

**INSTRUCTION MANUAL
FRAME READER**

FR-50

INTRODUCTION

Thank you for purchasing the TOPCON **FR-50** Frame Reader.

This manual describes the basic operation, trouble shooting, and cleaning methods for the FR-50 Frame Reader.


Please carefully read the "Display for Safe Use" and the "Safety Cautions" before putting this instrument into operation.


PRECAUTIONS

- Ensure that this precision instrument is used and stored in a controlled environment under normal temperature and humidity conditions, and avoid direct exposure to sunlight.
 - Never install this instrument on an uneven or loose work surface.
 - Always check that all cables are correctly connected before use.
 - When the instrument is not in operation, ensure to turn off the power switch.
 - When the instrument is not used for a long time, remove the power plug from the outlet.
-

DISPLAYS TO ENSURE SAFE OPERATION







To ensure safe operation and to avoid any danger to the operator, others or damage to property, warning messages are placed on the products and inserted in this instruction manual.

Display	Meaning
 CAUTION	Ignoring or disregarding this display may lead to personal injury or physical damage.

Icon	Meaning
	This indicates Mandatory Action. Specific contents are expressed with words or an icon either inserted in the icon itself or located close to the icon.

SAFETY CAUTIONS

CAUTION

Icons	Prevention Item	Page
	<ul style="list-style-type: none"> To avoid electrical shock, never disassemble, modify or repair the instrument. This condition should only be handled by an authorized TOPCON representative. 	—
	<ul style="list-style-type: none"> For certain internal components, avoid water and other liquid environments. A fire or electric shock may occur. 	—
	<ul style="list-style-type: none"> Don't put a metallic part into any ventilated areas, to avoid electric shock. 	—
	<ul style="list-style-type: none"> Carry the instrument carefully to avoid injury from it being dropped. 	8
	<ul style="list-style-type: none"> To avoid potential injury and/or damage to the instrument, ensure to install the instrument on a hard and stable work surface. 	8
	<ul style="list-style-type: none"> If the instrument emits smoke, turn off the power switch at once and unplug the power cord. 	—

USAGE AND MAINTENANCE

User

Prior to operation, fully read and abide to the guidelines in this manual and then operate, check or adjust the instrument accordingly.

User maintenance

Unless specified in this manual, the maintenance work shall be conducted only by an authorized service technician, to ensure the safety and performance of the instrument. For proper maintenance procedures, follow the applicable instructions in this manual.

When cleaning the exterior of the instrument

When cleaning the cover, wipe it with a soft cloth with a diluted neutral cleanser. Avoid cleaning any sensors unless using some type of compressed air canister.

CUSTOMER'S RESPONSIBILITY

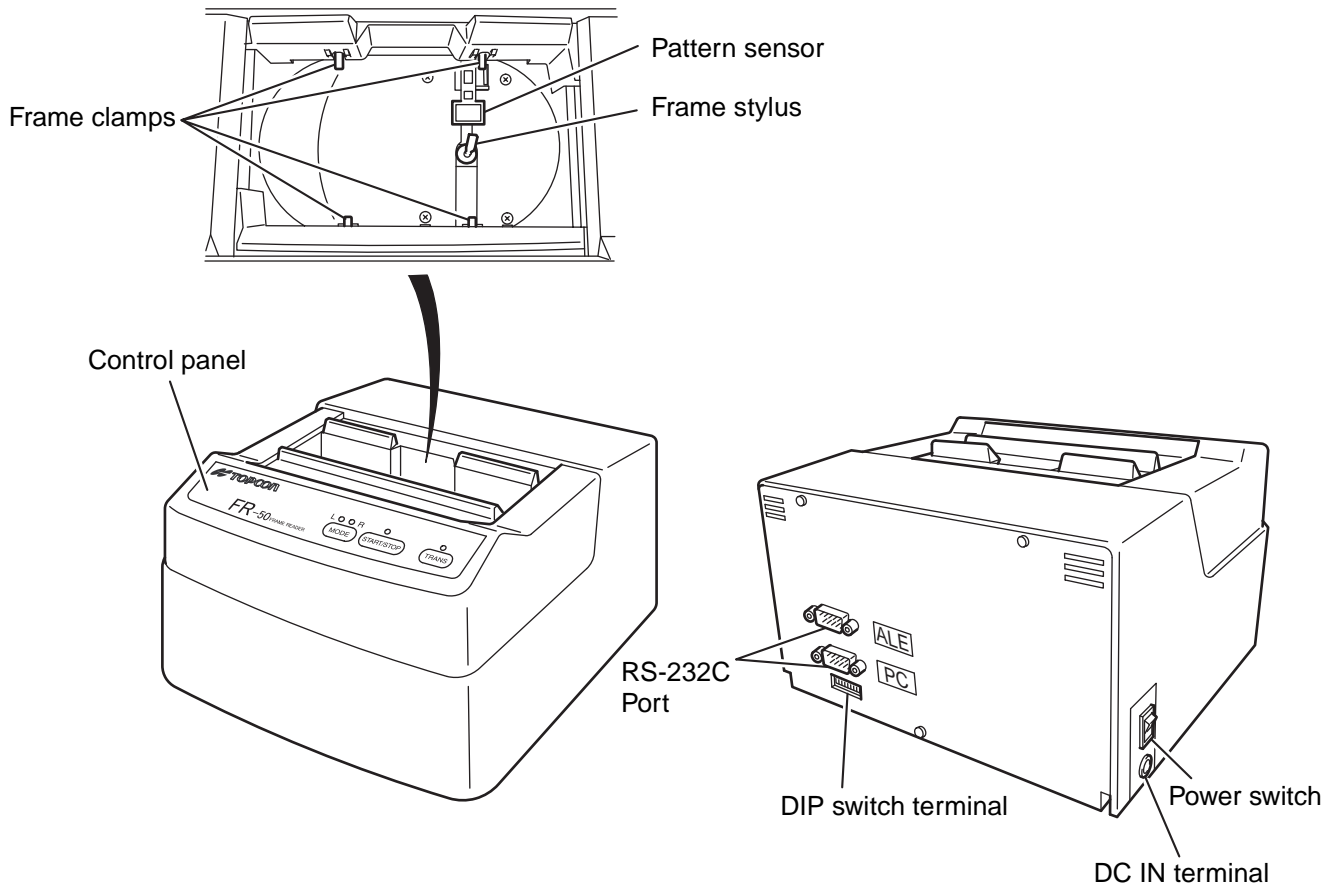
- TOPCON shall not take any responsibility for damage due to fire, earthquakes, actions by any third party and other accidentals, or the negligence or misuse by the user and use not specified in this manual.
- TOPCON shall not take any responsibility for damage derived from the inability to use this equipment, such as a loss of business profit or suspension of business transactions.
- TOPCON shall not take any responsibility for damage caused by operations other than those described in this Instruction Manual.

