ZGM1130

Glossmeter

Technical Manual

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Revision History

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2.0	May 18. 2021	PEGG, Initial release
2.1	Jan 23. 2023	PEGG, corrected wrong product name

Content

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The features described in this instruction manual represent the complete technology of this instrument. These features are either included in the standard delivery or available as options at additional costs.

Illustrations, descriptions as well as the technical specifications conform to the instruction manual at hand at the time of publishing or printing. However, Proceq SA policy is one of continuous product development. All changes resulting from technical progress, modified construction or similar are reserved without obligation for Proceq to update.

Some of the images shown in this instruction manual are of a pre-production model and/or are computer generated; therefore the design/features on the final version of this instrument may differ in various aspects.

The instruction manual has been drafted with the utmost care. Nevertheless, errors cannot be entirely excluded. The manufacturer will not be liable for errors in this instruction manual or for damages resulting from any errors.

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Shipment

Should the device be transported again, it must be packaged properly. Preferably use the original packaging for later shipments. Additionally, use filling material in the package to protect the device from any shock during carriage.

1 Safety notes

1.1 Symbols used

⚠ This note comprises instructions needed to follow directions, specifications, proper working procedure and to avoid data loss, damage or destruction of the instrument.

⚠ This note signifies a warning about dangers to life and limb if the apparatus is handled improperly. Observe these notes and be particularly careful in these cases. Also inform other users on all safety notes. Besides the notes in this instruction manual the generally applicable safety instructions and regulations for prevention of accidents must be observed.

1.2 Safety notes and hints

⚠ It is strictly forbidden to open the housing of the product! If not observed, all the guarantee and liability claims to Proceq SA will be void.

⚠ The glossmeter is exclusively intended for the determination of gloss ranges of surfaces. Any other use is considered as not being in accordance with the intentions of the manufacturer. The manufacturer is not liable for damage resulting from inappropriate application. The user bears the full responsibility.

⚠ Unauthorized modifications and changes of the product are not permitted.

⚠ Reproduction without permission is not allowed.

⚠ All maintenance and repair work which is not explicitly permitted and described in the present instruction manual shall only be carried out by **Proceq SA** or your authorized Zehntner agent, failure to comply voids warranty. Always disconnect the glossmeter from the USB port of the computer before the permitted maintenance.

⚠ **Proceq SA** refuses all warranty and liability claims for damages caused by usage of the product in combination with **non-original accessories**, or accessories from 3rd party suppliers.

⚠ Never unplug the USB-cable during a measurement or while the green data transfer indication light LED (2) is on.

⚠ Never immerse the device in water or other liquids: **Danger of short circuit!**

⚠ Never leave the product under direct sun exposure. Always store the product in its carrying case.

For the operation of the product all local safety regulations apply.

2   Introduction

The ZGM 1130 glossmeters are for measurement of all gloss ranges on all surfaces from matt to high gloss (up to 2000 GU).

The ZGM 1130 has an intuitive 2.4" LCD colour touchscreen for intuitive operation and easy use.

This instrument has the following features:

- Sturdy 20°, 60° and 85° measuring geometry in one device
- Graphical 2.4" LCD colour touchscreen display, switchable for right- and left-handed users
- A precision milled monobloc optic ensures stable and reliable gloss measurements
- Ergonomic, sturdy housing with first-class quality, slip-proof through eudermic, sweat-resistant rubber coating
- Precise results within milliseconds
- Powerful stray light compensation allows exact measurements of transparent objects
- User friendly, multilingual user interface
- Stand-alone operation or live mode with "GlossTools"
- Simultaneous display of up to 3 geometries as well as up to 3 statistical values
- Definition of reference and limit values for gloss measurements with colour coded indication of „pass/fail" information
- Automatic calculation of the geometry "reflection haze H" in accordance with ASTM D4039 at dual and triple angle versions
- Automatic, adjustable prompt for calibration
- Automatic calibration standard recognition
- Calibration unit ensures correct positioning during calibration and protects the calibration standard as well as the optics
- Easy management of the measuring data in the instrument's archive
- Connect to a PC/Mac using the supplied USB cable to access and print stored readings in csv-format. No software or internet connection required
- Easy evaluation of the measuring data e.g. with Microsoft Excel as well as easy transfer of the measuring data to in-house databases
- Versatile measuring and data analysis software "GlossTools" with additional features, free of charge
- Long-lasting LED illumination system
- Powerful battery and universal battery charger

