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We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



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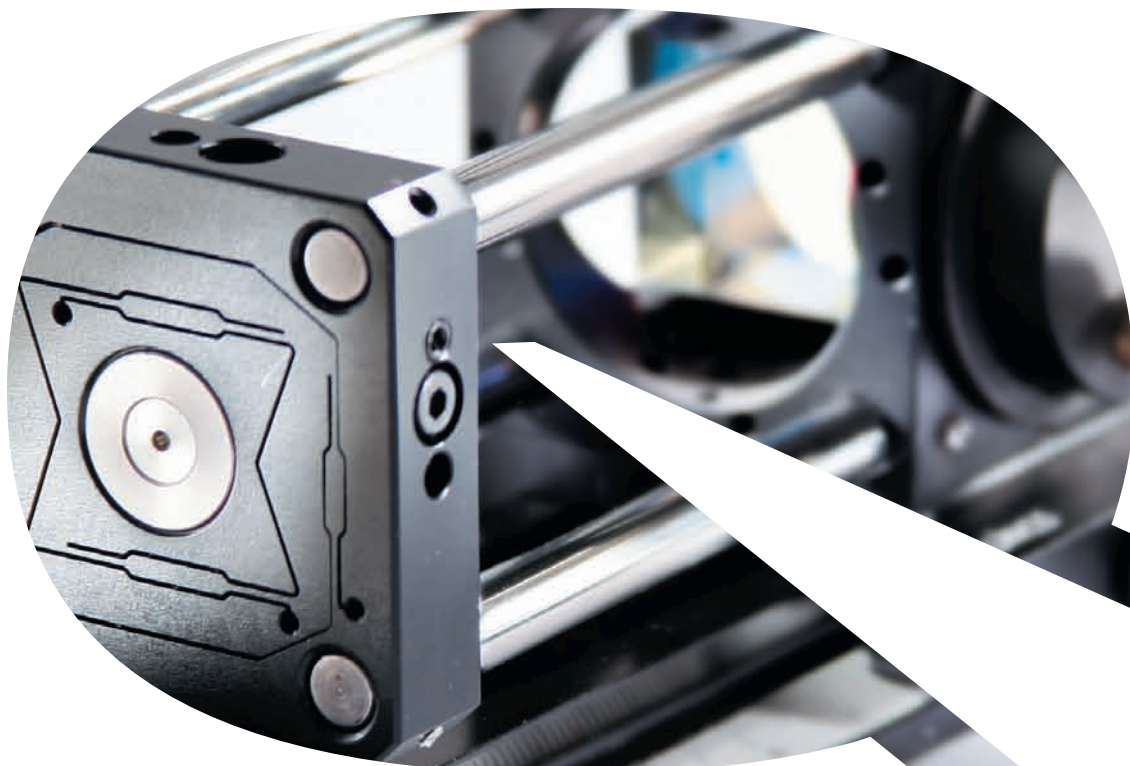
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LINOS Microbench, Bench and Rail Systems








About this Brochure

We received a lot of positive feedback on previous editions of our brochure describing our Microbench™ and Tube Mounting System C™ products. We are confident that this latest edition, reworked and expanded by the addition of the Nanobench™ and our flat rail and profile systems, lives up to the standard of quality you have come to expect from LINOS products.

Our main objective is to provide you with a clear overview of these systems, including details on their compatibility with one another. Numerous photographs illustrate a variety of applications and setups to help you choose the best combination for your own requirements.

The layout is designed to guide you straight to the information you need, from brief summaries to detailed descriptions and helpful tips.

Special pictograms represent the different LINOS systems to help you find what you need quickly:

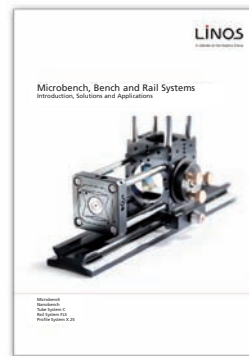
-  Microbench™
-  Nanobench™
-  Tube System C™
-  Rail Systems FLS
-  Profile System X 25



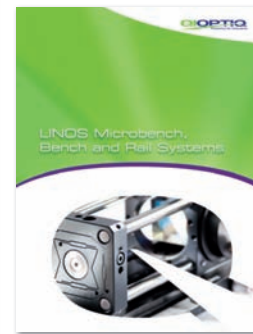
1. 1990 edition (german)



2. edition 2002



Edition 2009



New Q-style edition 2010



Further details are available in the main LINOS catalog of Qioptiq. Visit our website at www.qioptiq-shop.com for the latest information on all our products, special offers, and to place orders.

