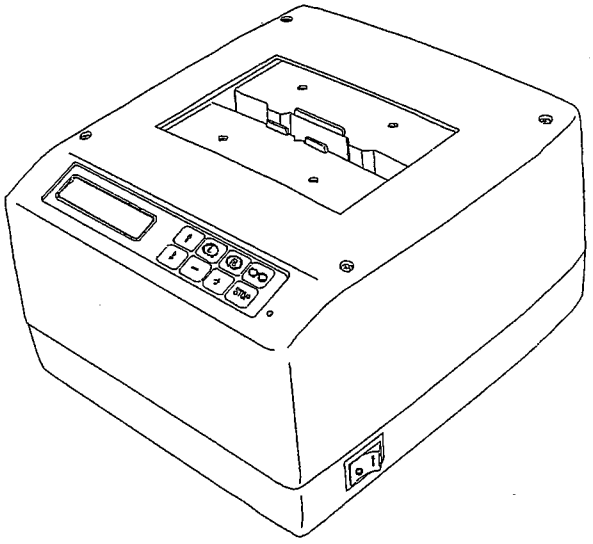
Takubomatic

FRAME SCANNER

FD-80

Operation Manual



Please be sure to read this manual carefully before using the instrument and keep it handy for ready reference.

TAKUBOMATIC Co., Ltd.

G301J32M3

IMPORTANT INFORMATION

< PURPOSE OF THIS MANUAL >

- The purpose of this manual is to provide the customer with the necessary and important information of the instrument related with its unpacking & installation, operating procedures, and checkup & adjustment procedures for safer and efficient use of the instrument.

< LIMITED WARRANTY >

- **TAKUBOMATIC Co., Ltd.** will not be liable for any damage or injury arising from an individual's failure to follow the instructions contained in this manual and to pay attentions and / or cautions normally required.
- **TAKUBOMATIC Co., Ltd.** will not be liable for any damages or consequential damages, including, without limitation thereof, damages or other costs resulting from any abuse, misuse, misapplication of the instrument and its components supplied by **TAKUBOMATIC Co., Ltd.**
- Provisions stated in the written guarantee separately submitted shall constitute the sole remedy for any breach of the warranty of **TAKUBOMATIC Co., Ltd.**

< OTHER IMPORTANT INFORMATION >

- When operating, checking up, or adjusting the instrument, take extreme caution on the generally required safety rules as well as on the items described in this manual.
- To prevent occurrence of an accident, do not attempt to carry out any operation, checkup, or adjustment in a manner other than those described in this manual or use the instrument for any unapproved purposes.
- It is assumed that this instrument is operated or serviced by English-speaking workers. If this is not the case, the customer must give sufficient safety instructions to the workers of the instrument in their native language.
- If you resale the instrument, never fail to attach this manual to the instrument. Also, inform our service representative nearest you, the exporter, or the manufacturer listed in the following page of the name and the address of the new customer of the instrument.
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- If you have questions, require further information, or place an order for spare parts, contact our service representative nearest you, the exporter, or the manufacturer written below.
  Also, gather the following information before contacting us to ask for repair work.

Model Name:	Frame Scanner FD-80
Date of Purchase:	Date, Month, Year
Serial No.:	Printed on the name plate at the rear side of main body
Troubles:	State the contents of abnormality in detail

Exporter:

TAKUBOMATIC Co., Ltd.
5-5-3, Miyahara, Yodogawa-ku,
OSAKA, 532 JAPAN
Phone: 066-394-2725
Fax: 066-394-2785

Manufacturer:

TAKUBO MACHINE WORKS CO., LTD.
1-7-11, Tadanoumi-tokonoura
TAKEHARA, HIROSHIMA, 729-2314 JAPAN
Phone: 0846-26-0421
Fax: 0846-26-1172

TABLE OF CONTENTS

1: SAFETY

This section describes the safety precautions to secure safety when unpacking & installing, operating, checking up, or adjusting the instrument.
The persons who handle the instrument must strictly observe the following safety precautions to use it safely

1.1 MEANINGS OF SIGNAL WORDS

The following signal words are used in this manual so that the instrument may be operated or serviced safely, therefore, their definitions must be completely understood before reading the body of this manual.

⚠WARNING **Indicates a potentially hazardous situation which, if not heeded, could result in death or serious injury.**

⚠CAUTION **Calls attention to instructions that must be observed to avoid possible minor or moderate injury and possible damage to the instrument.**

NOTE **Used to emphasize essential information.**

1.2 SAFETY PRECAUTIONS

When using the instrument, basic safety precautions including those in the following page should always be observed to reduce the risk of electric shock, personal injury, and damage to the instrument.

(a) General Precautions

⚠CAUTION

- **Read this manual!**
  Carefully read all the instructions contained in this manual before attempting to unpack, install, operate, check up, or adjust the instrument and follow those instructions.
- **Keep unauthorized persons away!**
  Do not let persons, especially children, touch the instrument and its accessories, keeping them away from the working area.
- **Keep working area clean!**
  Always keep working area neat and clean.
  (Cluttered area and workbench invite personal injury.)
- **Dress properly!**
  Do not wear loose clothing or accessories.
  (They can be caught by moving parts.)
  Also, non-skid footwear is recommended.

- **Carefully handle the power plug and the power cord!**

  <Handling of power plug>

  Pull out the power plug from the outlet when the instrument is not going to be used for a long time. Also, do not put anything near the outlet so that the power cord can be easily pulled out at any time. (If these are not observed, the power plug cannot be pulled out in case of an emergency.)
  Do not put many loads on one electrical outlet.
  Every once in a while, clean the pins of the power plug with a dry cloth.
  (If dust settles thick on them, they will become damp, and may cause a short-circuit or a fire.)

  <Handling of power cord>

  Never yank the power cord to disconnect it from the outlet.
  Keep the power cord away from heat, oil and sharp edges.
  Also, do not crush or squeeze the power cord with heavy objects such as the instrument or workbench.

- **Immediately ask for repair of defective parts!**
  Have defective parts and switches repaired or replaced by our service representative as soon as possible.

(b) Safety precautions during unpacking and installation

⚠ CAUTION

- **Take caution not to drop the instrument!**
  When carrying the instrument, hold the lower part of the instrument and lift it taking sufficient caution not to drop it. (If the instrument drops, it may be defected or you may get injured.)
  Besides, when putting the instrument on a table or the workbench, take caution not to get your fingers caught.

  Weight: 7 kg

- **Consider environmental conditions for storage and installation of the instrument!**
  Do not place the instrument where it may be exposed to direct sunlight, high humidity or temperature extremes.
  (If not observed, it may cause an instrument failure or malfunction, an electric shock, or a fire.)

- **Select appropriate place for installation!**
  Place the instrument where it can be operated comfortably and keep proper footing and balance at all times.
  (The instrument, if falls or drops, may result in personal injury.)

- **Keep enough space for working area!**
  (See Section 2.2.1 for the dimensions of required working space.)

- **Use the specified packing materials when transporting the instrument!**
  Use the specified packing materials when transporting the instrument to lessen its damage by falling, etc.
  (Excessive vibration or shock to the instrument may cause an instrument malfunction.)

- **Avoid unexpected start-up of the instrument!**
  Ensure that the power switch of the instrument is OFF when plugging in the power cord.

(c) Safety precautions before operation

⚠ CAUTION

- **Check damaged parts!**
  Before operating the instrument and using its accessories, they should be carefully checked to determine that they will operate properly and perform their intended functions.
  Check for mounting of movable parts, connection of movable parts, breakage of parts, and any other conditions that may affect their operation.
  Ask our service representative for repair or replacement of damaged parts.

(d) Safety precautions during operation

⚠ WARNING

- **Actions to take when abnormality has occurred!**
  When some abnormality (abnormal sound or smell) has occurred to the instrument during its operation, turn OFF the power switch of the instrument, and pull out the power plug or switch OFF the power breaker, and then ask our service representative for repair without fail.
  (Continuing operation in abnormal condition may cause an instrument failure, electric shock, and / or a fire.)

⚠ CAUTION

- **Precautions when operating control panel!**
  Never forcibly press the surface of the control panel by a sharp edge or fingernail.
  (If not observed, the surface of the panel may be damaged.)
  Instead, gently touch the buttons by your fingertip.

- **Do not use the instrument for any other purposes not intended!**
  Do not use this instrument for any purposes other than the one originally intended.
  (If not observed, it conditions may cause an instrument failure and / or personal injury.)

- **Do not allow to use a portable telephone!**
  Do not use any electric apparatus such as a portable telephone that emits electromagnetic waves. (It may cause a malfunction, a failure, etc. of the instrument.)

(e) Safety precautions during maintenance

⚠ CAUTION

- **Inspect the power cord!**
  Inspect the power cord of the instrument periodically, and if damaged, have it repaired by our service representative.

- **Prohibition of disassembly and modification!**
  Never perform any disassembly and / or modification of the instrument not specified in this manual. Ask our service representative for repair.
  (Unauthorized repair or modification will invite an electric shock, a fire, and / or an instrument failure.)

1.3 NOISE LEVEL

The maximum noise pressure level when operating the instrument (at 1 m off the instrument surface, 1.6 m above the floor level) measured by the method specified in the corresponding EN standard is as follows.

Equivalent continuous A-weighted sound pressure level (when lens or frame is being traced): Less than 70 dB

2: UNPACKING & INSTALLATION

This section describes the procedures of unpacking and installing the instrument after its delivery.

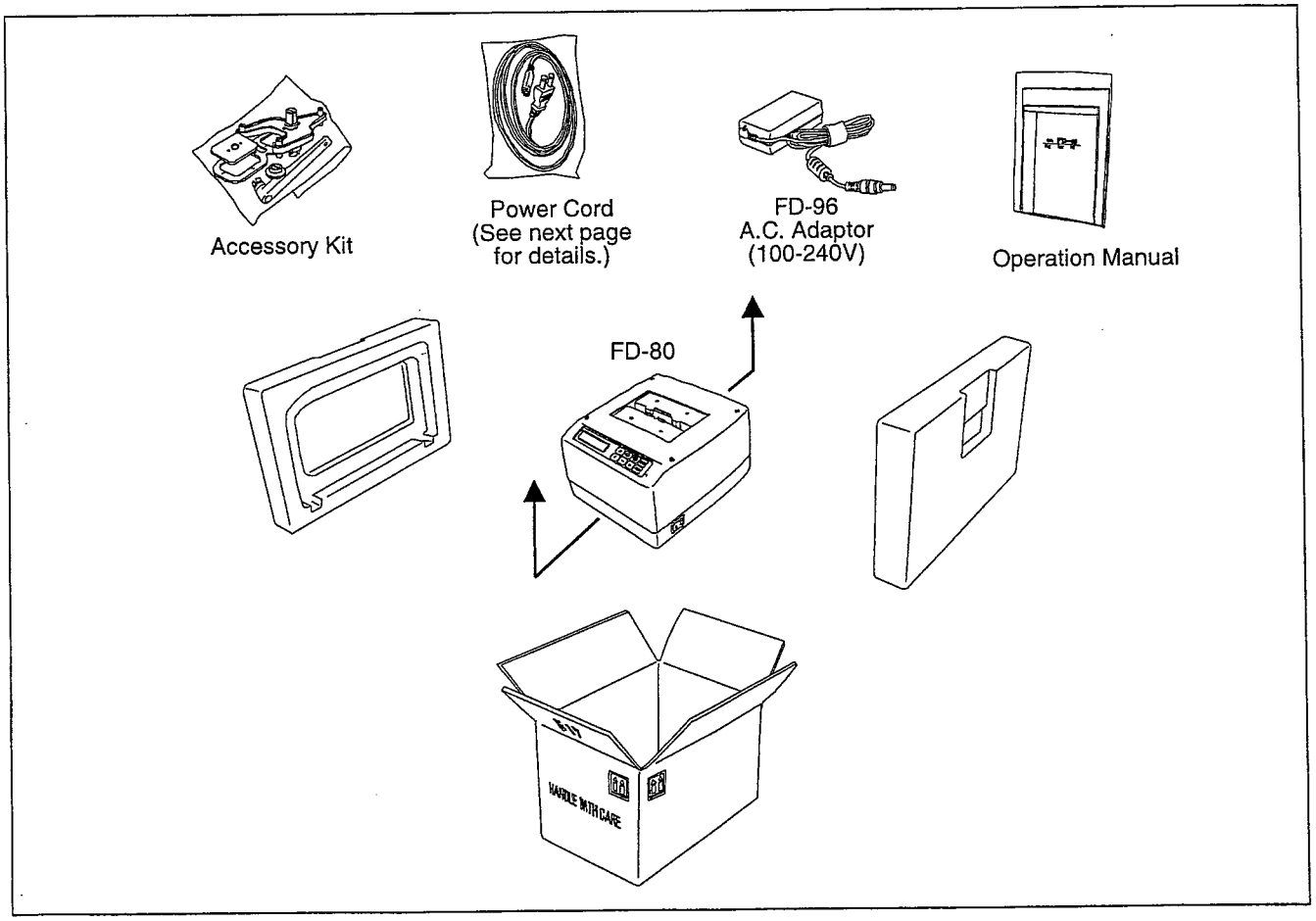
2.1 UNPACKING CARTON

The cardboard carton contains the instrument, its accessories, and its operation manual. Unpack the carton of the instrument in the following procedures.

⚠CAUTION **When performing the following work, take extreme caution not to drop the instrument. Otherwise, the instrument may fall, causing damage to the instrument or injury to the worker.**
Weight of instrument: Approx. 7 kg

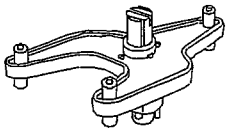
⚠CAUTION **Take special caution when handling this instrument since it is a precision instrument.**

(1) Firmly hold the lower part of the instrument by both hands as shown in the figure below, take the instrument out of the carton, and take out other items.
(2) Verify that all the items are included in the carton and there is no damage to them. (See the table and figure in the following page.)
(3) If there is any missing item or any damage is found, contact our service representative nearest you, the exporter, or the manufacturer listed in "Important Information" of this manual.

