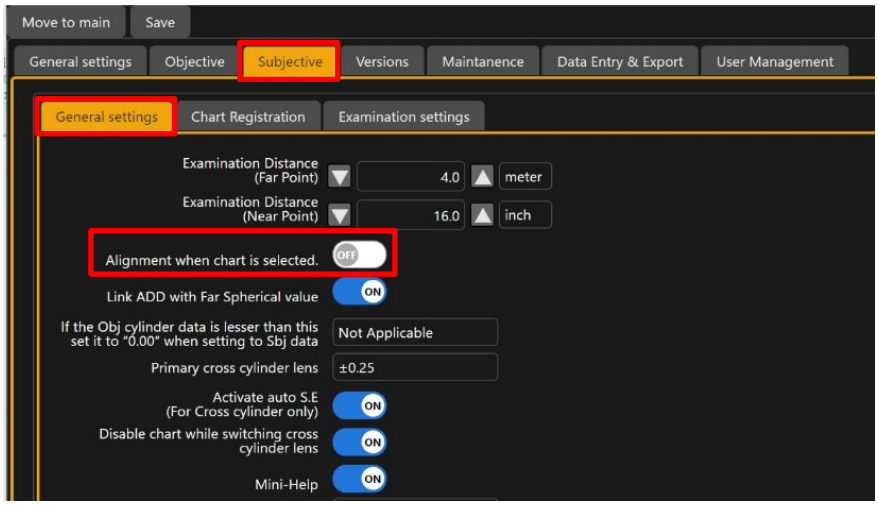
(2) Enter the Username and Password.

Username	**********
Password	**********

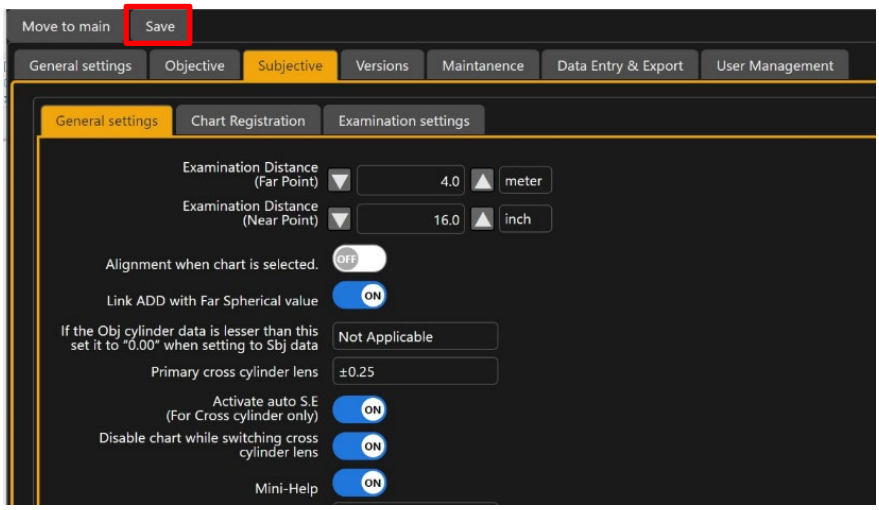
(3) Click [Setting]mark.



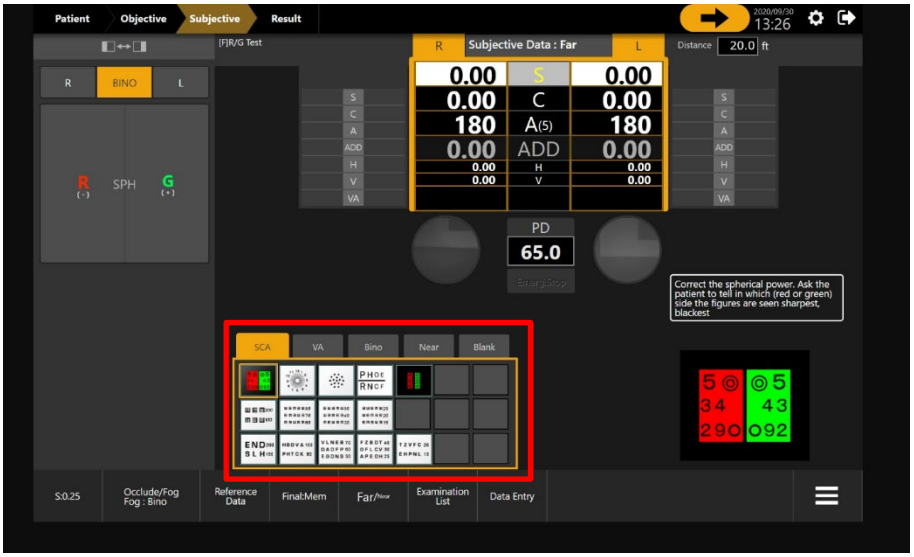
(4) Select “General settings” of “Subjective” tab. Then, switch “Alignment when chart is selected” to [OFF].



(5) Click［Save］.



(6) Look thorough the measurement window at Subjective screen to ensure that the visual acuity chart is switched when clicking a chart switching button.



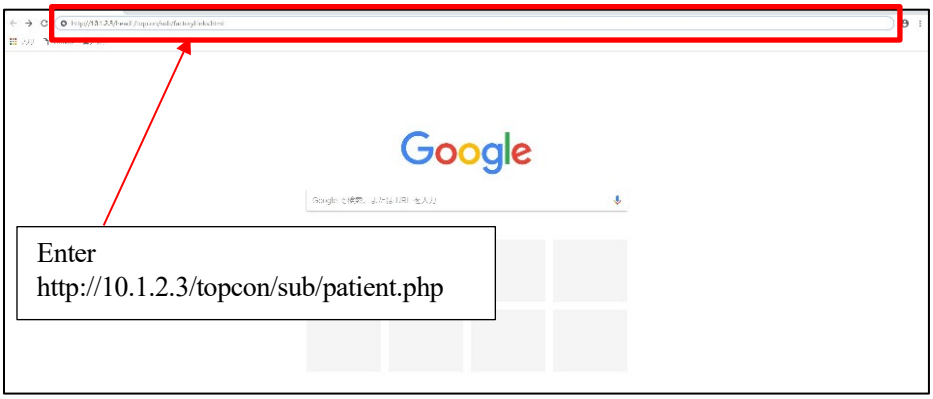
(7) Confirm the opposite HEAD in the same way.

2.18 Checking subjective 0D

(1) Start the Standard GUI screen from the following URL.

NOTE	• Use Google Chrome for activation.

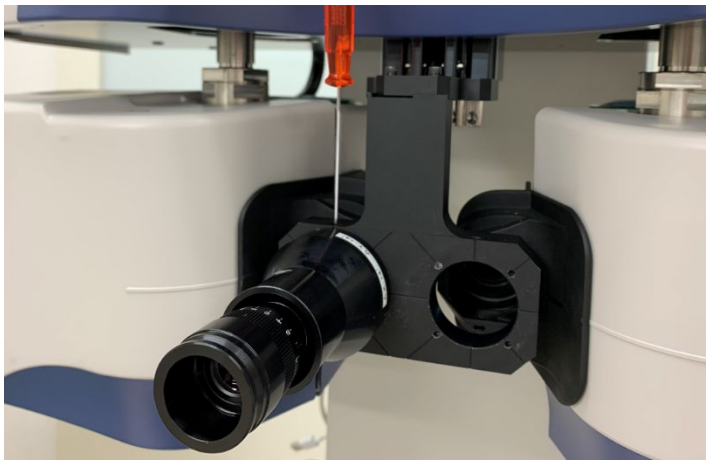
Content	URL	Remarks
Standard GUI	http://10.1.2.3/topcon/sub/patient.php	—



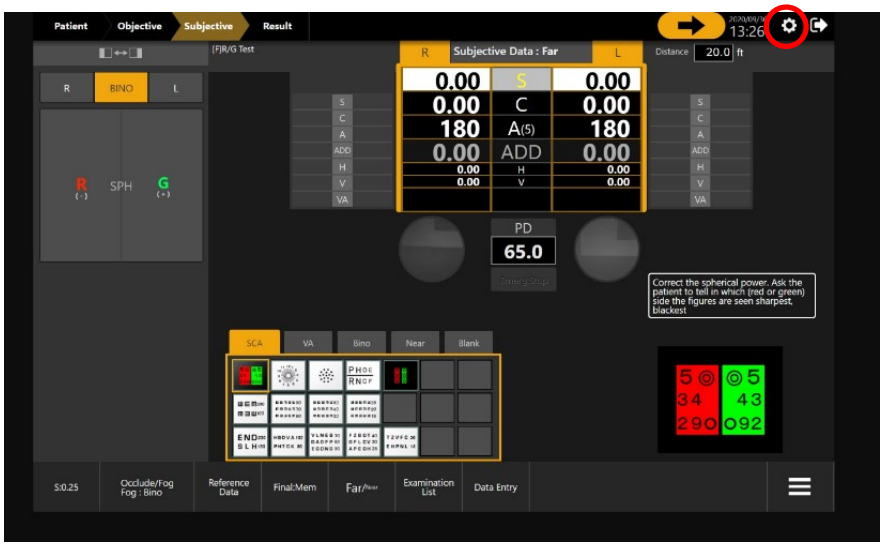
(2) Enter the Username and Password.

Username	**********
Password	**********

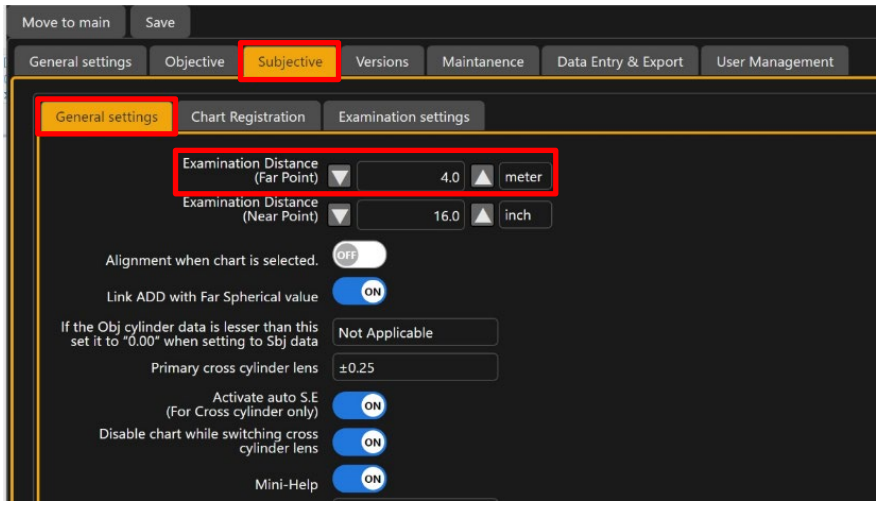
(3) Set the αβθ diopter telescope.



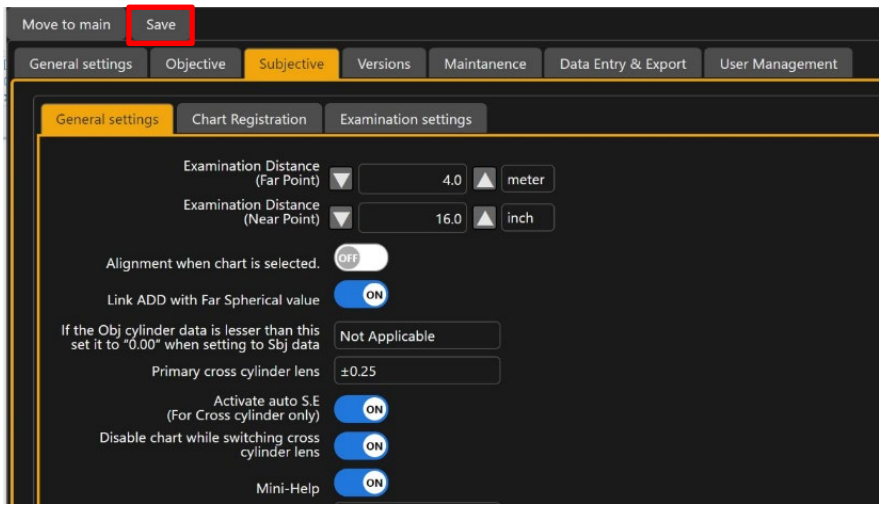
(4) Click the Settings button.



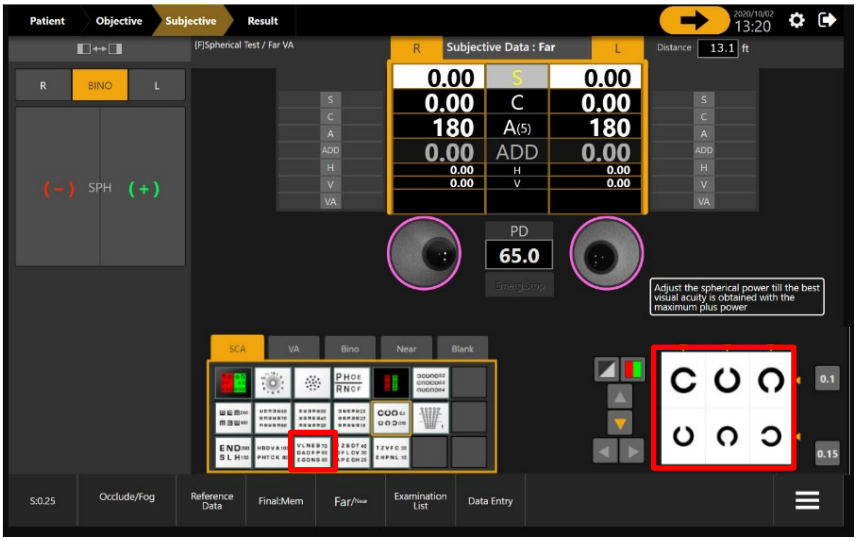
(5) Select［General Settings］in the “Subjective tab” and Set the inspection distance (for far) to "4m".



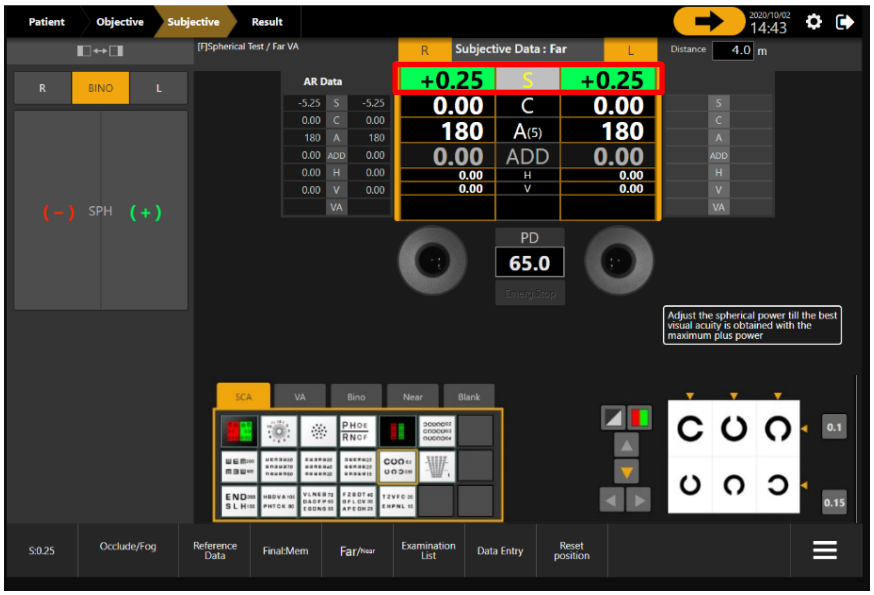
(6) Click [Save].



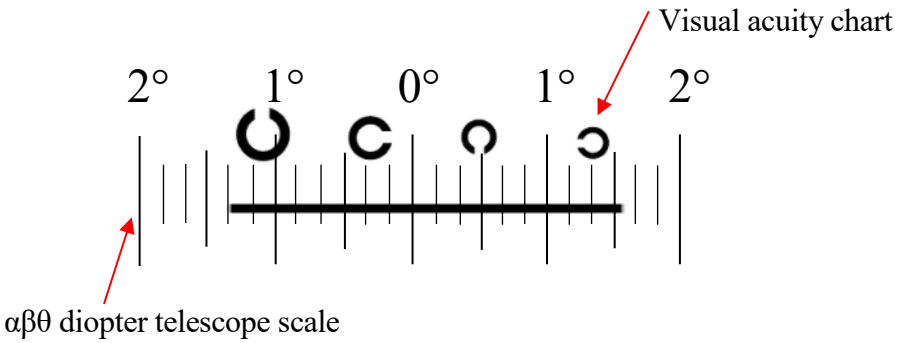
(7) Return to the subjective screen and display the chart of any visual acuity.



(8) The S value in both eyes is set to [+0.25].

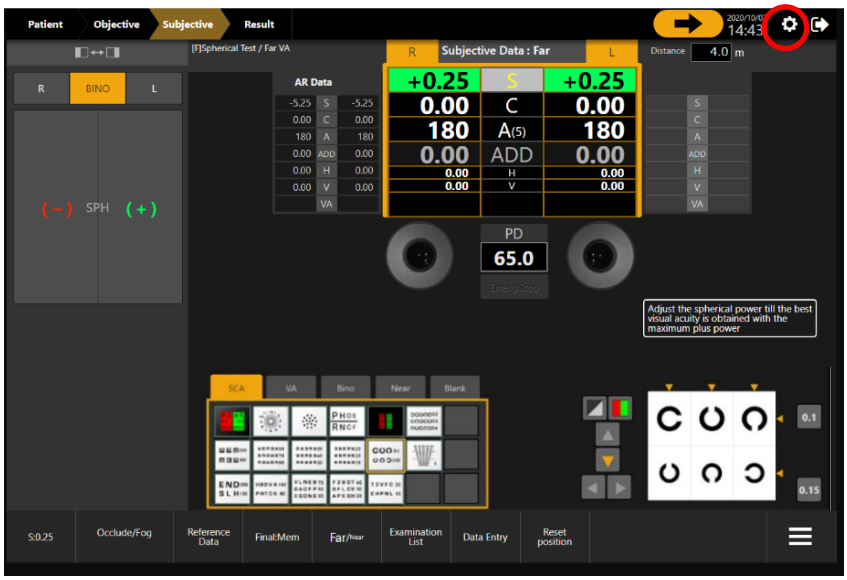


(9) Look through the measurement window to ensure that the scale pins on the αβθ diopter telescope and the visual acuity table pins together.



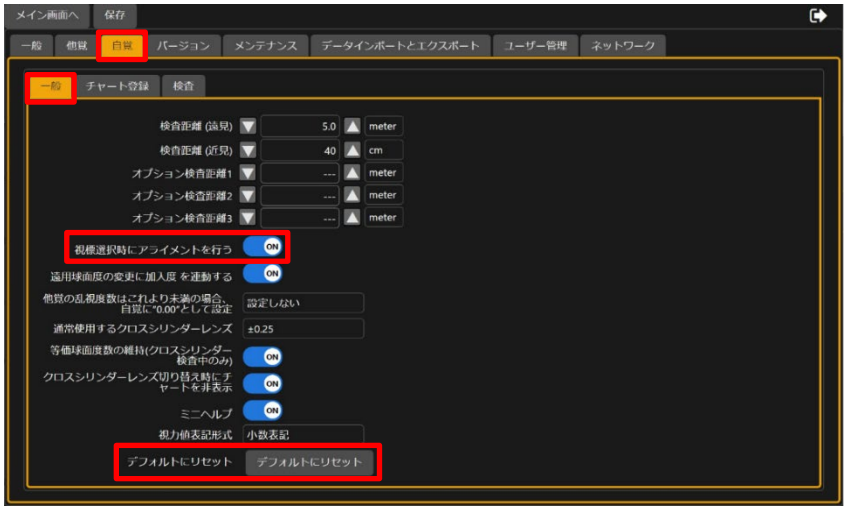
(10) Adjust the opposite HEAD in the same way.

(11) Click[Setting]mark.

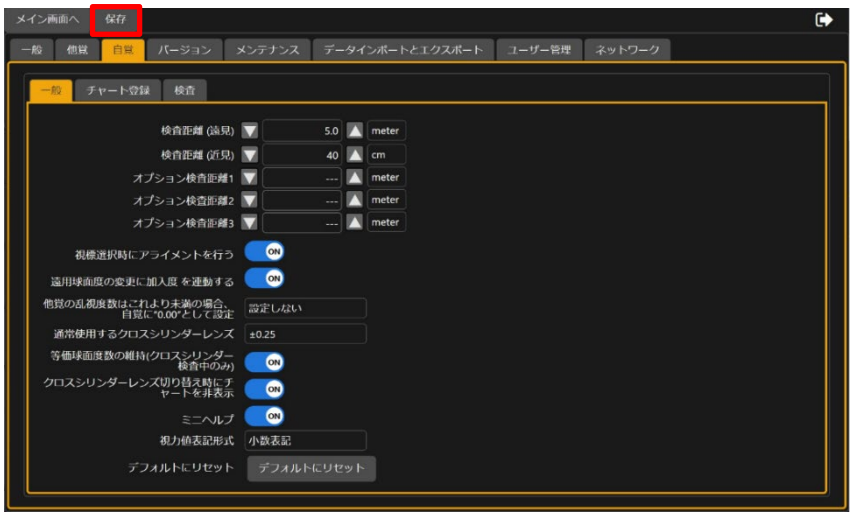


(12) Select［General Settings］in the “Subjective tab” . Then, Click "Result to default" to reset the inspection distance to the default value.

NOTE	• Change the "Alignment when chart is selected" to the customer's setting.



(13) Click［Save］.



2.19 Cleaning method

Use

This is the work to be performed when the measurement mirror and exterior cover becomes dirty.

Used tools

Tool name	Tool No.	Image
Blower	-	
Cotton Seagull (or Microstar)	-	
finger cot	-	
incandescent bulbs light（Tungsten etc.）	-	-
For forehead rest and exterior cover Neutral detergent for tableware	-	
For measuring lenses SH-11、ethanol	-	
For measuring mirror Fluorine solvent	-	

Work procedure

(1) Cleaning the part that comes into contact with the subject

(a) When the forehead rest becomes dirty, dissolve a neutral detergent for tableware in lukewarm water and wipe it with a cloth soaked in it.

(2) Keratoling・Cleaning the exterior cover

NOTE	• Do not wipe the plastic part of the main unit with a volatile solvent. • Wiping with benzine, thinner, ether, gasoline, chemical rag, etc. may cause discoloration or deterioration.

(a) If the keratoring and exterior cover become dirty, wipe off with the included monitor cleaner or a soft, dry cloth.

(b) When the keratoring and exterior cover are very dirty,dissolve a neutral detergent for tableware in lukewarm water, squeeze the cloth soaked in it tightly and wipe off.

(3) Cleaning method of the measured lens

・When adhering dust or dirt on the measuring lens・・・ Use a blower to blow off dust and dirt.

・When getting on fingerprints or oil on the measuring lens・・・ Use a blower to blow off dust and dirt, and clean the lens.

Soak a proper amount of ethanol or SH-11 in the paper and wipe lightly.

(4) Cleaning of measurement mirror

(a) Light up with incandescent light on the measurement mirror, check for dirt.

(b) In the case of dirt such as dust

Please blow it off with a blower.

⚠ CAUTION	• Be careful not to let the tip of the blower touch the measuring mirror.

(c) In the case of dirt such as tears and saliva

If the dirt does not come off, wipe off the dirt by rubbing lightly with a lens cleaning paper soaked with an proper amount of ethanol or Sh-11.

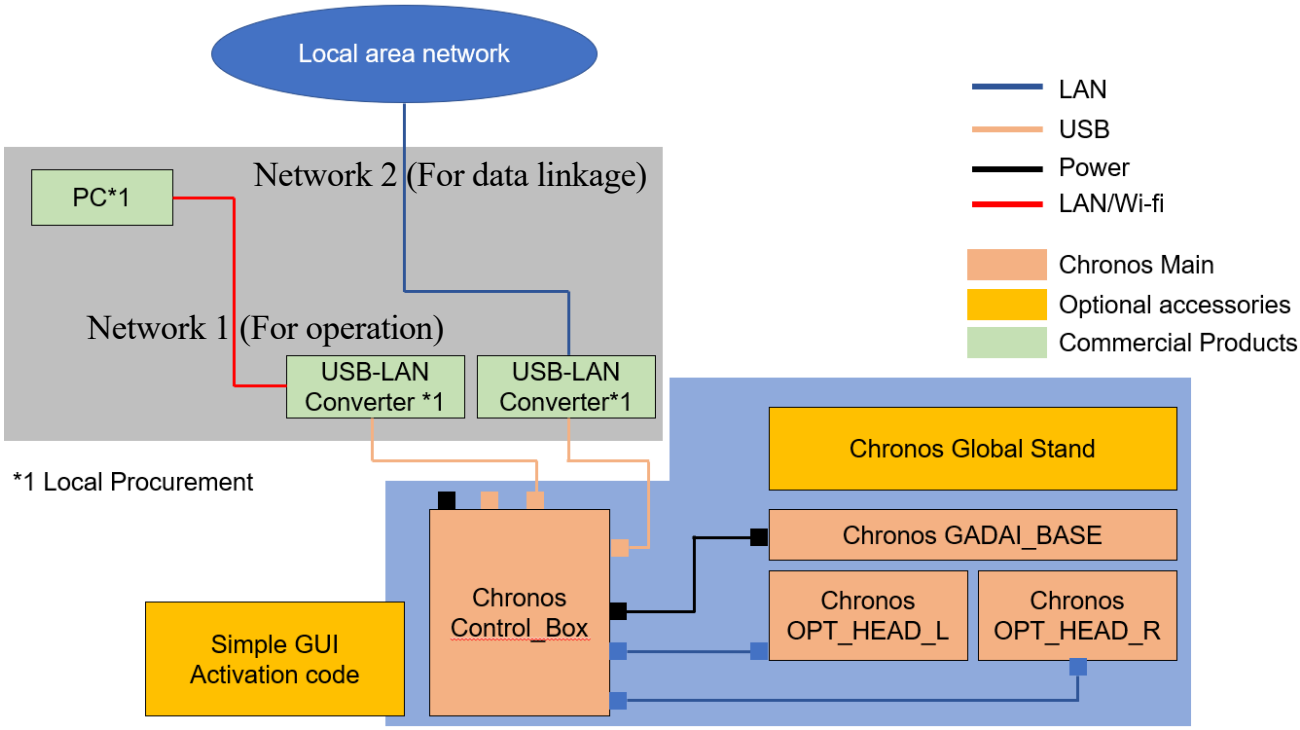
(d) If the dirt does not come off well

Wipe off with a highly volatile fluorine-based solvent.

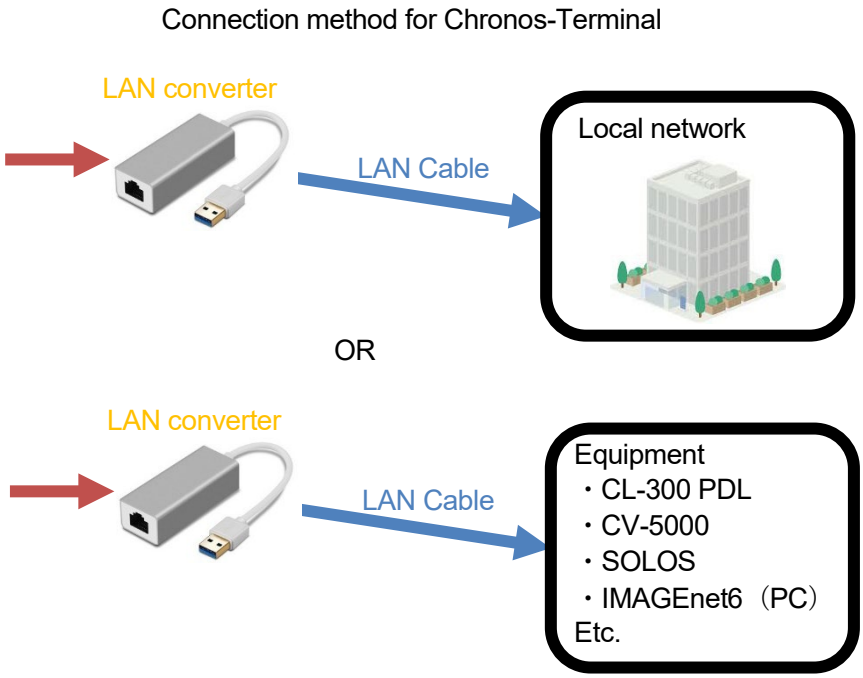
(e) Repeat steps (a) to (d) until no dirt is visible on the measurement mirror.

2.20 Network connection procedure

Configuration



Chronos can be connected to two networks, Network 1 (for operation) and Network 2 (for data linkage).
Network 2 (for data linkage) is described in this chapter.



Also, refer to the following Appendix for how to connect to individual devices.
5.3 How to connect CL-300 PDL and Chronos
5.4 How to connect CV-5000 and Chronos
5.5 How to connect SOLOS and Chronos
5.6 How to connect IMAGEnet6 and Chronos

2.20.1 How to connect Chronos to local area network

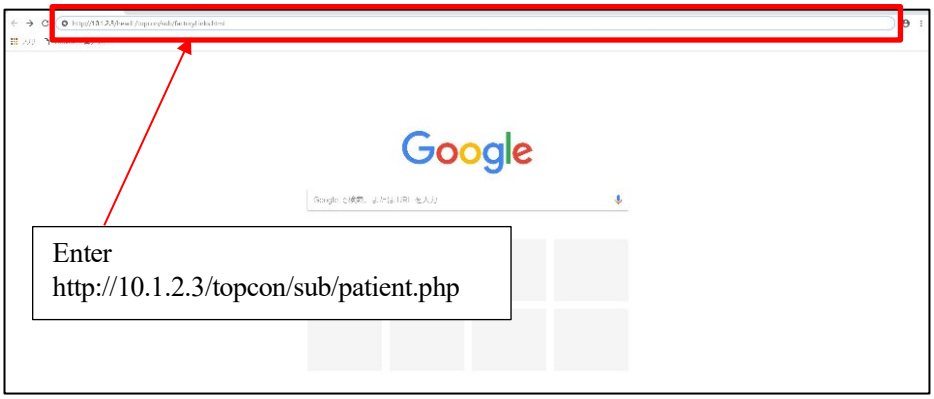
(1) Connect the second USB-LAN converter for network 2 to the CONTROL_BOX and connect the LAN cable connected to local area network.

NOTE	• Make sure the communication is active and POWER is supplied.

(2) Start the Standard GUI from the following URL.

NOTE	• Use Google Chrome.

Content	URL	Remarks
Standard GUI	http://10.1.2.3/topcon/sub/patient.php	—

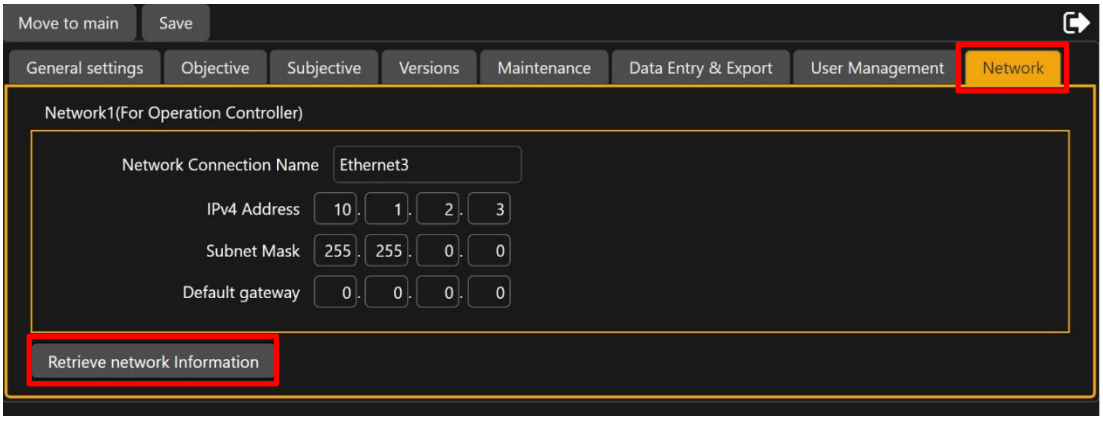


(3) Enter the Username and Password.

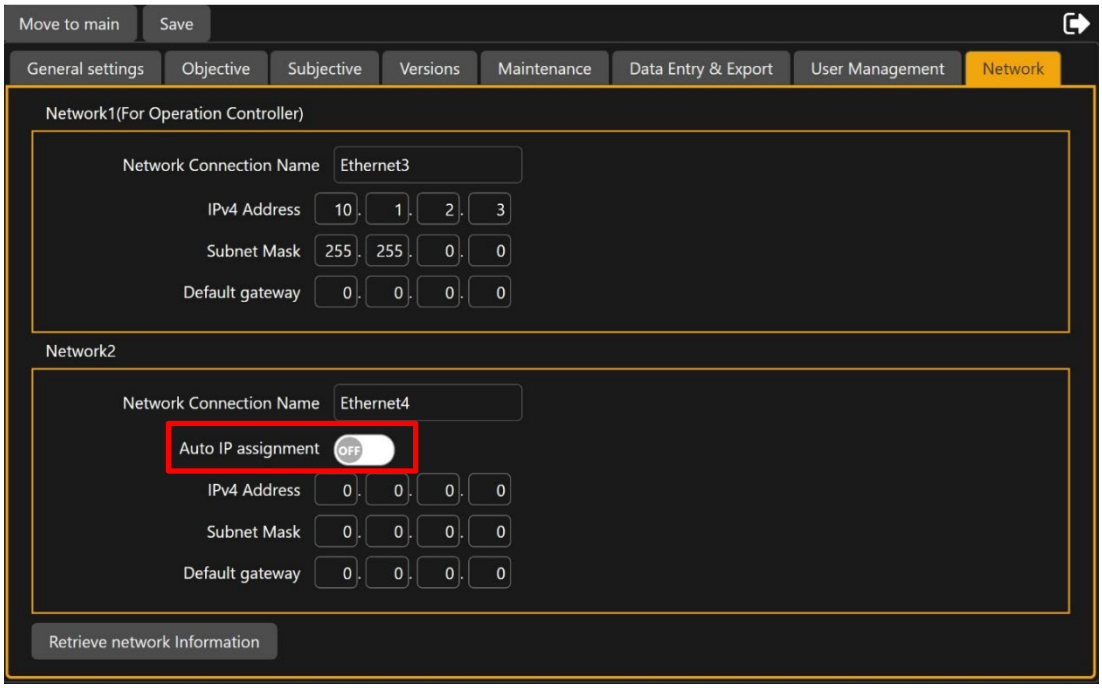
Username	**********
Password	**********

(4) Click [Setting]mark.

(5) Click［Retrieve network Information］in the "Network" tab.

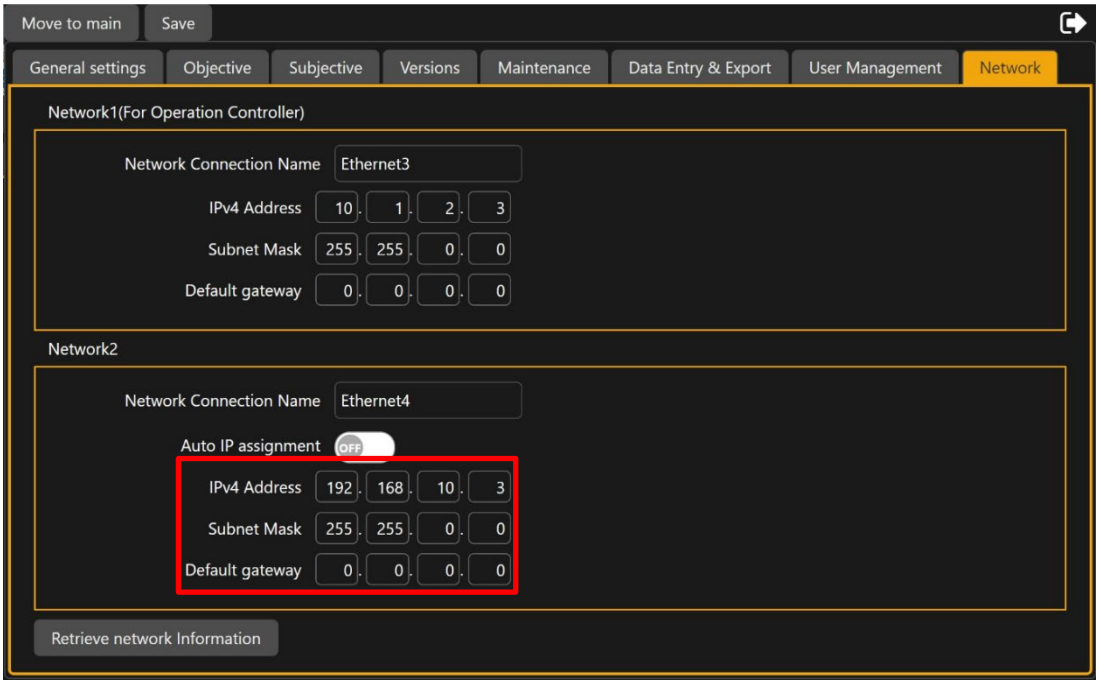


(6) Set "Auto IP assignment" to［OFF］in Network2.

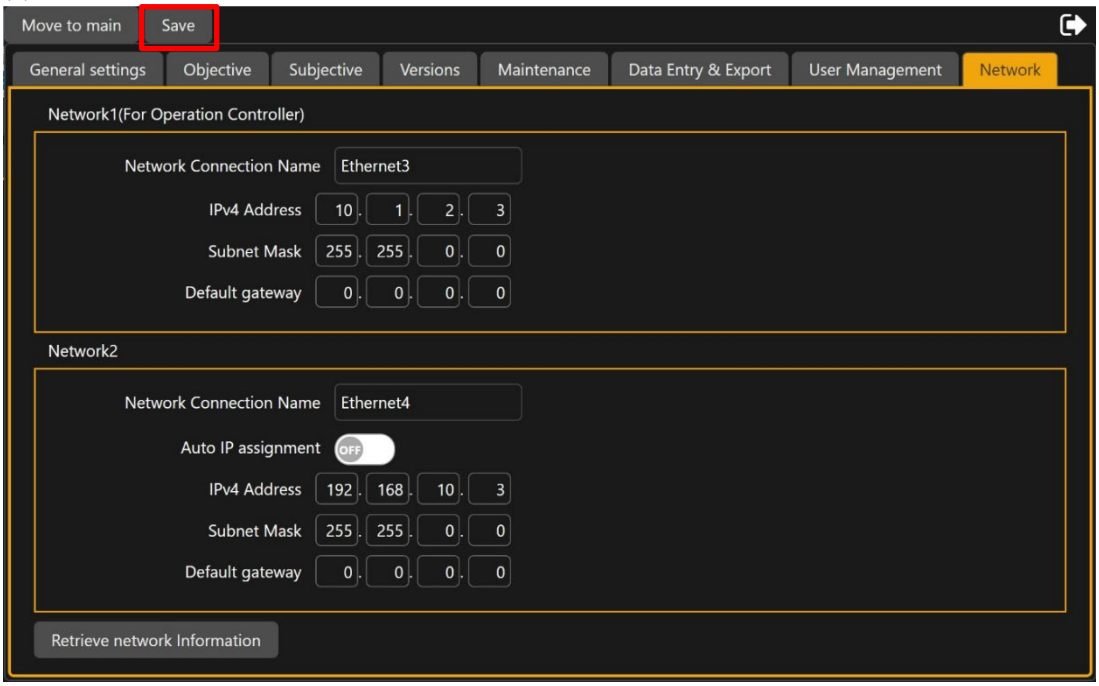


(7) Enter "IPv4 Address" and "Subnet Mask".

⚠ CAUTION	• Do not use "192.168.1.3" and "192.168.2.4", which are used for communication between CONTROL_BOX and OPT_HEAD. • Do not use IP addresses that are reserved or already in use in the existing network in the local.