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The Microbench Concept

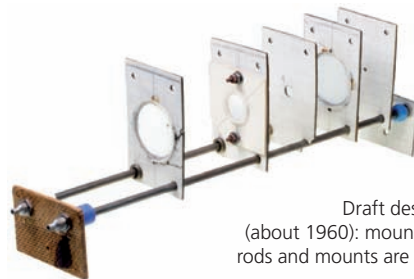
LINOS (the Catalog line of Qioptiq) – formerly Spindler & Hoyer – and the Microbench system are bound together inseparably, and have been for more than 40 years now. The long-established Spindler & Hoyer company began serial production of the compact 4-rod Microbench system, the innovative successor to the triangular rail system, as early as 1968.



Julius Adolf Hoyer and August Spindler, founders of Spindler & Hoyer (now Qioptiq)

Until well into the 1960s, optical test assemblies were generally set up on triangular profile, or "Zeiss profi 4" optical benches. These were heavy and relatively large constructions that permitted only linear, level optical arrangements. Those systems that did allow spatial expansion were not sufficiently torsion-resistant for metrological applications and

thus were suitable only for demonstration purposes. The dimensions of the accessories for these earlier-model benches made it impossible to achieve the compactness often sought-after in an optical setup. Furthermore, the insertion of microscope assemblies such as polarization, interference or measuring microscopes was exceedingly complex with conventional optical benches. The logical step was the development of a novel micro-optical bench.




Draft design of the Microbench (about 1960): mounting plates, connecting rods and mounts are still recognizable today

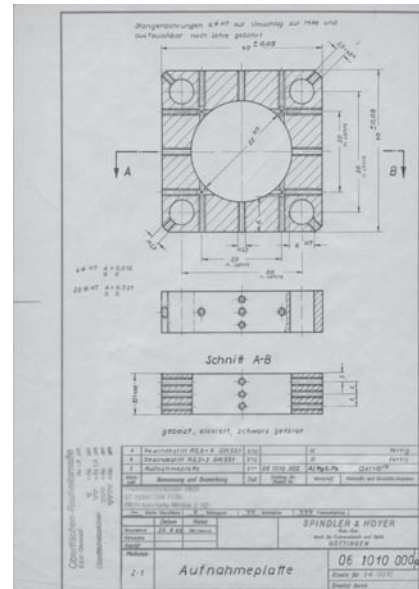
The distinctive feature of the new system was its high stability and precision. Since its introduction, optical and mechanical components of the Microbench system have become indispensable in optical laboratory experiments and are built into a large number of optomechanical devices.



Instruments made up of Microbench components are also ideal for demonstrations and practical training: the exposed design makes it easy not only to observe the entire system but also to alter or expand its most basic workings by simply adding components, such as grids, prisms, mirrors or other accessories.

In the following years the Microbench system has been continually expanded. Numerous mounted optics, specially designed for the Microbench, have been developed. The special  icon has been developed for use in our catalogs to make it easier for you to find mounted optics to add to your Microbench. Now in use both in our main catalog and the on-line shop, this icon shows you at a glance which optics are available in Microbench-compatible mounts.

For the past 40 years the Microbench has stood for the compatibility of all elements. Thanks to our extremely strict production tolerances, we can guarantee that components made today can be used with elements manufactured in the 1970s. And in our further development of the Microbench system, we will continue to ensure that new products are compatible with earlier-model elements.



Production drawing from 1963

Your advantage using LINOS products

- Decades of experience
- High flexibility thanks to a wide range of components
- High quality ensured by German manufacturing standards



Microbench Manufacturing Line

Top-quality materials

- Compliant materials
- Special alloys

meet the highest standards



Materials made from highest-quality aluminum alloy, for example: bulk material (round) for mounting plates

Optimized manufacturing

- Parts manufactured in a single work cycle
- Highest precision to meet our stringent tolerances

for pinpoint accuracy

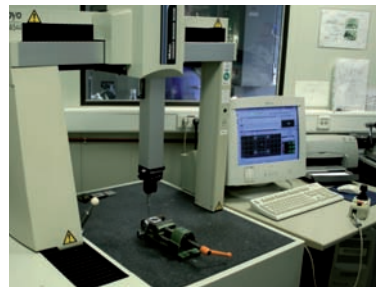


9-axis CNC milling machine handles all production stages, from aluminum bulk material (round) to finished mounting plate with all drill-holes and threads

