# DensiEye™

**Reference Manual**

x·rite

# Contents

# 1. **General**

## 1.1. **Introduction**

Dear Customer

Congratulations! You have just acquired the reflection densitometer DensiEye.

The DensiEye features an easy to use graphical user interface and a high level of automation. Its high measurement accuracy makes this a truly unique instrument.

In this reference manual, all functionality of the DensiEye 100 and DensiEye 700 is explained in step by step detail. For a quick first start, please refer to the quick start guide, which enables you to use your new instrument immediately.

Your X-RiteTeam

## 1.2. Safety instructions

The X-Rite DensiEye is not for use in an explosive environment

Do not expose the DensiEye to strong electromagnetic fields.

For safety reasons, the DensiEye should be operated at ambient temperatures between 10°C / 50°F and 40°C / 104°F with a relative air humidity of 20% to 80% (non-condensing).

For safety reasons, the DensiEye should be stored at ambient temperatures between -20°C  /- 4°F and 70°C / 158°F with a relative air humidity of 5% to 90% (non-condensing).

Do not expose the DensiEye to direct sunlight.

Protect the DensiEye against chemical substances, corrosive vapors, strong vibrations, and mechanical influences.

Always use the original packaging to transport the DensiEye.

Do not attempt to repair the DensiEye. Opening the instrument will void your warranty.

Only use genuine X-Rite accessories and spare parts

DensiEye should only be used by trained personnel

Always place samples on a stable measuring surface. Make sure the bottom of the shoe is flat against the measurement surface.

The plastic device casing can be cleaned using a damp cloth and a small amount of soap

Never short-circuit the batteries!

Always replace both batteries at the same time

Dispose of batteries in accordance with local regulations

## 1.3. Package contents

| Item | Name |
|---|---|
| 1 | DensiEye |
| 2 | Calibration card |
| 3 | USB cable |
| 4 | Quick start guide |
| 5 | Device certificate |
| 6 | Registration card |
| 7 | CD with operating instructions and software |
| 8 | Device case |

## 1.4. Packaging and transport

Always use the original packaging to transport the DensiEye.

# 2. Operation

## 2.1. Functional elements



## 2.2. Release and lock measuring head

### 2.2.1. Release measuring head

- Slide the locking button on the left side to the back to release the measuring head.
- After approximately 30 seconds of inactivity, the DensiEye goes into power saving mode.
- Press any button to wake up the instrument.

### 2.2.2. Lock measuring head

- Lower the measuring head and slide the locking button forward to lock the measuring head
- After approximately 30 seconds of inactivity, the DensiEye goes into power saving mode

### 2.3. Factory defaults

- Absolute/Difference values:            Absolute

- White base:                            Paper

- Reference set:                         1 reference set

- Filter/color selection:                Auto

- Pass/Fail indicator:                   Off

- Scale graduation for print characteristic:   10%

- Number of decimal places for densities:   2

- Language:                              English

- Left/right-handed operation:           Right-handed operation

## 2.4. Standard buttons

| Button | Description | Functionality | |
|---|---|---|---|
| △ | Up button | Moves cursor up | Increase value |
| ○ | Enter button | Open / close submenu<br>Toggle options | Confirm value |
| ▽ | Down button | Moves cursor down | Decrease value |

## 2.5. Special buttons and button combinations

| Button(s) | Description |
|---|---|
| Enter + Measure [1] | White measurement |
| Reset | Auto mode (DensiEye 700) or Density (DensiEye 100) is selected in the main menu<br><br>All settings are retained |
| Reset + Enter [2] | Auto Mode function is pre-selected in the main menu<br><br>All settings are reset to factory settings<br><br>The reference- and tolerance values are retained<br><br>The calibration is reset. The device must be re-calibrated |
| Enter (3 sec) | Return to Function Selection on the main menu |
| Enter (10 sec) | Displays the language selection menu |

**Note:**

[1] Sequence:

- Press the Enter button
- Execute a white measurement
- Release the Enter button

[2] Sequence:

- Press the Reset button
- Press the Enter button
- Release the Reset button
- Release the Enter button

## 2.6. Symbols and their functions

| Symbol | Name | Description |
|--------|------|-------------|
| ↗ | Return | Return to next menu level up, accepts data |
| 🗎 | Paper | Measure paper white / Measure absolute white reference (calibration) |
| 🎨 | Filter selection | Select density filter (automatic or manual) |
| 📦 | Reference selection | Select one of four reference sets |
| ■ | Solid | Measure solid patch / Edit or measure solid reference |
| ▦ | Halftone 1 | Measure halftone 1 / Edit halftone 1 reference |
| ▦ | Halftone 2 | Measure halftone 2 / Edit halftone 2 reference |
| ▦ | Halftone 3 | Measure halftone 3 / Edit halftone 3 reference |
| ⊗ | Gray balance patch | Measure gray balance patch / Edit or measure gray balance reference |
| AUTO | Any patch | Measure any patch using Auto Mode function |
| ✦ | View / Edit mode | View and edit halftone measurements |
| ▱ | Absolute / Difference mode | Toggle between absolute and difference values |
| 1 | First solid patch | Measure first solid patch (trapping) |
| 2 | Second solid patch | Measure second solid patch (trapping) |
| ◆ | Trapping | Measure trapping patch |
| K | Black | Edit black value (calibration) |
| C | Cyan | Edit cyan value (calibration) |
| M | Magenta | Edit magenta value (calibration) |
| Y | Yellow | Edit yellow value (calibration) |
| ± | Pass/Fail | Toggle Pass/Fail indicator on and off |
| □ | White base | Set white base to paper white or absolute white |
| ↔ | Scale graduation | Set scale graduation for print characteristics |
| .00 | Decimal places | Set accuracy for density measurements |
| ↺ | Screen orientation | Change screen orientation for right or left hand use |
| ℹ | Instrument type | Display device type information |
| 👄 | Language | Select language |

## 2.7.    Display and Pass/Fail indicator

### 2.7.1.    Display layout

The display is divided into 5 areas:

