EL-Nikkor Lenses
Photographers have often tended to neglect enlarging lenses in favor of top quality general photographic lenses, this in the mistaken belief that the latter contribute more to the overall quality of the finished photograph. Of late, however, this traditionally held view has begun to change with the realization by photographers that the enlarging lens can and does contribute significantly to the attainment of the desired high-quality enlargement.

This new awareness on the part of photographers has resulted in more serious evaluation of EL-Nikkor lenses, with accordingly high praise for the outstanding performance capabilities of these units. In fact, it can be said that Nippon Kogaku's original work developing high-quality enlarging lenses set the groundwork for subsequent use of small-format originals for critical photo-enlarging work at high magnifications.

Of course, when enlarging or color separating, the best results can only be obtained when the lens used has been specifically designed to match the original format size and magnification, and also has been fully corrected for chromatic aberration. EL-Nikkor lenses are designed for meeting the demanding requirements of photo enlargement, particularly in terms of producing high resolution images from small-format originals. EL-Nikkors are available in thirteen models of varying focal lengths for a wide range of magnifications and format requirements; for details, see Table 1 following.

### Table 1. EL-Nikkor Lenses

<table>
<thead>
<tr>
<th>LENS</th>
<th>MAX. APERTURE</th>
<th>FORMAT SIZE</th>
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</thead>
<tbody>
<tr>
<td>50mm</td>
<td>f/2.8</td>
<td>24 x 36 mm</td>
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<tr>
<td>55mm</td>
<td>f/2.8</td>
<td>24 x 36 mm</td>
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<tr>
<td>65mm</td>
<td>f/3.5</td>
<td>32 x 45 mm</td>
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<tr>
<td>75mm</td>
<td>f/4</td>
<td>56 x 80 mm</td>
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<tr>
<td>80mm</td>
<td>f/5.6</td>
<td>56 x 80 mm</td>
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<tr>
<td>105mm</td>
<td>f/5.6</td>
<td>65 x 90 mm (2-1/2&quot; x 3-1/2&quot;)</td>
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<tr>
<td>135mm</td>
<td>f/5.6</td>
<td>90 x 120 mm (4&quot; x 5&quot;)</td>
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<tr>
<td>150mm</td>
<td>f/5.6</td>
<td>100 x 150 mm (4&quot; x 5&quot;)</td>
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<tr>
<td>180mm</td>
<td>f/5.6</td>
<td>130 x 180 mm (5&quot; x 7&quot;)</td>
</tr>
<tr>
<td>210mm</td>
<td>f/5.6</td>
<td>160 x 210 mm (5&quot; x 7&quot;)</td>
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<tr>
<td>240mm</td>
<td>f/5.6</td>
<td>180 x 240 mm (8&quot; x 10&quot;)</td>
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<tr>
<td>300mm</td>
<td>f/5.6</td>
<td>270 x 330 mm (10&quot; x 12&quot;)</td>
</tr>
<tr>
<td>360mm</td>
<td>f/5.6</td>
<td>300 x 400 mm (11&quot; x 14&quot;)</td>
</tr>
</tbody>
</table>

### EL-Nikkor Lens Features

The design of enlarging lenses is quite different from that of general photographic lenses, necessitated by the demanding requirements of photoenlarging/photoengraving applications. Of the many factors considered, magnification stands out as significant, particularly when we consider that a 35mm original negative requires a magnification of 10X to produce a 10" x 12" print. The spectral sensitivity of the photosensitive printing paper also requires adequate consideration. And, of course, image displacement (as a result of chromatic aberration) when color separating demands the strictest control to ensure exact reproduction with faithful tones and full contrast. EL-Nikkor lenses are designed taking all these factors (and more) into full consideration. The result is a full range of enlarging lenses of the highest optical quality, fully capable of reproducing details and retaining the excellence of the original negative.

1) **Brightness**

EL-Nikkors are constructed with large maximum apertures to save on exposure time, which is advantageous when enlarging. Additionally, they are designed so that the front and rear elements are large in diameter for maximum light transmissions, not only at the center of the field, but also at the periphery.

2) **General Aberration Correction**

Optical aberrations are corrected for a short focusing distance corresponding to the standard magnifying power of the lens, with correction extending over an area larger than that of the original format size. Also, distortion is held to absolute minimum for faithful reproduction of the original. Lastly, EL-Nikkors produce a flat image plane that does not shift focus, even when the lens is stopped down.

