INSTRUCTION MANUAL

CG AUTO II (FOR BLOCK LENS)

Auto Contact Lens Radius Gauge

for Semi-Finished lens

Note:

This instrument was designed for exclusive use in laboratory.

NEITZ INSTRUMENTS CO., LTD.

TD11-12330002E

Read this Instruction manual before using this product.
Keep this Instruction manual in an accessible place for reference when required.

CONTENTS

1. The Safety Precautions

For the safety, The followings Safety Precautions must strictly be obeyed.
To fail in obeying them may affects safety and ability of the instrument.

⚠ **Warning**	This Symbol means Death or Severe injury, in case of inconformity.
⚠ **Caution**	This symbols means Injury and/or Material Damage, in case of inconformity.

Symbols and the meaning.

Never do	Things never do!
Instruction	Instruction to action which is compulsory.
No Disassembling	Do not disassemble.
Disconnect to Power	Disconnect the Connector of the Power Cable first.
No Wet Hand	Handle by wet hands is banned.

⚠ **Warning**	
Banning	Don't use in the place where there are extreme moisture and/ or salinity and /or the place where water can splash. It causes electric shock.
Banning	Don't use the instrument near the flammable-vapors and the fine particles such as propane gas and gasoline. It can cause a fire and/or an explosion.
Banning	Don't install the instrument in the place where the operator can not operate the instrument in the natural condition. It causes unbalance, falling and/or injury.
Banning	Don't install the instrument in the unstable place and the inclined place. It causes not only incomplete performance also machine trouble and/or falling of he instrument.
Banning	Don't give load onto outside instrument. It causes being unbalance, falling and/or injury.
Banning	Don't use a power Cable other than the one of accessory. It causes the fire, the machine trouble.
Banning	Don't use a fuse except the standard product of the specification. It causes a fire, the machine trouble.

 Banning	Be sure not to leave dust and/or alien in the inlet or in the connector of Power Cable. It causes a fire.
 Banning	When the Power Cable is damaged, don't use it. It causes electric shock and/or a fire.
 Banning	Don’t connect Power Cable in starburst connection. The cable have to surely be put orderly. It may cause the destruction of the instrument and/or injury.
 Banning	Don't put alien substance in the gap in the body of the instrument. It causes a fire and/or the machine trouble.
 Banning	Don’t give strong impact and/or throw a thing to the Instrument. It causes an injury, a machine trouble and/or a fire.
 No Disassemble	Don't disassemble the instrument. It causes electric shock, a fire and/or machine trouble.
 No wet hand	Don't touch the Power Cable, electric outlet and the instrument with the wet hand. It causes electric shock.
 Unplug Power Cable	When not using the instrument long, disconnect the Connector of the Power Cable. It causes electric shock, a fire and/or machine trouble.
 Unplug Power Cable	When moisture and/or liquid come in inside the instrument, disconnect the Connector of the Power Cable at once. It causes electric shock, a fire and/or machine trouble.
 Unplug Power Cable	When replacing and re-install the instrument or performing maintenance, disconnect the Connector of the Power Cable firstly. Otherwise it can cause electric shock.
 Instruction	Have grand connection properly. Otherwise it can cause an electric shock, a fire and/or machine trouble.
 Instruction	When connecting the connector of the Power Cable, make sure not to have some metal material to it, and be certain the connection to the end. Otherwise, it can cause electric shock, a fire.
 Instruction	When replacing and re-install the instrument, hold the instrument at the handles in the instrument in the right posture. Otherwise it can cause injury and/or a machine trouble.

Caution	
Banning	Don’t place heavy thing onto the Power Cable. It can cause electric shock and/or a fire.
Banning	Don’t use the instrument in such environment, like a place where the temperature changes rapidly, the wind of the air-conditioner is directly blew to the instrument and/or the instrument have dewfall. It can cause electric shock and/or a machine trouble.
Banning	Don’t use instrument in the place which the direct sunlight and/or any harmful light emits on to the instrument. That can cause the machine trouble and/or can affect measured value.
Banning	Don’t use the instrument in the place where the place and the weight or the centrifugal force effects the instrument. It can cause the machine trouble and/or can affect measured value.
Banning	Don’t press the switches with excessive power. It causes a deformation of it and the machine trouble.
Banning	Make sure that any stain remains in eyepiece and LCD panel. Also, refrain from touching or pressing them with finger. It can cause having stain and/or the machine trouble.
Banning	While the instrument operates, don't place a hands and things near the stage. It can cause injury by being caught with it and/or the machine trouble.
Banning	Don’t use Paint thinner, the polish and/or boiling water for the maintenance. Otherwise it causes deformation and/or the machine trouble.
Banning	Make sure that exchanging the light source(LED) just after turning them off. It can cause a body burn.
Instruction	When the instrument was in the environment which is out of the operating temperature limit, use instrument after keeping enough time to match up to a temperature. It can cause the machine trouble and/or can affect measured value.
Instruction	When turning on the instrument after some time, perform Warming-up for about 30 minutes and check the operation before measuring. It is to refrain from affecting measured value.
Instruction	To perform measurement in the high reliability, we recommend to check the measured value regularly with using some test piece. Otherwise It is to refrain from affecting measured value.
Instruction	Operator must check if the instrument does not have malfunction all the time. It is to refrain from being injured with instrument and/or from affecting measured value.
Instruction	When disconnect the connector of power cable from outlet, disconnect it by pulling the connector, not the cable. Otherwise, the cable can have damage and it can cause electric shock and/or a fire.
Instruction	In movement and transportation of the instrument, use a the original packing box. Otherwise it can cause deformation and/or machine trouble. package box.
Instruction	When disposing of the instrument, return it to the manufacturer of it for disassemble, material separation for proper disposing.