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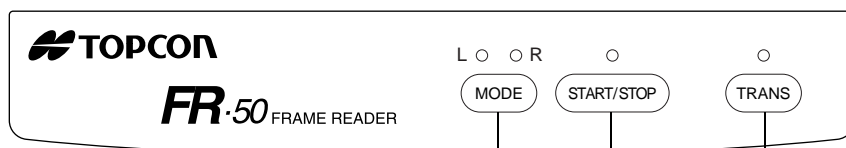
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COMPONENT NAMES

Main component names



Control panel



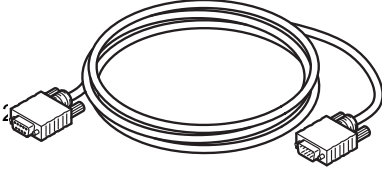
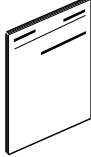
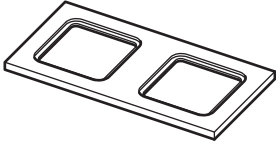
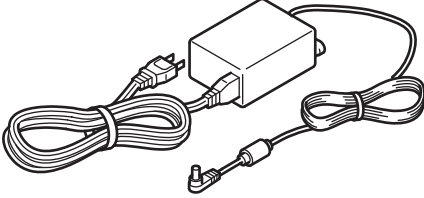

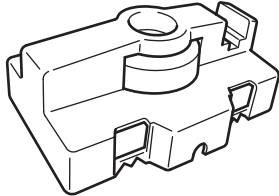
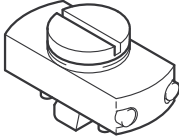
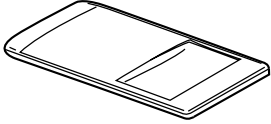
Transfer switch: Transfers the frame data to the edger/software.

Start/Stop switch: This switch starts and stops the frame shape measurement.

Mode switch: Select the eyewires to be measured.

Standard accessories

Make sure that the following standard accessories are provided. The quantities included are indicated by parentheses ().

<p>Interface cable (1)</p>  A coiled cable with two RJ45 connectors at each end.	<p>Instruction manual (1)</p>  A rectangular document representing an instruction manual.
<p>Reference frame (1)</p>  A rectangular frame with two square cutouts.	<p>AC adapter (1)</p>  A power adapter with a power cord and a connector cable.
<p>Pattern reference (1)</p>  A small, flat, rectangular component with two circular holes.	<p>Pattern adapter (1)</p>  A complex plastic component with various ports and a central circular feature.
<p>Pattern holder (1)</p>  A plastic component with a circular opening and a handle.	<p>Reference frame case (1)</p>  A rectangular case with a lid and a handle.

Subject to change in design and specifications without advance notice.