3) **Chromatic Aberration Correction**

Nikon EL-Nikkor lenses have optical elements made of the same type of glass as Apo-Nikkor lenses, our apochromatic lenses for photoengraving applications. With this glass, EL-Nikkors exhibit similarly high levels of chromatic aberration correction for superb results when color separating for photoengraving, or simply when photoenlarging. It should be noted that when working at the standard magnification setting, EL-Nikkors have a smaller amount of chromatic aberration than Apo-Nikkors owing to the shorter focal length.
4) Correction for Near-ultraviolet Range
There is considerable difference between the spectral sensitivity of the human eye (favoring energy from 400nm to 700nm) and that of photosensitive paper (highly responsive to ultraviolet energy from 350nm to 450nm). To ensure that focusing, as performed by the naked eye, is accurate for the sensitivity range of the paper, EL-Nikkor lenses are corrected for chromatic aberration to 380nm and feature optical glass carefully selected for minimum ultraviolet absorption. Finally, an anti-reflection coating for the wavelength of 400nm is applied as an additional measure to ensure maximum transmission of energy in the ultraviolet range. In sum, exact focus is maintained for color and black-and-white reproduction.

5) Image Resolution
EL-Nikkor lenses produce a flat image plane that does not shift focus as the lens is stopped down, nor as illumination of a different primary wavelength is used; thus, faithful reproduction is assured, even at the full aperture setting. Maximum image resolution is obtained when the lens is stopped down two or three stops, but will begin to decrease if the lens is stopped down further.

Lens Barrel Construction
The lens elements of EL-Nikkor lenses are housed in a black-finished barrel, with the easy-to-grasp aperture control ring fitted at the front end for ease of access and operation. All standard f/numbers in the operation range of the diaphragm are engraved on the ring in bold, white figures, with identical sets of numbers provided on opposite sides of the ring. As an aid when operating in the darkroom, equidistantly spaced click-stop positions corresponding to each of the standard f/numbers are provided. For lenses of longer focal length (i.e., 180mm and longer), intermediate markings for 1/3-stop positions are provided between the standard f/number figures; this is especially convenient for critical photoengraving work.

Mounting on the Enlarger
The seven EL-Nikkor lenses from 50mm to 135mm focal length are designed for mounting on most popular enlargers, and are thus fitted with the common Leica-type (39mm diameter, VP = 26) mount; within this range, the 80mm, 105mm and 135mm have a mounting ring which provides two mounting sizes for greater flexibility in attaching to some Durst and Omega models. Also, an extension ring is available for mounting the 50mm f/2.8 lens on Leitz Focomat models. Mounting lenses on certain other enlargers may call for an adapter ring or mounting flange, which in some cases must be specially prepared to meet the requirements of the lens/enlarger combination.
Mounting on the Process Camera

When mounting a photoengraving lens on a process camera, the front end (marked with the lens name) must be positioned facing the larger of the images, or the original. Thus, when enlarging, the lens faces the image; when reducing, it faces the original.

1) Enlarger-type Process Camera
Attach the lens in the usual manner, with its rear mount toward the camera. The six lenses from 150mm to 360mm focal length are supplied with a flange to facilitate sturdy attachment to the camera using nuts and bolts.

2) Darkroom Process Camera
The eight lenses from 105mm to 360mm focal length are fitted with a front mounting thread for attachment to the camera. The remaining five lenses from 50mm to 80mm focal length, on the other hand, have no such provision; instead, these units require the use of an accessory mounting ring connected to the filter attachment threads provided.

To gain access to the front mounting threads provided on the eight longest focal length lenses, simply remove the front ornamental ring, as shown in the photos 1 and 2. The front threads on the 150mm to 360mm lenses accept attachment of the mounting flange provided with the lens, thus assuring sturdy mounting on the camera (Photo 3).
Additional Applications
In addition to ordinary color or black-and-white negative enlargement and photoengraving/photoengraving of transparencies, EL-Nikkor lenses are suitable for use in many other photographic applications. With their superb optical performance, these lenses are ideal for special projection and close-up photography situations. And, as they are fully corrected for the near-ultraviolet range, EL-Nikkors are capable of recording phosphorescent (e.g., cathode ray tube-CRT-display) and fluorescent images. Also, these lenses can be used as an optical system for transmission of television images, or as a relay lens in combination with other optical devices.

Suitability for Photoengraving
Considering the strict chromatic aberration correction and high magnification capability of EL-Nikkor lenses, it is easy to understand why these units have taken their place beside Apo-Nikkor lenses for photoengraving applications; specifically, EL-Nikkor lenses have become popular choice units for color separation/direct screening processing calling for magnifications greater than 1X. In fact, with small-format originals, EL-Nikkors will produce better results than the comparatively long focal length Apo-Nikkor units. However, when choosing the proper EL-Nikkor for such special applications, best results will be obtained when a slightly longer focal length model is selected (i.e., 35mm format originals generally require a 50mm lens; for color separation, however, a 63mm or 80mm lens will prove better). This last point is understandable when we consider the type of illumination in use, the requirement for masking and the length of the overall working distance.

