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The handy gloss checker, IG-331, quantifies gloss levels, which were measured by visual check.
Before using the Gloss Checker, thoroughly read this manual for the proper usage. The instruction manual should be carefully stored.

- The sensor is not scratch resistant.
- Take care not to scratch or scrub the sensor.
- The protection cap contains a reference plate for calibration use. Never touch this plate and the lens with bare hands or any dirty item.
- Dirtiness on the reference plate or lens may cause inaccurate measurement. Clean these parts by wiping them with a clean dry soft cloth.
- Do not handle the main unit and the protection cap roughly.
- Never leave the Gloss Checker under direct sunlight for long hours.
- Do not store the Gloss Checker in areas with high humidity or excessive dust.
- After using the Gloss Checker, be sure to turn it off. If the Gloss Checker will not be used for a long time, remove the batteries.

Check that all of the items listed below are included in the carton:

• Main unit with battery holder lid	1 pc.
• Sensor	1 pc.
• protection cap with reference plate	1 pc.
• Curled cable	1 pc.
• #AA battery (1 pack)	4 pcs.
• Instruction Manual	1 copy

The batteries included in the carton may have a shorter life.

Diagram illustrating the connection of the Main Unit to the Sensor:

- Main Unit
- Display
- Control
- Sensor
- Center Position Mark
- Battery Holder (rear of main unit)
- Curled Cable
- protection Cap with Reference Plate for calibration use

The diagram shows a digital display with the following components and labels:

- Battery Level Mark:** Points to a battery level indicator (four bars) at the top left.
- Over Range:** Points to the word "OVER" on the left side.
- HOLD:** Points to the word "HOLD" on the left side.
- HOLD Mark:** Points to a small mark on the left side.
- Measured value in 2-½ digits:** Points to the large digits "100" in the center.
- 60° Meter Mark:** Points to a mark on the right side.
- 20° Meter Mark:** Points to a mark on the right side.

Diagram of the front panel of the 600 Series Meter. The panel features a central display area with a 'Gloss Checker' label. Surrounding the display are six circular buttons arranged in two rows of three. The top row buttons are labeled 'ON', 'CAL', and 'HOLD'. The bottom row buttons are labeled 'OFF', '20°', and '60°'. Labels with leader lines identify each button: 'CALIBRATION key (CAL key)' points to the 'CAL' button; 'ON key' points to the 'ON' button; 'OFF key' points to the 'OFF' button; '20° Meter key (20° key)' points to the '20°' button; '60° Meter key (60° key)' points to the '60°' button; and 'HOLD key' points to the 'HOLD' button. The 'Gloss Checker' label is positioned below the '20°' and '60°' buttons.

Remove ↑
Attach ↓

Make sure to fit the lid securely.

- Use #AA manganese or alkaline batteries. Rechargeable batteries such as NiH₂ batteries can not be used.
- Remove the batteries if the Gloss Checker will not be used a long period.
- If Battery Level Mark () blinks, replace with new batteries.

Be sure to perform calibration before starting measurement.

1. Press the ON key.
The power turns on and enters measurement mode.

1. Press the OFF key.
The power turns off.

Both 20° and 60° meters can be calibrated at the same time.

1. Properly set the protection cap to the sensor part.
2. Place the sensor on a flat surface and lightly press the center position mark on the sensor with a finger during calibration.
3. Press the CAL key for more than 2 seconds.
CAL display appears and automotive calibration starts.
After calibration is finished, measurement mode starts.
4. Check if the reading meets the specified calibration value (± 1).
The specified calibration value is indicated on the reference plate.

Calibration data will not be renewed.
Go through the calibration steps carefully again.

Be sure to perform calibration:

1. Remove the protection cap.
2. Place the sensor as close to the measuring object and lightly press the center position mark with a finger.
The displayed value shows the gloss level.

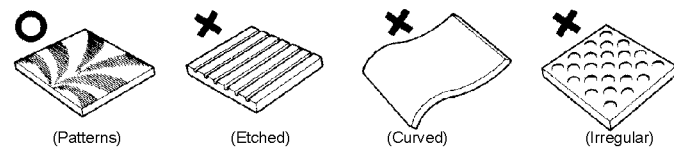
After the measurement, store the Gloss Checker according to the instructions below.

- Attach the protection cap to the sensor.
- If the Gloss Checker is not going to be used for a long period, remove the batteries.

- **Make sure not to use any organic solvents such as thinner.**
- **The Gloss Checker is not water-proof. Never wash the unit with water.**

The Gloss Checker uses two optical systems for different measurement angles of 60° and 20°. This allows for efficient measurements of gloss levels over a wide range. The 60° meter covers a wide range from low to high gloss levels. The 20° meter should be used to measure high gloss levels which are more than 70 on the 60° meter.
(The 20° meter is more sensible to surface conditions and the tilt of the sensor.)

Since the Gloss Checker uses two optical systems for measurement angles of 60° and 20°, it is suitable for quality control use of various materials such as coatings on painted plates, plastics, stones, tiles, and enamel. However, some materials, such as ground metallic surfaces, cannot be measured because their gloss levels are too high. Besides, the surface to be measured must be flat. Therefore, those objects which have a rough or curved surface may not be measured properly. Measured values for transparent objects are also effected by reflections from the bottom surface.