2.1   Scope of this document

This document is an instruction manual for the ZGM1130 Glossmeter family, which describes the correct use of the instrument. This manual covers all models of the ZGM 1130 series which includes 1-, 2- or also 3-angle models. Therefore, it is possible that some pictures or functional descriptions (e.g. selection of measuring geometry) may differ from your model.

3 Scope of Delivery

3.1 Standard delivery

The following parts are included in the delivery:

ZGM 1130	Content	
1	ZGM 1130 glossmeter	
1	calibration standard	
1	microfiber cleaning cloth	
1	Wrist loop	
1	certificate of manufacturer	
1	certificate of calibration	
1	carrying case	

3.2 Software

A software for windows PCs is available to connect to the device. This software allows to read data from the device.

The GlossTools software is available for download on the Proceq website.

Part of this package are also two APIs, which allow automized measurement:

Labview programming interface	
„GlossTools" programming interface (.NET API)	

ⓘ **Proceq** refuses all warranty and liability claims for damages caused by usage of the ZGM 1130 in combination with **non-original accessories**, or accessories from 3rd party suppliers.

4 Device Overview

1. Touch Display
2. USB Interface
3. Calibration standard
4. Measuring button
5. Measuring opening

4.1 Display

The ZGM 1130 is equipped with a touchscreen (1) in order to receive inputs from the user.

4.2 Measuring Button

The measuring button (4) is used to start, stop measurements or to switch the device off if configured. It is also used to exit the menu from any point and return back to the measuring window. Beside this it has the following functions:

- Trigger a single measurement
- Start / stop a scan measurement
- Start / stop interval measurements

4.3 Power Supply

The ZGM 1130 is powered by an internal rechargeable battery which can be charged over the USB port. Either a standard PC USB port or a high-power USB charger like included in the delivery of the ZGM 1130 can be used.

However, special attention should be paid to the USB cable since fast charging can only be reached when the supplied cable is used.

If the device is charging, 🔋 will be displayed in the upper right corner of the display.

🛈 Only a Zehntner Service Center is allowed to replace the battery.

4.4 Automatic System Check

The ZGM 1130 provides an automatic system check functionality. The device is turned on when placed on the calibration standard a system check will be performed during the startup phase. Whenever needed, the system will inform you about possible issues and instruct you to carry out the necessary steps to eliminate the problem.

4.5 Connectivity

The ZGM 1130 is equipped with a USB interface (2) which allows to download measurement files and to control the device. In order to use the ZGM 1130 together with the "GlossTools" software, the software needs to be installed first. To connect the ZGM 1130 with a PC no additional drivers are necessary. If the device is connected the first time to a PC, the necessary driver will be installed automatically. When the ZGM 1130 is recognized by the PC the shown pop up window appears on the touchscreen where three different connection modes are available.
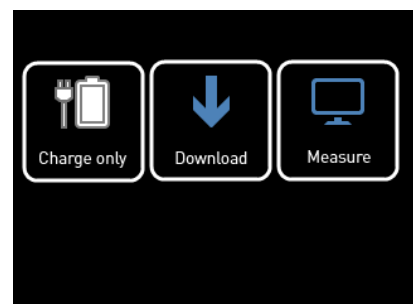
4.5.1 Charging only

In charging mode the device will be charged from the PC over USB but no data connection will be established. This mode is used when further measurements should be taken with the device but the battery is critically low.

A battery charging symbol 🔋 will be displayed in the upper right corner of the display when charging.

The ZGM 1130 can be charged either via a USB PC connection or with a USB wall charger. The latter will charge the ZGM 1130 faster than the USB PC connection.