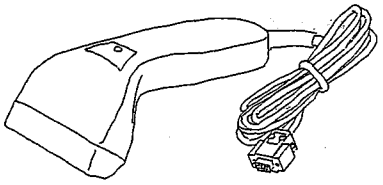


ITEMS INCLUDED IN CARTON

Item Code	Name of Item	Quantity
	FD-80	1
	Operation Manual	1
FD-95-1 FD-95-2 FD-95-3	Power Cord (US type) AA type Power Cord (EU type) AC type Power Cord (CH, AU type) AE type	1
FD-96	A.C. Adaptor (100 V – 240 V)	1
FD-100	Frame Template (in accessory kit)	1
FD-101	Lens Template (in accessory kit)	1
FD-102	Lens / Pattern Attachment (in accessory kit)	1
FD-104	Adhesive Lens Block (in accessory kit)	1
FD-105	Lens Block Remover (in accessory kit)	1
FD-106	Bar-code Reader (Option) (in separate package)	1

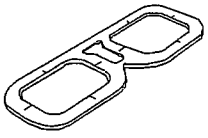


FD-102
Lens / Pattern Attachment



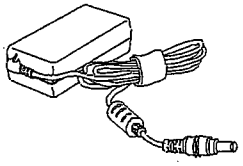
FD-106
Bar-code Reader (Option)

FD-101
Lens Template

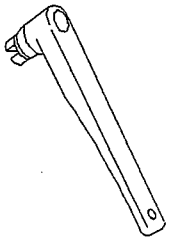


FD-100
Frame Template

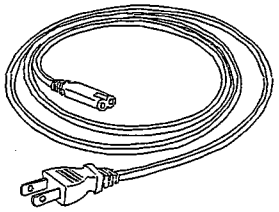
FD-104
Adhesive Lens Block



FD-96
A.C. Adaptor (100 V – 240 V)



FD-105
Lens Block Remover



FD-95-1 Power Cord (US type)
FD-95-2 Power Cord (EU type)
FD-95-3 Power Cord (CH, AU type)

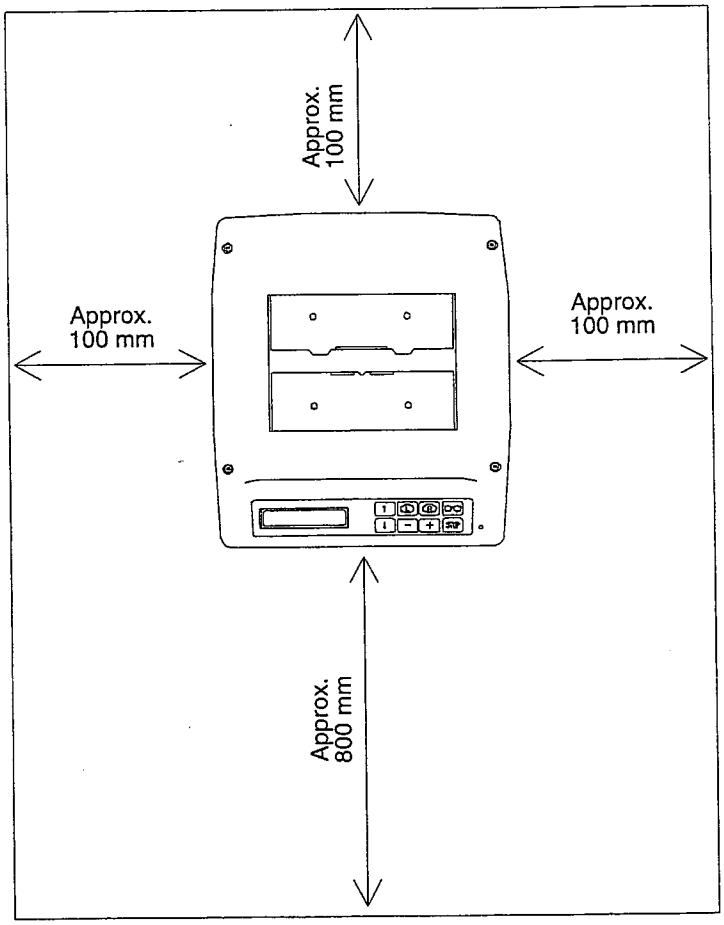
2.2 INSTALLATION

Install the instrument by following the instructions in this section.

2.2.1 Environmental Conditions for Installation

The place for installing the instrument must maintain the following environmental conditions.

Item	Conditions
Place for Installation	Indoor (Avoid direct sunlight.)
Altitude	Max. 2000 m
Ambient Temperature	41°F – 104°F (5°C – 40°C)
Max. Relative Humidity	50% at 104°F (40°C)
Power Source (Instrument)	24 V d.c., 20 W (to be used with AC adaptor)
Power Source (A.C. Adaptor)	100 – 240 Va.c., 50/60Hz
Min. Working Space	800 mm (front), 100mm (rear), 100mm (both sides) (See the figure below.)



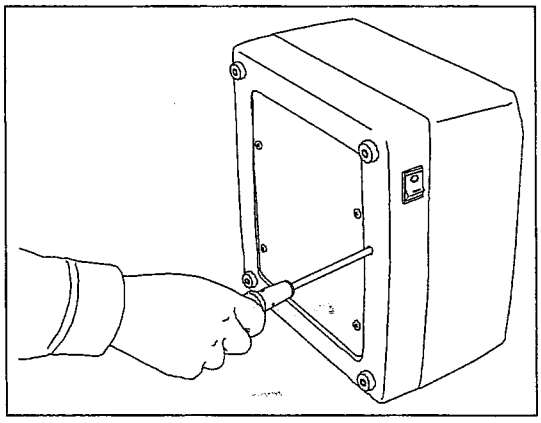
2.2.2 Installation Procedures

Install the instrument according to the following installation procedures.

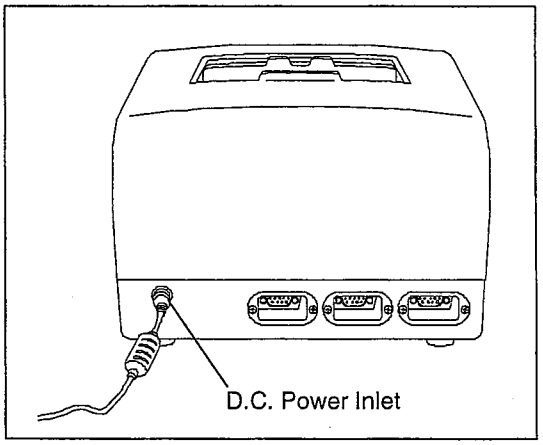
⚠ CAUTION **When carrying the instrument, take extreme caution not to drop the instrument. Otherwise, the instrument may fall, causing damage to the instrument or injury to the worker. Weight of instrument: Approx. 7 kg**

⚠ CAUTION **Take special caution when handling this instrument since it is a precision instrument.**

(1) Place the instrument on the workbench after unpacking the carton according to the unpacking procedures described in the former section.
(2) Lean down the instrument backward, insert the Phillips screwdriver to the position shown in the right figure, and then tighten it turning clockwise.
- The immobilizing clamp (inside the machine) moves downward to allow the tracing turntable to move right and left.

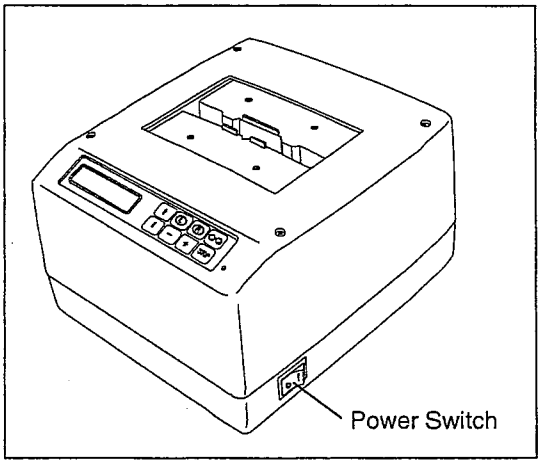


(3) Restore the instrument to the normal orientation, and plug in the code from the A.C. adaptor to the D.C. power inlet at the rear side of the instrument.



(4) Turn ON the power switch.
- The instrument automatically resets its control.

The instrument will become operative by performing the above operations.



(5) Perform the following operations according to the results of the automatic control reset.

<When instrument has successfully completed control reset:>

Auto. Adjustment by Frame Template (See Sec. 5.1.1.) → Auto. Adjustment by Lens Template (See Sec. 5.1.2.)

<When some abnormality (error) has occurred during automatic control reset:>

Perform Auto. Checkup and correct faulty.
↓ (See Sec. 5.4.)
Auto. Adjustment by Frame Template (See Sec. 5.1.1.) → Auto. Adjustment by Lens Template (See Sec. 5.1.2.)

(6) Connections of communication cables

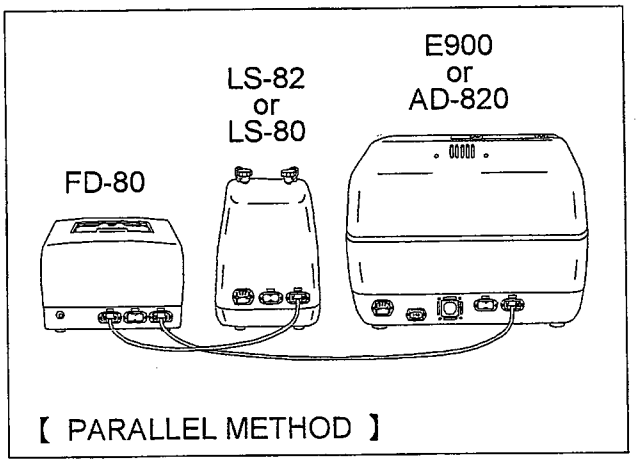
There are two methods in the communication cable connection, the parallel method and the chain method.

Select a cable connection suitable for the models, specifications and usage of the instruments.

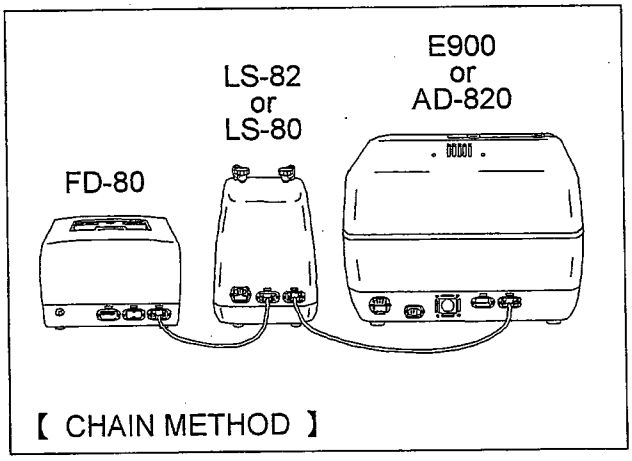
⚠ CAUTION **Do not connect the communication cable to the bar-code reader connector. Do not use any communication cable other than the one attached to the machine.**

⚠ CAUTION **When connecting LS-82 by the chain method, connect FD-80 (or FD-8, PM-80) to Bar-code reader connector of LS-82 and E900 (or AD-820) to RS-232C communication cable connector of LS-82.**
Any other connection is invalid and corresponding error code is displayed.

<Example of Cable Connections: for Standard Specifications>

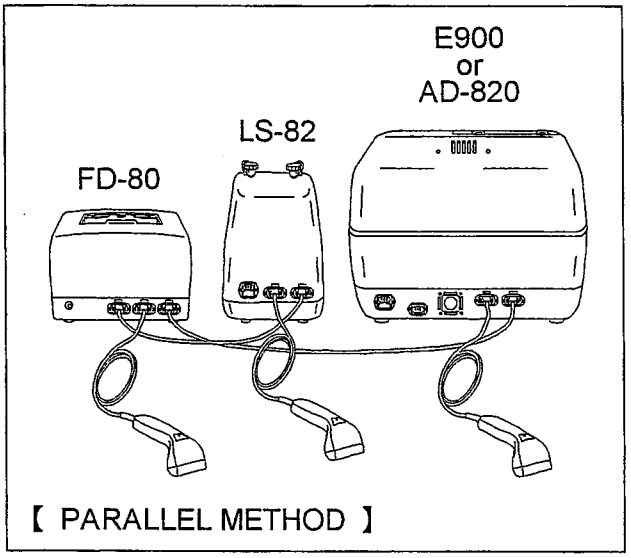


【 PARALLEL METHOD 】

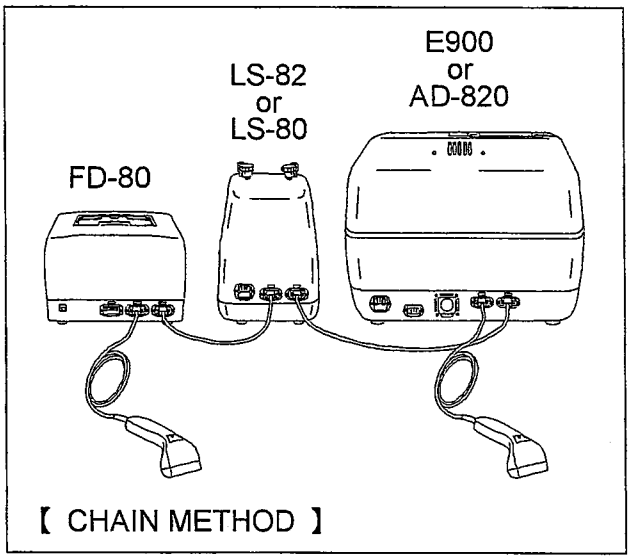


【 CHAIN METHOD 】

<Example of Cable Connections: for Bar-code (Option) Specifications >



(Example 1 for Bar-code Specifications (Option))



(Example 2 for Bar-code Specifications (Option))

(7) Communication data flow

<When not using a bar-code reader:>

- In the parallel method, a trace data of FD-80 can be independently read in to E900(AD-820) by pressing [Trans] button of E900(AD-820) or to LS-82(LS-80) by pressing [Data Entry] button of LS-82(LS-80).
- In the chain method, if there is no trace data in LS-82(LS-80), data is displayed on LS-82(LS-80) screen first and then read in to E900(AD-820) by pressing [Trans] button of E900(AD-820).

