

Spectrolino
SpectroScan
SpectroScan T

Operating Manual

Bedienungsanleitung

Instructions de service

Instrucciones operativas

Manuale d'istruzione



gmb
GRETAGMACBETH

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Operating Manual

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2 General

2.1 Spectrolino 4.5/8 mm

This manual describes the Spectrolino device with measurement apertures ranging from 4.5 to 8 mm. The instructions provided apply to both types of devices, unless differently indicated.

2.2 Safety

2.2.1 Warning Symbols

For safety reasons it is absolutely essential to read the user manual and all instruction contained in it.

In the user manual, important instructions are highlighted by the following symbols:



WARNING Symbol: Important warning regarding use. Failure to follow this instruction may result in data loss and operating anomalies.



ATTENTION Symbol: Failure to respect this information may cause damage to equipment.



HAZARD Symbol: Failure to follow this instruction may cause risk to the operator.

2.2.2 General Safety Warnings



- Spectrolino and SpectroScan/SpectroScan T are not explosion proof. These devices must not be used in environments where explosion hazards exist, or subjected to strong electromagnetic radiation.
- Do not use Spectrolino or SpectroScan/SpectroScan T in environments with temperatures in excess of 40° deg. C.
- Do not try to dismantle Spectrolino or SpectroScan/SpectroScan T for any reason. Unauthorised access of the equipment will void all warranties. If access of the equipment is necessary, the regional representative must be contacted for approval.
- Avoid using sharp objects with the SpetroScan/SpectroScan T, as these may cause damage to the electrostatic plate. If the electrostatic plate is damaged, the substrate will not stay in place and the unit will need to be sent to an authorized service center for repair.



- Spectrolino and SpectroScan/SpectroScan T should only be operated by trained personnel. Operation by untrained personnel may result in damage to the equipment and/or inaccurate data.
- The Spectrolino and SpectroScan/SpectroScan T must be installed on a stable horizontal surface, unexposed to sunlight and moisture.
- Both devices must be protected against chemical agents, corrosive vapors, strong vibration and mechanical impact.
- Use only GretagMacbeth accessories and spare parts.



- Before turning ON the SpectroScan/SpectroScan T, ensure that no objects are leaning or resting on the equipment.
- The electrostatic plate of the SpectroScan/SpectroScan T should be cleaned with Isopropyl alcohol on clean cloth. Alkaline solvents and soap should never be used to clean this plate.
- The plastic housings of both the SpectroScan/SpectroScan T and the Spectrolino should be cleaned with soap and water on a damp cloth.
- The operator should familiarize himself with all operating specifications contained in Chapter 6 before turning on the equipment.
- The equipment must be transported in its original packaging.

2.3 Packaging and transport

2.3.1 Unpacking and shipment

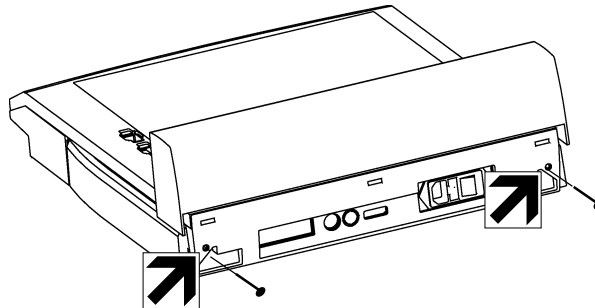
The Spectrolino and SpectroScan/SpectroScan T are delivered in specially designed highimpact packaging. SpectroScan is also equipped with mechanical lock down protection.



- To avoid damage, the devices must always be shipped in their original packaging. Ensure that the SpectroScan/SpectroScan T is also equipped with anchor screws for transportation.

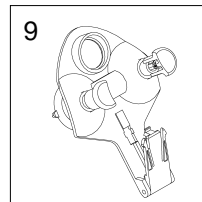
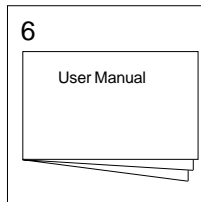
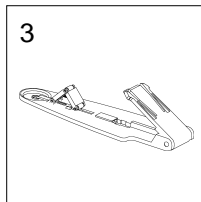
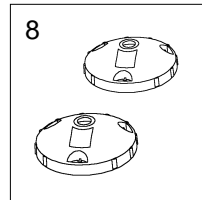
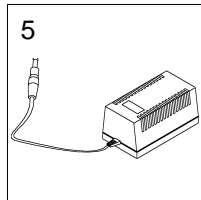
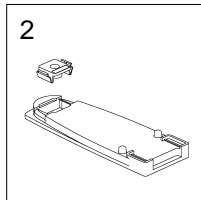
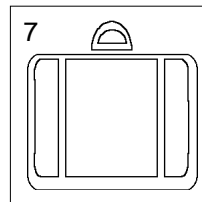
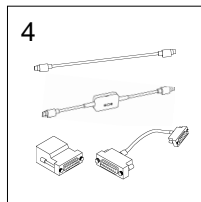
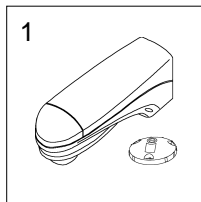
2.3.2 Removal of the SpectroScan/SpectroScan T protective packaging

Before starting the device, remove the screws on the back of the measuring table. Failure to remove the lock down screws, before operation, may result in damage to the instrument.



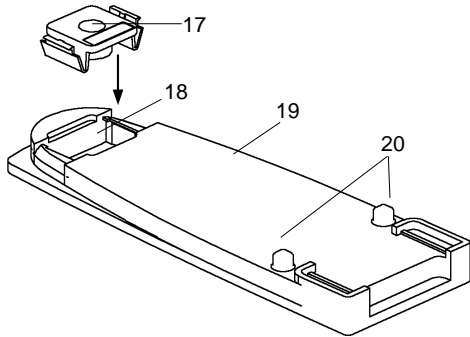
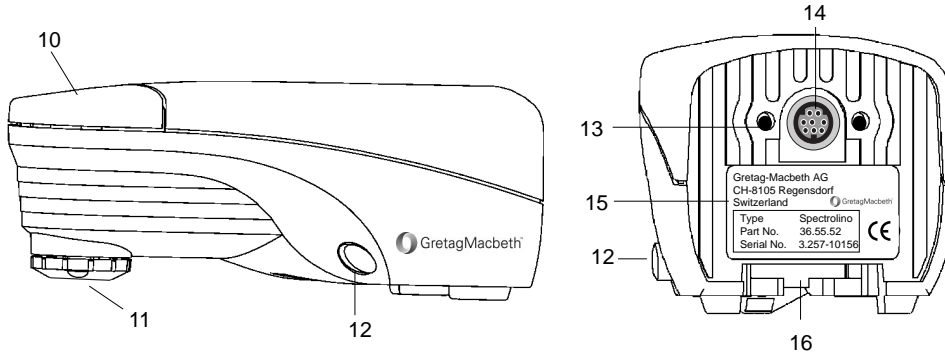
3 Spectrolino operation

