

GRIN Endoscopic Rod Lens Systems

GRIN endoscopic systems, which combine a GRIN objective lens, a GRIN relay lens and a GRIN eyepiece. Combining the system with a prism enables the change of the direction of view (see Fig. 2). Standard diameters are 0.5, 1.0 und 2.0 mm. We offer the systems in two different principle design options:

- A. The objective lens creates a reduced intermediate image at the exit surface of the objective lens, which will be imaged by the relay lens 1:1 (if the lens length of the relay lens is a multiple of the period) or - 1:1 (if the lens length of the relay lens is an odd multiple of the half period) to the exit surface of the relay lens.
- B. The objective lens creates a reduced intermediate image at the exit surface of the objective lens, which will be imaged by the relay lens (including the eyepiece in form of a $\frac{1}{4}$ pitch-lens (e.g. 0.75 pitch, 1.25 pitch, 1.75 pitch etc.) at infinity. Such a lens system is a complete endoscopic imaging system. It allows the direct observation with the human eye or the use of a conventional camera system (including camera lens).

Schematic view of the two designs:

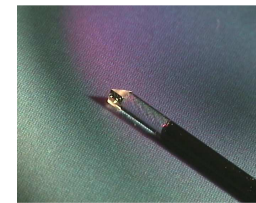
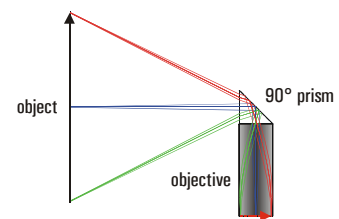
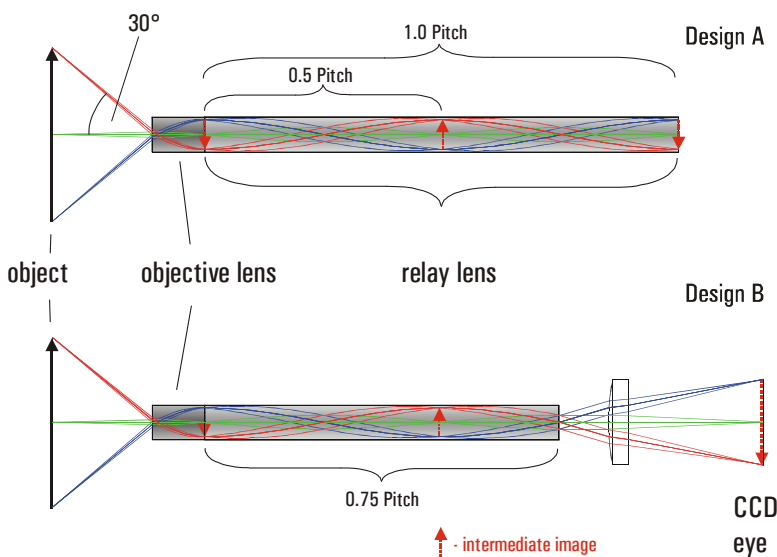


Fig. 1: Examples of designs for GRINTECH endoscopic systems. The pitch length can be increased by a whole number of the half pitch length in dependence on the requested endoscope length. Details are shown in table 1.

Fig. 2: Changing the direction of view of a GRIN lens by a 90° prism

Table 1: Configurations of endoscopic systems (other on request)

Design [Ø - pitch]	Diameter [mm]	Image orientation	System length [mm]	comment
0.5 - 0.75	0.5	like Design B	ca. 23.9	with eyepiece
0.5 - 1.0	0.5	like Design A	ca. 31.5	without eyepiece
0.5 - 1.25	0.5	inverted to Design B	ca. 39.1	with eyepiece
0.5 - 1.5	0.5	inverted to Design A	ca. 46.6	without eyepiece
0.5 - 1.75	0.5	like Design B	ca. 54.1	with eyepiece
1.0 - 0.75 *	1.0	like Design B	ca. 36.0	with eyepiece
1.0 - 1.0	1.0	like Design A	ca. 47.0	without eyepiece
1.0 - 1.25	1.0	inverted to Design B	ca. 58.5	with eyepiece
1.0 - 1.5	1.0	inverted to Design A	ca. 69.5	without eyepiece
1.0 - 1.75 *	1.0	like Design B	ca. 80.0	with eyepiece
2.0 - 0.75 *	2.0	like Design B	ca. 81.0	with eyepiece
2.0 - 1.00 *	2.0	like Design A	ca. 106.5	without eyepiece
2.0 - 1.25 *	2.0	inverted to Design B	ca. 132.0	with eyepiece
2.0 - 1.5	2.0	inverted to Design A	ca. 157.0	without eyepiece
2.0 - 1.75	2.0	like Design B	ca. 183.0	with eyepiece

(* - These configurations are standard and are available in smaller quantities (5 pc) on request.)

We will advise you. Please contact us.

Revision 04/2011