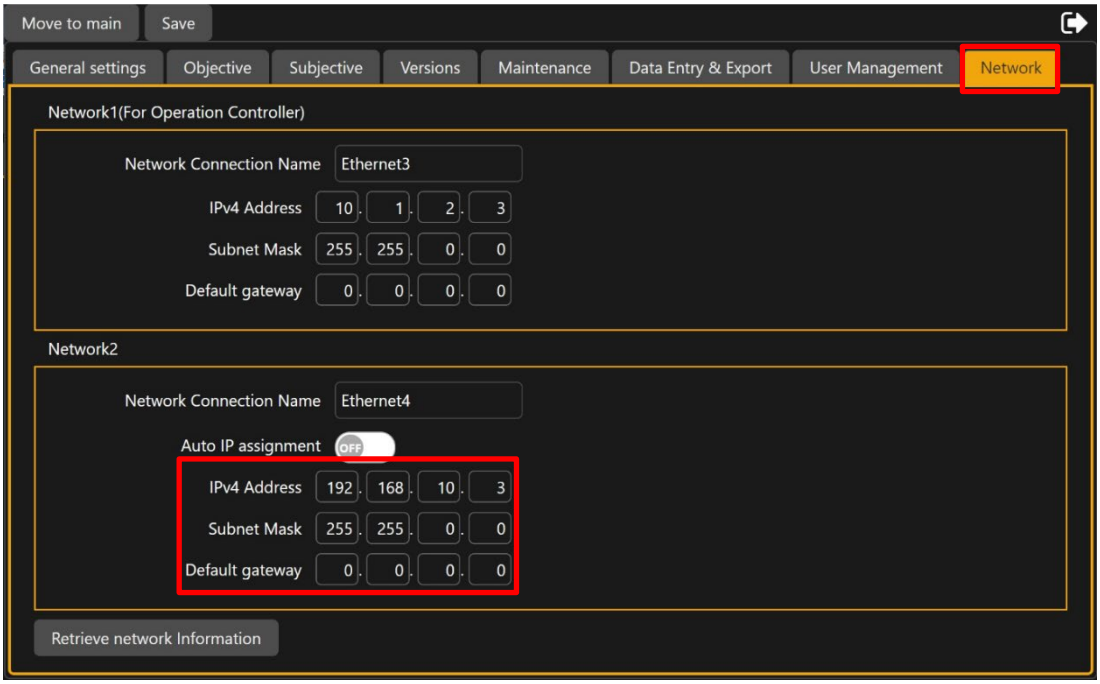


(8) Click [Save].



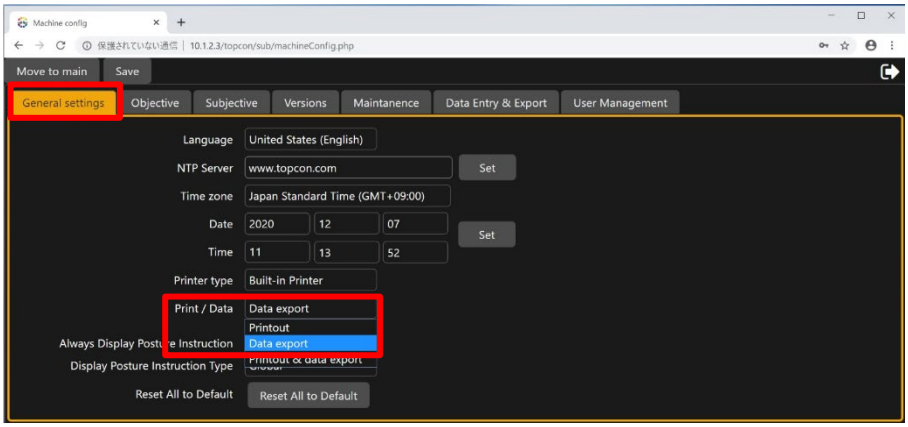
(9) Restart the device.

(10) Open the "Network" tab of the "Setting" mark and confirm that the "IPv4 Address" and "Subnet Mask" you entered are saved.

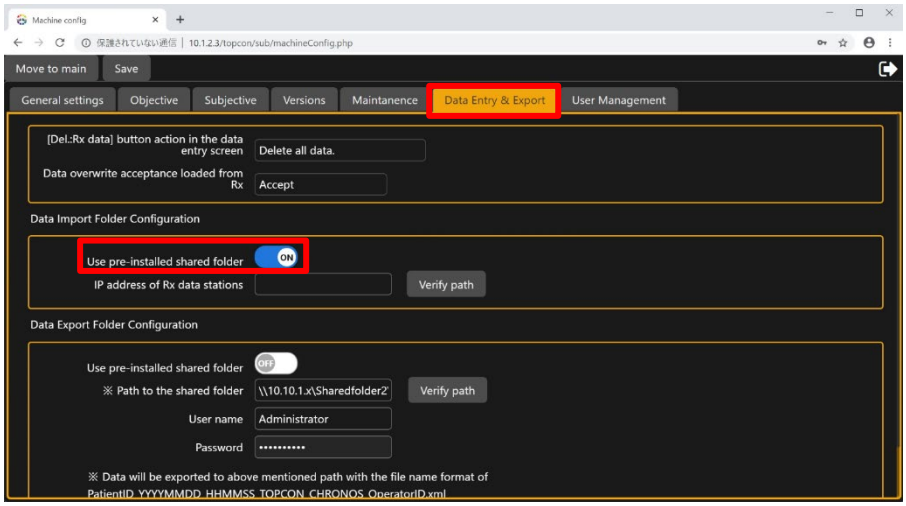


2.20.2 Shared folder settings *No IP specified, shared folder in Control BOX

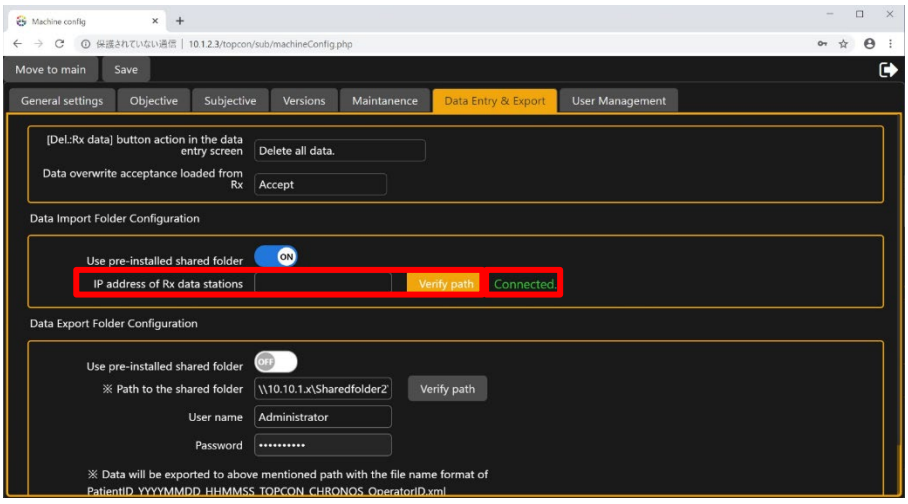
(1) Set [Print / Data] on the [General settings] tab of the setting screen to [Data export].



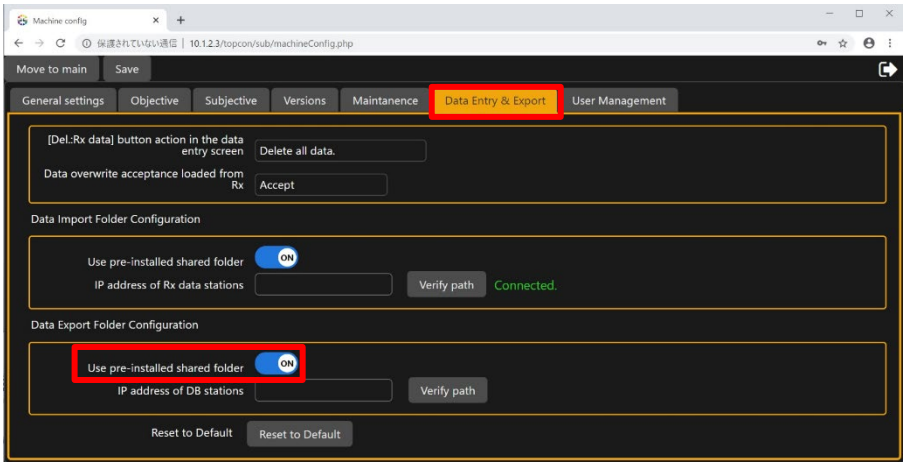
(2) Set [Use pre-installed shared folder] to [ON] in [Data import Folder configuration] on the [Data Entry & Export] tab of the setting screen.



(3) Click the [Verify path] button with the [IP address of CL / EZ data acquisition terminal] blank. [Connected] is displayed.

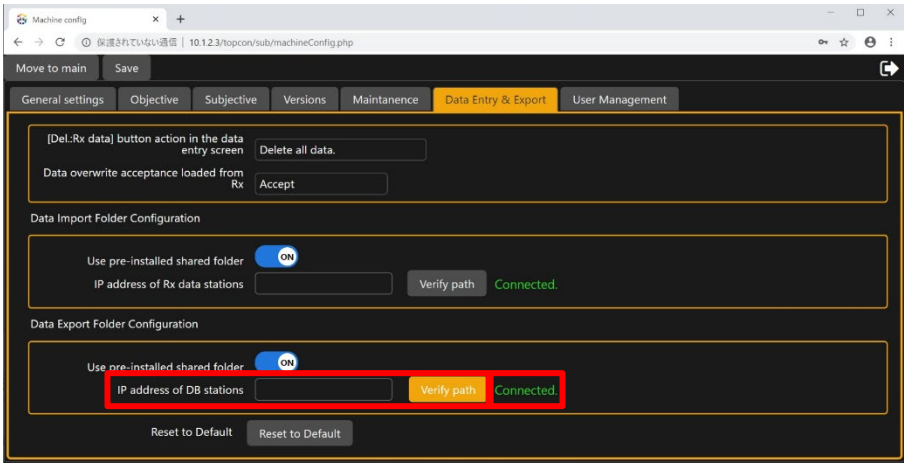


(4) Set [Use pre-installed shared folder] in [Data Export Folder Configuration] on the [Data Entry & Export] tab of the setting screen to [ON].

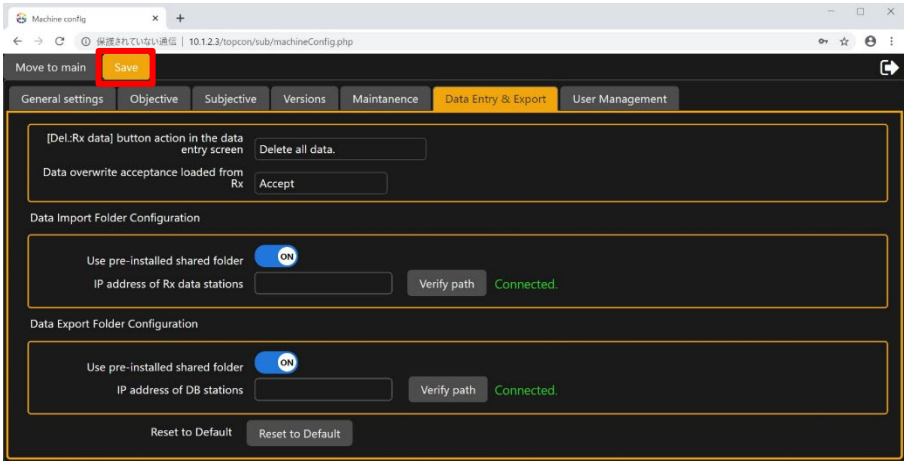


(5) Click the [Verify path] button with the [IP address for data export] blank.

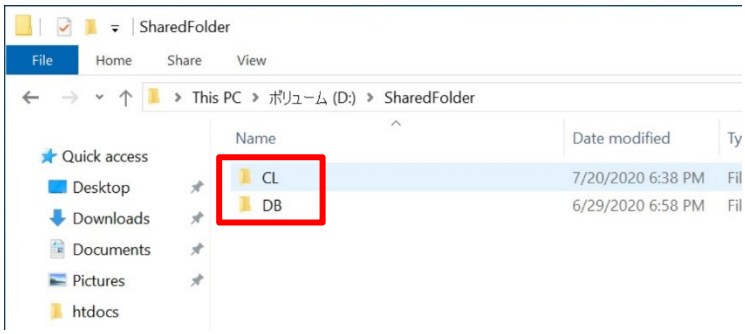
[Connected] is displayed.



(6) click the [save].

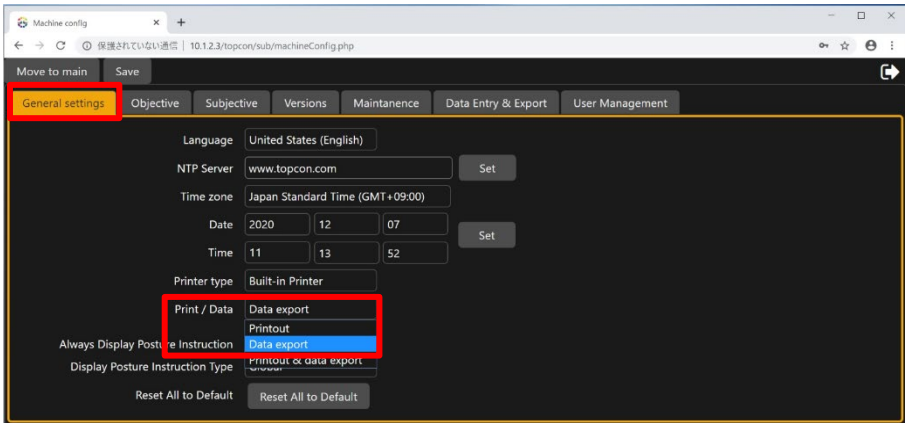


*Place it directly under Import data D: / SharedFolder / CL
*Place it directly under Export data: D:/SharedFolder/DB

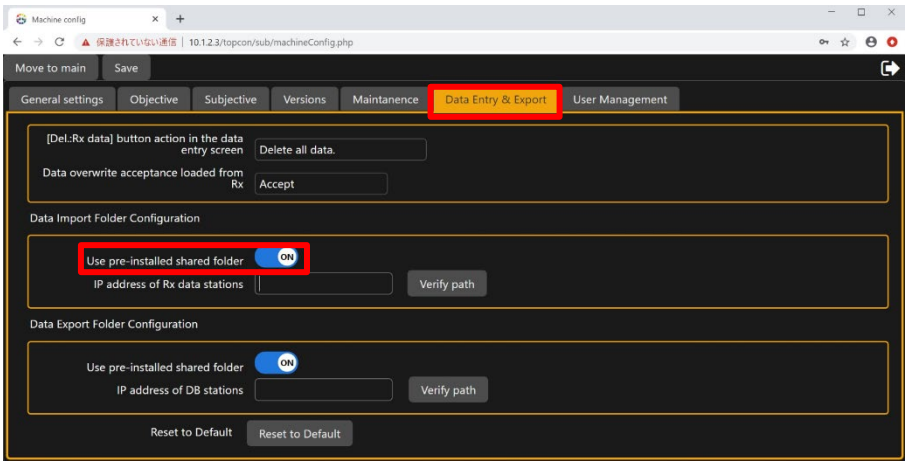


2.20.3 Shared folder settings *IP specified（When installing multiple Chronos or when importing or exporting from other Chronos）

(1) Set [Print / Data] on the [General settings] tab of the setting screen to [Data export].

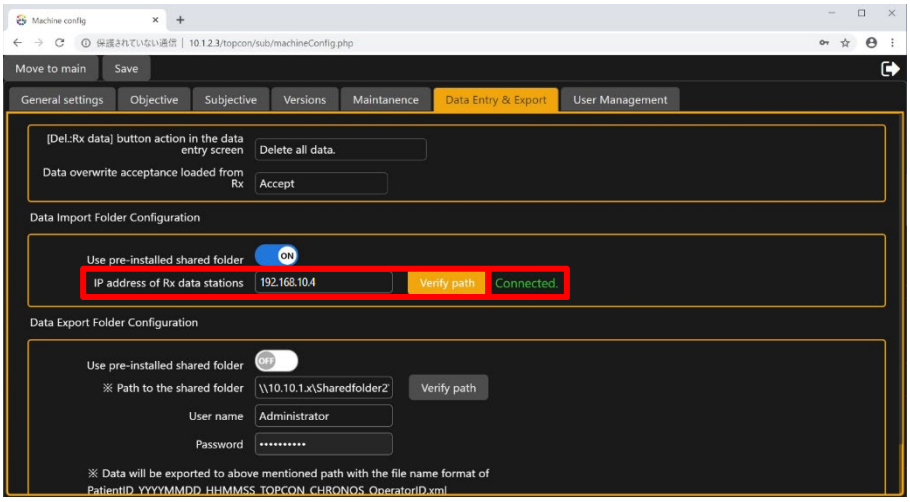


(2) Set [Use pre-installed shared folder] to [ON] in [Data import Folder configuration] on the [Data Entry & Export] tab of the setting screen.

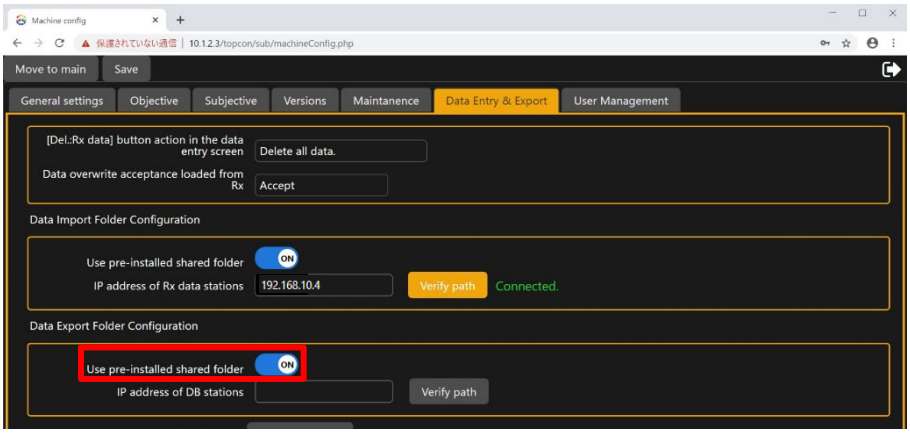


(3) Enter anIP address of the import source Chronos (e.g.: 192.168.10.4) in [IP address of CL / EZ data acquisition terminal] on the [Data import and export] tab of the setting screen. Click the [Verify path].

[Connected] is displayed.

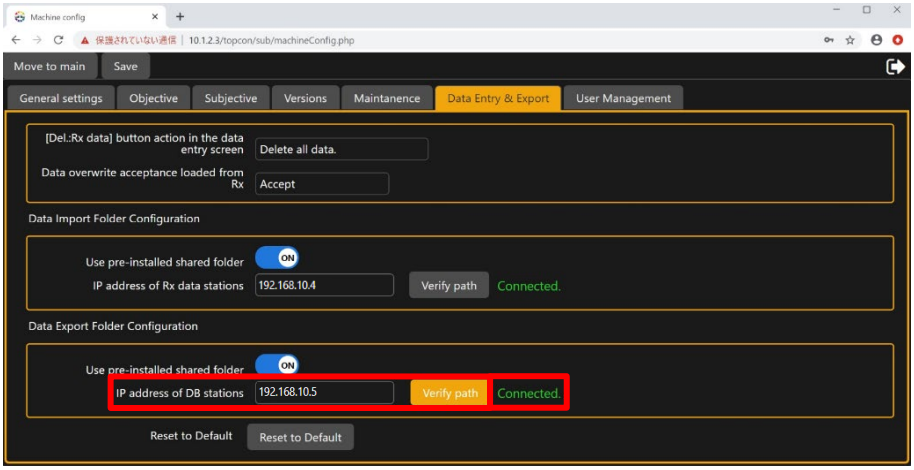


(4) Set [Use pre-installed shared folder] in [Data Export Folder Configuration] on the [Data Entry & Export] tab of the setting screen to [ON].

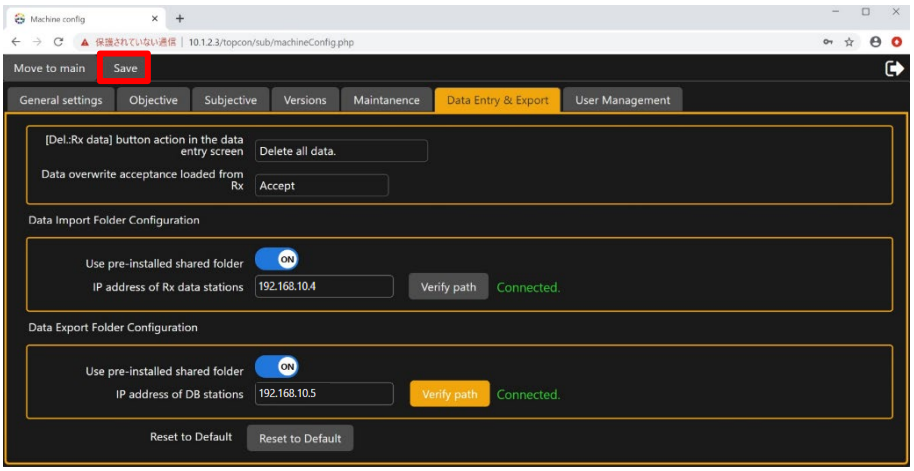


(5) Enter an IP address of the export destination Chronos (e.g.: 192.168.10.5) in [IP address for data export] on the [Data Entry & Export] tab of the setting screen and click the [Verify path].

[Connected] is displayed.

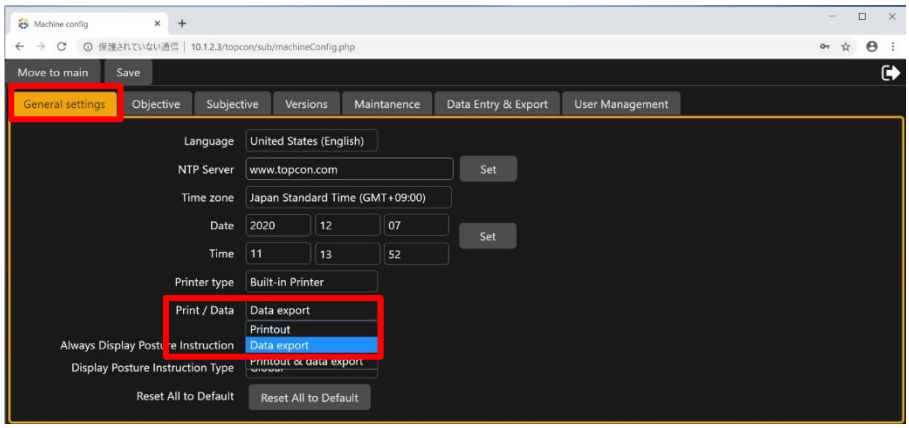


(6) Click the [Save].

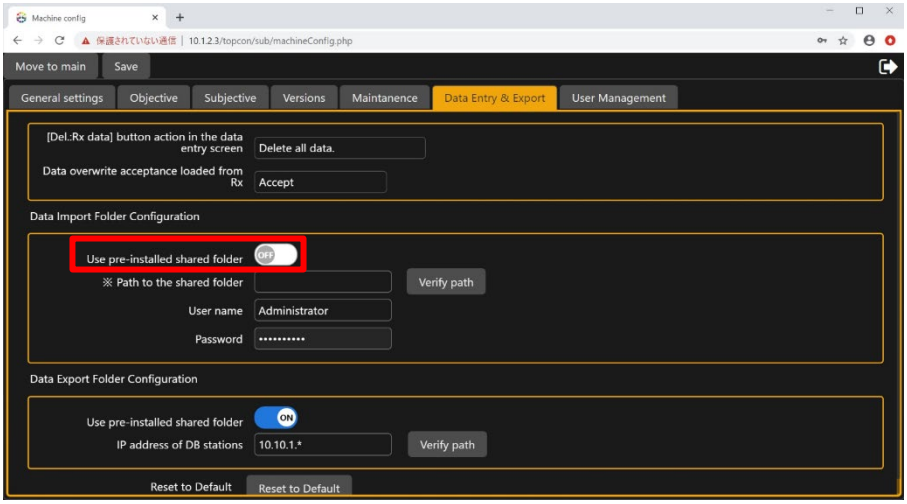


2.20.4 Shared folder settings *Use an external shared folder

(1) Set [Print / Data] on the [General settings] tab of the setting screen to [Data export].



(2) Set [Use pre-installed shared folder] to [OFF] in [Data import Folder configuration] on the [Data Entry & Export] tab of the setting screen.



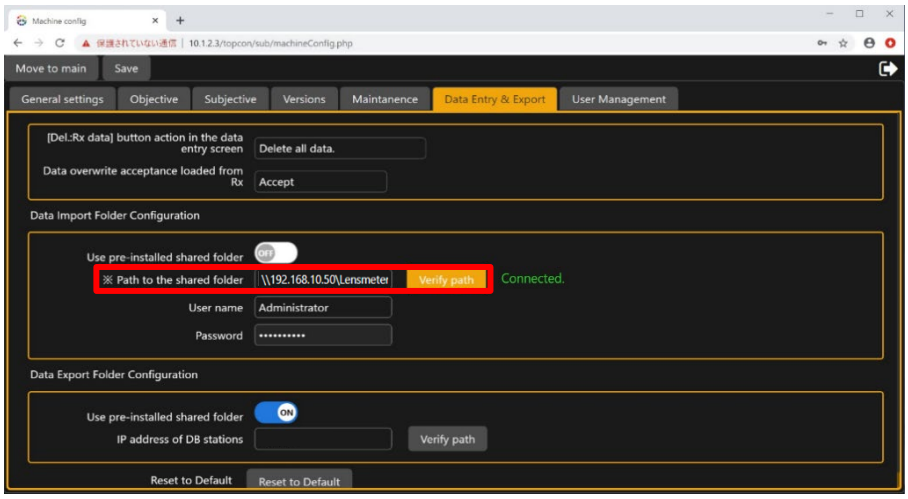
(3) Enter the information below in [Data Import Folder Configuration]. Then, click [Verify path].

・Path to the shared folder: ¥¥IPaddress¥ shared folder name (e.g.: ¥¥192.168.10.50¥Lensmeter)

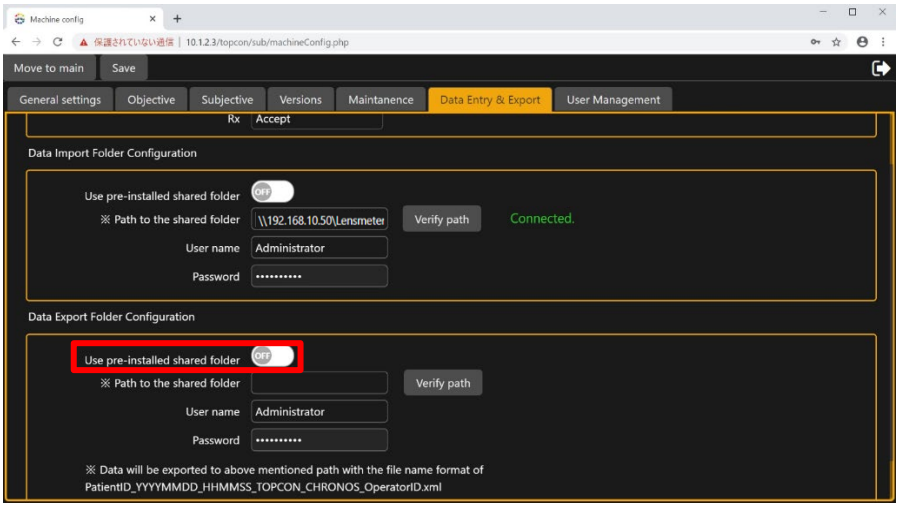
・User name: Username with access to the shared folder (e.g.: Administrator)

・Password: Password for the above username (e.g.: Topcon1932)

(4) [Connected] is displayed.



(5) Set [Use pre-installed shared folder] in [Data Export Folder Configuration] on the [Data Entry & Export] tab of the setting screen to [OFF].



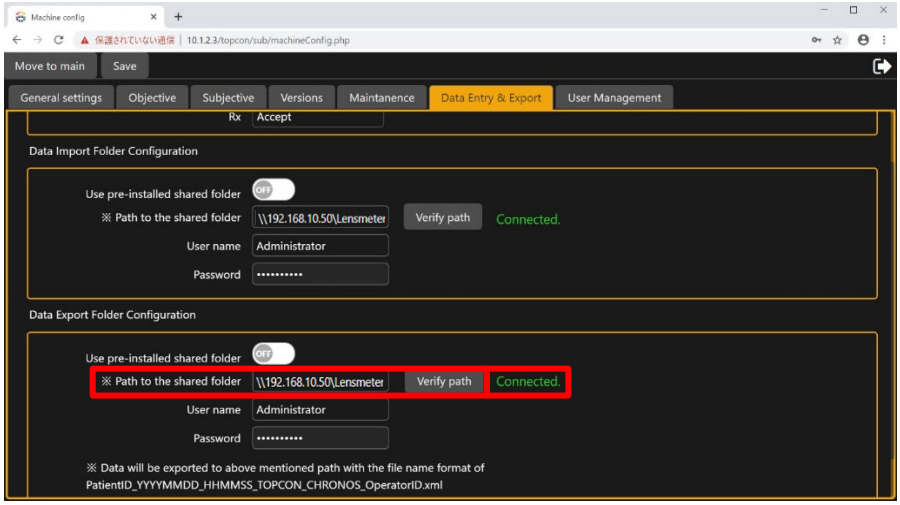
(6) Enter the information below in [Data Import Folder Configuration]. Then, click [Verify path].

・Path to the shared folder: ¥¥IPaddress¥ shared folder name (e.g.: ¥¥192.168.10.50¥Chronos)

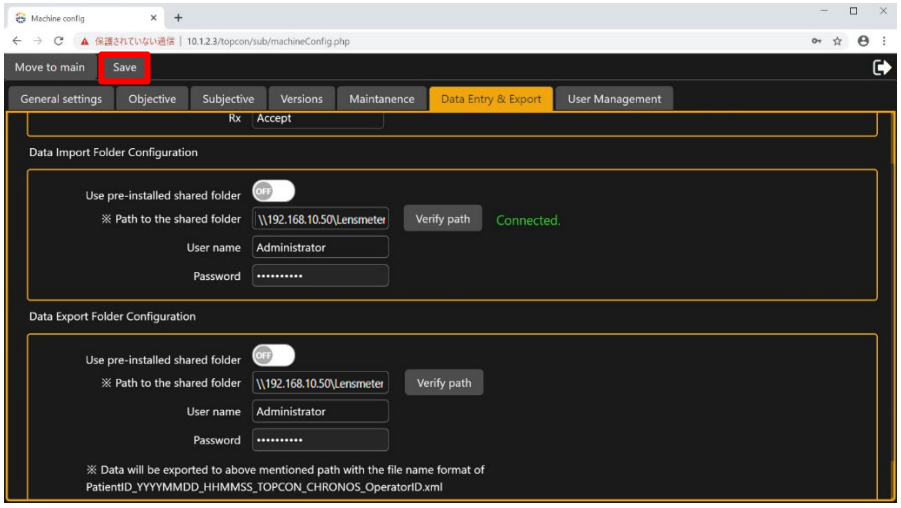
・User name: Username with access to the shared folder (e.g.: Administrator)

・Password: Password for the above username (e.g.: Topcon1932)

(7) [Connected] is displayed.



(8) Click the [Save].



3. Check sheet

3.1 Installation Check sheet for Chronos

Date of Installation (yyyy/mm/dd) :	Company name :
Serial Number（S/N）:	Person in charge Signature :

*Use Installation manual and Instruction manual in combination.

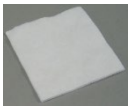
No	Items of check	Method Standard value	Necessary tools	Reference Chapter	Check L	Check R
1	Check the table tilt	With using the level, confirm the tilt for table	level	Chapter 2.2(1)	☐	
2	Check indicator of base unit	LED indicator of base unit is blinking in Green during initial moving after power on. And LED lights in Green after initial set.	—	—	☐	
3	Check α axis for Optical head	Standard: ±30′ (L/R) difference between L and R: within 10′	Test eye holder (PD65) αβθ fusion adjustment diopter telescope tool	Chapter 2.5.4(2)	Positive ′	′
				Appendix 5.1.4	Amount of eccentricity ′	′
				Chapter 2.5.4(2)	Difference from the axis of rotation ′	′
				—	difference: ′	
4	Check β axis for Optical head	Standard: ±30′ (L/R) difference between L and R: within 30′	↓	Chapter 2.5.4(2)	′	′
				Chapter 2.5.3	difference: ′	
5	Check θ axis for Optical head	Standard: ±30′ (L/R) difference between L and R: within 10′	↓	Chapter 2.5.2(2)	Positive ′	′
				Appendix 5.1.4	Amount of eccentricity ′	′
				Chapter 2.5.2(2)	Difference from the axis of rotation ′	′
				—	difference: ′	
6	Check XYZ adjustment. for Optical head	"Result": OK is displayed (L/R) Measure△X△Y△Z: within 0.1 (L/R)	Test eye holder (PD65) Test eye with pupil (-5D)	Chapter 2.7(8)	☐	☐
7	Check detection of forehead	Push forehead by hand. And release it after objective measurement start, then check Error message is appeared.	—	Chapter 2.10	☐	
8	Accuracy check of refract measurement	Measure (-5D) after auto alignment. (L/R) Standard: -5D(indicated value) ±0.25D	Test eye holder (PD65) Test eye with pupil (-5D)	Chapter 2.11	D	D
9	Check PD measurement	Measure (-5D) after auto alignment. (L/R) Standard: 65mm ±1mm	↓	Chapter 2.12	mm	

10	Accuracy check of corneal coverture	Measure (R8) after auto alignment (L/R) Standard : (R indicated value) ±0.05mm	↓	Chapter 2.13	R1 mm R2 mm	mm mm
11	Check the change of visual acuity chart	Push the changing button of visual acuity chart. Check the changing of visual chart kind (L/R)	—	Chapter 2.14	☐	☐
12	Check 0D for subjective measurement	Check focus of 0D in observation of Landolt ring by using diopter telescope tool. In equipment settings screen, set test (far) distance of 4m in subjective tab and save. Next go to subjective test screen. Display visual acuity chart of smallest size. Set "S" value to "+0.25D" both side(L/R). Look into the diopter telescope and make sure that the focus of scale in the telescope and the focus of center chart in visual acuity chart should be same in focus. After checked, return to original test distance.	Test eye holder (PD65) αβθ diopter telescope *adjust eye peace of the diopter telescope for visibility of the subject	Chapter 2.15	☐	☐
13	Check appearance	Check no stains and scratches by visually	—	—	☐	

Judgement	Remarks:
☐Pass ☐Fail	

4. List of Used Tools

4.1 Used Tool List

Name of the tool	Tool No.	Appearance
Test eye holder (PD65)	CHR-01	
αβθ diopter telescope *Components: Diopter Telescope (CHR-02), Stereo Camera Screw, Misalignment-preventive metal fitting, Power cable NTSC－USB Converter cable	CHR-032	
Test eye with pupil (-5D)×2	CHR-03	
Wrench	-	
Level Precision : ±2.5mm/m = Up to ±0.14° Sensitivity: ±0.5mm/m = Up to ±0.03°	-	
PC or tablet PC For PCs Operating system: Windows10 For tablet PCs: iPad OS 13	-	
Screwdriver	-	
Hex wrench	-	
Blower	-	
Cotton Seagull (or Microstar)	-	 

finger cot	-	
incandescent bulbs light（Tungsten etc.）	-	-
For forehead rest and exterior cover Neutral detergent for tableware	-	
For measuring lenses SH-11、ethanol	-	
For measuring mirror Fluorine solvent	-	

4.2 Tool Software List

Tool software name	Intended use	Image
Google Chrome	web application tool software	
ipsetting_L_Control_Box.bat	Connecting to PC network	
Chronos_Link_20200413_J_html	Google Chrome Bookmark Setting	
Calibration tool	αβθ axis confirmation and adjustment of the OPT_HEAD.	

5. Appendix

5.1 About the Diopter Telescope

Purpose

To understand clearly about how to use a Diopter Telescope and concept of eccentricity error, explained about concept of eccentricity error and how to identify and measure the amount of eccentricity.

5.1.1 What is a dioptric telescope?

A diopter telescope can create any diopter from the +4D to -4. 5D. Used primarily for telescope dioptric measurement, variable telescope dioptric displacement measurement, binocular left-right dioptric measurement, and angle measurement of real visibility, and in Chronos, it is used to adjust the position of the LCOS chart.

5.1.2 Part Names and Roles

(1) Seat plate

This is for making it easier to bring the diopter into close contact with the tip of the objective tube, the objective lens, and the eyepiece of the telescope during measurement.

(2) Diopter scale

Used to measure the diopter of the telescope. This scale is engraved at 0. 5D intervals from the +4D to-4. 5D.

(3) Diopter scale target

Indicates the current diopter position.

(4) Diopter scale target fixing screw

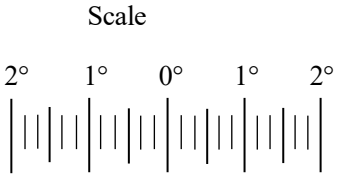
Fix the eyepiece.

(5) Scale

Used to measure angles, such as the field of view of the telescope. This scale is engraved at 10-minute intervals, 7 degrees left and right, centered at 0 degrees in the center. For readability, the scale line is long at every 1 ° and 30 minutes.

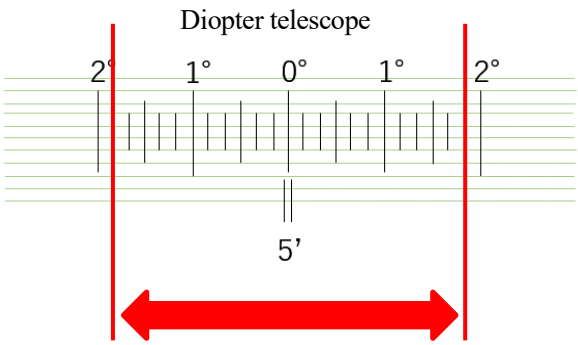
(6) Partial scale

Used to correct for when the measured eye's diopter is not normal. For example, if a measuring person wearing 2D glasses uses a diopter with the naked eye, adjust the scale by rotating the eyepiece so that the-2D point on the scale matches the diopter index. If the diopter of the eye is unknown, rotate and adjust the eyepiece until the scale is clearly visible. This scale is engraved at 0. 5D intervals and is designed to rotate more than ±4D.

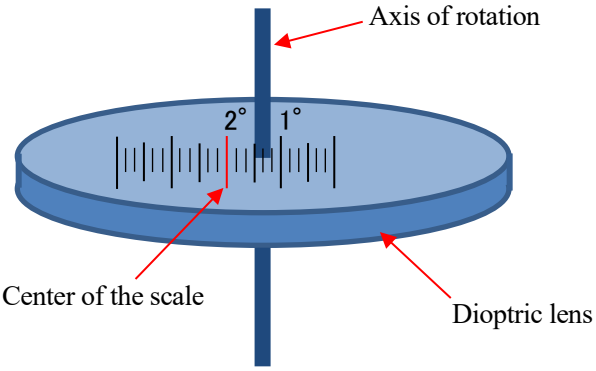


5.1.3 What is the eccentricity error?

Eccentricity error refers to the error caused by the center of the scale not coinciding with the center of the rotation axis. There is an individual difference in the eccentricity, and there is no diopter telescope with the same eccentricity. In Chronos, the position of LCOS charts is adjusted using the scale, so the eccentricity error must be taken into consideration.