100% Quality control

- Final inspection of all tolerances
- All components checked for accuracy of fit
- Mutual compatibility of all Microbench components assured

for consistent quality – for more than 40 years

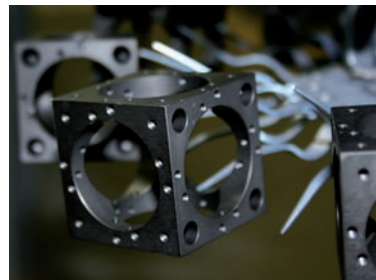


Final inspection of mounting plate tolerances at a coordinate measuring station

Surface finishing with precision anodizing

- Resistance to wear and tear
- Highest abrasion resistance ensures stringent manufacturing tolerances
- Matt black anodizing prevents reflections

for best surface quality



Microbench cubes mounted after surface finishing in anodizing bath

...and best of all:

All LINOS components are



Made in Germany

and RoHS and WEEE compliant



Bench Systems, Overview

LINOS bench and rail systems for experimental setups and measuring/inspection equipment offer high precision, excellent mechanical stability and flexibility in use. Our **Microbench** has stood the test of time for more than four decades, and we are constantly expanding the system to make sure all your requirements are met. At the same time, we continue to specialize in trend-setting developments.

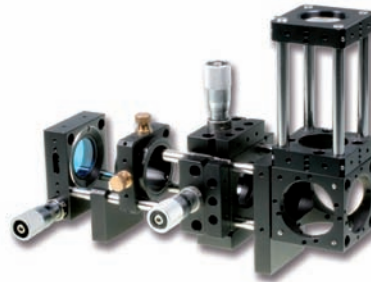
Several years ago, in response to the growing demand for smaller systems, LINOS introduced the **Nanobench** line. Compared to the 40-mm edge length of the Microbench system, the Nanobench edge length is just 25 mm.

Another important feature of this product line is our modular component system. The **Tube System C** enables fast set-ups of customized optical systems. The tubes have outer diameters of 30 mm and 35 mm and the system features a wide variety of lens mounts, diaphragms and adjustment units. The universal 1-32 UN mounting unit (C-Mount) enables direct connection to CCD cameras, lasers and microscopes.

In the area of mechanical systems for micro-optical applications, our long established policy of continuous development has brought forth the **Rail System FLS**, available for both the Nanobench (FLS 25) and the Microbench (FLS 40). This is a flat rail system that can be used with individual components, such as mounted optics or positioners or, for example, to fasten complex Microbench and Nanobench structures to optical tables.

Our **Profile System X 25** helps you achieve the best possible stability in your vertical structures. This system is compatible both with our Nanobench as well as the Flat Rail System FLS 25.

No matter which products you choose from our modular LINOS bench and rail systems, excellent compatibility of the systems with one another is guaranteed – and what's more, many other LINOS products, from mounted optics to lasers, can be directly integrated as well. This gives you the advantage of fast implementation, whether for experimental setups or permanent installation of complex measuring equipment. Whatever your application, you can find the optimum system or combination of systems for your particular specifications and spatial conditions within the extensive range of LINOS bench and rail systems.



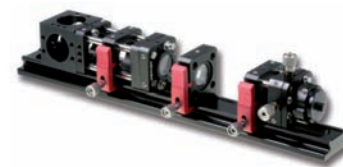
Microbench



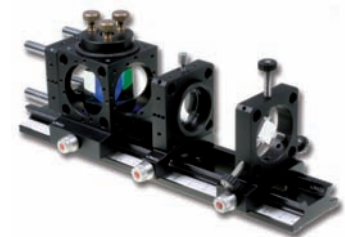
Nanobench



Tube System C



Rail System FLS 25



Rail System FLS 40



Profile System X 25

- Microbench and Nanobench: opto-mechanical systems
- Tube Mounting System C: modular component system
- Rail System FLS: flat rail systems for high-stability structures
- Profile System X 25: for horizontal and vertical setups with maximum stability



First of its Kind: The Microbench

Microbench is a compact component system for numerous areas of application – from lighting and imaging structures to optical experimental setups, measurement / inspection equipment and interferometric applications, to name just a few.


The outstanding characteristics of the LINOS Microbench products include their high mechanical stability - thanks to the use of highest quality materials - and their easy handling, even for first-time users.