- Header              ->      Display the name of the basic function
- Help area           ->      Display help on the specific function
- Symbol area         ->      Display symbols for navigation via options and menus
- Output area         ->      Display the measurement results
- Status area         ->      Display status messages (variable length):
    - Selected reference set for difference display
    - Selected density filter setting: Auto, Cyan, Magenta, Yellow or Black
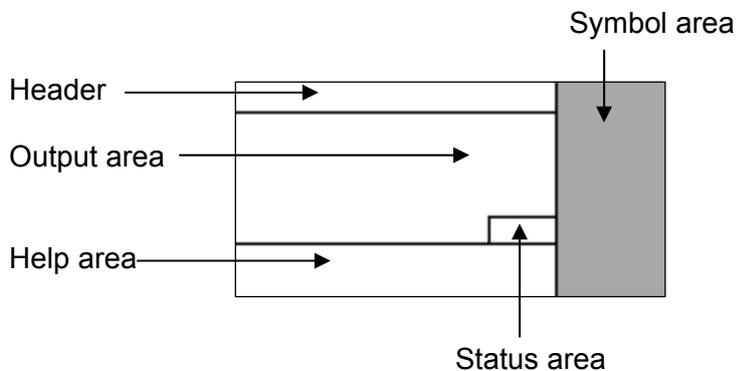


### 2.7.2.    Message box

A message box displays information and error messages for example "White measurement done".

### 2.7.3.    Pass/Fail indicator

The DensiEye has an integrated Pass/Fail indicator. If you take a density, dot gain, or gray balance measurement, the measurement values are compared to references and tolerances. The red LED indicates that the measurement is out of tolerance while a green light indicates the measurement is OK. Settings for the Pass/Fail indicator are in the function setup.

### 2.7.4.    Pass/Fail information display

After setting up reference and tolerance values for density, dot gain (DensiEye 700 only) and gray balance, the Pass/Fail function can indicate corrective measures to the right of the measurement values.

- If the measured value is below the specified tolerance range, the instrument displays an arrow pointing up.

- If the measured value is within tolerance, the instrument displays a check mark behind the value.

- If the measured value is above the specified tolerance range, the instrument displays an arrow pointing down.

## 2.8.    Function selection

- Use the Up/Down buttons to select a function from the main menu.

- Press the Enter button in the main menu to open the function screen

- Press the Enter button in a popup window to activate the selected option

## 2.9.    Symbol selection

- Use the Up/Down buttons to select a symbol from the main menu.

- The symbols have different functions (see section Symbols and their functions). Depending on the function, you need to press the Enter button or initiate a measurement.

## 2.10.    Positioning and measurement

- Always place the printed sheet on a stable measuring surface. Make sure the bottom of the shoe is flat against the measurement surface.

- Use measuring diaphragm to position the DensiEye properly on the measuring patch

- Lower the measuring head to initiate a measurement

- After the measurement, the instrument displays the measurement values and you can release the measuring head

# 3. Measurement Functions

### 3.1.    Auto Mode (DensiEye 700 only)

☛  •   The instrument identifies Solid, Halftone, Trapping or Gray Balance patches automatically and the display shows the corresponding measurement values
•   The Paper White measurement is performed automatically if the White Base is set to Absolute Auto or Paper Auto in the Function Settings.
•   The default setting for filter/color detection is the Automatic color/filter detection
•   Select reference values in the References menu

•   Select the Auto Mode in the main menu
   o   The status displays the current reference set
   o   The status displays "A" for automatic filter/color detection

   •   Select Absolute/Difference
      •   Select Absolute for absolute measurement values
         o   The output area displays D
      •   Select Difference for difference measurement values
         o   The output area displays ∆D

   •   Select Reference for difference readings
      •   The pop-up window shows a list with reference sets
      •   Select a reference set
         o   The status area displays the selected reference set

   •   Select Paper and measure paper white
      •   After the measurement, the message box briefly displays "White Measurement done"

   •   Measure solids in correct printing sequence
      •   The press icons in the output area show values for the solid densities and the corresponding colors starting from right to left
      •   The output area shows absolute or difference values for solid density and the corresponding color of the last patch:
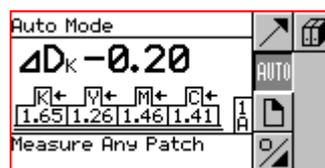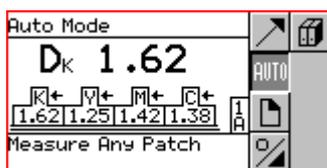
- Measure any patch (Solid, Halftone, Trapping or Gray Balance)
    - The output area shows the measurement values of the last patch:
        - Absolute or difference values for solid density and the corresponding color
        - Halftone reference and dot gain value and the corresponding color
        - Trapping value and the corresponding printing sequence
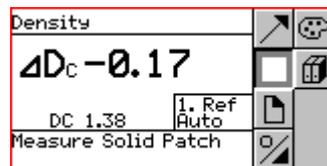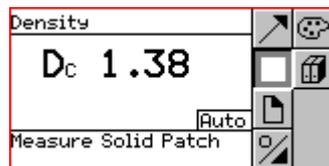        - Absolute or difference values for density for Cyan, Magenta and Yellow
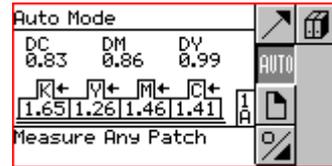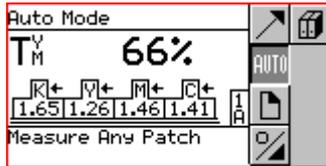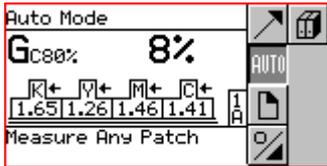


- Select Return to return to the main menu

## 3.2. Density

### 3.2.1. Density (Paper)

- Set White Base to Paper or Paper Auto in the Function Settings
- Make sure the instrument is calibrated for paper white base
- Set reference values in the References menu

- Select Density in the main menu
  - o The status displays the current reference set if the Pass/Fail detection is activated or Absolute/Difference is set to Difference
  - o The status displays the current filter/color

  - Select Filter
    - The pop-up window shows a list with automatic or manual filter/color selections
    - Set the automatic or manual filter/color selection
      - o The status displays the current filter/color

  - Select Absolute/Difference
    - Select Absolute for absolute density values
      - o The output area displays D
    - Select Difference for difference density values
      - o The output area displays ΔD