PREPARATIONS BEFORE USE

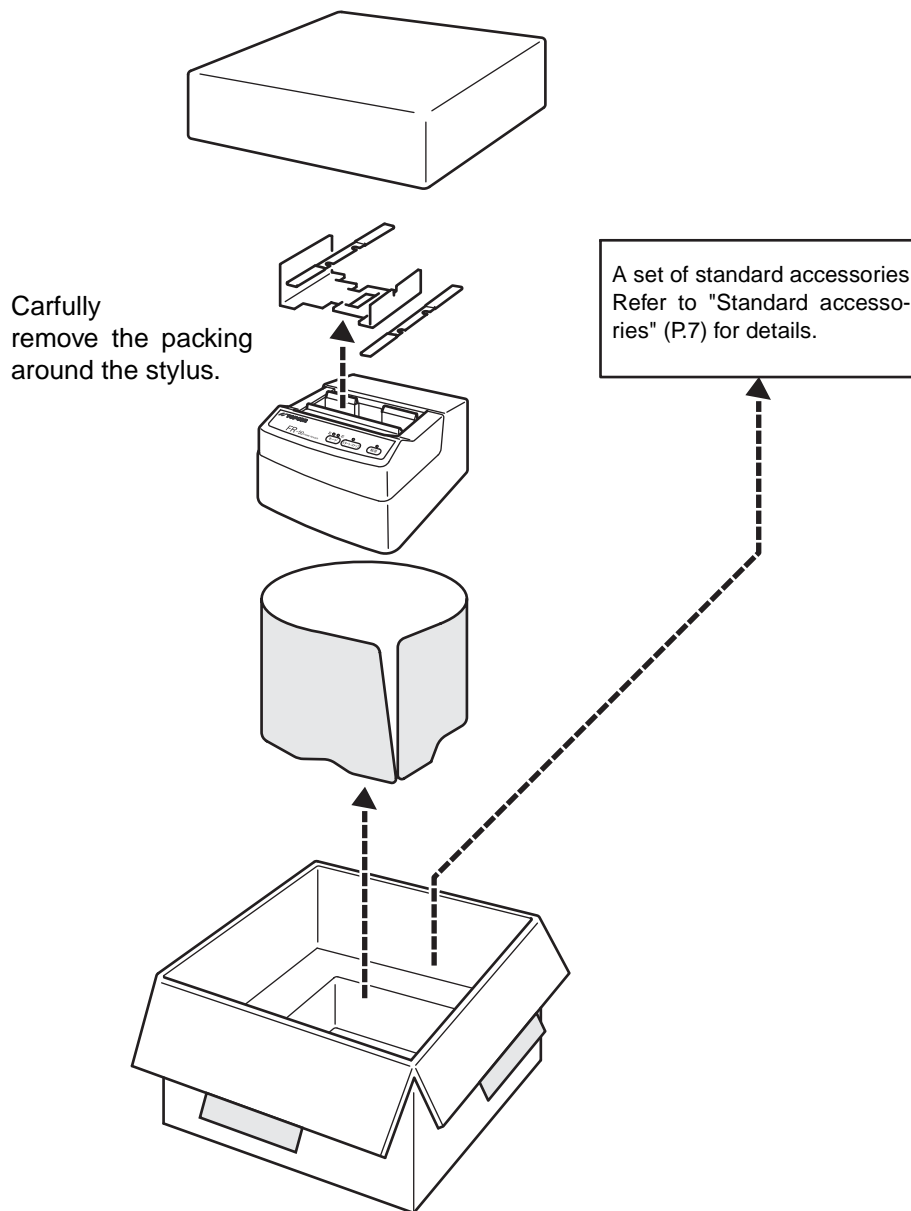
Installing the instrument



CAUTION

Carry the instrument carefully to avoid injury from it being dropped.

- 1 Make sure that the packing is carefully removed.



- 2 Install the instrument on a hard and stable work surface to ensure proper operation.

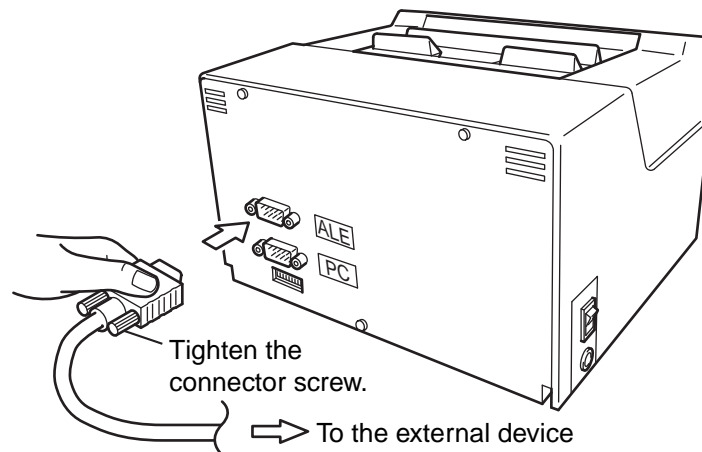


If the instrument operates on an unstable or inclined table, the stylus may not properly measure the frame.

Connecting the cords

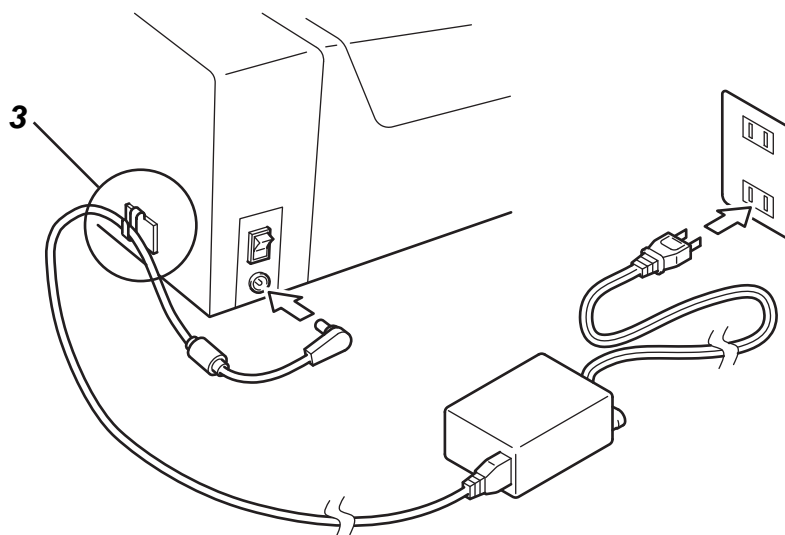
Connecting the RS232C cable

- 1** Make sure that the power switch of the FR-50 is in the OFF position.
- 2** Connect the instrument to the applicable external devices with the RS232C cable. For computer - base software applications, refer to the computer's reference manual.
- 3** Fasten the connector screw to prevent the RS232C cable from coming off.



Connect the AC adapter

- 1** Make sure that the power switch of the FR-50 is in the OFF position.
- 2** Connect the AC adapter's jack to the instrument and insert the main plug to a property grounded power receptacle.
- 3** Using the power cord clip, hold the cord to prevent the jack from coming off.

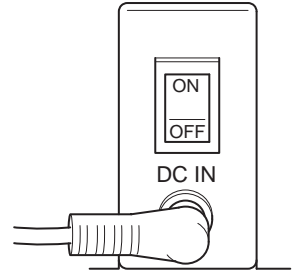


OPERATION

Prior to operation

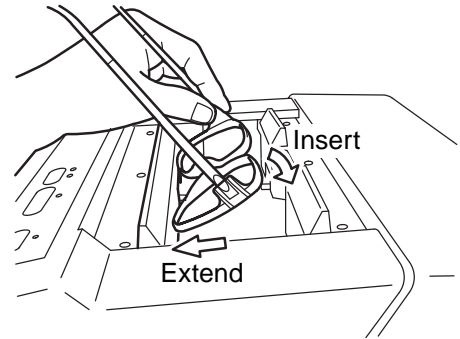
Turn on the power switch

- 1 Make sure that the RS232C cable is connected.
- 2 Turn the power ON with switch and allow the machine to initialize. Ensure that a frame is not inserted during initialization .
- 3 Make sure that "L" and "R"LED's, of the **MODE** switch are lit on the control panel.