A high degree of flexibility is ensured not only through the wide variety of components available for LINOS Microbench systems, but also by the range of adjustment elements and the system's modular design.

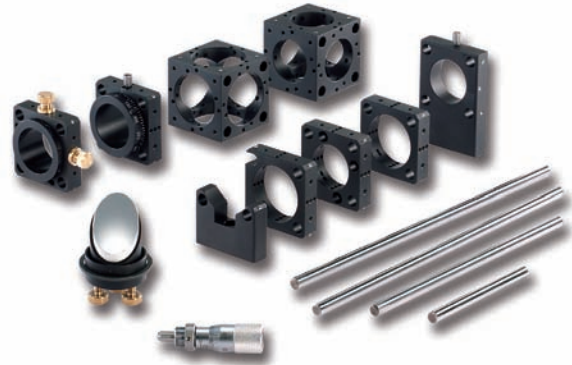
The basic principle lies in the combination of standardized mounting plates for integrating optics of all types, connected by stainless steel rods. Both linear and spatial setups can be implemented quickly and easily.


Microbench's Little Sister: Nanobench

The Nanobench is an extremely compact construction system for optics with diameters of up to 12.7 mm, and features exceptionally high precision. As with the Microbench system, mounted optics are fastened in mounting plates, which are connected by four rods to ensure extremely precise adherence to the optical axis.

A variety of base plates make it easy to fasten Nanobench components directly onto optical tables, mounting plates and support rods. With its compact dimensions and flexibility in three-dimensional structures, the Nanobench is ideal for applications in micro-optics and fiber optics. Here, too, LINOS offers a broad selection of mounted optics that can be directly attached to the Nanobench. The  icon helps to make it easy to find Nanobench-compatible products and accessories when ordering.

Adapters are available for fitting Microbench and Tube Mounting System C elements to your Nanobench system.



LINOS offers mounted optics developed specially for the Microbench with diameters from 18 mm to 31.5 mm. The special  icon, seen in both our main catalog and the on-line shop, shows you at a glance which optics are available for your Microbench system.

- Ideal system for optics with \varnothing 18 to 31.5 mm
- Modular design ensures greatest flexibility
- Extensive range of optics in Microbench mounts



- The ideal system for optics with \varnothing 3 mm to 12.7 mm
- Compact dimensions
- Modular design ensures greatest flexibility
- Extensive range of optics in Nanobench mounts



Well-rounded Product Line: Tube System C

The Tube Mounting System C is a modular component construction system for fast and trouble-free set-up of laboratory instruments, prototypes and small-batch production. Tubes are available in diameters of 30 mm and 35 mm. Threaded sockets and threaded rings enable the connection of a wide range of optics, with diameters from 6 mm to 31.5 mm.

With the Tube Mounting System C, creating your own lens and expander systems is a breeze. Adapter rings make this system compatible with the connecting threads on C-Mounts, microscopes and CCD cameras. Fine adjusters and focusing mounts let you make small changes in the length for highly precise focusing. Tube Mounting System and Microbench are excellent in combination; for example, to create a light-tight and dust-tight beam path.

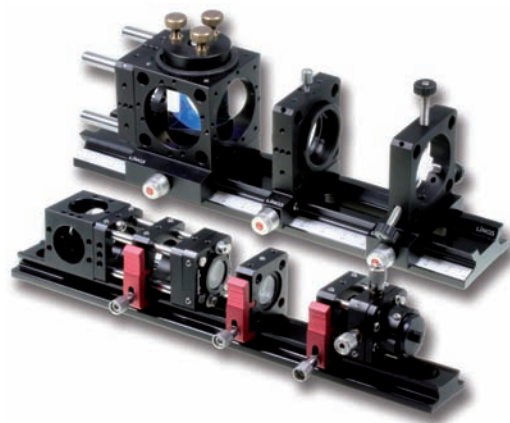


- To realize your laboratory instruments, samples, prototypes and small-batch production, including lenses and expander systems
- Modular component system
- For unmounted optics with \varnothing 6 to 31.5 mm
- Compatible with C-Mount, microscope and CCD cameras threads

Getting on Track: Flat Rail Systems FLS

Our flat rail system FLS includes the FLS 25 and FLS 40 types.: With the FLS 25, you can implement linear and areal structures and fasten 16 mm diameter mounted optics directly on a carrier. Because FLS 25 is fully compatible with the LINOS Nanobench system, you can add construction components and other special elements such as mirror and prism adjusters, positioning units and fiber couplers. The optical axis height is 20 mm.

