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User Guide

# **ELCOVISION Lens Distortion Correction**

By PMS Photo Mess Systeme AG



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This manual covers all versions 1.x of "ELCOVISION Lens Distortion Correction"

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1<sup>st</sup> Print October 2004

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# Preview

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## The Abilities of ELCOVISION Lens Distortion Correction

"ELCOVISION Lens Distortion Correction" is an universal image viewer. It can display nearly all known image formats.

However the major task is the automatic removal of picture distortions which occurs often with cameras using wide angle lenses.

### Feature List

- Full automatic lens distortion correction with one single mouse click
- Improvement of the image quality by elimination of the typical pixel noise of digital cameras
- Supports more than 50 digital image formats
- Batch processing of any numbers of images.
- Comfortable print functions which can print any number of images per page
- Comfortable digital magnifier for a close image inspection
- Integrated image processing tools for colour, gamma and contrast adjustment.

## Requirements for the Lens Distortion Correction

*The images must contain Exif Data*

The pictures of the digital cameras must contain so called Exif data. These additional information in each images allows ELCOVISION Lens Distortion Correction to identify the images and assign the appropriate lens correction information to the images.

*Use unaltered images directly from the camera*

It is important that you use the unaltered images directly from your camera. This is required because most imaging software removes the Exif information from the images or replaces it with their own Exif information. If this happens ELCOVISION Lens Distortion Correction can not assign the appropriate camera to the image and the lens distortion correction is therefore not available.

*The program must know the camera type*

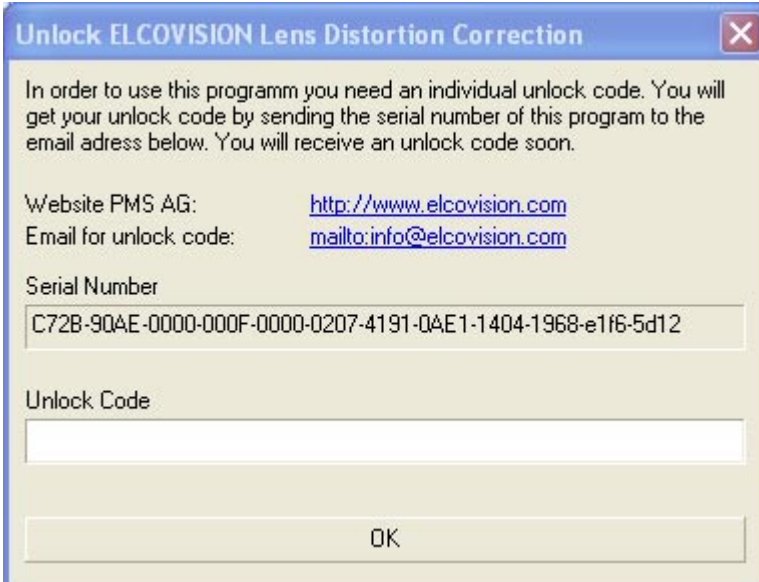
The used camera must be known to the program. We determine the distortion correction values for various camera types and supply them to ELCOVISION Lens Distortion Correction. We will support more and more cameras in the future.

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## Installation of ELCOVISION Lens Distortion Correction

In order to install the software simply run "SetupElcoPhoto.exe" and follow the on screen instructions. After the setup run the program. You will be asked for an unlock code:

### Unlock ELCOVISION Lens Distortion Correction



Unlock ELCOVISION Lens Distortion Correction

In order to use this program you need an individual unlock code. You will get your unlock code by sending the serial number of this program to the email address below. You will receive an unlock code soon.

Website PMS AG: <http://www.elcovision.com>  
Email for unlock code: <mailto:info@elcovision.com>

Serial Number  
C72B-90AE-0000-000F-0000-0207-4191-0AE1-1404-1968-e1f6-5d12

Unlock Code

OK

You can receive a 14 days unlock code free of charge to evaluate the program. Send the serial number to [info@elcovision.com](mailto:info@elcovision.com) and you will receive a unlock code within a few hours.