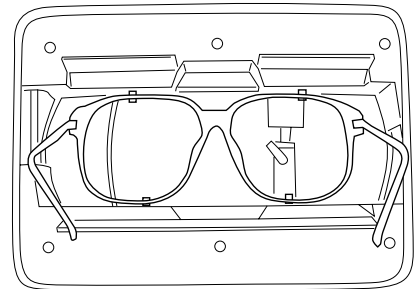


Inserting of the frame

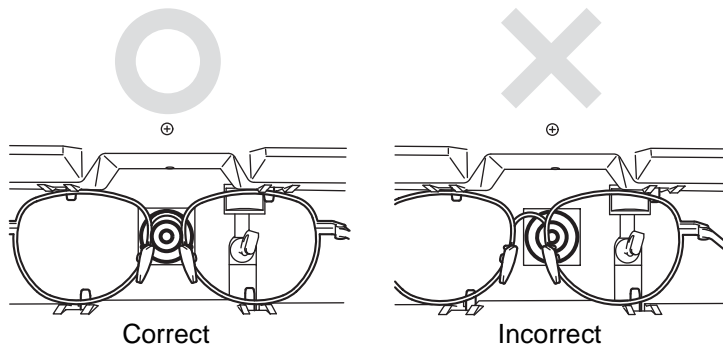
- 1 Insert the frame flush on the frame clamps, extending the holders.
- 2 Position the bridge of the frame within the central target.



- 3 Release the holders when the frame is positioned on the clamps.



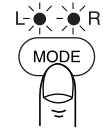
- Make sure that the frame is set on the 4 clamps.
Position the frame to the approximate center not to be off-set to the right or left.



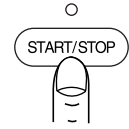
Measurement of the frame eyewires


Automatic measurement of both eyewires of the frame (standard method)

1 Select both left and right eyewires with the **MODE** switch until both LED's are illuminated.




2 Press the **START/STOP** switch. The lamp is turned on and the instrument starts to measure the selected eye.



 To interrupt the measurement, press the **START/STOP** switch again. The stylus returns to the inactive position.

3 Press the **RECALL** switch on the patternless edger to transfer the data to the patternless edger. Data can also be transferred by pressing the **TRANS** switch of the FR-50.

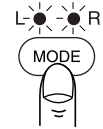


 When data is transferred to devices other than the patternless edger, refer to their instruction manuals accordingly.

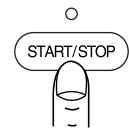
Semi-auto measurement mode of the frame eyewires

Carry out semi-auto measurement mode if the stylus cannot be set in the frame groove securely during automatic measurement. The stylus stops temporarily when it contacts the frame groove so you can check the set condition.


1 Select a measurement eye with the **MODE** switch.

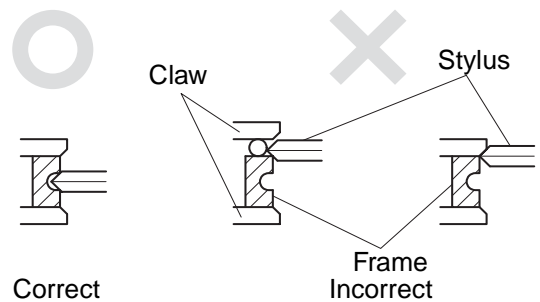


2 Hold the **START/STOP** switch until the LED's start to flicker, which indicates the semi-auto measurement mode.

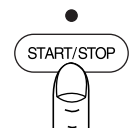


3 Make sure that the tip of the stylus is set in the frame groove.

 If the tip of the stylus is not set correctly, readjust it by hand. Do not try this in the automatic mode.




4 Press the **START/STOP** switch again. The stylus will start to measure the selected eyewires.



5 Press the **RECALL** switch of the patternless edger to transfer the data to the patternless edger. Data can also be transferred by pressing the **TRANS** switch of the FR-50.



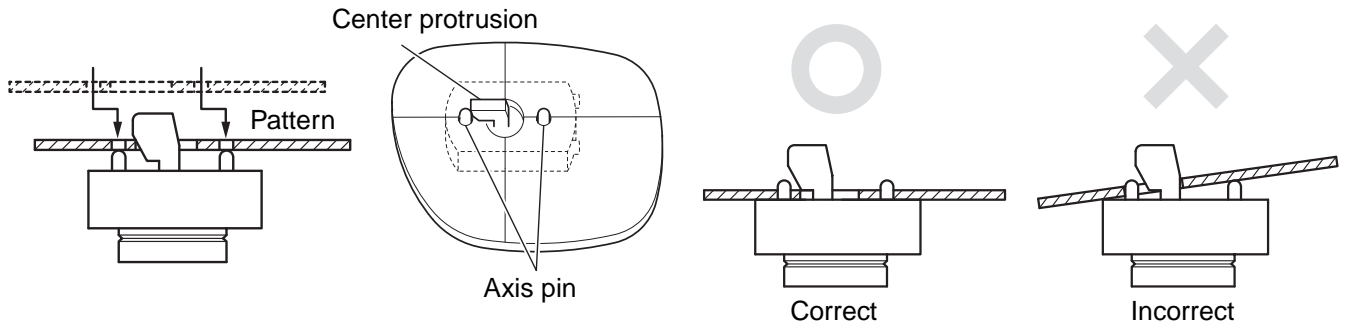
 When data is transferred to other devices other than the patternless edger, refer to their instruction manuals accordingly.

Measurement of pattern templates

Setting of the pattern template

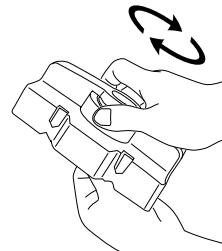
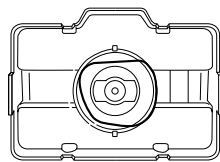
- 1 Set the pattern on the pattern holder.

Set the center protrusion of the pattern holder onto the center hole of the pattern and, by pulling the clamp, set the pattern on the axis pins securely.



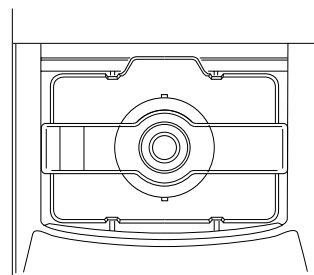
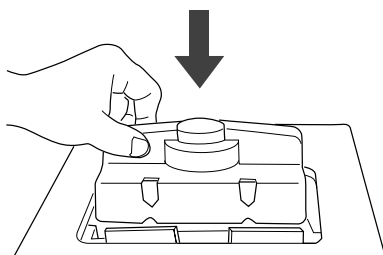
When the pattern is removed from the pattern holder, pull out the pattern slowly as pushing back the center protrusion.

