

PORRO PRISMS

A Porro prism, named for its inventor Ignazio Porro, is a type of reflection prism used to alter the orientation of an image. In operation, light enters the large face of the prism, undergoes total internal reflection twice from the 45° sloped faces, and exits again through the large face. An image traveling through a Porro prism is rotated by 180° and exits in the opposite direction offset from its entrance point, as shown in Figure 1.45. Since the image is reflected twice, the handedness of the image is unchanged. Porro prisms have rounded edges to minimize breakage and facilitate assembly.

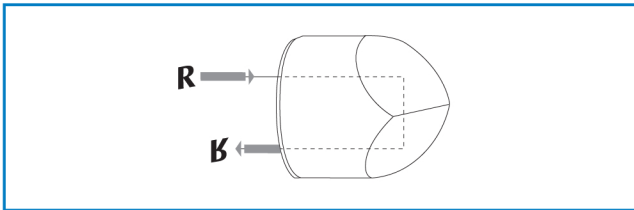


Figure 1.45 Porro prisms retroreflect and invert the image

Porro prisms are most often used in pairs, forming a double Porro prism, as shown in Figure 1.46. A second prism, rotated 90° with respect to the first, is placed such that the beam will traverse both prisms. The net effect of the prism system is a beam parallel to but displaced from its original direction, with the image rotated 180° . As before, the handedness of the image is unchanged.

Double Porro prism systems are used in small optical telescopes to reorient an inverted image and in many binoculars to both re-orient the image and provide a longer, folded distance between the objective lenses and the eyepieces.

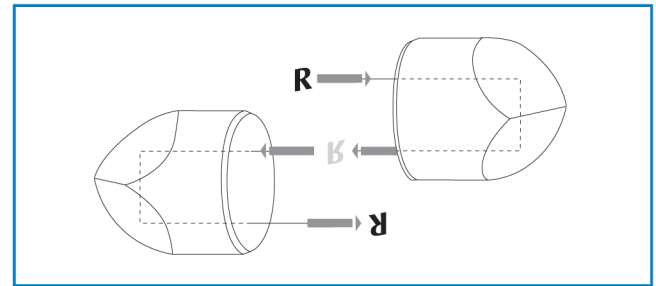


Figure 1.46 Double porro prism results in a beam parallel to but displaced from its original direction, with the image rotated 180°