4.5.2 Download

This mode connects the ZGM 1130 as a flash drive to the PC and enables the user to download measuring files directly from the device to the PC without installing any other software. Additionally, the device will also be charged in this mode.

4.5.3 Measure

The measure mode should be chosen when the device is used in conjunction with "GlossTools" or any other software. Additionally the device will also be charged in this mode.

4.6 Measuring Display

The measuring display is the main display and is shown when the device has been started. It has two different views which can be set-up in the menu. Detailed view shows more statistic information, while Simple view shows less but gives a better readability.

Simple View
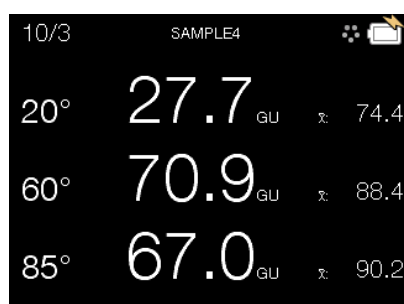
Detailed View
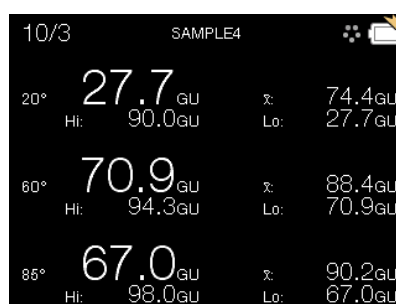
The status bar in the upper part of the display provides information about the battery condition, the measurement mode, name of the current measurement file and number of measurements.
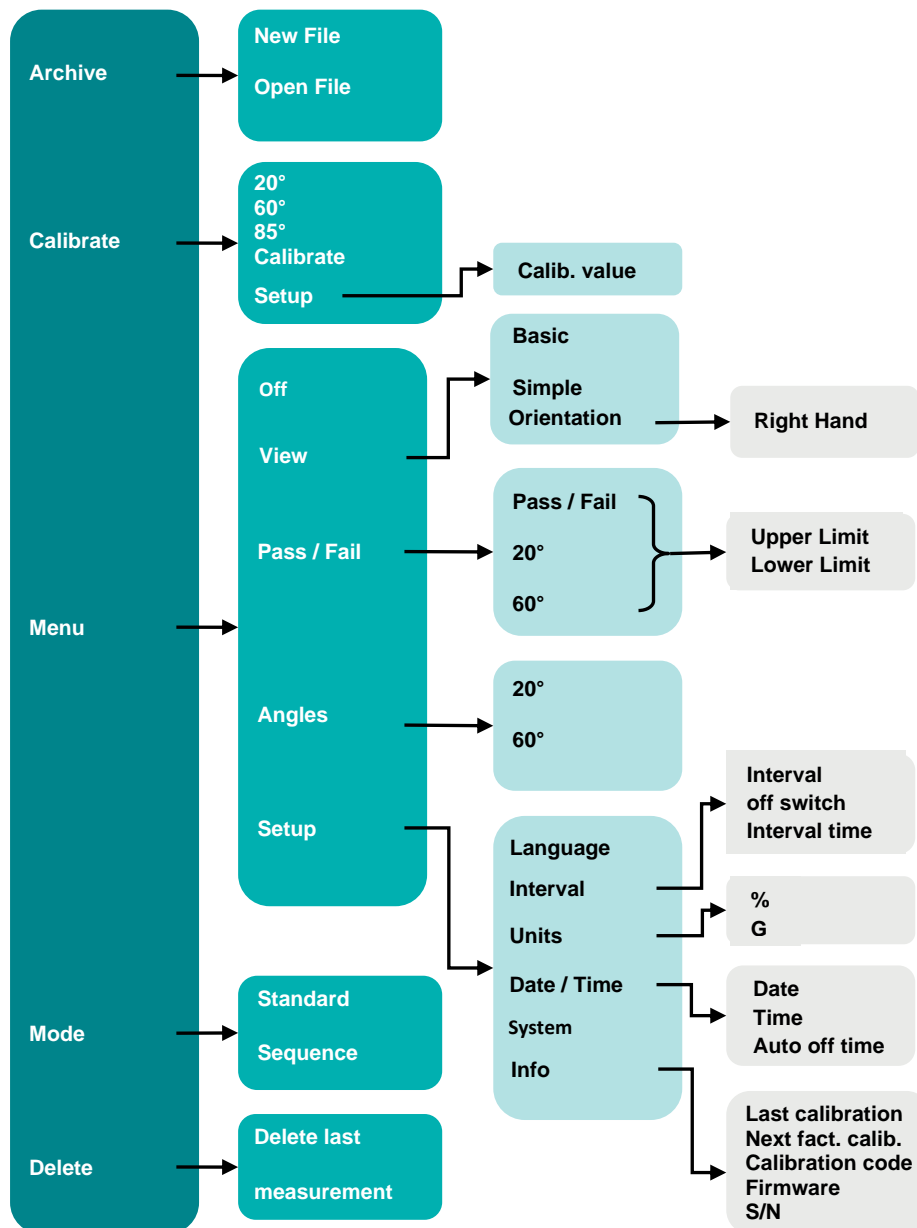
4.7 Quick Menu