- 2 Set the pattern on the pattern adapter and tighten the locking knob in a clock-wise direction. Check the setting of left or right eyewire while using the references on the pattern adapter. Set the pattern so that the right or left eyewire can be measured.



- 3 Insert the pattern adapter with the pattern holder itself.

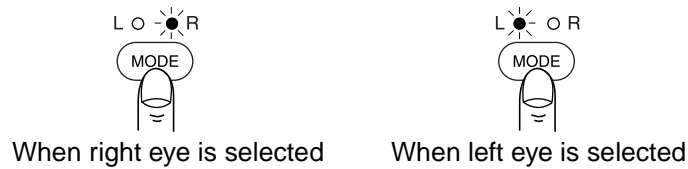
The buzzer sound indicates a pattern measurement and the ☼ "R"/"L" lamp accordingly of the **MODE** switch is ON.



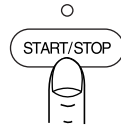
Make sure that the pattern adapter is properly set on the 4 clamps.

Automatic measurement of a pattern

- 1 Select the eyewire to be measured with the **MODE** switch.
Selection of both eyewires is impossible.



- 2 Press the **START/STOP** switch.
Measurement of the selected eyewire starts.



- 3 Press the **RECALL** switch on the patternless edger to retrieve the data.
Data can also be transferred by pressing the **TRANS** switch on the FR-50.

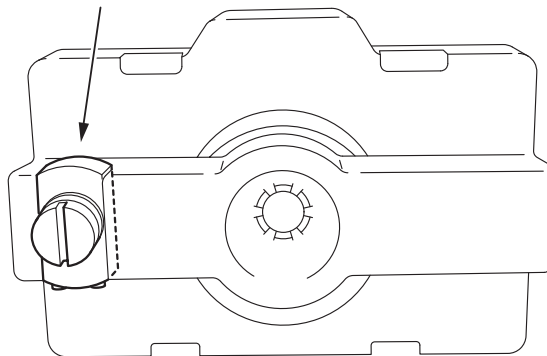


When data is transferred to other devices other than the patternless edger, refer to their instruction manuals accordingly.

Housing for the pattern holder when not in use

After measurement, return the pattern holder to the housing position. (Push it in until it snaps into place.)

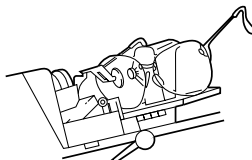
Pattern holder housing position



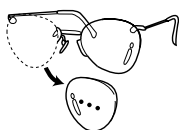
Measurement of a sample lens from its frame

Setting of a sample lens

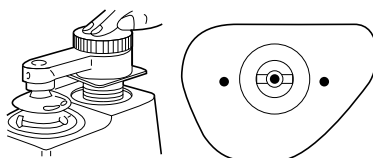
- 1** Mark your point on the sample lens with any lensmeter.
Check the leveling of the frame with your lensmeter and then mark the geometric center on the sample lens.



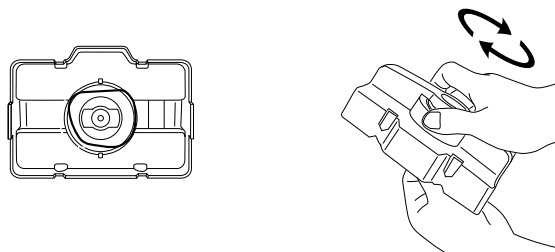
- 2** Remove the sample lens from the frame.



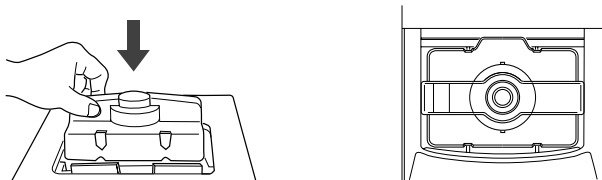
- 3** Bolck the sample lens with the leap-pad accordingly.



- 4** Set the sample lens on the pattern holder and tighten the fixation knob in clock-wise direction.



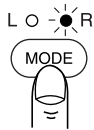
- 5** Insert the pattern adapter while extending the frame pads with the pattern holder itself.
The buzzer indicates proper positioning and the ☀ "R" lamp of the **MODE** switch is ON.



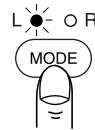
Make sure that the pattern adapter is set on the 4 clamps.

Automatic measurement of a sample lens

- 1 Select the eyewire to be measured with the **MODE** switch.
Selection of both eyewires is impossible.

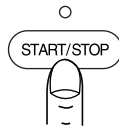


When right eye is selected



When left eye is selected

- 2 Press the **START/STOP** switch.



- 3 Press the **RECALL** switch on the patternless edger to retrieve the data.
Data can also be transferred by pressing the **TRANS** switch on the FR-50.

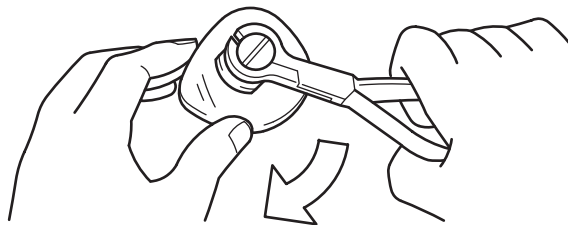


When data is transferred to other devices other than the patternless edger, refer to their instruction manuals accordingly.



Remove the block

Use deblocker, which is an accessory of the lens edger, and remove the block as shown below.



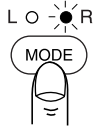
SPECIALIZED OPERATION

How to measure a high base-curved frame

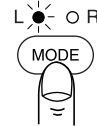
When the stylus comes off the frame's groove for a high base-curved frame during measurement, it may return to the initial status.

For these instances select a single eyewire.