1. Composition

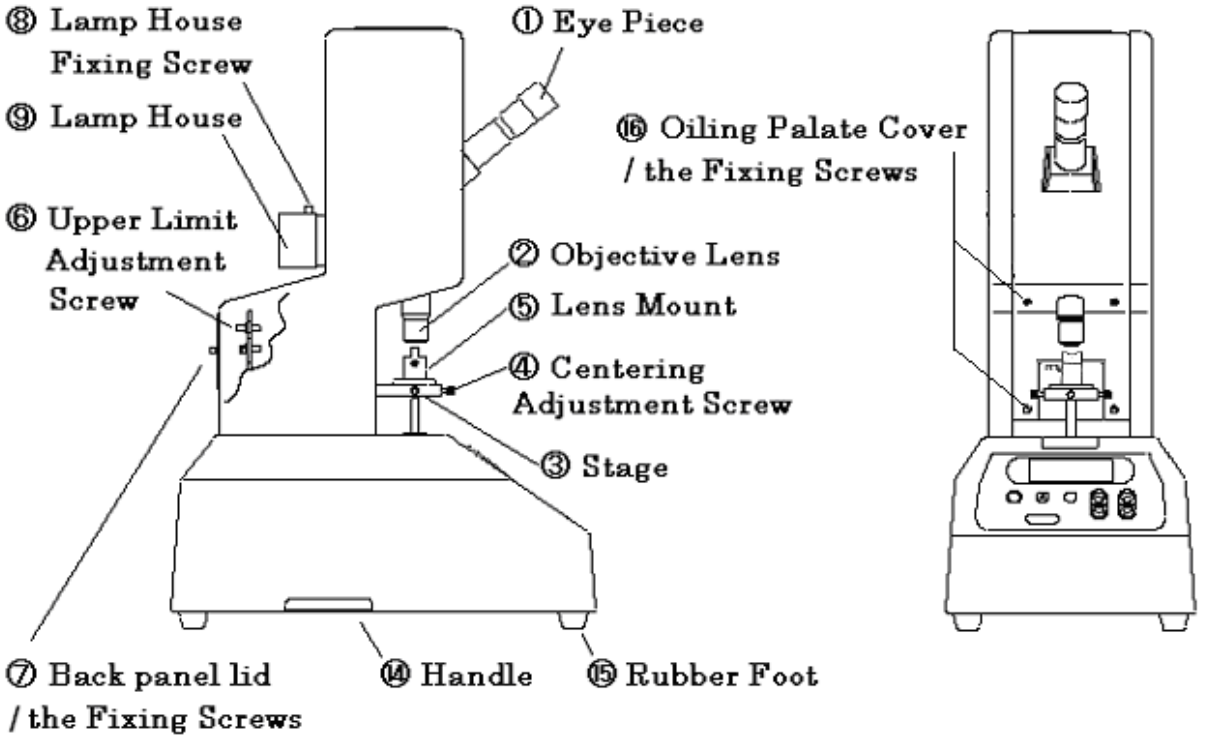
CG Auto II main unit……..……..……1 unit

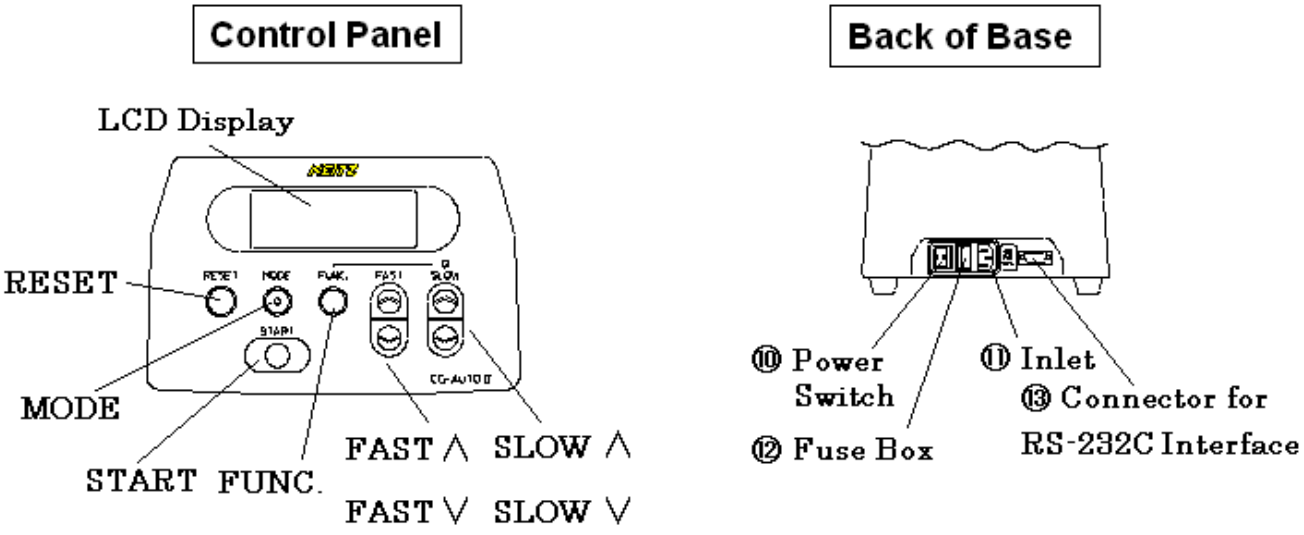
Lens Mount ……1 pc.
Test Piece(R7.7) and Lens Holder….. …..... ..1 pc.
Spare Fuse(Littelfuse 218 3.15A)……2 pcs.
Oil dropper……1 pc.
Dust Cover……1 pc.
Power cable……...1 pc.
Conversion plug for power cable…… 1 pc.
Instruction manual…….... 1 pc

Option Items

Printer for exclusive use ……..1 set
(with printer paper 1 roll, Ink ribbon 1 pc.)
Printer paper(5 rolls) ……1 set
Ink ribbon ……1 pc
RS-232C Cable for P.C. connection ……1 pc

3. CG-AUTO II Main Unit　The Name of the parts
3-1. Diagram - Outward Appearance.





3-2. Name and Function of Parts.

	Name	Function
①	Eye Piece	Look in from it for observation on Centering a Lens Block or a Test Piece, and check the status of focus.
②	Objective Lens	It is to obtain Aerial image or Surface Image of target, and to magnify the image.
③	Stage	Put Lens Mount on it.
④	Centering Adjustment Screw	It is to center the Lens Mount and fix it by adjusting the screw at 3 points.
⑤	Lens Mount	It is the part to put the Lens Block or Test Piece on it.
⑥	Upper Limit Adjustment Screw	Set the Upper Limit with the screw
⑦	Back panel lid and Fixing Screws	It is the cover and the fixing screw of the part of the Upper Limiter Adjustment Screw.
⑧	Lamp House Fixing Screw	It fixes the Lamp House.
⑨	Lamp House	The Green LED, which is the light source, is located inside.
⑩	Power Switch	It works to turn on and off the power.
⑪	Inlet	It is connected with the included Power Cable.
⑫	Fuse Box	The fuse inside protects the machine from an over-currents.
⑬	Connector of RS-232C Interface	It is to connect the unit to optional printer.
⑭	Handle	It is the part to hang fingers, when lift and move the unit.
⑮	Rubber Foot	It works to position the unit stably and prevent rocking.
⑯	Lubrication Palate Cover and the Fixing Screws	Remove the screws in the 4 corners of the cover and the palate to oil the mechanism inside.

3-3. Switches of the operation panel

CG Auto II has three modes for operating and the functions of the switches are different every mode.

- Auto mode : It is the mode that measures automatically.
- Manual mode : It is the mode that measures manually.
- Parameter mode : It is the mode to do the detailed setting for measurement.

Function list of the switches

(FUNC. Switch presses with pressing of the another switch while it pressing..)

Operation mode	Switch	Function
Auto	START	Start of the measurement. Release of Error(buzzer sound and blink of liquid crystal panel comes to stop and becomes standing condition for measurement.
	MODE	It shifts to manual mode. It switches from calibration screen to auto mode.
	FUNC + SLOW∧	Light source becomes 1 step bright.(1 to 10)
	FUNC. + SLOW∨	Light source becomes 1 step dark. (10 to 1)
	FUNC + FAST∧	Selecting of lens patterns[SPH] [TRC] [TRCR]
	FUNC + FAST∨	
	FUNC + MODE	It shifts to parameter mode.
	FUNC + START	It shifts to calibration mode.
	FUNC + RESET	It starts Warming Up.
	RESET	It resets and makes this equipment same condition as the time of the turning on.
MANUAL	START	It resets gage counter to “0.000”.
	SLOW∧	It rises in the stage at low speed.
	SLOW∨	It descends in the stage at low speed.
	FAST∧	It rises in the stage with intermediate speed.
	FAST∨	It descends in the stage with intermediate speed.