3.1 Bill of materials

**Legend:**

- 1 Spectrolino with NO filter
- 2 Calibration plate with white reference
- 3 Positioning foot
- 4 Cable set
- 5 Power supply
- 6 Manual
- 7 Carrying case
- 8 D65 filter, POL filter
(only for Spectrolino
4.5 mm)
- 9 Video adapter

3.2 Functional elements



Legend:

- | | |
|--|---------------------------------------|
| 10 Measurement key | 17 White reference with serial number |
| 11 Filter tube | 18 Slot for mounting white reference |
| 12 Release key | 19 Calibration plate |
| 13 Centring pin guides for mounting on SpectroScan | 20 Positioning pin |
| 14 Data interface | |
| 15 Identification plate | |
| 16 Slot for insertion of folding tab (24) | |

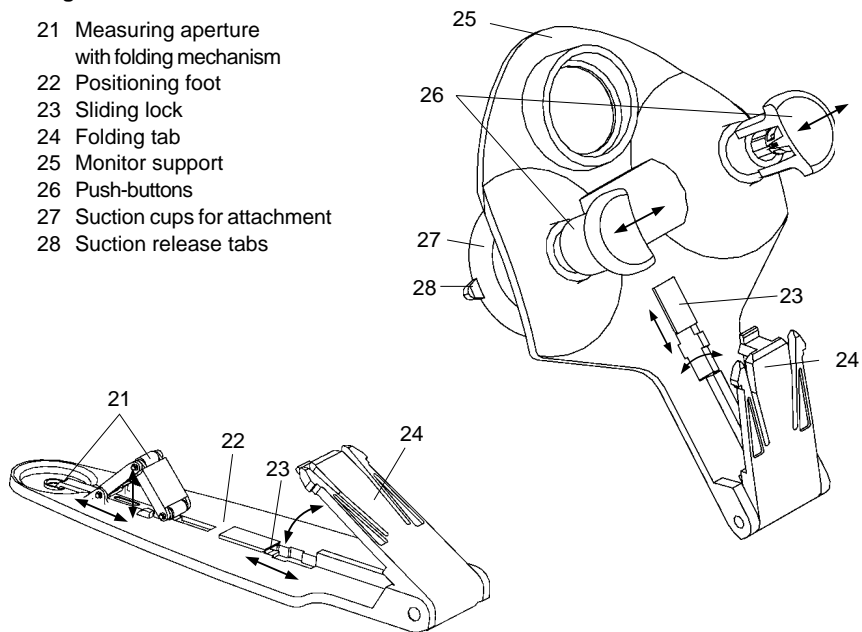
**Spectrolino
operation**

3

Spectrolino operation

Legend:

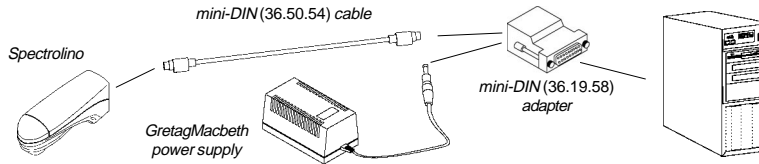
- 21 Measuring aperture with folding mechanism
- 22 Positioning foot
- 23 Sliding lock
- 24 Folding tab
- 25 Monitor support
- 26 Push-buttons
- 27 Suction cups for attachment
- 28 Suction release tabs



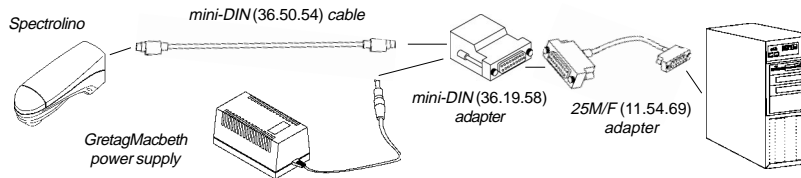
3.3 Set-up

The Spectrolino does not have a display. Measurements and analysis of the data is performed by means of various software packages. The cable set (4) supplied with the instrument, for connecting it to the computer, will address the following connection requirements for both Macintosh and Personal Computer. Details of the accessories provided with the instrument and how they would be configured are covered in the following diagrams. For direct connection to the computer a power supply (5) is included. When used with SpectroScan/SpectroScan T, the power is supplied by SpectroScan/SpectroScan T.

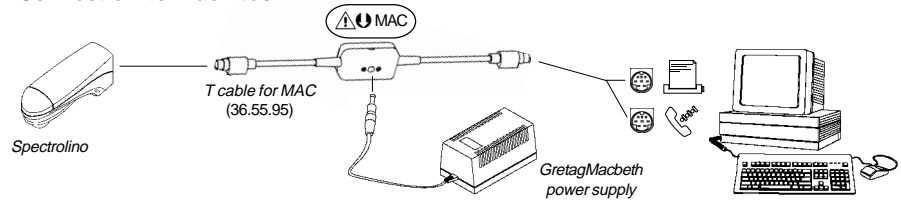
→ Connection to a PC with a 25 pin serial interface



→ Connection to a PC with a 9 pin serial interface

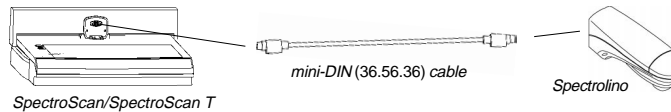


→ Connection to Macintosh



- When connecting to Macintosh, check cable directions. The warning given on the junction box indicates where the cable terminals must be inserted.

→ Connection through the SpectroScan/SpectroScan T for manual measurement of control or emissions



- To avoid confusion, compare the serial numbers of your own cables with those given in the respective overviews.
- If the Spectrolino is connected in any of these ways with power supplied, an acoustical signal will be given (a series of four tones) confirming the unit is connected correctly.

3.4 Use

The Spectrolino is equipped with a single measurement key (10). With this key you are able to actuate a measurement, as well as performing an absolute white calibration with automatic filter recognition or restoring the measuring conditions to the original factory settings.

The Spectrolino has the ability to measure reflectance, both manual and automatic, as well as take emissive measurements. Depending upon the software employed, the instrument can be attached to the SpectroScan/SpectroScan T, the positioning foot (22), or the monitor support (25) by sliding the instrument into the insertion slot (16) or the centering pins (13) on the SpectroScan/SpectroScan T.



- Be sure to check that the tabs (24) are securely fastened and locked down to the measuring foot (22) or the monitor support (25) before operation. This should also be checked when mounting on the SpectroScan/SpectroScan T. To unlock the instrument, press in and hold down the release keys (12) on both side of the instrument.

As the Spectrolino is not equipped with any display, its functions, such as measurement, absolute white calibration, etc. are confirmed by acoustic signals. The various tone sequences are described and illustrated with the various functions.

3.4.1 Manual control measurement

3.4.1.1 Absolute white calibration

Rest the Spectrolino on the calibration plate (19) with the white reference incorporated (17), so that the measuring equipment is correctly inserted on the positioning pins (20). Keep the measurement key (10) pressed for four seconds, until the device confirms successful calibration by means of an acoustic signal. This signal consists of three tones: one short low tone, one high long tone and finally another short low tone.