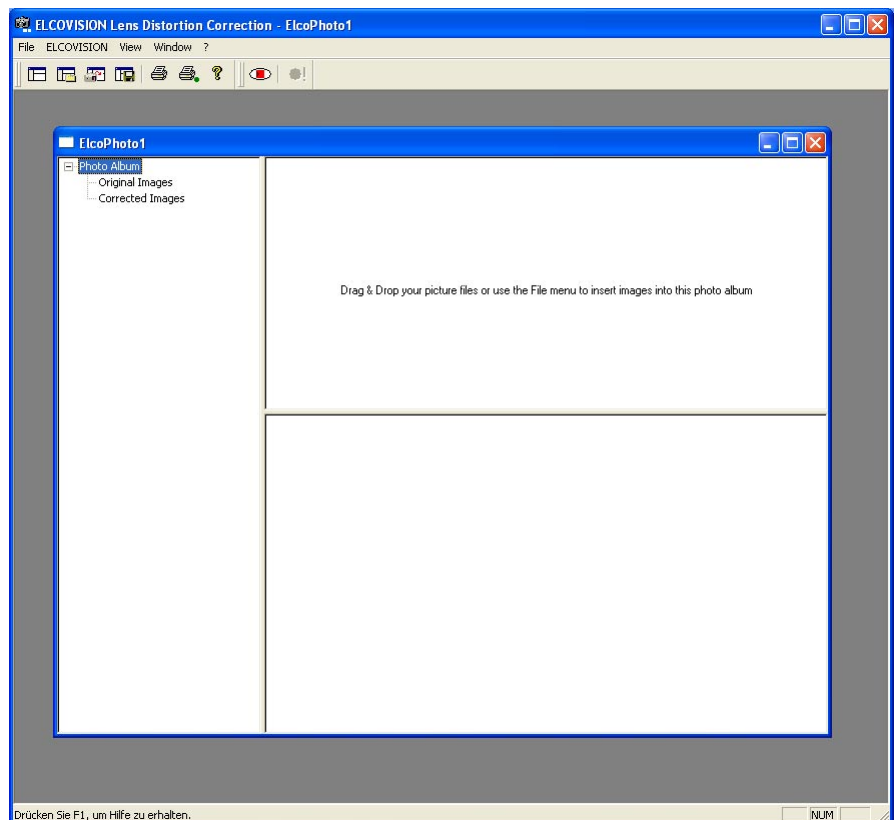
If you buy the program you will receive a permanent unlock code.

# User Guide

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## Step by Step Example of a Lens Distortion Correction

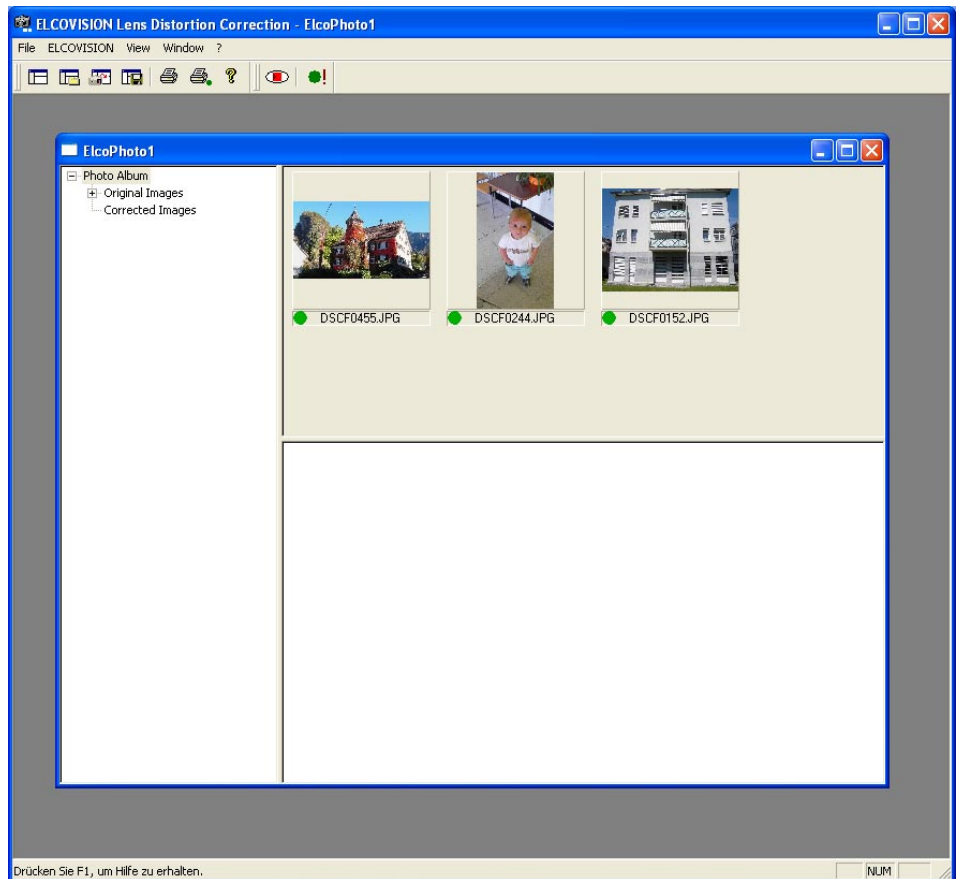
Start the program. You will see the program window:




*ELCOVISION Lens Distortion Correction main window*

ELCOVISION Lens Distortion Correction uses a photo album to manage your images. You can add any number of images into one photo album. Just drag&drop them from the windows explorer into the main window of ELCOVISION Lens Distortion Correction or use the File menu.

As soon as you insert images into a photo album the program displays them as thumbnails:



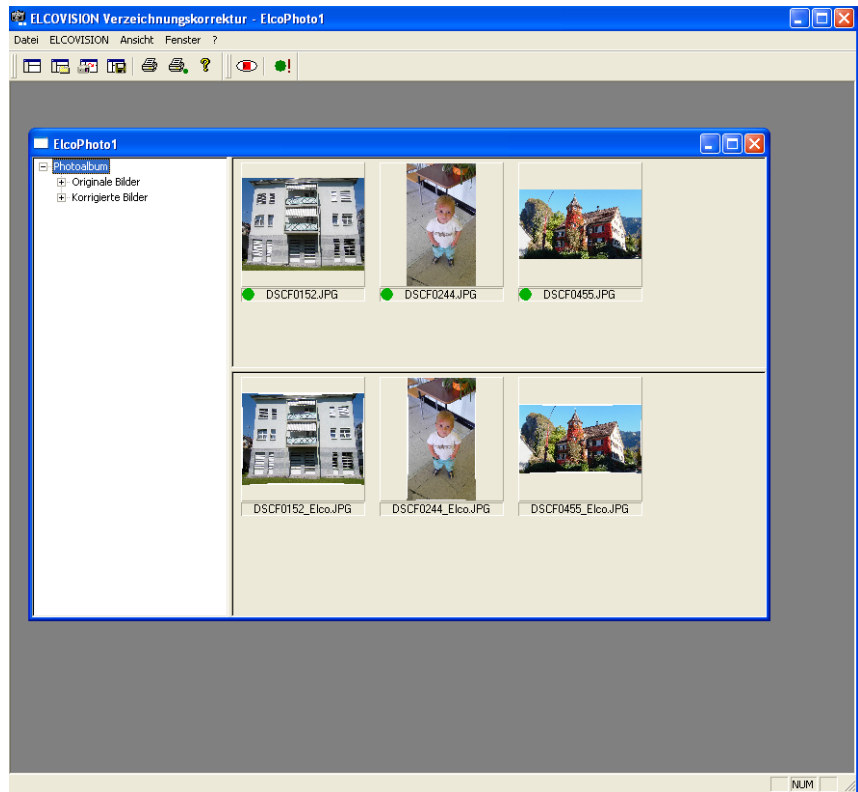
Main window with thumbnails

Click the  button to start the lens distortion correction. The program displays the progress:



After a few seconds all images in the photo album are lens distortion corrected and the result is displayed in the photo album:









*Photo album showing corrected images*

Now you can view or print the corrected images. You can also process them in other programs.