NOTE In order to read in new data to E900(AD-820), first read in new data to LS-82(LS-80) by pressing [Data Entry] button of LS-82(LS-80) and then read it in to E900(AD-820) by pressing [Trans] button of E900(AD-820). New data also can be read in to E900(AD-820)by pressing [Data Entry] button of E900(AD-820) after canceling old data by pressing [Clear] button of LS-82(LS-80) twice.

<When using bar-code reader:>

- In the parallel method, LS-82 and E900(AD-820) can independently read in the data of an intended job No. from FD-80. Data can also be read in in the manner same as when not using the bar-code reader.
- In the chain method, by reading an intended job No. with the bar-code reader of E900(AD-820), the data for the job No. read with the bar-code reader is first displayed on LS-82(LS-80) screen and read in to E900(AD-820). Data can also be read in in the manner same as when using the bar-code reader.

3: BASIC INFORMATION OF INSTRUMENT

This section provides the general information of the instrument, including the purpose and specifications of the instrument, the functions of its major components and operating buttons, and also major operations of the instrument.

3.1 PURPOSE OF INSTRUMENT

This is an instrument that automatically traces and measures eye glass frames, lenses, and patterns, and creates their data. Also, when used with a bar-code reader (Option), many data can be stored in the instrument with respective bar-codes so that necessary data can be used by a lens edger and / or a lens blocker later.

NOTE **In order to utilize the bar-code function effectively, use the instrument with an automatic edger and an lens blocker furnished with the bar code functions.**

3.2 SPECIFICATIONS OF INSTRUMENT

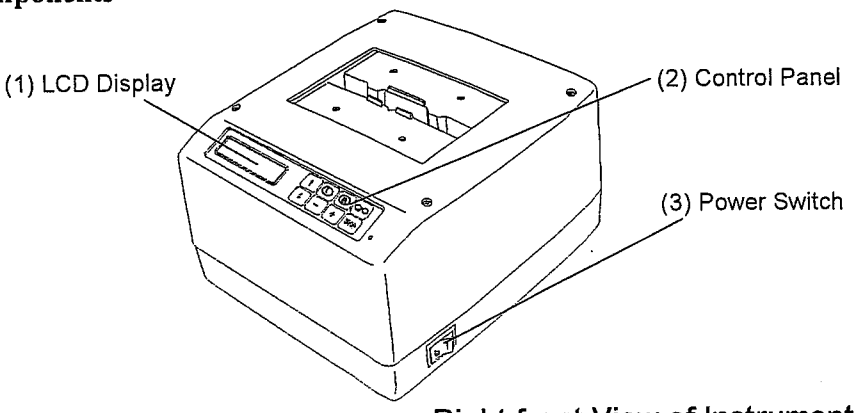
Item	Specification
Measuring Method	Automatic both-eye measurement in three dimensions
Tracing Method	Auto. tracing / Step-by-step frame tracing
Measuring Range	Frame: ϕ18-70
	Lens: ϕ15-70
Measuring Time	Frame (both eyes): 38 seconds
	Lens: 22 seconds
Outside Dimensions	280 (width) × 310 (depth) × 180 (height) mm
Weight	7 Kg
Power Source (Instrument)	24 V d.c., 20W (to be used with A.C. adaptor)
Power Source (A.C. Adaptor)	100 -240 Va.c., 50/60Hz
Data storing capacity	200 data

3.3 COMPONENTS AND THEIR FUNCTIONS

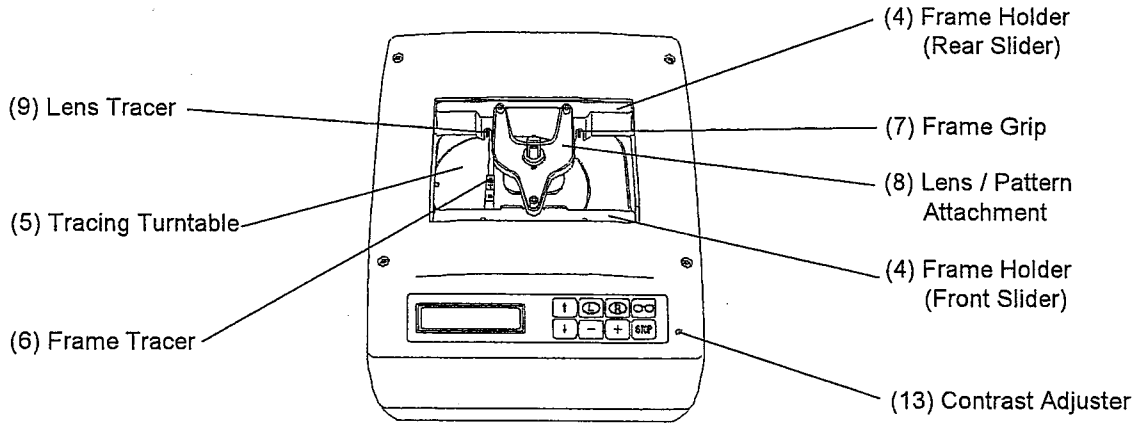
This section describes the names and functions of the mechanical and electrical components of the instrument, showing their positions in the figures.

3.3.1 Names and Functions of Components

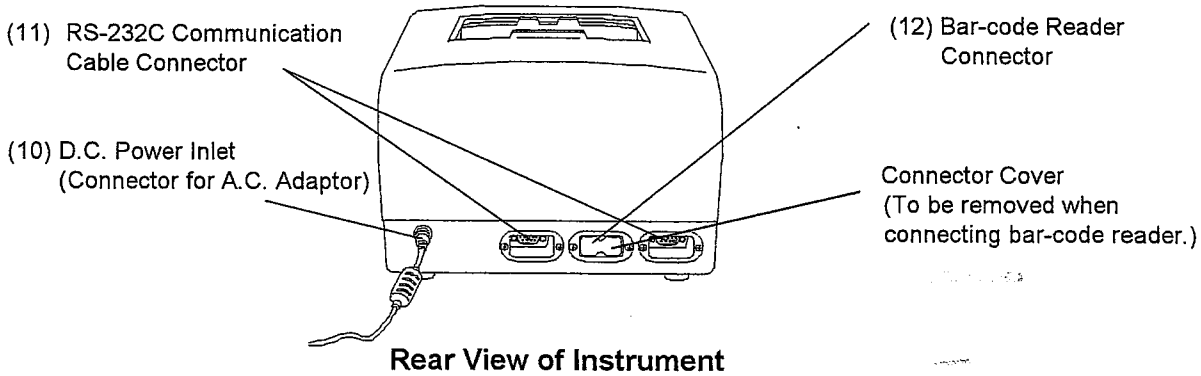
(a) Major Components



Right-front View of Instrument



Top View of Instrument



Rear View of Instrument

(1) LCD Display

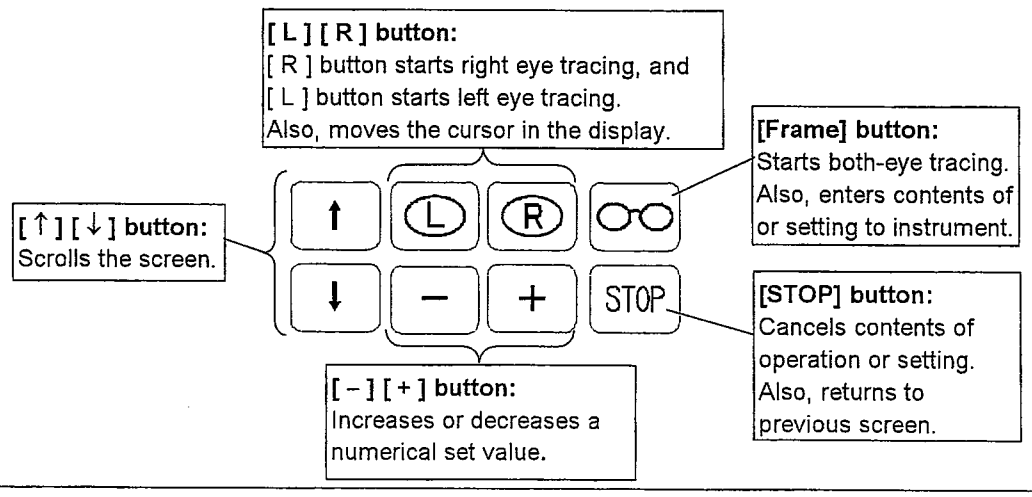
Displays the operation guidance, measured values, set values, error code, etc.

(2) Control Panel

This is the control panel of the instrument furnished with the following eight buttons.

⚠CAUTION **Never forcibly press the surface of the control panel by a sharp edge or fingernail. Instead, gently touch the buttons by your fingertip. If not observed, the surface of the panel may be damaged.**

<Major Functions of Each Button>



(3) Power Switch
Power switch of the instrument

⚠ CAUTION **Verify that this power switch is OFF before plugging in the cord from the A.C. adaptor into the D.C. power inlet.**

(4) Frame Holder (front slider, rear slider)
Set a frame to be traced to this holder and grip it with the frame grips (7). Also, this is designed so that the lens / pattern attachment can be set when tracing a lens or a pattern.

(5) Tracing Turntable
Designed to move right and left, and / or rotate according to the tracing operation or the adjusting & checkup operation.

(6) Frame Tracer
Traces the shape of a frame by setting its tip into the groove of a frame when tracing a frame.

(7) Frame Grip
Two pairs of frame grips are installed in each frame holder (front slider & rear slider) to grip a frame when tracing a frame.

(8) Lens Pattern Attachment
When tracing a lens, set a lens to be traced to this attachment with the adhesive lens block, and set it to the frame holder to secure the lens. When tracing a pattern plate, set a pattern plate to the pattern holder of this attachment.

(9) Lens Tracer
When tracing a lens, projects from the lower side of the tracing turntable to trace the shape of the lens.

(10) D.C. Power Inlet
Connector for the cord from A.C. adaptor (24 V d.c.)

⚠ CAUTION **Verify that the power switch (3) is OFF before plugging in the cord from the A.C. adaptor into this D.C. power inlet.**

(11) RS-232C Communication Cable Connector
Communication cable connector for the data transmission with our products, AD-820 automatic edger and LS-82 (or LS-80) Lens Blocker.
Connect when this instrument is used with AD-820 and LS-82 (or LS-80).
(See 2.2.2 (6) for details of cable connections.)

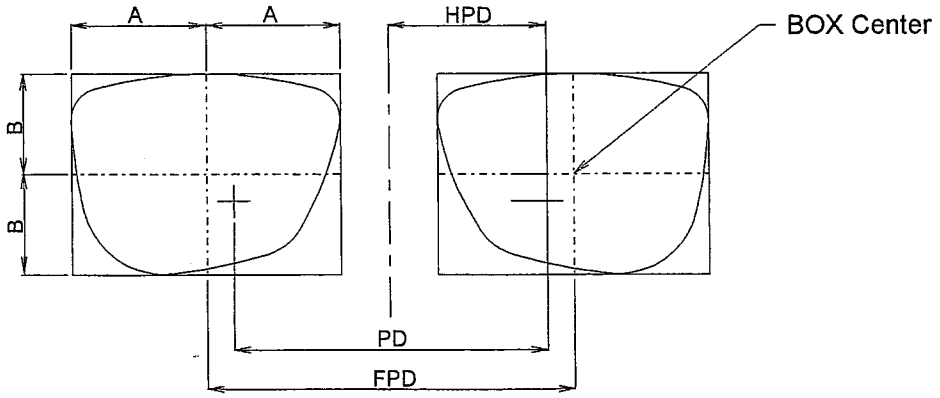
(12) Bar-code Reader Connector
Remove the connector cover and connect the bar-code reader (Option) when using the instrument with a bar-code reader (Option).
When the instrument is not used with a bar-code reader (Option), set the connector cover in position to prevent incorrect cable connection.

(13) Contrast Adjuster
This is a volume to adjust the brightness of the LCD display.

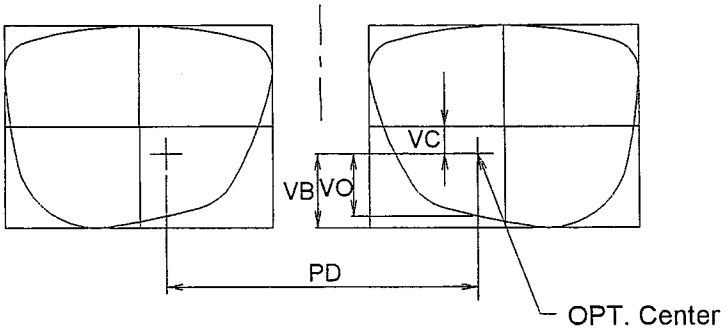
3.4 EXPLANATION OF MEASUREMENT TERMINOLOGY

This section explains the lens measuring terminology used in this manual.
There are two kinds in representation to show the measuring center, BOX center and OPT center (or optical center), and also, there are three kinds in representation, VC, VB, and VO, to show the vertical relative positions.

