Minimum / maximum subject size with different sensor formats

Sensor format	Subject size at 4:1	Subject size at 1:4
36 x 56 mm	≈ 9 x 14 mm	≈ 144 x 224 mm
40 x 54 mm	≈ 10 x 13.5 mm	≈ 160 x 216 mm
37 x 49 mm	≈ 9.3 x 12.3 mm	≈ 148 x 196 mm
36 x 48 mm	≈ 9 x 12 mm	≈ 144 x 192 mm
33 x 44 mm	≈ 8.3 x 11 mm	≈ 132 x 176 mm
24 x 36 mm	≈ 6 x 9 mm	≈ 96 x 144 mm
19.1 x 28.7 mm (APS-H)	≈ 4.8 x 7.2 mm	≈ 76 x 115 mm
15.6 x 23.6 mm (APS-C)	≈ 3.9 x 5.9 mm	≈ 62 x 94 mm
15.1 x 22.7 mm (APS-C Canon)	≈ 3.8 x 5.7 mm	≈ 60 x 91 mm
13.0 x 17.3 mm (FT/MFT)	≈ 3.3 x 4.3 mm	≈ 52 x 69 mm

12 aperture blades for a circular pupil and a perfect bokeh

The HR Digaron Macro 105 mm f/5.6 with 8 lens elements in 4 groups not only stands out due to its exceptional sharpness, but also due to a perfect bokeh thanks to an almost circular aperture with 12 aperture blades, even when stopped down: light spots outside the depth of field are reproduced as homogeneous circular circles of confusion.

Stop down only as far as needed for the wanted depth of field!

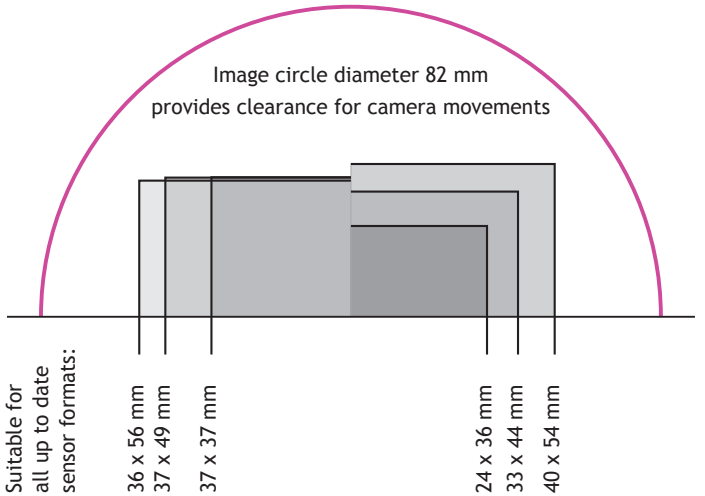
Because the resolution of this high performance lens is incredibly close to the diffraction limit, you should always only stop down by as much as the necessary depth of field requires. Stepping down does not increase sharpness (this is already optimum with a full aperture), but produces diffraction that reduces contrast and resolution. Please remember that the **effective** aperture in the macro range becomes much smaller than for far distances. At a scale of 1:1, the nominal f-number 5.6 becomes an effective f/11; at a scale of 2:1, it becomes f/16; and at a scale of 3:1, even f/22. This is why the aperture setting is deliberately limited to the smallest nominal aperture of f/16.

Suitable for technical cameras, SLR and other system cameras

The large image circle of 82 mm diameter is big enough for even the largest sensors of professional digital backs and still has sufficient reserves for camera movements (parallel shift and/or lens tilt). At the same time, the exceptional sharpness exceeds that of classical macro lenses both at very high resolution digital backs and at smaller system camera sensors (with even smaller pixel pitches in some cases).

The matching to different camera systems takes place using specific adapters on the V groove interface. Since the optical design of the lens does not permit a leaf shutter, the camera or the digital back has to have a focal-plane shutter or a sensor with an electronic shutter.

Focusing can take place by changing the distance from the motif or from the sensor. The latter is done using a bellows, using the bellows extension of the camera or using extension rings (with a fixed imaging scale) and a helical focusing mount (for continuous scale changes).



RODENSTOCK

Rodenstock Photo Optics, a Qioptiq brand

User Manual

HR Digaron Macro 105 mm f/5.6

High-Performance Lens for Magnification Scales from 1:4 to 4:1

Congratulations on purchasing this high-performance Rodenstock lens. We are confident you will enjoy all the features this macro lens can offer you: it is continuously optimizable for any imaging scale between 1:3 (ß′ = -0.3) and 3:1 (ß′ = -3) and thus offers an imaging quality that puts all that has gone before it into the shade. The sharpness is only limited by the physically unavoidable diffraction, the distortion is extremely low, reduced to almost zero from a scale of 1:1, and color fringes are a thing of the past.