The quick menu gives short access to all vital functions. It is accessible through a single touch on the touchscreen when the measurement window is shown.
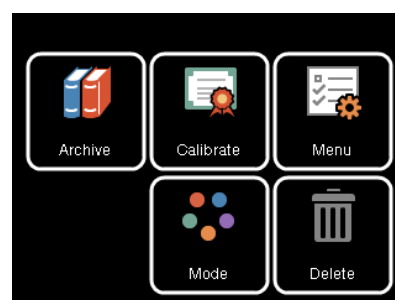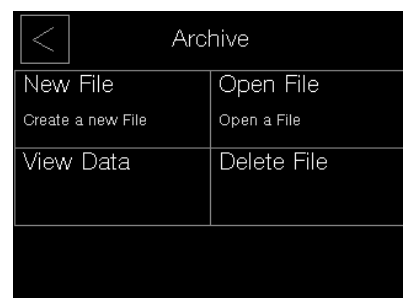
4.8 Menu Structure

The table below shows the menu structure of the ZGM 1130.


4.8.1 Archive

Every measurement is stored in a measurement file. These measurement files can be created, reopened, viewed or deleted in the archive menu. All measurement files are also accessible through USB.

New File

Creates a new measurement file with an individual name. The filename must not be longer than 8 characters. If the previous filename contains a number at the end of the filename, the number is selected automatically when creating a new file
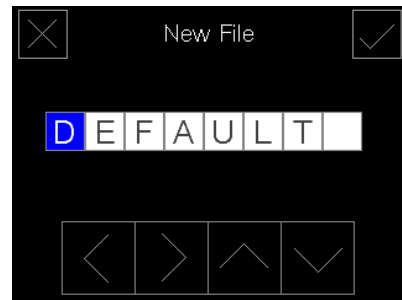
Use ☐ and ☐ to select a character and ☐ or ☐ to select, add or delete a character. Please consider that only capital ASCII characters and numbers are available. Confirm the new filename with ☑ or discard it with ☒.

Open File

This menu item allows to select an existing measuring file to add new measurements. Choose the measurement file to proceed with from the list. Then the selected measuring file will be loaded and the ZGM 1130 returns to the measuring window.

View Data

Measurements can also be viewed in a simple file viewer. Open any indicated measurement file from the list to navigate through the file. Use ☐ and ☐ to step through the file in single steps. ☐ and ☐ jumps to the end resp. to the beginning of the file.

Delete File

This function allows to delete whole measurement files from the ZGM 1130. Choose the measurement file to delete from the list and confirm or decline. If the current measurement file will be deleted, a new one named DEFAULT will be created automatically.

4.8.2 Calibrate

It is necessary to calibrate the device from time to time. This is required particularly if ambient conditions have been changed since the last calibration. It is recommended to calibrate the device at least every 2 days at minimum.

This function will automatically calibrate all available geometries against a calibration standard. The current calibration values are shown on the entry window of a calibration. These can be changed within the setup menu (e.g. for calibration on a second standard). When pressing the Calibration button the ZGM 1130 moves on with the calibration. If the device is not placed on the calibration standard a message is shown on the display.