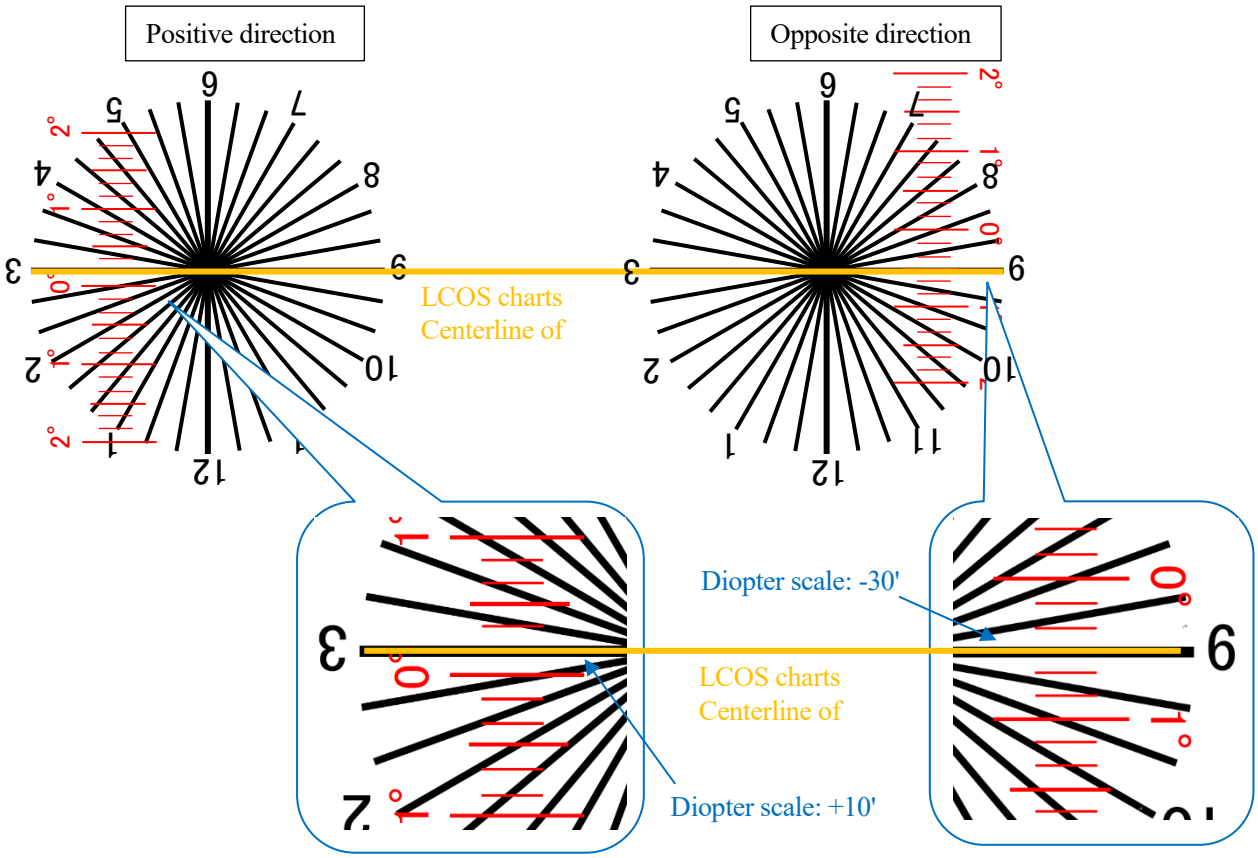
There is an individual difference in the amount of eccentricity



5.1.4 Elimination of eccentricity error

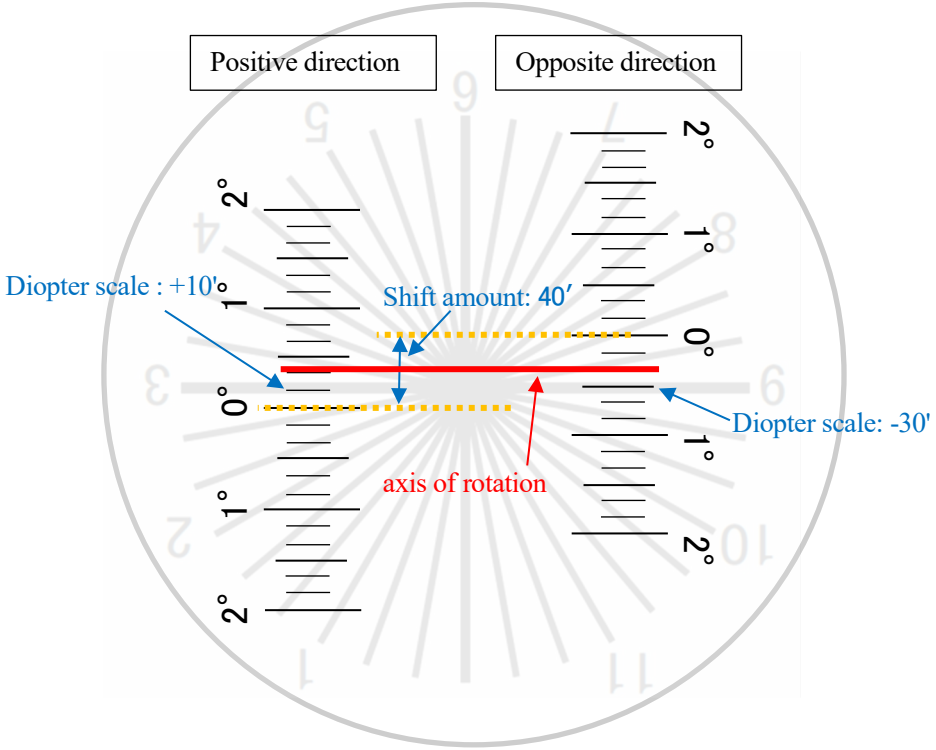
To measure the amount of eccentricity, it is necessary to measure the dioptric telescope in the opposite direction and take the average value. In other words, the amount of eccentricity is the value by halving the difference between the value measured in the "positive" direction and the value measured in the "opposite" direction.

NOTE	In the following cases When measured in the "Positive" direction, the center line of LCOS chart is at +10' of the desired diopter telescope scale. When measured in the "opposite" direction, the center line of LCOS chart is at the position of-30' of the desired diopter telescope scale.



NOTE	To measure the amount of eccentricity in the "Positive" direction, Since the amount of eccentricity = direction of "positive" – direction of "opposite" /2, it is 20'= (10') - (-30')/2 in other words, the diopter telescope scale is 20'shifted (eccentric), and the 20' position of the scale is the axis of lotation. To measure the amount of eccentricity in the "Oppisite" direction, the amount of eccentircity = direction of "opposite" - direction of "positive" /2

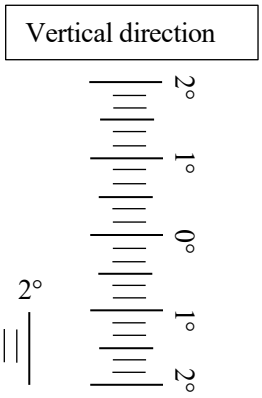
(1) Therefore in this case, adjust the LCOS chart to the position of the diopter telescope scale 20'.

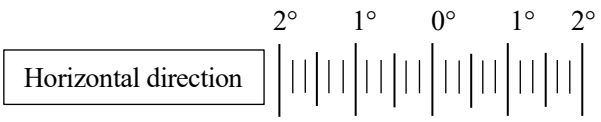


CAUTION	The diopter telescope used in Chrono has an attachment glued to it for placing in the model eye holder. In addition, the diopter scale is also glued and fixed in place. As this attachment has a pin for the diopter telescope scale to hold the vertical and horizontal directions, please be careful not to loosen the attachment. Also, be careful not to move the diopter scale.

Model eye holder (CHR-01)

When setting in the model eye holder, it is necessary to maintain the following direction



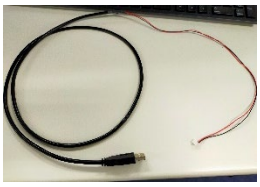


5.2 【CHR-32 αβθ diopter telescope】 Assembly Procedure

Purpose

CHR-32 is an improved version of CHR-02 which problems of CHR-02 have been solved. This procedure is for those who purchased only CHR-02 and explains how to install Stereo Camera and Metal Fitting for preventing the misalignment.

Required Tools

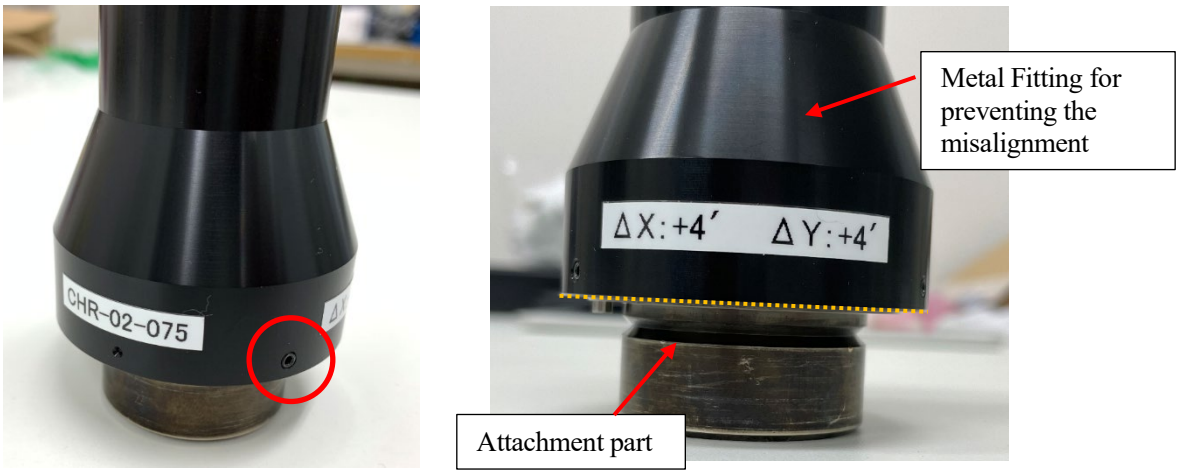
Tool name	Tool No.	Image
αβθ diopter telescope	CHR-02	
Stereo Camera	-	
Metal Fitting for preventing the misalignment.		
Power cable		
NTSC－USB Conversion cable		
Hex wrench	-	

5.2.1 Assembling the Metal Fitting for preventing the misalignment.

(1) Attach the Metal Fitting to αβθ diopter telescope.

(2) Fix it by three Hex screws.

NOTE	Please be sure that the Metal Fitting is flush with attachment part when fixing.

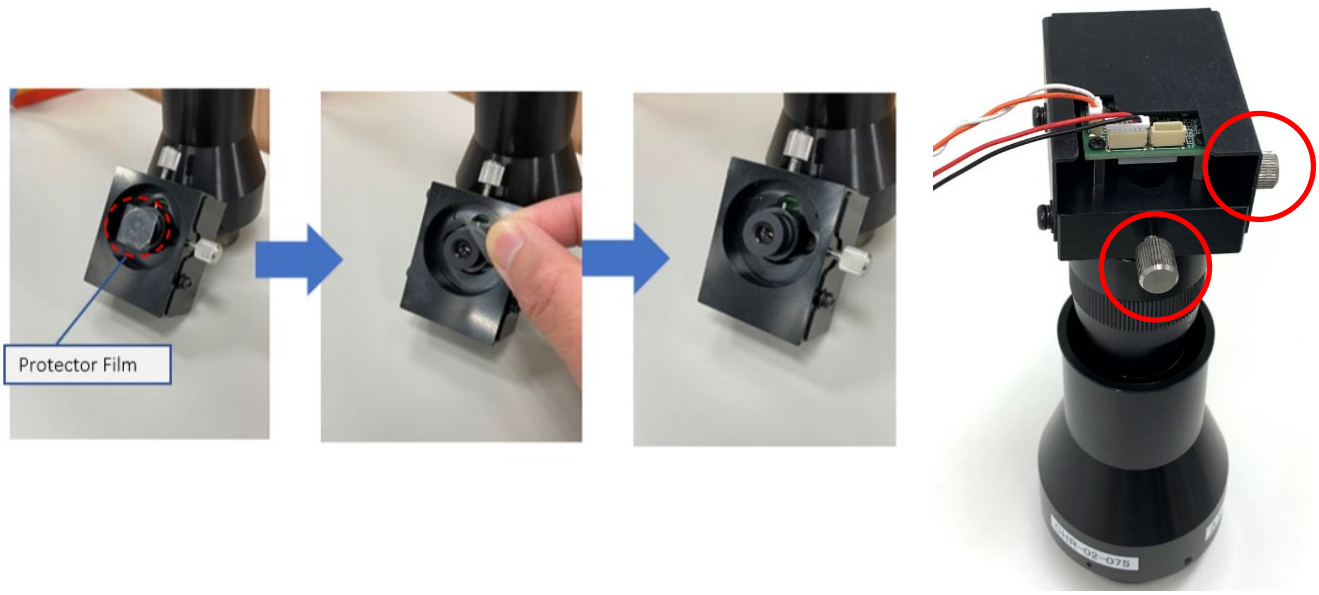


5.2.2 Assembling Stereo Camera

(1) Remove a part of αβθ diopter telescope pointed by red arrow in the below picture.

(2) Set the attachment of Stereo Camera to αβθ diopter telescope.

(3) Peel the protector film on the lens of Stereo Camera and fix it on the attachment by two screws.



5.3 How to connect CL-300 PDL to Chronos

5.3.1 Purpose

The connection and operation procedures for importing measurement data from CL-300 PDL to Chronos are described.

5.3.2 Required Tools

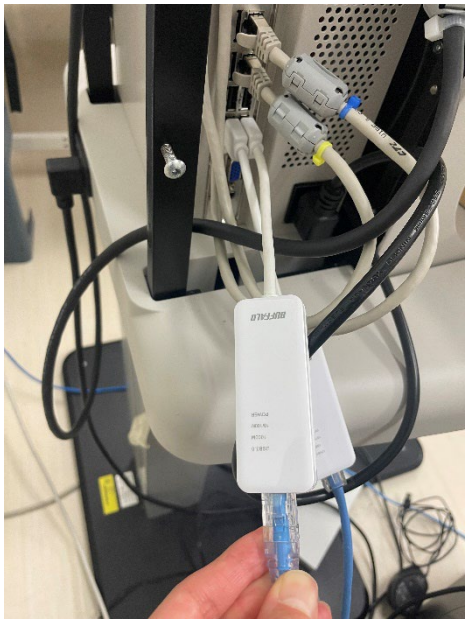
Tool name	Tool No.	Image
Laptop (LAN cable also needed for wired network)	—	
USB-LAN converter, LAN-cable	—	

5.3.3 Connecting CL-300 PDL to Chronos

NOTE

- Chronos control box does not have any additional LAN ports. Insert USB-LAN converter into USB3.0 port.
- USB-LAN converter connected in Chapter 2.3 is for Network1. In this case, connect additional USB-LAN converter for Network2.

CL-300 PDL



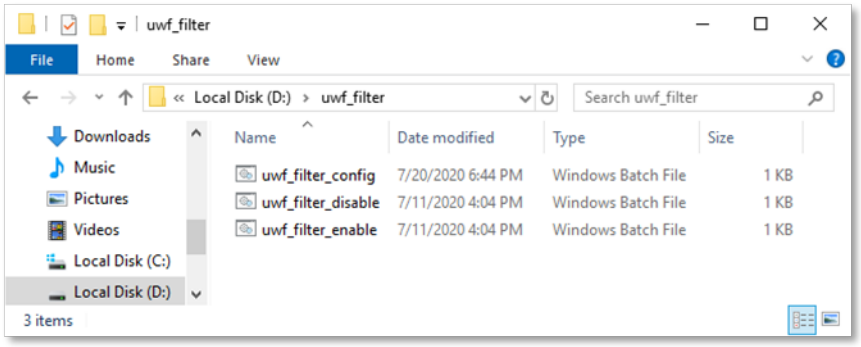
Chronos

5.3.4 Enabling SMB1.0 Supporting in Chronos Control Box

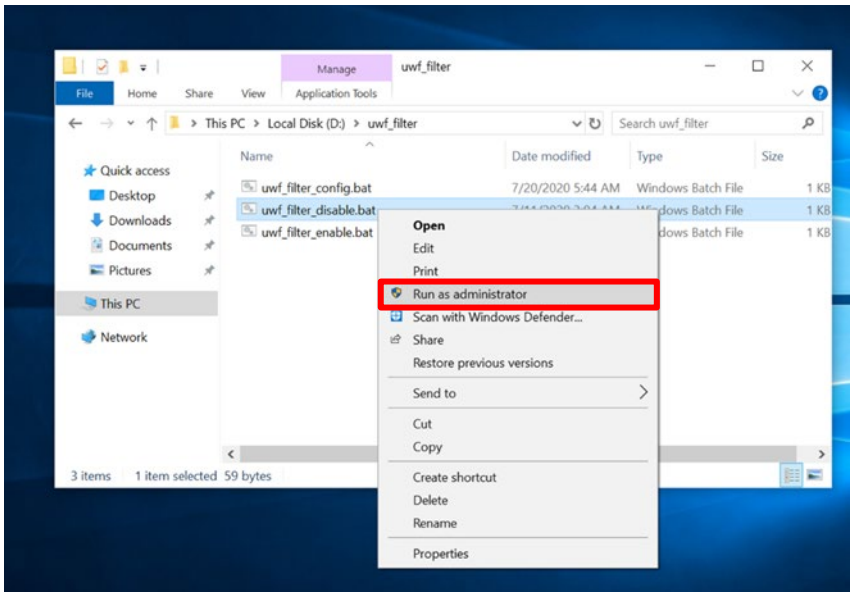
(1) Turn on Chronos control box.

(2) After the system starts up, access to it with using the remote desktop and open folder D:¥ uwf_filter.
Refer to Chapter 2.3 and 2.5 for how to connect to the control box with the laptop.
Information needed for connecting with remote desktop are as follows.

Computer	Username	Password
IP address of network 1 (default: 10.1.2.3)	Topcon	Topcon password (default: Topcon1932)



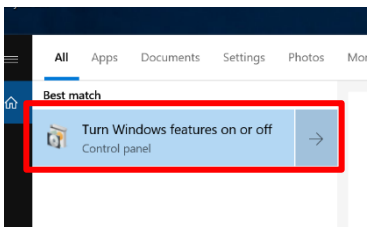
(3) Select "Run as administrator" from the contextual menu that appears by right-clicking uwf_filter_disable.bat.



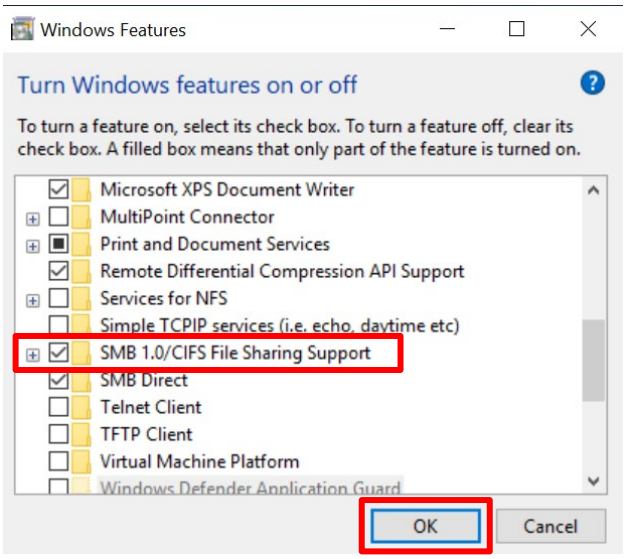
(4) When "User Account Control" dialogue box is displayed, select [Yes] button.

(5) The system will restart automatically.

(6) When the system restarts, type "Turn windows" in the search box on the taskbar and select "Turn Windows features on or off" displayed in the search candidates.

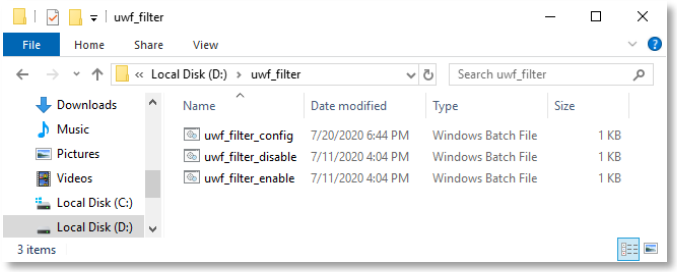


(7) When "Turn Windows features on or off" dialog is displayed, select the checkbox in which "SMB1.0/CIFS File Sharing support" and press [OK] button to close the dialog.

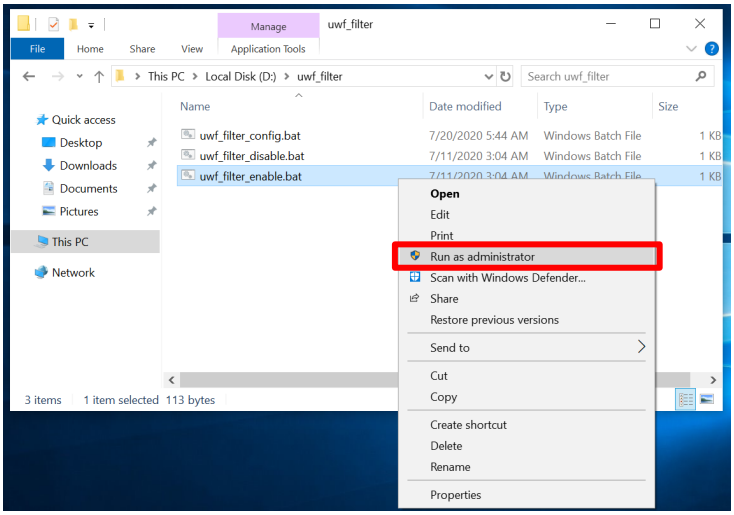


(8) A dialog box prompting you to restart the system is displayed. Press [Restart now] to restart the system.

(9) When the reboot is complete, start File Explorer and open uwf_filter folder on D-drive.



(10) Right-click the batch file labeled uwf_filter_enable in the folder and select "Run as administrator" from the contextual menu.



(11) When the "User Account Control" dialogue box is displayed, select [Yes] button.

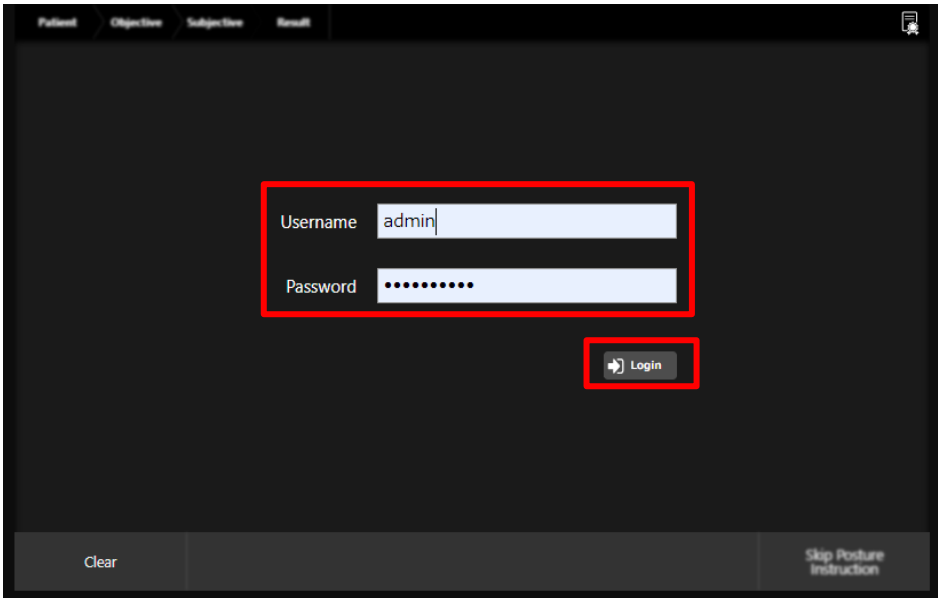
(12) The system will restart automatically.

5.3.5 Standard GUI settings

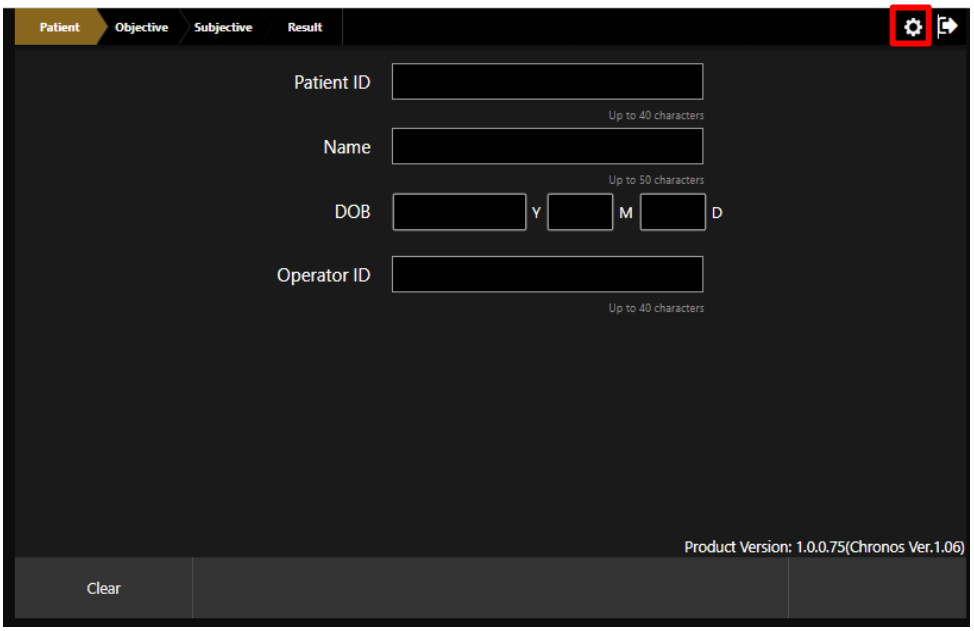
(1) Connect http://10.1.2.3/topcon/sub/login.php with the laptop.

(2) Enter user name and password and log in. *The default is below.

Username	Password
admin	Topcon@123

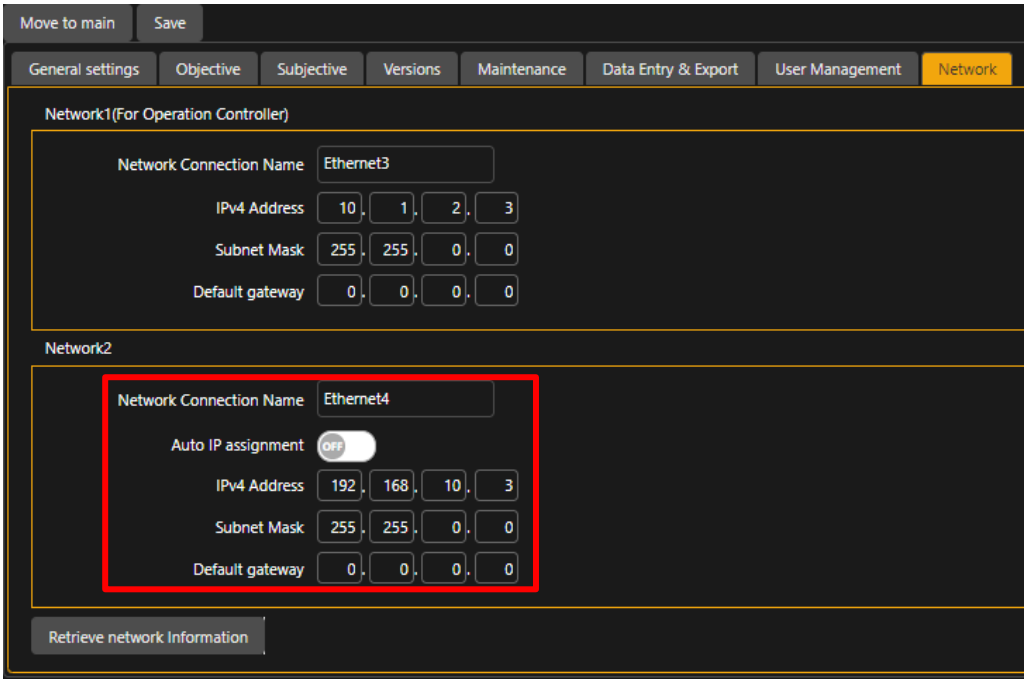


(3) Click Settings button.

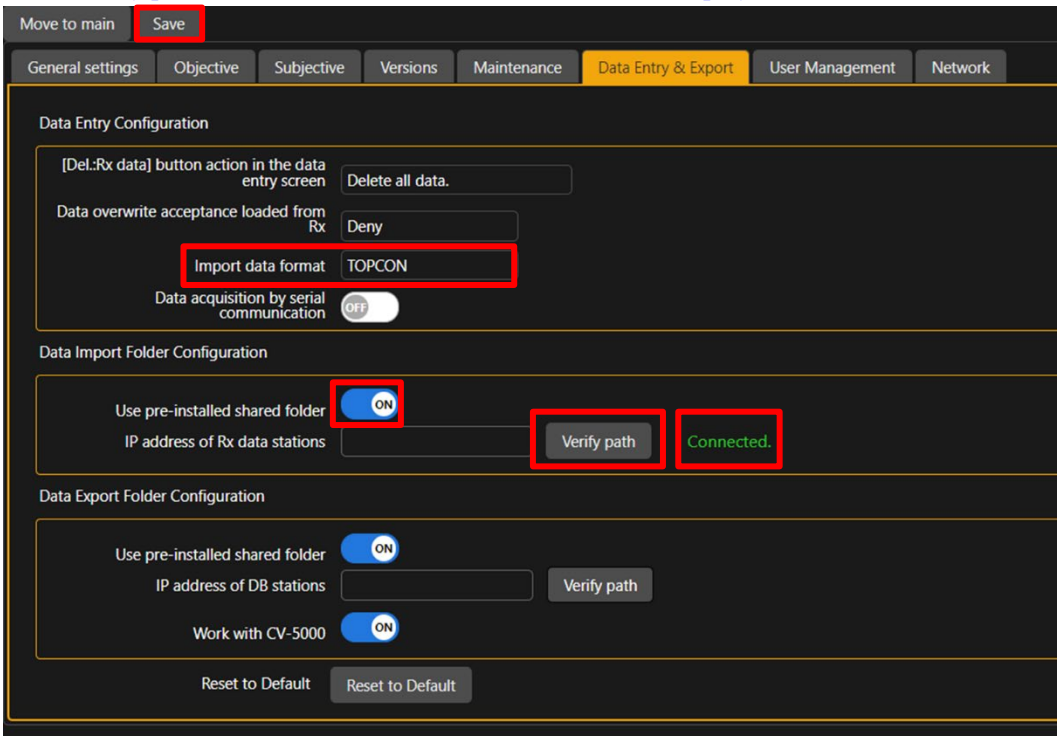


(4) Open [Network] tab, enter it in [Network 2].

IP address	Subnet Mask	Default gateway
192.168.10.3	255.255.0.0	0.0.0.0

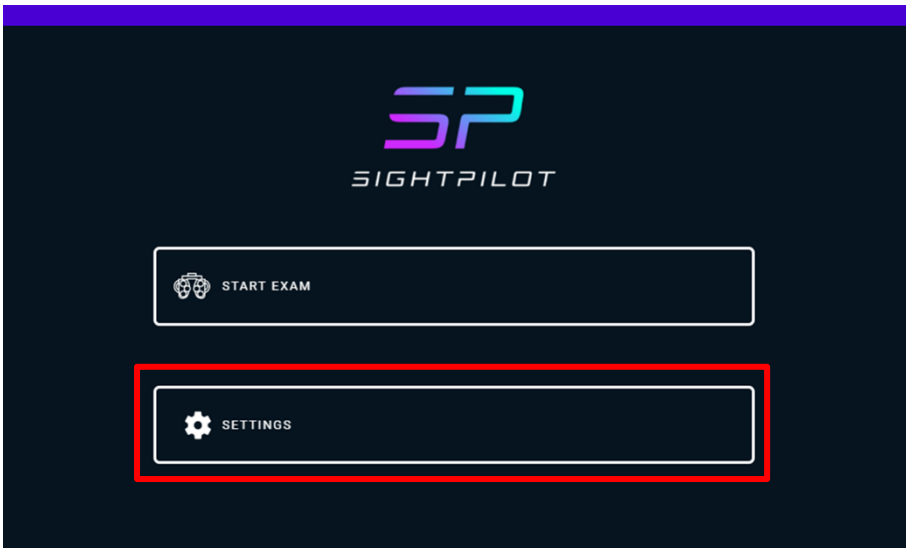


(5) Open [Data Entry & Export] tab, set "Import data format" to "TOPCON", and select "Use pre-installed shared folder" in "Data Import Folder Configuration".
Path of preinstalled shared folder: D:¥ SharedFolder¥cl
Click "Verify path" button and confirm that "Connected." is displayed, then click [Save] at the top.

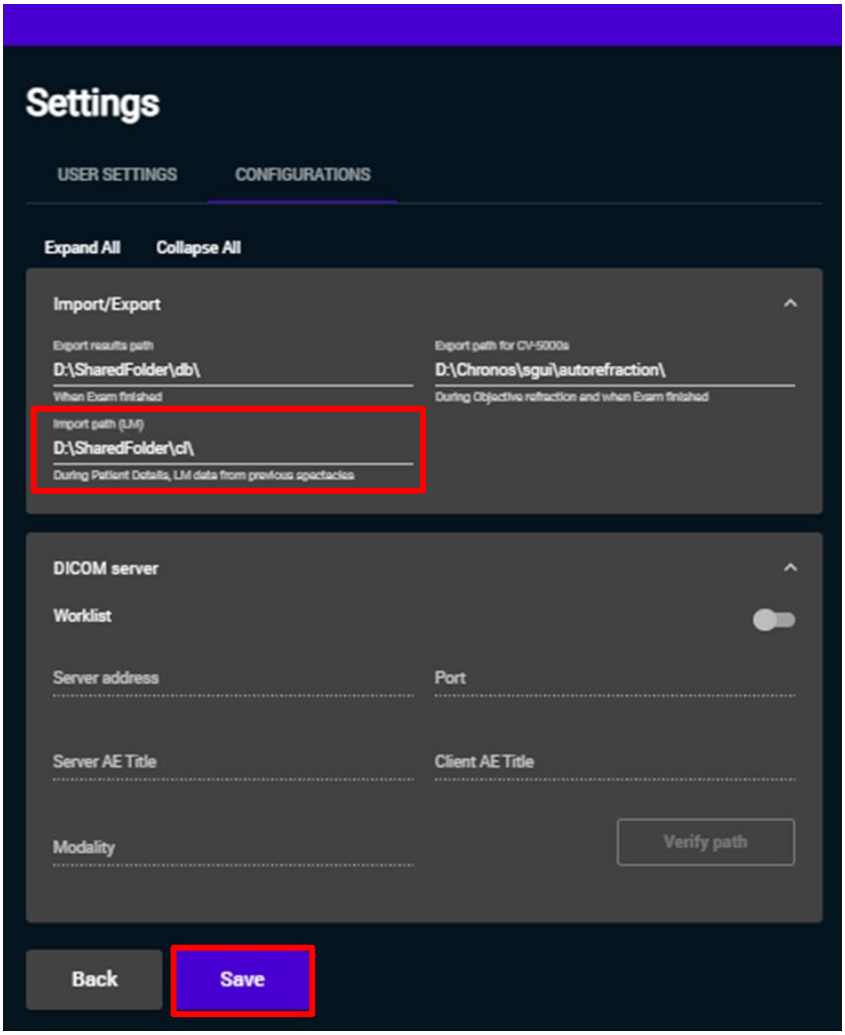


5.3.6 SightPilot settings

(1) Connect to http://10.1.2.3/sgui with the laptop and press Settings.



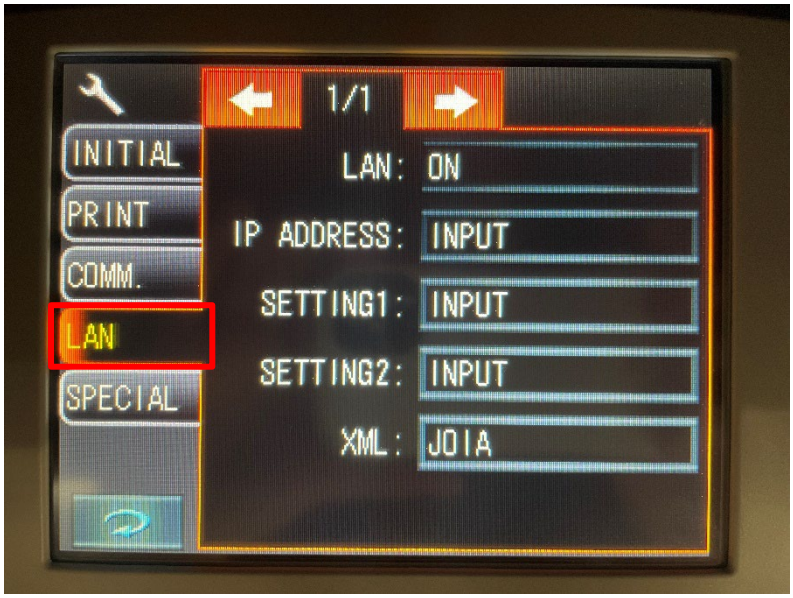
(2) Type D:¥ SharedFolder¥cl¥ in [Import path (LM)] and click [Save].



5.3.7 CL-300 PDL Connect Settings

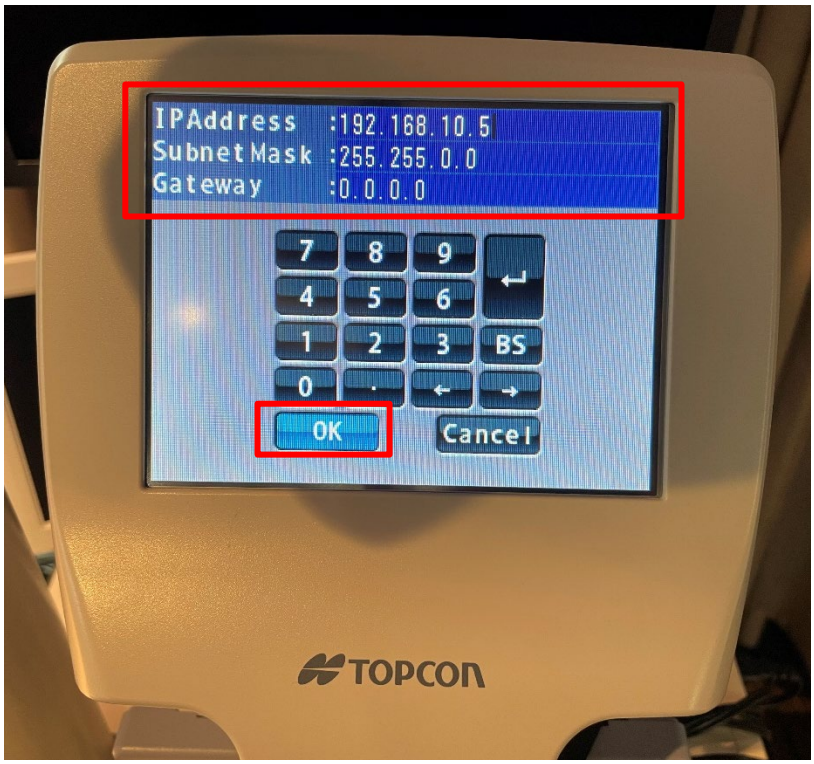
(1) Press [Set-up].

(2) Press [LAN].



(3) Enter the following in "IP address", and then press [OK].

IP address	Subnet Mask	Gateway
192.168.10.5	255.255.0.0	0.0.0.0



(4) Enter the followings in "Setting 1" and press [OK].

IP address	Link Folder
192.168.1035	Blank

(5) Enter the followings in "Setting 2" and press [OK].

Shared Folder	User Name	Pass Word
CL	Topcon	Topcon1932

(6) Select "TOPCON" for "XML".

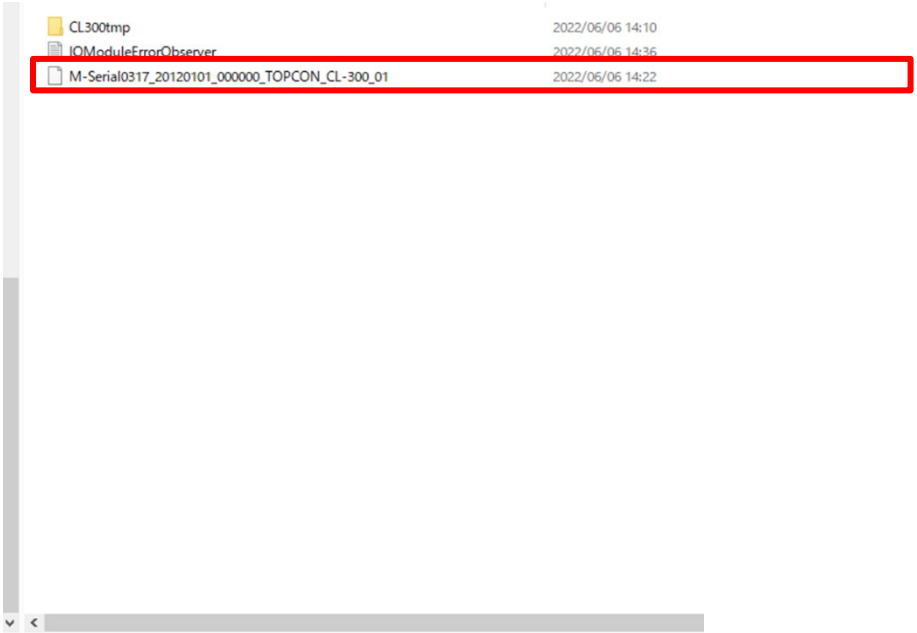
5.3.8 Operating procedures for CL-300 PDL

(1) Measure the left and right lenses with CL-300 PDL and press print button.

NOTE

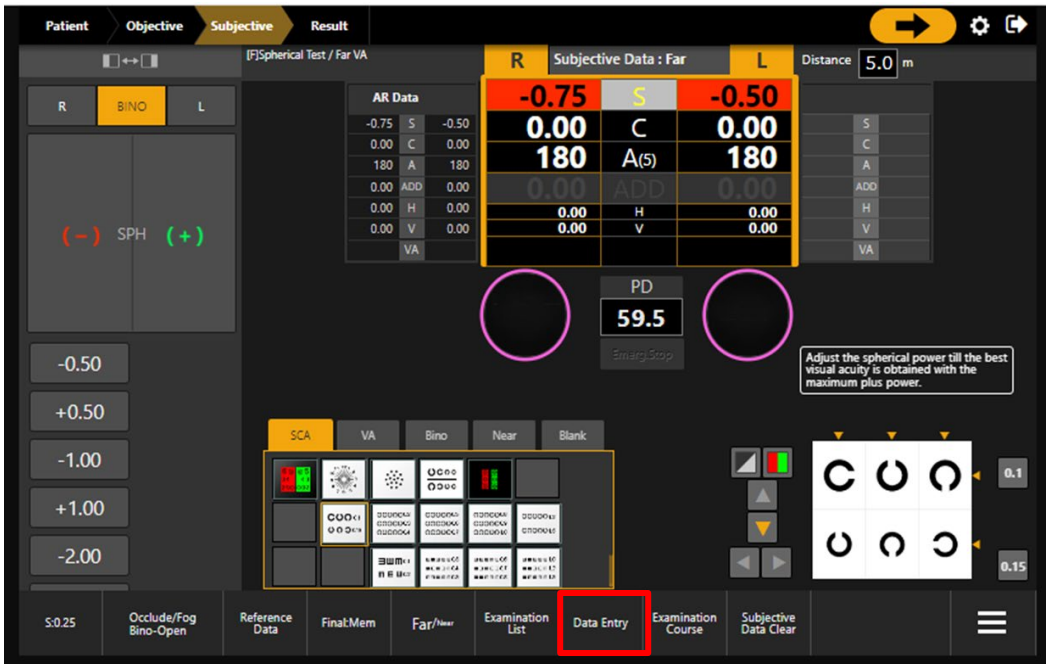
- Chronos does not receive any uniocular eye data, so must transmit binocular data.