Calibration of the Spectrolino is always an absolute white calibration. If the device has been set by software to paper references, during calibration it switches back to the absolute white reference.



- Ensure that the white reference serial number coincides with the serial number of the Spectrolino .
- Regularly check the cleanliness of the white reference.
- Calibrate the Spectrolino at least once a day.
- If numerous measurements are undertaken in rapid succession, after about 100 measurements, it is necessary to recalibrate the Spectrolino. If frequently switched on, the device's measurement lamp tends to overheat; this may cause colour shift. Through calibration, measurement results may be kept constant.
- If subjected to thermal oscillation greater than 5°C, the Spectrolino must be recalibrated.

3.4.1.2 Measurement of control originals

The Spectrolino is equipped with the measuring foot (22) for manual measurement. Insert the foot's folding tab (24) into the slot (16) of the instrument and ensure that the foot is in the locked position.



Position the instrument on the measurement field such that the colour completely fills the measuring aperture (21). Lowering the instrument onto the foot retracts the aperture so that there is no interference with the measurement. The measurement is actuated by brief pressure on the measurement key (10). A brief single tone confirms that the measurement has taken place.



- Ensure that the Spectrolino is on the same plane as the sample under measurement. For very thick samples, the measuring device must be brought to the same height by placing it on a suitable base. An oblique position of the measuring device may cause errors in measurement.

3.4.2 Taking emissive measurements

3.4.2.1 Calibration for emissive measurement

Before using the Spectrolino to perform an emissive measurement, it is necessary to perform a calibration for emissive measurement.



- Emissive measurements may only be performed using the NO filter. If necessary, before performing the calibration, replace the filter (for instructions, see chap. 3.4.4 Filter Substitution).

Position the instrument on the calibration plate (19) with the white reference (17), so that light can not enter the measuring aperture. Emissive calibration can only be initiated via software activation.

3.4.2.2 Monitor measurement

The Spectrolino is equipped with a monitor support (25) for emissive measurement. To set up for this measurement, insert the support's folding tab (24) into the slot (16) on the instrument until it locks in position. Attach the measuring device to the monitor support (25) by means of the sliding lock (23).



Position the Spectrolino on the monitor. The suction cups (27) are operated by pressing the pressure buttons (26). Usually, measurement is started by software. A succession of three brief tones confirms successful measurement.



- The Spectrolino may be removed from the monitor by pulling the vent tabs (28) of the suction cups (27). To avoid damage to the device, never pull the pressure buttons (26) to release the instrument.

3.4.3 Reset

Position the Spectrolino on the calibration plate (19) with the white reference incorporated (17). Keep the measurement key (10) depressed for ten seconds. Following the acoustic signals indicating simple control measurement and absolute white calibration, a sequence of four tones indicates imminent reset. At this point there will be two tones in rapid succession, that are repeated after a pause. The measuring device is restored to the original basic settings only after the fifth long tone.



- Resetting must always be performed if any anomalies occur in the link between software and the Spectrolino, or if the results of measurement cannot be reproduced. (see chap. 3.5 Diagnostics).

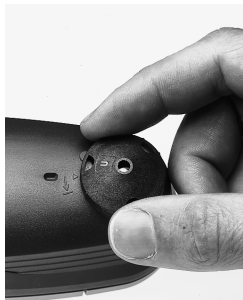
3.4.4 Filter substitution (only for Spectrolino 4.5 mm)

The Spectrolino comes equipped with three different filters tubes. Depending upon the application, it is possible to attach a NO filter, a POL filter (Polarisation) or a D65 filter in front of the measuring aperture. The filters are marked with the following white coloured letters:

Filter NO: **U**

Filter POL: **P**

Filter D65: **D65**



To substitute a filter attached to the aperture, turn the filter tube in a counter clockwise direction until the point of the arrow aligns with the arrow on the instrument. In this position, the filter may be easily removed. To attach new filter, align with the reference arrows and turn clockwise to the end of the mark. This is the only correct position for the filter.



- **Important:** Following every filter substitution it is necessary to perform absolute white calibration of the measuring device.
- Keep unused filters in a dark, dry place, well protected from dust. Regularly check that the filters are clean. Dirt or fingerprints may cause errors in measurement results.

3.5 Diagnostics

- Problem description: The Spectrolino does not work.
Cause: No electrical supply.
Remedy: Check to see that the charging unit is correctly inserted into the GretagMacbeth cable or the mini-DIN adapter.

- Problem description: Communication with hardware impossible.
Cause: Modified Baud rate.
Remedy: Check that cables and terminals are correctly inserted. Perform a reset as indicated in chap. 3.4.3

- Problem description: Measured values are unrealistic
Cause: Measurement conditions varied, or the measuring lamp is malfunctioning
Remedy: Check that the correct tube is being used, as well as the white reference belonging to the measuring device. Check that the measuring lamp lights up by performing a simple measurement. Perform a reset as indicated in chap. 3.4.3

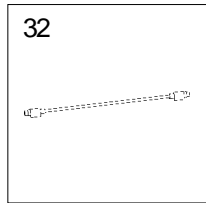
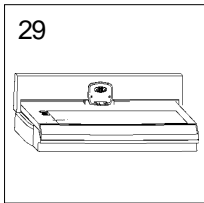
- Problem description: Application software indicates that the filter has not been identified
- Cause: The last absolute white calibration has not been performed as prescribed.
- Remedy: Perform a reset with the NO filter on white reference (see chap. 3.4.3).



- If the above measures are unable to restore normal operating conditions, it is necessary to contact your local GretagMacbeth support service immediately. Do not attempt to dismantle or repair the device.

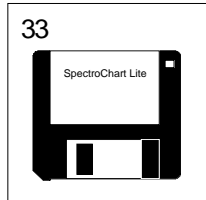
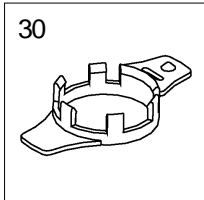
4 SpectroScan operation

4.1 Included in Supply



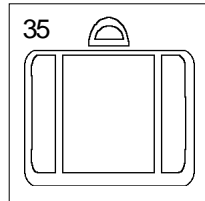
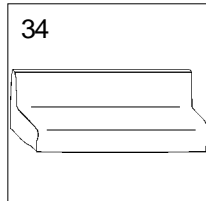
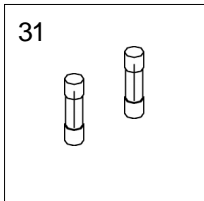
Legend:

- 29 SpectroScan
- 30 Positioning support
- 31 2 fuses
- 32 Cable set
- 33 SpectroChart Lite software, for Mac and Windows
- 34 Dust cover



optional:

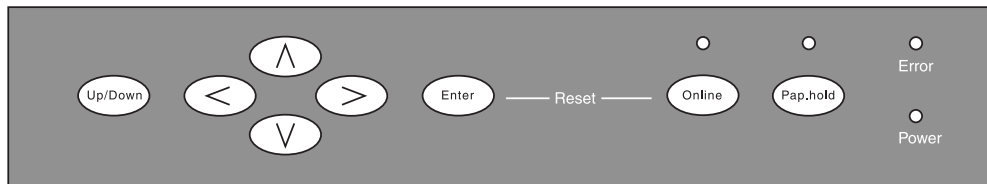
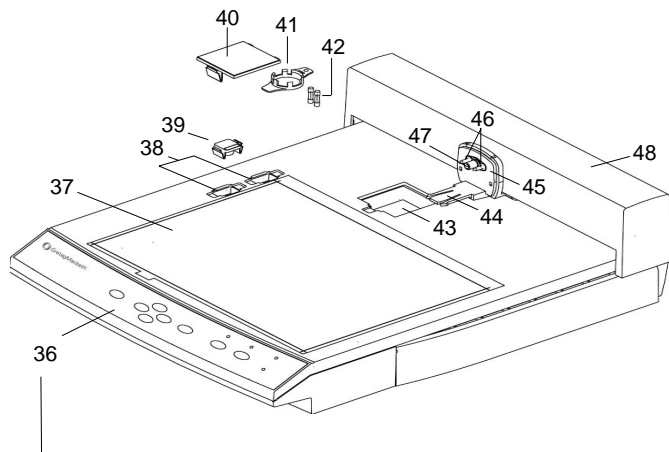
- 35 Carrying case

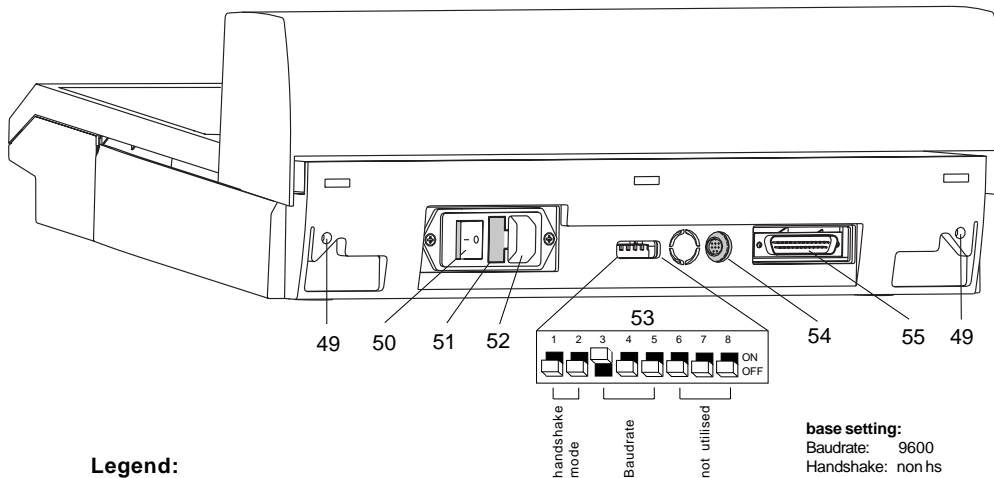


4.2 Functional elements

Legend:

- 36 Field control panel
- 37 Electrostatic plate
- 38 Slot for calibration tiles
- 39 Blank tiles
- 40 Storage compartment cover
- 41 Positioning device
- 42 Spare fuses
- 43 Storage compartment
- 44 Tab
- 45 Transverse slide
- 46 Centring pins
- 47 Mini-DIN data interface
- 48 Longitudinal slide





Legend:

- 49 Transportation protection
- 50 Main switch
- 51 Fuse box
- 52 Mains socket
- 53 DIP-switches
- 54 Mini-DIN data interface
- 55 D-sub data interface (25 P)

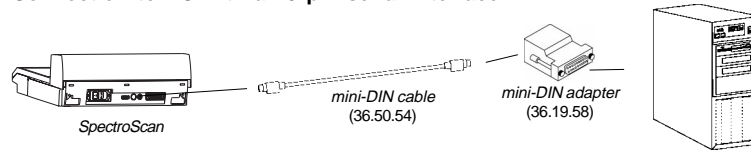
		S3	S4	S5
Baudrate:	300	OFF	OFF	OFF
	600	OFF	OFF	ON
	1200	OFF	ON	OFF
	2400	OFF	ON	ON
	9600	ON	OFF	OFF
	19200	ON	OFF	ON
	28800	ON	ON	OFF
57600	ON	ON	ON	
Handshake:	non handshake		S1	S2
	Xon/Xoff		OFF	ON
	Hardware		ON	OFF

base setting:
 Baudrate: 9600
 Handshake: non hs

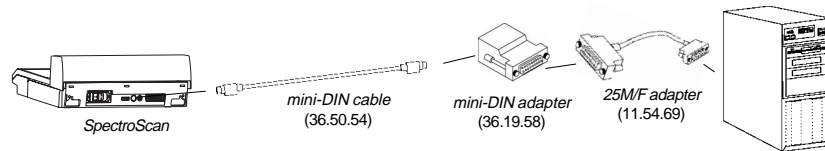
4.3 Set up

The SpectroScan does not have any display. Readings and analysis of measurement data are thus carried out by means of specific software. The cable set (4) supplied with the Spectrolino, for connecting it with the relative hardware, covers all connection requirements. Details regarding necessary accessories are given in the following overviews:

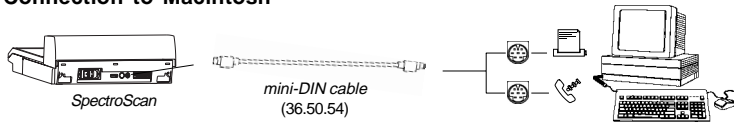
→ Connection to PC with a 25 pin serial interface



→ Connection to PC with a 9 pin serial interface

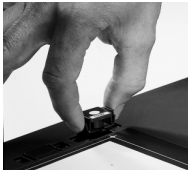


→ Connection to Macintosh



- To avoid confusion, compare the item code of your cable with the indications given in the corresponding overview.
- Check the DIP-switches configuration (see page 23) on the back of the measuring table.
- Connection to the main power supply (customer outlet) must be made with the cable supplied.

Before turning on the power to the SpectroScan, the Spectrolino must be attached by the following procedure:



Point 1: Mount the white reference (17) from the Spectrolino into the upper slot (38) of the SpectroScan.



Point 2: Insert the positioning device (41) on the Spectrolino so that it locks into position.




Point 3: Insert the Spectrolino into the tab (44) on the SpectroScan until it locks into position.

4.4 Use

The SpectroScan must always be operated with the appropriate software. This document explains procedures for applying the software supplied with the device, called SpectroChart Lite. Specific information regarding this software is given in the "Readme.txt" file in the program.



4.4.1 Measurement original setup

Position the test chart to read on the electrostatic surface (37), such that it does not exceed the white markings. Pressing the field command key (36) , fixes the test chart to the measuring table.



- The allowed thickness for test originals is just 1.5 mm. To avoid measuring errors, this value must not be exceeded.
- Normally no supplementary fixing is required for the original.
- Ensure that the original is level, and that no bubbles form.
- The orientation of the original is irrelevant, as any obliquity is compensated by the software.