  - Select Reference for difference readings
    - The pop-up window shows a list with reference sets
    - Select a reference set
      - o The status area displays the selected reference set
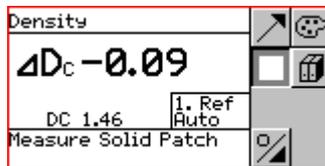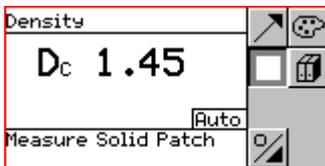


  - Select Paper and measure paper white
    - After the measurement, the message box briefly displays "White Measurement done"

  - Measure Solid
    - The output area shows absolute or difference density values and the corresponding color of the last patch

  - Select Return to return to the main menu

### 3.2.2. Density (Absolute)

- Set White Base to Absolute or Absolute Auto in the Function Settings
- Make sure the instrument is calibrated for absolute white base
- Set reference values in the References menu

- Select Density in the main menu
  - o The status displays the current reference set if the Pass/Fail detection is activated or Absolute/Difference is set to Difference
  - o The status displays the current filter/color

  - Select Filter
    - The pop-up window shows a list with automatic or manual filter/color selections
    - Set the automatic or manual filter/color selection
      - o The status displays the current filter/color

  - Select Absolute/Difference
    - Select Absolute for absolute density values
      - o The output area displays D
    - Select Difference for difference density values
      - o The output area displays ΔD



  - Select Reference for difference readings
    - The pop-up window shows a list with reference sets
    - Select a reference set
      - o The status area displays the selected reference set

  - Measure Solid
    - The output area shows absolute or difference density values and the corresponding color of the last patch

  - Select Return to return to the main menu

### 3.3.    Dot Gain (DensiEye 700 only)
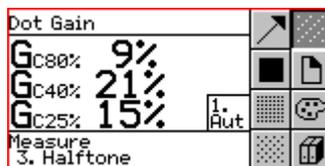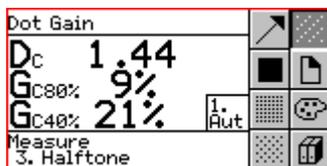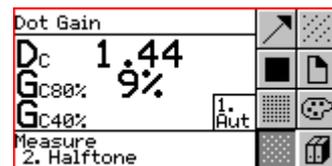
![hand pointing icon]

- Dot gain is a densitometric function based on paper white
- Make sure the instrument is calibrated for paper white base
- Set reference values in the References menu
- Deactivate halftone reference values in the References

- Select Dot Gain in the main menu
    - o    The status displays the current reference set
    - o    The status displays the current filter/color

    - Select Filter selection
        - The pop-up window shows a list with automatic or manual filter/color selections
        - Set the automatic or manual filter/color selection
            - o    The status displays the current filter/color

    - Select Reference for difference readings
        - The pop-up window shows a list with reference sets
        - Select a reference set
            - o    The status area displays the selected reference set

    - Select Paper and measure paper white
        - After the measurement, the message box briefly displays "White Measurement done"



- Measure Solid
    - o    The output area displays solid density values

- Measure 1. Halftone (if activated)
    - o    The output field displays solid density, the 1. halftone reference and dot gain values

- Measure 2. Halftone (if activated)
    - The output field displays solid density, 1. and 2. halftone reference and dot gain values

- Measure 3. Halftone (if activated)
    - The output field displays 1., 2. and 3. halftone reference and dot gain values

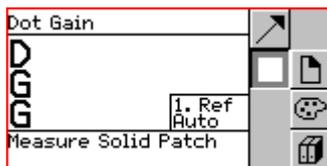- Select Return to return to the main menu

### 3.4. Trapping (DensiEye 700 only)

- Trapping is a densitometric function based on paper white
- Make sure the instrument is calibrated for paper white base

- Select Trapping in the main menu
    o The status displays the current filter/color

  - Select Filter selection

    - The pop-up window shows a list with automatic or manual filter/color selections

    - Set the automatic or manual filter/color selection

        o The status displays the current filter/color

  - Select Paper and measure paper white

    - After the measurement, the message box briefly displays "White Measurement done"
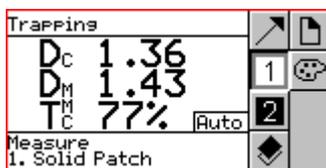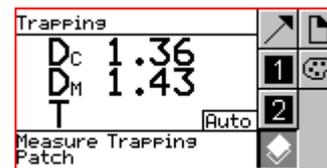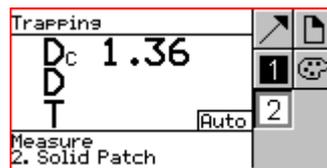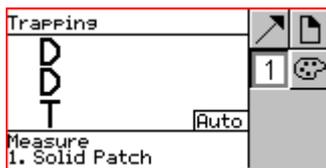


- Measure 1st Solid Patch

    o The output field displays the density values of the 1. solid patch

- Measure 2nd Solid Patch

    o The output field displays the density values of the 1. and 2. solid patch

- Measure Trapping Patch

    o The output field displays the density values of the 1. and 2. solid patch and % Trapping

- Select Return to return to the main menu

### 3.5.  Gray Balance

#### 3.5.1.  Gray Balance (Paper)

- Set White Base to Paper or Paper Auto in the Function Settings
- Make sure the instrument is calibrated for paper white base
- Set reference values in the References menu

- Select Gray Balance in the main menu
    - o  The status displays the current reference set if the Pass/Fail detection is activated or Absolute/Difference is set to Difference

    - Select Absolute/Difference
        - o  Select Absolute for gray balance absolute values
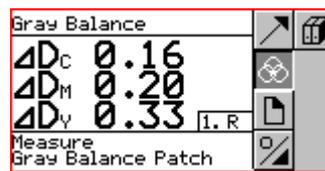            - ▪  The output area displays DC, DM and DY
        - o  Select Difference for gray balance difference readings
            - ▪  The output area displays ∆DC, ∆DM and ∆DY

    - Select Reference for difference readings
        - The pop-up window shows a list with reference sets
        - Select a reference set
            - o  The status area displays the selected reference set

    - Select Paper and measure paper white
        - After the measurement, the message box briefly displays "White Measurement done"



- Measure Gray Balance Patch
    - o  The output area displays absolute or difference values for density for Cyan, Magenta and Yellow

- Select Return to return to the main menu

### 3.5.2. Gray Balance (Absolute)

- Set White Base to Absolute or Absolute Auto in the Function Settings
- Make sure the instrument is calibrated for absolute white base
- Set reference values in the References menu