(2) Access ¥¥10.1.2.3¥cl on the laptop and confirm that the XML file was created.

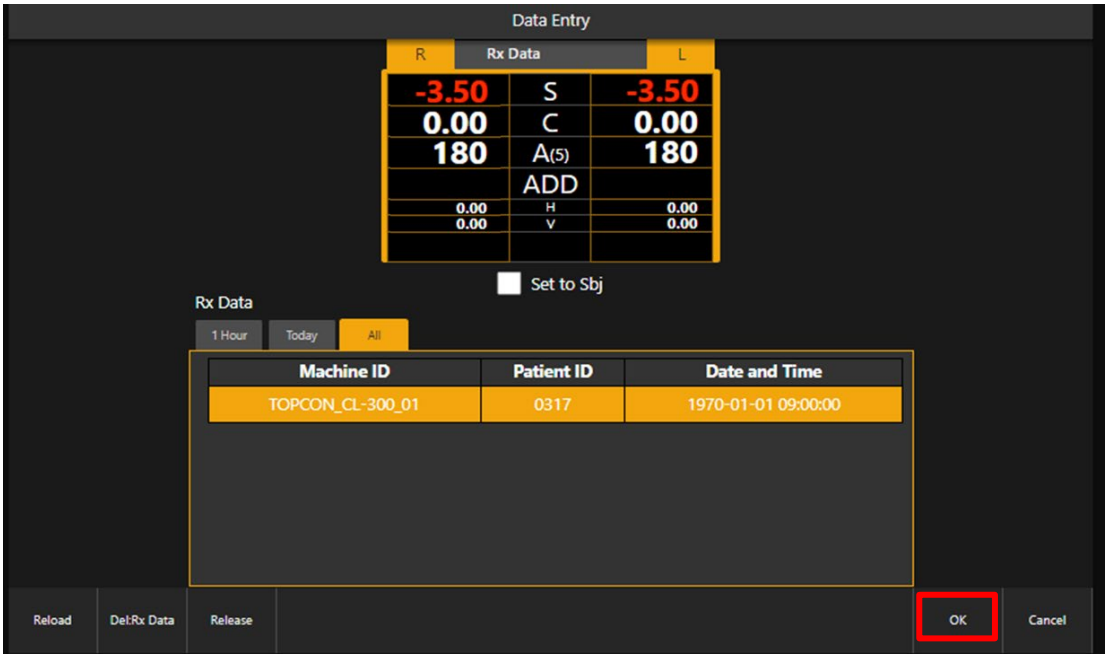


5.3.9 Standard GUI operating procedures

(1) Click [Data Entry] button on the subjective screen.

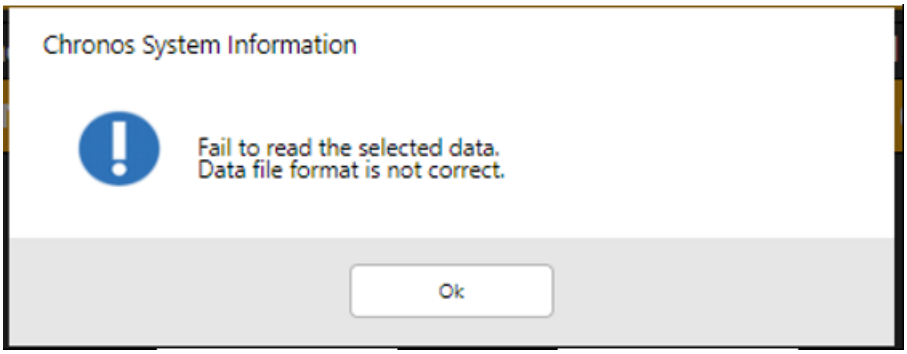


(2) After selecting the relevant data, click [OK] button in the lower right corner of the screen.

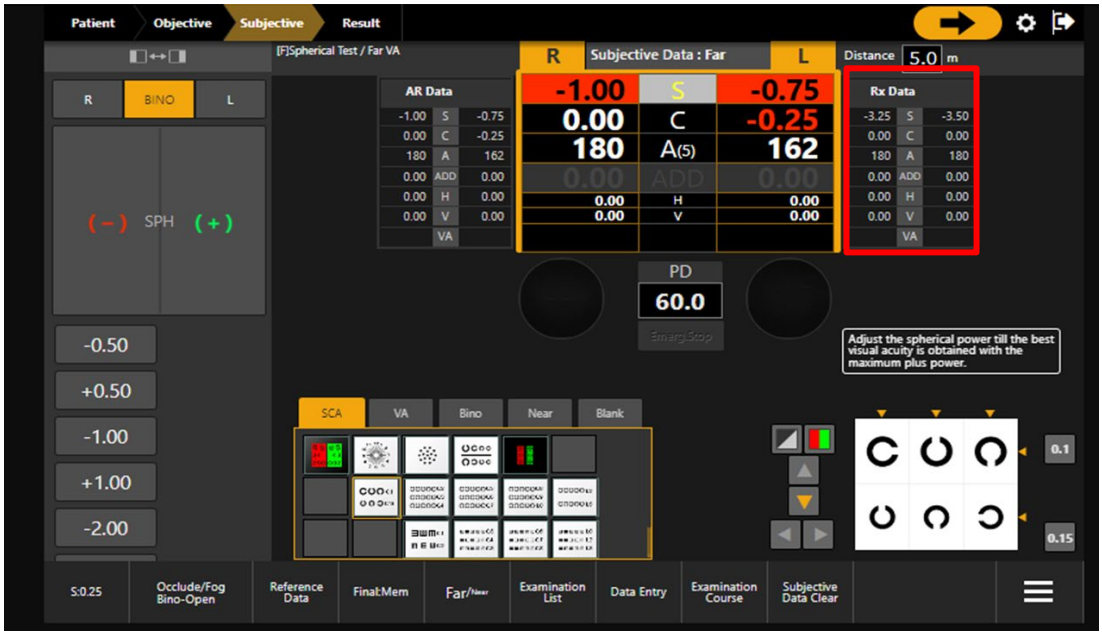


NOTE

- If uniocular data is received, the following error is displayed. Ensure that binocular data are sent.

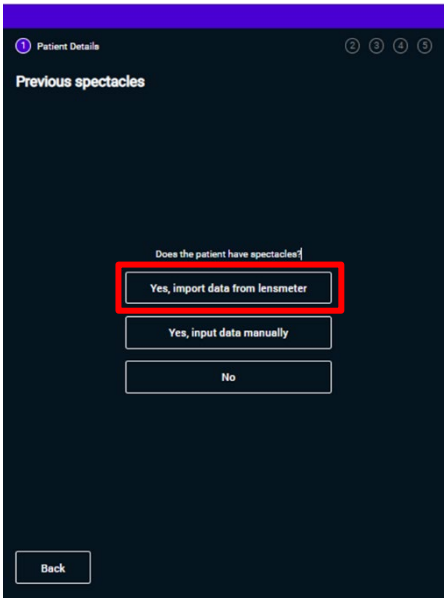


(3) The data is reflected.



5.3.10 Operating procedures for SightPilot

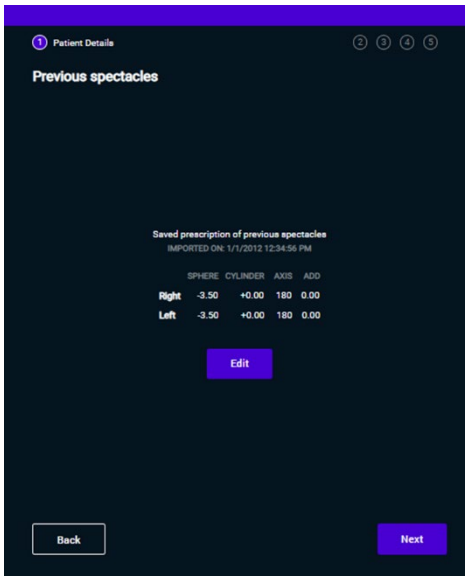
(1) After patient registration, select “Yes, import data from lensmeter”.



(2) The outcome measured by CL-300 PDL is displayed.

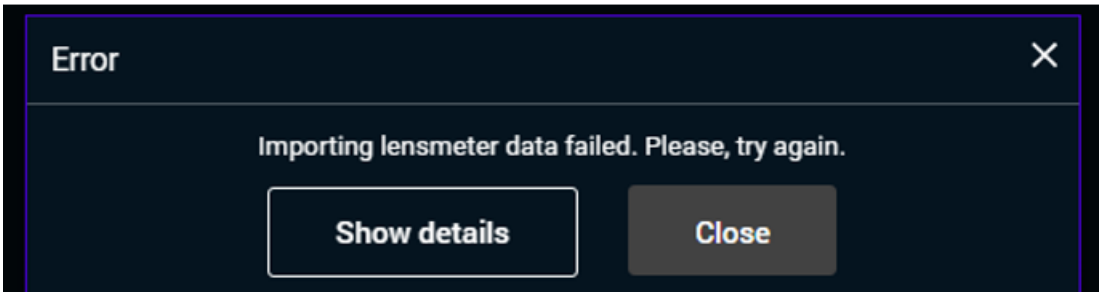
NOTE

- Only the most recent data in the specified folder is automatically loaded.



NOTE

- If uniocular data is received, the following error is displayed. Ensure that binocular data are sent.



5.4 How to connect CV-5000 to Chronos

5.4.1 Purpose

The connection and operation procedure for importing measurement data fromChronos to CV-5000 are described.

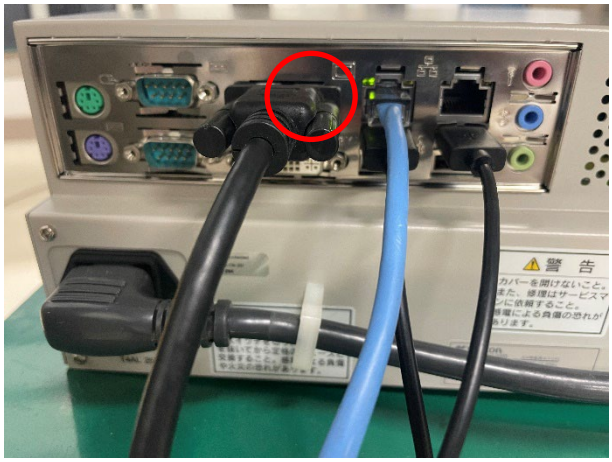
5.4.2 Required tools

Tool name	Tool No.	Image
Laptop (LAN cable also needed for wired network)	—	
USB-LAN converter, LAN-cable	—	

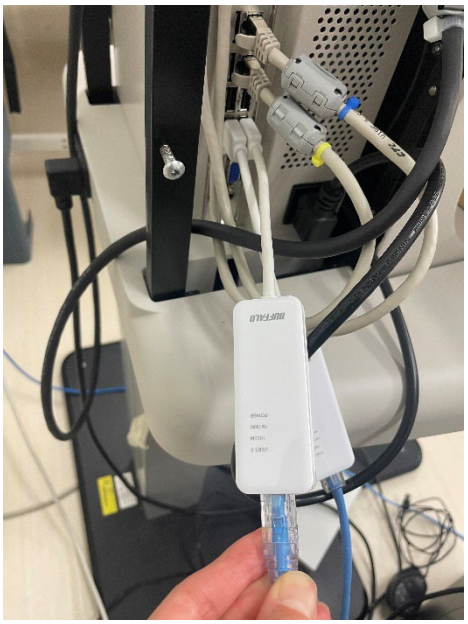
5.4.3 Connecting CV-5000 to Chronos

NOTE

- Chronos control box does not have any additional LAN ports. Insert USB-LAN converter into USB3.0 port.
- USB-LAN converter connected in Chapter 2.3 is for Network1. In this case, connect additional USB-LAN converter for Network2.
- Use the same port as the picture for the LAN port on CV-5000.



CV-5000



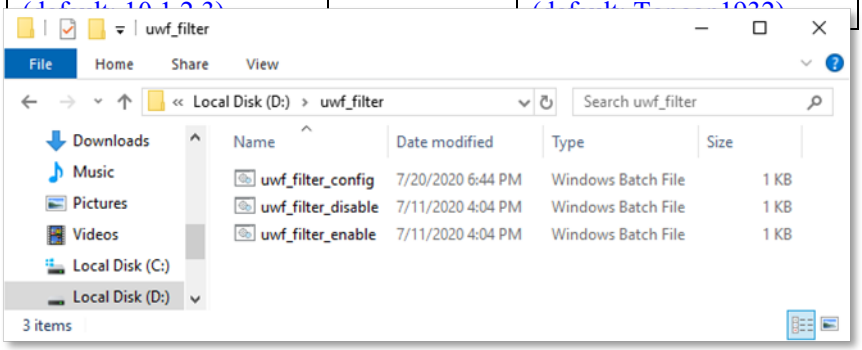
Chronos

5.4.4 Enabling SMB1.0 Supporting in Chronos Control Box

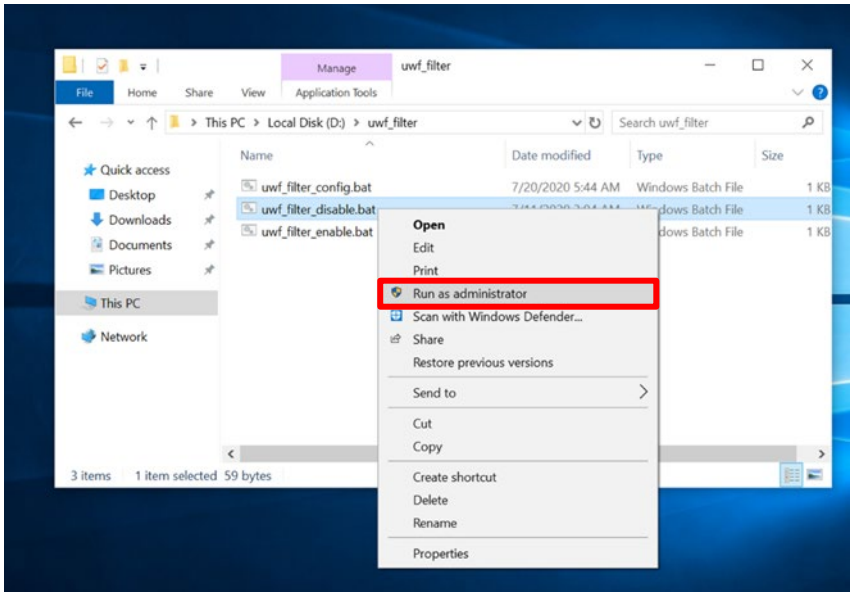
(1) Turn on Chronos control box.

(2) After the system starts up, access to it with using the remote desktop and open folder D:¥ uwf_filter.
Refer to Chapter 2.3 and 2.5 for how to connect to the control box with the laptop.
Information needed for connecting with remote desktop are as follows.

Computer	Username	Password
IP address of network 1 (default: 10.1.2.3)	Topcon	Topcon password (default: Topcon1032)



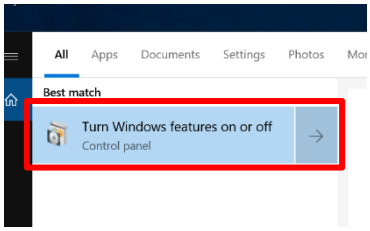
(3) Select "Run as administrator" from the contextual menu that appears by right-clicking uwf_filter_disable.bat.



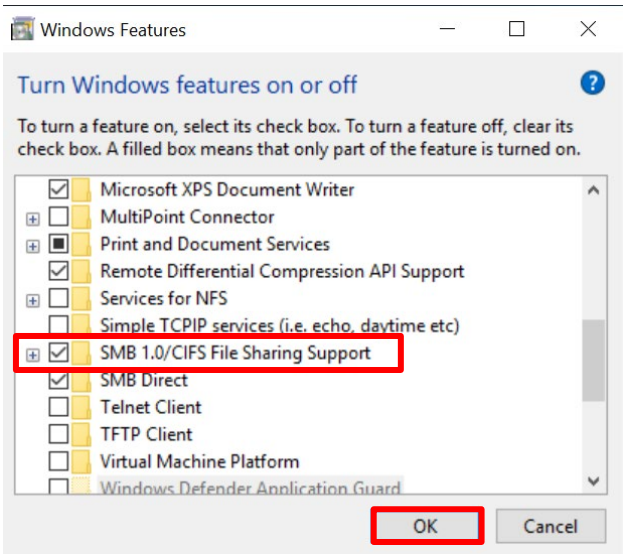
(4) When the "User Account Control" dialogue box is displayed, select [Yes] button.

(5) The system will restart automatically.

(6) When the system restarts, type "Turn windows" in the search box on the taskbar and select "Turn Windows features on or off" displayed in the search candidates.

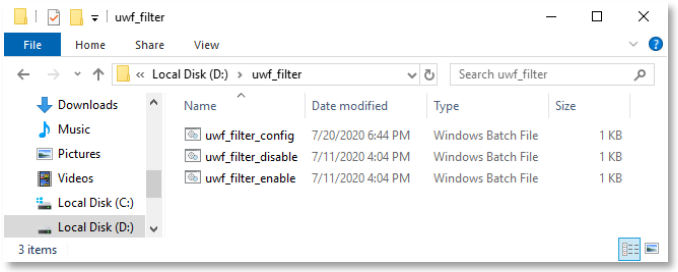


(7) When "Turn Windows features on or off" dialog is displayed, select the checkbox in which "SMB1.0/CIFS File Sharing support" and press [OK] button to close the dialog.

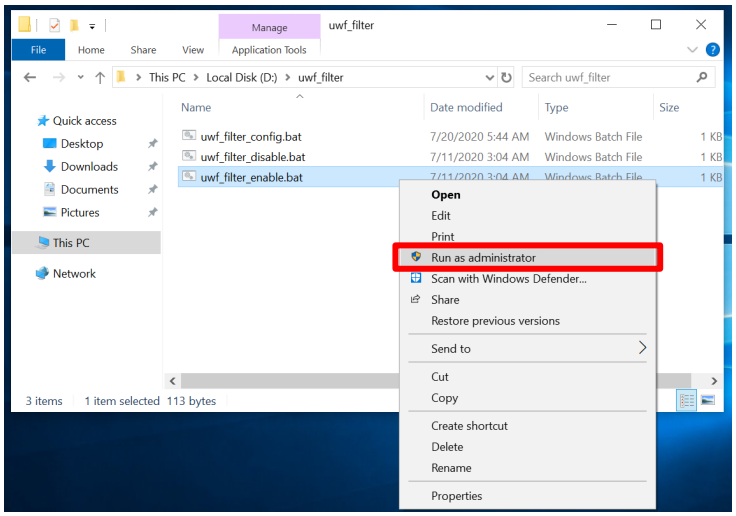


(8) A dialog box prompting you to restart the system is displayed. Press [Restart now] to restart the system.

(9) When the reboot is complete, start File Explorer and open uwf_filter folder on D-drive.



(10) Right-click the batch file labeled uwf_filter_enable in the folder and select "Run as administrator" from the contextual menu that appears.



(11) When "User Account Control" dialogue box is displayed, select [Yes] button.

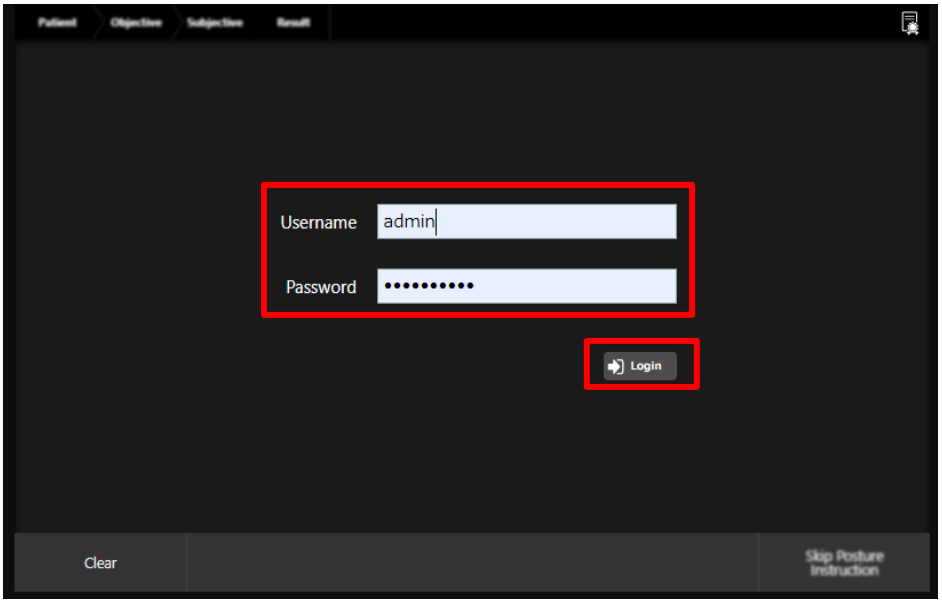
(12) The system will restart automatically.

5.4.5 Standard GUI settings

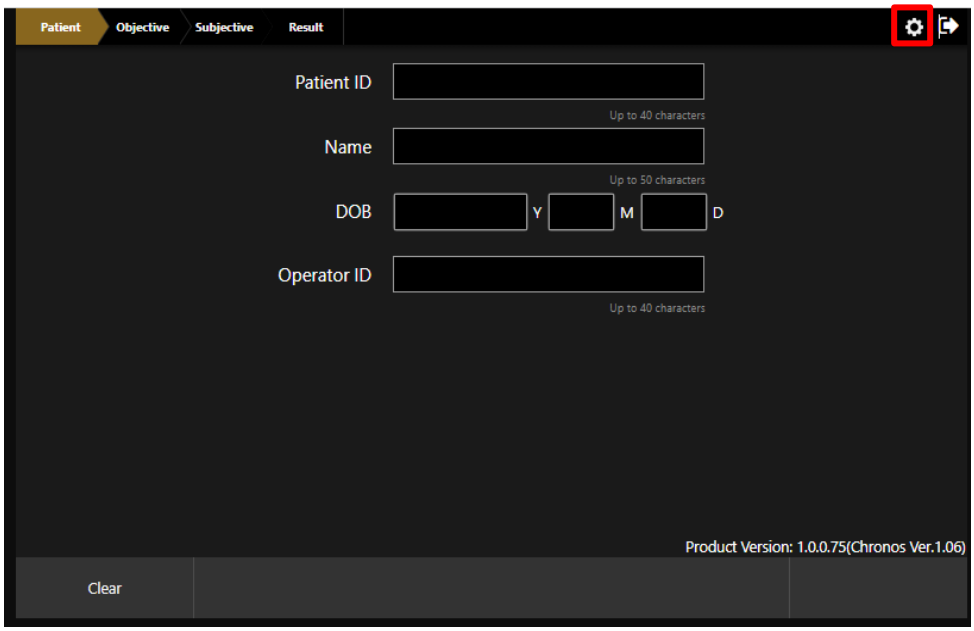
(1) Connect http://10.1.2.3/topcon/sub/login.php with the laptop.

(2) Enter user name and password and log in. *The default is below.

Username	Password
admin	Topcon@123

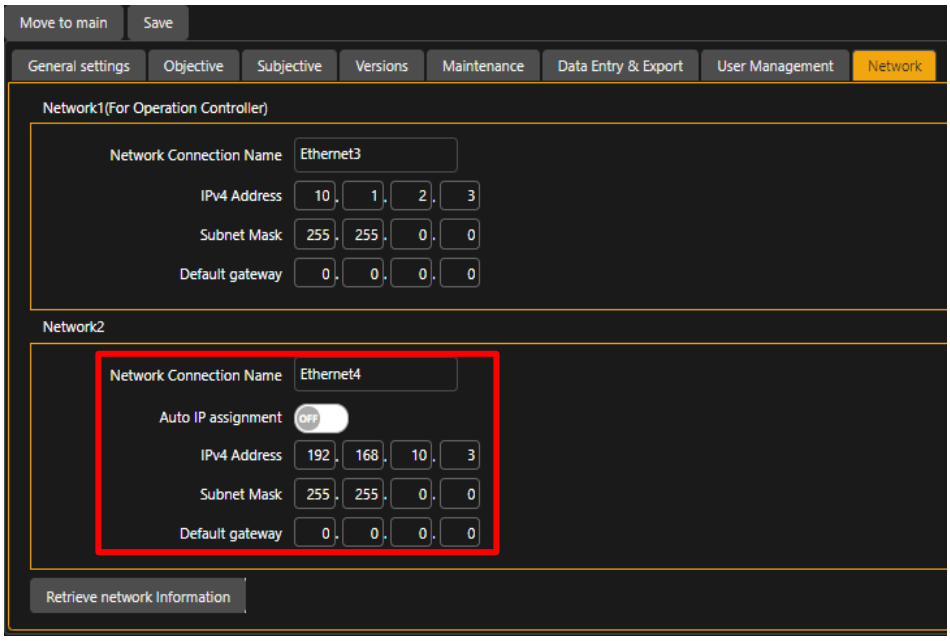


(3) Click the Settings button.



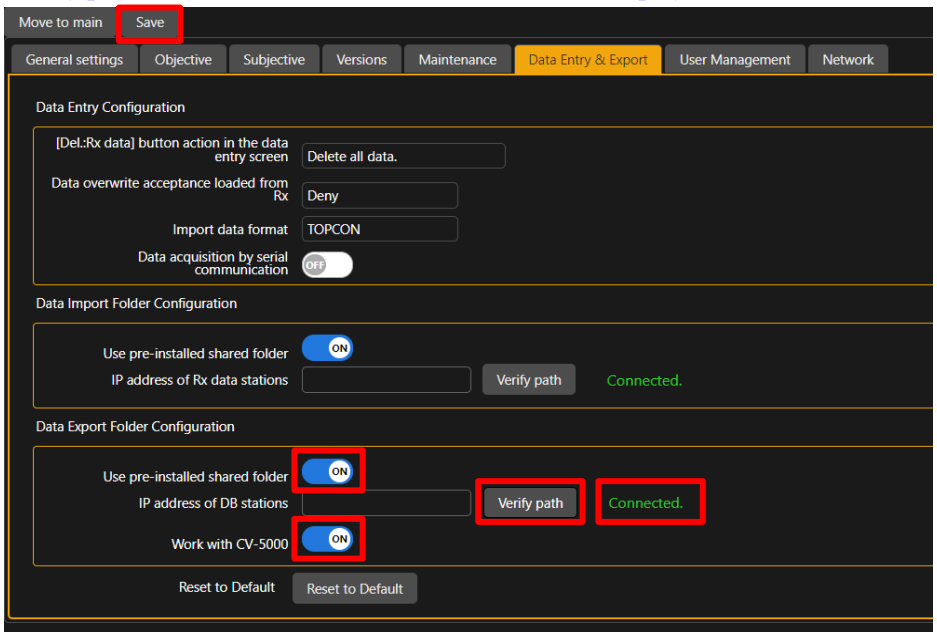
(4) Open [Network] tab, enter it in [Network 2].

IP address	Subnet Mask	Default Gateway
192.168.10.3	255.255.0.0	0.0.0.0



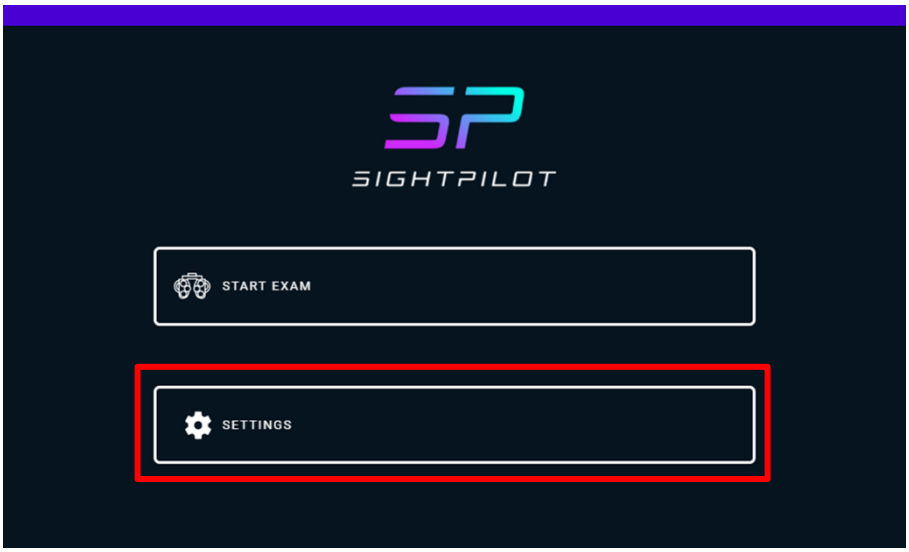
(5) Open [Data Entry & Export] tab and set the following.
"Data Export Folder Configuration"
- Select "Use pre-installed shared folder".
  Path of preinstalled shared folder: D:¥ SharedFolder¥db
- "Work with CV-5000" is ON

Click [Verify path] button and confirm that "Connected." is displayed, then click [Save] at the top.

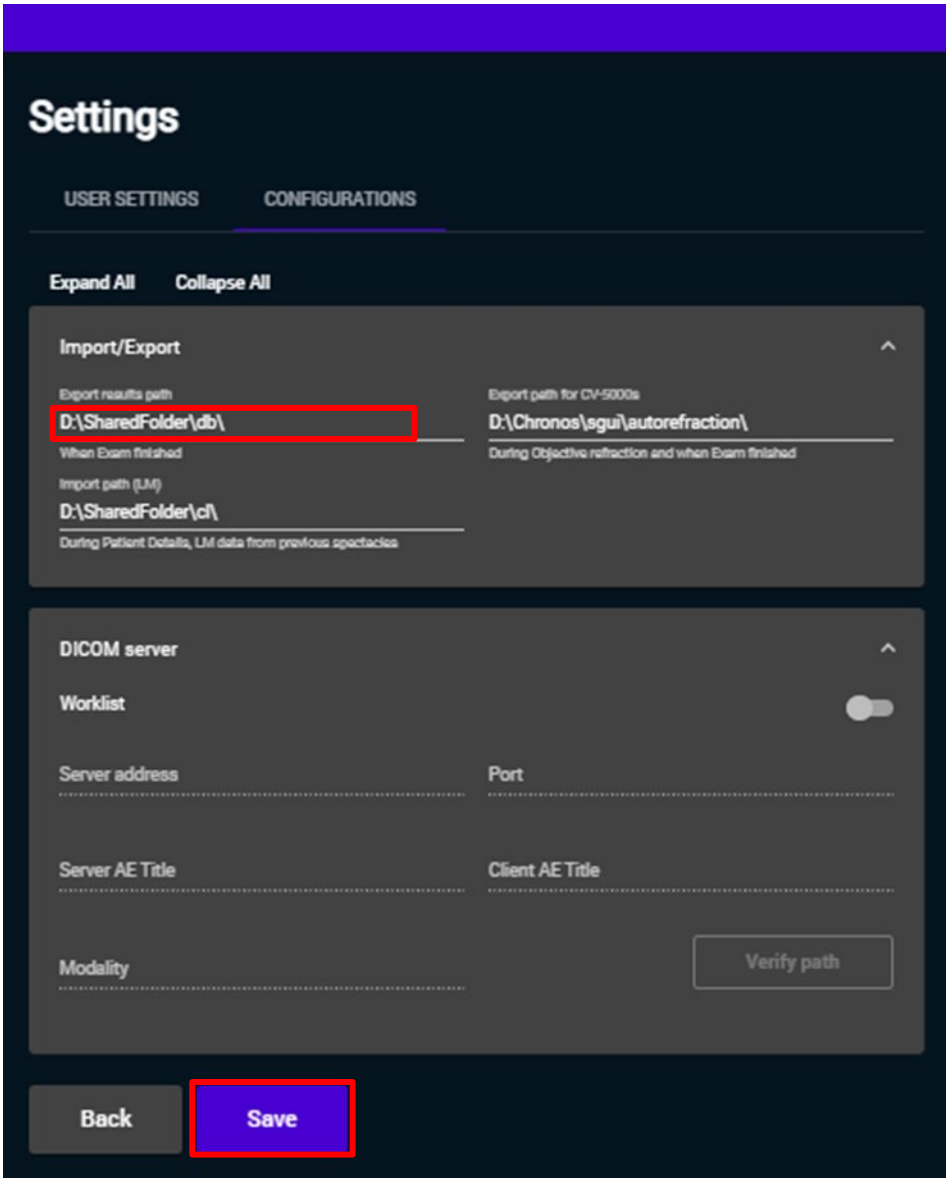


5.4.6 SightPilot settings

(1) Connect to http://10.1.2.3/sgui with the laptop and click Settings.



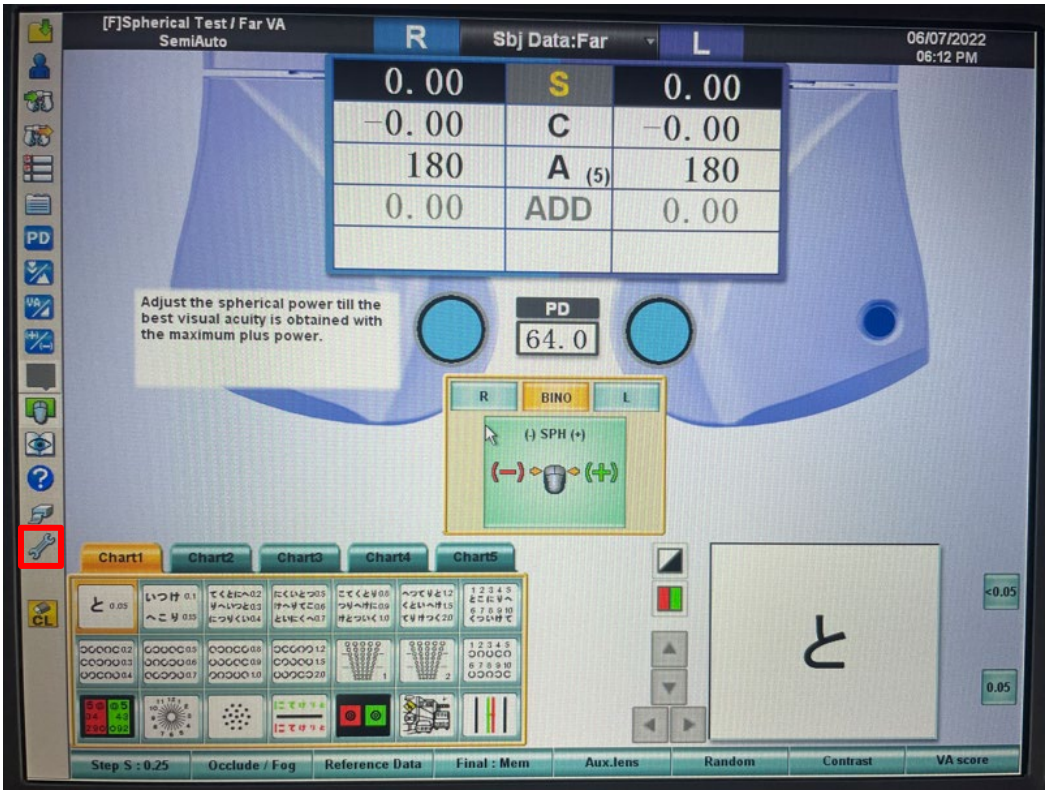
(2) Enter D: ¥ SharedFolder ¥ db ¥ in [Export results path] and click [Save].



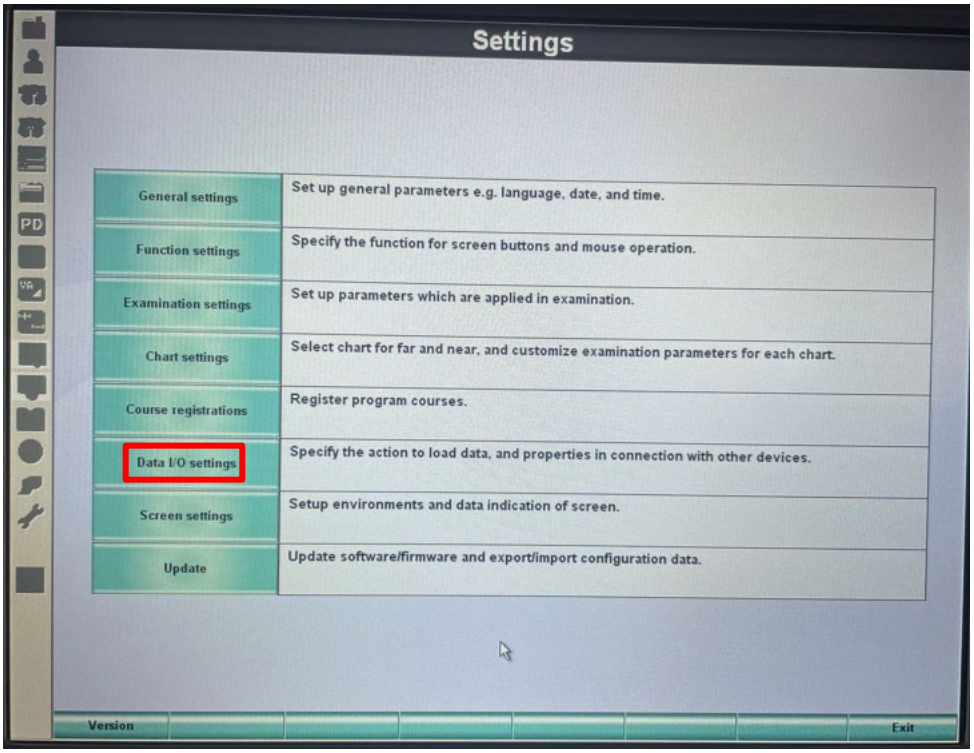
5.4.7 CV-5000 connection settings

The following is an example of a mouse type.

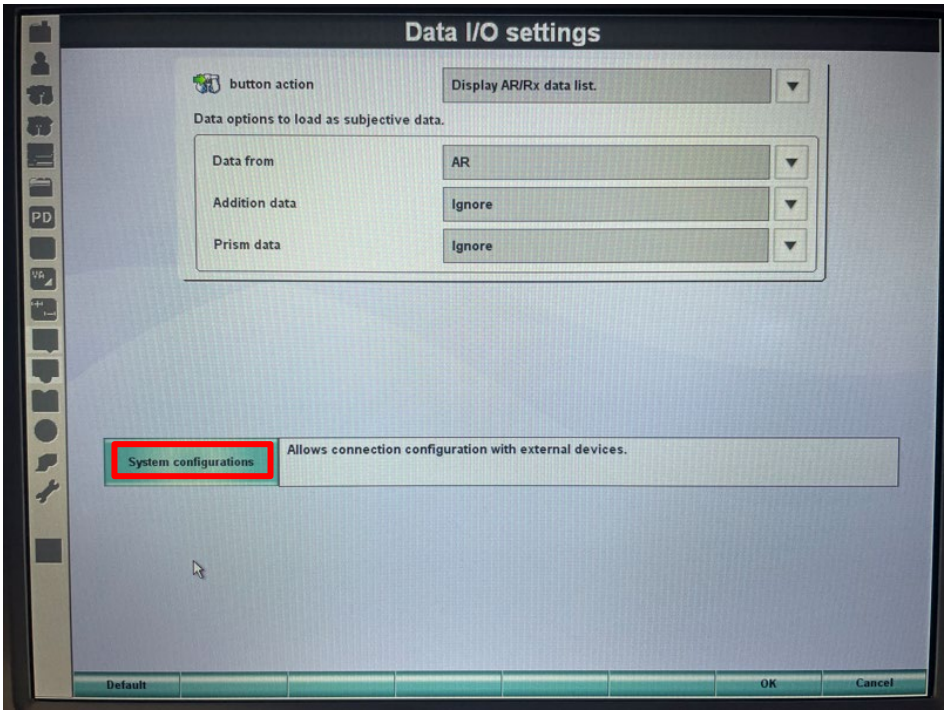
(1) Click "Set-up" button.



(2) Click [Data I/O settings].