With the Flat Rail System FLS 40, you can install mounted optics with diameters of 25, 30 or 35 mm, in conjunction with mounting plates or cubes from the Microbench series, on a carrier. With this linear rail design, the optical axis height is 40 mm. Compatibility of the Flat Rail System FLS 40 with the Microbench system enables easy combination with a number of construction components.



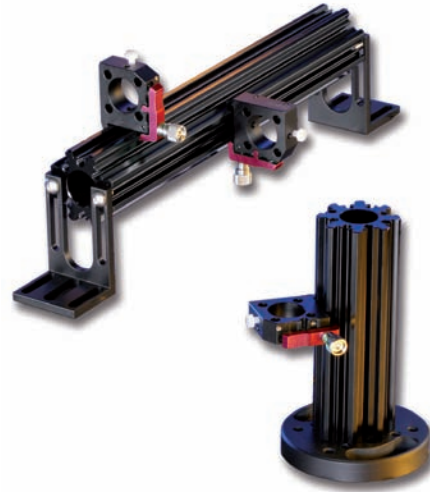
- Compatible with Nanobench (FLS 25) or Microbench (FLS 40)
- For mounted optics with \varnothing 16 mm (FLS 25) or 25/30/35 mm (FLS 40)
- Direct installation on breadboards, optical tables, etc.
- Greatest flexibility and compatibility



High-profile Products: Profile System X 25

Do you require even higher stability? Then you need our Profile System X 25. This octagonal profile system is ideal not only for horizontal structures, but for vertical applications as well.

The Profile System X 25 gives you many attachment options of a universal carrier. Moreover, this system uses the FLR 25 carriers from the FLS 25 system, making it even more universal – and economical.



- Highest stability
- Direct installation on breadboards, optical tables, etc.
- For linear and spatial structures
- Excellent straightness with low torsion


Basic Principles: Microbench

The Microbench system is based on a small number of elements, such as mounting plates, mounts and cubes, in which optics are installed. These mounts are connected by rods to form extremely compact and sturdy units.

The bore holes for the rods on all mounting plates have identical outer diameters and spacing. The edge length is 40 mm, and thickness is 10 mm. Where not indicated otherwise, the same dimensions apply for other components in the series, such as holders and special mounting plates. The rods are made of corrosion-resistant stainless steel specially for connecting individual Microbench components. They are induction-hardened to prevent marks made by adjustment screws. To ensure there is no play in the guidance of mounting plates and other components, the rods are lapped to fit.

Cubes are multifunctional elements for steering light beams and for integrating various types of optics in holders. Cubes can be combined with rods and mounting plates to create compact, three-dimensional structures. They are available with mounting diameters of 25 mm and 30 mm to fit holders in different sizes.

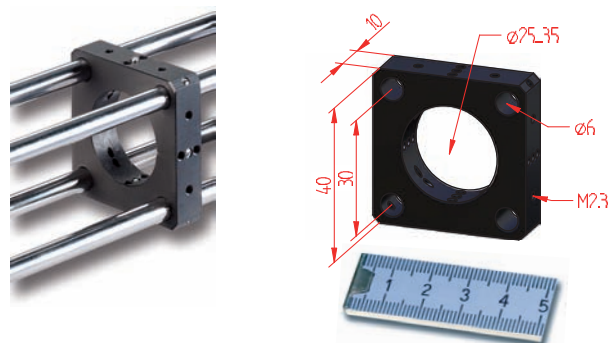
Microbench screws and threaded pins have M2.3 threads and are essential accessories for all mounting plates, holders and cubes.

- For optics from \varnothing 18 to 31.5 mm
- For a large assortment of mounted optics made specially for the Microbench, please see the LINOS catalog or www.qioptic.com (look for the Microbench icon: )
- Fast integration of Nanobench components using adapters
- Direct attachment of all components in the Tube Mounting System C line with \varnothing 30 mm or 35 mm



Mounting plates

- Lead-free aluminum alloy
- Matt black anodized surfaces
- Inner diameter: 25, 30 or 35 mm with H7 tolerances
- Four bore holes for mounting the connecting rods. The tolerances for the rod bore holes on the mounting plates, together with the tolerances for the rods, guarantee a system with virtually zero play.