4.4.2 Definition of original type and orientation

Initiate the SpectroChart Lite software by double-clicking on the corresponding icon. The software itself establishes the link with the SpectroScan and checks that the Spectrolino is connected. If communication is correctly established, it is necessary to inform the software which type of test chart is being used. Clicking on the field  displays a selection of the available test charts. Select the desired test chart and confirm selection by clicking .

In the dialogue window that follows, it is possible to define the name and type of file, as well as the place in which it is to be saved. Confirm settings by clicking . The test chart to be measured is then loaded. The video representation of the test chart serves as a visual control during the measurement process.

To permit the SpectroScan to position the measuring device over the fields to be measured, it is necessary to specify the dimensions and position of the test chart. Reply to the question regarding positioning of the sheet. The video representation now shows the three positions that must be reached manually with the Spectrolino. The predefined sequence must be respected.



Using the SpectroScan field command cursor keys (36) , position the measuring device so that the positioning device grid (30) entirely covers the 1st measurement field completely. To check positioning, the Spectrolino may be lowered onto the measuring surface and then raised by means of the key. The coordinates of the 1st measurement field are transferred to the software when the key is pressed. To enter the readings for the 2nd and 3rd fields, proceed as described above.



After having inserted the last position, an absolute white calibration of the Spectrolino is performed automatically, and the automatic data reading procedure is started. The process is displayed on the video screen, and may be interrupted at any moment.



- The procedure described may vary according to the type of software being used.

4.4.3 Supplementary functions



4.4.3.1 Reset

The SpectroScan software may be reset by pressing the  and  keys. Resetting reinitialises the measuring table.



- Resetting must be performed in cases of connection problems between user software and the SpectroScan
- Resetting of the measuring table is independent of the Spectrolino. If a communication anomaly occurs, the measuring device must be reset before the reset of the measuring table (see chap. 3.4.3).

4.4.3.2 Demo Mode

Keeping the  and  depressed when switching the measuring table on, simulates a test chart measurement. The measuring table crosses 20 fields transversely, and 10 fields longitudinally. The procedure may be interrupted by switching the table off.

4.4.3.3 Replacing fuses

First, disconnect the device from the main power supply by removing the plug. In the storage compartment (43) of the SpectroScan there are two spare fuses. To replace these fuses, open the fuse box (51) on the back of the device. The measuring table may only be switched on again when the fuse box is closed.



- Before opening the fuse box, always disconnect the device from the main power supply. Fuses must be replaced with code 13.52.05 type fuses supplied by GretagMacbeth .

4.5 Diagnostics

- Problem description: The SpectroScan does not work, and power supply indicator lights do not come on.
Cause: No electrical supply
Remedy: Check that the cable and connections are correctly inserted, and that the device is switched on. Replace the fuses (see chap. 4.4.3.3.).

- Problem description: Communication with hardware impossible.
Cause: Modified baud rate.
Remedy: Check configuration of the DIP-switches and correct cable connections.
Perform a reset as described in chapter 4.4.3.1.

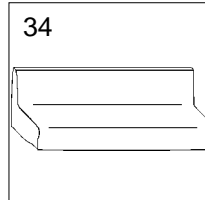
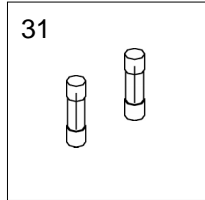
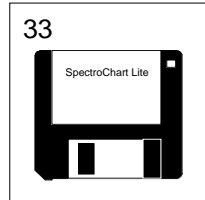
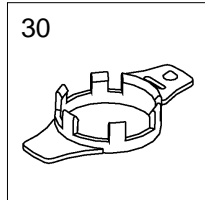
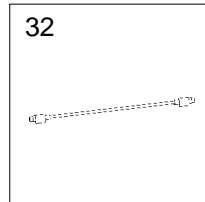
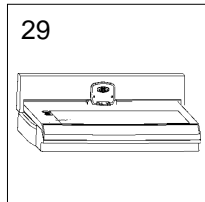
- Problem description: The transverse and longitudinal slides do not move, or make strange noises when they move.
Cause: Software or motor problem.
Remedy: Remove the transportation protection (chap. 2.3.2)
Perform a reset as described in chapter 4.4.3.1., then perform a demo (chap. 4.4.3.2).



- If the above measures are unable to restore normal operating conditions, it is necessary to contact your local GretagMacbeth support service immediately. Do not attempt to dismantle or repair the device.

5 SpectroScan T operation

5.1 Included in Supply

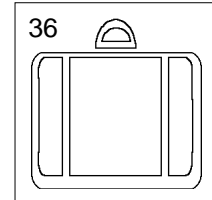
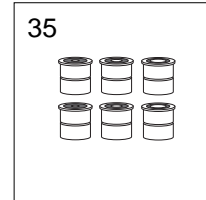


Legend:

- 29 SpectroScan T
- 30 Positioning support
- 31 2 fuses
- 32 Cable set
- 33 SpectroChart Lite software, for Mac and Windows
- 34 Dust cover
- 35 6 measurement apertures and 1 cover

optional:

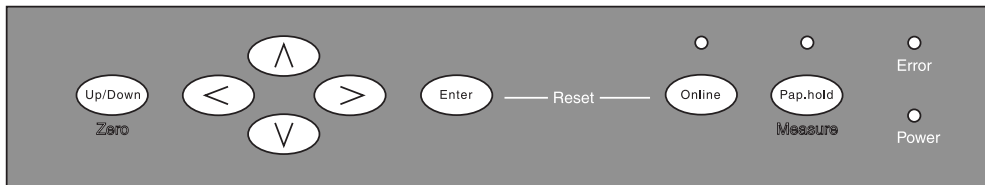
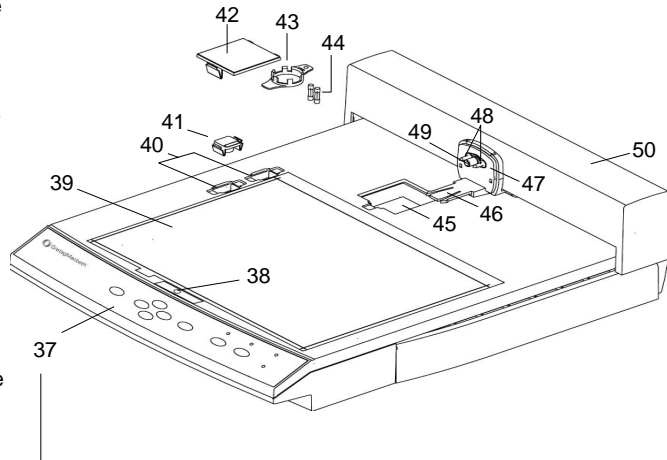
- 36 Carrying case