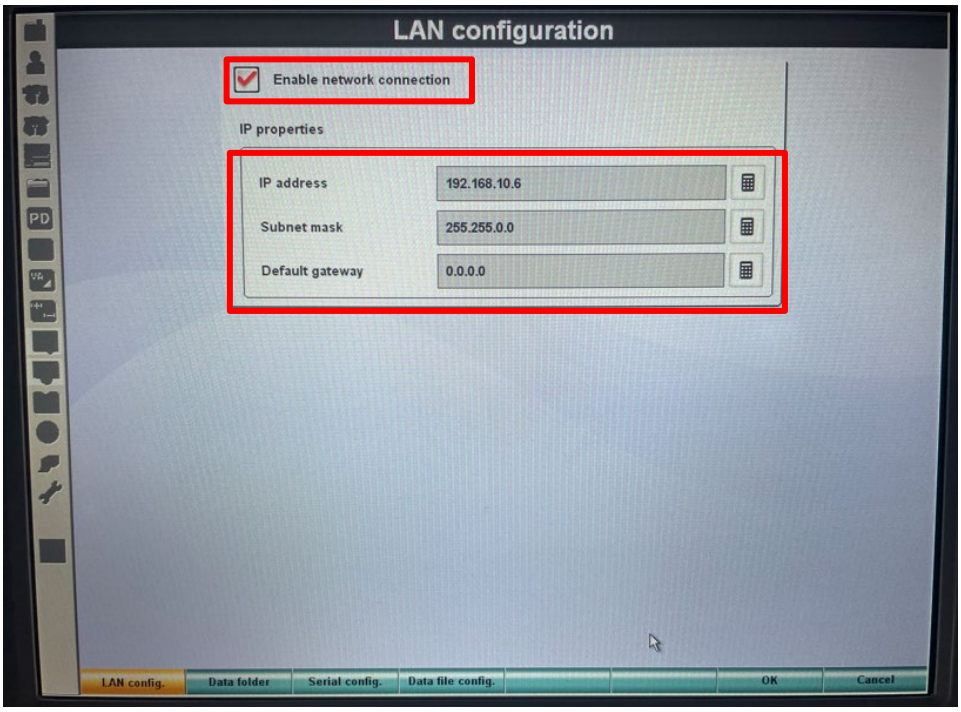


(3) Click [System configurations].

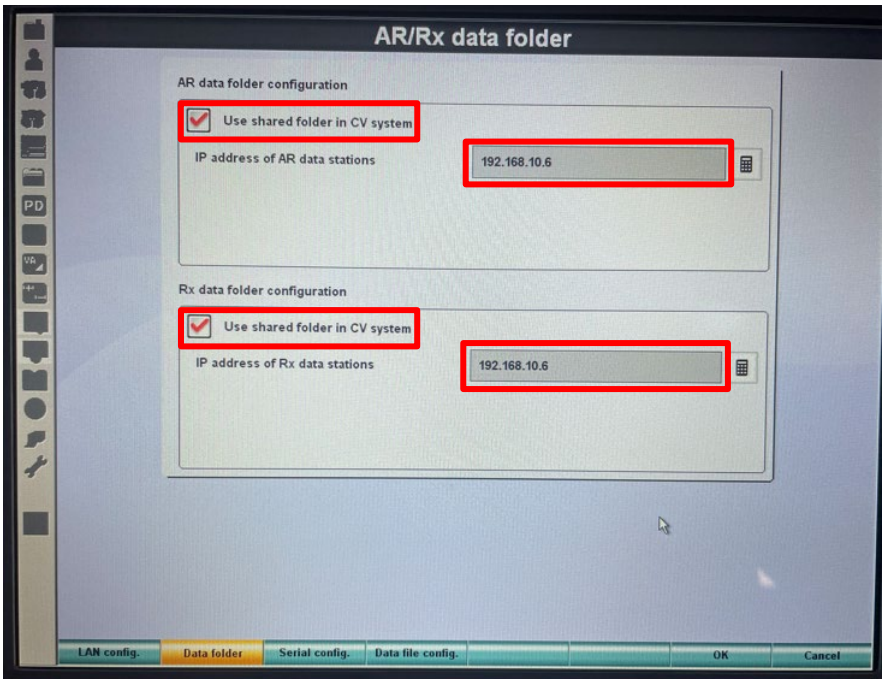


(4) In LAN configuration tab, enter the followings:
☑ for "Enable network connection"
IP properties

IP address	Subnet Mask	Default Gateway
192.168.10.6	255.255.0.0	0.0.0.0

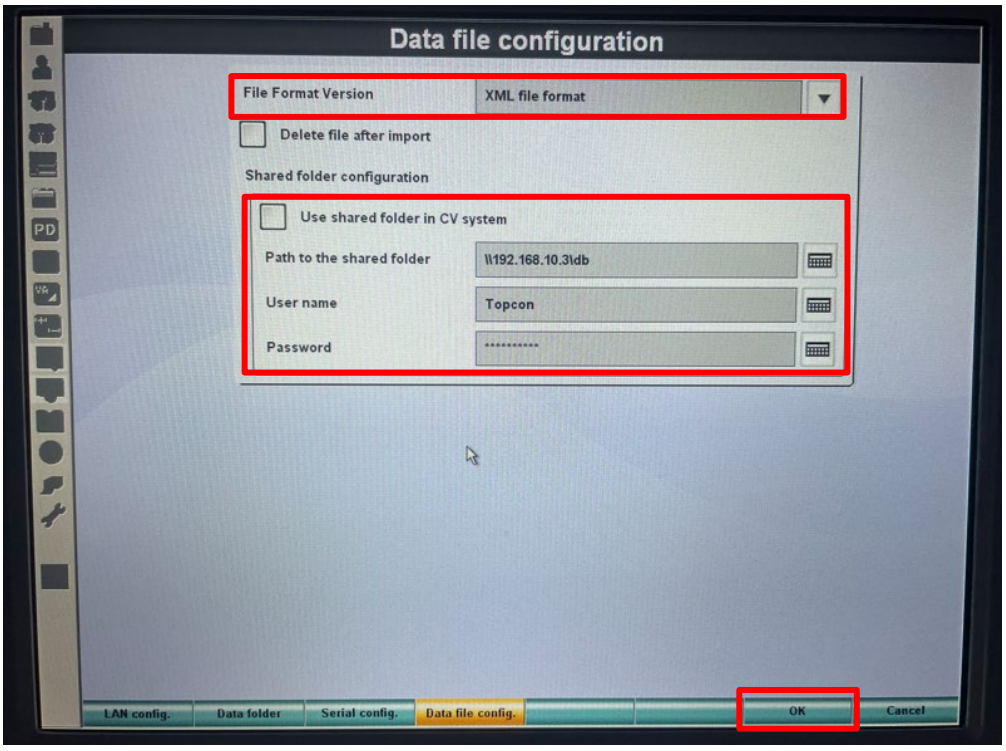


(5) In Data Folder tab, enter the followings.
Setting AR data folder configuration
☑for "Use shared folder in CV system"
"IP address of AR data stations": 192.168.10.6
Set Rx data folder configuration in the same way.

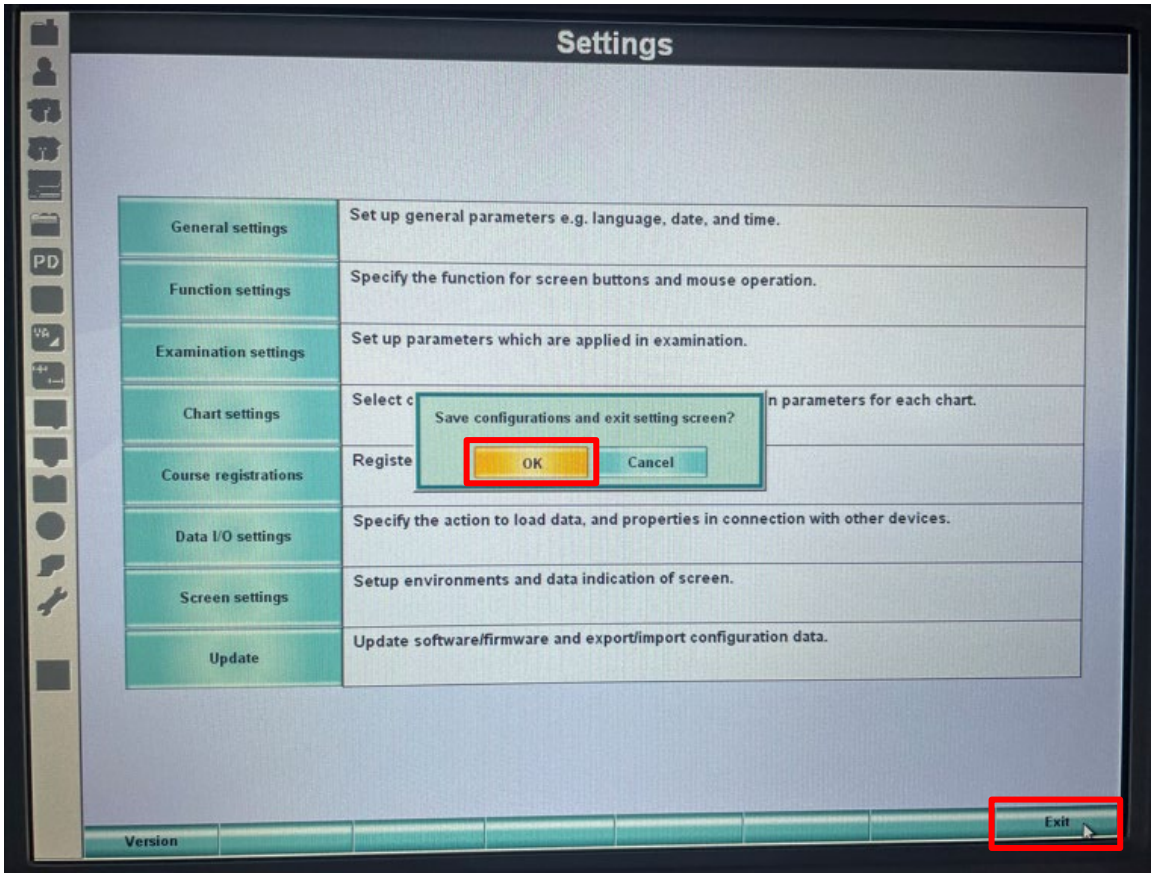


(6) On Data file configuration tab, enter the followings and click [OK].
Select "XML file format" for "File Format Version"
Shared folder configuration
Remove the ☑ "Use shared folder in CV system"

Shared folder name	Username	Password
\\192.168.10.3\db	Topcon	Topcon1932

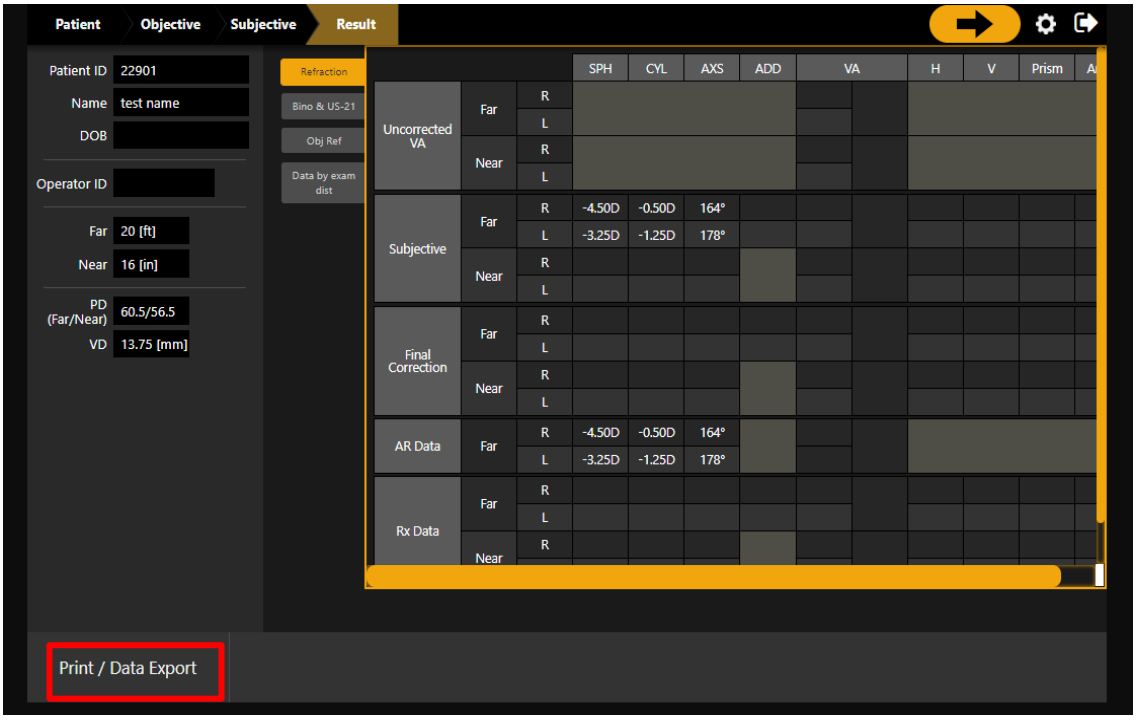


(7) Click [Exit] in the lower-right corner and click [OK].

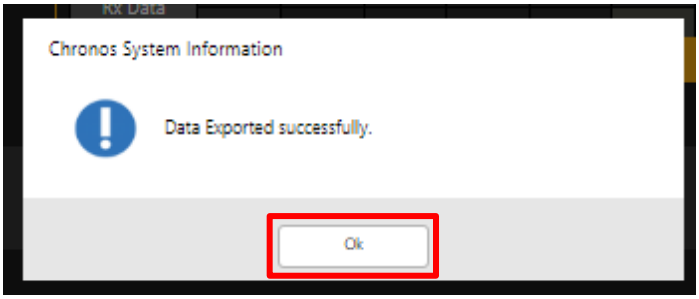


5.4.8 Standard GUI operating procedures

(1) After examination with Standard GUI, click [Print/Data Export] to export data.

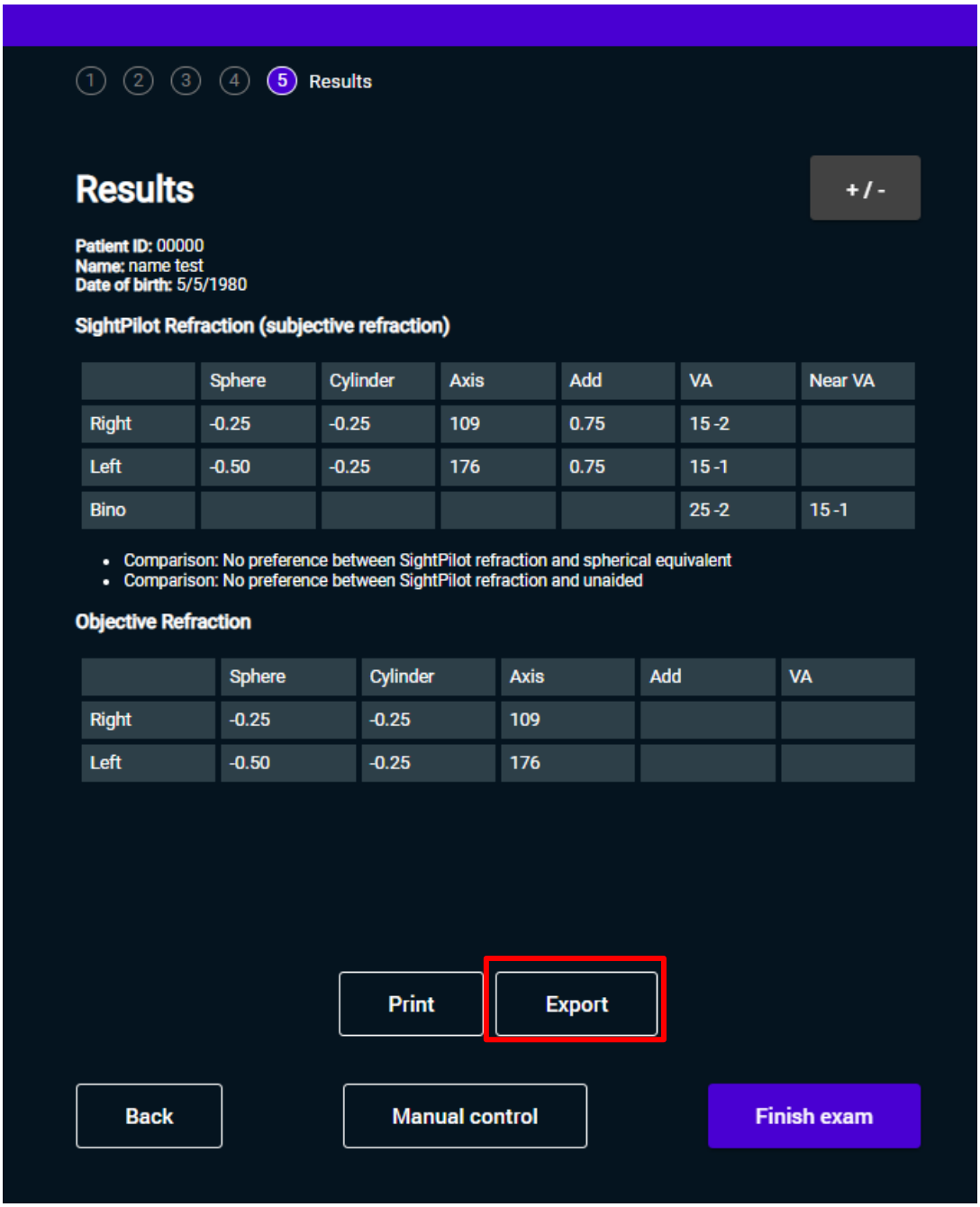


(2) If the export is successful, the following message will be displayed. Click [OK].



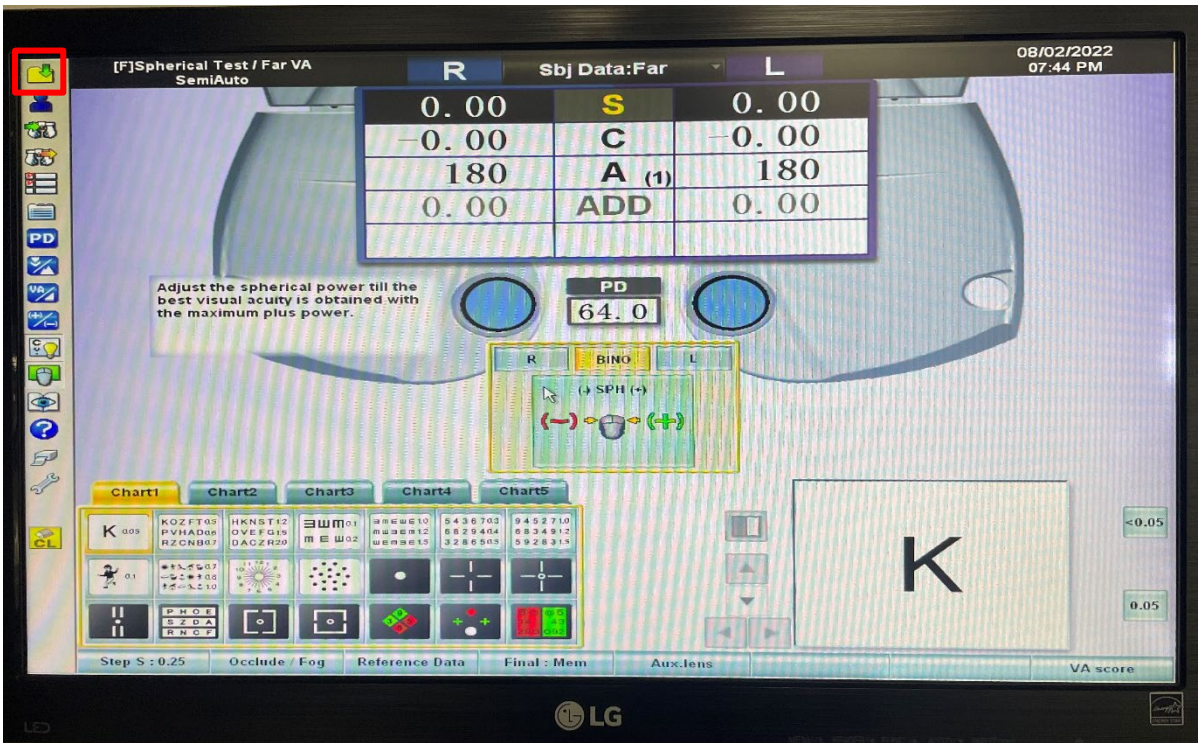
5.4.9 Operating procedures for SightPilot

(1) After examination with SightPilot, click [Export].

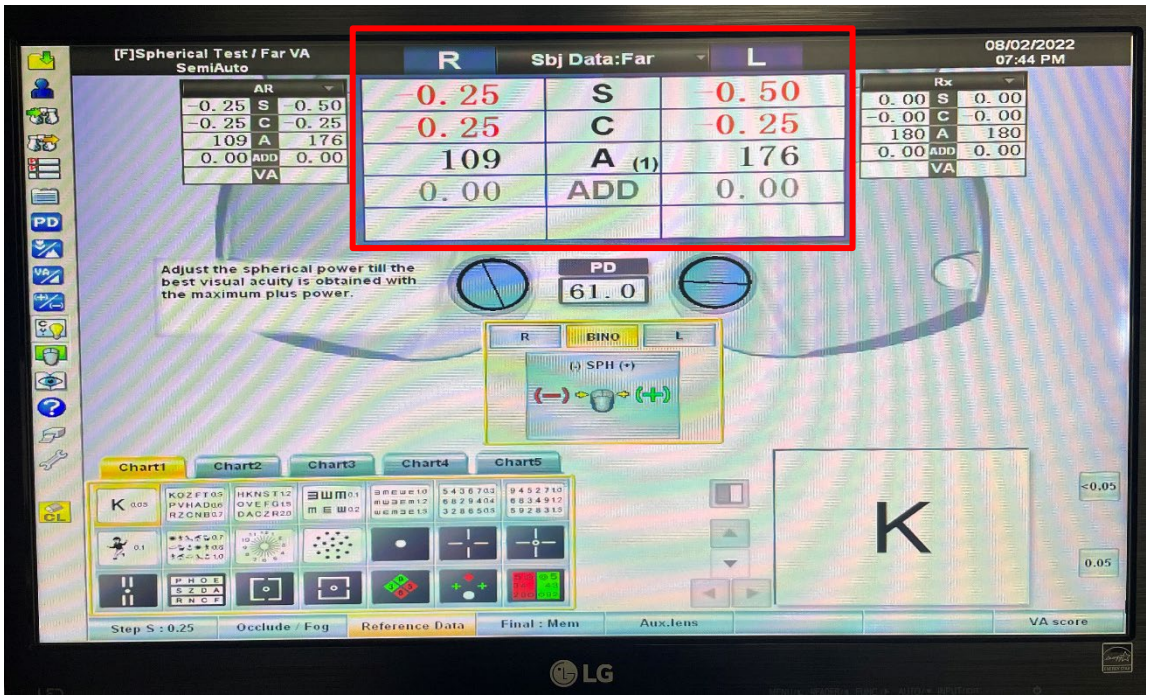


5.4.10 Operating procedures for CV-5000

(1) Click File Import button in the upper left corner.



(2) Shows the results measured in the standard GUI or SightPilot.



5.5 How to connect SOLOS to Chronos

5.5.1 Purpose

The connection and operation procedure for importing measurement data from SOLOS to Chronos are described.

5.5.2 Required tools

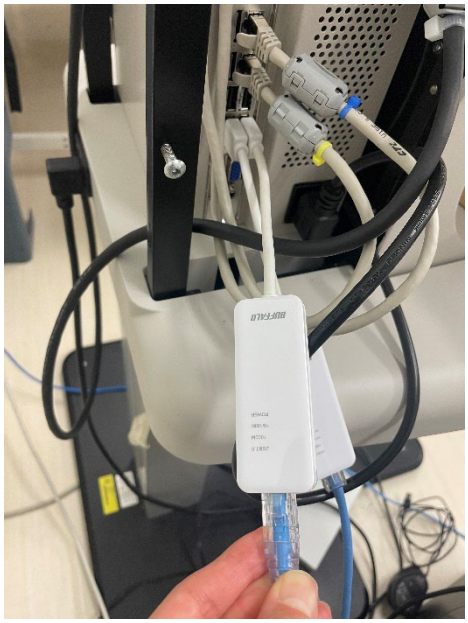
Tool name	Tool No.	Image
Laptop (LAN cable also needed for wired network)	—	
USB-LAN converter, LAN-cable	—	

5.5.3 Connecting SOLOS to Chronos

NOTE

- Chronos control box does not have any additional LAN ports. Insert USB-LAN converter into USB3.0 port.
- USB-LAN converter connected in Chapter 2.3 is for Network1. In this case, connect additional USB-LAN converter for Network2.

SOLOS



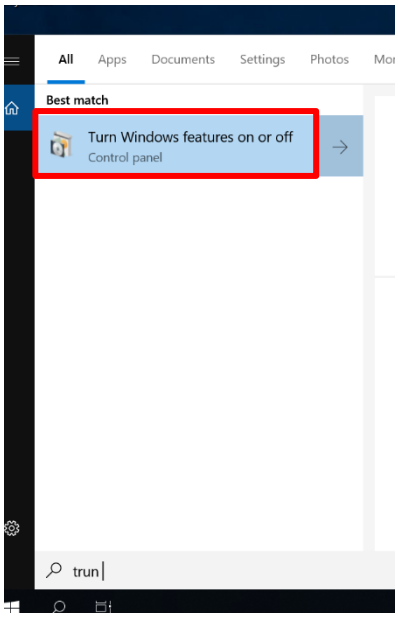
Chronos

5.5.4 Check the SMBs setup in Chronos Control Box

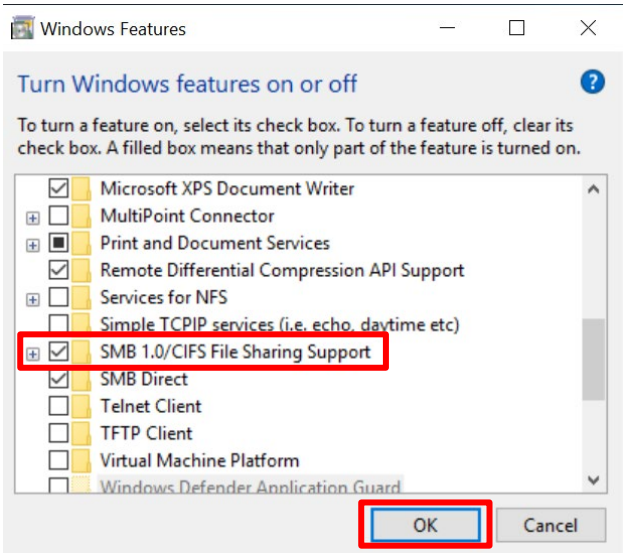
(1) Turn on Chronos control box.

(2) After the system starts up, access it from the laptop with the remote desktop, enter "Turn windows" in the search box on the taskbar, and select "Turn Windows features on or off" as the search option.
Refer to Chapter 2.3 and 2.5 for how to connect to the control box with the laptop.
Information needed for connecting with remote desktop are as follows.

Computer	Username	Password
IP address of network 1 (default: 10.1.2.3)	Topcon	Topcon password (default: Topcon1932)



(3) When "Turn Windows features on or off" dialogue box appears, check whether "SMB1.0/CIFS File Sharing support" is checked or not. (The settings confirmed here are used in "5.5.7 (4)".)5.5.7(4)
・Checked: SMBv1 is used.
・Unchecked: SMB v2.x/v3.x is used.
When the confirmation is complete, press [OK] button to close the dialog box.

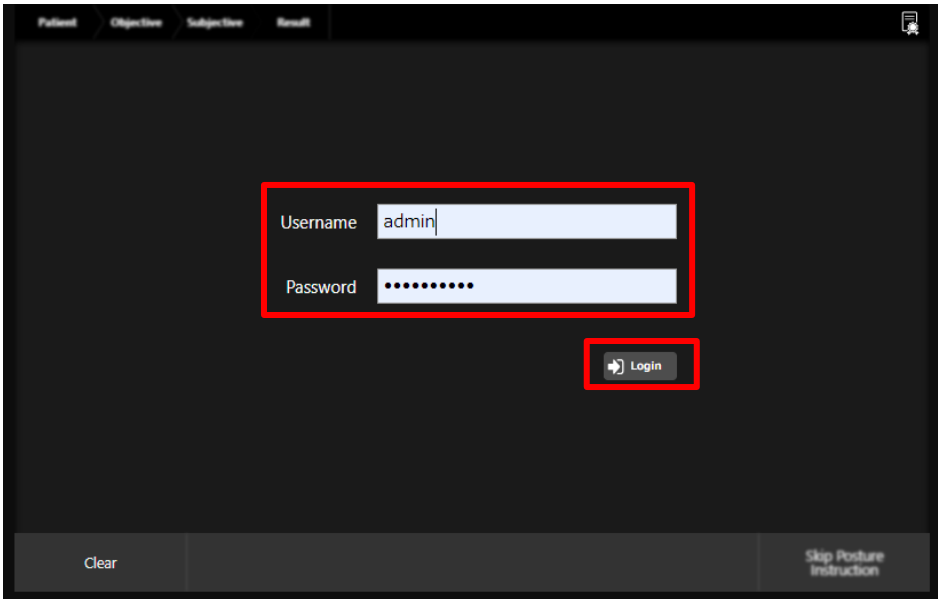


5.5.5 Standard GUI settings

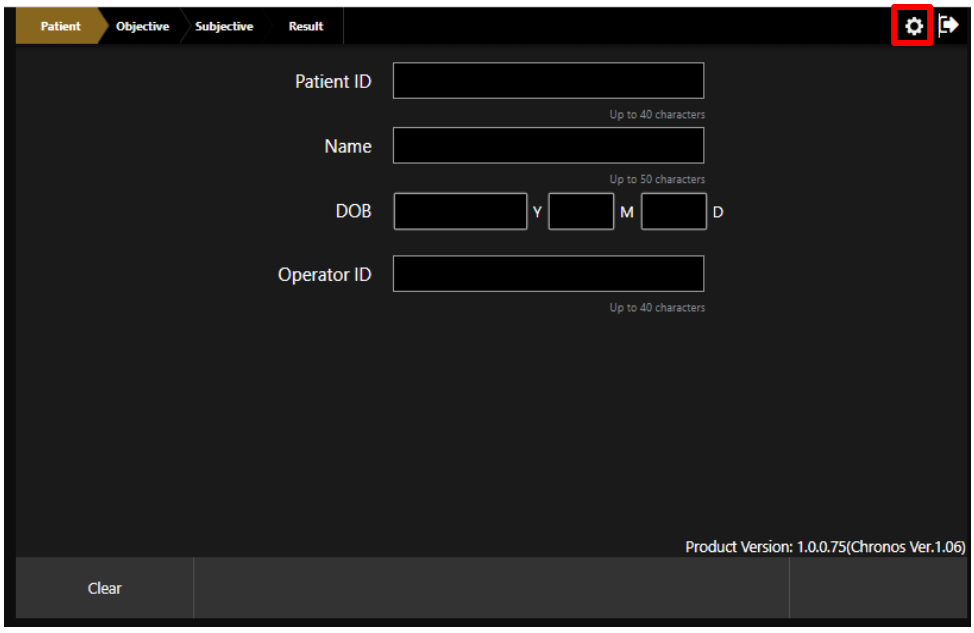
(1) Connect http://10.1.2.3/topcon/sub/login.php with the laptop.

(2) Enter user name and password and log in. *The default is below.

Username	Password
admin	Topcon@123

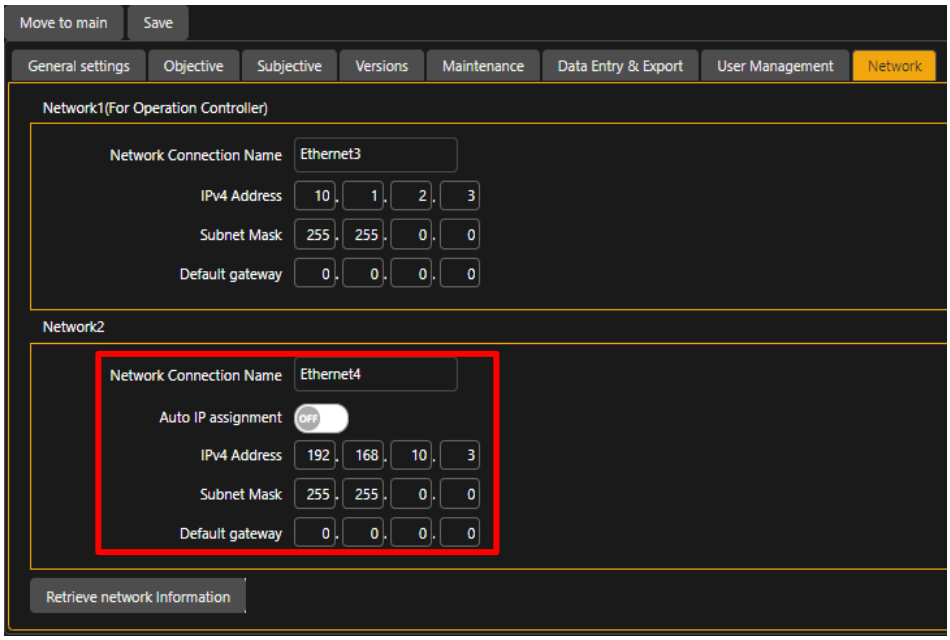


(3) Click Settings button.

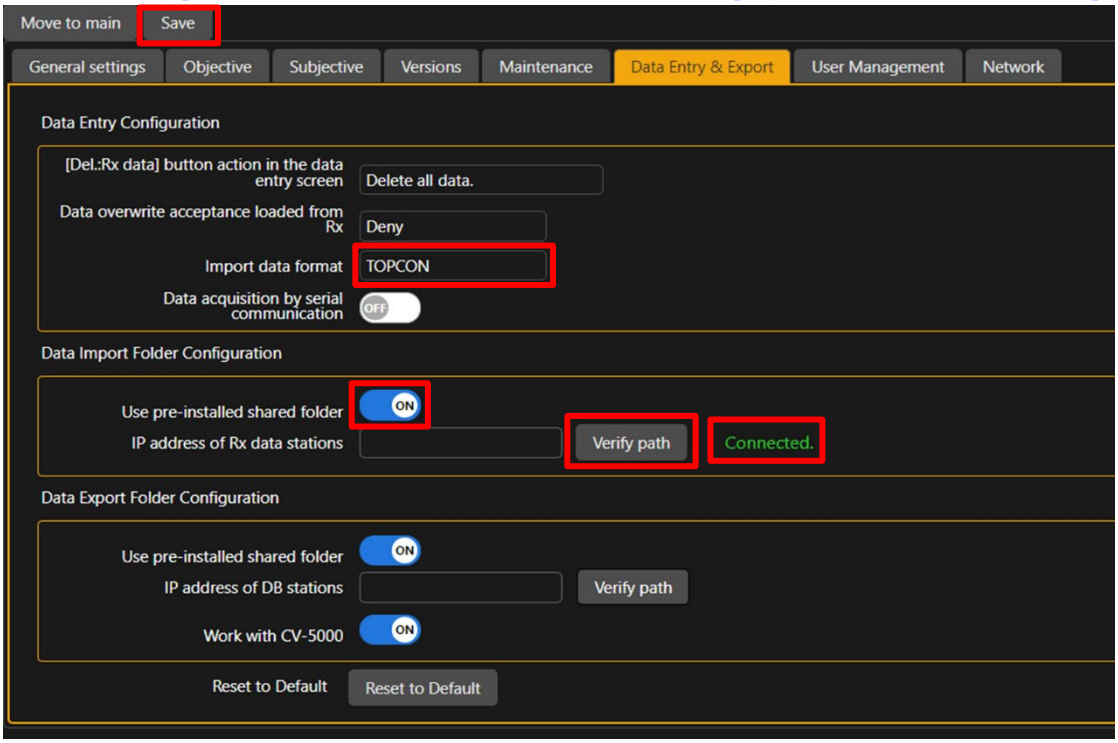


(4) Open [Network] tab, enter it in [Network 2].

IP address	Subnet Mask	Default Gateway
192.168.10.3	255.255.0.0	0.0.0.0

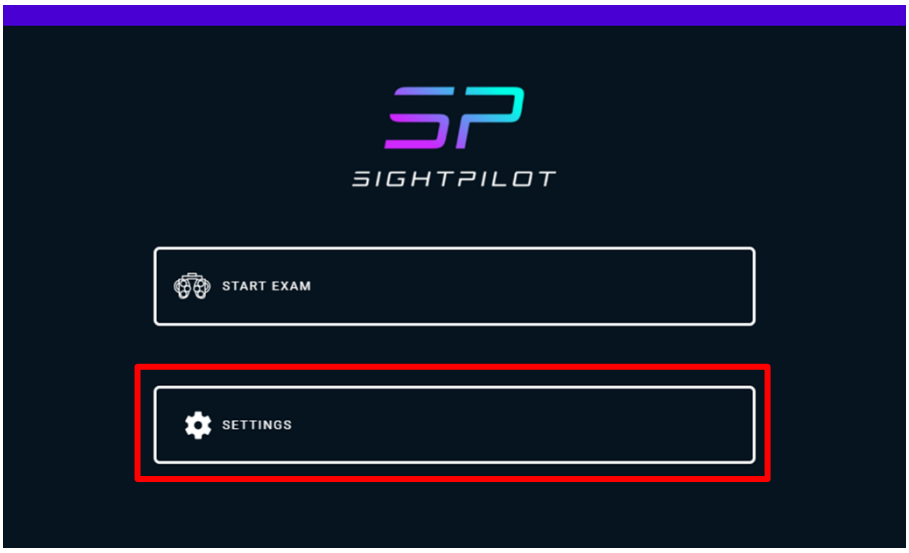


(5) Open [Data Entry & Export] tab, set "Import data format" to "TOPCON", and select "Use pre-installed shared folder" in "Data Import Folder Configuration".
Path of pre-installed shared folder: D:¥ SharedFolder¥cl
Click "Verify path" button and confirm that "Connected." is displayed, then click Save at the top.

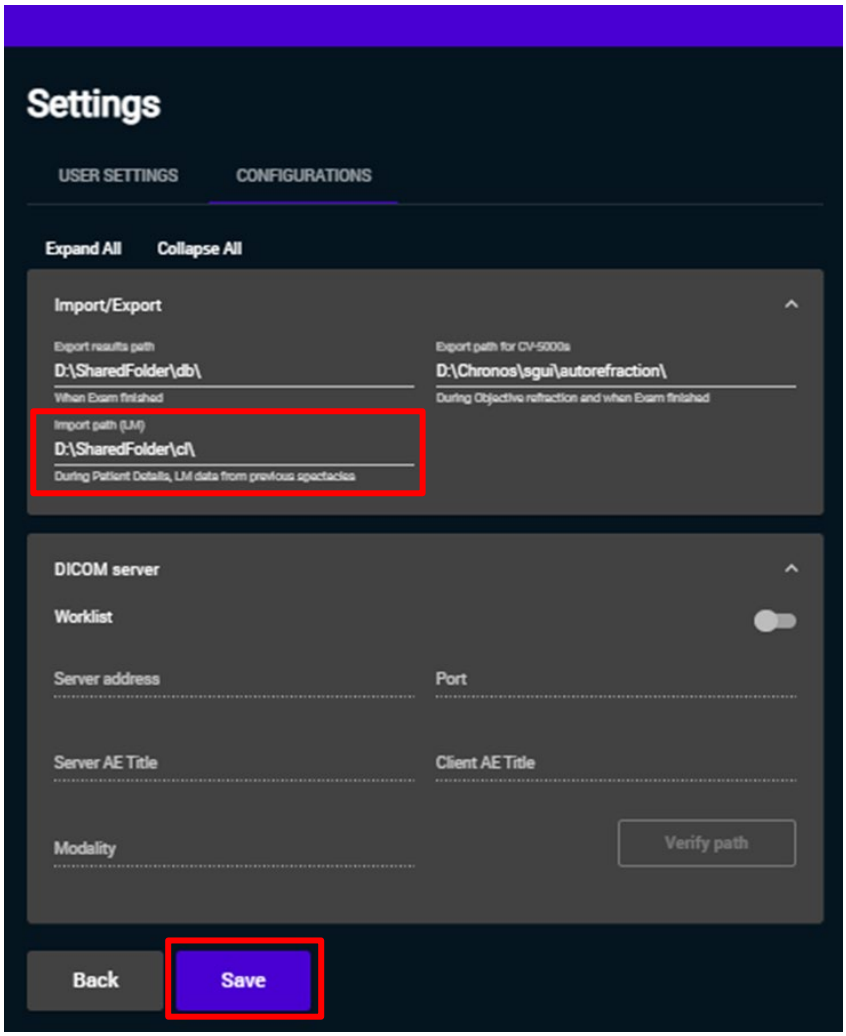


5.5.6 SightPilot settings

(1) Connect to http://10.1.2.3/sgui with the laptop and click Settings.

