

INSTRUCTION MANUAL



HAND-HELD Type

Instruments included in the case

Applanation tonometer	1
Finder eyepieces (6 ×)	1
Rest ring for calibration	1
Weight for calibration (20 mmHg)	1
Weight for calibration (50 mmHg)	1
Spare bulb	1
AA size batteries	2

■ INTRODUCTION ■

Thank you for your purchase of Kowa's HA-2 Hand-Held Applanation Tonometer. This manual provides a description of the operating procedure of the HA-2 along with important precautions to be observed during its use.

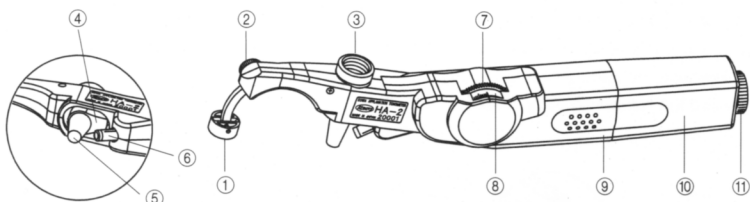
Please read this entire manual carefully to ensure that the system is able to demonstrate its full capabilities and be used effectively.

After you have finished reading it, please keep it in an easily accessible location near the system for future reference.

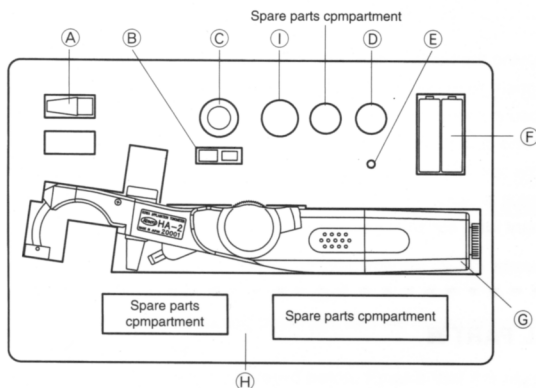
■ PRECAUTIONS CONCERNING USE ■

- Handle the system with care to prevent it from being subjected to strong shocks.
- Avoid installing or storing the system in locations subjected to high temperatures and humidity, direct sunlight or high levels of dust.
- When not in use store the system in its carrying case to protect its components.
- The manufacturer is not liable for malfunctions or injuries resulting from maintenance or repairs performed by persons other than the specified repair service.
- The manufacturer is not liable for malfunctions or injuries resulting from modification, maintenance or repairs using parts other than the specified repair parts.
- The manufacturer is not liable for malfunctions or injuries based on results obtained by not observing the cautions or operating procedure described in this instruction manual.
- The manufacturer is not liable for malfunctions or injuries caused by use of this system under ambient conditions that deviate from the conditions of use of this system, including the power supply and environmental conditions, as described in this instruction manual.
- The manufacturer is not liable for malfunctions or injuries caused by fire, earthquake, flood, lightning or other natural disasters.
- The pressurization dial should be returned to the initial position (lamp is off) before storing the device. Remove the battery from the battery case when storing the device for a long period of time.

■ NAMES OF WORKING PARTS ■



- | | | |
|----------------------------------|--|------------------|
| ① Forehead rest | ⑤ Doubling prism | ⑧ Scale |
| ② Locking knob for forehead rest | ⑥ Illumination and filter rod | ⑨ Main casing |
| ③ Finder eyepieces (6 ×) | ⑦ Thumb wheel for applanation pressure | ⑩ Battery casing |
| ④ Prism holder | | ⑪ Fixing knob |



- | | | |
|---|--------------------------------|---------------------------------------|
| ① Doubling prism (optional part) | ⑤ Spare bulb | ⑩ Long eye relief 3 × (optional part) |
| ② Weight for calibration (20 mmHg, 50 mmHg) | ⑥ Batteries (2 pcs. AA size) | |
| ③ Rest ring for calibration | ⑦ Applanation tonometer (HA-2) | |
| ④ Finder eyepieces (6 ×) | ⑧ Carrying case | |

■ INSTRUMENTAL PREPARATION ■

Tonometer HA-2 is supplied with its accessories in a compact carrying case, as shown in the illustration above. Set up the separated tonometer as follows.