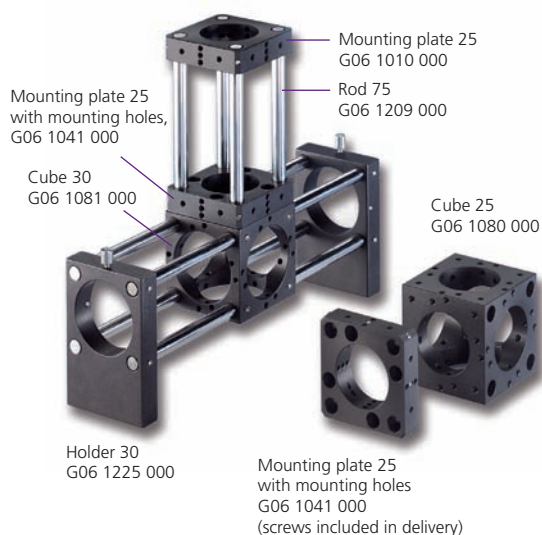
Rods

- Hardened stainless steel with polished surfaces
- Lapped to fit
- Outer diameter: 6 mm
- Lengths: 20 mm to 450 mm
- Compatible adjustment rings as holders or stops; e.g., for Z-adjustment of individual components



Cubes

- Multifunctional elements for 3D structures
- Ideal for beam deflectors
- Inner diameter of bore holes: 25 or 30 mm
- Two of the cube sides have bore holes for rods, four sides have threads for mounting plates with tapped holes



Microbench accessories:

- Threaded pins: M2.3x3, G06 1011 000 (150 pcs) For attaching rods to mounting plates and holders (alternative to mounting without tools: M2.3x4 headed screws (G06 1238 000, 20 pcs))
- Threaded pins: M2.3x6, G06 1012 000 (150 pcs) For attaching mounted optics in mounting plates (alternative to mounting without tools: M2.3x9 headed screws (G06 1239 000, 20 pcs))
- Special screwdriver for all threaded pins: G06 1090 000



Basic Principles: Nanobench


The functional principle of the Nanobench is identical to that of the Microbench system. The dimensions and tolerances, however, are on a smaller scale, compared to the Microbench's size. A wide range of mounting plates, holders, rods and cubes are available for creating sturdy and extremely compact systems.

The bore holes for the rods on all Nanobench mounting plates have identical outer diameters and spacing. The edge length is 25 mm, and thickness is 10 mm. Where not indicated otherwise, the same dimensions apply for other components in the series.

The rods are made of corrosion-resistant stainless steel specially for connecting the individual Nanobench components. They are induction hardened to prevent marks made by adjustment screws. To ensure there is no play in the guidance of mounting plates and other components, the rods are lapped to fit. They have a diameter of 4 mm and are available in various lengths.

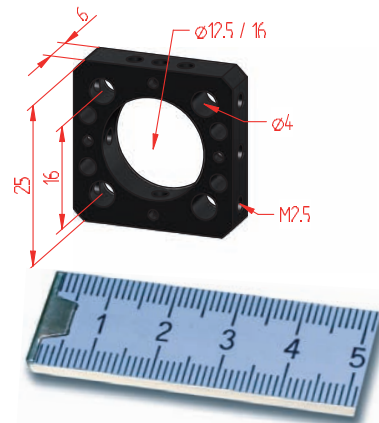
Cube N is a multifunctional element for creating a beam diverter or integrating various optics in optic holders. Combined with rods and mounting plates, it lets you set up extremely compact three-dimensional structures. The mount diameter is 16 mm.

The screws and threaded pins in the Nanobench system have M2.5 threads.

- For optics from \varnothing 3 to 12.7 mm
- For a large assortment of mounted optics made specially for the Nanobench, please see the LINOS catalog or www.qioptiq-shop.com (look for the Nanobench icon: )
- Ideal for use in micro- and fiber optics
- Compatible with the Microbench and Tube Mounting System C systems

Mounting plates

- Lead-free aluminum alloy
- Matt black anodized surfaces
- Inner diameter: 12.5 or 16 mm with H7 tolerances
- Four bore holes for mounting the connecting rods. The tolerances for the rod bore holes on the mounting plates, together with the tolerances for the rods, guarantee a system with virtually zero play.