Accessories for EL-Nikkor Lenses
Accessory rings are available to facilitate mounting EL-Nikkor lenses onto different types of enlargers and process cameras. For the EL-Nikkor 50mm f/2.8, 50mm f/4, 63mm f/3.5, 75mm f/4 and 80mm f/5.6 lenses, accessory mounting rings connect to the front filter attachment threads for reverse mounting of the lens on the process camera. An additional ring is available for mounting the 210mm f/5.6 onto the Durst-type enlarger.
### EL-Nikkor 75mm f/4

- **Focal length**: 75mm
- **Maximum aperture ratio**: 1.4
- **Minimum f/stop**: f/45
- **Lens construction**: 4 elements in 3 groups
- **Correction wavelength range**: 380 ~ 700nm
- **Standard magnification**: 5X
- **Usable magnification range**: 2X ~ 10X
- **Picture angle**: 52°
- **Vignetting**: 0% (at f/8)
- **Distortion**: -0.25% (at 5X)
- **Image size**: 400mm² (at 5X)
- **Original size**: 80mmφ (56 x 56mm format)
- **Overall working distance**: 540mm (at 5X)
- **Weight**: 80g
- **Diameter**: 44.5mm
- **Length**: 32mm
- **Rear mount size**: 30mm (1/P = 26)
- **Front mount size**: (mounting adapters available)
- **Attachment size**: 34.5mm (P = 0.5mm)
- **Flange diameter**: —

### EL-Nikkor 80mm f/5.6

- **Focal length**: 80mm
- **Maximum aperture ratio**: 1:5.6
- **Minimum f/stop**: f/45
- **Lens construction**: 6 elements in 4 groups
- **Correction wavelength range**: 380 ~ 700nm
- **Standard magnification**: 5X
- **Usable magnification range**: 2X ~ 15X
- **Picture angle**: 57° 40'
- **Vignetting**: 0% (at f/8)
- **Distortion**: -0.035% (at 5X)
- **Image size**: 500mm² (at 5X)
- **Original size**: 100mm² (56 x 72mm format)
- **Overall working distance**: 576mm (at 5X)
- **Weight**: 150g
- **Diameter**: 44.5mm
- **Length**: 34.5mm
- **Rear mount size**: 30mm (1/P = 26); 32.5mm (P = 0.5mm)
- **Front mount size**: (mounting adapters available)
- **Attachment size**: 34.5mm (P = 0.5mm)
- **Flange diameter**: —
**EL-Nikkor 105mm f/5.6**

- Focal length: 105mm
- Maximum aperture ratio: 1:5.6
- Minimum f/stop: f/45
- Lens construction: 6 elements in 4 groups
- Correction wavelength range: 380 ~ 700nm
- Standard magnification: 5X
- Usable magnification range: 2X ~ 10X
- Picture angle: 56°
- Vignetting: 0% (at f/8)
- Distortion: +0.009% (at 5X)
- Image size: 650mmφ (at 5X)
- Original size: 130mmφ (65 x 90mm format)
- Overall working distance: 756mm (at 5X)
- Weight: 220g
- Diameter: 48mm
- Length: 30.5mm
- Rear mount size: 38mm (1/P = 26)
- Front mount size: 39mm (1/P = 26)
- Attachment size: 34.5mm (P = 0.5mm)
- Flange diameter: [diagram]

**EL-Nikkor 135mm f/5.6**

- Focal length: 135mm
- Maximum aperture ratio: 1:5.6
- Minimum f/stop: f/45
- Lens construction: 6 elements in 4 groups
- Correction wavelength range: 380 ~ 700nm
- Standard magnification: 5X
- Usable magnification range: 2X ~ 10X
- Picture angle: 54°
- Vignetting: 0% (at f/8)
- Distortion: +0.025% (at 5X)
- Image size: 800mmφ (at 5X)
- Original size: 160mmφ (4" x 5" format)
- Overall working distance: 972mm (at 5X)
- Weight: 260g
- Diameter: 57mm
- Length: 47.2mm
- Rear mount size: 39mm (1/P = 26)
- Front mount size: 46mm (P = 0.5mm)
- Attachment size: 46mm (P = 0.5mm)
- Flange diameter: [diagram]
**EL-Nikkor 150mm f/5.6**