- 1 Press the **MODE** switch to select only one measurement eye, left or right eye.
If both eyes are selected, correct measurement is impossible.

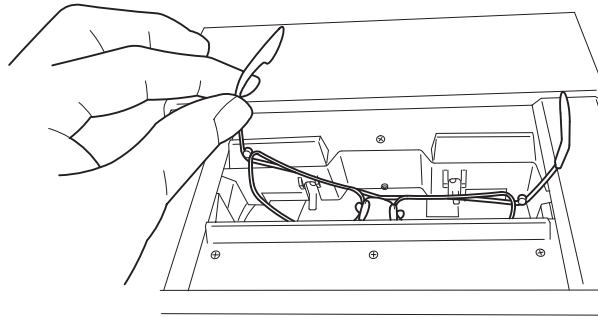


When right eye is selected

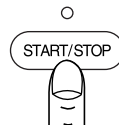


When left eye is selected

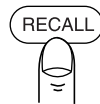
- 2 Incline the frame so that the frame of the selected eye may be approximately horizontal.



- 3 Press the **START/STOP** switch to carry out the one eye measurement while holding the bows of the frame by hand so as not to move during measurement.



- 4 Press the **RECALL** switch of the patternless edger to transfer the data to the patternless edger.
Data can also be transferred by pressing the **TRANS** switch of the instrument.



When data is transferred to other devices except the patternless edger, refer to their instruction manuals.



In one eye measurement, FPD cannot be measured. Input data on the patternless edger.

How to connect to ALE-X1

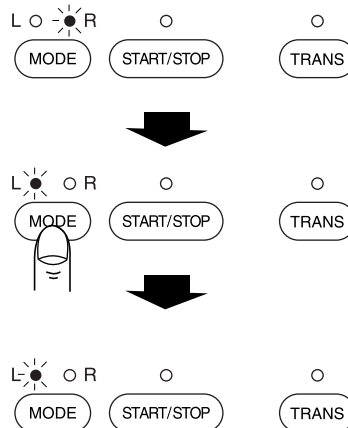
The exclusive cable is necessary to connect FR-50 to ALE-X1.

Contact your nearest TOPCON office or TOPCON service office when ordering the exclusive cable.

How to give priority to left eye (for patterns)

When pattern is measured, the "R" lamp is normally lit. The program can be changed to give priority to left eye in the following way.

- 1** Turn off the power switch.
- 2** Set the pattern adapter.
- 3** Turn on the power switch while pressing the **MODE** switch.
- 4** The \circ_R lamp is lit. Press the **MODE** switch to light the $L \circ$ lamp.



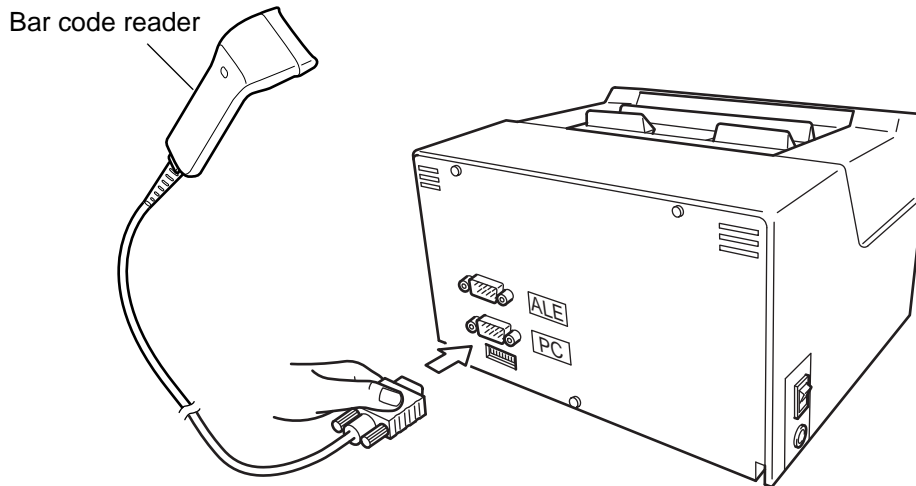
- 5** Press the **START/STOP** switch.
After the buzzer sounds, the lamp flickers 5 times to show that the change is stored.
- 6** Turn off the power switch.
If not, the next measurement is not possible.
From now on, the left eye is selected when pattern is measured.

Carry out the same procedure to set the program as it was before.

How to connect with the bar code reader

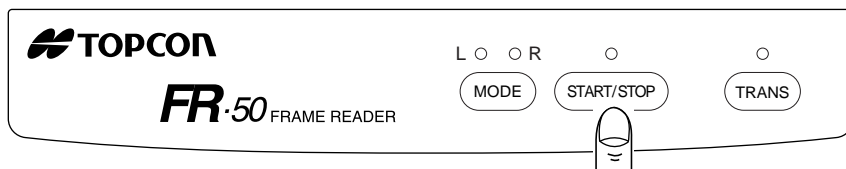
For this instrument, a bar code system equipped with a bar code reader (option) can be used. For the details of bar code system, refer to "HOW TO OPERATE (VARIETY OF OPERATION)" in the ALE-5000 series instruction manual.

- 1** Turn off the power switch.
- 2** Set the DIP switches to the format of bar code.
For setting of bar code, refer to "Setting of the communication format" (Setting example 2) in P.24.
- 3** Connect the frame reader to the bar code reader. If the bar code reader has a connecting screw, connect it with the frame reader securely first and then use the screw.

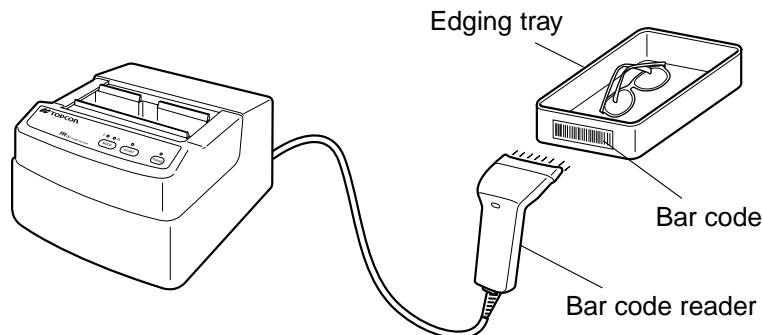


How to use

- 1** Measure the frame (pattern).