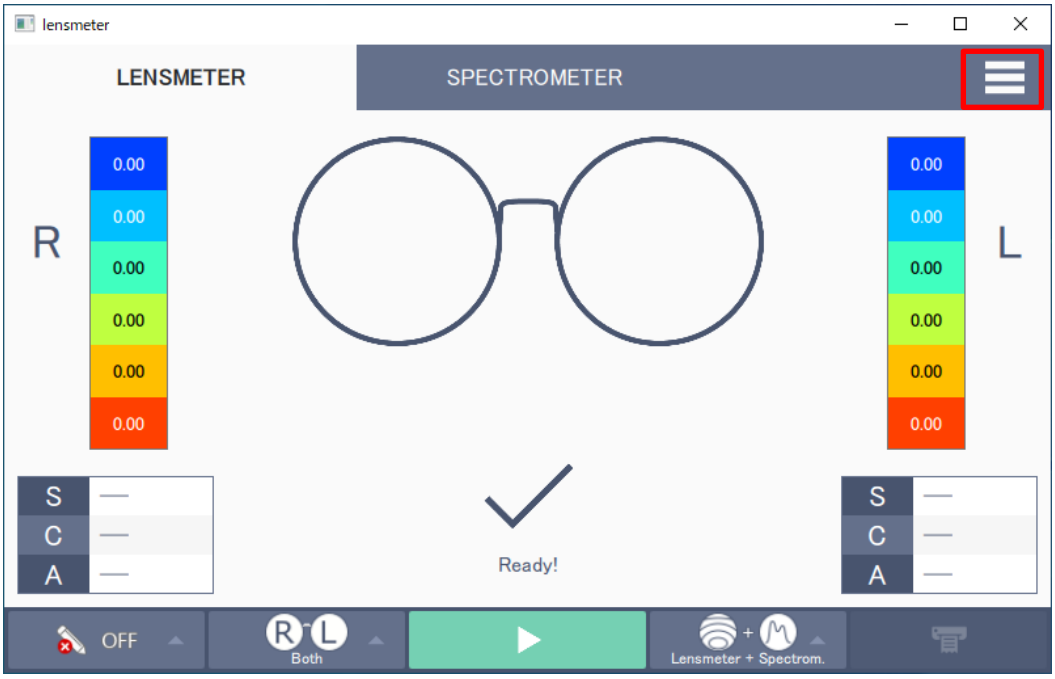


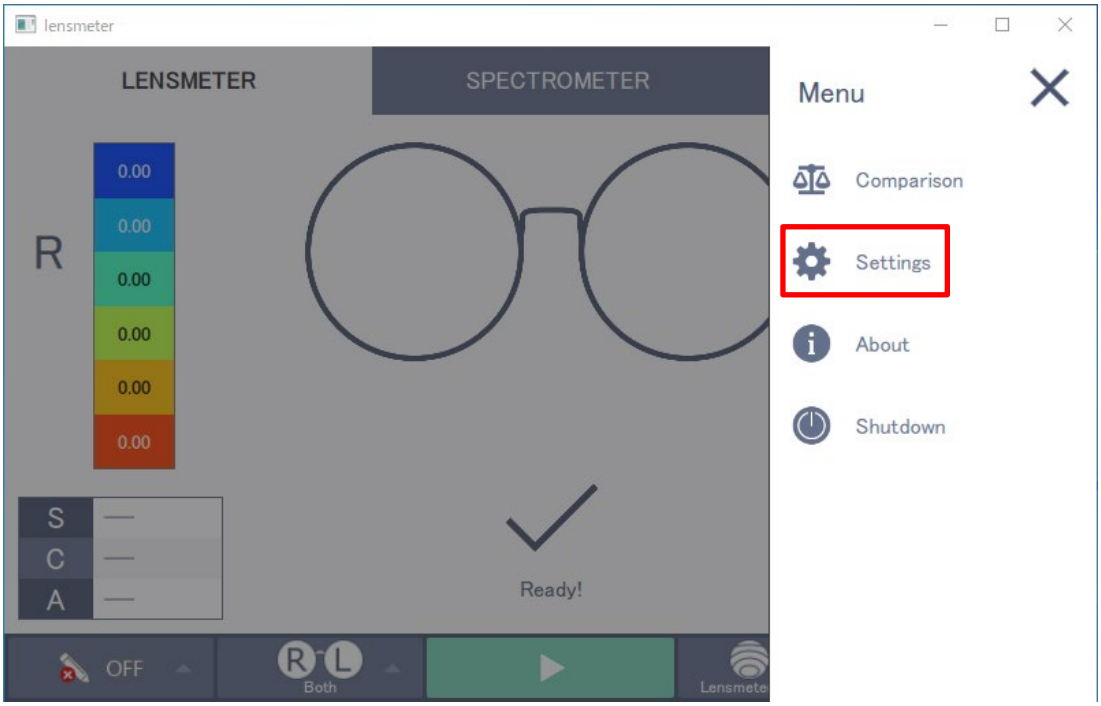
(2) Type D:¥ SharedFolder¥cl¥ in [Import path (LM)] and click [Save].



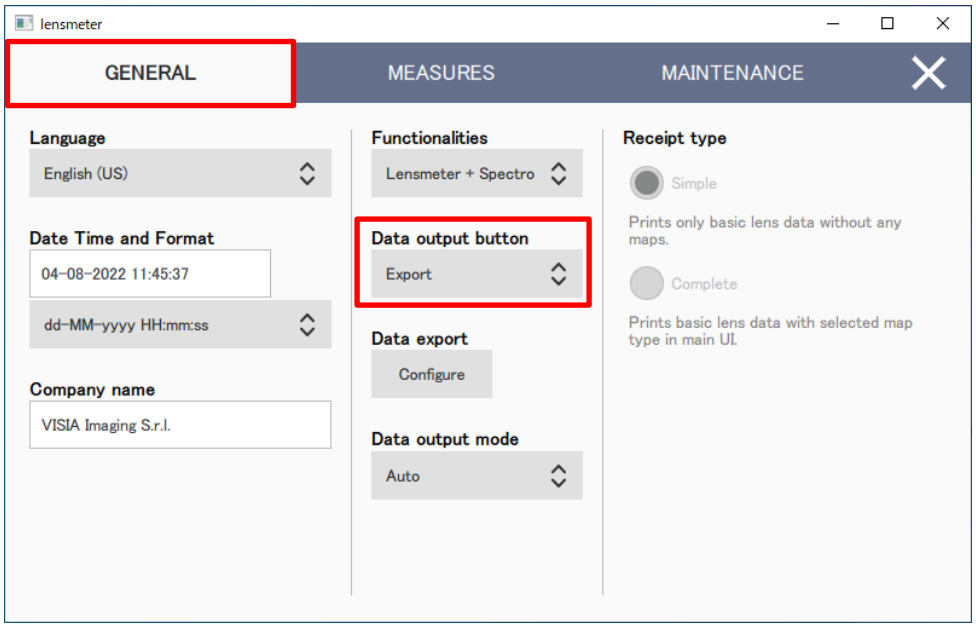
5.5.7 SOLOS data-output settings

(1) Click [Menu] button > [Settings].

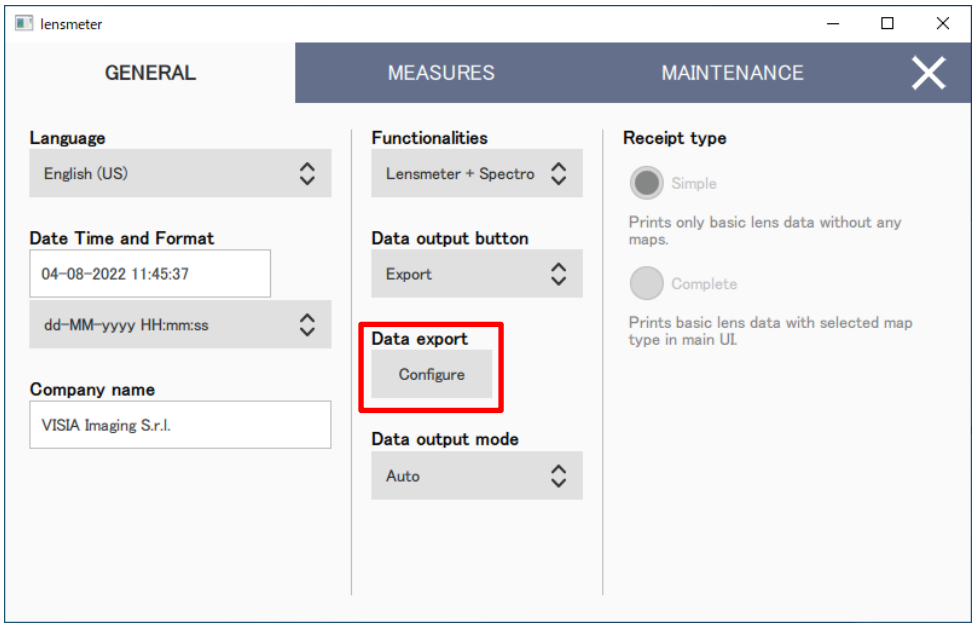




(2) Select General tab and change Data output button Settings to [Print + Export] or [Export].



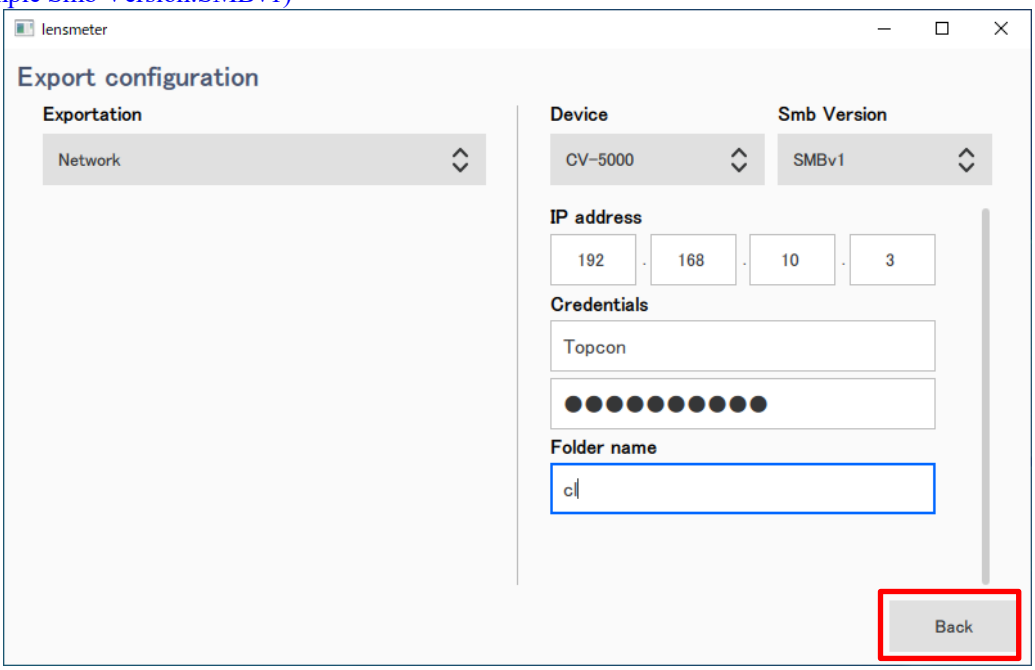
(3) Click [Configure] button under Data export to open Export configuration.



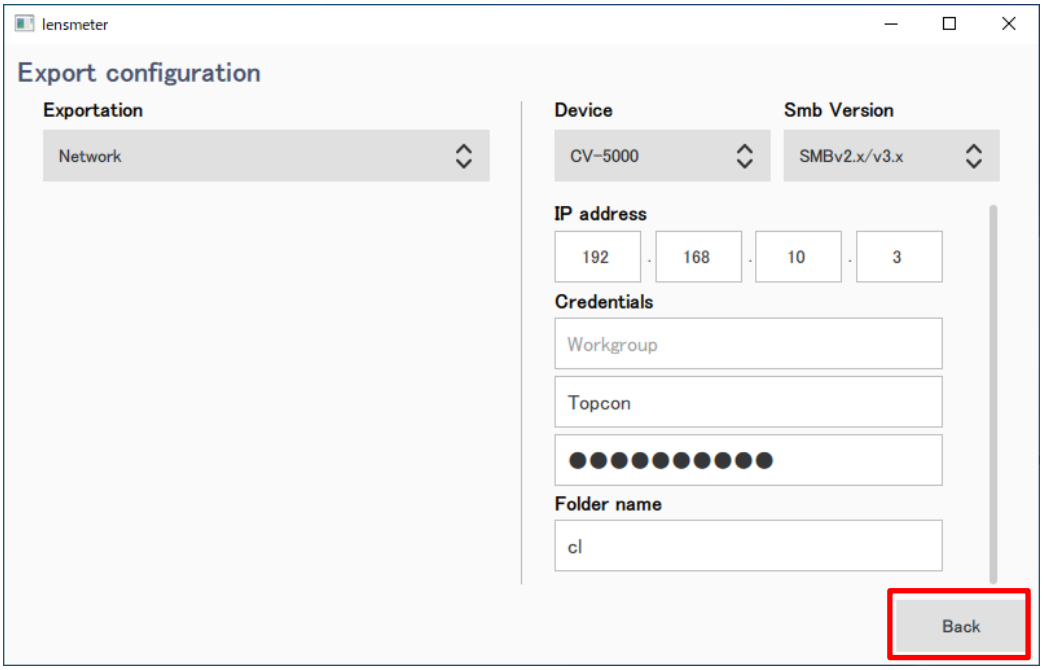
(4) Change the settings as shown below and click [Back] button.
[NOTE] The settings differ depending on the version of the SMB identified in Chapter 5.5.4 Check the SMBs setup in Chronos Control Box.5.5.4Check the SMBs setup in Chronos Control Box

Items		Content
Exportation		Network
Device		CV-5000
Smb Version		SMBv1 or SMBv2.x/v3/x (Select according to the version of SMBs in Chronos control box identified in "5.5.4(3)).)
IP address		192.168.10.3
Credentials	Workgroup	Blank (Smb Version is not displayed by SMBv1)
	User Name	Topcon
	Password	Topcon1932
Folder Name		cl

(Sample Smb Version:SMBv1)

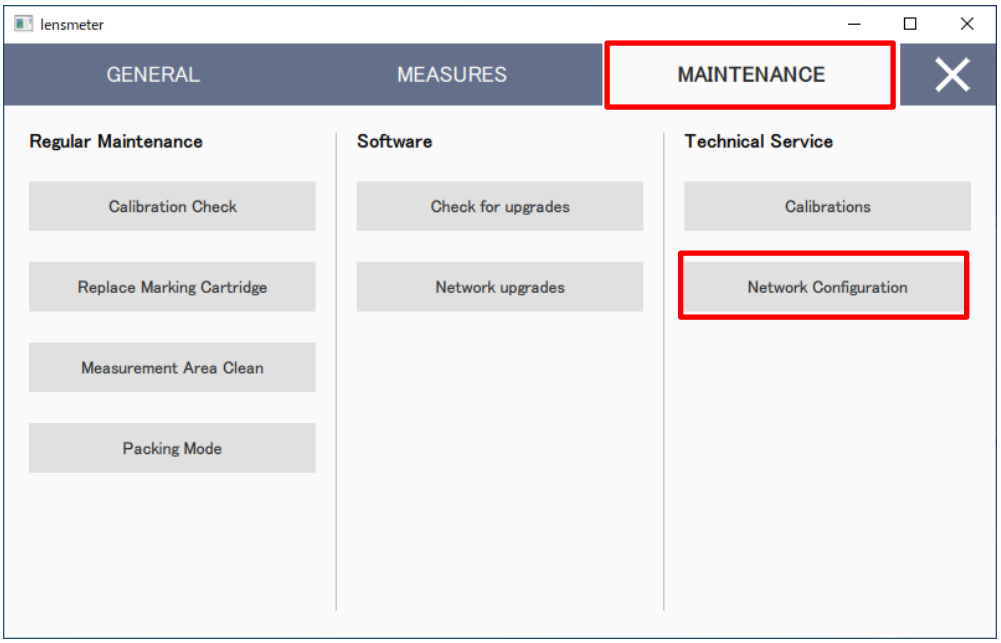


(Sample Smb Version:SMBv2.x/v3/x)



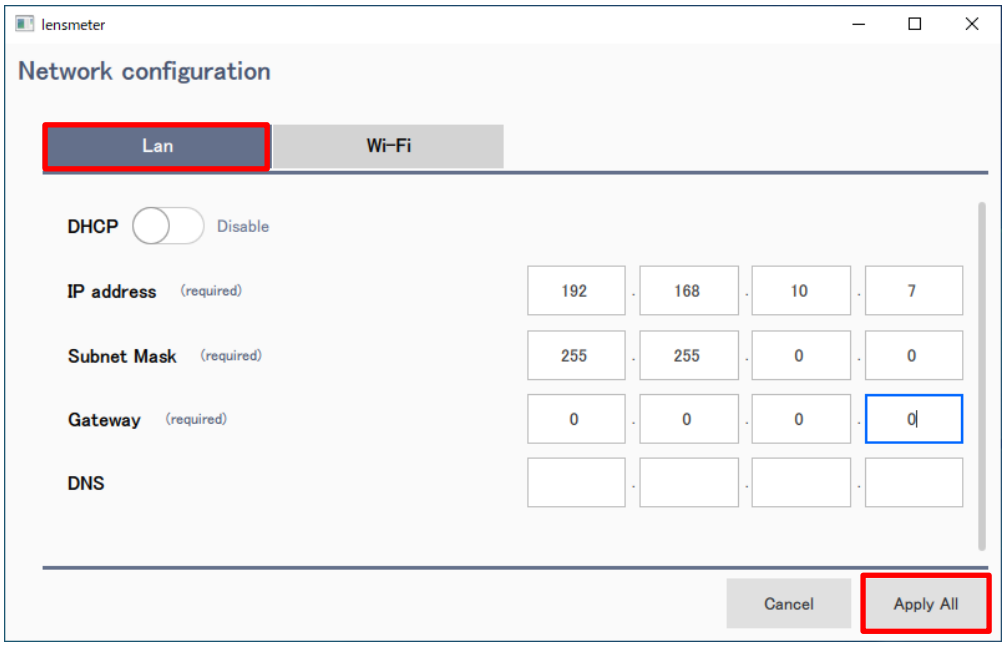
5.5.8 SOLOS connection settings

(1) Select Maintenance tab and click [Network Configuration] button.

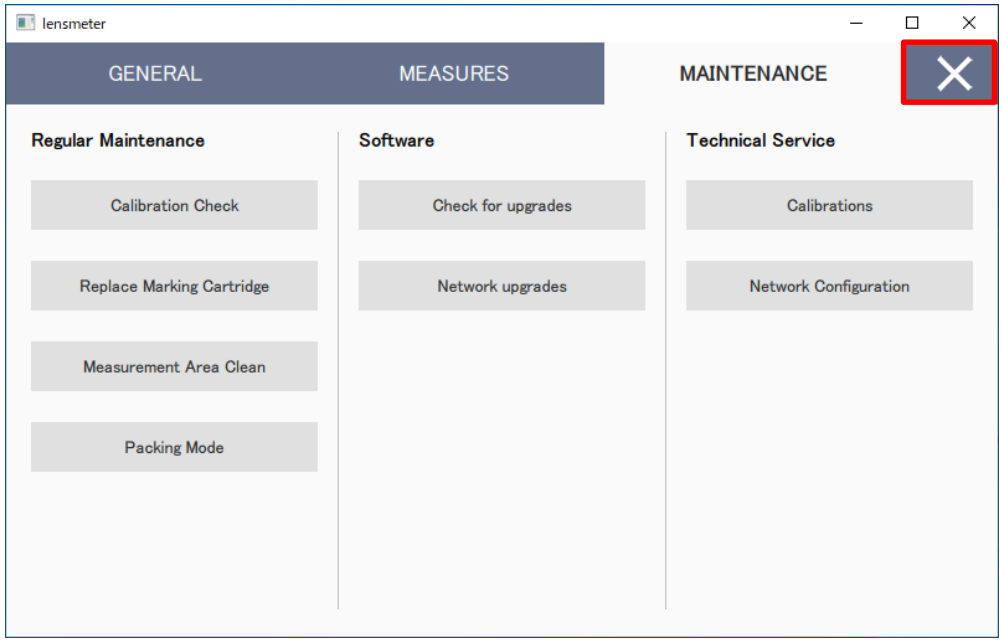


(2) Select Lan tab, make the following settings, and click Apply All button.
DHCP: Disabled

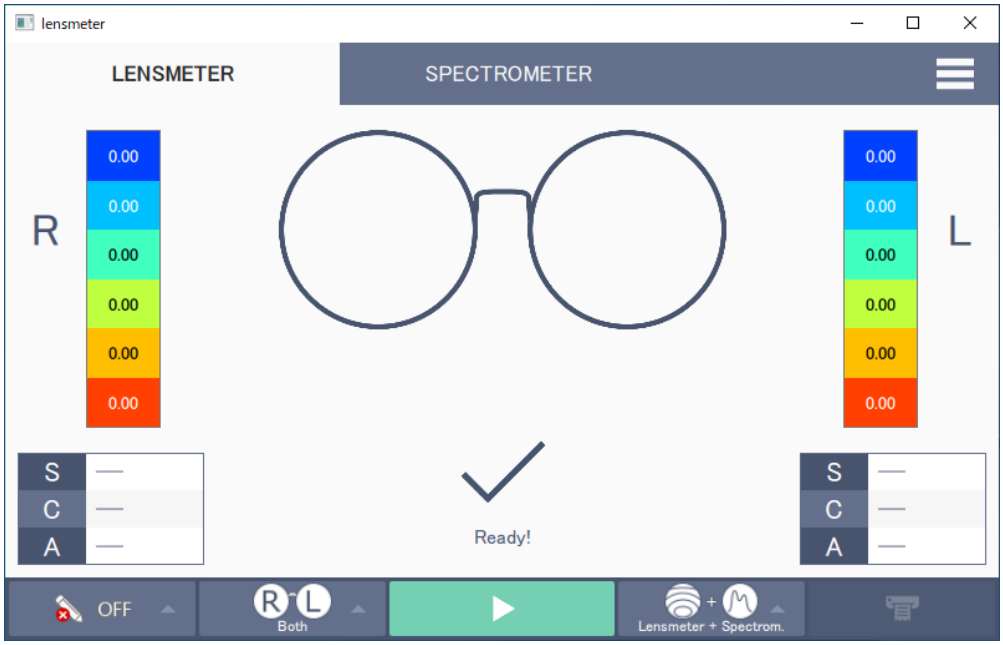
IP address	Subnet Mask	Gateway	DNS
192.168.10.7	255.255.0.0	0.0.0.0	Blank



(3) Click "X" button.



(4) Return to the Measurement screen. SOLOS settings are now complete.

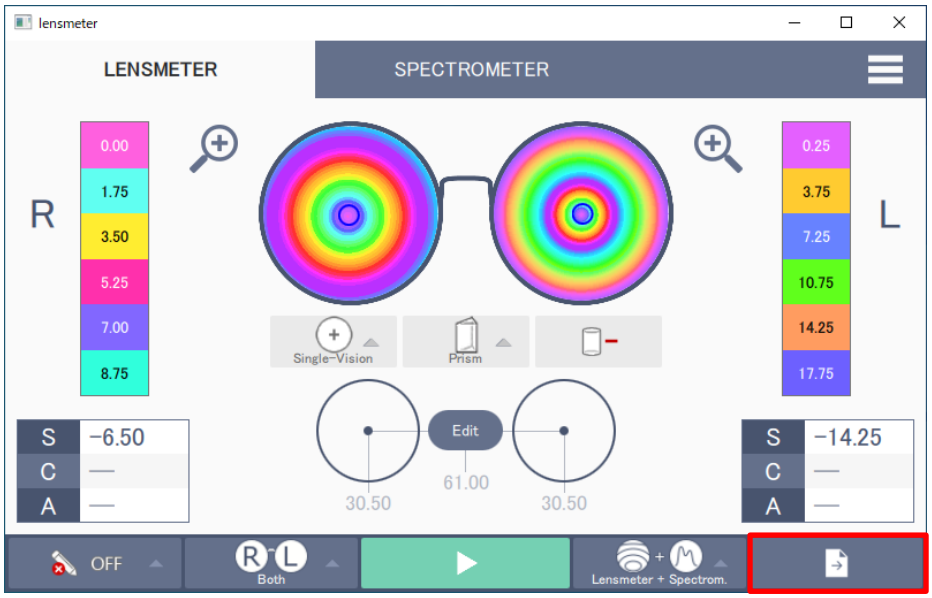


5.5.9 Operating procedures for SOLOS

(1) After measuring with SOLOS, press data-output button to export data.

NOTE

- Chronos does not receive any uniocular eye data, so must transmit binocular data.

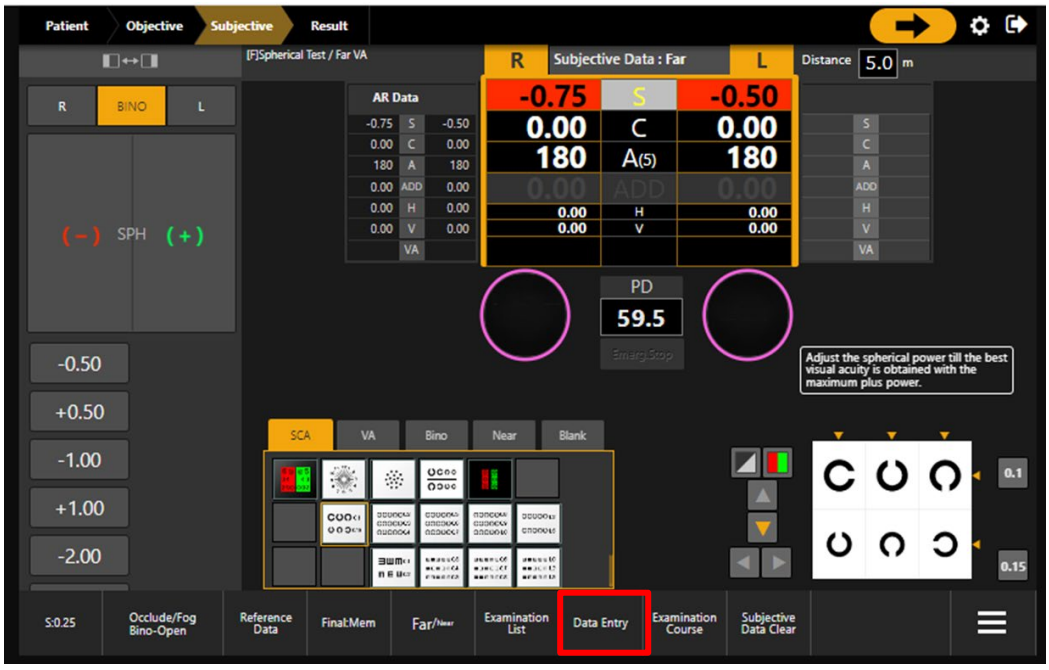


If the following error is displayed, review the settings.

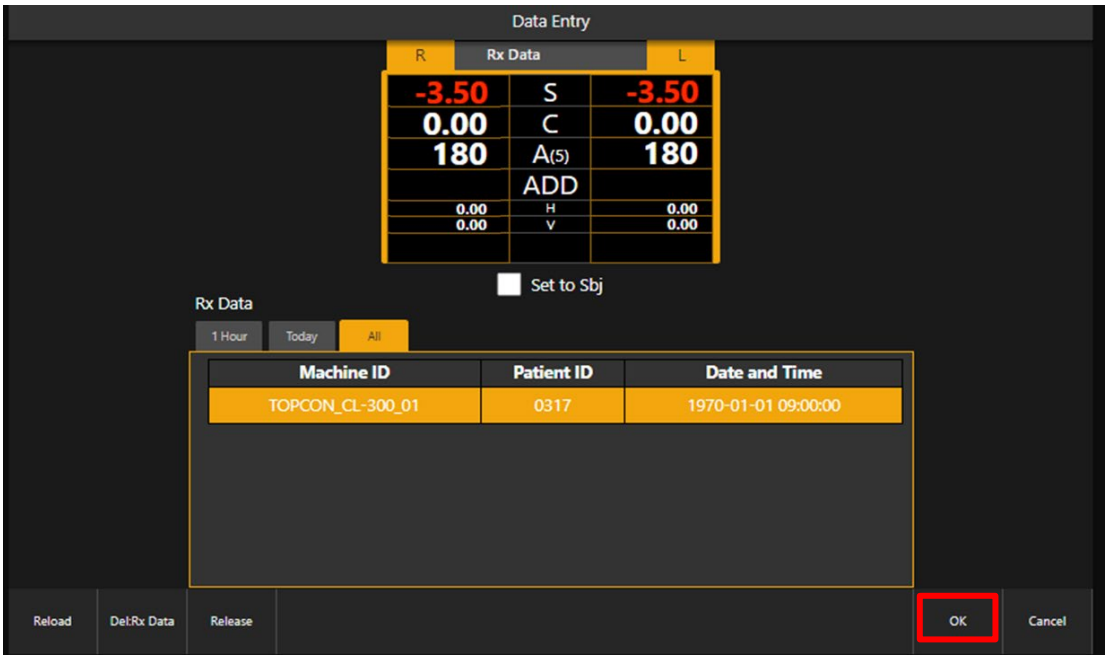
Error Message	Response	References
Data export error Error code: 256	Ensure that Smb Version is correct.	2.3.1 (4)
Data export error No remote device is found. Check the export destination setting.	Check that the IP address and other settings are correct. If multiple devices are connected, check that they do not overlap with the IP addresses of other devices.	2.3.1 (4) 2.3.2 (2)

5.5.10 Standard GUI operating procedures

(1) Click [Data Entry] button on the subjective screen.

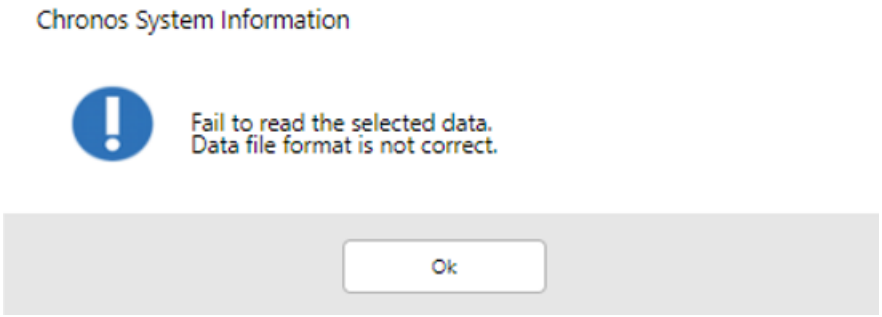


(2) After selecting the relevant data, click [OK] button in the lower right corner of the screen.

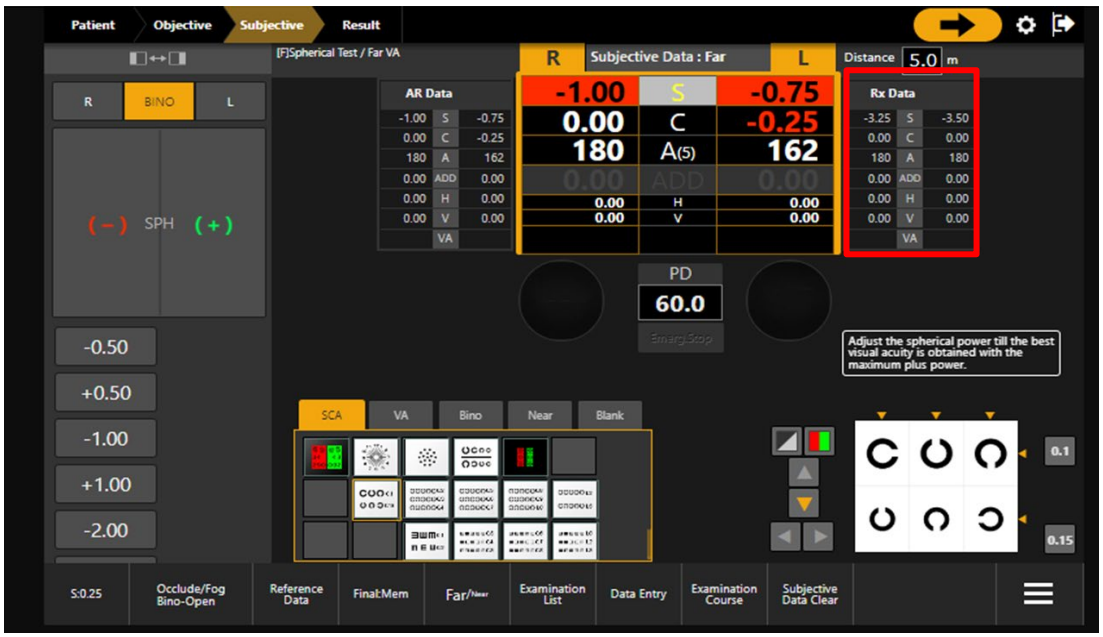


NOTE

- If uniocular data is received, the following error is displayed. Ensure that binocular data are sent.

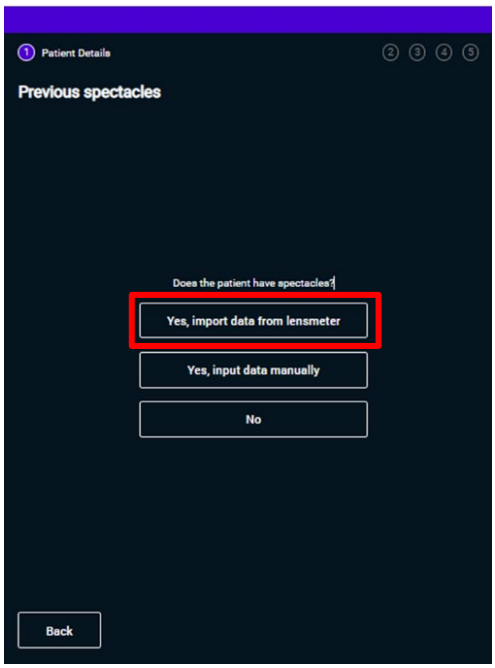


(3) The data is reflected.



5.5.11 Operating procedures for SightPilot

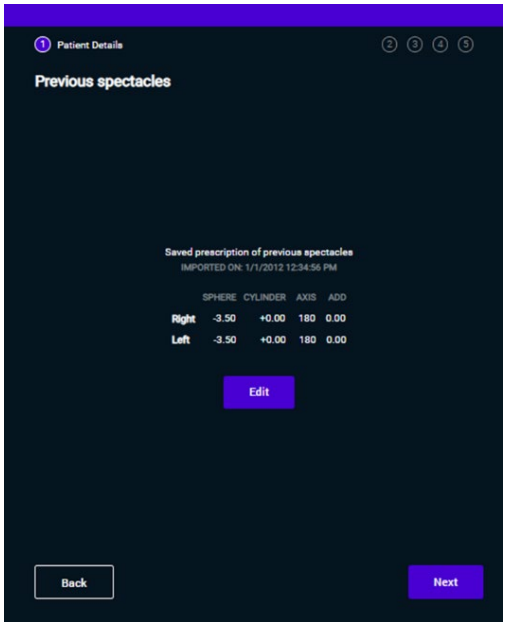
(1) After patient registration, select “Yes, import data from lensmeter”.



(2) The outcome measured by SOLOS is displayed.

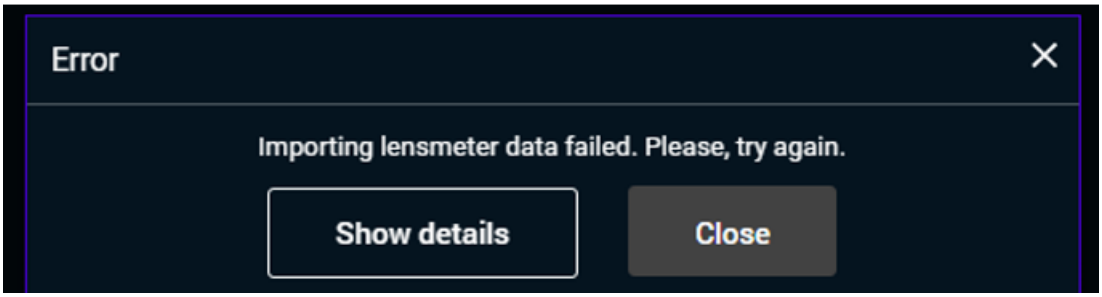
NOTE

- Only the most recent data in the specified folder is automatically loaded.



NOTE

- If uniocular data is received, the following error is displayed. Ensure that binocular data are sent.



5.6 How to Connect IMAGEnet6 and Chronos

5.6.1 Purpose

The connection and operation procedure for importing measurement data from Chronos to IMAGEnet6 are described.

5.6.2 Required tools

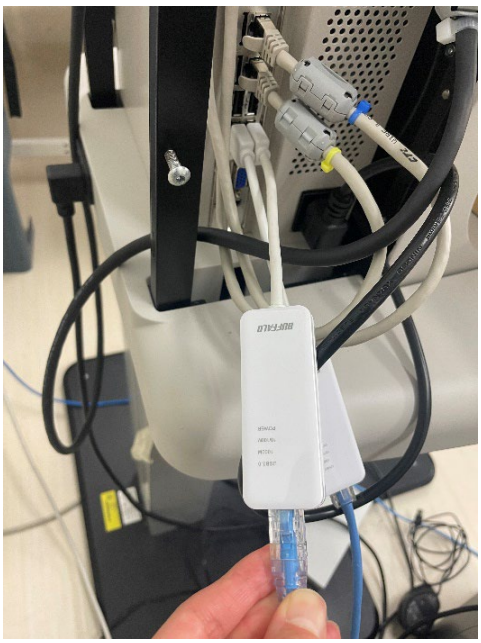
Tool name	Tool No.	Image
Laptop (LAN cable also needed for wired network)	—	
USB-LAN converter, LAN-cable	—	

5.6.3 Connecting IMAGEnet6 (PC) to Chronos

NOTE

- Chronos control box does not have any additional LAN ports. Insert USB-LAN converter into USB3.0 port.
- USB-LAN converter connected in Chapter 2.3 is for Network1. In this case, connect additional USB-LAN convereter for Network2.

PC for IMAGEnet6



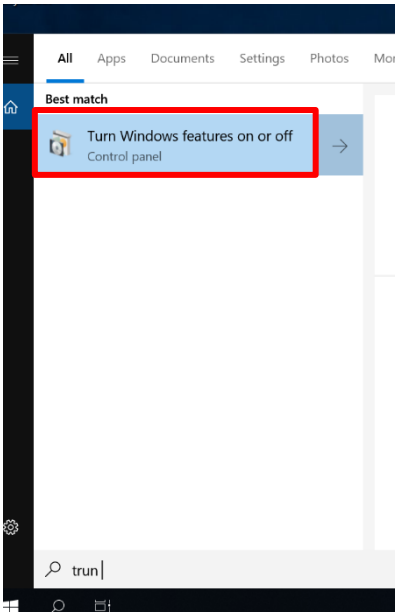
Chronos

5.6.4 Check the SMBs setup in Chronos Control Box

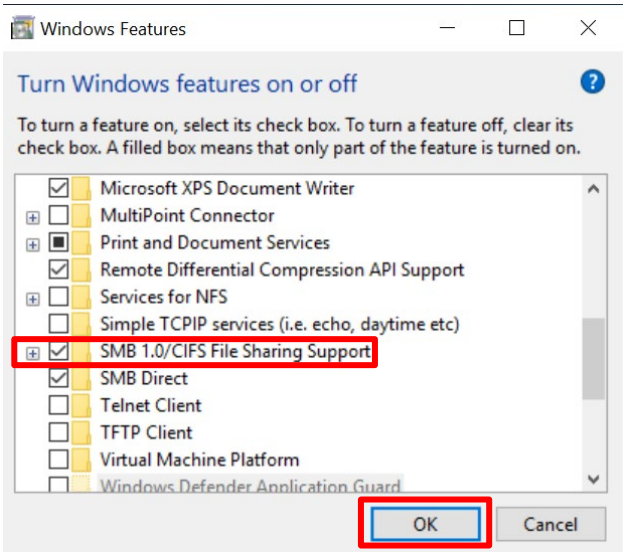
(1) Turn on Chronos control box.

(2) After the system starts up, access it from the laptop with using remote desktop, enter "Turn windows" in the search box on the taskbar, and select "Turn Windows features on or off" as the search option.
Refer to "2.3" and "2.5" for how to connect to the control box with the laptop.
Information needed for connecting to a remote desktop are as follows.