	SLOW∧+FAST∧	It rises in the stage at high speed.
	SLOW∨ + FAST∨	It descends in the stage at high speed.
	MODE	It shifts to Auto mode.
	FUNC + SLOW∧	Light source becomes 1 step bright.(1 to 10)
	FUNC. + SLOW∨	Light source becomes 1 step dark.(10 to 1)
	FUNC. + MODE	It shifts to parameter mode.
	RESET	It resets and makes this equipment same condition as the time of the turning on.
Parameter	START	It fix and writes a changed value in the back up memory. (When not pressing START even if it changes a value, it returns to the original value in "RE POWER ON" or RESET.)
	SLOW∧	It moves the set item(upstroke). It returns to the bottom line of previous page.
	SLOW∨	It moves the set item(downstroke). It shifts to the top line of next page.
	FAST∧	Change of set value (8 → 9 → 0 →1 →･･･, Max.Target B.C. only 0.5 unit). Switching over at Alternative.
	FAST∨	Change of set value(2 → 1 → 0→ 9→･･･, Max. Target B.C. only 0.5 unit) . Switching over at Alternative.
	FUNC.	It moves the digit of set value(the lower rank → higher rank).The movement from the highest lank to the lowest rank.
	MODE	It shifts to the Auto mode.
	RESET	It resets and makes this equipment the same condition as the time of the turning on.

4. How to use the system

4-0 Flow Chart to Auto Measurement

Item	Reference Items	Applicable case
Unpacking ・Installation	4-1	
Power On	4-2	
Centering of Lens Mount	4-3	• First Use after Purchase of this unit. • When changing Lens Mount.
Setting of Upper Limit	4-4	• First Use after Purchase of this unit • When center thickness of block lens is changed with over 1.5mm.
Calibration	4-5	• First Use after Purchase of this unit. • When center thickness of block lens is changed with over 1.5mm. • When reset gauge counter on Manual Mode. • When changing parameter of Max measurement Base Curve..
Warming Up	4-6	• In order to stabilize the measurement, the execution of Warming Up of the unit is strongly recommended.
Auto Measurement	4-7	

4-1 Unpacking and Installation

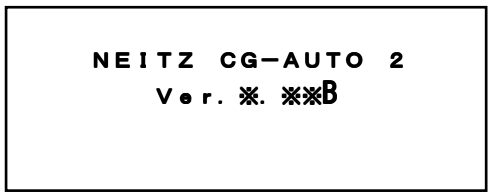
Unpacking and lay down the box and draw out the CG AUTOII. Install the CG AUTOII main unit on the stable stand.

4-2 Power On

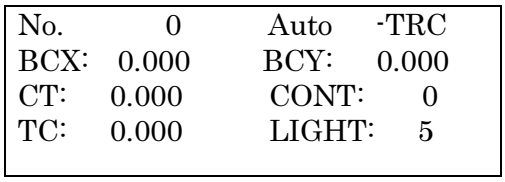
Insert a power cord in the inlet and plug into the electric outlet.
On turning on the power switch **I**, the backlight of LCD lights up and all system is initialized. Power source is shut off with switch **O**.

Display of LCD at power on

The version information of the system program.



It is initialized within several seconds and it stands by the AUTO MODE.



4-3. Centering for Lens Mount.

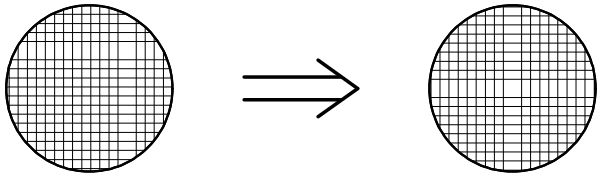
This is to adjust the Lens Block so that it is positioned in center of the view from Eye Piece.

For Spherical Lens Block :

① Set the unit to Manual Mode.

② Put the Lens Block for measurement on the Lens Mount.
Rise the Stage by pressing FAST or SLOW Switch. Rise the stage to a height where the first image (aerial image) is in the view certainly.

③ Adjust position of the part, which the both of horizontal line interval and vertical line interval is largest(the largest square), to be in center of the view by 3 Centering Adjustment Screws and fix them firmly.

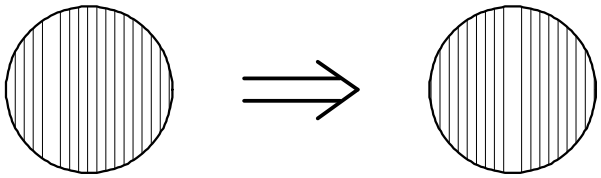


For Toric Lens Block :

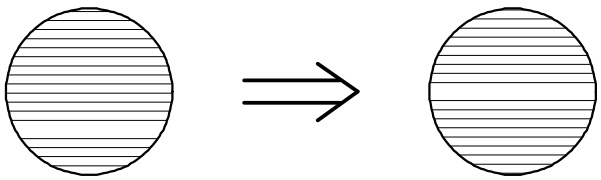
① Set the unit to Manual Mode.

② Put the Lens Block for measurement on the Lens Mount, with the line in the Lens Mount and *Axis Mark*(any reference mark standing for one of the meridians to figure toracity.) in the Lens Block (refer 3-6 Auto Measurement) .
Rise the Stage by operating FAST or SLOW Switch. Rise the stage to a height where the first image (aerial image) is in the view certainly.

③ In case of Centering for Toric pattern lens (=TRC pattern lens) the first image is vertical stripes and one of interval of stripes is wider than other intervals. Adjust the wider interval so that it positions in the horizontal center; so as to have equivalent number of the narrow intervals are positioned in the both of right and left; by screwing or unscrewing 3 Centering Adjustment Screws.



Then, Rise the Stage from the height. The next image is horizontal stripes and one interval of stripes is wider than other stripes. Adjust the wider interval so that it positions in the vertical center; so as to have equivalent number of the narrow intervals are positioned in the both of upward and downward; by screwing or unscrewing 3 Centering Adjustment Screws.



With repeating the above procedures, adjust the both wider intervals, in horizontal stripes and vertical stripes, positioned in center of the view, and fix Centering Adjustment Screws firmly.

Please note that in case of Centering on TRCR pattern Lens Block (=Reversed Toric pattern Lens Block), the order of appearance of the vertical stripe image and horizontal stripe image is reversed.

4-4 Setting method of the end of rise(Upper Limit)

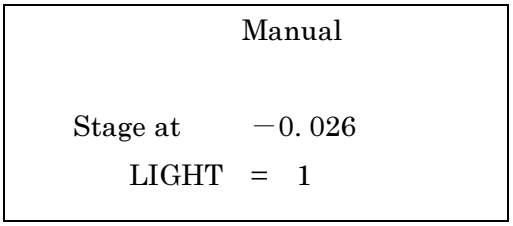
The position to make the limit to rise the stage any more is called the end of the rise (Upper Limit). This setting is definitely required for the operation of this system when starting operation and exchanging of using lens mount. Upper Limit is a sensor that detects the position in which the rise of the stage is stopped before the contact lens put on the lens mount knocks against object lens.

When the setting of Upper Limit is too high, there is danger that the object lens knocks against the contact lens , either or both of object lens and the contact lens have a damage. On the other hand, when the setting of Upper Limit is too low, the "No Image" error occurs because the stage reaches Upper Limit before detecting the surface image (second image) while executing the auto measurement. (Refer to the details of clause 4-7-4).

Set Upper Limit with following procedure.

① Set the lens mount on the stage and put the contact lens on it.(It doesn't care about the test piece which was manufactured for the height of the lens to become the same as the contact lens measurement time.

② Press MODE switch and make Manual mode. It shows a gauge counter in the 3rd line(stage height).