5.2 Functional elements

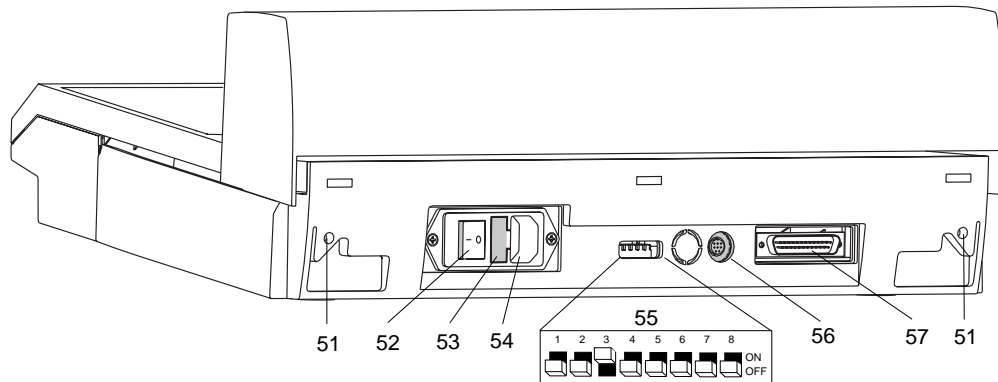
Legend:

- 37 Field control panel
- 38 Measurement aperture with lighting of surrounding area
- 39 Electrostatic plate
- 40 Slot for calibration tiles
- 41 Blank tiles
- 42 Storage compartment cover
- 43 Positioning device
- 44 Spare fuses
- 45 Storage compartment
- 46 Tab
- 47 Transverse slide
- 48 Centring pins
- 49 Mini-DIN data interface
- 50 Longitudinal slide



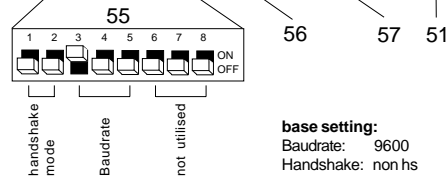
SpectroScan T
operation

5



Legend:

- 51 Transportation protection
- 52 Main switch
- 53 Fuse box
- 54 Mains socket
- 55 DIP-switches
- 56 Mini-DIN data interface
- 57 D-sub data interface (25 P)

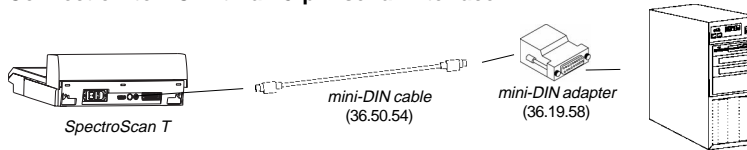


		S3	S4	S5
Baudrate:	300	OFF	OFF	OFF
	600	OFF	OFF	ON
	1200	OFF	ON	OFF
	2400	OFF	ON	ON
	9600	ON	OFF	OFF
	19200	ON	OFF	ON
	28800	ON	ON	OFF
57600	ON	ON	ON	
Handshake:	non handshake		S1	S2
	Xon/Xoff		OFF	ON
	Hardware		ON	OFF

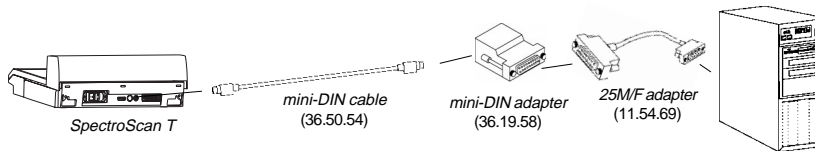
5.3 Set up

The SpectroScan T does not have any display. Readings and analysis of measurement data are thus carried out by means of specific software. The cable set (4) supplied with the Spectrolino, for connecting it with the relative hardware, covers all connection requirements. Details regarding necessary accessories are given in the following overviews:

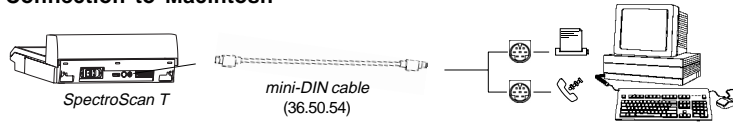
→ Connection to PC with a 25 pin serial interface



→ Connection to PC with a 9 pin serial interface



→ **Connection to Macintosh**



- To avoid confusion, compare the item code of your cable with the indications given in the corresponding overview.
- Check the DIP-switches configuration (see page 32) on the back of the measuring table.
- Connection to the main power supply (customer outlet) must be made with the cable supplied.

Before turning on the power to the SpectroScan T, the Spectrolino must be attached by the following procedure:



Point 1: Mount the white reference (17) from the Spectrolino into the upper slot (40) of the SpectroScan.



Point 2: Insert the positioning device (43) on the Spectrolino so that it locks into position.




Point 3: Insert the Spectrolino into the tab (16) on the SpectroScan T until it locks into position.

5.4 Use

The SpectroScan T must always be operated with the appropriate software. This document explains procedures for applying the software supplied with the device, called SpectroChart Lite. Specific information regarding this software is given in the "Readme.txt" file in the program.

5.4.1 Reflection measurement



5.4.1.1 Measurement original setup

Position the test chart to read on the electrostatic surface (37), so that it does not exceed the white markings. Pressing the field command key (36) , fixes the test chart to the measuring table.



- The allowed thickness for test originals is just 1.5 mm. To avoid measuring errors, this value must not be exceeded.
- Normally no supplementary fixing is required for the original.
- Ensure that the original is level, and that no bubbles form.
- The orientation of the original is irrelevant, as any obliquity is compensated by the software.

5.4.1.2 Definition of original type and orientation


Initiate the SpectroChart Lite software by double-clicking on the corresponding icon. The software itself establishes the link with the SpectroScan and checks that the Spectrolino is connected. If communication is correctly established, it is necessary to inform the software which type of test chart is being used. Clicking on the field  displays a selection of the available test charts. Select the desired test chart and confirm selection by clicking .

SpectroScan T operation

In the dialogue window that follows, it is possible to define the name and type of file, as well as the place in which it is to be saved. Confirm settings by clicking . The test chart to be measured is then loaded. The video representation of the test chart serves as a visual control during the measurement process.

To permit the SpectroScan T to position the measuring device over the fields to be measured, it is necessary to specify the dimensions and position of the test chart. Reply to the question regarding positioning of the sheet. The video representation now shows the three positions that must be reached manually with the Spectrolino. The predefined sequence must be respected.



Using the SpectroScan T field command cursor keys (36) , position the measuring device so that the positioning device grid (30) entirely covers the 1st measurement field completely. To check positioning, the Spectrolino may be lowered onto the measuring surface and then raised by means of the key. The coordinates of the 1st measurement field are transferred to the software when the key is pressed. To enter the readings for the 2nd and 3rd fields, proceed as described above.

After having inserted the last position, an absolute white calibration of the Spectrolino is performed automatically, and the automatic data reading procedure is started. The process is displayed on the video screen, and may be interrupted at any moment.



- The procedure described may vary according to the type of software being used.

5.4.2 Transmission measurement (only with Spectrolino 4.5 mm)

When it is turned On, SpectroScan T is set to Reflection mode. In order to switch the instrument to transmission measurement mode, simultaneously press **Zero** and **Measure** keys on Field Control Panel (37). When going to transmission mode, the surrounding area is lighted and the measurement lamp is turned on in stand-by. Furthermore, Spectrolino is automatically positioned on measurement aperture. This procedure requires about 20 seconds. After the position change, Spectrolino moves to the waiting position, out of the measurement field.