Conventional macro lenses suffer from typial shortcomings

Lenses are always optimized for an imaging scale that depends on the intended area of use. Optimization is usually carried out for infinity (ß′ = -0). Less frequently, but almost always for technical lenses for studio photography, optimization is carried out for a scale of 1:20 or 1:10 (ß′ = -0.05 or ß′ = -0.1), which corresponds to a distance of around 20 times to 10 times the focal length. With different scales or different distances, the imaging quality first reduces by a small amount and then more and more. This applies to the sharpness and equally to the distortion, the color fringes and other aberrations. A larger value, e.g. 1:3 (ß′ ≈ -0.3), is selected as the optimization scale for macro lenses and an optical design is chosen that keeps the sharpness drop relatively small over a wide scale range. Irritating aberrations nevertheless become visible when high demands are made and when the scales differ more from the optimum, above all when the distance setting should reach up to infinity (ß′ = -0).

The HR Digaron Macro 105 mm f/5.6 is totally uncompromising

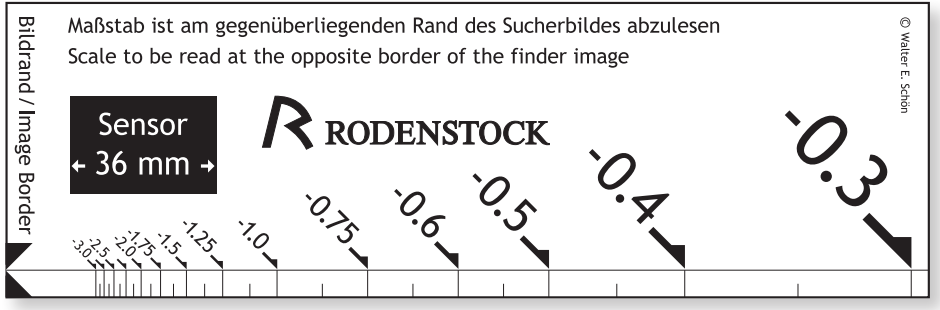
The Rodenstock HR Digaron Macro 105 mm f/5.6 has not been optimized for a fixed scale in order to avoid such compromises. The lens can rather be individually and continuously optimized for every shot within the range from ß′ = -0.3 to ß′ = -3 using a rotating ring by displacing an internal lens element group (“floating elements”). This delivers exceptional image quality without any compromises toward either end of the recommended scale range from 1:4 (ß′ = -0.25) to 4:1 (ß′ = -4). The rotating ring should be set to ß′ = -0.3 for scales below 1:3 and to ß′ = -3 for scales above 3:1.

The HR Digaron Macro, that is superior to all other lenses from around 1:4, can even be used up to infinity (ß′ = -0) with only small losses in quality.

The scale bar from ß′ = -0.3 to ß′ = -3 for positioning the floating elements can be found directly behind the orange ring with the associated black index line. The scale is set to -1.00 on the photo shown at the side. We have prepared scale measurement cards for all relevant sensor sizes to enable you to make an exact determination of the scale to be set for your macro shots. However, some measurement cards are too large to be included inside the box of this lens without being folded. But you can download a PDF (2 DIN A4 pages) of the cards from

www.rodenstock-photo.com/measuring.pdf

Simply print the page with the measurement card that matches your sensor size (the sensor width in landscape format is indicated in a black rectangle) on DIN A4 paper of cardboard thickness. If you use a transparent adhesive foil to laminate the card, the measurement card cut-out along the frame will be more stable and will also remain clean longer. The measurement card for the sensor format 24 mm x 36 mm is shown below:



How to find the right image scale to be set

Arrange the motif and the lighting as usual. Before you check the image on the monitor of the camera, of the digital back, of your tethered computer or on the screen of a technical camera, you can first roughly estimate the imaging scale to be set at the rotational ring or simply set it to ß′ = -1.00.

Once you have decided on the motif design, simply hold the measurement card matching your sensor size in the sharpness plane of your motif such that the left edge contacts the left image margin in landscape mode. You can now read the imaging scale off the bar at the right hand image margin. It is usually sufficient to make an estimate directly at the motif. For more precision, read the scale value off the monitor or off the ground glass screen. In portrait mode, hold the measurement card vertically at the lower image margin and read the scale from the upper margin (in the example below ß′ ≈ -0.45).

Alternatively, you can measure the motif working distance from the front lens edge and read the scale from this bar ➔

You can set this scale at the rotational ring (set to the respective end position if the range -0.3 to -3 is exceeded) and can either use the focusing mount or the bellows extension or use a camera movement to refocus to maximum sharpness.