MA68II

MULTI-ANGLE SPECTROPHOTOMETER

WARNING: This instrument is not for use in explosive environment.

WARNUNG: Das Gerät darf in einer explosiven Umgebung NICHT verwendet werden.

FCC

This equipment has been tested and found to comply with the limits for a Class A digital

CE DECLARATION

Manufacturer's Name:	X-Rite, Incorporated
Manufacturer's Address:	3100 44th Street, S.W. Grandville, Michigan 49418 U.S.A.
Model Name:	Multi-Angle Spectrophotometer
Model No.:	MA68B
Directive(s) Conformance:	EMC 89/336/EEC LVD 93/68/EEC

Dear Customer:

Table of Contents

This manual is organized into eight sections and four appendices. In order to make the best use of your instrument, it is recommended that you read all sections and appendices.

PRODUCT DESCRIPTION

The X-Rite MA68II multi-angle spectrophotometer is designed for measuring color on metallic and pearlescent paint finishes. The instrument incorporates a

INSTALLING BATTERY PACK

The instrument is shipped from the factory with the battery pack removed. **The battery pack is located in the instrument case (refer to Appendix D for location) and must be installed before the instrument is used.**

To Install Battery Pack:

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APPLYING POWER

NOTE: The battery pack must be installed before plugging in the AC Adapter.

1-5 1-5CHARG STATHE BATTERY PACKj/

AC Adapter Connection:

NOTE: Do not plug the AC adapter into the instrument without a battery pack

MENU PAGE SELECTION AND DISPLAY DESCRIPTION

The main menu is contained in two pages. To advance through the page menus, continually press Key #1.

norm (normal)

The norm key will always return the display to the main screen (L*a*b*, L*C*h°, etc.).

pass/fail

The pass/fail key is used to access pass/fail operation and tolerance editing.

store (storage)

The store key is used to access storage operation. From this mode measurement data is stored, printed and deleted from selected groups. This function can also be used with X-Rite's X-RiteColor® Master software program.

cal (calibration)

The cal key accesses the calibration function where white calibration and

The characters in the display above each keyswitch dictate which function will be selected or which action will take place when a keyswitch is pressed. Normally, uppercase lettering is used for display messages, and lower-case lettering is used for menu options that are selectable by the user.

The left side of the display label lists the measurement angle description. Each

INSTRUMENT POSITIONING AND MEASUREMENT TECHNIQUES

In order for the MA68II to obtain accurate and repeatable measurements, the bottom of the sensor nose must be flat with the surface to be measured. Any movement of the sensor nose can cause the measurement angles to vary, greatly affecting measurements on metallic and pearlescent paint finishes.

Measurements performed on a surface with a curve can cause measurement errors especially at the near specular

SECTION TWO

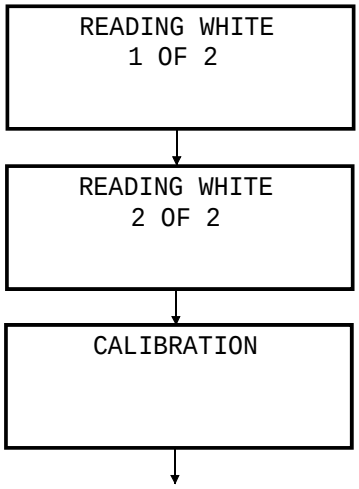
POSITIONING THE INSTRUMENT ON THE

INSTRUMENT CALIBRATION

SECTION TWO

- **READING WHITE - 1 OF 2, 2 OF 2** is displayed**.**

NOTE: If an error message occurs during calibration, try reading plaque again. If error message still occurs, refer to Appendix A.



- After white calibration readings are complete**, CALIBRATION UPDATED** is momentarily displayed and then **READ ZERO REFLECTANCE.**

3. Position instrument on **black trap**—as previously discussed—and press firmly on front of instrument.

4. Press **[read]** key #4.

OPERATION OPTIONS

9. Select read switch method by pressing **[⇔]** key #2 or **[⇒]** key #3.

PRINTOUT OPTIONS

Setting the printout options will determine what data will be transmitted out of the RS-232 port for normal and storage operation. Listed below are the available options.

REFERENCE ENTRY

The MA68II can display the difference between a reference and a sample. In order to display these differences the reference must first be entered into memory. There are 200 locations to store references.

The references are stored spectrally and the tristimulus values are recalculated each time a different illuminant/observer is selected.