Rods

- Hardened stainless steel with polished surfaces
- Lapped to fit
- Outer diameter: 4 mm
- Lengths: 12 mm to 200 mm



Cubes

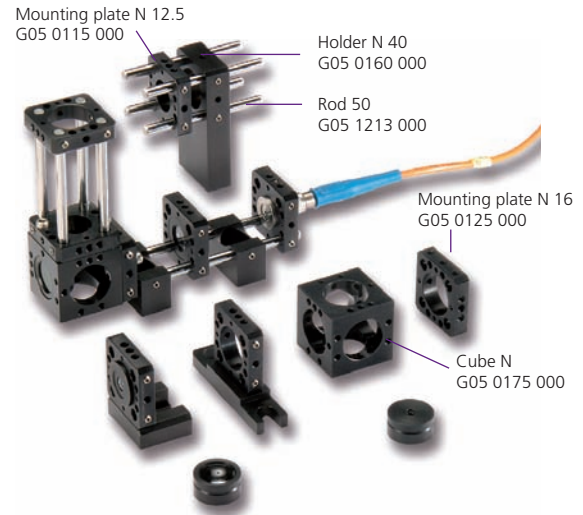
- Multifunctional elements for 3D structures
- Ideal for beam deflectors
- Inner diameter of bore holes: 16 mm
- M2.5 thread for mounting plates

Nanobench accessories:

- Threaded pins: M2.5x3, G05 1520 000 (20 pcs) or G05 1521 000 (100 pcs) to attach rods and mounted optics.

Note: When you order a set of mounting plates (4 pcs) the threaded pins are included in delivery.

- Tool Set N, G05 0501 000



Basic Principles: Tube System C

Key components of the tube mounting system are the Tubes C, which are available in two diameters and various lengths. All tubes are made of matt black anodized aluminum.

Tubes C30 have an outer diameter of 30 mm and a free inner diameter of 22.4 mm. Each features C-Mount connection threads inside and outside. The inner side has an M23.2x0.75 thread for mounting optics. Tubes C30 are available in lengths from 6 to 85 mm.

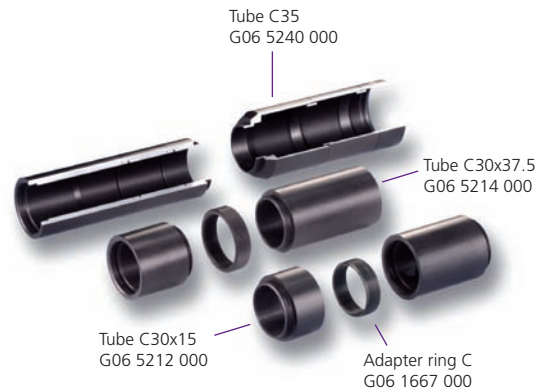
Tubes C35 have an outer diameter of 35 mm and a free inner diameter of 31.5 mm, and are available in lengths from 20 mm to 80 mm. These are connected using 6 mm wide threaded rings. The C35 tubes feature an M32.5x0.75 inner thread for mounting optics.

Beam Deflector Cube C lets you connect mirror and prism accessories. These have 30 mm bore holes for prism accessories and three (or five) bore holes with C-Mount inner threads for connecting the tubes. Bore holes not in use can be closed with protective caps.

Unmounted optics can be installed directly in the tube system and affixed using threaded rings.

Tubes

- Lead-free aluminum alloy
- Matt black anodized surfaces
- Outer diameter: 30/35 mm
- Inner diameter: 22.4/31.5 mm
- C-Mount (1-32 UNC) connection threads

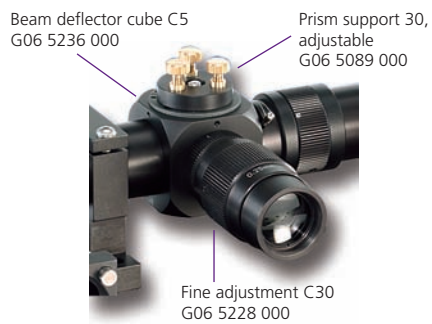


- Light-tight and dust-tight system for use in research, development and industry
- For fast and economical set-up of customized optical systems (prototypes and small-batch production)
- Universal mounting unit enables direct connection to CCD cameras, lasers, microscopes
- Compatible with Microbench



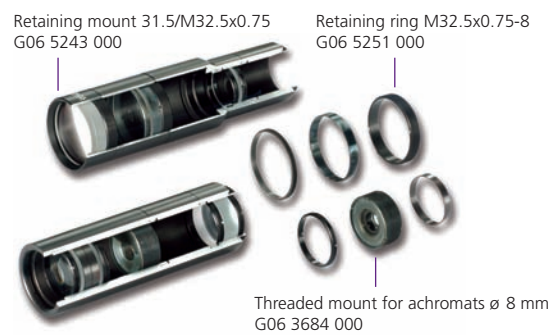
Beam deflector cubes

- Beam Deflector Cube C with C-Mount connection threads
- Uses range from beam-steering mirrors and beam-splitting cubes to adjustment sets