- 2** Read the bar code of the frame (pattern) to be saved.



- 3** Each data is automatically transmitted to the ALE side and is saved.

TROUBLE SHOOTING

Trouble shooting guide

If there is a malfunction, first check the cause by following the steps on the check list. If the problem cannot be solved or the malfunction seems to be other than the items listed, contact your TOPCON dealer.

Check list

Content of the trouble	Example of possible causes	Measures	Reference page
No power	The AC adapter is not connected properly.	Connect it properly.	9
Data is not transferred.	The RS-232C cable is not connected properly.	Connect it properly.	9
The transferred frame data is not good.	The frame moves during measurement because it is not properly set.	Set the frame properly.	10
	The frame is set invertedly.	Set the frame properly.	10
	There is a clearance or step difference in the end piece of the frame.	Tighten the end piece correctly.	10
	The stylus is not set on the frame groove properly.	Make sure that the stylus is set on the frame groove and measure the frame.	10
The transferred pattern data is not good.	The pattern set direction is not the same as indicated on the pattern holder.	Set the pattern in the right direction.	12
	The pattern set direction is not the same as the selected mode.	Select the eye applicable to the pattern set direction.	12
	The pattern moves during measurement.	Tighten the fixation knob firmly.	12
	There is an abnormal step difference in the pattern.	Correct the pattern shape to be smooth.	12
The buzzer sounds and the lamp flickers on the control panel.	It is probably caused by a mis-operation or a malfunction of the instrument.	Refer to "Error codes".	20
Measurement is not correct in "auto-measurement".	<ul style="list-style-type: none"> • The stylus comes off from the frame. • An error has occurred during measurement. 	Perform "semi-auto measurement".	11
The half-eye frame is not measured correctly.	<ul style="list-style-type: none"> • The stylus comes off from the frame. • The frame is deformed during measurement. 	Refer to "Special mode".	21
The measurement accuracy is not good.	Calibration is not correct.	Perform calibration.	22

Error codes

If a mis-operation or a trouble of the instrument has occurred, the lamp flickers on the control panel and the buzzer sounds according to the cause of trouble.

Error code table

Display				Trouble	Description
Number of times for buzzer	Flickering lamp on the control panel				
	L MODE	R	START/STOP		
3 times	●	●	○	○	The stylus comes off. Set the frame properly.
No sound	●	●	○	● Flickers 5 times.	Transmission and reception are not possible. Turn off the power of the instrument. Refer to "Connecting the cords" and then carry out measurement again.
5 times	●	●	● Flickers.	○	Abnormal pattern sensor Incline the pattern sensor and press the START/STOP switch again.
8 times	●	● "R" flickers.	○	○	Abnormal rotary movement Turn off the power of the instrument. Turn on the power again and carry out measurement.
8 times	● "L" flickers	○	○	○	Abnormal horizontal movement Turn off the power of the instrument. Turn on the power again and carry out measurement.
8 times	●	● "R" and "L" flicker.	○	○	Abnormal S movement Turn off the power of the instrument. Turn on the power again and carry out measurement.
8 times	●	● "R" and "L" flicker.	● Flickers.	○	Abnormal clamp Turn off the power of the instrument. Turn on the power again and carry out measurement.

- LED is ON.
- LED is OFF.
- LED flickers.

If the problem is not solved, contact your nearest TOPCON office or TOPCON service office.

Special mode

When measuring a short vertical width (half-eye) frame, the stylus may come off from the frame or be deformed. Only when a short vertical width frame is detected, measurement takes twice the normal time. Measurement is done more carefully. In this case, perform measurement in the following way.

- 1** Turn off the power switch of FR-50 and set the DIP switch at its rear to "Special mode". Refer to P.24 for setting "Special mode".
- 2** Turn on the power switch of FR-50 and carry out the normal measurement.
- 3** After measuring the frame, set "Special mode" to "OFF" while the power switch of FR-50 is off and reset FR-50 to the normal frame measurement condition.



If "Special mode" is set and the frame is not detected, measurement is done at the normal mode.

Calibration of measurement accuracy

Calibration of measurement accuracy is necessary to maintain the instrument's performance.

Normal edging

Adjustment of frame size and axis

- 1** Turn off the power switch.
- 2** Turn on the power switch as pressing the **START/STOP** and **TRANS** switches.
- 3** Set the reference frame template.
Make sure that the simple reference frame is set correctly with good balance.
- 4** Press the **START/STOP** switch.
The buzzer sounds 5 times after measurement is repeated for adjustment to show that calibration has been ended correctly.
- 5** Turn off the power switch.
If not, the next measurement is not possible.

Adjustment of pattern size and axis

- 1** Turn off the power switch.
- 2** Turn on the power switch as pressing the **START/STOP** and **TRANS** switches.
- 3** Set the simple pattern reference frame on the pattern holder.
- 4** Insert the pattern adapter on which the simple pattern reference frame is set into the instrument.
Make sure that the pattern adapter is properly set on the 4 clamps.
- 5** Press the **START/STOP** switch.
The buzzer sounds 5 times after measurement is repeated for adjustment to show that calibration has been ended correctly.
- 6** Turn off the power switch.
If not, the next measurement is not possible.

Communication edging

When communication edging is done, use the correction unit which is sold separately.