Symbols	Meaning
PD	Shows the eye point (distance between pupils).
FPD	Shows the distance between the centers of both right and left frames.
BOX center (BOX mode)	Shows the geometrical center of a frame. (BOX mode shows the distance to the edge of a frame using the geometrical center of the frame as the measuring center.)
OPT (Optical) center (OPT. mode)	Shows that PD is the center for measurement. (OPT mode shows the distance to the edge of a frame using PD as the measuring center.)
HPD (HPD mode)	Shows the distance from the right and left PD points to the nose center. (HPD mode uses the distance from right and left PD positions to the nose center for data representation.)
VC (VC mode)	Shows the vertical distance from the eye point to BOX center. (VC mode shows a distance by the above-mentioned relative position.)
VB (VB mode)	Shows the vertical distance from the eye point to BOX bottom edge. (VB mode shows a distance by the above-mentioned relative position.)
VO (VO mode)	Shows the vertical distance from the eye point to the frame edge just below the eye point. (VC mode shows a distance by the above-mentioned relative position.)



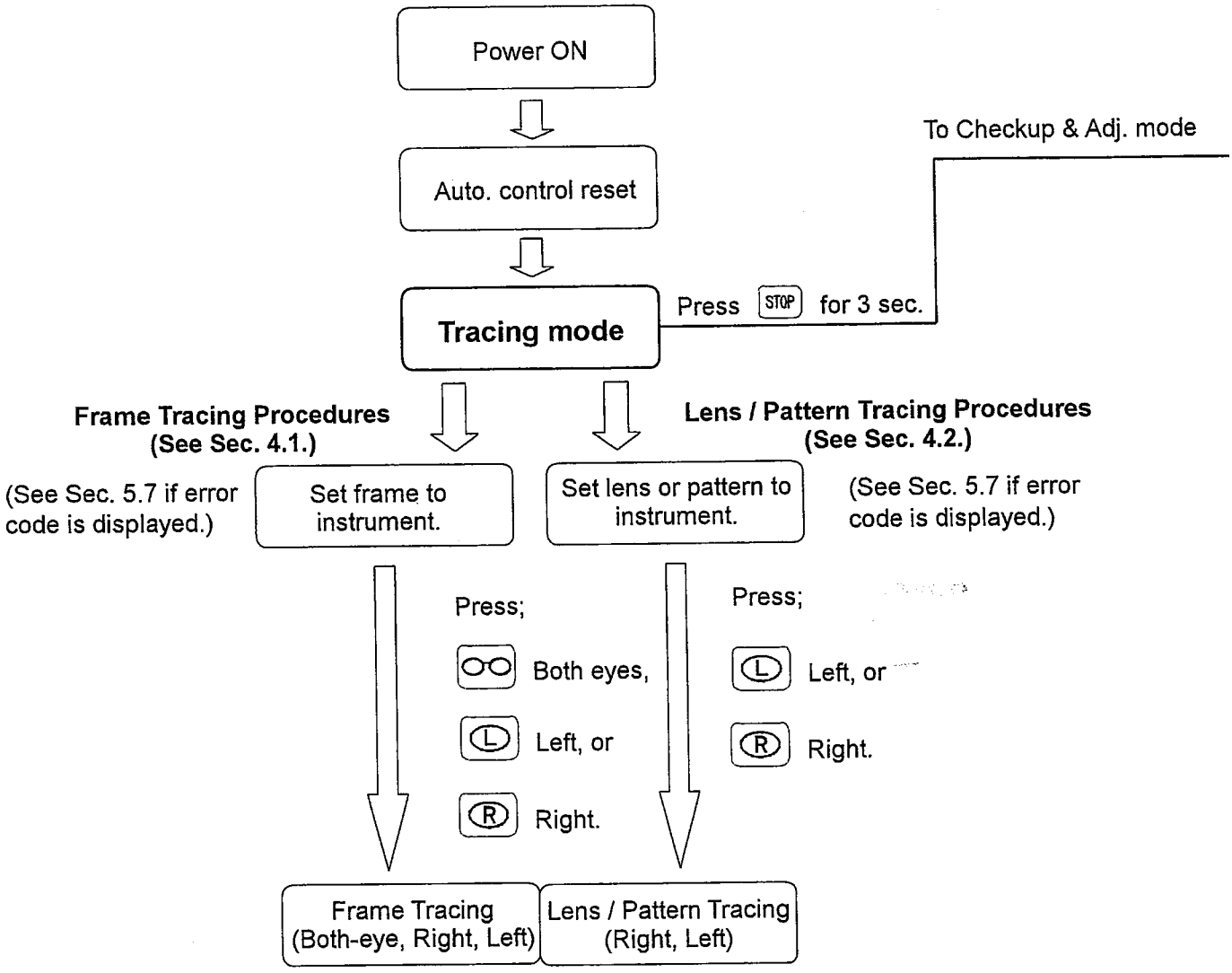
BOX center shows the geometrical center of a frame.



OPT center is based on PD.
There are three kinds in data representation, VC, VB, and VO, to show the vertical relative positions.

3.5 TRACING MODE, AND CHECKUP & ADJUSTMENT MODE

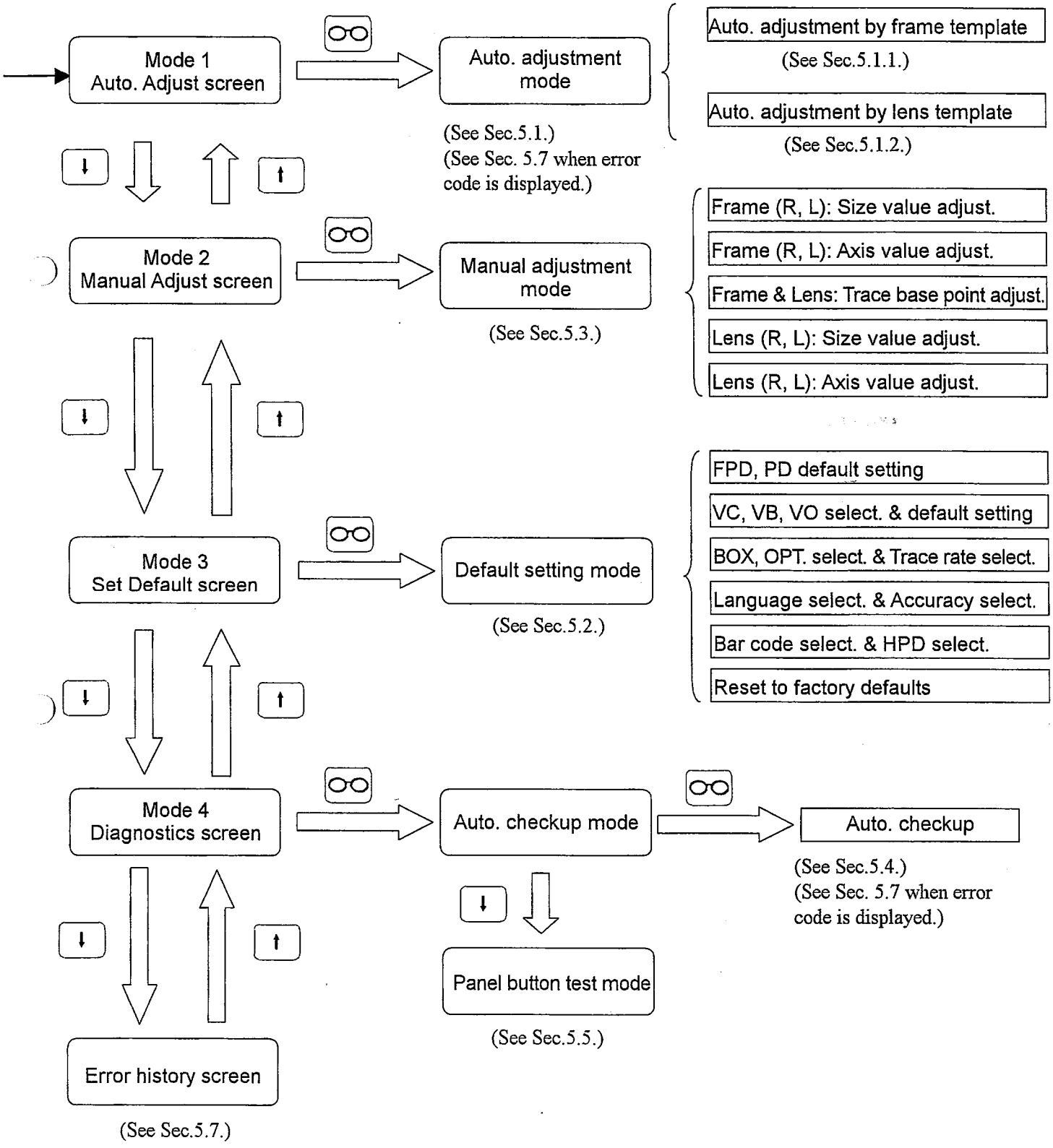
(1) Structure in Tracing mode



<Other functions often used for tracing>

- Changing tracing speed ..... See Sec. 4.3.1.
- Changing mode and numeral in data setting screen ..... See Sec. 4.3.2.
- Method to trace frame with strong curve ..... See Sec. 4.3.3.
- Step-by-step frame tracing ..... See Sec. 4.3.4.
- Calling out previous data ..... See Sec. 4.3.5.
- Control reset ..... See Sec. 4.3.6.
  (See Sec. 5.7 when error code is displayed during control reset.)

(2) Structure in Checkup & Adjustment mode



4: TRACING OPERATION

This section describes the following items related to the tracing operation of the instrument.

⚠ WARNING **When tracing a frame, a lens, or a pattern with the instrument, observe the safety precautions in Section 1 "SAFETY".**

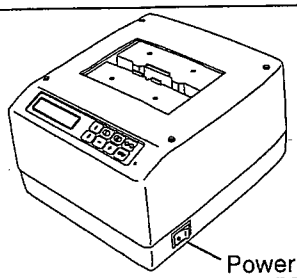
⚠ WARNING **When some abnormality (abnormal sound or smell) has occurred to the instrument, turn OFF the power switch of the instrument, and pull out the power plug or switch OFF the power breaker, and then ask our service representative for repair without fail.**

⚠ CAUTION **Never forcibly press the surface of the control panel by a sharp edge or fingernail. Instead, gently touch the butons by your finger tip. If not observed, the surface of the panel may be damaged.**

NOTE **When some error has occurred during tracing motion, restore the instrument referring to Section 5.7 "Error Display and Error History.**

4.1 FRAME TRACING PROCEDURES

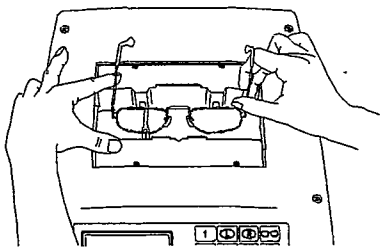
Trace a frame according to the following procedures.

Step	Contents of operation	Illustration
1	Check following items before turning ON the power switch. • Communication cables with our products LS-82 (or LS-80) and / or AD-820 (or AD-800) correctly connected. (See Sec. 2.2.2 (6).) (Only when used with the above our products) • The instrument is adjusted. (See Sec. 5.1 and Sec. 5.4.) • There are neither dirt nor foreign matters on the top of the tracing turntable. (Vacuum with a vacuum cleaner if dirt or foreign matters exist.)	
2	Turn ON the power switch. 1) Turn ON the power switch of the instrument. • The instrument automatically resets its control. **NOTE** **See Section 5.7 when some error has occurred.**	

Step	Contents of operation	Illustration

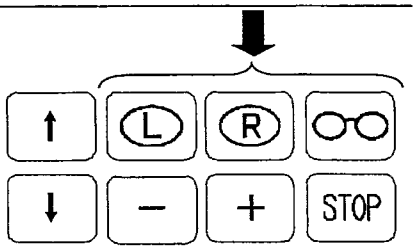
3 Set a frame to be traced to the instrument.

1) Open the frame holders (front slider, rear slider) and set a frame between the frame grips.



4 Start tracing a frame.

1) Press a tracing button (one of [OO], [R], and [L] buttons) according to the tracing method).
   [OO] : Both frames are traced.
   [R] : Only right frame is traced.
   [L] : Only left frame is traced.

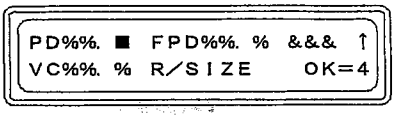


5 Set the data.

<Data to be set>

- Select PD or HPD, FPD, BOX or OPT, VC, VB, or VO, and set each numerical set value for them. (See Sec. 4.3 2 "Changing mode and numeral in data setting screen" for details.)

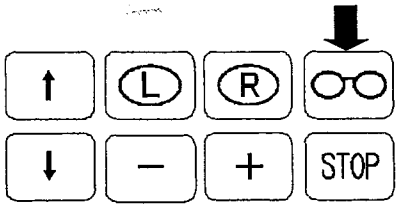
NOTE **The numerical value of FPD is unchangeable in case of a both-frame tracing.**



Example of Data Setting Screen

6 Store the set data.

1) Press [OO] button.



<With instrument of standard specifications>

- The set data is decided and stored into the instrument, and the frame data screen is displayed. **(Communication enable condition)**

<E.g. of screen of standard spec.>

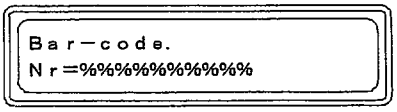
<With instrument of bar-code specificatiosn (Option)>

- The bar code read screen is displayed.

1) Read a bar code.

- A frame data is stored into the instrument with a corresponding bar code, and the bar code screen is displayed for three seconds. Afterwards, the instrument automatically returns to the tracing mode. **(Communication enable condition)**

<E.g. of screen of bar code spec.>



7 Read and use the data with lens blocker and / or automatic edger.

<With instrument of standard specifications>

1) Read out the traced data from the lens blocker and /or the automatic edger, performing data read-out operation. (See the operation manual of the lens blocker and / or the automatic edger for details.)

<With instrument of bar-code specifications (Option)>

1) Read the bar code with the lens blocker and / or the automatic edger.
   - The data stored in this instrument is read out. (See the operation manual of the lens blocker and / or the automatic edger for details.)