Refer to the manual of Charge Type system for installation of the battery case and the battery.

1. Attach eyepiece

Attach the desired eyepiece to the finder screw by turning it clockwise.

2. Attach doubling prism

- 1) Sterilize the doubling prism ⑤ and wipe solution drops off before use.

Caution: Long immersion in an antiseptic solution may produce swelling of plastics, splitting of glued portions and moisture inside the prism.

- 2) Insert the doubling prism into the prism holder ④ so that the index is aligned to 180° or 0°.

3. Insert the batteries

- 1) Remove the battery housing by turning fixing knob ⑪ counterclockwise.
- 2) Insert two batteries with their + and - signs aligned accordingly.
- 3) Replace the housing and fix it by pressing and turning the knob in the direction of the arrow.

4. Adjust extension of forehead rest

Loosen locking knob for forehead rest ② by turning it counter clockwise, extend forehead rest ① as far as it may maintain an adequate distance when the prism touches the cornea. To stabilize turn the knob clockwise.

5. Adjust direction of illumination

The rod can be directed to any side within a small range. Adjust the direction so that the illumination lights up the view finder field evenly when the prism nearly touches the cornea.

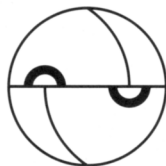
■ HOW TO USE ■

Preparation

- (Patient) Apply anaesthetic to the cornea to be examined, then apply a small amount of fluorescent stuff to color the eye.
- (Instrument) The contacting portion of the prism should be sterilize and cleaned perfectly. A prism surface smudged with tears or mucus lowers the accuracy of measurement.

Examination

1. Have the patient gaze straight forward with eye fully opened.
2. Hold the tonometer straight with your thumb on the thumb wheel ⑦.
3. Turn the thumb wheel until the scale reads "1" (10 mmHg).
4. Hold the tonometer close enough as so that the prism is almost on the cornea and ensure that the forehead rest ① comes in contact with the patient's forehead.
5. Look through the finder. The finder field will be bright from the reflection of cornea.
6. Get a light applanation on the cornea by the doubling prism gently. Two green semi-circles split on both sides will be visible as shown in Fig.1.



Correct

Fig. 1

If an undesired applanation such as those shown in Figs 2, 3 and 4 is obtained, repeat step 4 and below and obtain correct semi-circles.



Fig. 2



Fig. 3



Fig. 4

Fig. 2 ~ Fig. 4 Incorrect applanation

7. Turn the thumb wheel ⑦ gently to increase applanation pressure. The said semi-circles will increase in size and become clear and definite.
8. When the semi-circles contact each other at their inside edges, cease turning. (Fig. 5)



Fig. 5

9. Remove the tonometer from the cornea while keeping your thumb still on the thumb wheel. Read the scale and multiply the reading by ten.

■ LIMITS OF ACCURACY ■

Degree of accuracy claimed for devices with a measuring function.

- | | |
|--------|----------------------------------|
| ±1mmHg | more than 0 and less than 30mmHg |
| ±2mmHg | more than 30, 60mmHg or less |

■ ZERO POINT ADJUSTMENT ■

After some period of time, you may find your calibration readings do not stay within acceptable tolerances. In such a case, adjust the zero point, following the procedures outlined below.

1. Remove the battery casing and lay the tonometer on a desk, as for calibration. Hold the remaining body to level it. (Fig. 7)

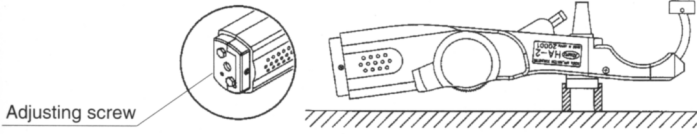


Fig. 7

2. After removing the battery case, turn the adjusting screw that was covered by the case until the doubling prism reaches the STANDARD level. With this adjustment a small amount of shift will be produced in every reading.
3. Calibrate and check that "0", "20 mmHg" and "50 mmHg" readings fall within acceptable tolerances. If the result is unsatisfactory, repeat the above mentioned adjustment and check until the desired result is obtained.
4. If adjustment fails, consult your dealer or contact us for more information.