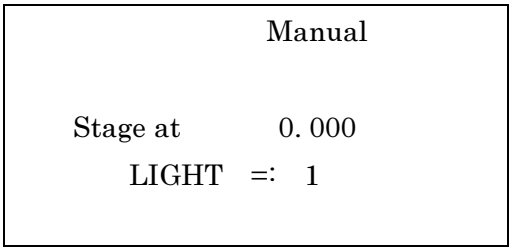
③Remove the lid and the lid stop screw of the main unit back.

④Loosen the Upper Limit screw and move it downward at the lowest position.

⑤At this stage, the Clause 4-3 Centering for Lens Mount must be completed.

⑥Make the stage rise with the switch of FAST, SLOW and stop it at the height that is seen the surface image.

⑦Press START switch and reset gauge counter "0".



⑧Continuously, make the stage rise to the height of 2.2mm with pressing FAST., SLOW switch. Loosen the Upper Limit screw again, and move it upward slowly. At the height of the boundary to begin to display of Upper Limit and sound the buzzer, fix the sensor point (Upper Limit) with tightening the Upper Limit screw.

	Manual
Upper	Limit
Stage at	2. 260
LIGHT	= 1

⑨Confirm if the stage stops at the position of Upper Limit automatically, with operating of moving the stage downward and upward, with pressing FAST. SLOW switch. If it is confirmed, the setting is ending.

⑩Close the lid and tighten the lid stop screw.

However, when changing the Lens Mount used at the Setting Upper Limit to a different height of Lens Mount(the difference is over 1.5mm), make the setting of Upper Limit again with executing the above operation ①～⑩.

4-5 Calibration：
It is necessary to perform Calibration in advance of measurement.
Calibration is to set the proper Starting Measurement Point by detecting the position of the surface image with using Test Piece of Accessory or a Lens Block, which its Center Thickness is known.

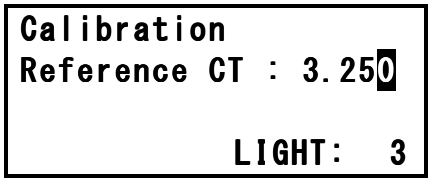
In case that the unit lost the data of position, e.g. reset the Gauge Counter in Manual Mode by pressing START or Starting Measurement Point was changed by changing parameter for the Maximum Target Base Curve (Max. Target BC), Calibration should be performed again. In this case, pressing START Switch in Auto Mode, Display automatically shifts to Calibration without performing measurement.

Before performing Calibration, please check if the Upper Limit Setting is correctly completed.

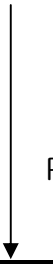
① After assuring Centering for Lens Mount is done correctly, shift to Auto Mode by pressing the MODE Switch.
The Stage moves down automatically to the Starting measurement point, when Stage is not there.

② Put the Test Piece of Accessory or a Lens Block, which its Center Thickness is known, and press FUNC. + START Switches at a time.

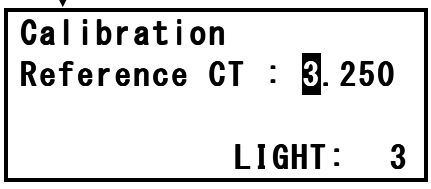
LCD Display shifts to Calibration screen and the Center Thickness is indicated in 2nd line.
(The value of "3.250" is a primarily set value. The digit at right end is blinking.)
In case the indicated value is not same as the value of the thickness of the Lens Block,
correct it by following the procedure below.



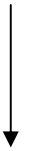
* To press FUNC. + SLOW∧ or FUNC. + SLOW ∨ changes the intensity of illumination. To return to Auto Mode, press MODE Switch.

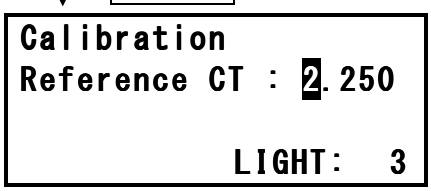


③ To press FUNC. once makes the blinking part on a digit moves next left digit. To do so at left end digit brings the blinking part to right end.
(Drawing on the right shows the LCD display after pressing FUNC. 3times.)

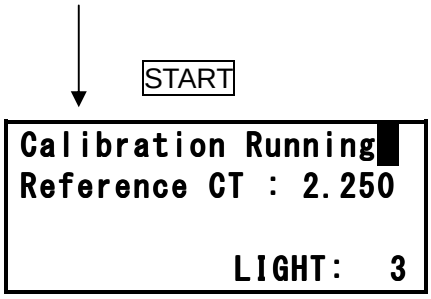


④ To press FAST∧ once increase the number of blinking part with 1, from 0 up to 1.
To press FAST∨ once decrease the number of blinking part with 1, from 0 up to 9.
(The drawing on the right stands for pressing one time.)



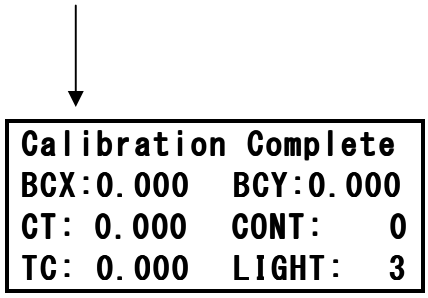


⑤ After setting the value, press START.
" Calibration Running "is indicated in the 1st line
of LCD Panel and Calibration is going to be performed.

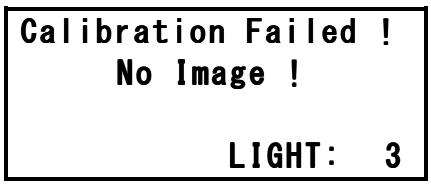


* While performing Calibration, observe image in the Eye Piece to assure that the surface image is properly recognized.

⑥ When the Calibration is completed, LCD Display
indicates shifts to Auto Mode and " Calibration Complete "
is indicated in the 1st line.



In case that the Calibration was failed, panel indicates
" Calibration Failed ! " and the reason of the error, at the time
the LCD Panel itself blinks and buzzer
sounds, if the "Buzzer Enb." is set as "Yes".



The following reasons are supposed as the reason of error:

With indication of " No Image "
- No Lens Block is on the Lens Mount.
- Centering is not correctly made.
- Upper Limit Setting is set too low.
- Illumination is too low.
- Alignment of lens and Lens Mount is not properly made.
- Set value of Max. Target BC is too small.

With indication of " Brightness "
- Illumination is excessive.

After solving these problems of the above errors, perform the Calibration completely.
Pressing START Switch again, LCD Display shift to one indicated in ②.

4-6 Warming Up

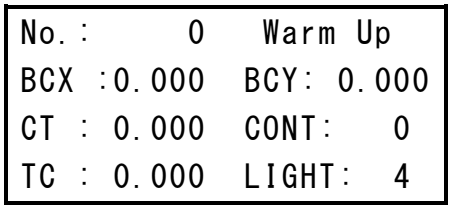
The warming up has a purpose of raising internal temperature of the CG Auto II beforehand for the measurement to make an influence by the change of the internal temperature of the CG Auto II little. For the exact measurement, we strongly recommend to execute the warming up of the instruments.

When pressing .[FUNC] + [RESET] switches on auto mode, the display shows as below and starts warming up.

By this operation

① First, press .[FUNC.] switch.
② Second, press [RESET] switch while pressing .[FUNC] switch.
③ Thirdly, release [RESET] switch with keeping pressing [FUNC] switch.
④ Finally, release [FUNC] switch.

Be conscious of the above procedure.
Please note, when becoming the condition that only [RESET] switch was pressed, this machine is reset.