REFERENCE MANUAL

Specifications & performance

Measuring:	Automatic read for both eyes
Tracing:	Automatic and semi-automatic
Measuring range:	Up to $\phi 90\text{mm}$ (Vertical width: 24 to 65mm)
Dimensions:	280 (W) \times 280 (D) \times 180 (H)
Mass:	8kg
Power input:	DC24V 1.25A
Standby power:	2W
Power:	AC adapter (accessory)
Use temperature:	5°C~35°C
Measurement points:	1000 points/360°

Communication specifications

1. Basic specification:	Based on RS-232C
2. Transmission:	Start-stop transmission
3. Baud rate:	9600/19600 bps (selected by DIP switch)
4. Parity:	None
5. Stop bit length:	1 bit
6. Data length:	8 bits
7. Data code:	HEX/ASCII

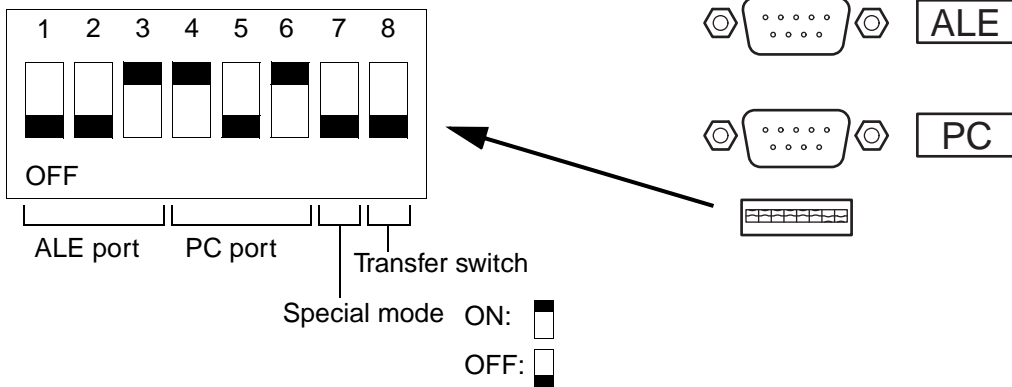
AC adapter specifications

Rated power frequency:	AC100 ~ 240V 50/60Hz
Output:	DC24V, 1.85A

Setting of the communication format

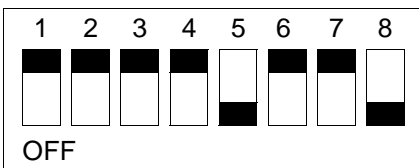
Before communication with outside, change the following DIP switches to each format.
 Before changing, turn off the power switch of FR-50.

Setting of DIP switches when shipped



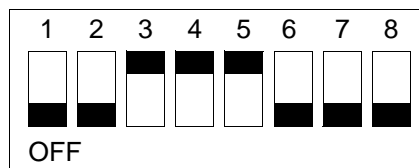
ALE port 1 2 3			PC port 4 5 6			Special mode 7	Transfer switch 8		
[up][up][up]	[up][up][up]	FR-50 mode	[up][up][up]	[up][up][up]	FR-50 mode	[down]	Invalid	[down]	Data is transferred to only ALE port. If this port is set to "Meganet" or "Bar code", data cannot be transferred.
[up][up][down]	[up][up][down]	OMA	[up][up][down]	[up][up][down]	OMA	[down]		[down]	
[up][down][up]	[up][down][up]	Meganet	[up][down][up]	[up][down][up]	Meganet	[down]		[down]	
[up][down][down]	[up][down][down]	Bar code	[up][down][down]	[up][down][down]	Bar code	[down]		[down]	
[up][down][down]	[up][down][down]	FR-20 mode	[up][down][down]	[up][down][down]	FR-20 mode	[up]	Valid	[up]	Data is transferred to only PC port. If this port is set to "Meganet" or "Bar code", data cannot be transferred.

Setting example 1 :



ALE port : FR-20 mode 9600bps
 PC port : Meganet
 Special mode : Valid
 Transfer switch : Valid for only ALE port.

Setting example 2 :



ALE port : FR-50 mode 19200bps
 PC port : Bar code
 Special mode : Invalid
 Transfer switch : Data is transferred from ALE port.

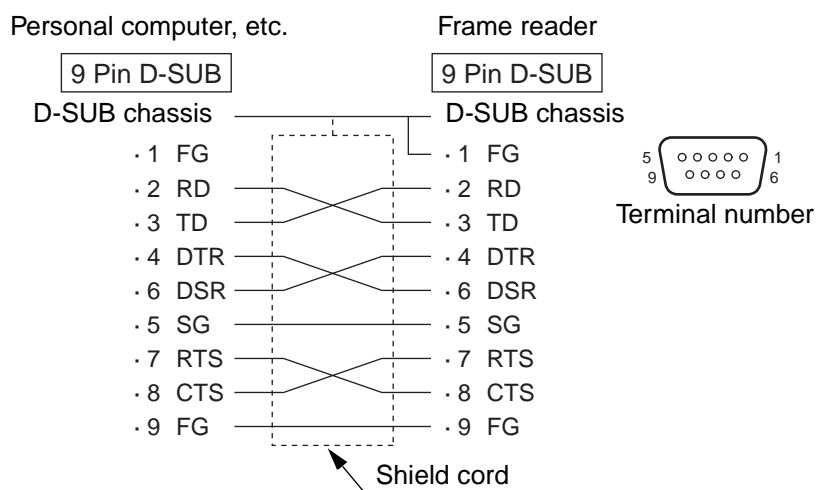
Note: In "Setting example 2", when Switch 8 is changed from its "lower" side to "upper" side (only PC port is valid), data cannot be transferred because "PC port" is set to "Bar code".
 (LED blinks several times and then it keeps lighting.)

Connector terminal number and signal name

- (1) Connector (on frame reader side) D-SUB 9-pin male screw type
 (2) Terminal number and number name

Terminal No.	SIG	Signal name	Terminal No.	SIG	Signal name
1			6	DSR	Personal computer ready signal
2	RD	Transmission data	7	RTS	Command for transmission
3	TD	Reception data	8	CTS	Transmission is possible.
4	DTR	Instrument ready signal	9	FG	Earth for safety
5	SG	Signal ground			

Connection (cord)



Communication and data format

The communication format supported by frame reader is OMA bar code. Contact your nearest TOPCON office or TOPCON service office for the details of communication and data format.

When contacting Topcon with questions, please have the following information available.

- Model name: FR-50
 - Serial number: This is described on the nameplate on the rear side of the base.
 - Period of use: Please inform us of the purchase date of this instrument.
 - State of malfunction: Please provide a detailed description of your problem.
-

FRAME READER

FR-50

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