- Select Gray Balance in the main menu
  - o The status displays the current reference set if the Pass/Fail detection is activated or Absolute/Difference is set to Difference

  - Select Absolute/Difference
    - o Select Absolute for gray balance readings
      - The output area displays DC, DM and DY
    - o Select Difference for gray balance difference readings
      - The output area displays $\Delta DC$, $\Delta DM$ and $\Delta DY$

  - Select Reference for difference readings
    - The pop-up window shows a list with reference sets
    - Select a reference set
      - o The status area displays the selected reference set

  - Measure Gray Balance Patch
    - o The output area displays absolute or difference values for density for Cyan, Magenta and Yellow

  - Select Return to return to the main menu

### 3.6. Dot Area (DensiEye 700 only)

- Dot Area is a densitometric function based on paper white
- Make sure the instrument is calibrated for paper white base

- Select Dot Area in the main menu
  - o The status displays the current filter/color

  - Select Filter selection
    - The pop-up window shows a list with automatic or manual filter/color selections
    - Set the automatic or manual filter/color selection
      - o The status displays the current filter/color

  - Select Paper and measure paper white
    - After the measurement, the message box briefly displays "White Measurement done"



- Measure Solid
  - o The output area displays solid density values

- Measure Halftone
  - o The output field displays solid density and dot area of halftone

- Select Return to return to the main menu

### 3.7. Print Characteristic (DensiEye 700 only)

- Print Characteristic is a densitometric function based on paper white
- Make sure if instrument is calibrated for paper white base
- Set Scale Graduation (e.g. 10%) in the Function Settings menu

- Select Print Characteristic in the main menu
  - o The output area displays an empty print characteristic diagram
  - o The status displays the current filter/color

  - Select Filter selection
    - The pop-up window shows a list with automatic or manual filter/color selections
    - Set the automatic or manual filter/color selection
      - o The status displays the current filter/color

  - Select Paper and measure paper white
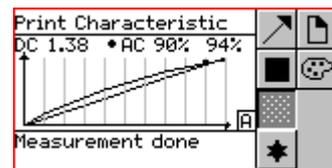    - After the measurement, the message box briefly displays "White Measurement done"
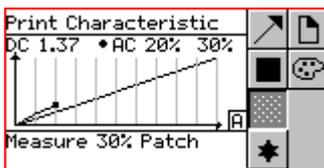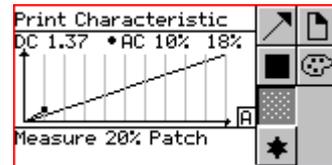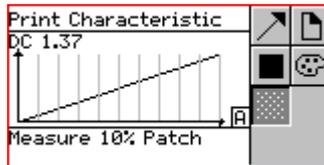


- Measure Solid
  - The output area displays solid density values

- Measure halftone patches e.g.10% patch up to 90% patch
  - The output field displays solid density, the last dot area reference, the corresponding dot area sample value and the print characteristic curve
  - After the last measurement, the help area displays "Measurement done"

- Select View / Edit
    - A vertical bar points to the last measured halftone
    - Use the Up/Down button to select and view the desired halftone
    - Re-measure the desired halftone
    - Press the Enter button to exit the View / Edit mode


- Select Return to return to the main menu

# 4. References

- Set White Base to Paper or Paper Auto and Absolute or Absolute Auto in the Function Settings
- Make sure that the instrument is calibrated for paper or absolute white base

- Select References in the main menu
    - o The header displays the current reference set
    - o The symbol area shows the symbols for Reference selection, Solid, Halftone 1 …3 (DensiEye 700 only) and Gray Balance
    - o If paper white base is set, the Paper symbol appears

## 4.1.   Select a reference set

- The DensiEye includes 6 reference sets
- A reference set contains:
    - o Solid density references and tolerance values
    - o Halftone and dot gain reference values, dot gain tolerance values (DensiEye 700 only)
    - o Gray balance density references and tolerance values

- Select Reference
    - Select a reference set
        - o The header area displays the selected reference set
        - o If paper white base is set, the help area displays the Paper symbol and "Measure Paper White"

- Measure Paper White
    - After the measurement, the message box briefly displays "White Measurement done"

## 4.2. Solid reference

- Reference values are referenced to paper white or absolute white base
- Measured reference values appear in a table with solid density reference and tolerance values for cyan, magenta, yellow and black
- You can edit or measure these reference values and edit the tolerance values for each color in this table

### 4.2.1. Measure Solid reference values (Paper)

- Set White Base to Paper or Paper Auto in the Function Settings
- Make sure that the instrument is calibrated for paper white base

- Select Paper and measure paper white

  - After the measurement, the message box briefly displays "White Measurement done"

- Select Solid

  - o The output area displays a table with solid density reference and tolerance values for cyan, magenta, yellow and black

  - o Measure solid reference values

    - ▪ The output area displays measured solid density reference values

- Select Return to return to the main menu

### 4.2.2. Edit Solid reference and tolerance values (Paper)

- Set White Base to Paper or Paper Auto in the Function Settings
- Make sure that the instrument is calibrated for paper white base

- Select Solid

  - o Highlight solid density reference and tolerance values for cyan

  - o Press the Enter button to open the edit or measure screen

    - Edit or measure solid density reference values

    - Edit solid density tolerance value

      - The output area displays the measured or edited solid density reference and tolerance values

- Continue editing the other colors as described

- Select Return to return to the main menu

### 4.2.3. Measure Solid reference values (Absolute)

- Set White Base to Absolute or Absolute Auto in the Function Settings
- Make sure that the instrument is calibrated for absolute white base

- Select Solid
    - o The output area displays a table with solid density reference and tolerance values for cyan, magenta, yellow and black
    - o Measure solid reference values
        - ▪ The output area displays measured solid density reference values

- Select Return to return to the main menu

### 4.2.4. Edit Solid reference and tolerance values (Absolute)

- Set White Base to Absolute or Absolute Auto in the Function Settings
- Make sure that the instrument is calibrated for absolute white base

- Select Solid
    - o Highlight solid density reference and tolerance values for cyan
    - o Press the Enter button to open the edit or measure screen
        - • Edit or measure solid density reference values
        - • Edit solid density tolerance value
            - • The output area displays the measured or edited solid density reference and tolerance values