This warming-up is recommended to continue until the measurement with 300 times ends or [RESET] switch is pressed regardless of the existence or non-existence of the error. The Brightness change by the light source and so on go after closing Warming up with pressing [RESET] switch.

＊For the exact measurement, we recommend to do the CALIBRATION after Warming Up.

4-7 AUTO MEASUREMENT

It begins measurement after putting the lens block to lens mount and pressing START switch.

4-7-1 Measurement Pattern

Set the Measurement Pattern to meet the object lens block. Measurement Pattern has SPH, TRC and TRCR. When pressing FUNC + FAST ∨ or FUNC + FAST∧ switch on Auto Mode, the pattern changes by turns.

When measuring a spherical lens block, it makes a measurement pattern SPH. Because the spherical lens block doesn't have a Toric axis, it can measure the measurement pattern of TRC, TRCR but the Measurement pattern of SPH can reduce a measuring time. By the position of the axis mark of the lens block to measure when measuring a Toric lens block. It chooses either of TRC, TRCR a measurement Pattern.

Measurement pattern	Lens block to measure	Lens block's placing
SPH	Spherical lens block	
TRC	Toric lens block which is marked with an axis line in the axis with the smaller curvature of the base curve.	It sets for the axis line to be suitable for the measurer. A base Curve with big curvature is displayed in BCX and a small base Curve is displayed in BCY.
TRCR	Toric lens block which is marked with an axis line in the axis with the bigger curvature of the base curve.	

Regarding the display of measurement result, refer to "Display of the liquid crystal Panel" of clause 4-7-2..

4-7-2 Display of liquid Crystal Panel

It display the various information with 4 digit 20 words.

Display examples are shown below. Examples 1 to 3 are the ones when setting the various parameter. Regarding the parameter, please refer to 4-7-3 Parameter mode.

.

Example 1

```
No.:   1   Auto  TRC
BCX:7.699   BCY:7.697
CT: 2.130   CONT: 50
TC: 0.002   LIGHT: 5
```

contents of the display

Measurement number : 1	auto mode	TRC pattern	
BC Value X Axis :	7.699	TC Value Y Axis :: :	7.697
Center Thickness::	2.130	CONT Value	: 50
TC Value :	0.002	Brightness of Power Source *	5

Example 2

```
No.:    1   Auto SPH
BC :7.699
CT : 2.130   CONT  : 50
TC : 0.002   LIGHT:  5
```

contents of the display

It shows the lens of Example 1 with SPH pattern. On the pattern, BC can be shown only with average Value. The average of BCX and BCY of Example1 .

Example 3

```
No.:    1   Auto TRC
BCX:7.70    BCY:7.70

TC:  0.002  LIGHT: 5
```

contents of the display

It shows the display of the minimum digit with 0.01mm. (CT) and CONT value can be set with no measurement and shows with blank in the display of the panel. The example 3 shows the setting without measurement of CT and CONT.

Example 4

```
No Image    Auto TRC
BCX: 0.000  BCY: 0.000
CT: 0.000  CONT:   0
TC: 0.000  LIGHT:  5
```

contents of the display

It shows the case when measurement can not done due to detection error for reflection image. In this case, display blinks. Regarding the details of error, refer to the 4-7-4 clause Error.

Example 5

```
CONT:20/30   Auto TRC
BCX: 7.699   BCY: 0.000
CT: 2.130   CONT:  20
TC: 0.002   LIGHT:  5
```

contents of the display

It shows CONT error while other measurements were successfully done. In this case, this instruments warn with blink of display.. Also, refer to the 4-7-4 clause Error.

4-7-3 Parameter mode

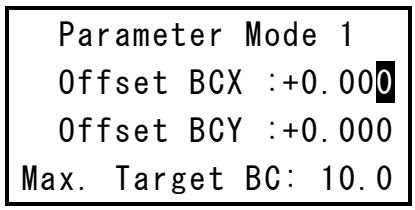
To fit the way you use, make the various setting.

4-7-3-1 List of Parameter

Page	The parameter name (Liquid crystal display)	Function:	At Ex-Factory
1	Base curve Offset X-axis (Offset BCX)	When the base curve value of X-axis of test blank of this Equipment and User's does not suit, it uses to revise. It is possible to set by the 0.001mm unit in the range of -9.999～+9.999.	+0.000
	Base curve Offset Y-axis (Offset BCY)	When the base curve value of Y-axis of test blank of this Equipment and User's does not suit, it uses to revise. It is possible to set by the 0.001mm unit in the range of -9.999～+9.999.	+1.450
	The maximum measurement Base curve value (Max. Target BC)	When understanding the base curve value range of the measuring object, according to the value, it moves the measurement starting point. Because the total travel distance of the stage decrease, the measuring time can be reduced. In case of changing this setting value, it necessary to operate "Calibration" once again. It is possible to set by the 0.5mm unit in the range of 7.0～10.5 In this setting, it is required only by SLOW△, SLOW▽ switches not with the digit movement by FUNC. switch.	10.0
2	The base curve The minimum display digit (Minimum Digit)	It sets the minimum digit which displays a measured base curve value. The 0.01mm unit and the 0.001mm unit can be chosen.	0.01
	Center Thickness measurement on/off (Thickness Enb.)	It is the setting whether or not which does Center Thickness measurement. It does not display an item on the LCD when not measuring Center Thickness. Due to this, the information of the screen looks simple. YES/NO can be chosen.	Yes
	Buzzer on/off (Buzzer Enb.)	It is the setting whether or not which rings a buzzer when error occurs. With working circumstance, when the buzzer sound is noisy, it can be no sound.	Yes
3	Contrast measurement on/off (Cont Err Enb.)	It is the setting whether or not which does Contrast measurement. It does not display an item on the LCD when not measuring contrast. Due to this, the information of the screen looks simple. Also, Measurement time is a little of bit shortened. YES/NO can be chosen.	Yes
	The contrast error detection value (Cont Err Limit)	It sets the value to detect as the contrast error when measuring a contrast. The measured contrast value is judged an error in case it is under the set value.	30
	Toric Error detection value (TC Err Limit)	It sets the value which is detected as TORIC ERROR. If the difference of measured the base curve values of X-axis and Y-axis was more than the set value, it judges as error. In 00-99 ranges, it is possible to set by the 1-μm unit in the range of 00 ～99. The Toric Error is valid only when measuring in the SPH pattern.	30
4	Baudrate (RS-232C speed)	It sets the speed of communication with external PC or printer. It selectable out of 2400bps, 4800bps, 9600bps, 19200bps	2400
	Output Format	It sets the Output Format for result of measurement to external PC or printer. It is selectable in either " CG-A Format " or "CSV Format"	"CG-A"
	Output Device	It sets for choice of device that the CG Auto communicates, with Printer(PRN) or PC(TERM). In case PRN was in choice, ACK and NAK for communication handshaking, and message for operator is not transmitted.	"PRN"

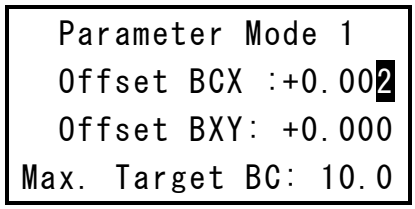
4-7-3-2. Setting method of Parameter

① When pressing FUNC. + MODE on Auto mode or Manual mode, it switches over to Parameter mode and 0 of upper section right end blinks in the turning-over.