- For transmission measurements, the position support (30) is not required. Remove it, if necessary, prior to perform the measurement, in such a way as to facilitate the positioning of the measurement original.
- Warning: the thickness of material for transmission measurement, must not exceed 0.25 mm.

The SpectroScan T supply also includes 6 measurement apertures and a cover (35). The type of aperture to be used for measurements depends on the measurement objective. With directional apertures it is possible to detect the heterogeneity of a measurement original, while using the diffusion apertures it is possible to obtain an average value of the measured field. The instructions for aperture replacement are described on chapter 5.4.2.3 of this manual.



- If no transmission measurements are performed for a long period of time, remove the measurement aperture and fit the cover, to prevent the device from getting dusty.

5.4.2.1 Calibration

Before performing measurements with SpectroScanT, it is necessary to calibrate the measurement instrument. By briefly pressing the Zero key, Spectrolino turns to the measurement position. After about 10 seconds the instruments turns back to the waiting position. The calibration procedure is now completed.



- Perform a calibration after every position change. Moreover, the instrument should be calibrated at regular intervals (i.e. after about 10 measurements) and after long pauses between measurements.

5.4.2.2 Measurement start up

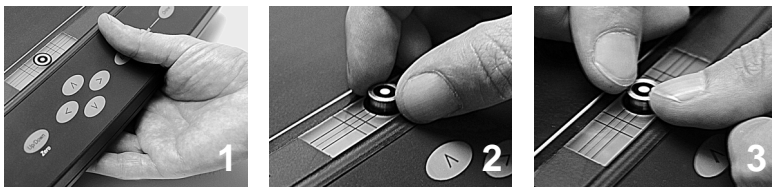
Position the original to be measured onto the aperture. Press briefly the Measure key to start the measurement. The measurement operation requires about 5 seconds. As soon as the measurement is carried out, Spectrolino returns to the waiting position.



- The measurement original must be positioned in manual mode. Depending on the software used, the measurement may automatically start up. The instructions for automatic measurement start up can be found in the relevant software documentation.

5.4.2.3 Aperture substitution

By slightly raising the measurement lamp (figure 1) the measurement aperture is ejected. Grasp the aperture end, extracting it with care (figure 2). Now insert the desired the new aperture and press it with both thumbs to fit in position (figure 3).





After any aperture replacement, it is necessary to perform a re-positioning operation. To do this, **press and hold** the **Zero** key until Spectrolino moves from the waiting position. After about 20 seconds the re-positioning operation is completed and the instrument turns back to the waiting position.



- Do not touch the aperture surface with fingers, to prevent it from getting dirty.
- To clean the measurement apertures use a soft cloth dampened with alcohol to avoid scratching the aperture surface.

5.4.3 Supplementary functions



5.4.3.1 Reset

The SpectroScan T software may be reset by pressing the  and  keys. Resetting reinitialises the measuring table.



- Resetting must be performed in cases of connection problems between user software and the SpectroScan T.
- Resetting of the measuring table is independent of the Spectrolino. If a communication anomaly occurs, the measuring device must be reset before the reset of the measuring table (see chap. 3.4.3).

5.4.3.2 Demo Mode

Keeping the  and  depressed when switching the measuring table on, simulates a test chart measurement. The measuring table crosses 20 fields transversely, and 10 fields longitudinally. The procedure may be interrupted by switching the table off.

5.4.3.3 Replacing fuses

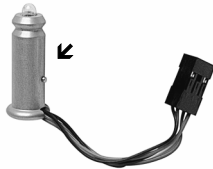
First, disconnect the device from the main power supply by removing the plug. In the storage compartment (45) of the SpectroScan T there are two spare fuses. To replace these fuses, open the fuse box (53) on the back of the device. The measuring table may only be switched on again when the fuse box is closed.



- Before opening the fuse box, always disconnect the device from the main power supply. Fuses must be replaced with code 13.52.05 type fuses supplied by GretagMacbeth .

5.4.3.4 Replacing the measurement lamp

To replace the measurement lamp, turn off SpectroScan T and remove the aperture, as described on chapter 5.4.2.3. Pull down the lamp to remove it from the receptacle. Extract the plug that connects the lamp to the instrument. Set the new lamp so that the cable and the guidance pin are turned to the right, then carefully insert the new lamp. Ensure that the guidance pin (see the arrow) is correctly set inside the groove. Now connect the plug of the new lamp to the instrument and re-insert the measurement aperture. When the instrument is turned on, it automatically performs a re-positioning. Perform a calibration before starting a new measurement.



- Use exclusively GretagMacbeth lamps, article 36.61.16.

5.5 Diagnostics

- Problem description: The SpectroScan T does not work, and power supply indicator lights do not come on.
Cause: No electrical supply
Remedy: Check that the cable and connections are correctly inserted, and that the device is switched on. Replace the fuses (see chap. 5.4.3.3.).

- Problem description: Communication with hardware impossible.
Cause: Modified baud rate.
Remedy: Check configuration of the DIP-switches and correct cable connections.
Perform a reset as described in chapter 5.4.3.1.

- Problem description: The transverse and longitudinal slides do not move, or make strange noises when they move.
Cause: Software or motor problem.
Remedy: Remove the transportation protection (chap. 2.3.2)
Perform a reset as described in chapter 5.4.3.1., then perform a demo (chap. 5.4.3.2).

- Problem description: During re-positioning, the **Error** Led lights up.
Cause: 1. The measurement lamp is faulty.
2. The cover is installed instead of the aperture.
Remedy: 1. Observe if the lamp lights at the measurement start up.
If not, replace the lamp following the instructions described on Chapter 5.4.3.4.
2. Insert an aperture and repeat the positioning operation.
- Problem description: Spectrolino does not position onto the measurement aperture.
Cause: Mechanical problem.
Remedy: Send the instrument and related apertures to a GretagMacbeth Service Centre.



- If the above measures are unable to restore normal operating conditions, it is necessary to contact your local GretagMacbeth support service immediately. Do not attempt to dismantle or repair the device.

6 Technical Specifications (subject to changes)

6.1 Spectrolino

Spectral analysis:

with a holographic diffraction grating

Spectral range:

380 nm to 730 nm

Physical resolution:

10 nm

Measurement modes:

Reflection, Emission, Transmission

Reflection:

Measurement geometry:

45°/0° ring optic DIN 5033

Measurement aperture: 4.5/8 mm

Light source: gas filled tungsten, type A illumination

Physical filters:

D65 (approximated daylight), Pol (polarised) and No (neutral, incandescent lamp light A)

Spectra: reflection, density

Colorimetry:

CIE-XYZ, CIE-xyY, CIE-L*a*b*, CIE-L*C*h*(a*b*), CIE-L*u*v*, CIE-L*C*h*(u*v*), LABmg, LCHmg, HunterLab, RxRyRz

Illumination types:

D50, D65, A, C, D30... D300, F1...F12

Standard observer angles:

2°, 10°

White base: absolute, relative

Density standards:

DIN 16536, DIN 16536 NB, ANSI STATUS A, ANSI STATUS T

Measurement time:

No Filter ca. 1 s, Pol Filter ca. 2.5 s, D65 ca. 2 s Filter

Measurement range:

Density DIN 16536: 0.0 D – 2.5 D

Reflection:

380 – 480, 650 – 730 nm: 0...200 %

480 – 520, 600 – 650 nm: 0...150 %

520 – 600 nm: 0...120 %

Inter-instrument agreement:

typically 0.3 ΔE^*CIE_{Lab} (D50, 2°), average based on 12 BCRA tiles, maximally 0.8 ΔE^*CIE_{Lab} (D50, 2°) on 12 BCRA tiles.