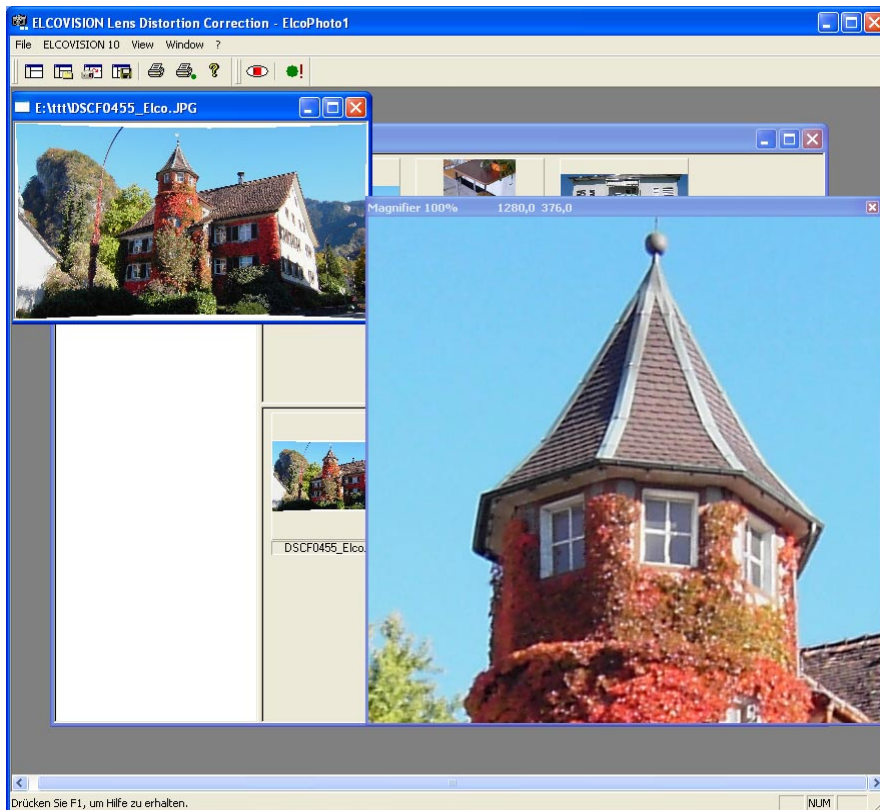
## Which Pictures can be Corrected?

ELCOVISION Lens Distortion Correction shows a symbol beneath each thumbnail in the photo album. This symbol shows you if the image could be corrected or not:

Symbol	Meaning
	ELCOVISION Lens Distortion Correction has recognized the camera type and the lens parameters. The picture can be corrected.
	ELCOVISION Lens Distortion Correction has recognized the camera type but not the lens parameters. <b>The picture can not be corrected.</b>
	ELCOVISION Lens Distortion Correction has not recognized the camera type but the lens parameters. <b>The picture can not be corrected.</b>
	ELCOVISION Lens Distortion Correction has not recognized the camera type and the lens parameters. <b>The picture can not be corrected.</b>

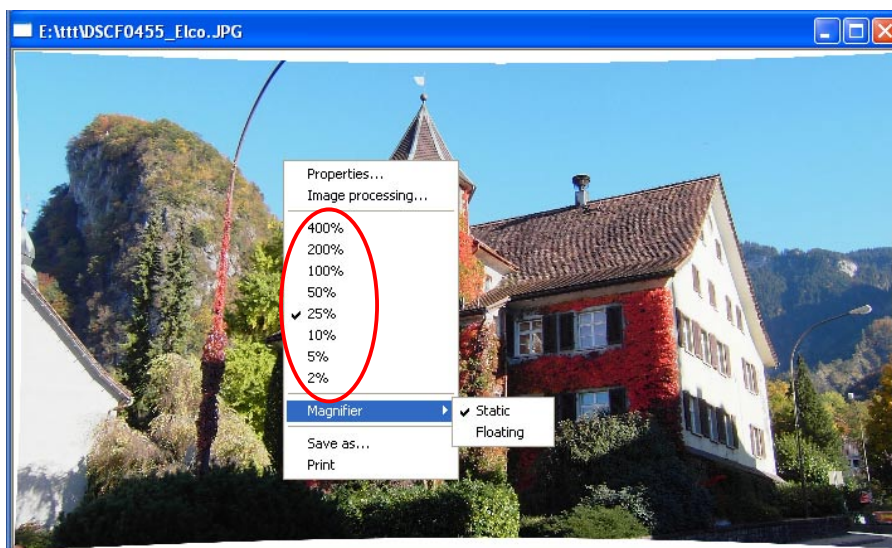
# Displaying Images and Image Processing