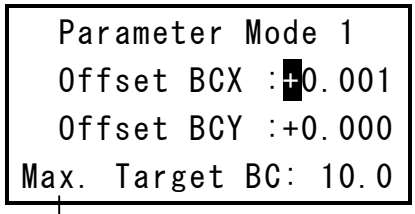
② When pressing FAST∧, the figure becomes 1 from 0. . When pressing FAST∨, the figure becomes 9 from 0. Press the switches repeatedly until getting the setting figure.
Right example shows 2times pressing of FAST∧.

Press FAST∧ two times.



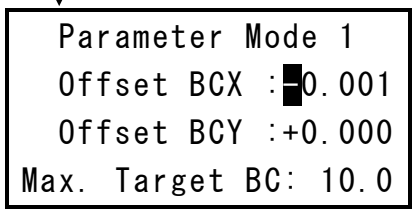
③ When pressing FUNC., turn-over blink moves to 1 digit left. Change the figure to setting figure with repeating ②③.
Right example shows 4 times pressing of FUNC.

Press FUNC. four times.



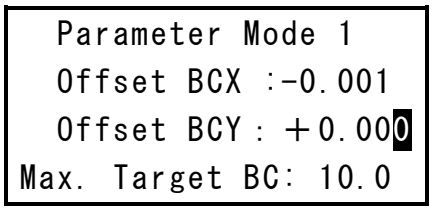
④ When pressing FAST∧or FAST∨、
「＋」 changes to「－」、「－」 changes to「＋」.

FAST∧



⑤When pressing START , change of ②～④ are fixed. Do not press START until fixing of an item.(When not pressing START, it returns to the original value with re-power on and pressing RESET) . At this time, it shows that turning-over blink moves to right end of 1 section below and fixing of the change.

START



⑥ When pressing SLOW∨, turn over blink oves to 1 section below. Right example show the movement to the 2 page on parameter mode by 2 times pressing SLOW∨.

Press SLOW∨ two times.

```
  Parameter Mode 2
Minimum Digit: 0.001
Thickness Enb.:  Yes
 Buzzer  Enb. :  Yes
```

⑦ When pressing FAST∧ or FAST∨、「0.001」 &「0.01」 are shown interchangeably.
(Also「Yes」&「No」 is shown as the same as the above.)

FAST∧

```
  Parameter Mode 2
Minimum Digit:  0.01
Thickness Enb.:  Yes
 Buzzer  Enb. :  Yes
```

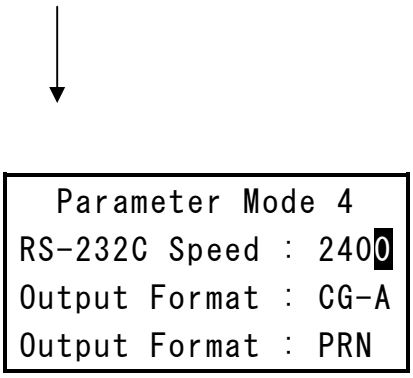
⑧ When pressing START, change of ⑦ is fixed. Do not press START until fixing of an item. (When not pressing START, it returns to the original value with re-power on and pressing RESET) . At this time, it shows that turning-over blink moves to right end of 1 section below and fixing of the change.

START

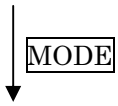
```
  Parameter Mode 2
Minimum Digit:  0.01
Thickness Enb.:  Yes
 Buzzer  Enb. :  Yes
```

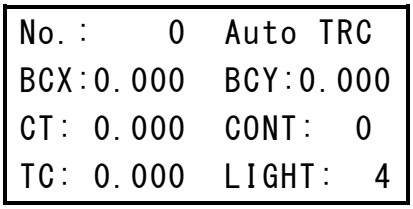
⑨ The repetition of these and its setting to the page 4 of the parameter mode.

```
  Parameter Mode 3
Cont Err Enb. :  Yes
Cont Err Limit:   30
 Tc Err Limit :   30
```



⑩ Finish the setting of all parameters.
When pressing MODE, it returns to the auto mode.





4-7-4 The error list

Following list shows error in Auto mode.
When the error occurs, by pressing START switch, the blink of LCD and the buzzer sound come to stop. After confirming the displayed contents on LCD, start re-measurement by pressing START switch again.

The display example	The error name	Cause and handling
No Image	malfunction of the reflection image detection	Reflection from the lens block on the lens mount can not be normally detected The following factors are considered. ・ The lens block is not in the lens mount. ・ Centering of the lens block or the lens mount is shifted. ・ The setting at UPPER LIMIT is too low. ・ The brightness from the light source isn't adequate. (Adjust the brightness as occasion arises because it is set at "1"which is most darkest when the machine shipped.) In case of Toric lens block, the axis does not fit.
Brightness	Illumination excessiveness	The reflection from the lens block on the lens mount is too strong. Adjust the brightness from the light source again.
Cont:20/30	Contrast error	The value of Ratio of strength of reflection which is measured at focus position of the aerial image and a position of point0.025mm(25μm) from the focus position is underrun. In the case of indication as "20/30 ", it means that acquired value was 20, although the set value was within 30.
TC: 30/20	Toric Error	The difference of measured value of X-axis and Y axis base curve was overrun. In case of the display example, it means that the difference with the B.C. value of the "X axis and the B.C. value of the Y axis is 0.030mm(30μm) although the set value was 0.020mm(20μm). This error occurs only by SPH mode.

4-8. Manual Measurement.
This is the manual measurement of Base Curvature of Lens Block.

For Spherical Lens Block :

① Set the unit to Manual Mode.

② Put the lens for measurement on the Lens Mount.
Rise the Stage by pressing FAST or SLOW switch. Reset the Gauge Counter of the LCD Display by pressing START switch at the height of the Stage, where the first image; vertical and horizontal lines(grid, aerial image) is in view most sharply.

③ Rise the Stage again and the next image, which is ; vertical and horizontal lines (grid, surface image) is in view. Read the value of the Gauge Counter; indicated after "Stage at " in the LCD Display at the height of the Stage, where the image is most sharply observed.

For Toric Lens Block (TRC Pattern Lens Block) :

① Set the unit to Manual Mode.

② Put the Lens Block for measurement on the Lens Mount, with the line in the Lens Mount and *Axis Mark* in the Lens Block (refer 3-6 Auto Measurement) .(any reference mark standing for one of the meridians for the reference to toric.)
Rise the Stage by pressing FAST or SLOW switch. Reset the gauge counter by pressing START switch at the height of the Stage, where the first image; vertical lines(Aerial image) is most sharply observed.

③ Rise the Stage again and the next image, which is; vertical and horizontal lines (grid, surface image) is most sharply observed.
Read the value of the Gauge Counter at the height of the Stage, where the image is most sharply observed. The value means the Base Curve value of the larger curvature.

④ Reset the gauge counter by pressing START Switch.

⑤ Then, descend the Stage and the next image, which is; horizontal lines(Aerial image) is most sharply observed.
Read the value of the Gauge Counter at the height of the Stage, where the image is most sharply observed. Read the value of Gauge Counter. The value, which the read value is converted to a positive number, is the value of the smaller BC.

Please note that in case of TRCR pattern Lens Block, the order of appearance of the vertical stripe image and horizontal stripe image is reversed.

4-9. External control

All the control, except control in Manual Mode, is possible by PC, connected with CG AUTO II at its RS-232C connector in the back panel.

4-9-1. The Communication Format

・The communication format is as follows.

full duplex / 8Data Bit / 1Stop Bit / Non parity

Following Baudrate is selectable in “RS-232C Speed” Parameter.