- Focal length: 150mm
- Maximum aperture ratio: 1:5.6
- Minimum f/stop: f/4.5
- Lens construction: 6 elements in 4 groups
- Correction wavelength range: 380 ~ 700nm
- Usable magnification range: 2X ~ 8X
- Picture angle: 54°
- Vignetting: 0% (at f/8)
- Distortion: +0.01% (at 4X)
- Image size: 760x580 (at 4X)
- Original size: 190mmφ (4" x 5" format)
- Overall working distance: 937.5mm (at 4X)
- Weight: 300g
- Diameter: 62mm
- Length: 65.5mm
- Rear mount size: 53mm (P = 0.75mm)
- Front mount size: 53mm (P = 0.75mm)
- Attachment size: 47mm (P = 0.5mm)
- Flange diameter: 74mm

**EL-Nikkor 180mm f/5.6**

- Focal length: 180mm
- Maximum aperture ratio: 1:5.6
- Minimum f/stop: f/4.5
- Lens construction: 6 elements in 4 groups
- Correction wavelength range: 380 ~ 700nm
- Usable magnification range: 2X ~ 8X
- Picture angle: 54°
- Vignetting: 0% (at f/8)
- Distortion: -0.01% (at 4X)
- Image size: 920x690 (at 4X)
- Original size: 230mmφ (5" x 7" format)
- Overall working distance: 1,125mm (at 4X)
- Weight: 430g
- Diameter: 76mm
- Length: 62.6mm
- Rear mount size: 62mm (P = 1mm)
- Front mount size: 62mm (P = 1mm)
- Attachment size: 58mm (P = 0.75mm)
- Flange diameter: 88mm
**EL-Nikkor 210mm f/5.6**

- Focal length: 210mm
- Maximum aperture ratio: 1:5.6
- Minimum f/stop: f/45
- Lens construction: 6 elements in 4 groups
- Correction wavelength range: 380 ~ 700nm
- Standard magnification: 4X
- Usable magnification range: 2X ~ 8X
- Picture angle: 54°
- Vignetting: 0% (at f/8)
- Distortion: +0.01% (at 4X)
- Image size: 1,080mm (at 4X)
- Original size: 270mm (5" x 7" format)
- Overall working distance: 1,315.5mm (at 4X)
- Weight: 600g
- Diameter: 82mm
- Length: 77mm
- Rear mount size: 72mm (P = 1mm)
- Front mount size: 72mm (P = 1mm)
- Attachment size: 68mm (P = 0.75mm)
- Flange diameter: 98mm

**EL-Nikkor 240mm f/5.6**

- Focal length: 240mm
- Maximum aperture ratio: 1:5.6
- Minimum f/stop: f/45
- Lens construction: 6 elements in 4 groups
- Correction wavelength range: 380 ~ 700nm
- Standard magnification: 3X
- Usable magnification range: 1X ~ 6X
- Picture angle: 54°
- Vignetting: 0% (at f/8)
- Distortion: -0.02% (at 3X)
- Image size: 990mm (at 3X)
- Original size: 330mm (8" x 10" format)
- Overall working distance: 1,260mm (at 3X)
- Weight: 910g
- Diameter: 81.7mm
- Length: 82mm (P = 1mm)
- Rear mount size: 82mm (P = 1mm)
- Front mount size: 82mm (P = 1mm)
- Attachment size: 77mm (P = 0.75mm)
- Flange diameter: 108mm
EL-Nikkor 300mm f/5.6

Focal length: 300mm
Maximum aperture ratio: 1:5.6
Minimum f/stop: f/45
Lens construction: 6 elements in 4 groups
Correction wavelength range: 380 ~ 700nm
Standard magnification: 2X
Usable magnification range: 1X ~ 4X
Picture angle: 52°
Vignetting: 0% (at f/8)
Distortion: -0.03% (at 2X)
Image size: 880mm² (at 2X)
Original size: 440mm² (10" x 12" format)
Overall working distance: 1,350mm (at 2X)
Weight: 1,550g
Diameter: 117mm
Length: 97mm
Rear mount size: 100mm (P = 1mm)
Front mount size: 100mm (P = 1mm)
Attachment size: 95mm (P = 1mm)
Flange diameter: 131mm

EL-Nikkor 360mm f/5.6

Focal length: 360mm
Maximum aperture ratio: 1:5.6
Minimum f/stop: f/45
Lens construction: 6 elements in 4 groups
Correction wavelength range: 380 ~ 700nm
Standard magnification: 2X
Usable magnification range: 1X ~ 4X
Picture angle: 52°
Vignetting: 0% (at f/8)
Distortion: -0.02% (at 2X)
Image size: 1,000mm² (at 2X)
Original size: 500mm² (11" x 14" format)
Overall working distance: 1,620mm (at 2X)
Weight: 2,700g
Diameter: 143mm
Length: 119mm
Rear mount size: 130mm (P = 1.5mm)
Front mount size: 130mm (P = 1.5mm)
Attachment size: 120mm (P = 1mm)
Flange diameter: 165mm