5. After selecting reference location, center measurement aperture in sensor nose over reference to measure. Use the alignment marks on14[(t).1(m)1to.1(ent)4and Use

5. The instrument will display the absolute or difference measured for the selected angles.

USING MEASUREMENT AVERAGING

NOTE: Measurement Averaging must be activated in Operation Options before averaging can be performed. Refer to Section Three for procedure.

When averaging is activated, the averaging sequence will be required for all functions (i.e., normal, storage, and pass/fail).

Measurement averaging can be set “1 -

PASS/FAIL METHOD = ÷FI (Flop Index)

5. Press **[next]** key #4 to advance to **“FI HIGH TOLERANCE”** screen.

6. Set FI high tolerance values by pressing the **[+]** key #2 to increase value or **[-]** key #3 to decrease value.

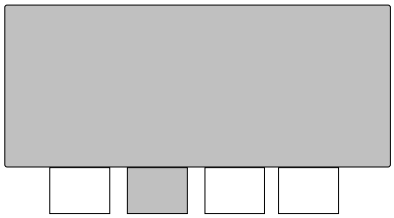
PASS/FAIL METHOD =

3. A **“PASS”**

SECTION SIX

Storage Operation

5. The last measurement data can be displayed by pressing **[view]** key #2.



NOTE: Measurements can be taken in the view mode if desired.

6. Press **[exit]** key #1 to return to the storage display.
7. Continue with additional measurements if required.

NOTE: The “data group name” can be customized by “downloading” group names with X-RiteColor® Master software package.

DELETING STORED MEASUREMENTS

There are three methods that can be used to delete stored measurements.

Delete Last -

Delete Last

1. Press **[last]** key #4.

2. Press **[⇦]**

SECTION SIX

PRINTING STORED MEASUREMENTS

The MA68II has the ability to output stored measurement data directly to a serial printer or a computer. Stored data can be output in a “simplified” format or a more detailed “report” format.

SECTION SIX

Print Group

1. Press **[group]** key #3 to enter

SECTION SIX

TAGGING AND STORING OPERATION (USING OPTIONAL BCR)

3. Connect the Barcode Reader to the I/O port if not already connected, and scan the desired barcode.

4. The bar code name should appear on the first line of the display.

- Select desired tagging method.

- Press **[tag all]** key #2 if every measurement that is to be stored will receive the scanned tag.

NOTE: "tag all" will not appear if any measurements have previously been stored.

- Press **[tag group]** key #3 if all measurements in the selected group are to have the same scanned tag.

NOTE:

¢ A total of “6” tags can be attached to each measurement. The total of “6” tags includes combinations of “all”, “group”, and “next” tag selections.

5. Scan additional bar codes if more are required for “all”, “group”, or “next” samples.

NOTE: If no tag method is selected before a measurement is taken, the instrument assumes a “next tag” selection.

REPLACING THE BATTERY PACK

1. Unplug the AC adapter and click power switch to OFF.
2. Carefully set instrument on its top and slide battery access cover toward rear of instrument and remove.
3. Grasp plastic tab that extends from battery pack and pull until pack is removed.
4. Slide new—or charged—battery pack into instrument until connector is properly seated.
5. Reinstall battery access cover by sliding into position.
6. Discharged battery packs should be charged in the instrument for 16 hours.

APPENDIX A

Technical Specifications

Measuring Geometries:

45° Illumination

15°, 25°, 45°, 75°, 110° off specular viewing

Angular accuracy ∂0.2°♯

Fiber optic pick-up with Dynamic Rotational Sampling (DRS)

Measuring Area:

.5 inch dia. (12mm)

Light Source:

Gas-filled tungsten lamp, approx. 3000°K

Illuminant Types:

C, D_{65}, D_{50}, A, F2, F7, F11, & F12

Standard Observers:

2° & 10°

Receiver:

Blue-enhanced silicon photodiodes

Spectral Range:

400nm - 700nm

Spectral Interval:

Measurement
10nm, 400nm - 640nm
20nm - 640nm - 700nm
15nm bandwidth

Data Output
10nm, 400nm - 700nm

Storage (five angles):

200 Standards

890 Samples

Measurement Range:

APPENDIX B

Display Messages

Calibration Error Messages

CALIBRATION ERROR

APPENDIX C

Optional Accessories

- Battery Pack Assembly MA58-05
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APPENDIX C

PACKAGING DRAWING

X-Rite, Incorporated—World Headquarters