4.2 LENS / PATTERN TRACING PROCEDURES

Trace a lens or a pattern according to the following procedures.

Step	Contents of operation	Illustration

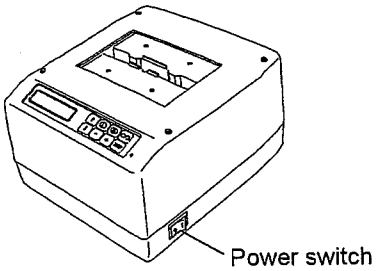
1 Check following items before turning ON the power switch.

- Communication cables with our products LS-82 (or LS-80) and / or AD-820 (or AD-800) correctly connected. (See Sec. 2.2.2 (6).) (Only when used with the above our products)
- The instrument is adjusted. (See Sec. 5.1 and Sec. 5.4.)
- There are neither dirt nor foreign matters on the top of the tracing turntable. (Vacuum with a vacuum cleaner if dirt or foreign matters exist.)

2 Turn ON the power switch.

1) Turn ON the power switch of the instrument.
   - The instrument automatically resets its control.

NOTE **See Section 5.7 when some error has occurred.**



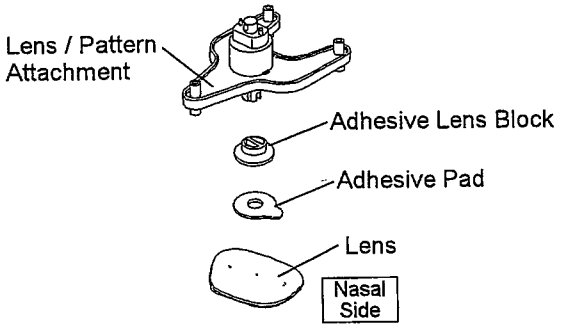
3 Set a lens or a pattern to be measured to the instrument.

<When tracing a lens>

1) Put horizontal axis dots to a lens to be traced with a lens meter in advance.
2) For the lens blocker, set the lens to the adhesive lens block matching the horizontal axis with the adhesive pad.

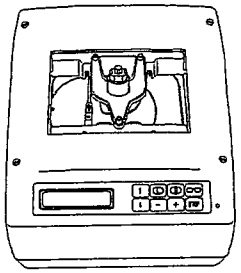
NOTE **Take caution not to protrude adhesive pad from a lens.**

3) Set the adhesive lens block with the lens on to the lens / pattern attachment.



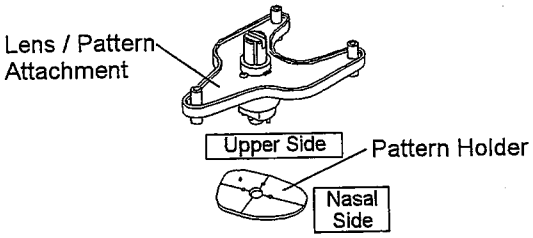
NOTE **Nasal side is on the right side in case of a right lens**

4) Set the lens / pattern attachment between the frame holders (front slider, rear slider).



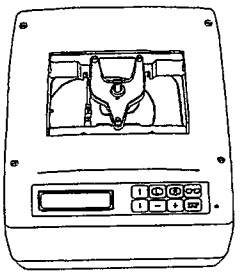
<When tracing a pattern>

1) Set a pattern to be traced to the pattern holder of the lens / pattern attachment.



NOTE **Nasal side is on the right side in case of a right pattern.**

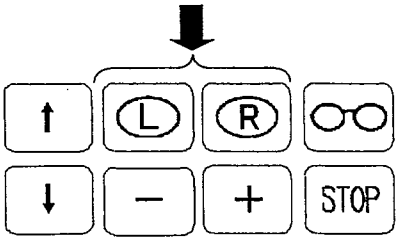
2) Set the lens / pattern attachment between the frame holders (front slider, rear slider).



Step	Contents of operation	Illustration

4 Start tracing a lens or a pattern.

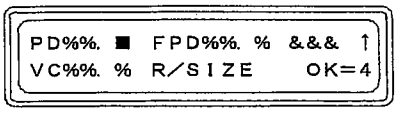
1) Press a tracing button (either Ⓡ or Ⓛ button) according to the tracing method).
   Ⓡ : Press to trace right lens or pattern.
   Ⓛ : Press to trace left lens or pattern.



5 Set the data.

<Data to be set>

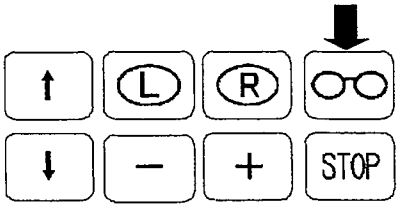
- Select PD or HPD, FPD, BOX or OPT, VC, VB, or VO, and set each numerical set value for them.
  (See Sec. 4.3 2 "Changing mode and numeral in data setting screen" for details.)



Example of Data Setting Screen

6 Store the set data.

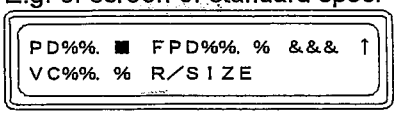
1) Press ∞ button.



<With instrument of standard specifications>

- The set data is decided and stored into the instrument, and the lens data screen is displayed. **(Communication enable condition)**

< E.g. of screen of standard spec. >

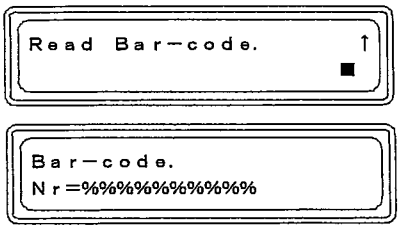


<With instrument of bar-code specificatiosn (Option)>

- The bar code read screen is displayed.

1) Read a bar code.
   - A lens data is stored into the instrument with a corresponding bar code, and the bar code screen is displayed for three seconds. Afterwards, the instrument automatically returns to the tracing mode. **(Communication enable condition)**

< E.g. of screen of bar code spec. >



7 Read and use the data with lens blocker and / or automatic edger.

<With instrument of standard specifications>

1) Read out the traced data from the lens blocker and /or the automatic edger, performing data read-out operation. (See the operation manual of the lens blocker and / or the automatic edger for details.)

<With instrument of bar-code specifications (Option)>

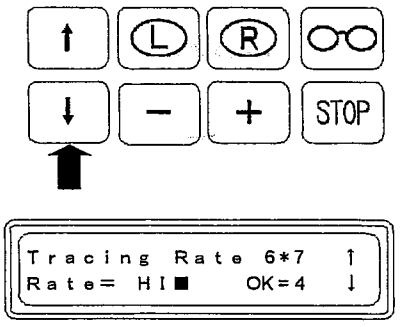
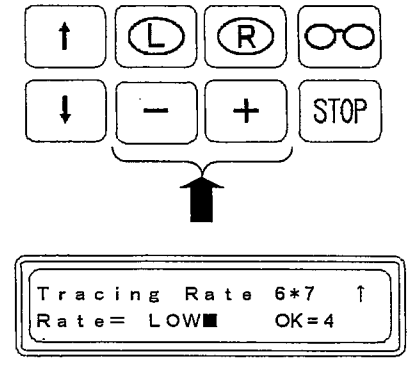
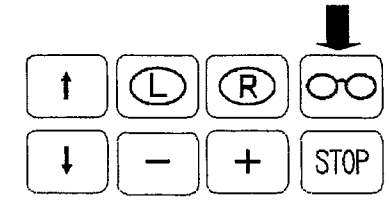
1) Read the bar code with the lens blocker and / or the automatic edger.
   - The data stored in this instrument is read out. (See the operation manual of the lens blocker and / or the automatic edger for details.)

4.3 OTHER FUNCTIONS OFTEN USED FOR TRACING

This section explains other convenient functions often used when a frame, a lens, or a pattern is traced.

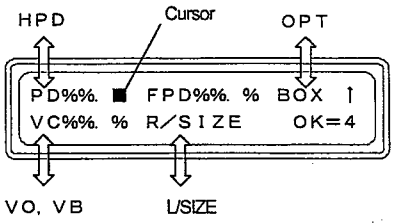
4.3.1 Changing Tracing Speed

The frame tracer may come off the groove of a frame when tracing a frame with a strong curve. Besides, when tracing a lens or a pattern with sharp corner, the lens tracer may jump if the tracing speed is fast and the beautiful trace data may not be obtained. In such a case, lower the tracing speed by the following method.

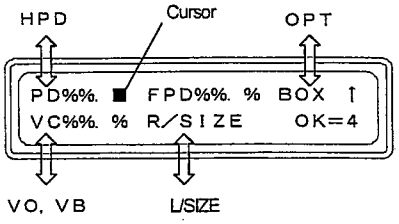
Step	Contents of operation	Illustration
1	Press [↓] button while "Scanning lens." or "SCAN FRAME" is displayed. • The tracing speed change screen is displayed on the LCD display.	
2	Change the tracing speed by pressing [−] and / or [+] button. [−] button: Tracing speed decreases. [+] button: Tracing speed increases.	
3	Press [∞] button. • The changed tracing speed is decided. Tracing of a frame, a lens, or a pattern is done by this tracing speed only once for the next tracing. Tracing after that is done by the defaulted tracing speed.	

4.3.2 Changing Mode and Numeral in Data Setting Screen

After tracing motion of the instrument is complete, change the data modes, PD or HPD, BOX or OPT, VC, VB, or VO, and each numerical set value in the following method.



Example of frame data setting screen



Example of lens data setting screen

NOTE **See Section 3.4 for detailed meanings of each mode.**

<Procedures to change mode>

(1)Switching PD⇔HPD mode

[Switching from PD to HPD mode]

Hold pressing Ⓡ or Ⓛ button for one second or more.

- The HPD mode screen on the pressed-button side opens.
  (e.g.: When Ⓡ is pressed, the HPD mode screen for the right-eye opens.)

(Here, change the numerals of intended items according to the instructions described in **<Procedures to change a numeral in HPD mode>** described below.)

To open the HPD mode screen for the eye not selected, press the button for the eye not currently selected (,whose HPD mode screen is not open). (i.e.: If the screen for the right eye is open, press Ⓛ button.)

- The HPD mode screen for the eye not selected opens.

[Switching from HPD to PD mode]

Hold pressing Ⓡ or Ⓛ button for one second or more.

- The PD mode screen on the pressed-button side opens.

(2) Switching VC⇔VB⇔VO mode

Move the cursor to the numeral of VC (or VB, VO) section by pressing Ⓛ or Ⓡ button, and press [↓] button.

(3) Switching BOX⇔OPT mode

Move the cursor to the numeral of BOX (or OPT) section by pressing Ⓛ or Ⓡ button, and press [↓] button.

<Procedures to change a numeral>

(1)Move the cursor to an intended numeral to be changed by pressing Ⓛ or Ⓡ button.
(2)Change the numeral to an intended value by pressing [−] or [+] button.
(3)Repeat the former steps (1) and (2) to change the numerals for all the items whose data need changing.

NOTE **For a both-frame tracing, the numeral of FPD is unchangeable.**

<Procedures to change a numeral in HPD mode>

[Changing HPD value]

Move the cursor to the HPD numeral portion by pressing Ⓛ or Ⓡ button, and press [−] or [+] buttons to change the value.

- The HPD value for only the selected eye changes.
  (To change the HPD value for the eye not selected, open the HPD mode screen for the unselected eye and change the HPD value in the same manner. The above-mentioned operations will change the HPD value for both the left and right eyes independently.)

[Changing VC (or VB, VO) value]

Move the cursor to the numeral of VC (or VB, VO) portion by pressing Ⓛ or Ⓡ button, and press [−] or [+] buttons to change the value.

- VC (or VB, VO) value for the selected eye changes. At this time, the VC (or VB, VO) value for the unselected eye also changes to the same value.

(To further change only the VC (or VB, VO) value for the eye not selected, open the HPD mode screen for the unselected eye and change the VC (or VB, VO) value in the same manner. The above-mentioned operations will change the VC (or VB, VO) value for both the left and right eyes independently.)

<Confirmation of numerals in HPD data display screen>

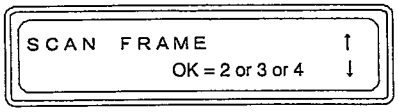
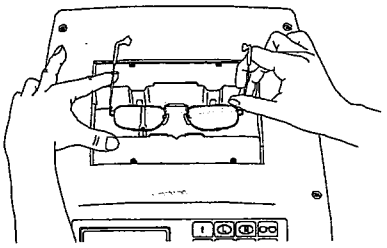
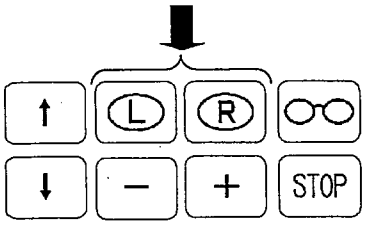
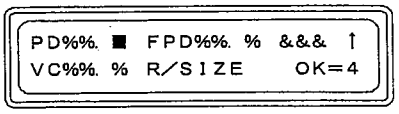
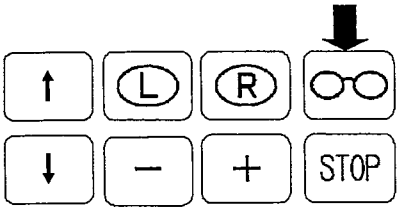
To confirm the numerals for the right-eye, press Ⓡ button for one second or more.

To confirm the numerals for the left-eye, press Ⓛ button for one second or more.

- HPD value and VC (or VB, VO) value on the selected eye side are displayed.