■ OPTIONAL PART ■

Long eye relief 3 ×.

1. Remove the finder eyepiece 6 × that comes with the system from the finder screw, and attach the long eye relief 3 ×.
2. Examinations can be made with an examiner's eye approximately 30cm distant from the finder.



■ CALIBRATION ■

1. Lay the tonometer on a desk as shown in Fig. 6, fitting the eyepiece to the calibration rest ring (C).

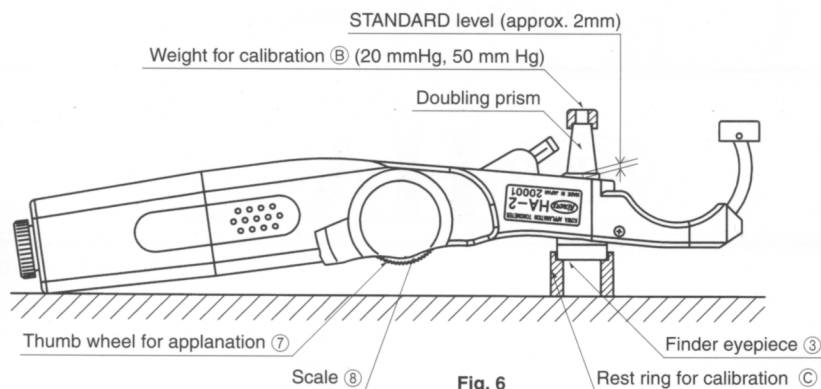


Fig. 6

2. Set the scale (8) to "0" (illumination is off at this point), then turn the thumb wheel (7) to raise the doubling prism receptacle (4) to the STANDARD level, where the rim of the doubling prism receptacle (4) is 2 mm above the body surface.
3. Put a 20 mmHg weight gently on the doubling prism and turn the thumb wheel (7) to raise the doubling prism to the STANDARD level. Read the scale.
4. Put a 50 mmHg weight gently on the doubling prism and turn the thumb wheel to raise the rim to the STANDARD level. Read the scale.
5. Compare the readings to the tolerance tabulated below. Ensure that the readings fall within acceptable limits.
6. If your results are unsatisfactory, repeat calibration. If the second calibration is also unsatisfactory, consult your dealer or inform us directly.

■ TOLERANCE TABLE ■

Weight	Tolerance
0 (No weight)	0 ± 1 grad.
20 mmHg	2 ± 1 grad.
50 mmHg	5 ± 1.5 grad.

■ MAINTENANCE ■

Taking care of the Tonometer

- a. Avoid shock and vibration as these will damage your tonometer.
- b. When you put away the instrument, be sure to turn the thumb wheel to "0" (illumination off) on the scale and remove the batteries. Replace the main body and accessories in the case and store it in a cool, dry place.

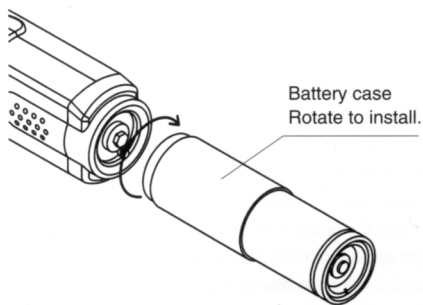
Replacement of illumination bulb

Pull out the illumination rod (6) and the bulb will be accessible. Simply pull out the bulb and replace it. Two spare bulbs are provided in the carrying case for replacement. When the last one is used, order a new set from your dealer.

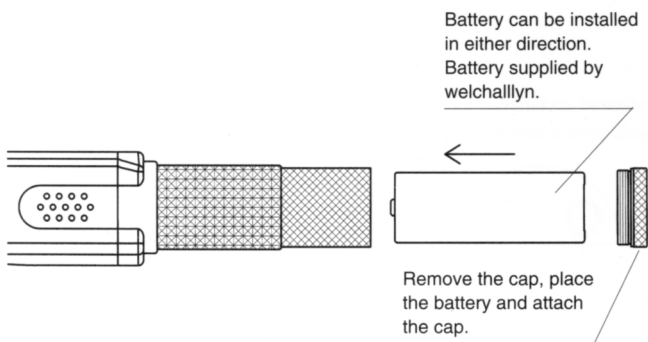
■ CHARGE TYPE ■

This type allows using the battery and battery charger, products of WelchAllyn, instead of SUM-3 batteries. Use the battery of 3.5 V specification. Lamp is interchangeable with the SUM-3 battery type.