- Continue editing the other colors as described

- Select Return to return to the main menu

### 4.3. Halftone and Dot Gain (DensiEye 700 only)

- Halftone reference values, dot gain reference and tolerance values can be edited

- Select Halftone 1, Halftone 2, or Halftone 3
    - o The output area displays a table with halftone and dot gain reference values and dot gain tolerance values for cyan, magenta, yellow and black

- Press the Enter button
    - o Highlight dot area and dot gain reference and dot gain tolerance values for cyan
    - o Press the Enter button to open the edit screen
        - Edit dot area reference value
        - Edit dot gain reference value
        - Edit dot gain tolerance value

- Continue editing the other colors as described

- Select Return to return to the main menu

## 4.4. Gray Balance

- Reference values are referenced to paper white or absolute white base
- Measured reference values appear in a table with solid density reference and tolerance values for cyan, magenta, yellow and black
- You can edit or measure these reference values and edit the tolerance values for each color in this table

### 4.4.1. Measure Gray Balance reference values (Paper)

- Set White Base to Paper or Paper Auto in the Function Settings
- Make sure that the instrument is calibrated for paper white base

- Select Paper and measure paper white

  - After the measurement, the message box briefly displays "White Measurement done"

- Select Gray Balance

  o The output area displays a table with gray balance density reference and tolerance values for cyan, magenta, yellow and black

  o Measure gray balance reference values

    ▪ The output area displays measured gray balance density reference values

- Select Return to return to the main menu

### 4.4.2. Edit Gray Balance reference and tolerance values (Paper)

- Set White Base to Paper or Paper Auto in the menu Function Settings
- Make sure that the instrument is calibrated for paper white base

- Select Gray Balance
    - o Highlight gray balance reference and tolerance values for cyan
    - o Press the Enter button to open the edit screen
        - Edit or measure gray balance density reference value
        - Edit gray balance density tolerance value
            - The output area displays the measured or edited gray balance density reference values and the edited gray balance density tolerance values

- Continue editing the other colors as described

- Select Return to return to the main menu

### 4.4.3. Measure Gray Balance reference values (Absolute)

- Set White Base to Absolute or Absolute Auto in the menu Function Settings
- Make sure that the instrument is calibrated for absolute white base

- Select Paper and measure paper white
    - After the measurement, the message box briefly displays "White Measurement done"

- Select Gray Balance
    - o The output area displays a table with gray balance density reference and tolerance values for cyan, magenta, yellow and black
    - o Measure gray balance reference values
        - The output area displays measured gray balance density reference values

- Select Return to return to the main menu

### 4.4.4. Edit Gray Balance reference and tolerance values (Absolute)

- Set White Base to Absolute or Absolute Auto in the Function Settings
- Make sure that the instrument is calibrated for absolute white base

- Select Gray Balance
  - o Highlight gray balance reference and tolerance values for cyan
  - o Press the Enter button to open the edit or measure screen
    - Edit or measure gray balance density reference value
    - Press the Enter button to open the edit window for gray balance density tolerance value
    - Edit gray balance density tolerance value
      - The output area displays the measured or edited gray balance density reference values and the edited gray balance density tolerance values

- Continue editing the other colors as described

- Select Return to return to the main menu

# 5. Calibration

## 5.1. Calibration (paper white base)

- In the graphic arts industry, measurements with paper white base are the preferred operating mode. All measurements are relative to paper white
- Check the calibration once a month and recalibrate the instrument if necessary
- For precise measurements, make sure to only use the calibration reference you received with your DensiEye
- The density standard and the filter type on the calibration card must correspond with the device information

### 5.1.1. Select paper white base

- Select Function Settings in the main menu

- Select White base
    - o The output area displays the current settings

- Press the Enter button to open the pop-up screen

- Set the white base to paper or paper auto
    - o The output area displays the current settings

- Select Return to return to the main menu

### 5.1.2. Calibration (Paper)

- Select Calibration in the main menu
- Measure Paper White on the calibration card
  - After the measurement, the message box briefly displays "White Measurement done"

- Measure the solid patches Black, Cyan, Magenta and Yellow on the calibration card
- Press the Enter button to open the edit or measure screen for Black
  - o Edit density value

- Continue editing the other colors as described

- Select Return to return to the main menu

### 5.1.3. Check Calibration (Paper)

- Select Density in the main menu
- Select Paper
- Measure Paper White on the calibration card
  - o After the measurement, the message box briefly displays "White Measurement done"

- Measure Solid Patch B, C, M, Y on the calibration card
  - o The difference between reference value and the measured value must be within ± 0.01

- Select Return to return to the main menu

## 5.2. Calibration (absolute white base)

- Measurements with absolute white base are required for applications which specifically call for absolute white as white base
- Measurement values are referenced to absolute white for density and gray balance
- In this mode, the calibration has to be checked once a week, or whenever the ambient temperature has changed by more than 10 °C / 18 °F. Recalibrate the instrument if necessary
- The density standard and the filter type on the calibration card must correspond with the device information

### 5.2.1. Select absolute white base

- Select Function Settings in the main menu

- Select White Base
    - o The output area displays the current setting

- Press the Enter button to open the pop-up screen

- Set White Base to Absolute or Absolute Auto
    - o The output area displays the current settings

- Select Return to return to the main menu

### 5.2.2.      Calibration (Absolute)

- Select Calibration in the main menu

- Measure Paper White on the calibration card

- Measure the solid patches Black, Cyan, Magenta and Yellow on the calibration card
    - Instrument displays measurement values

- Press the Enter button to open the edit screen for Black
    - Edit the white value for black according to the value on the calibration card
    - Edit black density value according to the value on the calibration card

- Continue editing the other colors as described

- Select Return to return to the main menu

### 5.2.3.      Check Calibration (Absolute)

- Select Gray Balance in the main menu
- Measure White Patch on the calibration card
    - The difference between the white reference values and the measured values for Cyan, Magenta and Yellow must be within ± 0.01

- Select Return to return to the main menu

- Select Density in the main menu
- Measure White Patch on the calibration card
    - The difference between the white reference value and the measured value for black must be within ± 0.01

- Measure Solid Patch B, C, M, Y on the calibration card
    - The difference between the color reference values and the measured values must be within ± 0.01