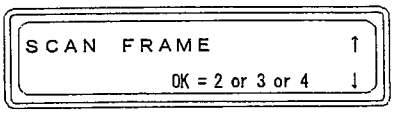
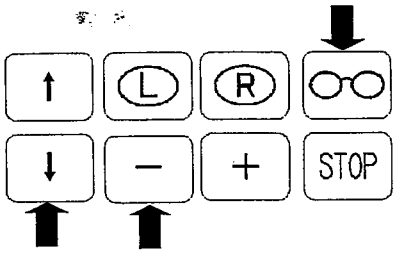
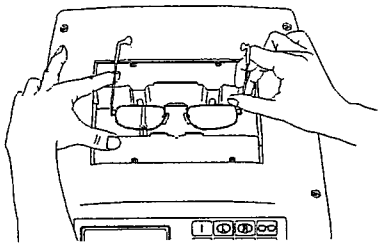
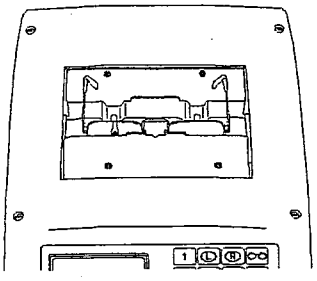
4.3.3 Method To Trace Frame With Strong Curve

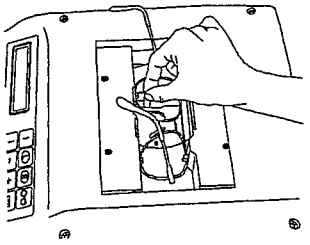
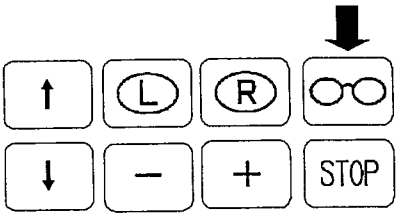
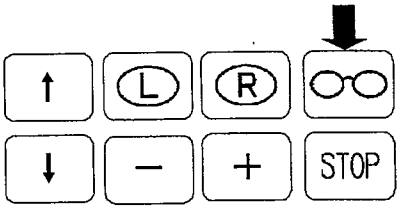
When tracing a frame with a strong curve difficult to trace even if the tracing speed is decreased, trace either the left or right frame only by the following method.

Step	Contents of operation	Illustration
1	Verify that the instrument is operating properly with "SCAN FRAME" is displayed on the LCD display.	
2	Set a frame to the frame holder by putting either right or left frame to be traced between the frame grips. 1) Symmetrically set the frame on the tracing side to the center of the frame grips without chucking the side not to be traced.	
3	Press the tracing button (either Ⓡ or Ⓛ button) on the tracing side. • The instrument starts a frame tracing motion. • When the tracing motion is complete, the frame data setting screen is displayed.	
4	Set the data. <Data to be set> • Select PD or HPD, FPD, BOX or OPT, VC, VB, or VO, and set each numerical set value for them. (See Sec. 4.3 2 "Changing mode and numeral in data setting screen" for details.)	 Example of data set screen
5	Store the set data. 1) Press ∞ button. • The set data is decided and stored into the instrument.	
6	Read and use the data with lens blocker and / or automatic edger. 1) Read out the traced data from the lens blocker and /or the automatic edger, performing data read-out operation. (See the operation manual of the lens blocker and / or the automatic edger for details.)	

4.3.4 Step-by-step Frame Tracing

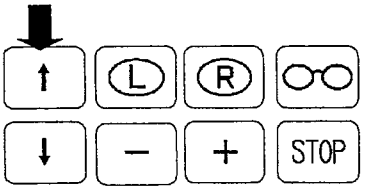
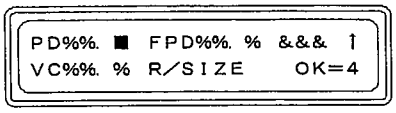
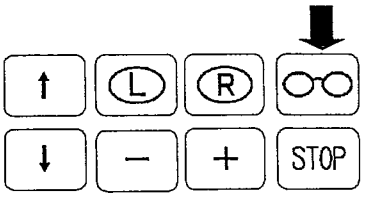
In case when it is hard to fit the frame tracer into the groove of the frame or when the frame tracer comes off the groove during the tracing motion, the frame tracer can be put into the groove by hand and also the motion of the instrument is stopped at each operation step so that tracing condition can be confirmed by using the step-by-step frame tracing function.

Step	Contents of operation	Illustration
1	Verify that the instrument is operating properly with "SCAN FRAME" is displayed on the LCD display.	
2	Decrease the tracing speed. 1) Press [↓] button to enter the step-by-step frame tracing mode. 2) Decrease the tracing speed as intended by pressing [−] button, as necessary. 3) Press [OO] button to enter the both-eye measuring mode, press [Ⓡ] button to enter the right-eye measuring mode, or press [Ⓛ] button to enter the left-eye measuring mode. • The selected tracing speed is set to the instrument.	
3	Set a frame to be traced to the instrument. 1) Open the frame holders (front slider, rear slider) and set the frame between the frame grips.	
4	Move the frame to the correct position as necessary and chuck it with the frame grips. 1) Press [−] button. • Upper and lower frame grips close to chuck the frame. 2) Press [OO] button. NOTE **If the position of the frame is improper, open the frame grips by pressing [+] button, move the frame to a correct position, and press [−] button again.**	

Step	Contents of operation	Illustration
6	Guide and insert the frame tracer to the frame groove. (As necessary) 1) Put the frame tracer into the frame groove by fingers if the frame tracer is not in the frame groove.	
7	Restart the tracing operation. 1) Press [OO] button. • The instrument restarts the tracing operation to trace the frame. **NOTE** **Repeat the operations in Steps 6 and 7 for the both-frame tracing.** • When the tracing motion is complete, the traced value is displayed on the display.	
8	Set the data. <Data to be set> • Select PD or HPD, FPD, BOX or OPT, VC, VB, or VO, and set each numerical set value for them. (See Sec. 4.3 2 "Changing mode and numeral in data setting screen" for details.)	
9	Store the set data. 1) Press the [OO] button. • The set data is decided and stored into the instrument.	
10	Read and use the data with lens blocker and / or automatic edger. 1) Read out the traced data from the lens blocker and /or the automatic edger, performing data read-out operation. (See the operation manual of the lens blocker and / or the automatic edger for details.)	

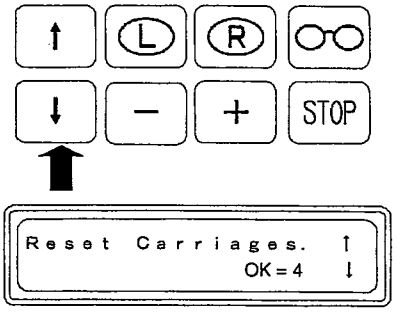
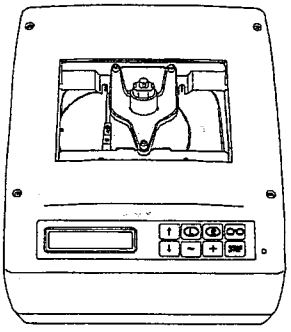
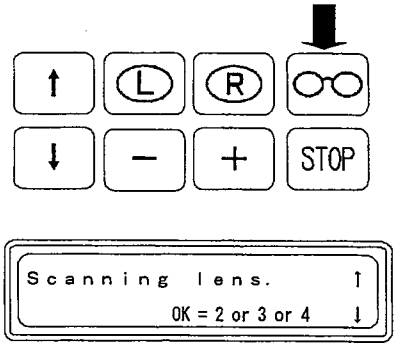
4.3.5 Calling Out Previous Data

Even after a data setting screen is deleted after storing the data, the previous data setting screen immediately before deleting the screen can be called out on the LCD display. Besides, newly set data can be stored into the instrument by changing the set data here.

Step	Contents of operation	Illustration
1	Display the deleted data setting screen. 1) Press [↑] button with the data setting screen deleted. • The previous data setting screen is displayed.	
2	Change the set data as necessary. **<Data to be set>** • Select PD or HPD, FPD, BOX or OPT, VC, VB, or VO, and set each numerical set value for them. (See Sec. 4.3 2 "Changing mode and numeral in data setting screen" for details.)	 Example of data set screen
3	Store the set data. 1) Press [∞] button. • The set data is decided and stored into the instrument.	

4.3.6 Control Reset

When the power supply is intercepted or the instrument is forcibly manipulated by hand during a tracing operation, the measuring base point of the instrument will be deviated. In such a case, reset the control of the instrument in the following procedures.

Step	Contents of operation	Illustration
1	Press [↓] button twice while "Scanning lens." or "SCAN FRAME" is displayed. • The tracing speed change screen is displayed on the LCD display.	
2	Set the Lens / Pattern attachment to the frame holder. **NOTE** **The control reset operation does not start even if the operation in Step 3 is done without setting the lens / pattern attachment to the frame holder. In this case, "Reset frame holder" is displayed on the display.**	
3	Press [∞] button. • The instrument starts the control reset operation. • When the control reset is completed normally, "Scanning lens" will be displayed. **NOTE** **See Section 5.7 when some error has occurred.**	
4	Detach the lens / pattern attachment from the frame holder after the control reset operation is complete.	

4.4 SELECTION AND SETTING OF BAR-CODE READER (OPTION)

A bar-code reader (Option) can be connected to this instrument as an standard specification, and the frame (or lens) data can be stored with the bar code.
Observe the following requirements when selecting and setting a bar-code reader.

(1) Selection of bar-code reader
Select a bar-code reader of the following specifications.
① Jack type: Dsub-9 female
② Signal-Pin allocations

Pin No.	Output Signal
2	TXD
3	RXD
5	GND
7	CTS
8	RTS
9	+5V

(2) Setting of bar-code reader
Before using a bar-code reader, make the following settings referring to the instruction manual of the bar-code reader.

No.	Setting item		Setting
1	Interface		RS-232
2	Parameter	Baud rate	9600
3		Parity	None
4		Data bit	Eight bits
5		Stop bit	Two bits
6		Hand shaking	None
7	Terminator		CR (od)
8	Preamble & Postamble		Preamble STX (02)
9	Permit the type of the bar code to be used.		

NOTE **The flow of the bar code data will be as follows by performing the above-mentioned settings.**
STX, Data 1, Data 2, Data 3, ··· Data 12, CR

(3) Allowable maximum digits of bar code
The digits of the bar code to be used for reading out must be **12 digits or less**.
(4) To use the bar-code reader, set "Bar-code" in "Bar code select. & HPD select. screen" to "ON".

NOTE **See "Sec. 5.2 "Defaults Setting" for details.**

(5) When used in EU territories, the bar-code reader shall comply with EN55022: 1998 /A1: 2000/ A2: 2003, Class B and EN61000-6-1: 2001.

5: CHECKUP & ADJUSTMENT

This section describes the checkup & adjustment. the troubleshooting, etc. of the instrument.

⚠ WARNING **When checking up or adjusting the instrument, observe the safety precautions in Section 1 "SAFETY".**

⚠ WARNING **When some abnormality (abnormal sound or smell) has occurred to the instrument, turn OFF the power switch of the instrument, and pull out the power plug or switch OFF the power breaker, and then ask our service representative for repair without fail.**

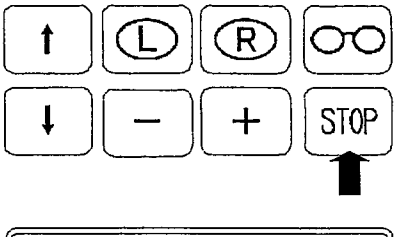
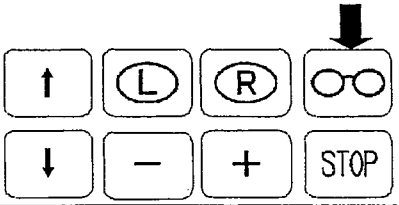
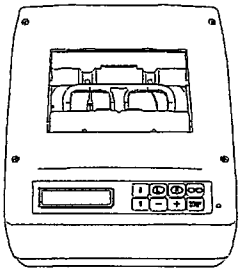
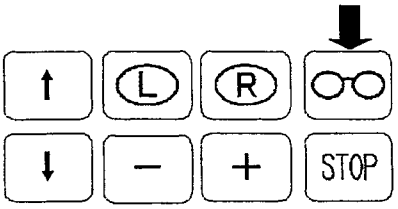
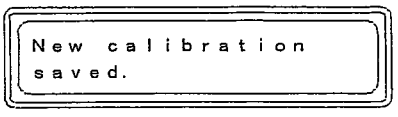
⚠ CAUTION **Never forcibly press the surface of the control panel by a sharp edge or fingernail. Instead, gently touch the butons by your finger tip. If not observed, the surface of the panel may be damaged.**

5.1 AUTO. ADJUSTMENT OF INSTRUMENT

Perform the auto. adjustment of the instrument periodically (Every 2 or 3 days) according to the following procedures to insure the measuring accuracy of the instrument.