If you double click on a thumbnail in the photo album the image is displayed:



*Displayed image with static magnifier window*

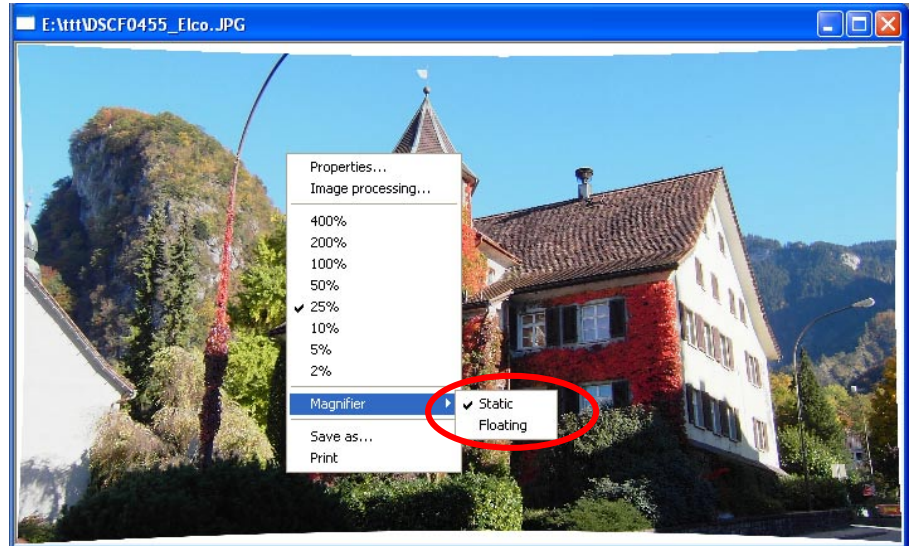
The image is displayed using the scale specified in the program settings. You can use the context menu of the image to adjust the scale:



## The Magnifiers of ELCOVISION Lens Distortion Correction

ELCOVISION Lens Distortion Correction has two different magnifiers. A static magnifier window in and a floating magnifier which floats above the image like a real magnifier.

### Magnifier Control



#### ***Switch Between Static and Floating Magnifier***

You can switch between the both kind of magnifier using the context menu of any image.

#### ***Turn Magnifier On/Off***

By pressing the middle mouse button or the spacebar the magnifier window is switched on or off

#### ***Adjust the Magnifier Enlargement***

You can adjust the enlargement of the magnifier by scrolling the mouse wheel or by pressing the '+' and '-' keys on the numeric keypad.

#### ***Adjust Size of the Magnifier Window***

You can adjust the size of the magnifier window by pressing the 'Ctrl' Key and scrolling the mouse wheel, or by pressing the 'Page Up' or 'Page Down' keys on the keyboard.

### **Saving the Images in Any Format**

You can save any image in any supported image format by clicking on "Save as" in the context menu.