2400bps, 4800bps, 9600bps, 19200bps

・The pin layout of the 9pin D-SUB connector(of back panel) is as follows.

Pin #2 : RxD
Pin #3 : TxD
Pin #5 : GND
Pin #7 : RTS *
Pin #8 : CTS *

* Pin #7 and Pin #8 is connected internally in CG AUTO II.

4-9-2. Measurement Result Output Format.

The format of out put of Measurement Result is selectable in either “ CG-A Format ” or “CSV Format ” in “Output Format” Parameter.
Output comes out in either format, selected in “Output Format” Parameter as either “ CG-A Format ” or “CSV Format ”.
With no additional operation, data output is done every time when the measurement is completed automatically.

4-9-2-1. “CG-A Format ”

Output in “CG-A Format ” is done in the same format as the former Model of CG AUTO(CG AUTO I)

It outputs in the series of data like following:
AAAA△△B.BBB△C.CCC△△D.DDD△△E.EEE△△FF△△△G.GGG△HH*CRLF*

The following is what the each letters of data stands for.

AAAA : number of measurement.(the sum of measurement after Power is on or after Reset)
B.BBB : BC (Base Curve , average of X axis and Y axis)
C.CCC : BCX (Base Curve , measured value of X axis)
D.DDD : BCY (Base Curve , measured value of Y axis)
E.EEE : TC (an absolute value of the result of the measured value of X axis minus the measured value of Y axis)
FF : CONT (the difference of clearness of the image taken at the distance where focus was made and the same taken at the distance at 0.025mm far from where focus was made.)
G.GGG : CT (Center thickness)
HH : Error Cord
00 Normal
E1 Error of “No Image ”
E2 Error of “TC ”
E3 Error of “ Cont ”
E4 Error of “ Brightness ”

△ : a space (ASCII CODE = 0x20)
CR : Carriage Return (ASCII CODE = 0x0d)
LF : Line Feed (ASCII CODE = 0x0a)

A Letter, A – H, is 1-digit figure(ASCII CODE = 0x30～0x39） or one single space.
In H, the 1-digit is “E” (ASCII CODE = 0x45), when an error occurs.
“.” is ASCII CODE = 0x2e.
For example, the data format in case that the 15th lens was measured and the result was BC=7.700mm,

BCX=7.699mm,BCY=7.701mm, CONT=43, CT=0.125mm appears like,
△△15△△7.700△7.699△△7.701△△0.002△△43△△△0.125△00*CR LF*

4-9-2-2. "CSV Format "
It is a standard format such as for PC, indicated with comma dividing each data, and the out put is in series of data like following.

AAAA,B.BBB,C.CCC,D.DDD,E.EEE,FF,G.GGG,HH*CRLF*

Each letter stands for meaning likewise to " CG-A Format ". "**.**" is ASCII CODE = 0x2e.
The order of the data in the format is also same as "CG-A Format " but the place of blank in the series has comma and space(s) is deleted, whereas the place of blank is indicated with space(s) in " CG-A Format "

For example, the date format in case that the 15th lens was measured and the result was BC=7.700mm, BCX=7.699mm,BCY=7.701mm, CONT=43, CT=0.125mm, the same data mentioned "CG-A Format " above, appears like,
15**,**7.700**,**7.699**,**7.701**,**0.002**,**43**,**0.125**,**00*CR LF*

4-9-2-3. Command for the external control.
For external commanding the unit, please refer the PC → CG-AUTO II Command List in the next page.

All command except "S" for Starting measurement and for Resetting unit on occurred error and "ESC" for Emergency Stop unit, needs to send ""CR,LF" (ASCII CODE = 0x0d, 0x0a) in addition.

For example, To set Max. Target BC 80 needs to send MX80, then send "CR,LF" (ASCII CODE = 0x0d, 0x0a)
When the unit receives the command, unit sends back "1" as ACK, after execute the command.
(Exemption: When the unit received "S" command, unit sends back "1" as ACK on its receipt of the command, then start measurement. The completion of a measurement must be known with the output of the measurement result.)
When the unit fails in receipt of the command, unit sends back "0" as NAK.
When sending commands at once for such as changing some parameters, it need to make each command after making sure of ACK or NAK, sent back each other.

4-9-2-4 Command List

Command Name	Function	Example for command
Start Measurement	To start measurement one time	Press “S”
Error Reset	To Reset on status of error.	Press “ S “ (it works, when the machine on the status of error.)
Emergency Stop	To Stop movement (when the stage is moving	Press “ESC” Key （ASCII CODE = 0x1b）
Lens Information	To set the value for Blank mode	“ MS ” :Set the mode to SPH “ MT “ Set the mode o TRC “ MR “ Set the mode TRCH “ M? “ Inquiry of Current Settings
BCX Offset	To set the value for BCX Offset	“ OX+1234 ” : Offset BCX value = +1.234mm(Example) “ OX-0005 ” : Offset BCY value = -0.005mm(Example) “ OX? ” Inquiry of Current Settings
BCY Offset	To set the value for BCY Offset	“ OY+1234 ” :Offset BCX value = +1.234mm(Example) “ OY-0005 ” :Offset BCY value = -0.005mm(Example) “ OY? “ Inquiry of Current Settings
Max. Target BC	To set Maximum Target BC	“MX80 “ : Max.Target BC = 8.0mm (Available from 60 to 95, in 5mm step) “MX “ : Max.Target BC = 10.0mm “MX? “ Inquiry of Current Settings
Minimum Digit	To set smallest digit for indication of value.	“ MD00 “ : Smallest digit of indicated value= 0.001mm “ MD01 “ : Smallest digit of indicated value= 0.01mm “ MD? “ Inquiry of Current Settings
Thickness Enb.	To set for if measuring Center Thickness or not.	“ CTO“ : Measure Center Thickness “ CT1“ : Do not measure Center Thickness “ CT? “ Inquiry of Current Settings
Buzzer Enb.	To set for executing buzzer sound	“ BZ0 “ : Not executing “ BZ1 “ : Execute Buzzer sound “ BZ? “ Inquiry of Current Settings
Cont Err Enb.	To set for if Contrast is measured or not.	“ CE00 “ : Not executing “ CE35 “ : Measure Contrast(example, when setting (value of 35 against the measured value.) “ CE? “ Inquiry of Current Settings
Tc Err Limit	To set the value which is figured as error.	“ TE30 “ : Value figured as error, when measured (value is less than 30(example). “ TE? “ Inquiry of Current Settings
Light Level	To set intensity of illumination.	“ L5 “ : set the intensity as 5. “ L+ “ : increase degree of the intensity with 1. “ L- “ : decrease degree of the intensity with 1. “ L? “ Inquiry of Current Settings
Parameter List	To Inquire ‘PARAMETER LIST’	Press “ PL “
Calibration	To execute Calibration with a standard value of Center Thicknes s..	“ CA3120 “ : Execute Calibration with the value of Center Thickness – 3.120mm. “ CA ” : Execute Calibration with the value of Center Thickness which is currently set.
Warm Up Start	Start running in Warm Up Mode.	“ WUS ”

Exclude “S” of Start Measurement and Error Reset, and “ESC” Key of Emergency Stop, each command is required to add “ CRLF” (ASCII CODE=oxod, oxoa) to the end of the command. After execution of “ESC”, Reset of CG Auto unit is required.

5. Maintenance

5-1. Confirming repeatability of measurement with Test Piece of accessory.

To perform measurement in the high reliability, we recommend to check the repeatability in measurement regularly.