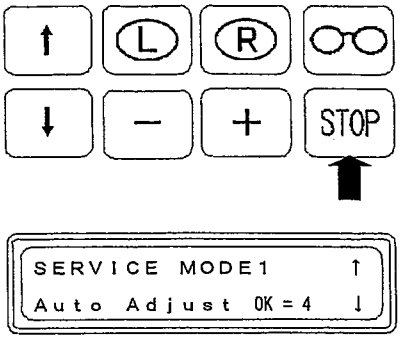
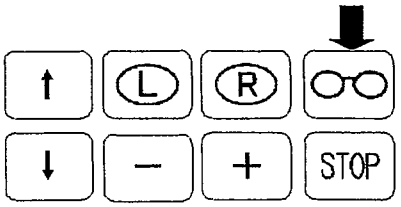
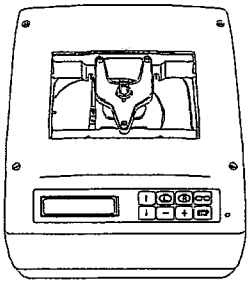
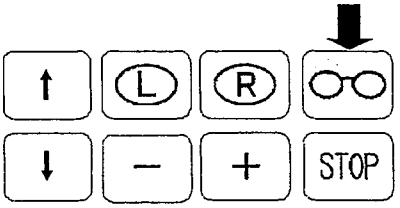
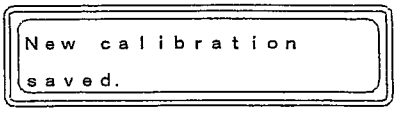
5.1.1 Auto. Adjustment by Frame Template

NOTE **See Secion 5.7 when some error has occurred.**

Step	Contents of operation	Illustration
1	Set the instrument to Checkup & Adjustment mode. 1) Press [STOP] button for approximately three seconds in the Tracing mode. • The instrument enters the Checkup & Adjustment mode, and "SERVICE MODE 1 Auto Adjust" is displayed. **<Frame template size>** (R, L) size: 50.0 ± 0.05 Frame pitch: 70.0 ± 0.1	
2	Set the instrument to Auto. adjustment mode. 1) Press [∞] button. • The instrument enters Auto. adjustment mode, and " Auto Adjust Frame Set cal template." is displayed.	
3	Set the frame template to the frame holder. 1) Set the frame template between frame grips.	
4	Start Auto. adjustment of the instrument. 1) Press [∞] button. • Auto. adjustment by the frame template starts. "Save new calibration?" is displayed after Auto. adjustment is complete.	
5	Overwrite the base data for frame tracing. 1) Press [∞] button. • The base data for the frame tracing is overwritten, and "New calibration saved" is displayed.	
6	Detach the frame template from the instrument. 1) Detach the frame template by hand after Auto. adjustment is complete.	

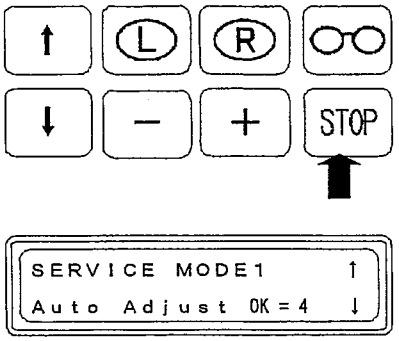
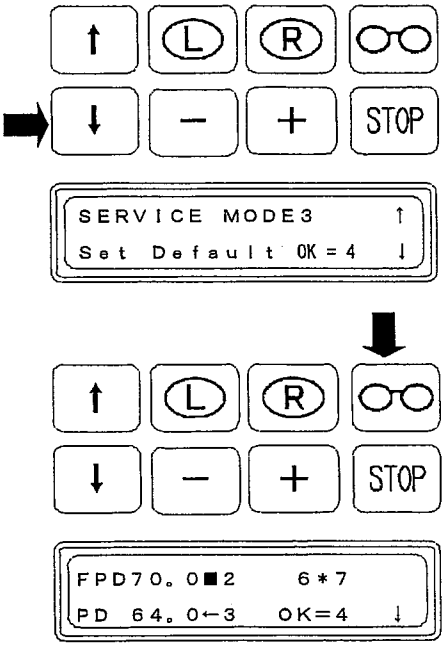
5.1.2 Auto. Adjustment by Lens Template

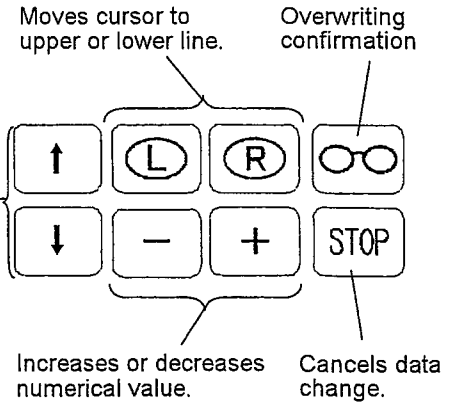
NOTE **See Secion 5.7 when some error has occurred.**

Step	Contents of operation	Illustration
1	Set the instrument to Checkup & Adjustment mode. 1) Press [STOP] button for approximately three seconds in the Tracing mode. • The instrument enters the Checkup & Adjustment mode, and "SERVICE MODE 1 Auto Adjust" is displayed. **<Lens template size>** Size: 50.0 ± 0.05	
2	Set the instrument to Auto. adjustment mode. 1) Press [∞] button. • The instrument enters Auto. adjustment mode, and " Auto Adjust Frame Set cal template." is displayed.	
3	Set the lens template to the frame holder. 1) Set the lens template in the pattern holder. 2) Set the pattern holder to the lens / pattern attachment. 3) Set the lens / pattern attachment between the frame holders. **NOTE** **The display changes to "Auto Adjust Lens Set cal template" when the frame holders are opened by hand.**	
4	Start Auto. adjustment of the instrument. 1) Press [∞] button. • Auto. adjustment by the lens template starts. "Save new calibration?" is displayed after Auto. adjustment is complete.	
5	Overwrite the base data for lens tracing. 1) Press [∞] button. • The base data for the lens tracing is overwritten, and "New calibration saved" is displayed.	
6	Detach the lens template from the instrument. 1) Detach the lens template by hand after Auto. adjustment is complete.	

5.2 DEFAULTS SETTING

Various initial values (defaults) can be set for measurement and setting with this instrument. Set or check the defaults according to the following procedures.

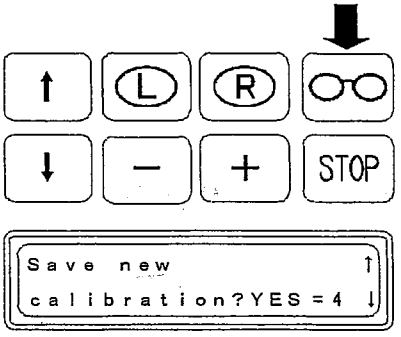
Step	Contents of operation	Illustration
1	Set the instrument to Checkup & Adjustment mode. 1) Press [STOP] button for approximately three seconds in the Tracing mode. • The instrument enters the Checkup & Adjustment mode, and "SERVICE MODE 1 Auto Adjust" is displayed.	
2	Set the instrument to the defaults setting mode. 1) Press [↓] button twice. • "SERVICE MODE 3 Set Default" is displayed on the display. 2) Press [OO] button. • The instrument enters the defaults setting mode, and "FPD·PD defaults setting screen" is displayed.	
3	Choose the defaults setting screen of an intended item whose defaults need to be changed. 1) Select the defaults setting screen of an intended item whose defaults need to be changed by pressing [↓] and [↑] buttons FPD, PD defaults setting screen ⇒ Unit: 0.5mm [↓] [↑] VC, VB, VO select. & defaults setting screen ⇒ Unit: 0.1mm [↓] [↑] BOX, OPT. select. & Trace rate select. screen ⇒ Trace rate: HI, MID, LOW [↓] [↑] Language select. & Accuracy select. screen ⇒ Lang: Jap, Eng; Accuracy: 0.01mm, 0.05mm [↓] [↑] Bar code select. & HPD select. screen ⇒ Bar-code: ON, OFF; HPD select: ON, OFF [↓] [↑] Reset to factory defaults screen	**NOTE** See Sec. 3.4 for the measurement terms such as FPD, PD, etc. **NOTE** Change each default according to the operation in Step 4.

Step	Contents of operation	Illustration
4	Change a default or selection. 1) Change a set value or selection using Ⓛ Ⓡ buttons and + − buttons. <Function of each button> Ⓛ : Cursor moves to the upper line. Ⓡ : Cursor moves to the lower line. + : Numerical value increases. − : Numerical value decreases. ∞ : "Overwriting conform. screen" is displayed. STOP : Change of data is canceled, and the instrument returns to the Tracing mode.	

NOTE **Repeat the operations in Steps 3 and 4 in order to change the defaults of two or more items.**

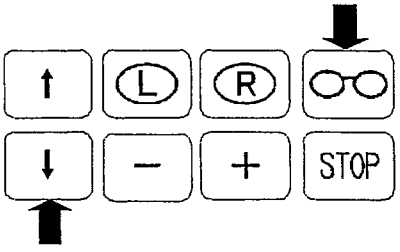
5 Overwrite to the changed set value.

1) Press ∞ button.
   - "Overwriting conform. screen" is displayed.



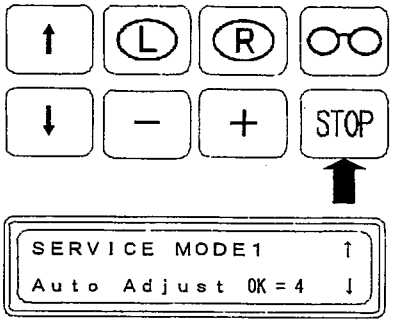
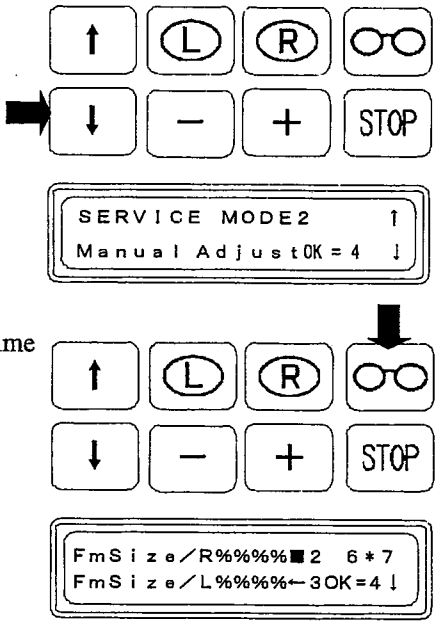
2) Press ∞ button.
   - The set value is overwritten, and the instrument returns to the Tracing mode.

NOTE **Select "Reset to factory defaults?" by pressing ↓ button and then press ∞ button when you want to reset the settings and selections to the those on shipment from the factory.**
   - All the settings and selections return to those on shipment from the factory, and the instrument returns to the tracing mode.

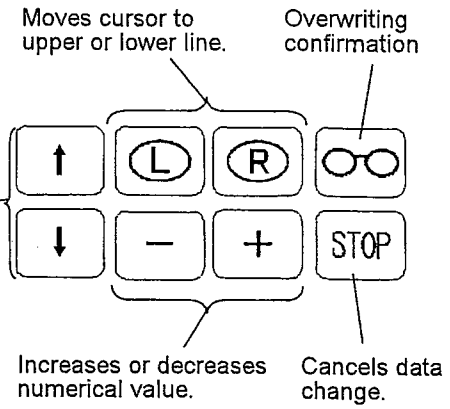


5.3 MANUAL ADJUSTMENT OF INSTRUMENT

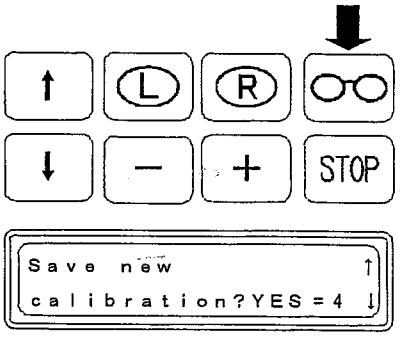
Perform the manual adjustment of the instrument according to the following procedures when there is some deviation in the measured value even after the auto. adjustment is performed.

Step	Contents of operation	Illustration
1	Set the instrument to Checkup & Adjustment mode. 1) Press [STOP] button for approximately three seconds in the Tracing mode. • The instrument enters the Checkup & Adjustment mode, and "SERVICE MODE 1 Auto Adjust" is displayed.	
2	Set the instrument to the Manual adjustment mode. 1) Press [↓] button once. • The manual adjustment screen is displayed on the display. 2) Press [∞] button. • The instrument enters the manual adjustment mode, and the "Frame (R, L): size value adjustment" screen is displayed.	
3	Choose the screen of an intended item whose set values need to be changed. 1) Select the screen of an intended item whose set values need to be changed by pressing [↓] and [↑] buttons. (Also, change set values with [+] [−] buttons according to the operations in Step 4.) Frame (R, L): Size value adjust. screen ⇒ Unit: 0.02mm Frame (R, L): Axis value adjust. screen ⇒ Unit: 0.3deg. Frame P,D value adjust. screen ⇒ Unit: 0.5mm Lens (R, L): Size value adjustment screen ⇒ Unit: 0.02mm Lens (R, L): Axis value adjustment screen ⇒ Unit: 0.3deg. ※Frame P,D value adjustment was added to the software Ver.01.14 and after.	**NOTE** **Each axis value of frame and lens change as follows by operation of following buttons.** **[+] button: Nasal side Up** **[−] button: Nasal side Down** **NOTE** **Frame pitch value determines the FPD value when measuring the frames for both eyes.** **[+] button: FPD value increases.** **[−] button: FPD value decreases.**

CHANGE SIZING →

Step	Contents of operation	Illustration
4	Change a set value or selection. 1) Change a set value or selection using Ⓛ Ⓡ buttons and + − buttons. <Function of each button> Ⓛ : Cursor moves to the upper line. Ⓡ : Cursor moves to the lower line. + : Numerical value increases. − : Numerical value decreases. ∞ :"Overwriting conform. screen" is displayed. STOP : Change of data is canceled, and the instrument returns to the tracing mode.	