Computer	Username	Password
IP address of network 1 (default: 10.1.2.3)	Topcon	Topcon password (default: Topcon1932)

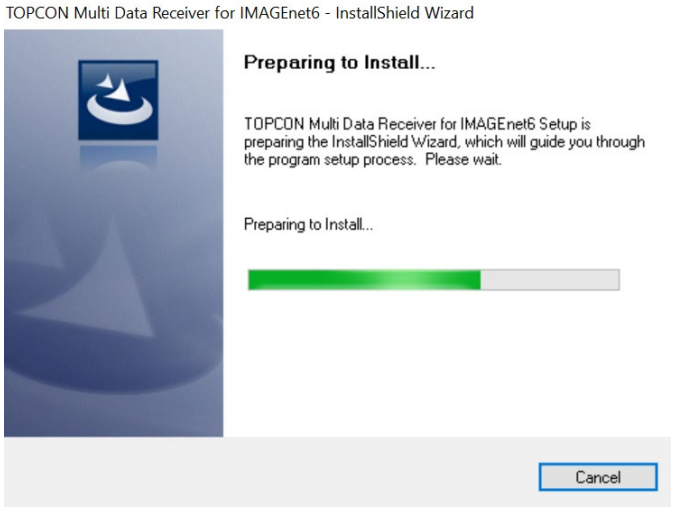


(3) When "Windows Features on or off" dialogue box appears, check whether "SMB1.0/CIFS File Sharing support" is checked or not. (The settings confirmed here are used in "5.6.6(2)".)エラー！参照元が見つかりません。
・Checked: SMBv1 is used.
・Unchecked: SMBv2.x/v3.x is used.
When the confirmation is complete, press [OK] button to close the dialog box.

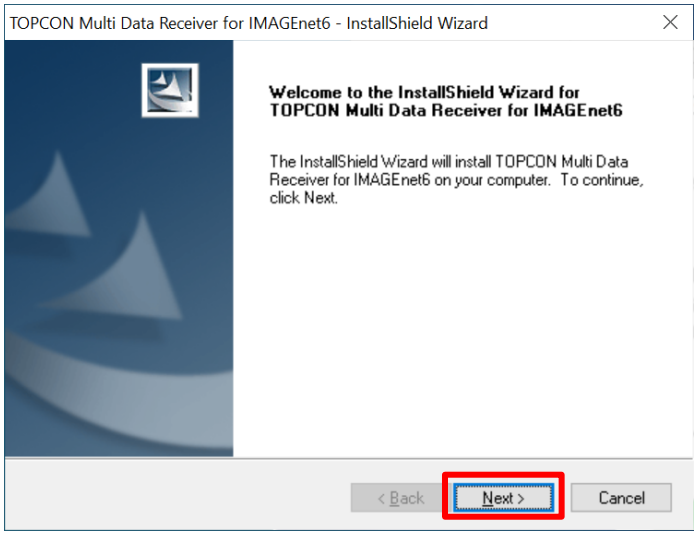


5.6.5 Installing MDR

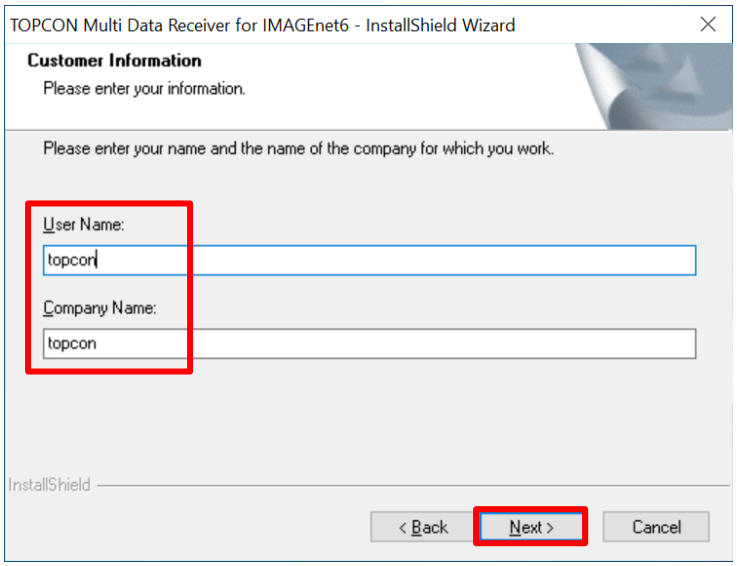
(1) Execute "setup.exe" of MDR on the PC on which IMAGEnet6 is installed. “setup.exe” for MDR is located on IMAGEnet6 install disc at the following location:
Install disc ¥MDR¥ setup.exe
Note: If IMAGEnetR4 is installed, install MDR for IMAGEnetR4. If you install MDR for IMAGEnet6, IMAGEnetR4 and MDRs will not work properly.



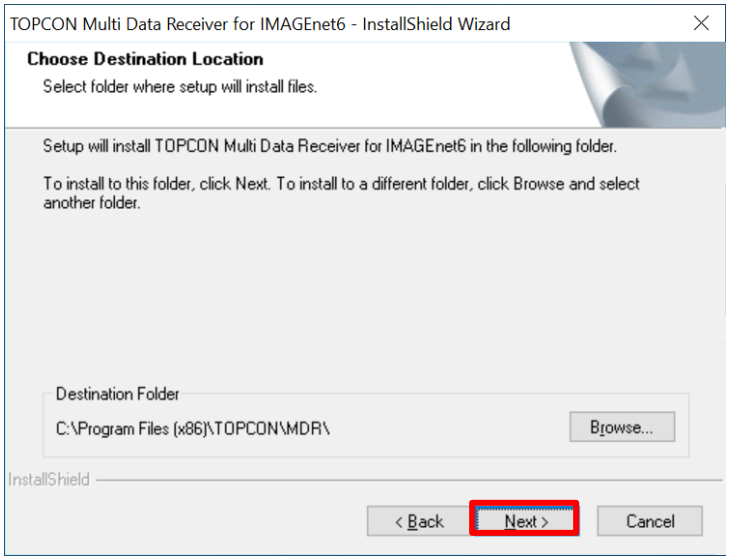
(2) Click [Next].



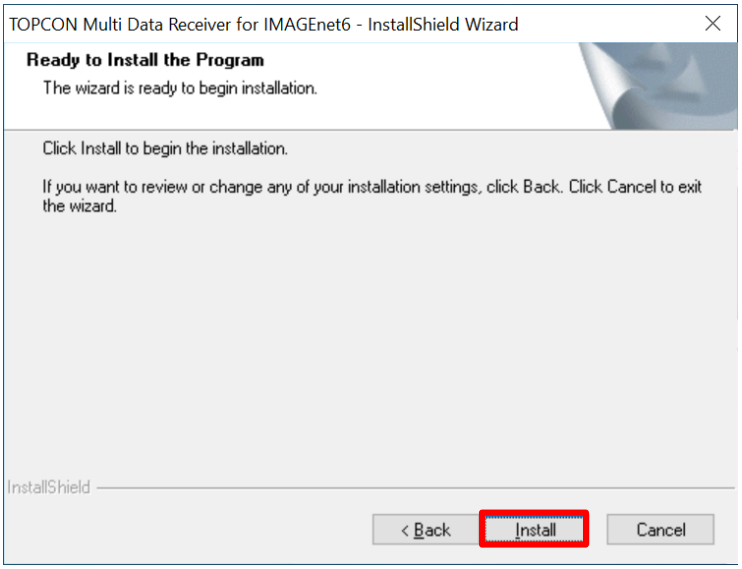
(3) Enter the user information and click [Next].

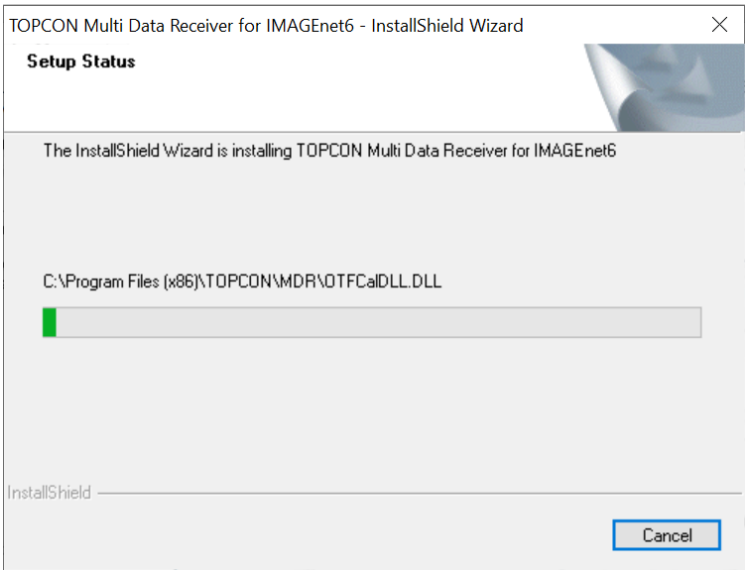


(4) Click [Next].

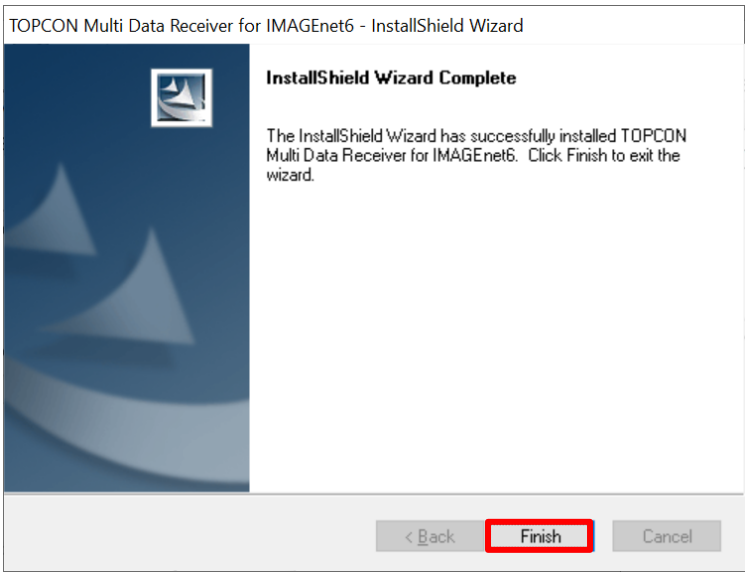


(5) Click [Install].



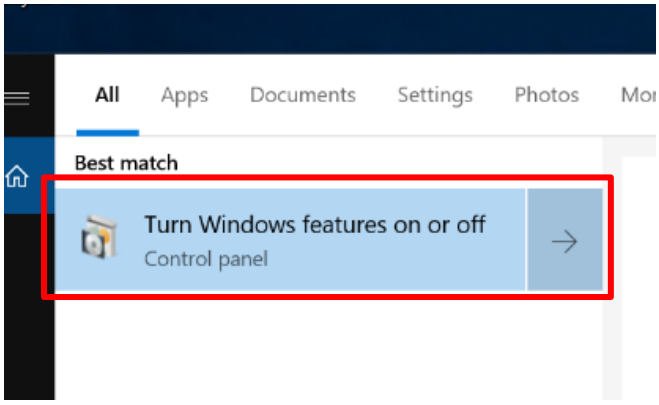


(6) Click [Finish].

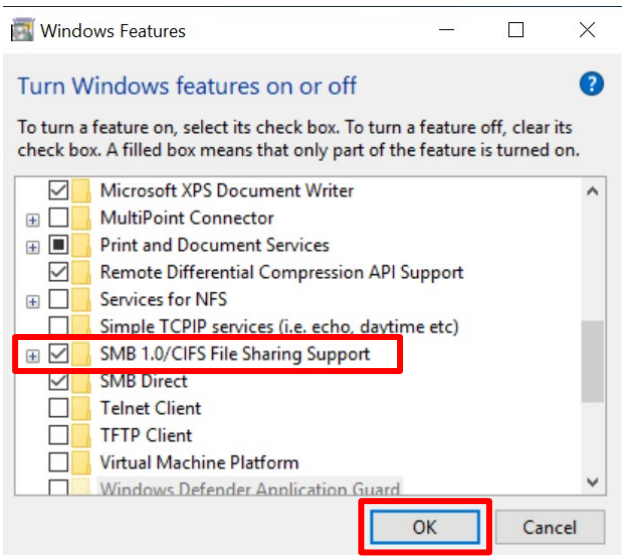


5.6.6 SMB setting of PC

(1) Enter "turn" in the search box of the taskbar on the PC and select "Turn Windows features on or off" in the search candidates.

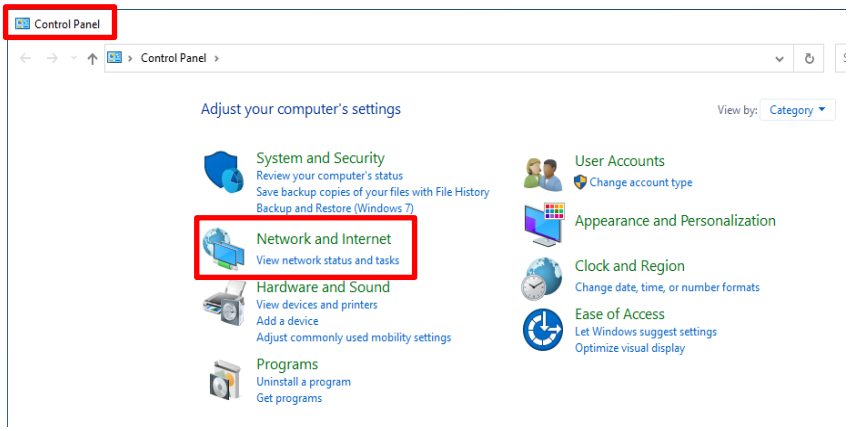


(2) Confirm if the check of "SMB1.0/CIFS file sharing support" in "Turn Windows features on or off" is the same as the setting in "5.6.4 Check SMB settings of Chronos control box". and click the [OK] button to close the dialog.

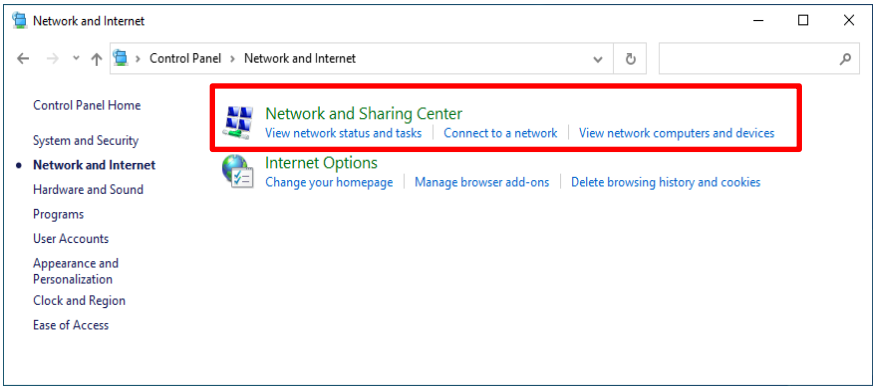


5.6.7 Network settings

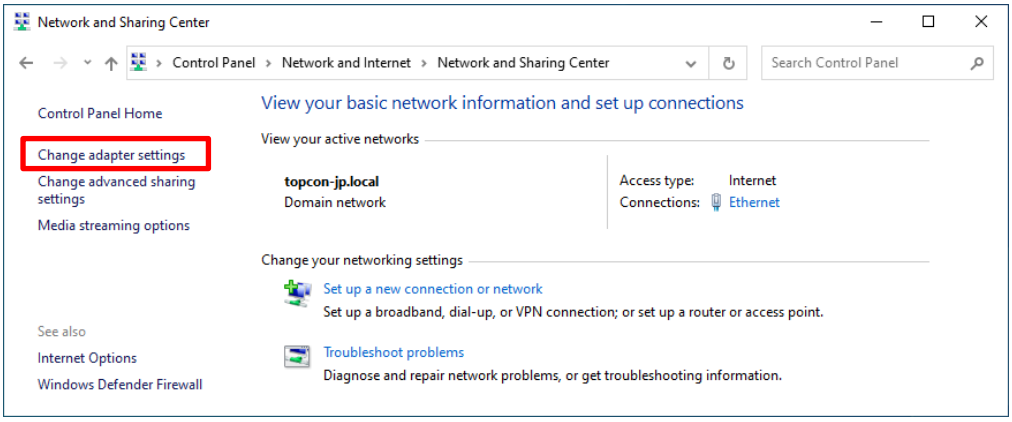
(1) Open Control Panel on PC and click [Network & Internet].



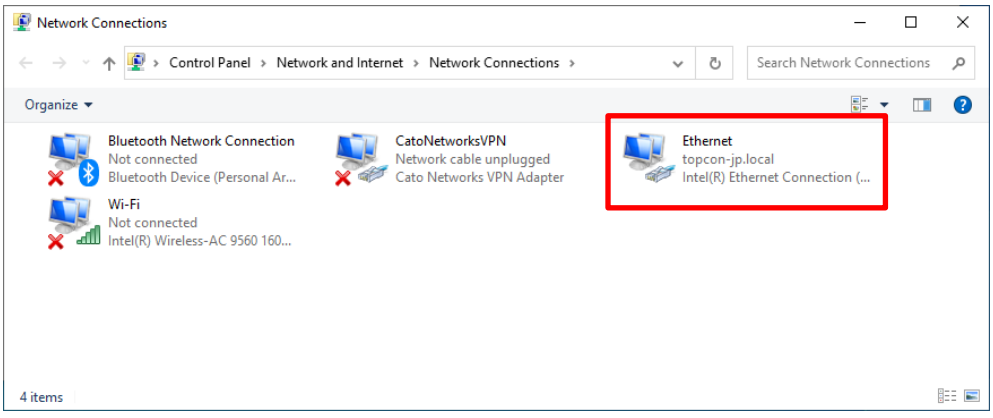
(2) Click [Network and Sharing Center].



(3) Click [Change adapter settings].

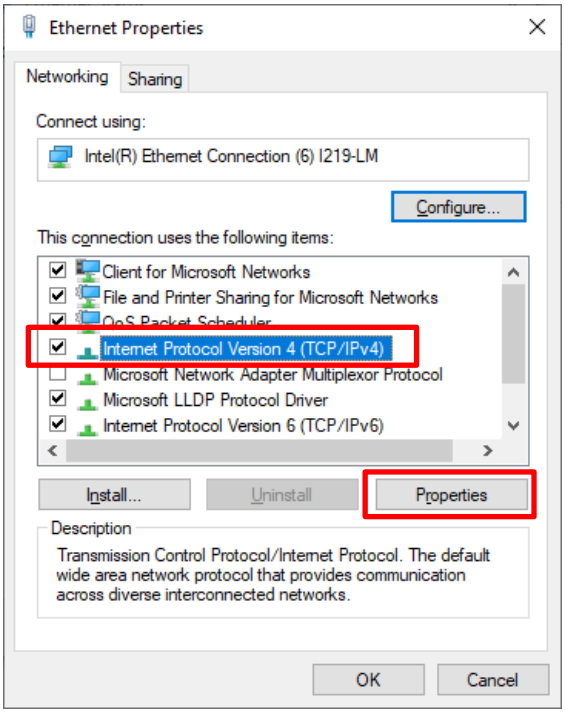


(4) Right-click the Ethernet connected to CONTROL_BOX and select Properties.



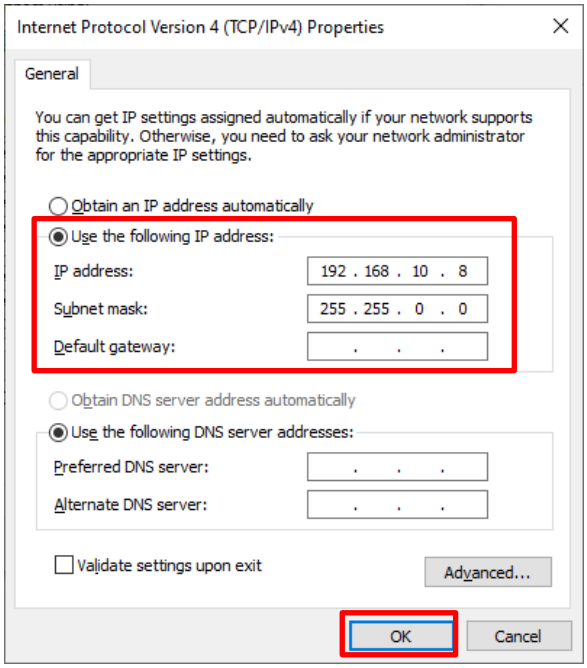
(5) Select Internet Protocol Version 4 and click [Properties].

NOTE	• Clear the check box for Internet Protocol Version 6.



(6) Select “Use the following IP address” and enter the following values for the IP address and subnet mask.

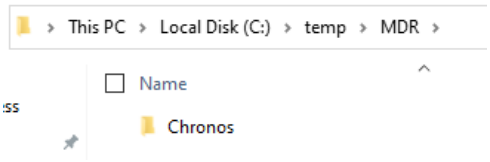
IP address	Subnet Mask
192.168.10.8	255. 255. 0. 0



(7) Click [OK] to finish configuring the network.

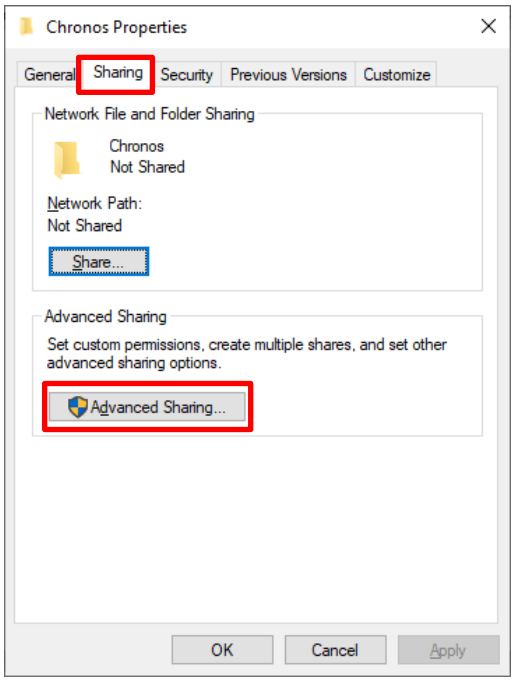
5.6.8 Creating a Shared Folder

(1) Create a folder to receive Chronos test data on the PC.
e.g. C:¥Temp¥MDR¥ Chronos

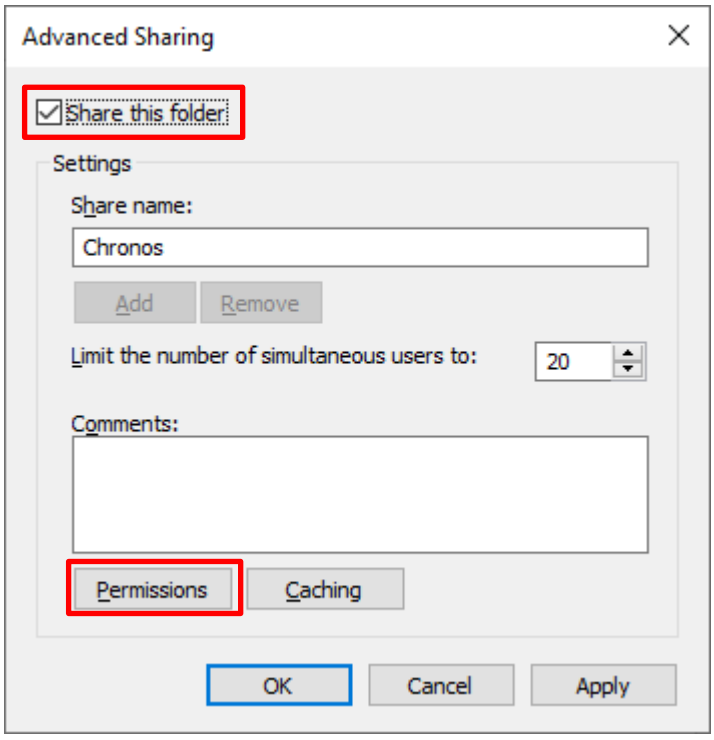


(2) Right-click the folder and click Properties.

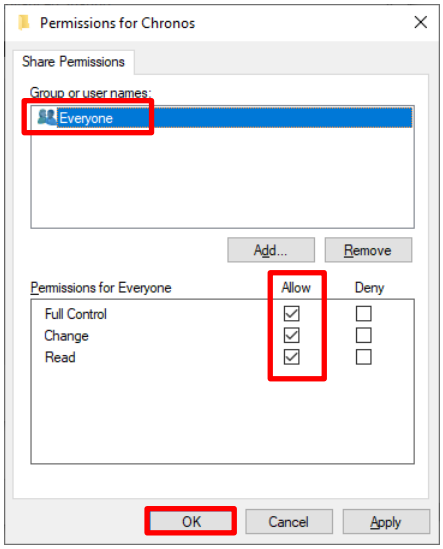
(3) Under Properties, select “Sharing” tab, and then click [Advanced Sharing].



(4) Under Advanced Sharing, select "Share this folder" and click [Permissions].



(5) Under Permissions, select “Everyone”, check “Full Control”, and then click [OK].



(6) Under Advanced Sharing, click [OK].

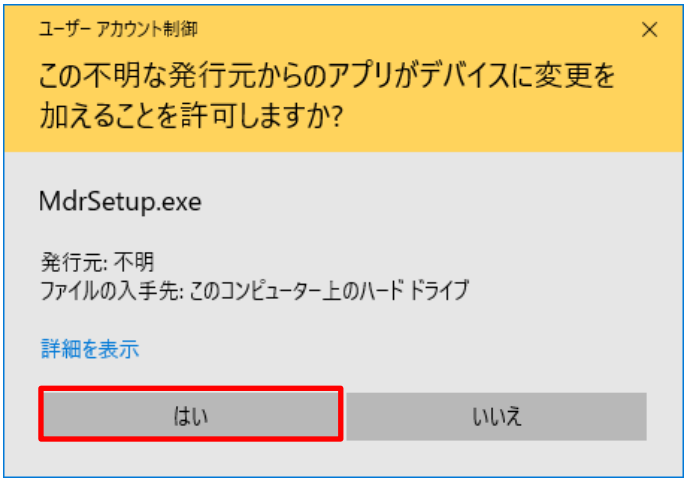
(7) Click [Close] button in the properties.

5.6.9 MDR settings

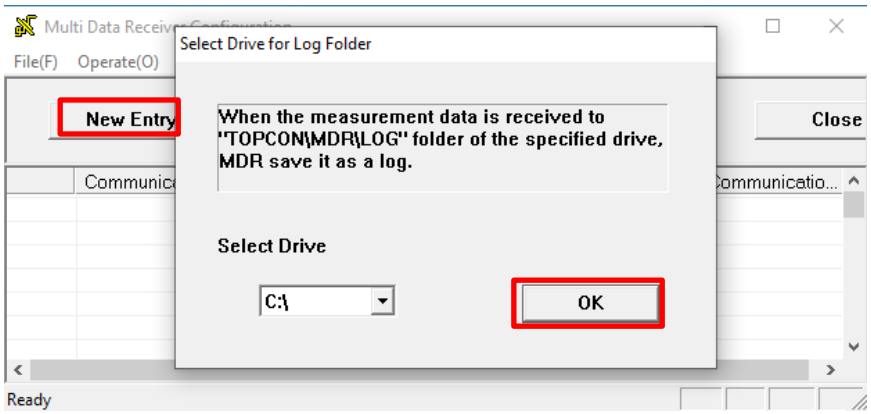
(1) Execute "MdrSetup.exe" on the computer. MdrSetup.exe resides in the following paths:

C:¥Program Files (x86)¥TOPCON¥MDR¥MdrSetup.exe

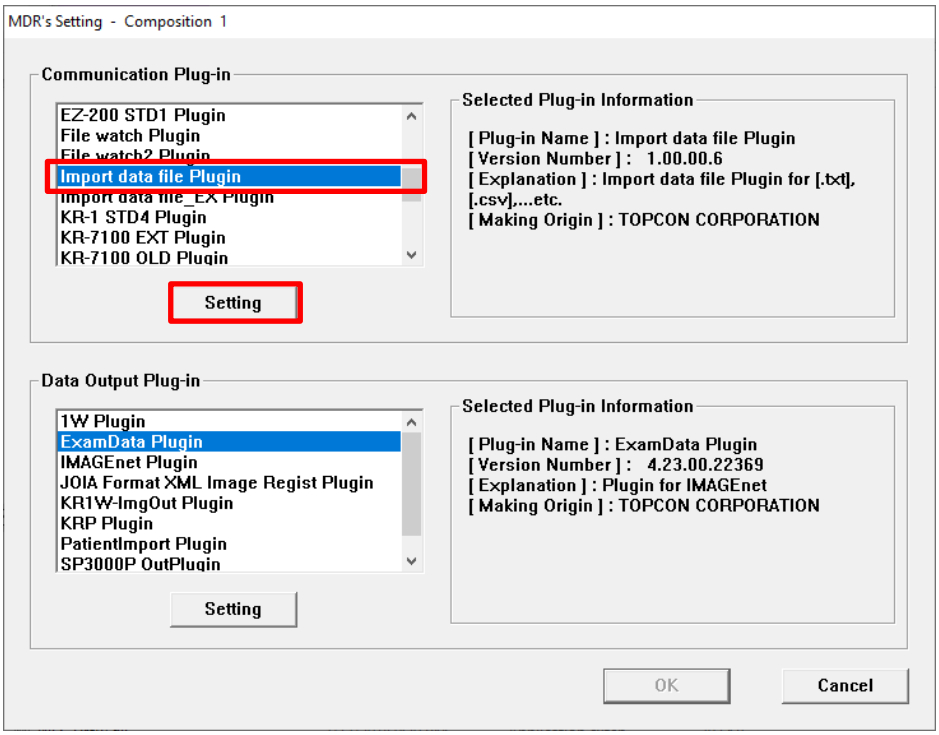
If the following is displayed, click [Yes].



(2) Click [OK], and then click [New Entry].

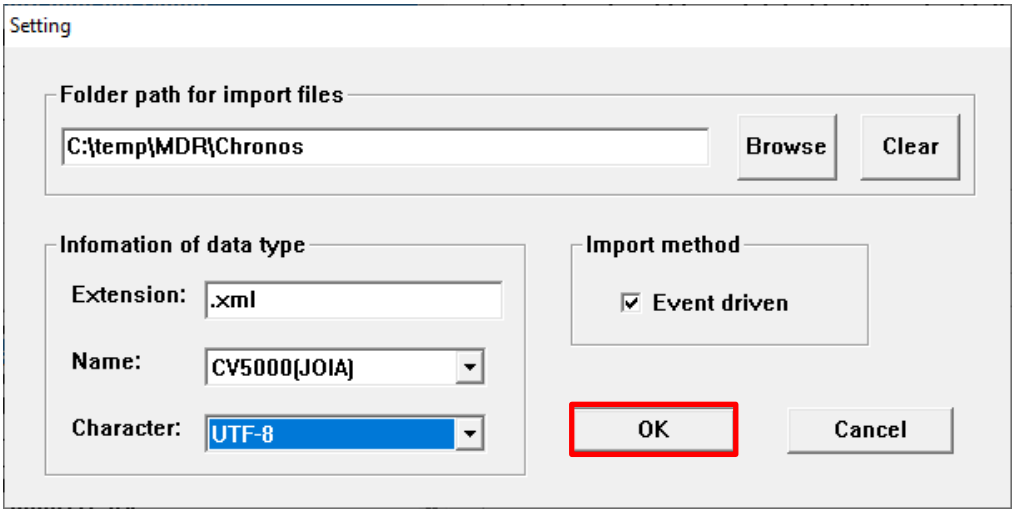


(3) Select "Import data file Plugin" in "Communication plug-in" and click [Setting].

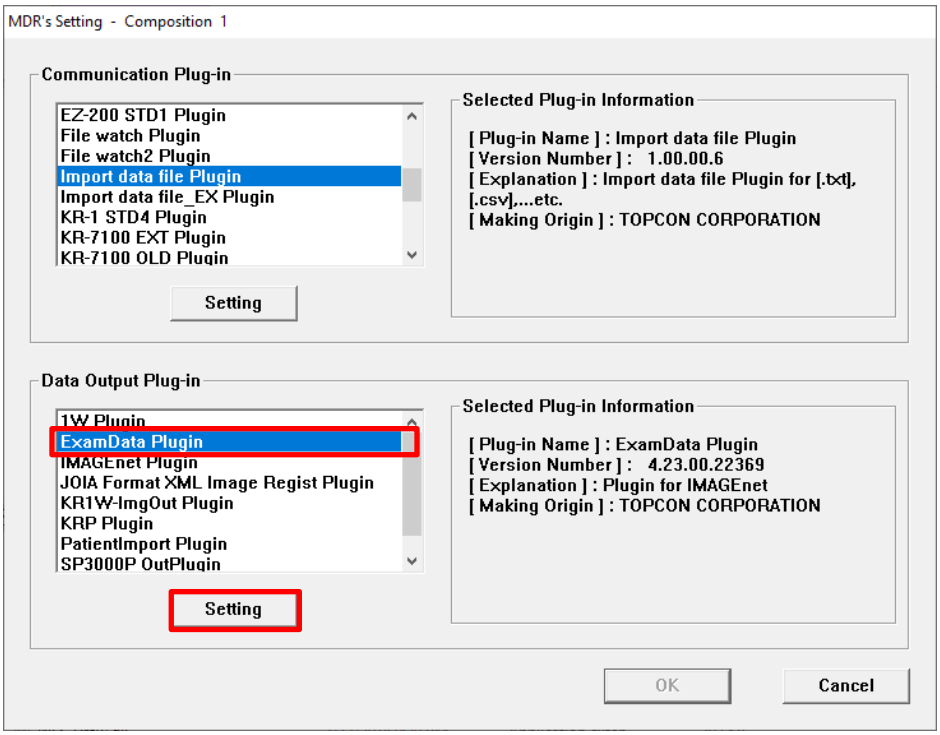


(4) Set as follows and click [OK] button.
Path to the folder where the examination data files will be received, e.g. C:¥ Temp¥MDR¥ Chronos

Extension	Name	Character	Event driven
.xml	CV5000(JOIA)	UTF-8	ON

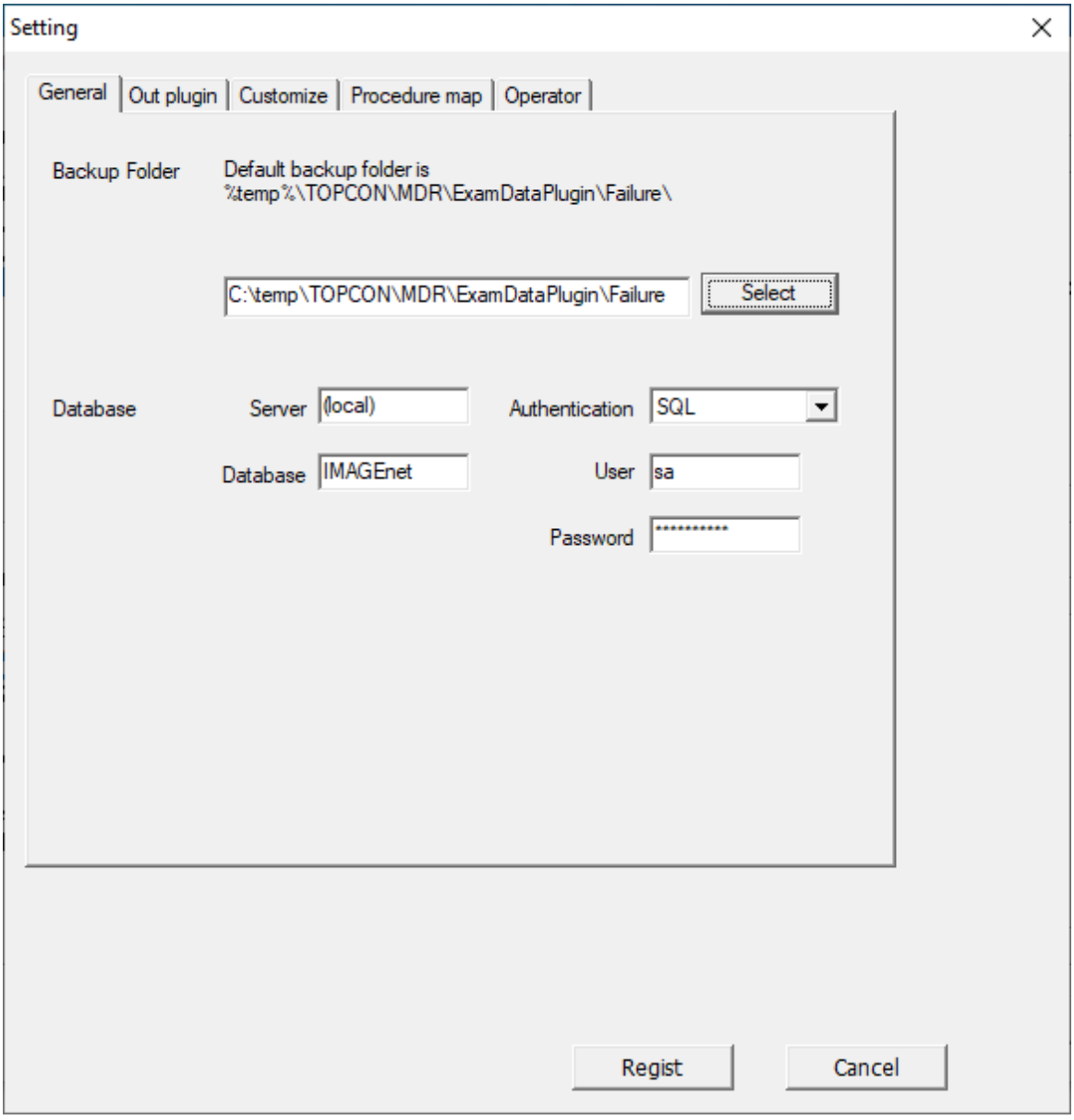


(5) Select "ExamData Plugin" in "Data Output Plug-in" and click [Setting].



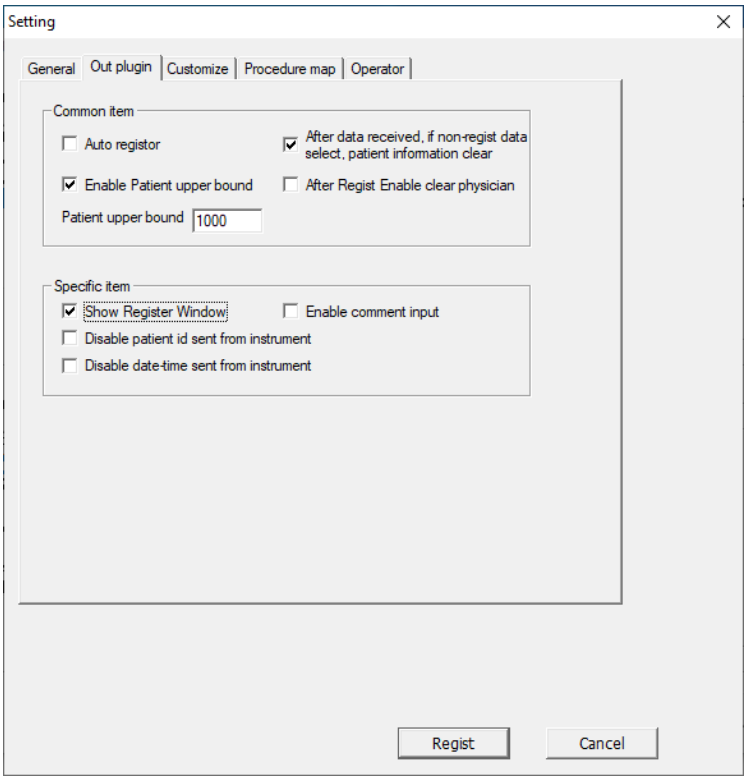
(6) Set the following settings on General tab.