- Select Return to return to the main menu

## 5.3. Density calibration reference

- Do not use the X-Rite calibration cards after the expiration date
- Always keep the X-Rite calibration card in its protective cover in a dry place
- Treat the calibration card with care and make sure not to scratched or soiled the measurement patches
- Clean the calibration fields with a soft cloth



DENSITY CALIBRATION REFERENCE

| | Paper | | Absolute | | | |
|---|---|---|---|---|---|---|
| | white | color | white | color | | |
| B | 0.00 | | | | Type: | |
| C | 0.00 | | | | Density Standard: | |
| M | 0.00 | | | | Filter: | |
| Y | 0.00 | | | | Part Number: | |
| white | | | | | Serial Number: | |
| | | | | | Expiration Date: | |

Part Number 341773-14

# 6. Settings

## 6.1.  Function settings

- Select Function Settings in the main menu
  - The symbol area displays symbols for Pass/Fail, white base, scale gradation, and decimal places

### 6.1.1.    Pass / Fail indicator

- The Pass/Fail indicator can be switched On and Off
- A green light indicates that the measured value is within tolerance
- A red light indicates that the measured value is out of tolerance

- Select Pass/Fail
  - The output field displays the current settings

- Press the Enter button to open the pop-up screen
- Toggle Pass/Fail Indicator On or Off
  - The output field displays the current settings

- Select Return to return to the main menu

### 6.1.2. White base

🖐 • Depending on the application, you can select Paper or Paper Auto and Absolute or Absolute Auto as white base
  • In Auto Mode, Paper Auto causes an automatic paper white measurement
  • In Auto Mode, Absolute Auto causes an automatic paper white measurement only for Dot Gain and Trapping
  • White Base Paper Auto corresponds to White Base Paper
  • White Base Absolute Auto corresponds to White Base Auto

• Select White Base

  o The output field displays the current setting
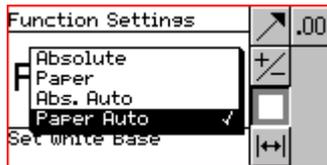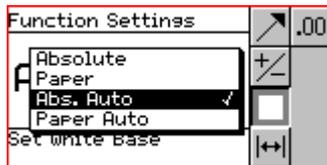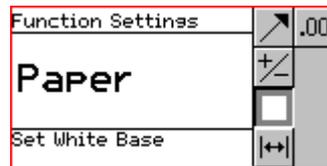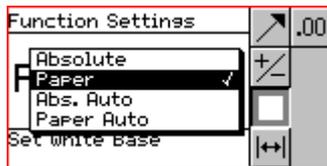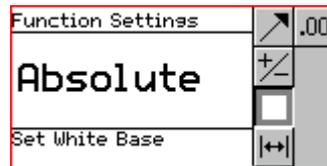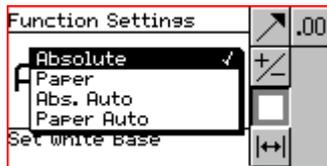


• Press the Enter button to open the pop-up screen

• Set White Base to Absolute, Paper, Absolute Auto or Paper Auto

  o The output field displays the current setting

• Select Return to return to the main menu

### 6.1.3. Scale graduation (DensiEye 700 only)

- Set an application related scale graduation before measuring a Print Characteristic

- Select Scale Graduation
  - o The output field displays the current setting

- Press the Enter button to open the pop-up screen
- Set Scale Graduation (5% … 50%) for Print Characteristic
  - o The output field displays the current setting

- Select Return to return to the main menu

### 6.1.4. Decimal places

- The number of decimal places for density values can be set to 2 or 3 digits

- Select Decimal places
  - o The output field displays the current setting
- Press the Enter button to open the pop-up screen
- Set Decimal Places to 2 or 3 digits
  - o The output field displays the current setting

- Select Return to return to the main menu

## 6.2. Device settings

- Select Device Settings in the main menu
  - o The symbol area displays the symbols for Display Orientation, Instrument Type and Language

### 6.2.1. Display orientation

- The display can be rotated for right or left handed operation

- Select Display orientation
  - o The output field displays the current setting

- Confirm to rotate display for left or right hand operation
  - o The output field displays the current setting

- Select Return to return to the main menu

### 6.2.2. Instrument type

- This screen displays important information about your instrument like instrument type, firmware version, serial number, densitometric standard and filter

- Select Instrument type
  - o The output field displays instrument type Information
    - ▪ Type:        Instrument type
    - ▪ Firmware:    Firmware version
    - ▪ S/N:         Serial number
    - ▪ Standard:    Densitometric standard (ISO E, ISO I or ISO T)
    - ▪ Filter:       Pol or No (polarized or unpolarized)

- Select Return to return to the main menu

### 6.2.3. Language

- The texts can be displayed in different languages

- Select Language
    - o The output area displays the current language


- Press the Enter button to open the pop-up screen
- Select Language
    - o The output area displays the current language


- Select Return to return to the main menu

# 7. USB Interface

## 7.1.    USB Driver installation

**Procedure:**

- Insert DensiEye Application CD into the CD-Drive

- Connect the USB cable to the DensiEye and the computer

- The Plug&Play window appears. Select the driver on the CD

- Confirm all messages to install the driver

- The USB-Interface is available as a COM port and can be used like a serial interface.

The assigned COM port can be changed in the property sheet of the Windows Device Manager as follows:

- Open the Control Panel and select System. The System Properties opens.

- Select the Hardware tab and click on Device Manager.

- From the View menu, select Devices by type.

- Select Ports (COM & LPT)

   o   Select USB serial port

   o   Click Properties.

   o   Select the Port Settings tab

   o   Click Advanced

   o   Select the desired COM port number from the list

   o   Click OK

## 7.2.    USB interface protocol

The device automatically reports all measurement to an external host. The report strings are in ASCII text and terminated by a carriage return <CR> and a line feed <LF>, (ASCII 13, ASCII 10).

Please refer to the document "DensiEye Data Interface Description" for detailed information.

# 8. Upgrade DensiEye 100 to 700

You can upgrade the DensiEye 100 to the full functionality of the DensiEye 700 by entering a special 4 digit code (for example: 1679). Please contact your X-Rite dealer with the serial number of your instrument to purchase the upgrade code.