### **Additional Image Processing**

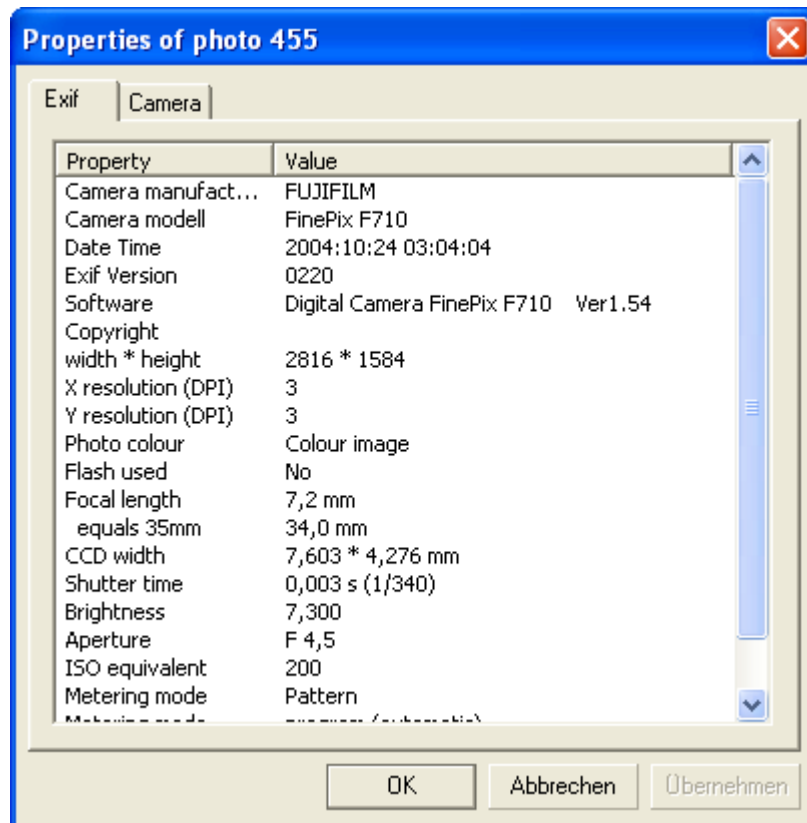
ELCOVISION Lens Distortion Correction has a small built in image processing tool. You can adjust contrast or brightness. There is a built in gamma correction and many other tools. Choose "Image processing..." in the context menu of any image to start this tool.

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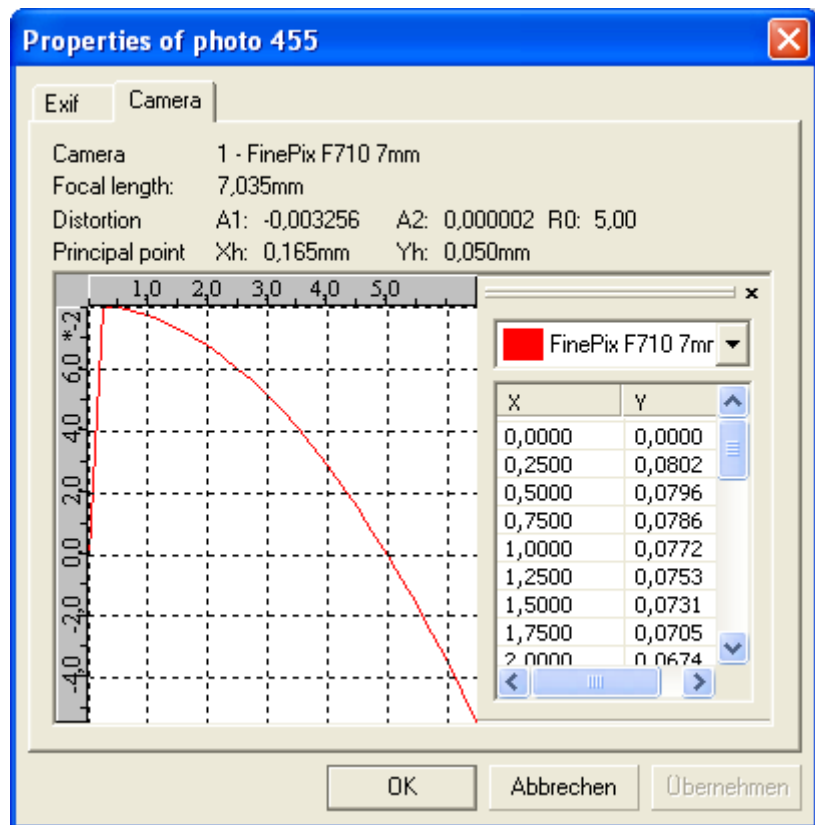
## Image Properties

When you choose the option "Properties" in the image context menu you get more information about the image and its distortion.