After the device has performed a calibration, a summary will be shown indicating which angles exceeding a certain tolerance.

Confirm the calibration with ☑ or discard it with ☒.

✔ This angle has been calibrated successfully without any error.

✔ This angle has been calibrated successfully without any error, but the device has not been placed on its calibration standard.

✖ An error occurred during calibration. Please consider the message shown.

4.8.3 Menu

The menu items gives the user access to all settings of the device.

Off - Switches the ZGM 1130 off.

View

The view of the display can be set-up to either a **Simple View** which improves readability of the measuring display but shows less detailed statistic information or to a **Detailed View** which shows more detailed statistic information but in a smaller font.

Simple View

Detailed View

x̄: Shows the average value of all measurements taken within a sequence

$$\frac{1}{n} \times \sum_{i=1}^{n} = x \quad \text{"n" stands for number of measurements}$$

Hi: Shows the highest measured value

Lo: Shows the lowest measured value

All statistic values refer to the current sequence of measurements and will be reset when a new sequence has been started.
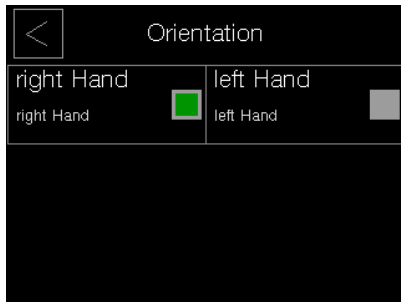
Orientation

Turns the display for right- or left-hand use.
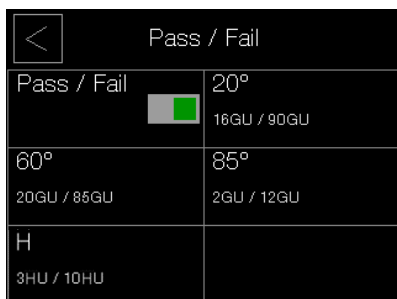
Pass / Fail

Switches the Pass / Fail functionality for all supported angles on or off.
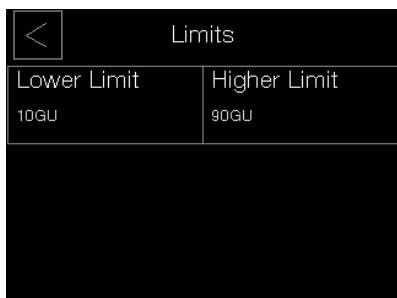
20 ° 60 ° 85° & H

Lower and higher limits can be defined for each supported angle individually. If the measured value is below or above of these values, the measured value will be marked with a ⬇ or ⬆.
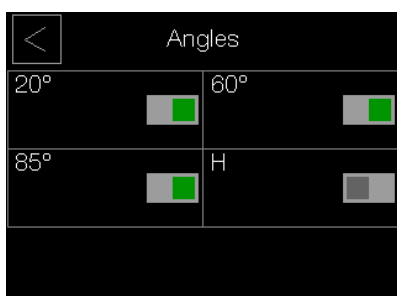
Angles

Each supported angle can be turned on or off separately, but only up to three angles at one time can be measured.
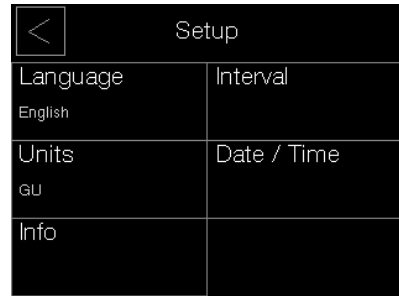
🛈 Please be aware that reflection haze is only available on devices supporting 20° and 60° measuring angles.

H = 60° value – 20° value

Setup

Language
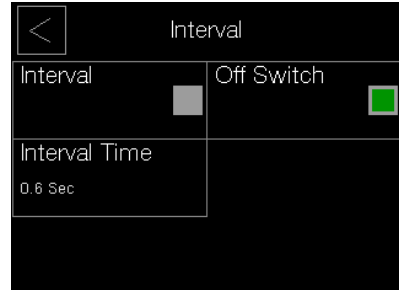
Choose one of the shown languages. The selected language will be applied immediately.