**Upgrade Procedure:**

- Press and hold the Reset button.
- Press and hold the Down button.
- Release the Reset button.
- Release the Down button.
  - o The DensiEye is now in programming mode. The display shows 0000.

```
0000                    1679
```
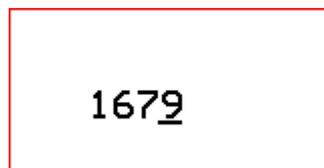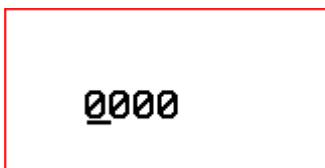
- Use the Up/Down button to set the code for the first digit.
- Press the Enter button to move the cursor to the next digit.
- Repeat steps 5 and 6 until all digits are entered.
- After the last digit is entered, the additional functions are available and can be selected from the main menu.

# 9. Maintenance and Care

## 9.1 Reset

If the instrument is unresponsive, the microprocessor may be locked up. This can happen after changing batteries or another disruption. Press the Reset button (red button on the bottom side of the measuring head). The instrument restarts and displays the the status of the DensiEye as follows:

- In the main menu, the settings Auto Mode (DensiEye 700) or Density (DensiEye 100) are selected
- All settings remain the same

**Procedure:**

- Press the Reset button for approximately 3 seconds

## 9.2 Total Reset

After a Total Reset the status of the DensiEye is as follows:

- In the main menu, the settings Auto Mode (DensiEye 700) or Density (DensiEye 100) are selected
- All settings are reset to factory defaults
- The reference and tolerance values remain the same
- The calibration is reset
- The device must be recalibrated

**Procedure:**

- Press the Reset button

- Press the Enter button

- Release the Reset button

- Release the Enter button

## 9.3   Instrument type information

If you have technical questions always mention device type, serial number and firmware version

**Procedure:**

- Select Device Settings in the main menu

- Select Instrument Type
  - o The output field displays instrument information
    - Type:          Instrument type
    - Firmware:    Firmware version
    - S/N:           Serial number
    - Standard:    Densitometric standard (ISO E, ISO I or ISO T)
    - Filter:         Pol or No (polarized or unpolarized)

- Select Return to return to the main menu

## 9.4 Replacing the batteries

- The batteries must be replaced after approximately 500,000 measurements
- The DensiEye monitors the battery voltage. If the batteries are low, the instrument displays an empty batteries symbol

- Replace the batteries as soon as possible

**Procedure:**

- Remove the cover from the battery compartment
- Remove the two old batteries
- Insert the new batteries while taking the polarity into account. The polarity and the mounting position are illustrated in the battery compartment
- Place the battery cover back on
- Dispose of the old batteries in accordance with local regulations
- Press the Reset button

Push to release
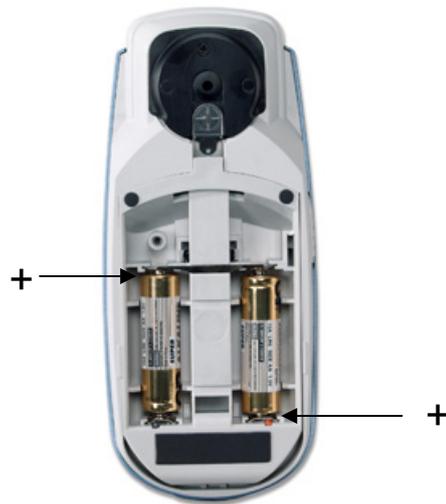
- Always replace both batteries at the same time
- If you are not using the instrument for an extended period of time, please remove the batteries from the battery compartment.

## 9.5. Firmware upgrade

**Required:**

- Download Software "X-Rite Firmware Downloader"
- DensiEye Firmware
- USB cable

**Procedure:**

- Connect the DensiEye with the data cable
- Press the Reset button and keep it pressed
- Press and release the Up button
- Release the Reset button. The instrument is now in programming mode (the screen is empty)
- Start the "X-Rite Firmware Downloader" application
- Click the COM port in the Settings menu
- Click Connect
- Click Prog and select the firmware file. The firmware downloads within a few seconds
- Close the Firmware Downloader Software window
- Press and release the Reset button
- Disconnect the cable
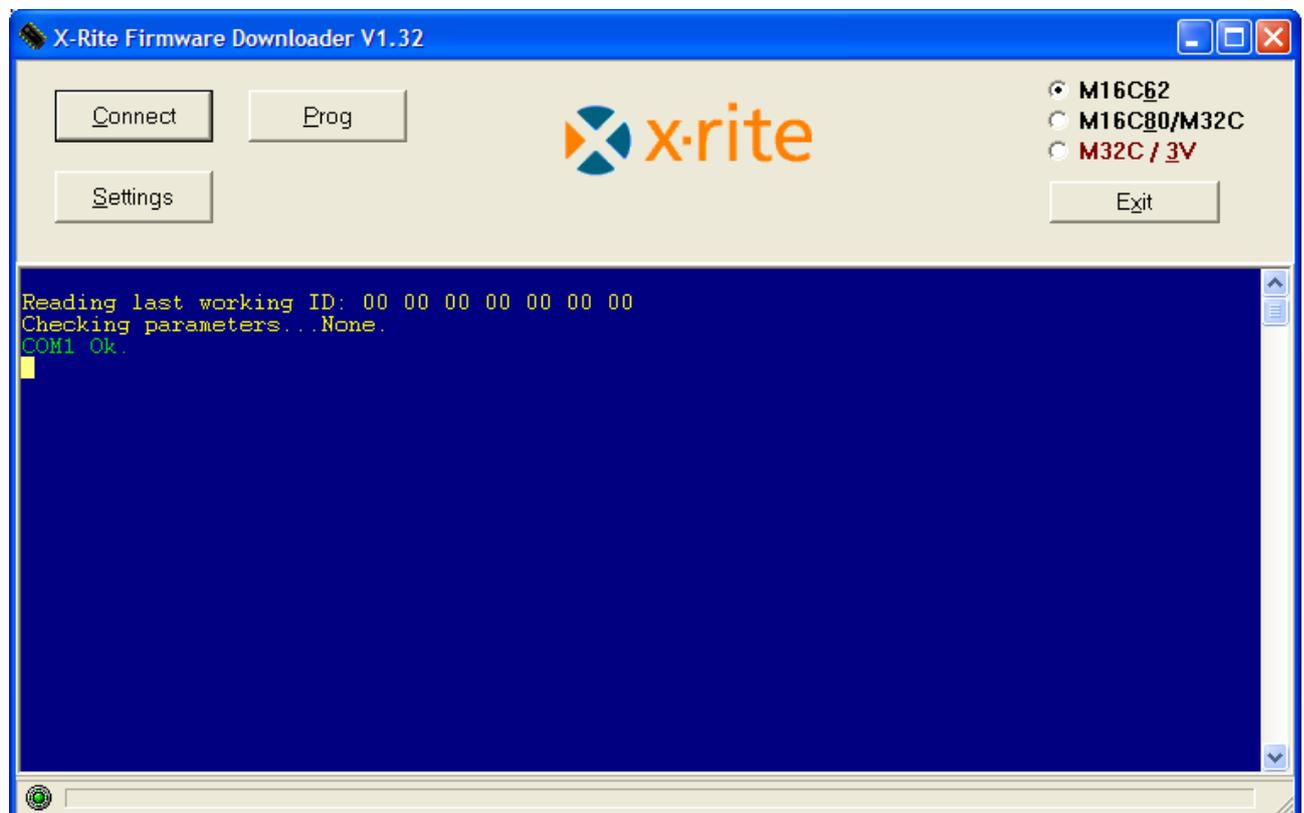
### 9.6. Warranty registration