The tab 'Exif' shows you the Exif data of the image:




The tab 'Camera' shows the lens distortion graph of the image:



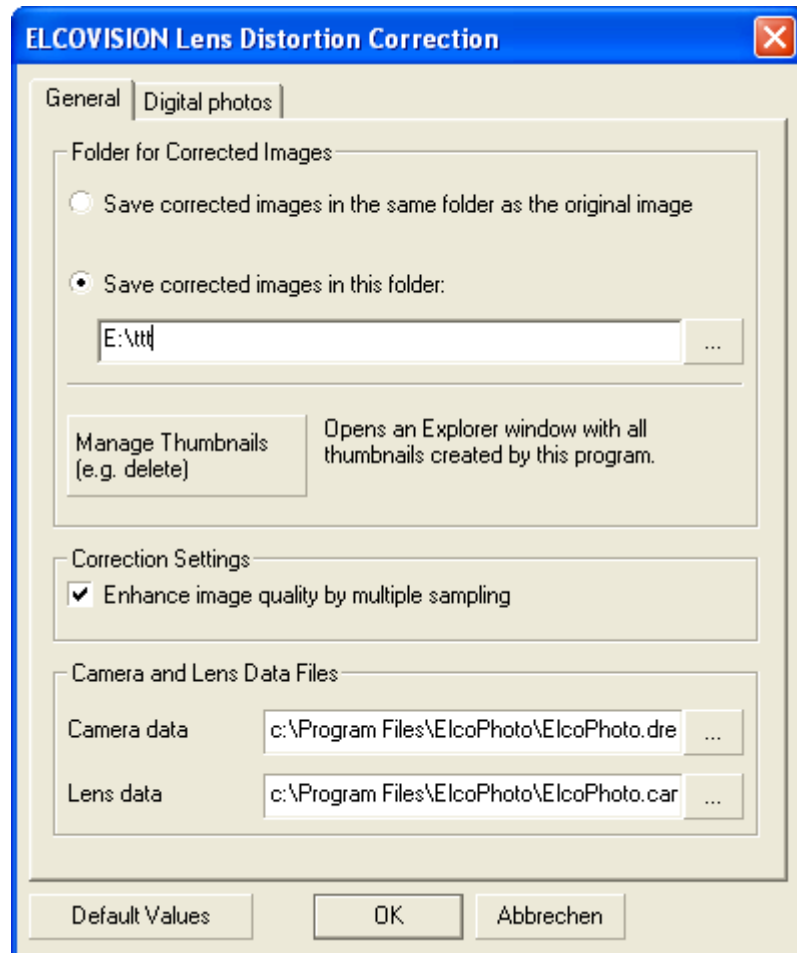
The lens distortion is radial symmetric to the centre of the picture. The graph shows how much a pixel at a given radius from the image centre has to be moved in order to compensate the distortion.

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# ELCOVISION Lens Distortion Correction Settings

Click on the  button in the toolbar in order to configure the program:

## General Settings



### Save corrected images in the same folder as the original image

The lens distortion corrected image is saved in the same folder as the original image. In order to distinguish the corrected image from the original ELCOVISION Lens Distortion Correction adds an "\_Elco" to the filename.

### Save the corrected images in this folder

ELCOVISION Lens Distortion Correction saves the corrected images in the given folder. It adds also an "\_Elco" to the filename.

### Manage Thumbnails (e.g. delete)

ELCOVISION Lens Distortion Correction will generate a lot of thumbnails when you use the program. This button opens an explorer window in the thumbnail folder. So you can delete all of them if you like.

### Enhance image quality by multiple sampling

ELCOVISION Lens Distortion Correction uses a special algorithm which reduces the pixel noise. The sharpness of the image remains unaffected. This option enhances the image quality.