Interval

Set-up the second function of the measure button. When "Interval" is chosen, the device conducts measurements in the given interval as long as the measuring button is pressed. If the option "Off Switch" is chosen, the device will turn off after holding the measuring button pressed for 3 seconds. The interval time can be set in the corresponding menu.
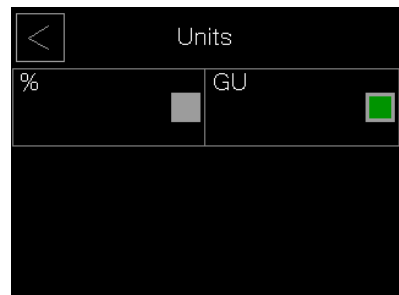
Units

The measured values (except Haze) can be displayed either in Gloss Unit (GU) or as a percentage relative to the selected measuring angle.

100% @ 20° ≡ 2037 GU

100% @ 60° ≡ 1000 GU
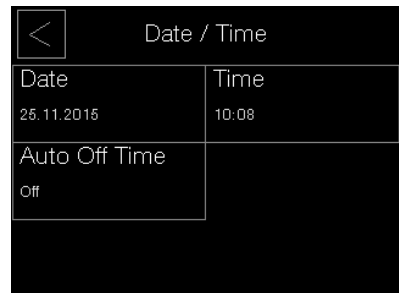
100% @ 85° ≡ 161 GU
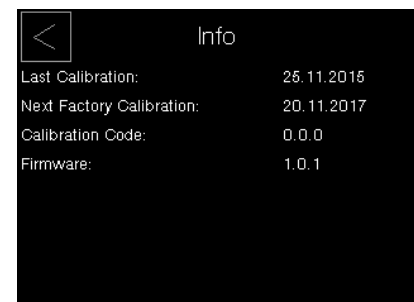
Date / Time

Set up date, local time and the time in minutes after the device will turn off when not used. If Auto Off Time is set to "0" the device will not switch off automatically.

Info - General information about the device will be shown here e.g. when the factory calibration expires and a recalibration from the manufacturer is recommended.

4.8.4 Modes

The ZGM 1130 supports three different measure modes. Standard and Sequence mode are used to trigger one measurement at a time. Whereas Scan mode measures continuously with high speed as long as the measure button is pressed. This enables to measure an average value over a much larger area than just the measuring area itself.
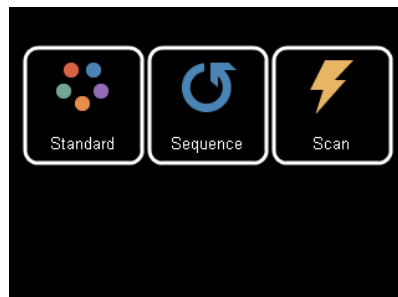
In **Standard mode,** only single measurements are taken and the statistic values are reset when the mode has been changed or the same mode has been chosen again.

In **Sequence mode,** the number of single measurements which should be made and lead to an average value can be predetermined. The statistic values are reset after this predefined number of single measurements, when the mode has been changed or the same mode has been chosen again.

In **Scan mode,** the ZGM 1130 measures with high speed as long as the measuring button is pressed. All single measurements completed during that time lead to one single average value which will be added to the statistic display. Treated as one measurement. The statistic values are reset when the mode has been changed or the same mode has been chosen again.

4.8.5 Reset

To reset the device press the reset button through the hole at the bottom of the device with a paper clip or something similar.

5 Operation and handling

The following paragraph guides through how gloss should be measured with a ZGM 1130. Beside this the following notes shall be considered:

- ❗ Proper measurements are only possible on even, clean and unscratched surfaces.
- ❗ Always indicate the used measuring geometry for all measurements.
- ❗ Measurements of different geometries can neither be compared nor converted into another.