1. Assembly



2. Installation of battery



To charge the battery, simply stand it on the battery charger of WelchAllyn.

Any other details of handling are same as the SUM-3 battery type, however, the battery case must be removed before calibrating the system.

■ CAUTION ■

1. Avoid subjecting the device to excessive shocks or vibrations.
2. When storing, return the pressure dial to the initial position (not lit), and store in a clean location free of humidity.
3. When not using for a long period of time, remove the batteries from the battery compartment.
4. Environmental condition for storage and transportation $-15^{\circ}\text{C} \sim +60^{\circ}\text{C}$
< 95%RH (no condensation)

■ PRECAUTIONS CONCERNING USE OF MEDICAL ELECTRICAL EQUIPMENT ■

This section describes general precautions concerning the use of medical electrical equipment based on Notification No. 495 of the Pharmaceutical Affairs Bureau of the Ministry of Health and Welfare dated June 1, 1972.

1. Equipment should only be operated by qualified personnel.
2. The following items must be observed when installing equipment.
 - (1) Install in a location free of moisture.
 - (2) Install in a location where there is no risk of detrimental effects caused by air pressure, temperature, humidity, ventilation, sunlight, dust, salt or air containing sulfur and so forth.
 - (3) Install the equipment in a stable manner while paying attention to inclines, vibrations and shock (including that during transport).
 - (4) Do not install in locations where chemicals or pharmaceuticals are stored or where there is generation of gas.
 - (5) Use the proper power supply frequency, voltage and allowable current values (or power).
 - (6) Confirm the status of battery-powered power supplies (degree of discharge, polarity, etc.).
 - (7) Make sure the equipment is properly grounded.
3. The following items must be observed before using the equipment.
 - (1) The equipment must be inspected for switch contact, polarity, dial settings and meter readings to confirm that it is operating properly.
 - (2) Confirm that the equipment is properly grounded.
 - (3) Confirm that all cords are properly and securely connected.
 - (4) Avoid combined use of equipment since this can lead to errors in accurate diagnoses and danger.
 - (5) Re-inspect any external circuits that come in direct contact with patients.
 - (6) Check any battery-operated power supplies.
4. The following items must be checked during use of the equipment.
 - (1) Do not exceed the time or quantity required for diagnosis or treatment.
 - (2) Continuously monitor the equipment for any abnormalities as well as the status of the patient.
 - (3) When an abnormality is noticed in the equipment or patient, appropriate measures must be taken such as terminating operation of the equipment while ensuring the safety of the patient.
 - (4) Do not allow the patient to touch the equipment.
5. The following items must be observed following use of the equipment.
 - (1) Turn off the power after first returning all operating switches, dials and other components to their status prior to use in accordance with the specified procedure.
 - (2) When pulling out cords, pull out the cord while holding onto the plug body so as not to apply excessive force to the cord itself.
 - (3) The following items must be observed with respect to the location where the equipment is stored.
 - (a) Store in a location free of moisture.
 - (b) Store in a location where there is no risk of detrimental effects caused by air pressure, temperature, humidity, ventilation, sunlight, dust, salt or air containing sulfur and so forth.
 - (c) Store the equipment in a stable manner while paying attention to inclines, vibrations and shock (including that during transport).
 - (d) Do not store in locations where chemicals or pharmaceuticals are stored or where there is generation of gas.
 - (4) Store all accessories, cords, leads and other components in an organized manner after cleaning.
 - (5) Always make sure to clean the equipment so that it functions properly the next time it is used.
6. In the event equipment should malfunction, the operator should not attempt to correct the problem, but rather appropriately indicate that the equipment is not operating properly and await repairs by qualified personnel.
7. Never attempt to disassemble or modify the equipment.
8. Maintenance and Inspection
 - (1) All equipment and components should be inspected regularly.
 - (2) When resuming use of equipment that has not been used for a long time, always confirm that the equipment operates properly and safely before use.



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