- You need to register your DensiEye to receive technical support
- You can register the DensiEye online at http://www.xrite.com

**X-Rite end user warranty**

X-Rite warrants this Product against defects in material and workmanship for a period of twelve (12) months from the date of shipment from X-Rite's facility, unless mandatory law provides for longer periods. During such time, X-Rite will either replace or repair at its discretion defective parts free of charge.

X-Rite's warranties herein do not cover failure of warranted goods resulting from: (i) damage after shipment, accident, abuse, misuse, neglect, alteration or any other use not in accordance with X-Rite's recommendations, accompanying documentation, published specifications, and standard industry practice; (ii) using the device in an operating environment outside the recommended specifications or failure to follow the maintenance procedures in X-Rite's accompanying documentation or published specifications; (iii) repair or service by anyone other than X-Rite or its authorized representatives; (iv) the failure of the warranted goods caused by use of any parts or consumables not manufactured, distributed, or approved by X-Rite; (v) any attachments or modifications to the warranted goods that are not manufactured, distributed or approved by X-Rite. Consumable parts and Product cleaning are also not covered by the warranty.

X-Rite's sole and exclusive obligation for breach of the above warranties shall be the repair or replacement of any part, without charge, which within the warranty period is proven to X-Rite's reasonable satisfaction to have been defective. Repairs or replacement by X-Rite shall not revive an otherwise expired warranty, nor shall the same extend the duration of a warranty.

Customer shall be responsible for packaging and shipping the defective product to the service center designated by X-Rite. X-Rite shall pay for the return of the product to Customer if the shipment is to a location within the region in which the X-Rite service center is located. Customer shall be responsible for paying all shipping charges, duties, taxes, and any other charges for products returned to any other locations. Proof of purchase in the form of a bill of sale or receipted invoice which is evidence that the unit is within the Warranty period must be presented to obtain warranty service. Do not try to dismantle the Product. Unauthorized dismantling of the equipment will void all warranty claims. Contact the X-Rite Support or the nearest X-Rite Service Center, if you believe that the unit does not work anymore or does not work correctly.

THESE WARRANTIES ARE GIVEN SOLELY TO BUYER AND ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR APPLICATION, AND NON-INFRINGEMENT. NO EMPLOYEE OR AGENT OF X-RITE, OTHER THAN AN OFFICER OF X-RITE, IS AUTHORIZED TO MAKE ANY WARRANTY IN ADDITION TO THE FOREGOING.

IN NO EVENT WILL X-RITE BE LIABLE FOR ANY OF BUYER'S MANUFACTURING COSTS, OVERHEAD, LOST PROFITS, GOODWILL, OTHER EXPENSES OR ANY INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES BASED UPON BREACH OF ANY WARRANTY, BREACH OF CONTRACT, NEGLIGENCE, STRICT TORT, OR ANY OTHER LEGAL THEORY. IN ANY EVENT OF LIABILITY, X-RITE'S MAXIMUM LIABILITY HEREUNDER WILL NOT EXCEED THE PRICE OF THE GOODS OR SERVICES FURNISHED BY X-RITE GIVING RISE TO THE CLAIM.

### 9.7. Recertification

- X-Rite recommends annual recertification of the DensiEye reflectance densitometer

- Contact your X-Rite dealer or your nearest X-Rite Service Center for more information on the recertification process

### 9.8. Service

- Do not attempt to repair the X-Rite DensiEye yourself

- Opening the instrument without authorization will void your warranty

- Contact X-Rite Support or your nearest X-Rite Service Center if you experience problems with your instrument

# 10. Specifications

## 10.1. Functions

- Automatic color recognition (CMYK)
- Automatic patch type recognition (Solid, Halftone, Trapping, Gray Balance) (DensiEye 700 only)
- Automatic paper white measurement
- Density, Density difference
- Dot Gain (shadow, half tone, highlight) (DensiEye 700 only)
- Trapping (DensiEye 700 only)
- Gray Balance, Gray Balance difference
- Dot Area (Murray Davis) (DensiEye 700 only)
- Print Characteristic (DensiEye 700 only)

- Pass/Fail Indicator with correction advice
- Reference Sets (predefined but customizable)
- Density Calibration

- Absolute White and Paper White base switchable

## 10.2. Technical Specification

|  | Specification |
|---|---|
| Illumination | 3 LED (red, green, blue) |
| Measuring geometry | 45°/0° (according to DIN 5033) |
| Measurement aperture | 3 mm or 1.6 mm (ex factory) |
| Density Standards | ISO Status I / E / T (according to ISO 5-3) (ex factory) |
| Polarization filter | With / without (ex factory) |
| Measurement range | 0.00 – 3.00 D |
| Repeatability | ± 0.01 D or ± 1% |
| Inter instrument agreement | ± 0.02 D or ± 2% |
| Linearity | ± 0.01 D or ± 1% |
| Measuring time | 0.5 seconds |
| Graphical display | 160 x 80 Pixels, 4 gray scales |
| Interface | USB |
| Measurements per battery set | Over 500.000 |
| Power source | 2 Alkaline 1.5 V size AA |
| Dimension (H x W x L) | 50 x 75 x 175 mm |
| Weight [gr.] | 400 |