Short-term repeatability:

0.03 $\Delta E^*10 CIE_{Lab}$ (D50, 2°), mean value of 10 measurements every 10 s on White.

Density repeatability:

density DIN 16536 (repeatability \pm 0.01 D)

With No-Filter: 0.0 D – 2.2 D, Yellow 0.0 D – 1.8 D

With Pol-Filter: 0.0 D – 2.2 D, Yellow 0.0 D – 1.5 D

Emission:

Measurement spot size: 4.5/8 mm

Measurement range: 0...300 cd/m²

Video frequency: 50 – 250 Hz

Emission spectra:

spectral radiometric emission measurement

Colorimetry: XYZ, xyY

Standard observers: 2°, 10°

Brightness base: absolute, relative

Measurement time: ca. 1.5 s

Short-term repeatability: x, y: ± 0.001
(typically, measured on white 80 cd/m²)

Transmission (with SpectroScan T):

Measurement geometry:

diffuse/specular (d/0), specular/specular
(0/180) to DIN 5033

Apertures: 1 mm, 2 mm, 3 mm

Illuminant: illumination A to ISO 5/3

Spectra: transmission, density

Colorimetry:

CIE-XYZ, CIE-xyY, CIE-L*a*b, CIE-
L*C*h (a*b), CIE-L*u*v, CIE-L*C*h*(u*v*),
LABmg, LCHmg, HunterLab

Illumination types:

D50, D65, A, C, D30... D300, F1...F12

Standard observers: 2°, 10°

Density standards:

DIN 16536, DIN 16536 NB, ANSI STATUS A,
ANSI STATUS T

Measurement time: 5 s

Short-term repeatability:

0.5 ΔE*CIELab (D65, 2°)

Mean value of 10 measurements every

15 s on 3 mm aperture, diffuse

Measurement range:

Standard deviation of 10 measurements
every 10 s with 3 mm aperture, diffuse/
specular:

Density (ANSI A):

Cyan 0.0 D – 2.5 D : 0.03 D

Magenta 0.0 D – 2.5 D : 0.03 D

Yellow 0.0 D – 2.5 D : 0.03 D

Data interface specification:

RS 232C serial interface with baud rates from
110 to 57,600

Data interface connector: Mini-Din connector

Power supply: 15 V DC 0.8A

Power supply adapter specifications:

85 VAC – 270 VAC, 47 – 63 Hz

Environment conditions:

- Indoor usage
- Operating temperature: 10°C to 35°C
- Storage temperature: -20°C to 50°C
- Humidity:
 - max 80%, non condensing
- Altitude: up to 2000 m NN
- Dirty degree:
 - 2 according to IEC 664

Physical dimension:

Length 155 mm, Width 65 mm, Height 63 mm
Weight: 230 g.

6.2 SpectroScan and SpectroScan T**Data interface specification:**

RS 232C serial interface with baud rates
110 to 57,600

Data interface connector:

Mini-Din and D-Sub connector

Operating voltage:

100 VAC to 240 VAC +/- 15%, transient
over-voltage according to Category II

Frequency: 50 to 60 Hz**Power consumption:**

100 VAC 2A, 240 VAC 1A

Environment conditions:

- Indoor usage
- Operating temperature: 10°C to 40°C

- Storage temperature: -20°C to 70°C
- Humidity:
 - max 80% of relative humidity up to 31°C,
decreasing in linear mode up to 50% of
relative humidity at 40°C, non condensing
- Altitude: up to 2000 m NN
- Dirty degree:
 - 2 according to IEC 664

Physical dimension:

Depth 53 cm, Width 43 cm, Height 15 cm
Weight: 7.5 kg.

Thickness of sample:

Reflection: max 1.5 mm
Transmission: max 0.25 mm

Positioning precision: ± 0.25 mm**Positioning area:** max 24 x 31 cm**Fuses:** T 2.5 AL 250 V

6.3 CE Declaration of conformity

The undersigned, representing the following manufacturer

Gretag-Macbeth AG
Althardstrasse 70
CH-8105 Regensdorf

herewith declares that the product

XY-Table	XY-Table	Spectrophotometer
SpectroScan	SpectroScanT	Spectrolino

is in conformity with the provisions of the following EC directive(s) (including all applicable amendments)

73/23/EEC Electrical equipment for use within specified voltage limits

89/336/EEC Electromagnetic compatibility

and that the standards and/or technical specifications referenced overleaf have been applied.

Last two digits of the year in which the CE marking was affixed: **99**

CH-8105 Regensdorf
06. Okt. 1999

Th. Senn
Vicepresident

Ch. Benz
Product Manager Instruments



References of standards and/or technical specifications applied for this declaration of conformity, or parts thereof:

- harmonized standards on Europe and in Switzerland:

EN61010-1:1993 + A2:1995

Safety requirements for Electrical Equipment for Measurement, Control and Laboratory Use, Part 1: General

EN55011:1991 (class B)

EMC Emission measurements for Industrial, Scientific and Medical equipment (ISM-Equipments)

EN50082-2:1995

EMC generic immunity. (- 1): residential commercial and light industrie, (- 2): Industrial enviroments

- Standards for Canada and USA

CAN/CSA-C22.2

Safety requirements for Electrical Equipment for Measurement, Control and Laboratory Use, Part 1: General

UL Std. No. 3101-1

Safety requirements for Electrical Equipment for Measurement, Control and Laboratory Use, Part 1: General

FCC, Part 15, class A

Emission

6.4 FCC Declaration of conformity

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to both Part 15 of the FCC Rules and the radio interference regulations of the Canadian Department of Communications. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is like to cause harmful interference in which case the user will be required to correct the interference at his own expense.



Switzerland: Tel: +41 1 842 24 00, Fax: +41 1 842 22 22
United States: Tel: 800-622-2384, 845-565-7660 (Outside USA and Canada), Fax: 845-565-0390
Germany: Tel: +49 61 02 79 57 0, Fax: +49 61 02 79 57 57
United Kingdom: Tel: +44 1928 280050, Fax: +44 1928 280080
France: Tel: +33(0)1 6106 2180, Fax +33 (0)1 3462 0947
Italy: Tel: +39 0574 527755, Fax: +39 0574 527671
Russia: Tel: +7 095 502 9265 Fax: +7 095 502 9267
China (Hong Kong): Tel: +852 2368 7738, Fax: +852 2368 6717
China (Shanghai): Tel: +86 21 6267 6180, Fax: +86 21 6267 6832

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Part No. No. 98.43.61 (02/05)