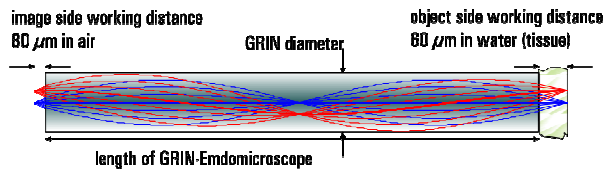


GRIN Needle Endoscopes for Fluorescence Microscopy - please see note below*

GRIN Needle Endoscopes are used for deep tissue imaging. They relay the micron-scale resolved image of the tissue over a longer length to a plane outside of the tissue at the other end of the needlescope. They are used with multi-photon fluorescence imaging (Design Wavelength 860 nm). The Endoscopes are fabricated as GRIN-singlets with NA = 0.50 on both sides or as GRIN-doublets with an object NA of 0.5 and an image NA of 0.19. Working distances on object side are specified in water or tissue, on image side in air. They are offered in different lengths resulting from adding 0.5 GRIN-pitches (periods) to the GRIN. Optional, they can be offered as side viewing needlescope by adding a 90° prism on object side.

Singlets:

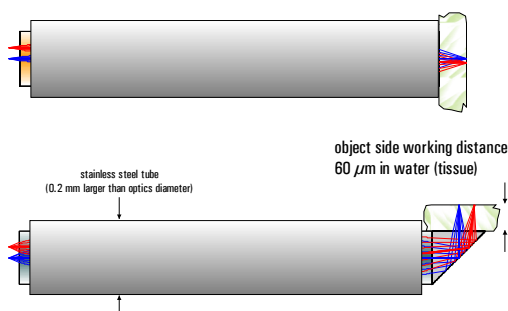


- object side working distance in water: 60 μm
- image side working distance in air: 0 μm / 80 μm
- design wavelength: 520 nm
- NA Object / image side: 0.50 / 0.50
- Magnification: 1:1 / 1:-1 (depending on pitch length)

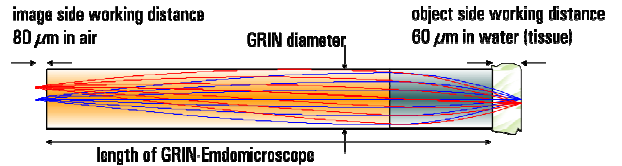
Available lengths:

Diameter (mm)	Product Code	Image side working distance (μm)	Length (mm)
0.50	NEM-050-60-00-520-S-0.5p	0	2.22
	NEM-050-60-80-520-S-0.5p	80	2.08
	NEM-050-60-80-520-S-1.0p	80	4.38
	NEM-050-60-80-520-S-1.5p	80	6.67
	NEM-050-60-80-520-S-2.0p	80	8.96
1.00	NEM-100-60-00-520-S-0.5p	0	4.67
	NEM-100-60-80-520-S-0.5p	80	4.54
	NEM-100-60-80-520-S-1.0p	80	9.28
	NEM-100-60-80-520-S-1.5p	80	14.02

- Other diameters (0.35 mm, 0.60 mm, 0.85 mm, 1.80 mm or 2.00 mm), other working distances or other design wavelength are available on request



Doublets:



- object side working distance in water: 60 μm
- image side working distance in air: 80 μm
- design wavelength: 520 nm
- NA Object / image side: 0.50 / 0.19
- Magnification: 1:2.6 / 1:-2.6 (depending on pitch length)

Available lengths:

Diameter (mm)	Product Code	Length (mm)
0.50	NEM-050-60-80-520-DS	3.98
	NEM-050-60-80-520-DM	10.08
	NEM-050-60-80-520-DL	16.19
1.00	NEM-100-60-80-520-DS	8.28
	NEM-100-60-80-520-DM	20.50

- Other diameters (0.35 mm, 1.8 mm), other working distances or other design wavelength are available on request

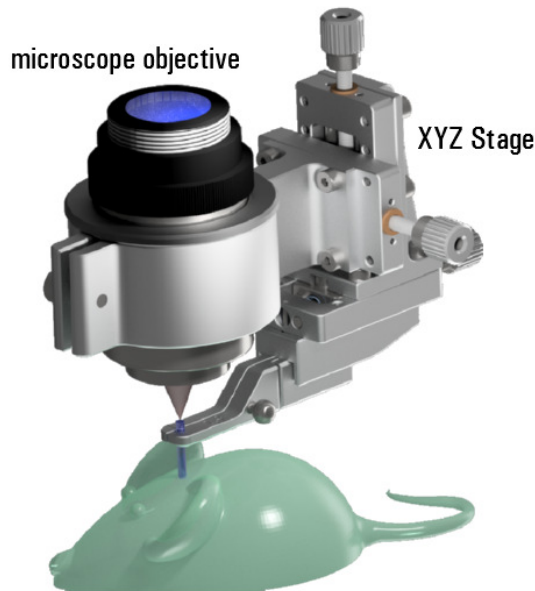
Notes:

- Diameters are sole GRIN-optics diameters
- Optionally the Endoscopes can be delivered in medical-grade stainless steel tubes (1.4301), with outer diameters of 0.70 mm for 0.5 mm optics and 1.2 mm for 1.0 mm optics. The tubes are mounted flush on the object side (tissue, high NA) for the side viewing version the prism is not protected by the tube. On the image side, the optics sticks out of the tube by 50 – 500 μm. Please add -ST to the product code if desired.
- The lengths can have a tolerance of +/- 5 %.
- The lenses are non-coated. For customized projects, the lenses can be AR-coated.
- A side-viewing scope using microprisms may be also possible on a customized basis (see left).
- Please ask for combination with imaging fiber bundles (Fujikura) as customized solution.

* not available for following applications : Please note our partnership with Inscopix as our exclusive distributor for the field of non-confocal, single photon epi-fluorescence imaging for neuroscience applications in non-humans (see page 10).

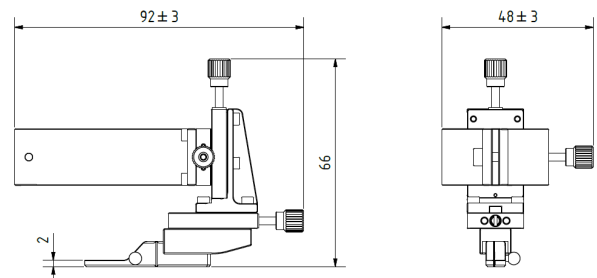
Positioning Stage for GRIN-Needle Endomicroscopes and High NA objectives

XYZ Stage and objective mounting to connect and align to microscope objectives



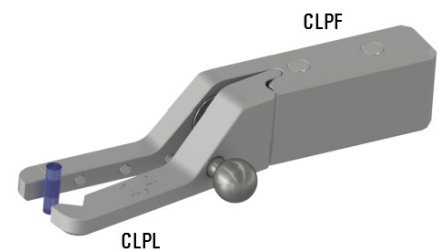
Applications and properties:

- holding, handling and three-axis-positioning of GRIN-microsystem relative to microscope objectives
- mounting for microscope objective diameter 30 mm (standard)
- smaller microscope objectives diameters are possible with assistance of an adapter ring (for ordering see table below)
- stable and reliable construction of the XYZ-stage
- adjustment travel: X - 7.5 mm, Y - 6.5 mm, Z - 6.5 mm
- thread pitch 0.2 mm
- easy pick and drop of the jaws with magnetic pull
- durable anodized aluminum surface



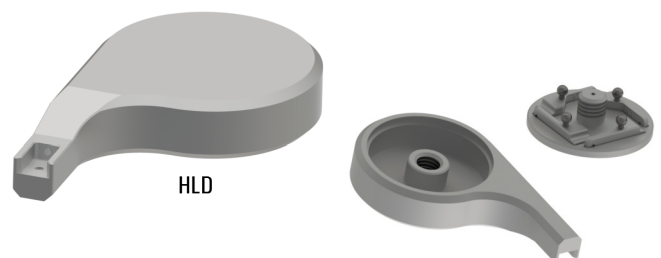
Clamping unit (CLPF + CLPL)

- consisting of fixed and loose jaw (CLPF+CLPL)
- holding and fixation of GRIN-microsystems
- different movable jaws for diameter: 0.5 / 0.7 / 1.0 / 1.2 / 1.4 mm
- easy change of movable jaw due to magnetic pull
- ball handle for moving the movable jaw for picking and dropping the microsystem



Holder for clamping unit (HLD) with movable jaw magazine

- holding and handling of the jaws including the GRIN-microsystem
- easy pick and place of the jaws because of magnetic pull
- allows the one-hand-usage to pick and drop the GRIN-microsystems
- magazine with four places for the not used movable jaws inside the handlebar
- anodized aluminum



Set includes:

- XYZ Stage (XYZSTG)
- fixed jaw of the clamping unit (CLPF)
- holder for clamping unit inclusive magazine for three jaw of different diameters (HLD)
- one movable jaw of your choice (CLPL)
- other movable jaws for different diameter can be ordered separately

XYZSTG-B	XYZ Stage (B=blue)
CLPLXX-B	Loose jaw (XX = 1.4 / 1.2 / 1.0 / 0.7 / 0.5 mm; B=Blue)
CLPF-B	Fixed jaw (B=blue)
ADPXX	Adapting for microscope objective XX=Diameter
HLD-B	Holder for clamping unit (B=blue)

Variations due to modifications of the production process are possible. It is the user's responsibility to determine suitability for the user's purpose. Please ask for customized solutions.