All the models of the ZGM 1130 series are equipped with an **automatic adaptation of the measuring range**, which makes them capable of measuring even specimen in the extended measuring range with values between 200 and 2000 gloss units. This enables you to measure even specimens with high reflectance like mirrors or metallic specimens.

5.1 Calibration

Before a series of measurements is being started the device should be calibrated. In order to do a calibration follow the steps below:

- ▪ Clean the calibration standard with a microfiber cleaning cloth.
- ▪ Place the ZGM 1130 on the calibration standard and start the device.
- ▪ Open the quick menu with a single tip on the touch screen and select "Calibrate".
- ▪ Double check the stated calibration values with the values on the bottom side of the calibration standard. If they match proceed by pressing "Calibrate" or set-up the correct values by pressing the "Setup" button.
- ▪ Now, the ZGM 1130 performs a calibration on every angle and shows a calibration summary when finished.
- ▪ Accept or cancel the calibration.

- ❗ Beside the provided calibration standard any other standard with a known value and appropriate size can be used for calibration.

5.2 Measuring procedure

The ZGM 1130 can be used as a standalone device or in conjunction with the "GlossTools" software and a PC.

No matter if the ZGM 1130 is used standalone or with "GlossTools" the specimen should be larger than the measuring area of the device (see section 9).

- ❗ The center of the device's measuring area is marked in longitudinal direction with ⟍ on its housing.

5.2.1 Using the ZGM 1130 standalone

If the ZGM 1130 is used without connection to a PC measurements are stored by default in a measurement file. Please follow the steps below:

- ▪ Create or select a measurement file in the archive menu (see section 4.8.1)
- ▪ Chose a measurement mode in the quick menu (see section 4.8.4)
- ▪ Chose the appropriate measuring geometry in the setup menu (see section 7)
- ▪ Trigger measurements with the measurement button.

5.2.2 Using the ZGM 1130 with "GlossTools"

In order to use the ZGM 1130 connect the device via USB to a PC. When the device is connected chose "Measure" from the pop-up menu on the device to establish a connection with "GlossTools". While connected measurements can be triggered with the measurement button of the device or by software. For a detailed explanation of the "GlossTools" software refer to the software instruction manual.

6 Measurement File

All measurement files are stored in the internal memory and can be downloaded via USB.

When the ZGM 1130 is connected to USB choose Download and the device will appear as a flash drive on the Computer. Measurement files are comma separated (CSV) and can be viewed with any notepad or spreadsheet program.

Each measurement file can contain up to 1000 single measurements. These are structured as shown below. The measurement file starts with header information about the device and the supported angles.

> ❗ Measurement files can be exchanged between ZGM 1130´s. However the header information will not change, new measurements will just be added at the bottom of the file

Each measurement is structured in the following 12 rows:

No.	Ascending number of a single measurement
20°	Measurement value of the 20° angle in GU or %
60°	Measurement value of the 60° angle in GU or %
85°	Measurement value of the 85° angle in GU or %
H	Measurement value of reflection haze in HU
Date	Date the measurement has been taken [DD.MM.YYYY]
Time	Time the measurement has been taken [hh:mm:ss]
Sequence	Ascending sequence number. This number is incremented whenever a predefined number of sequence measurements have been done or when the measure mode has been changed.
IsOnStandard	A flag which indicates if the measurement has been taken on the calibration standard or on the sample. '1' = on the calibration standard '0' = not on the calibration standard
Mode	Indicates the measure mode. Can be "Standard", "Sequence" or "Scan"
Comment	not used in the ZGM 1130
SampleName	not used in the ZGM 1130

> ❗ Note: Please be aware that the statistic values are not stored in the measurement file. However, statistic values can easily be calculated with any spreadsheet program.

7 How to choose the correct measuring geometry in the area of paint industry

The following explanations apply to smooth coated surfaces, they do not fully apply for metallic and textured coatings or uneven surfaces. They do not apply at all for other surfaces such as foils, metals, textiles and paper.

According to the standard ISO 2813 and ASTM D523 the correct measuring geometry should be determined by a pre - measurement taken at 60°. Related to that the correct measuring geometry can be determined with the table below.