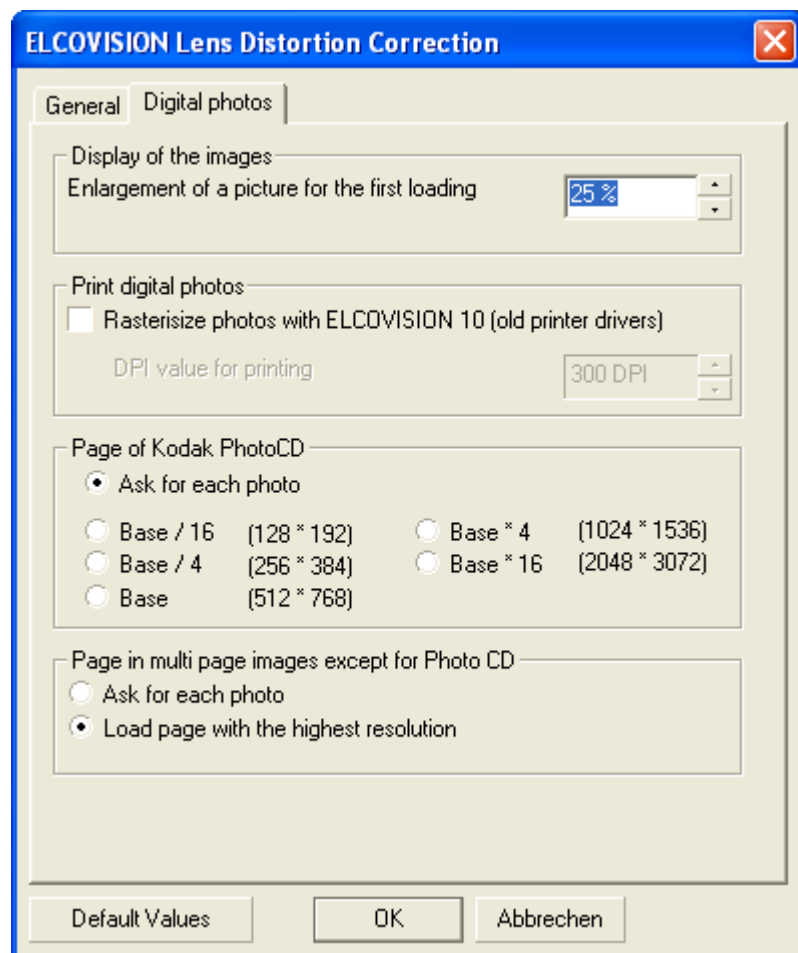
### Camera Data

This file contains the values for the various CCD sizes of the cameras. Normally you don't need to change this file.

### Lens Data

This file contains the lens distortion values for the supported cameras. Normally you don't need to change this file.

## Settings for Digital Images



### Enlargement of a picture for the first loading

If you double click on a thumbnail in the photo album this setting specifies the enlargement of the displayed image.

### Rasterisize photos with ELCOVISION (older printer drivers)

If you experience problems when you are printing the images this option could help to eliminate them.

### **Page of Kodak PhotoCD**

The Kodak PhotoCD image format (.pcd) contains several resolutions of the images. Here you can choose which resolution you prefer.

### **Page in multi page images except for Photo CD**

There are several image formats which supplies the same image in various resolutions. Here you can define the behaviour of ELCOVISION Lens Distortion Correction for these kind of images.



# Glossary of Terms

## Radial-symmetric Distortion

Distortion is an image formation error of a lens. In order to be able to correct these errors numerically it is regarded as radial-symmetric distortion errors.

The following equations are used:

$$dr = R1 * (r^3 - r * r_0^2) + R2 * (r^5 - r * r_0^4)$$

with

$$r = \sqrt{x^2 + y^2}$$

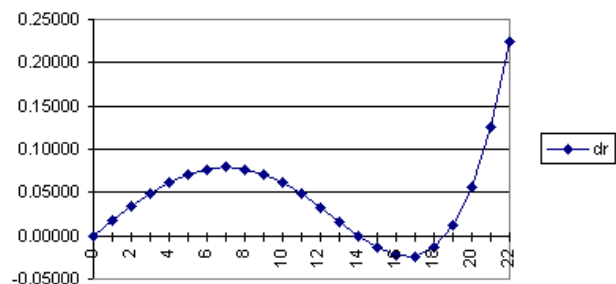
Legend

- dr      distortion
- r      radial distance from centre (origin)
- r<sub>0</sub>      radial distance where distortion becomes zero the second time
- R1, R2      radial-symmetric distortion parameters

### Example

Leica R5 ELCOVISION, 24mm Inf

R1      -1.40E-04  
R2      2.58E-07  
r<sub>0</sub>      14 mm





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