① Set the unit to Manual Mode and pull down the Lens Mount until it stops automatically.
② Put the Test Piece of accessory. At the time, insert it in so that the bottom end of the Test Piece touches the Stage surface.
③ Perform Centering for the Test Piece.
④ Execute Measurement repeatedly in the Auto Mode and check if the measured value meets the value of the BC of Test Piece.
If the Values meet, the setting of correction value with Test Piece is successfully completed.
In case it does not meet, set OFFSET of Base Curve with refering 4-7-3. Parameter Mode.

5-2. Exchange the light Source.

Since the LED is used for light source, it is not necessary to exchange it for long.
When the intensity became low or the light is turned off, it needs to exchange with new Lamp House. The following is the procedure:

① Turn off the unit with pressing Power Switch to [○] and unplug the Power Cable.
② Unplug the connector of the cord sticking out from the Lamp House at the back of the unit body.
③ Unscrew the Lamp House Fixing Screws and pull out the Lamp House.
Exchange the Lamp House. It is not possible to exchange LED only.
④ Since centering(positioning) of Light Source is done in advance of ex-factory, it is not necessary to do it at the time of exchange Lamp House.

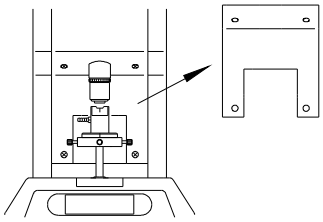
5-3. Cleaning.

In case any stein or salinity adheres to the unit body, wipe it off with dust cloth, which is squeezed strongly.
The Test Piece and Lens Mount is to be kept clean and is with nothing remained there.

5-4. Lubrication.

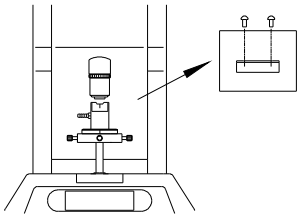
The lubricant is in the accessory of the unit, but lubrication is not needed basically.

Lubrication except need of time-wise or excessive lubrication can be a cause of trouble to mechanism.

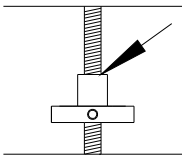


① Lubrication of time-wise
The part of the Lead Screw became not smooth or any allophone is occurred.

② How to lubricate
Unscrew and remove the fixing screws in the 4 corners and the Lubrication Palate Cover.
Remove a black dust proof cover, which is set inside.
Unscrew 2 of fixing screws in the center of the cover and remove the screw and the Black dust proof cover.



- Cut off the tip of accessory syringe.
- Move down the Stage.
- Insert the tip of syringe and send it to the part between the Lead Screw and flange, put 1 or 2 drops of lubricant oil. (Please be careful not to put too much. In case put it too much, wipe it with cotton bat.)



③ Storage of lubricant

Store it in cool and dark place.

After opening the syringe, it is not necessary to take care of evaporation.

5-5. Exchange the Fuse.

When the Fuse is burnt out, exchange it with the following procedure.

① Turn off the unit with pressing Power Switch to ○ and unplug the Power Cable.

② Open the Fuse Box at the ditch with screw driver.

③ Remove the Fuse and Exchange it with new one.

(Close the Fuse Box by following above procedure reversely.)

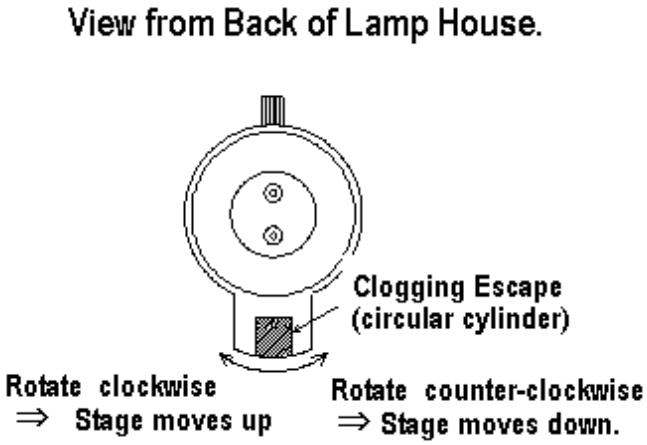
5-6. Recovery for clogging of Stage movement.

When the movement of Stage had clogging, recover it with the following procedure.

① Turn off the unit with pressing Power Switch to ○ and unplug the Power Cable.

② Check whether the Stage is clogged at high end or low end of the Stage travel.

③ Insert any slim stick like screw driver to a hole in the Clogging Escape(circular cylinder) being beneath Lamp House.
If the clogging happens at high end, rotate the black circular cylinder counter-clockwise.
If the same is happens at low end, rotate the black circular cylinder clockwise.
(Attention not to rotate the cylinder wrong way as it can make the clogging harder.)
When rotation of the cylinder became smooth, clogging is recovered.



④ Plug the Power Cable and turn on the unit by putting Power Switch to [I] mark, the Stage returns to the starting measurement point.

6. Specifications

CG-AUTO II Main Unit.

＊ Scope	: Monocular Scope
＊ Magnification	: Approximately 100times (Objective 10times, Eyepiece 10times)
＊ Illumination	: Green LED
＊ Projection Pattern	: Special Square Type
＊ Rack of Mount	: Exclusive Stage
＊ Gauge	: Digital Gauge Sensor
＊ The unit of measurement	: 0.001mm
＊ Display	: LCD, 4 Lines, 20 Digits
＊ Dimension & Weight	: Width 230 Depth 390 Height 630 (mm)
＊ Voltage Input Operating	: 100V- 240V　60VA 5/60Hz
＊ Environment	: Temperature - From 10℃ to 30℃ Relative Humidity – Less than 75%
＊ Applicable Standard	: Safety Standard：IEC61010-1 Ed2.0：2001 EMC：IEC61326-1 Ed1.0：2005

Ability Specifications

＊ Measuring Object	: Base Curve(BC) of Lens Block, Toric Value(TC) and Center Thickness(TC)
＊ Range of Measurement	: From R6.0 to R9.9
＊ Indication Unit	: 0.001mm or 0.01mm (0.01mm is on choice for value of BC)
＊ Accuracy of Measurement	: 0.005mm(Accuracy of repeatability in measurement of Test Piece)
＊ Accuracy of Lens Centering	: Within φ0.3mm
＊Measurement of Base Curve	: Measure the BC for each axis with two sensors that are intersecting at right angle, and indicate a value of the average of them for SPH pattern lens, and indicate values of each axis for TRC or TRCR pattern.
＊Measurement of Contrast	: Measure contrast in reflection image and use it for judgment of quality of Surface in BC of the lens block.
＊Time for Measurement	: Approximately 10sec. per a measurement. (It is time until the measured value is indicated after putting a spherical lens block to the lens mount and pressing START in the measurement in SPH mode.)
＊Operation Sequence	: Manual Mode Observe the projection pattern in BC of the lens block as having the lens mount risen or descended manually with switch.

: Auto Mode
1)Put a lens block.
2)Press START
3)Auto measurement
4)Indicates measurement result, output data to RS-232C
5)Remove lens block

＊Index Number : Indicates Index Number, which increases with 1(1-9999) per measurement and output data to RS-232C

＊Offset for BC value (correction) : Possible to add offset value from 0 to ± 9.999(mm) to BC value

＊Interface : Possible to output measurement result through RC-232C, to execute some operation in auto-mode and to change value of parameter.

7. Contact

When the malfunction is detected, stop using the instrument and contact your supplier immediately.

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