ISO 2813			ASTM D523	
Value @ 60°	Geometry		Value @ 60°	Geometry
>70 GU	20°		>70 GU	20°
10 GU – 70 GU	60°		10 GU – 70 GU	60°
<10 GU	85°		<10 GU	85°

8 Maintenance and Cleaning

8.1 Maintenance carried out by the user

You may only carry out the following maintenance and repair by yourself:

- Outer cleaning of the device (see section 8.2)
- Cleaning of the standard (see section 8.3)

ⓘ All other maintenance and repair operations may only be done by Zehntner or your authorized Zehntner-agent, otherwise all warranty will be void.

8.2 Cleaning of the aluminum housing

Before cleaning disconnect the USB-cable from your computer. For cleaning of the aluminum housing use a proper, soft and moist cloth. Use exclusively soft cleaning agents.

ⓘ Do not use strongly acidic or alkaline liquids.

ⓘ Never immerse the device in water or other liquids.

ⓘ If the device has to be disinfected, do not use disinfectants that contain sodium hydroxide.

8.3 Cleaning of the standard

The accuracy of measurements can be impaired significantly by using dirty or damaged standards. Since the surface of the standards is highly sensitive, cleaning must be undertaken with great care. To clean standards, use the included microfiber cleaning cloth.

ⓘ Apply only slight pressure during cleaning and make sure there are no large particles on the standard or in the cloth that could damage or scratch the surface.

ⓘ Do not use any aggressive and abrasive cleaning agents to clean the standard.

9 Technical Specification

Geometry	ZGM1130.6	1-angle: 60°
	ZGM1130.26	2-angle: 20°, 60° and reflection haze H
	ZGM1130.268	3-angle: 20°, 60°, 85° and reflection haze H

Surfaces — All kind of materials such as e.g. paint, coatings, plastic and metals

20°	High gloss
60°	Semi gloss
85°	Low gloss

Measurement range
20°: 0 – 2'000 GU
60°: 0 – 1'000 GU
85°: 0 – 160 GU

Resolution — 0.1 GU

Measuring area
20°: ø 9.8 mm / 0.39"
60°: 15.5 x 8.4 mm / 0.61 x 0.33"
60°: 44 x 4.7 mm / 1.73 x 0.19"

Measurement Time — 0.15 s /Geometry

Display — 2.4" colour LCD Touchscreen, LED backlight

Interface — USB1.1 – Universal Serial Bus (Mini B)

PC software — GlossTools, PC Software for easy control, operation and display.

Memory capacity — 1 million measurements

Precision

Range	0 – 199.9 GU	200 – 2'000 GU
Repeatability	0.1 GU	0.1 %
Reproducibility	0.5 GU	0.4 %

Units — GU, %

Spectral evaluation — V(λ) adapted

Light source — LED

Power supply — Accumulator   Li-Ion

Warranty — 2 years

Operating Temperature — 0°C – 40°C (32°F – 104°F)

Storage Temperature — -20°C – 60°C

Relative humidity — up to 85 %, non condensing

Dimensions — 150 x 52 x 71 mm (5.91 x 2.05 x 2.8")

Weight — 420 g (0.93 lbs)

Standards compliance — ASTM D523, ASTM D2457,
EN ISO 2813, BS 3900-D6, DIN 67530,
for versions 1130.26 and 1130.268 additionally ASTM D4039
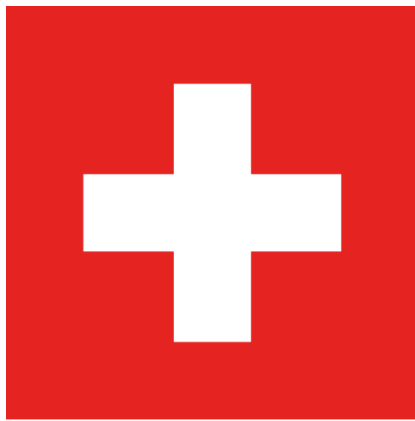
For safety and liability information, please download www.screeningeagle.com/en/legal

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