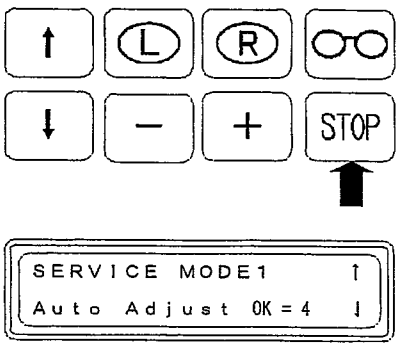
NOTE **Repeat the operations in Steps 3 and 4 in order to change the defaults of two or more items.**

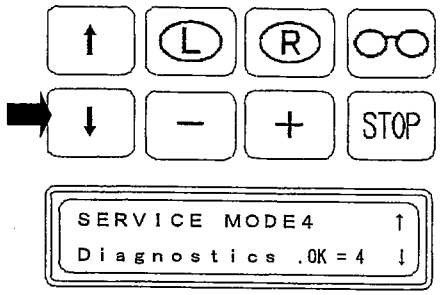
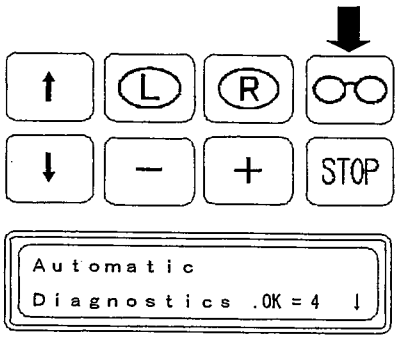
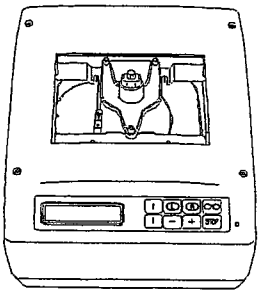
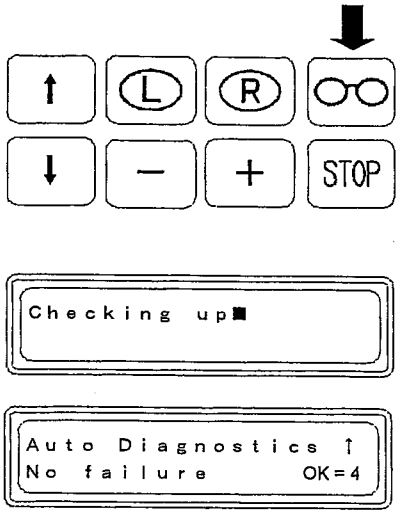
Step	Contents of operation	Illustration
5	Overwrite to the changed set value. 1) Press ∞ button. • "Overwriting conform. screen" is displayed. 2) Press ∞ button. • The set value is overwritten, and the instrument returns to the tracing mode.	

5.4 AUTO. CHECKUP OF INSTRUMENT

Perform the auto. checkup of the instrument according to the following procedures when some malfunction has occurred (with an error code displayed) in the control reset operation after the power switch is turned ON or while the instrument performs a tracing operation.

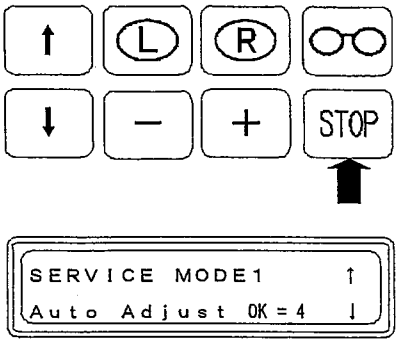
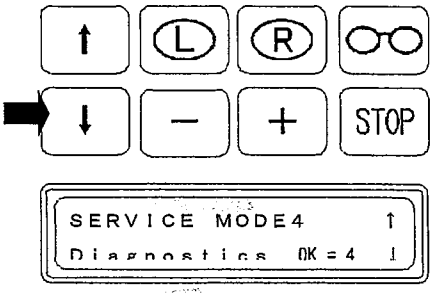
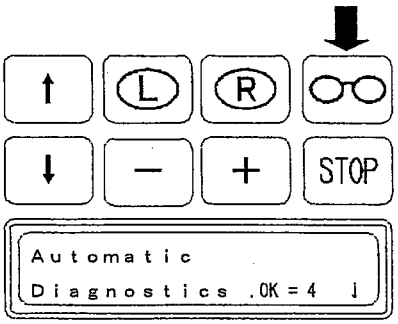
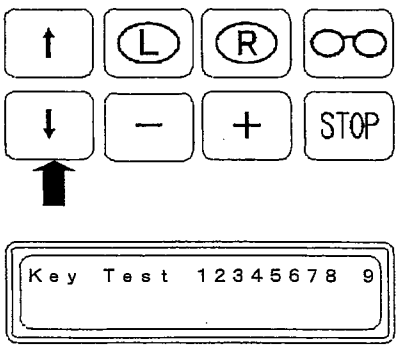
NOTE **See Secion 5.7 when some error has occurred.**

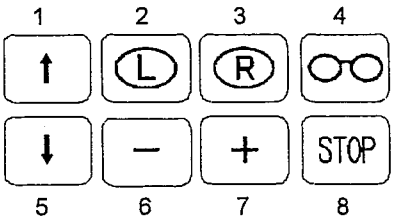
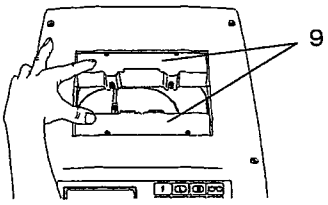
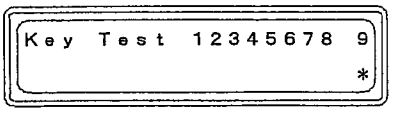
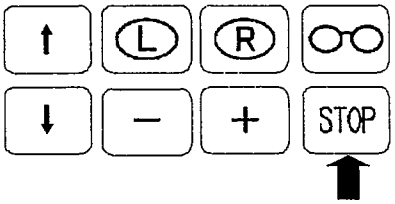
Step	Contents of operation	Illustration
1	Set the instrument to Checkup & Adjustment mode. 1) Press STOP button for approximately three seconds in the tracing mode. • The instrument enters the Checkup & Adjustment mode, and "SERVICE MODE 1 Auto Adjust" is displayed.	

Step	Contents of operation	Illustration
2	Set the instrument to the Auto. checkup mode. 1) Press [↓] button three times. • "SERVICE MODE 4 Diagnostics" is displayed on the display.	
	2) Press [∞] button. • The instrument enters Auto. checkup mode, and the confirmation screen on the lower right is displayed.	
3	Set the lens / pattern attachment to the frame holder. 1) Open the frame holders (front slider, rear slider) by hand, and set the lens / pattern attachment to the instrument. • The frame grips at four positions close once and then open. NOTE **The Auto. checkup operation does not start if the lens / pattern attachment is not set to the frame holder.** **In this case, "Auto Diagnostics Reset frame holder" is displayed on the display.**	
4	Start the Auto. checkup operation. 1) Press [∞] button after confirming opening / closing of the frame grips. • The auto. checkup of the instrument starts, and "Checking up" is displayed in the display. • If abnormality is not found in auto. checkup, "Auto Diagnostics No failure" is displayed after the checkup is complete. • When some abnormality is found, error code is displayed. In this case, check the contents of the error on the Error Codes List in Section 5.7, and contact our service representative, the exporter, or the manufacturer written in "IMPORTANT INFORMATION" at the front general section of this manual.	

5.5 TEST OF BUTTONS ON CONTROL PANEL

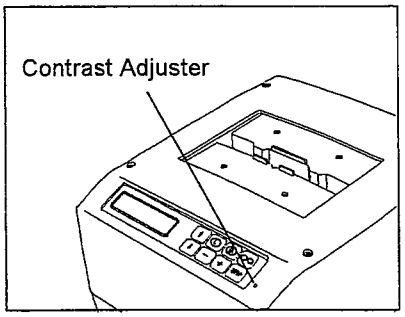
Test the buttons according to the following procedures when you feel abnormality in the function of each button on the control panel.

Step	Contents of operation	Illustration
1	Set the instrument to Checkup & Adjustment mode.	
2	1) Press [STOP] button for approximately three seconds in the tracing mode. • The instrument enters the Checkup & Adjustment mode, and "SERVICE MODE 1 Auto Adjust" is displayed.	
	Set the instrument to the button test mode. 1) Press [↓] button three times. • "SERVICE MODE 4 Diagnostics" is displayed on the display.	
	2) Press [OO] button. • The instrument enters the Auto. checkup mode, and the Auto. checkup confirmation screen is displayed.	
	3) Press the [↓] button. • The instrument enters the button test mode, and "Key Test" is displayed.	

Step	Contents of operation	Illustration
3	Check the function of each button.	
	1) Press each button of the control panel or fully open the frame holders, and verify that * mark is displayed below each button in the screen.	
	<Relations between display No. and button> 1 : ↑ button 2 : Ⓛ button 3 : Ⓡ button 4 : ∞ button 5 : ↓ button 6 : + button 7 : − button 8 : STOP button 9 : Frame holder limit switch	
	2) When * mark is not displayed, the corresponding button or the frame holder limit switch may be defected. In such a case, contact our service representative, the exporter, or the manufacturer.	
4	Escape from the button test mode.	
	1) Press STOP button for approximately three seconds. • The button test mode closes and the tracing mode is restored.	

5.6 BRIGHTNESS ADJUSTMENT OF LCD DISPLAY

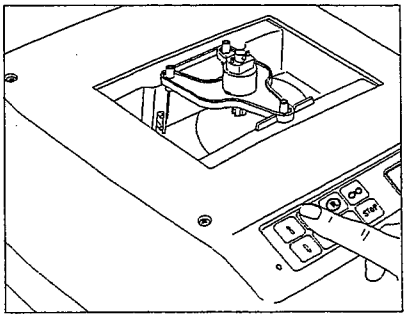
Adjust the brightness of the LCD display by inserting a Phillip screwdriver into the contrast adjuster at the right of the control panel when the indications displayed on the screen are difficult to see.



5.7 RETURNING FRAME TRACING PROBE TO BASE POINT

By performing the control reset in the procedures shown in Section 4.3.6, the frame tracing probe returns to the base point.

NOTE **If the tracing probe does not return to the base point, move the rotary disc to the center and perform the control reset operation.**



NOTE **The tracer assembly moves up and down during tracing to keep balance with little resistance.**

NOTE **Also, perform the operations for <<RETURNING FRAME TRACING PROBE BASE POINT>> in this section when the tracing probe does not return to the base point at the power ON.**

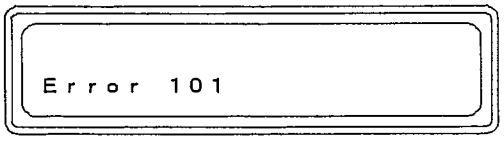
5.8 ERROR DISPLAY AND ERROR HISTORY

This section describes the error code display that may occur during the operation of the instrument, the error history function, and also the measures to be taken when an error occurs.

(1) Error code display

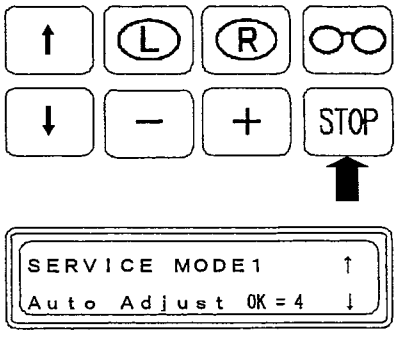
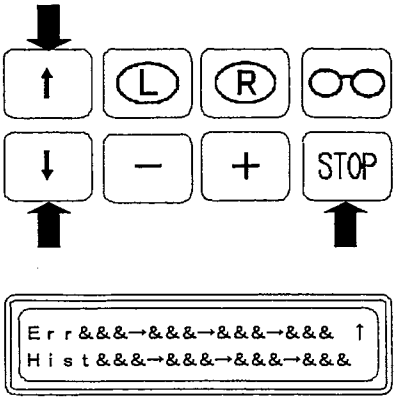
When an error occurs, error code is displayed on the LCD display.
In such a case, check the contents of the error according to the Error Codes List in the following page, and take appropriate measures to restore normal operation of the instrument.

<Example of error display>



(2) Error history

The instrument is furnished with the error history function and displays the errors in the past (8 errors at maximum).
Check the error history according to the following procedure if necessary.

Step	Contents of operation	Illustration
1	Set the instrument to Checkup & Adjustment mode. 1) Press [STOP] button for approximately three seconds in the tracing mode. • The instrument enters the Checkup & Adjustment mode, and "SERVICE MODE 1 Auto Adjust" is displayed.	
2	Set the instrument to the error history mode. 1) Press [↓] button four times. • The error history screen is displayed on the display. <Function of valid buttons> [↑]: Returns to Auto. checkup screen. [STOP]: Instrument returns to Tracing mode.	

(3) The errors that occur with this instrument are roughly classified into four types. Consult the following table with the error code displayed on the LCD display to confirm the contents of the error, and then take appropriate measures to restore the normal operation of the instrument.

Error type	Error code	Content of error	Measures to be taken
Tracing error	101	Lateral movement accuracy of tracing turntable is poor.	Contact our service representative, exporter, or manufacturer.
	102	Tracing accuracy is poor.	Same as above.
	103	Variation of traced data is large.	Slow down the tracing speed and perform tracing again.
	104	Rotation base point switch of tracing turntable is faulty.	Contact our service representative, exporter, or manufacturer.
	105	Tracing table side switch id faulty.	Same as above.
	106	Frame / lens selector switch	Same as above.
Comm. error	200	Communication error	• Check the connections of the communication cables. • Turn OFF the power supply of this instrument and other connected instruments, and turn ON the power supply and check communication again. • Contact our service representative, exporter, or manufacturer.
	201		
	202		
	203		
Auto. checkup error	301	Frame / Lens tracer does not operate or the tracing encoder is defected.	Contact our service representative, exporter, or manufacturer.
	302		
	303	Tracing turntable does not rotate or limit switch is defected.	
	304		
	305	Count error of tracing turntable rotation	
	306		
	307		
	308		
	309	Tracing turntable does not move right and / or left, or limit switch is defected.	
	310		
	311	Lens tracer does not move or limit switch is defected.	
	312		
Auto. adjustment error	401	Size value error	Contact our service representative, exporter, or manufacturer.
	402	Axis value error	
	403	Frame base point error / lens base point error	
	404	Size value time-out	
	405	Things other than specified gauge was used.	Use frame gauge or lens gauge.

RECORD OF REVISION

Rev. No.	Date of Revision	Contents of Revision	Signature

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