A diagram showing the components for connecting the sensor to the main unit. The components are labeled: Main Unit, Sensor, Connector, and Curled Cable. The Main Unit is a handheld device with a display showing '55' and several buttons. The Sensor is a small rectangular module. The Connector is a small plug. The Curled Cable is a flexible cable with a multi-pin connector at one end and a single-pin connector at the other. The diagram shows the Sensor connected to the Connector, which is then connected to the Curled Cable, which is finally connected to the Main Unit.

Please use only the Curled Cable included. Do not use a normal telephone curled cable as proper readings cannot be taken.

Press the 20° key and enter the 20° measurement mode. The 20° meter mark lights on the display.

Press the 60° key and enter the 60° measurement mode. The 60° meter mark lights on the display.

When you wish to hold a reading on the display, press the HOLD key. The reading will freeze and HOLD mark blinks.
Press the HOLD key again to release the reading and return to normal operation.

To restart measurement, press the ON key and enter the measurement mode. Make sure to calibrate before measuring.

If measurement value amounts over 199, OVER appears on the display and value of 199 blinks.

If high-gloss objects are measured with the 60° meter, the gloss level difference may be difficult to detect compared to human eyes. In this case the measurement should be made with the 20° meter for more precise readings. (Switch the mode if the gloss level is greater than 70 when measured with the 60° meter.)

The Gloss Checker, a practical tool for quality control is suitable for measuring the difference between objects with similar surface materials. However, it may show different results from existing gloss checkers for the same materials, especially those which have complex surface textures, such as paint and ink.

The gloss level measures the reflection when a beam of light is shined on a surface. It is determined by the ratio of the intensity of the light reflected off the measured spot to that from the reference plate. JIS 28741 specifies that the gloss level on the surface of glass with a refractive index of 1.567 should have a reference level of 100. However, since this glass is chemically unstable, the Gloss Checker uses a black glass plate with a gloss level of 90 on the 60° meter and 84 on the 20° meter, as the reference plate for calibration use. (JIS : Japanese Industrial Standard)

Diagram illustrating the optical geometry of the proposed system. The setup shows a central vertical axis. Two light sources are positioned at 60° from the vertical axis, and two photo sensors are positioned at 20° from the vertical axis. The surface is horizontal, and the measured surface area is indicated by a shaded region. The angles 20° and 60° are marked for the sensor and source positions respectively.

After checking the contents below and still the problem exists, contact the Service Department or the dealer where you purchased the Gloss Checker.

The power is off	⇒ Press the ON key.
The batteries are not installed	⇒ Install the batteries.
The batteries have run out	⇒ Replace the batteries.
The batteries is set with the polarities reverse	⇒ Reinstall the batteries in the correct position.

The measured surface is rough	⇒	Measure a flat surface.
The sensor part is floating	⇒	Ensure the sensor makes a tight fit with the spot to be measured.
The lens is dirty	⇒	Wipe the lens with dry soft cloth or the like.
The reference plate for calibration use is dirty	⇒	Clean the reference plates with dry soft cloth or the like.
The batteries have run out	⇒	Check the Battery Level Mark which shows the batteries have run out. If Battery Level Mark () blinks, replace with new batteries.
The protection cap is on	⇒	Take off the protection cap.
In the State of HOLD condition	⇒	Press the HOLD key.
Shows abnormal figure or "Err" shows on the display	⇒	Take out the batteries, wait for about 10 seconds and then reload the batteries and perform the calibration.

The gloss level is too high	⇒	Can not measure because of too high-gloss level.
Bad calibration	⇒	Carefully perform the proper calibration.

Measurable range	0 to 100
Optical systems	60° : 60° Optical Range 20° : 20° Optical Range
Measurable spot	60° : Oval Size of 6 mm·3 mm 20° : Oval Size of 4 mm·3 mm
Light source	LED(wavelength 890 nm)
Display	LCD for digital display in 2-1/2 digits in the range of 0 to 199.
Sensor	Silicon Photo Diode
Accuracy	±5% of full scale ±1 digit (60° meter) ±20% of full scale ±1 digit (20° meter)
Repeatability	±5% of full scale ± 1 digit (On black reference plate)
Power source	Four #AA batteries.Continuous Operation:50 hours (R6P battery type at 25°C ambient temp.)
Ambient temperature range	10°C to 40°C without condensation
Features	•HOLD key can retain the measurement value • Measurement mode selection between 60°/20° meter • Battery level warning • Auto calibration • Automatic power-off mechanism after about 5 minutes
Mass	Approx. 350 g (including battery)



This equipment is in conformity with the following directives and standards:

Directives: The EMC Directive 89/336/EEC as amended by 92/31/EEC and 93/68/EEC, in accordance with the Article 10 (1) of the Directive.

Standards: EN61326: 1997 /A2:2001 Class B Portable(Emission tests were conducted according to the requirements of EN55011:1998)

Warning: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the **FCC Rules**. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Consult the dealer or an experienced radio/TV technician for help.