Items	Content
Backup Folder	Specify a folder of your choice if you have. (If there is no specific folder, you can leave this as blank.)
Server	Enter the server name of IMAGEnet6. e.g. (local)
Database	Enter IMAGEnet6 database name. e.g. IMAGEnet
Authentication	Select Windows Authentication or SQL-Authentication. e.g : SQL Authentication
User	If you select SQL authentication, enter the user name that can access the database. e.g.:sa
Password	If you select SQL authentication, enter the password that corresponds to the user name that can access the database. e.g. :Topcon1932

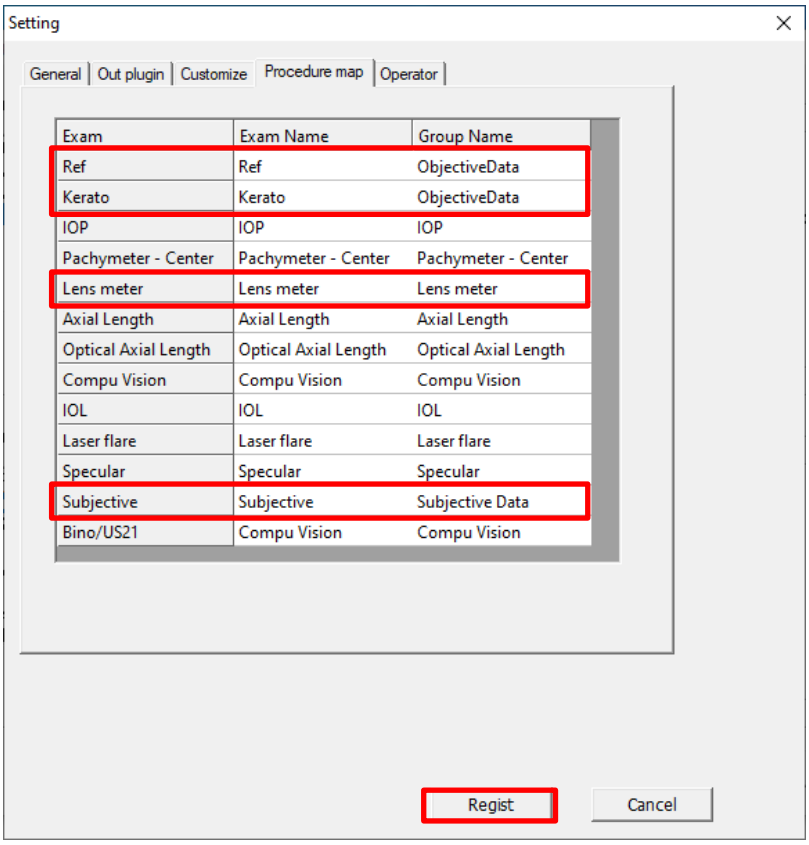


(7) On “Out PlugIn” tab, make the following settings:

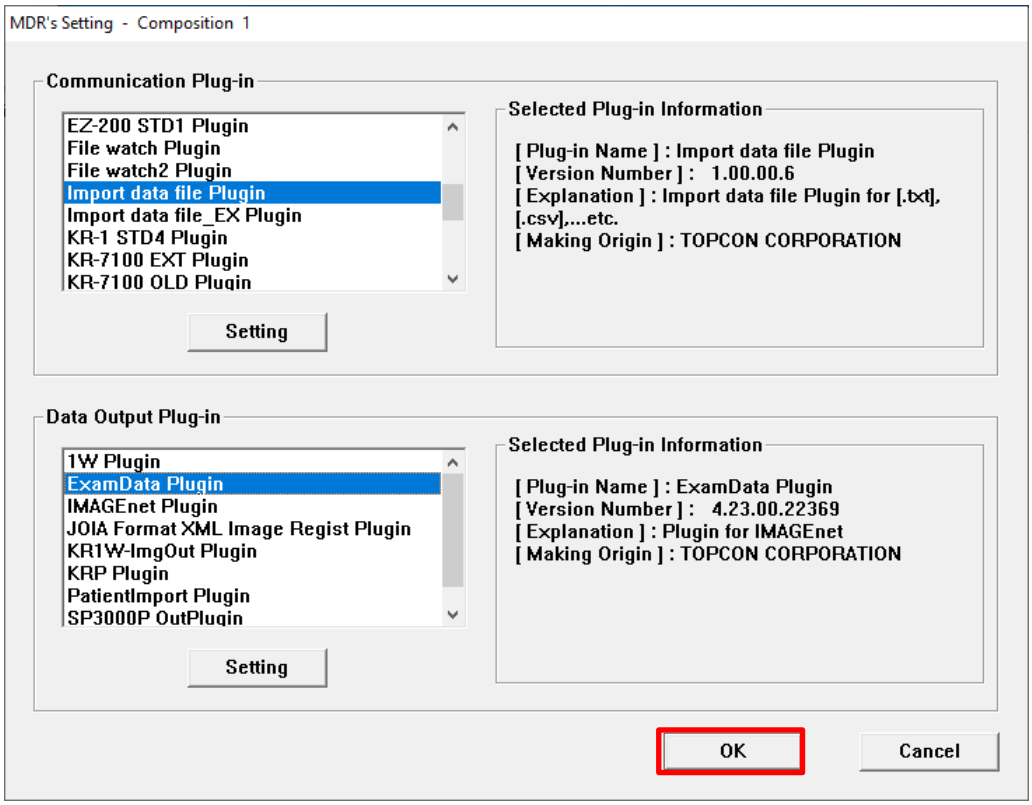
Items	Content
Auto registor	Check this box if you would like automatic register if receiving data from the test instrument when the patient ID is being searched. Example: OFF
After data received, if non-regist data select, patient information clear	Check this box if you would like automatic clear of patient information, if unregistered data selected from the unregistered list immediately after receiving data from the test instrument,. Example :ON
Enable Patient upper bound Patient upper bound	Setting the upper limit for the number of patients displayed. Example :ON/1000
After Regist Enable clear physician	Check this box if you want to clear the patient name value when clicking the Clear button. In that case, the value of the patient name is cleared immediately after data registration. Example: OFF
Show Register window	Check this box to display the registration window when you connect an test instrument that does not normally require the registration window to be displayed. Example :ON
Enable comment input	Check this box to enter comments in the registration window. Example: OFF
Disable patient id sent from instrument	Check this check box if you want to ignore the ID number in the data sent from an instrument. In that case, patient selection becomes mandatory in the MDR. Example: OFF
Disable date-time sent from instrument	Check this check box if you want to ignore the inspection date and time in the data sent from an instrument. In this case, the system time of the computer on which MDR is installed is registered as the inspection date and time. Example: OFF



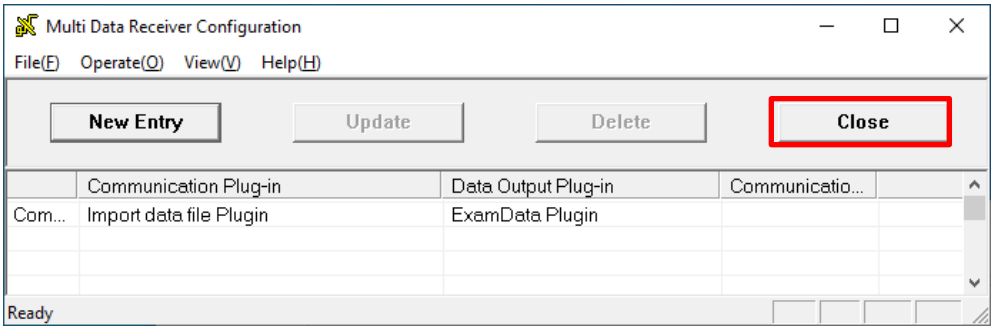
(8) Set “Procedure Map” tab as desired and click [Regist] button.
Chronos's examination data are "Ref", "Kerato", "Lens meter," and "Subjective". You can change the procedure name registered in IMAGEnet6 by changing the "Exam Name" and "Group Name".



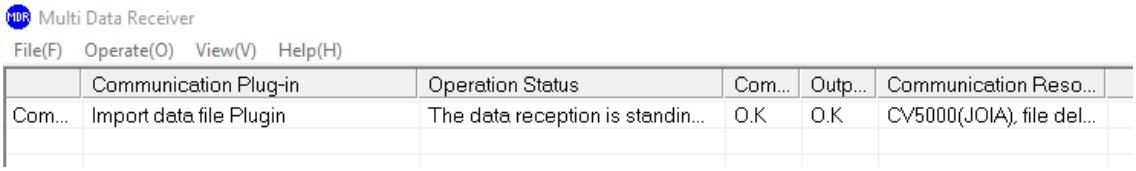
(9) Click [OK] button.



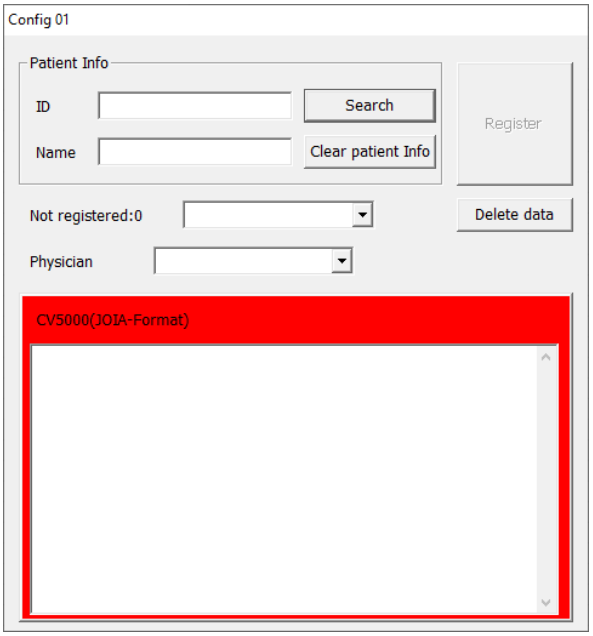
(10) Click the [Close] button.



(11) Setting is completed once MDR has been activated as follows.



When "Show register window" is ON, the following window is also displayed.

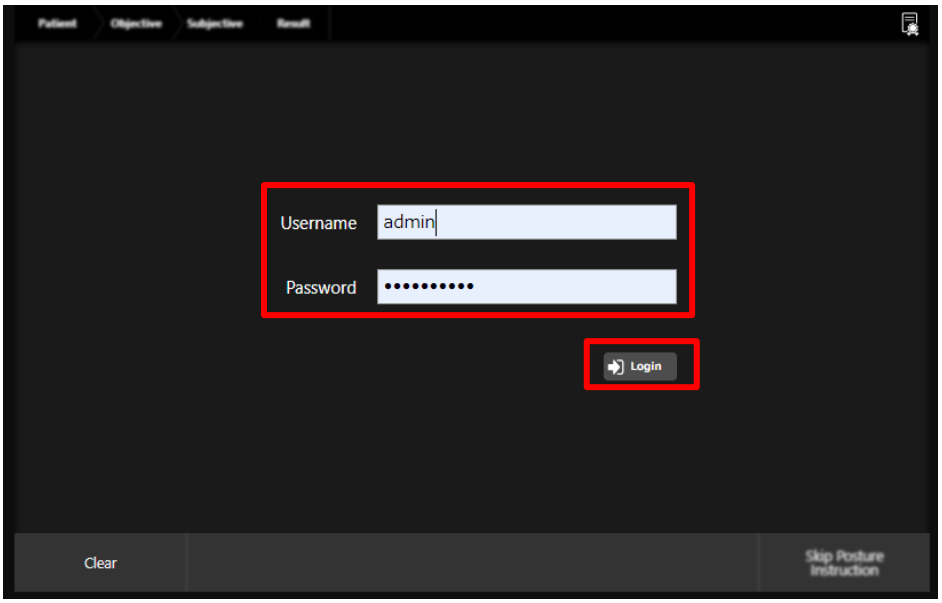


5.6.10 Standard GUI settings

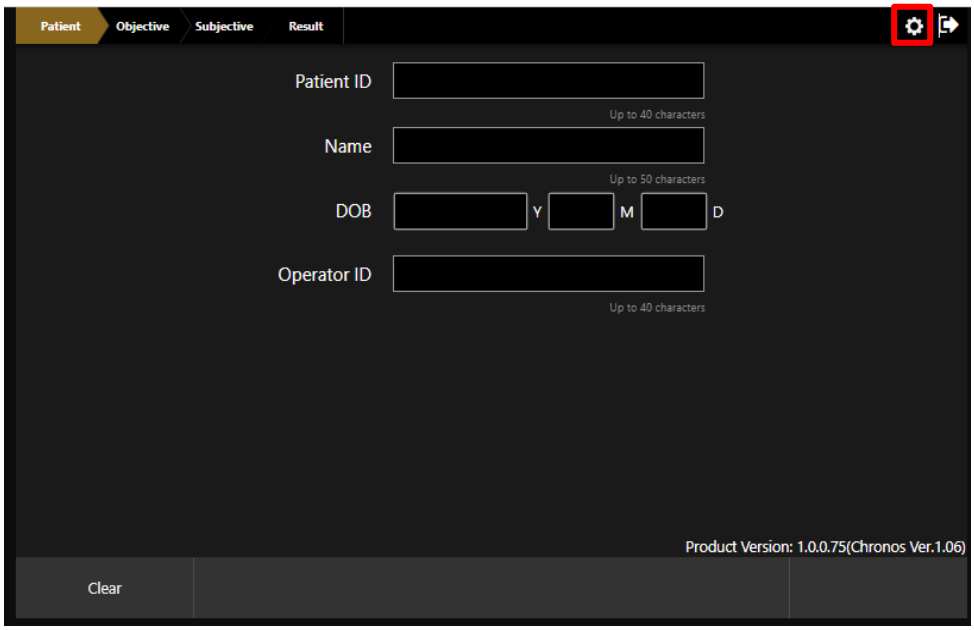
(1) Connect http://10.1.2.3/topcon/sub/login.php with the laptop.

(2) Enter your username and password and log in.*The default is below.

Username	Password
admin	Topcon@123

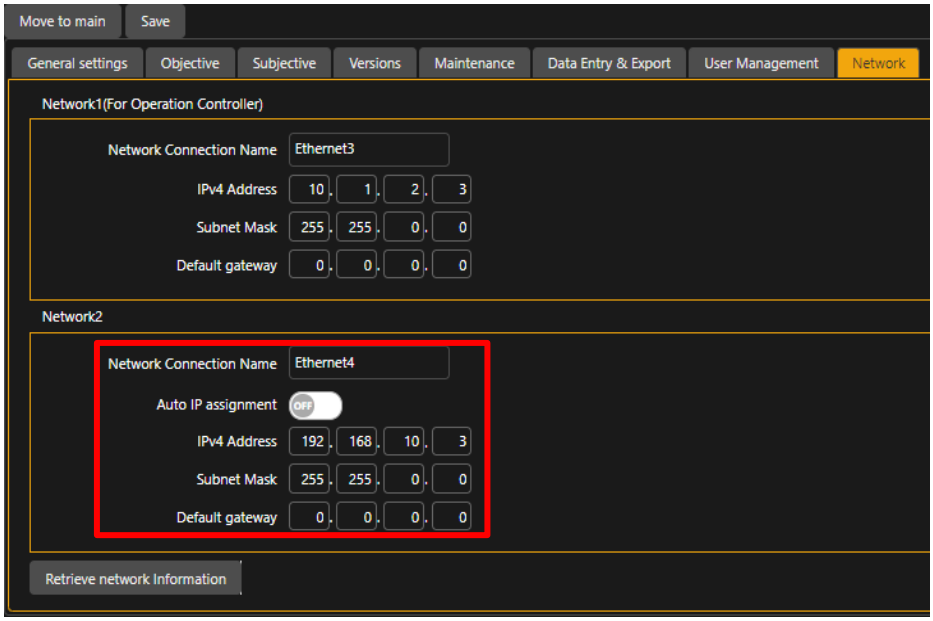


(3) Click Settings button.



(1) Open [Network] tab, enter it in [Network 2].

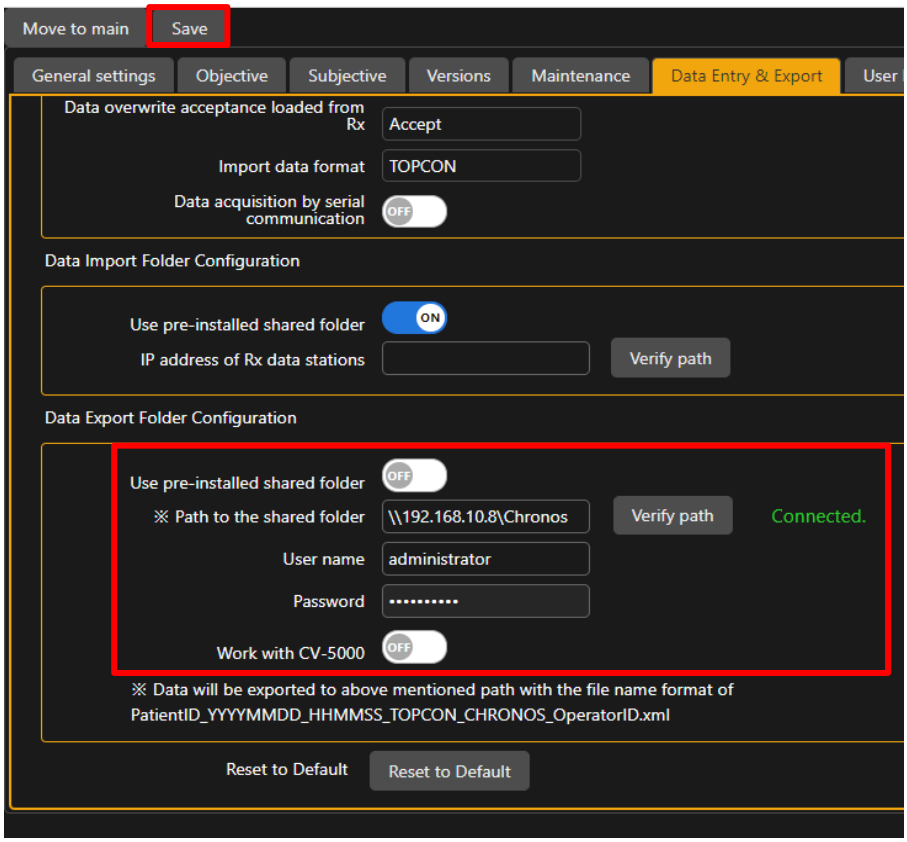
IP address	Subnet Mask	Gateway
192.168.10.3	255.255.0.0	0.0.0.0



(1) Open [Data Entry & Export] tab and set the following.
"Data Export Folder Configuration"
- OFF using pre-placed shared folders

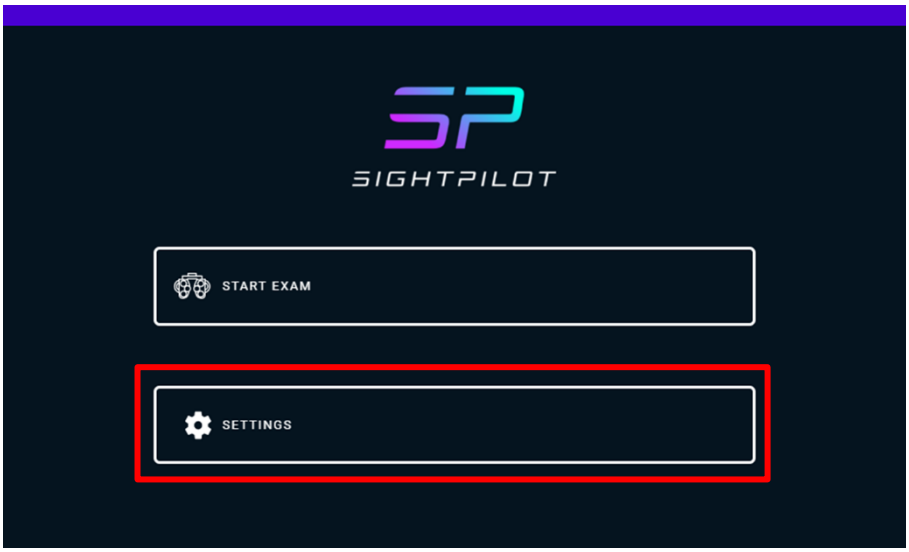
Shared folder path	User name	Password
\\192.168.10.8\chronos	user name of MDR PC	The password of the user

- OFF "Work with CV-5000"
Click "[Verify path] and confirm that "Connected." is displayed, then click [Save] at the top.



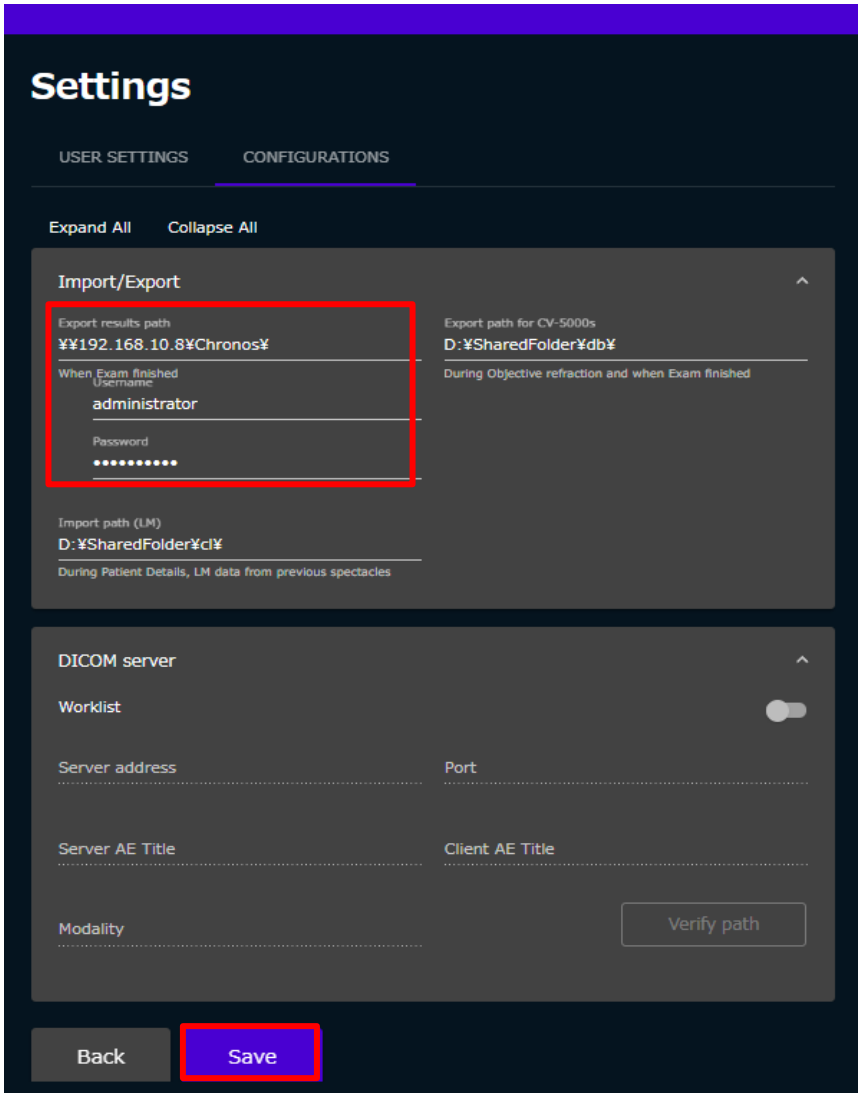
5.6.11 SightPilot settings

(1) Connect to http://10.1.2.3/sgui with the laptop and click [Settings].



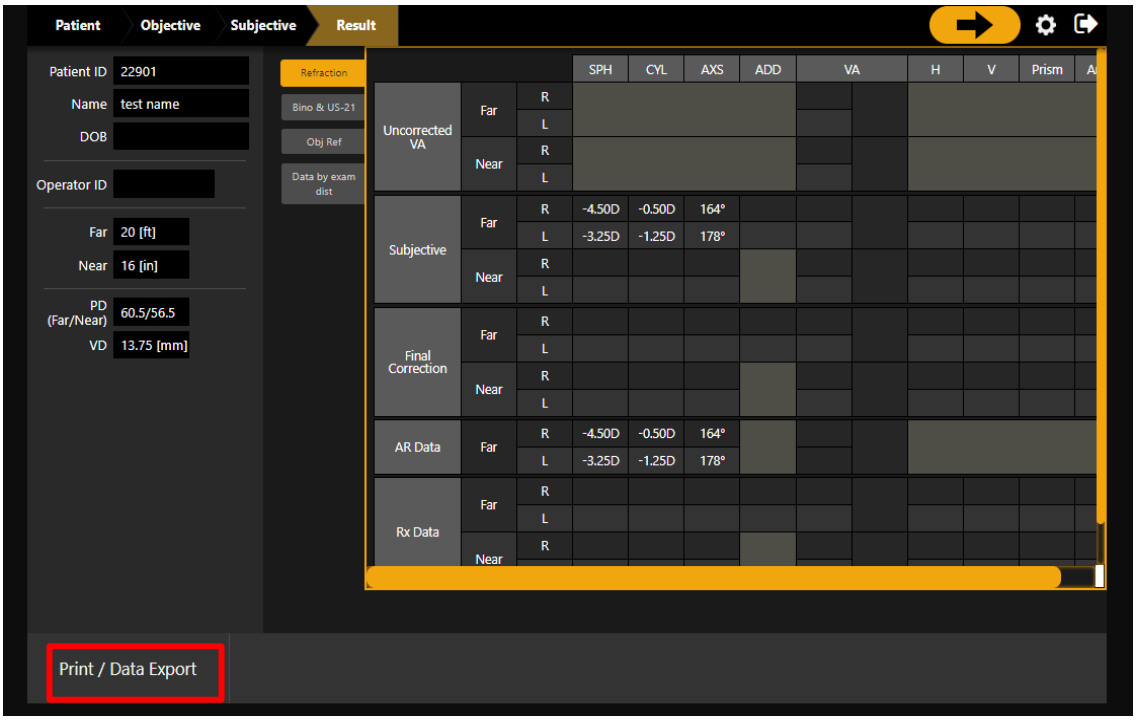
(1) Enter the following in [Import/Export] and click［Save].

Export results path	Username	Password
\192.168.10.8\chronos\	user name of MDR PC	The password of the above user

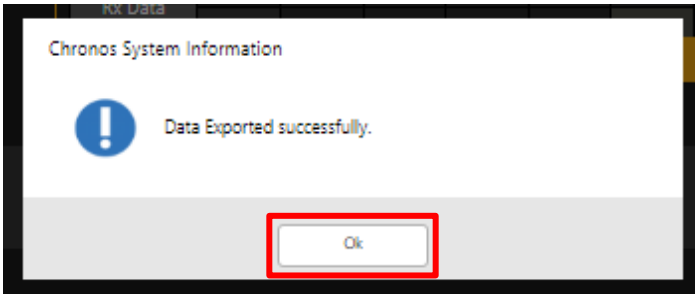


5.6.12 Standard GUI operating procedures

(1) After examination with Standard GUI, click [Print/Data Export] to export data.

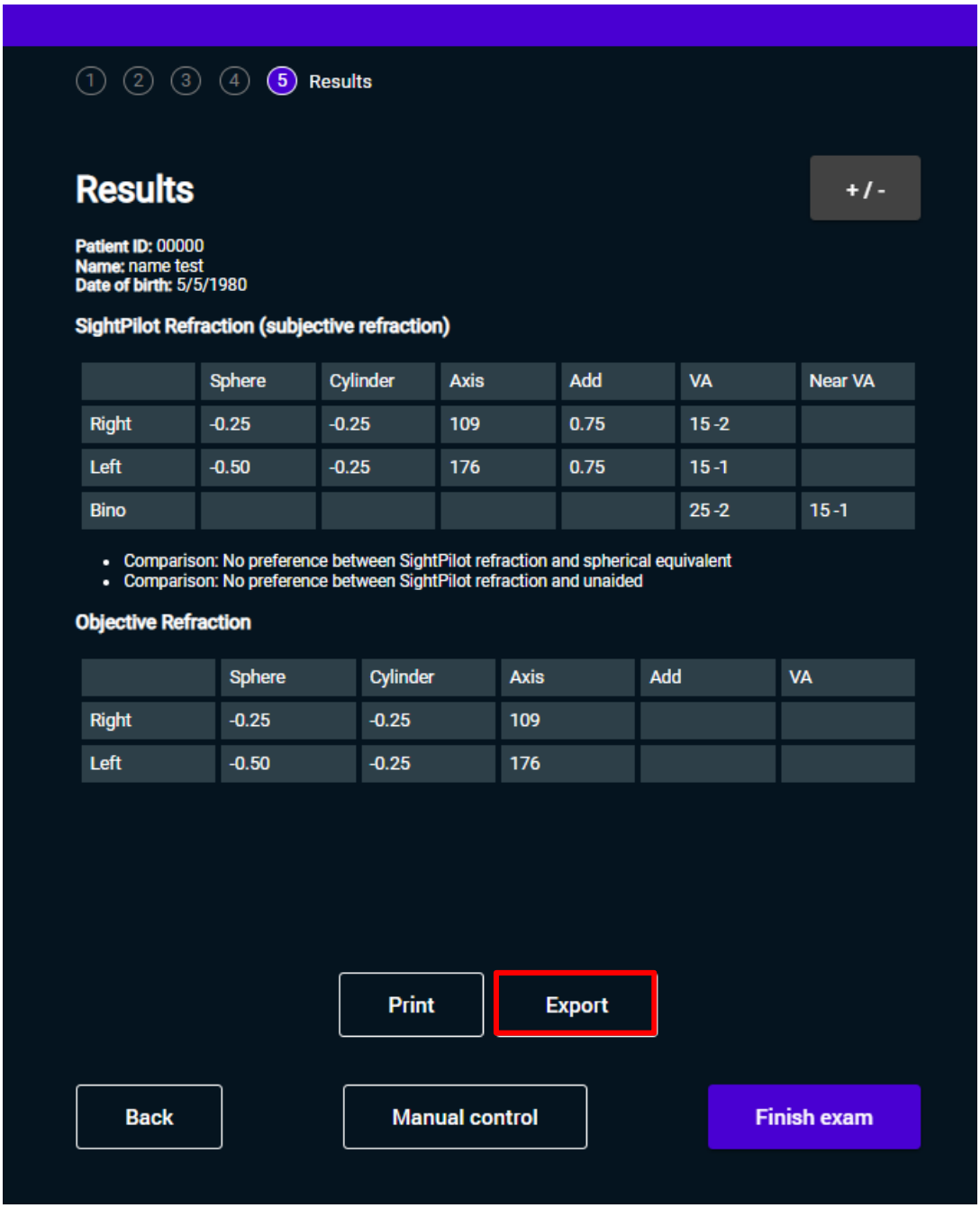


(2) If the export is successful, the following message is displayed. Click [OK].



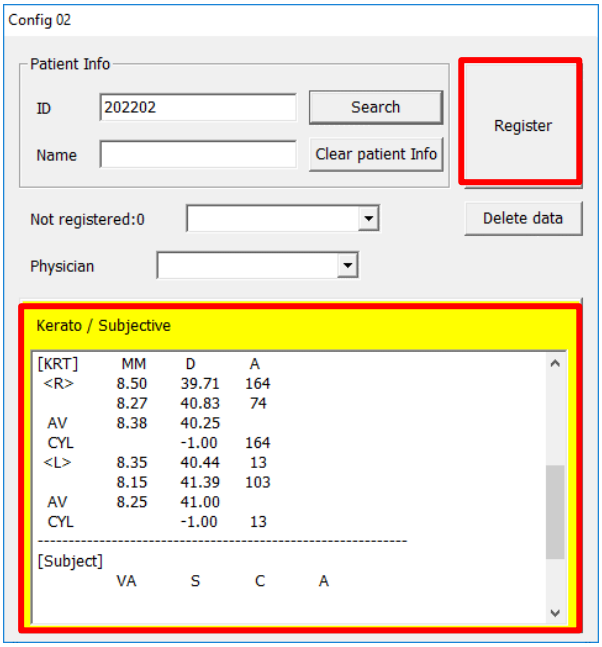
5.6.13 Operating procedures for SightPilot

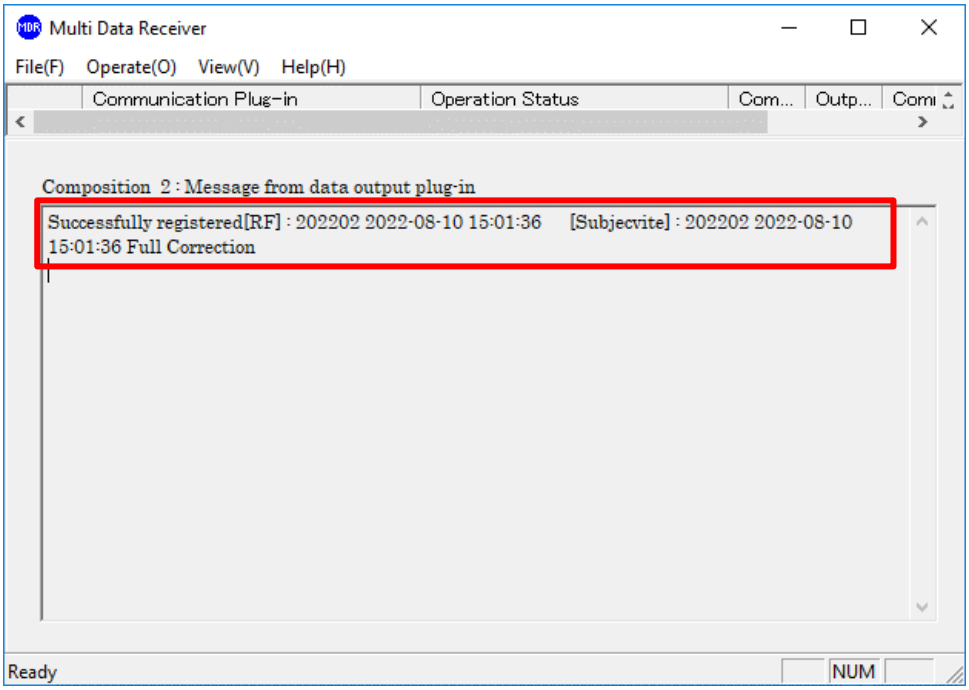
(1) After examination with SightPilot, press [Export].



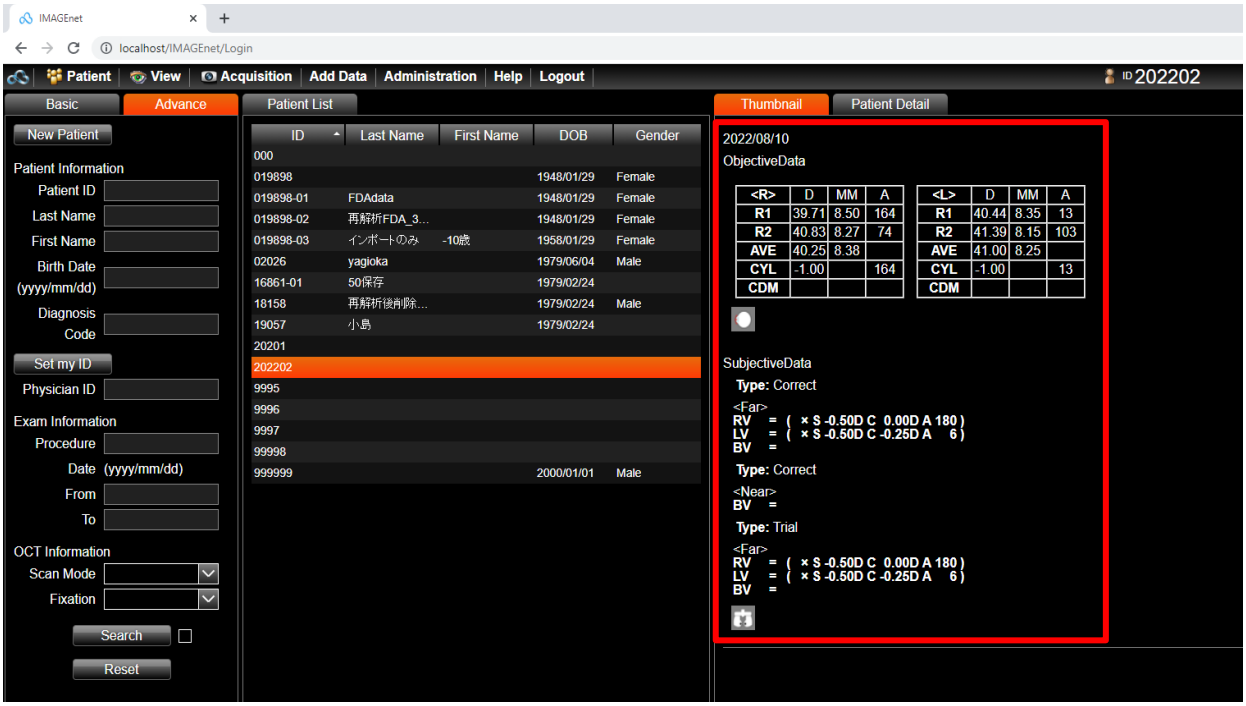
5.6.14 IMAGEnet6 Operating steps

(1) Examination results import with MDR.





(2) Confirm that the data is registered in IMAGEnet6.



TOPCON MEDICAL SYSTEMS, INC.
111 Bauer Drive, Oakland, NJ 07436, U.S.A. Phone:+1-201-599-5100 Fax:+1-201-599-5250 www.topconmedical.com

TOPCON HEALTHCARE SOLUTIONS, INC.
111 Bauer Drive, Oakland, NJ 07436, U.S.A. Phone:+1-201-599-5100 Fax:+1-201-599-5250 www.topconhealth.com

TOPCON CANADA INC.
110 Provencher Avenue, Boisbriand, QC J7G 1N1 CANADA Phone:+1-450-430-7771 Fax:+1-450-430-6457 www.topcon.ca

EC REP **TOPCON EUROPE MEDICAL B.V. (EU Importer)**
(European Representative)(European Sole Sales Company)
Essebaan 11 2908 LJ Capelle a/d IJssel THE NETHERLANDS
Phone:+31-(0)10-4585077 FAX:+31-(0)10-2844944 Email: medical@topcon.eu; www.topcon-medical.eu

ITALY OFFICE
:Viale dell' Industria 60; 20037 Paderno Dugnano; (Milano), ITALY Phone:+39-02-9186671 Fax:+39-02-91081091 E-mail: info@topcon.it; www.topcon-medical.it

DANMARK OFFICE
:Praestemarksvej 25; 4000 Roskilde, DANMARK Phone:+45-46-327500 Fax:+45-46-327555 E-mail: topcon@topcondanmark.dk www.topcon-medical.dk

IRELAND OFFICE
:Unit 276, Blanchardstown; Corporate Park 2 Ballycoolin Dublin 15, IRELAND
Phone:+353-18975900 Fax:+353-18293915 E-mail: medical@topcon.ie; www.topcon-medical.ie

TOPCON DEUTSCHLAND MEDICAL G.m.b.H.
Hanns-Martin-Schleyer Strasse 41; D-47877 Willich, GERMANY
Phone:+49-(0)2154+8850 Fax:+49-(0)2154-885177 E-mail: med@topcon.de; www.topcon-medical.de

TOPCON ESPAÑA S.A.
HEAD OFFICE:Frederic Mompou 4 Esc. A Bajos 3, 08960 Sant Just Desvern Barcelona, Spain
Phone:+34-93-4734057 Fax:+34-93-4733932 E-mail: medica@topcon.es; www.topcon-medical.es

TOPCON FRANCE MEDICAL S.A.S.
1 rue des Vergers, 69760 Limonest, FRANCE
Phone:+33 (0) 437581940 Fax:+33 (0) 472238660 E-mail:topconfrance@topcon.com; www.topcon-medical.fr/fr/

TOPCON SCANDINAVIA A.B.
Neongatan 2, S 431 53 Mölndal, SWEDEN Phone:+46-(0)31-7109200 Fax:+46-(0)31-7109249 E-mail:medical@topcon.se; www.topcon-medical.se

TOPCON (GREAT BRITAIN) MEDICAL LTD.
Kennet Side / Bone Lane, Newbury, Berkshire RG14 5PX United Kingdom
Phone:+44(0)1635 551120 Fax:+44(0)1635 551170 E-mail:medical@topcon.co.uk; www.topcon-medical.co.uk/uk/

TOPCON POLSKA Sp. z. o. o.
ul. Warszawska 23, 42-470 Siewierz, POLAND Phone:+48-(0)32-6705045 Fax:+48-(0)32-6713405 www.topcon-medical.pl

TOPCON SINGAPORE MEDICAL PTE. LTD.
100G Pasir Panjang Rd #05-05 Interlocal Centre Singapore 118523 Phone:+65-6872 0606 Fax:+65-6773 6150 www.topcon.com.sg

TOPCON INSTRUMENTS (MALAYSIA) SDN.BHD.
No. 6, Jalan Pensyarah U1/28, Hicom Glenmarie Industrial Park, 40150 Shah Alam, Selangor, MALAYSIA Phone: +60-(0)3-50223688 Fax: +60-(0)3-50313968

TOPCON INSTRUMENTS (THAILAND) CO.,LTD.
77/162 Sinnsathorn Tower, 37th Floor, Krungthonburi Rd., Klongtonsai, Klongsarn, Bangkok 10600,THAILAND Phone:+66(0)2-440-1152~7 Fax:+66-(0)2-440-1158

MEHRA EYETECH PVT. LTD.
801 B Wing, Lotus Corporate Park, Graham Firth Steel Compound Goregaon (East) Mumbai 400063 Maharashtra, India Phone:+91-22-61285455 Fax:+91-22-24378531

TOPCON (BEIJING) MEDICAL TECHNOLOGY CO., LTD.
Room 2808, Tower C, JinChangAn Building No. 82 Middle Section of East 4th Ring Road, Chaoyang District, Beijing 100124, People's Republic of China
Phone:+86-10-87945176

Manufacturer

TOPCON CORPORATION

75-1 Hasunuma-cho, Itabashi-ku, Tokyo, 174-8580 Japan.
Phone: +81-(0)3-3558-2522/2506 Fax: +81-(0)3-3966-5106 www.topcon.co.jp

O-CHR-8-2207-08