Optics mounting

- Integrate unmounted optics with diameters of 22.4 mm and 31.5 mm
- Integrate smaller optics using screw fittings



Basic Principles: Flat Rail and Profile Systems

Flat rails and carriers compatible with Nanobench and Microbench systems are available with the corresponding dimensions and beam heights. The Flat Rail System FLS 25 has been developed specially for LINOS Nanobench, and FLS 40 for Microbench. Both systems feature excellent straightness and evenness with low torsion. The slotted holes in the rails enable mounting on breadboards and optical tables independent of existing hole patterns.

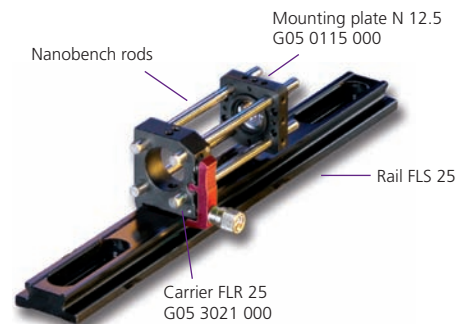
The carriers have a spring-loaded lever. Just loosen the knurled screw, and the spring tension makes it easy to move the carriers smoothly to the desired position. Then tighten the knurled screw again to affix the carrier in position. Precision milling of bearing surfaces together with abrasion-resistant anodizing ensure that components slide smoothly and evenly on the rail.

The Profile System X 25 has an 8-sided aluminum profile and, in addition to horizontal structures, is ideal for vertical applications. This system uses the same carrier as the one used in Flat Rail System FLS.

- For linear and areal structures
- Direct installation on breadboards, optical tables, etc.
- One carrier for two systems – FLS 25 and X 25
- FLS systems feature precise bearing surfaces and spring-loaded clamp on the carrier

Flat Rail System FLS 25

- Flat micro-optical bench
- Precise bearing surfaces
- Abrasion-resistant anodizing
- Lengths: 50 mm to 500 mm
- Slotted holes on the rail enable table mounting independent of existing hole patterns
- Compatible with Nanobench system
- Carrier with spring-loaded clamp

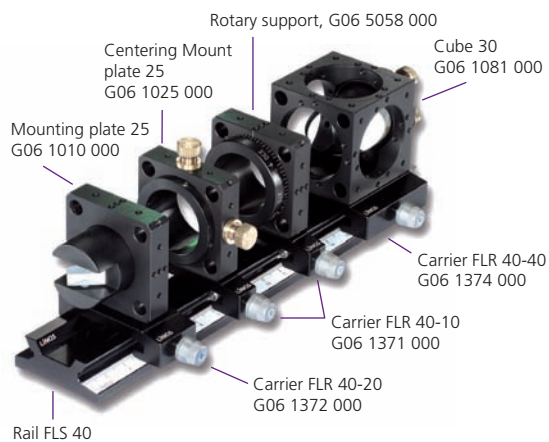


Also available in the Qioptiq on-line shop is the Flat Rail System FLS 65, the latest addition to our comprehensive line of rail systems. Visit our website at www.qioptiq-shop.com for detailed information and to place orders.



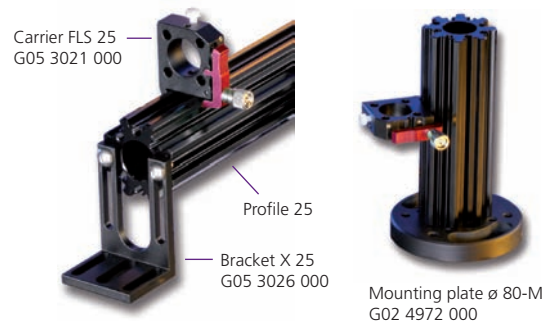
Flat Rail System FLS 40

- Precise bearing surfaces
- Abrasion-resistant anodizing
- Lengths: 40 mm to 1000 mm
- Scale
- Slotted holes on the rail enable table mounting independent of existing hole patterns
- Compatible with Microbench system
- Carrier with spring-loaded clamp



Profile System X 25

- Sturdy octagonal profile for three-dimensional structures
- Compatible with FLR 25 carriers
- Horizontal and vertical mounting with angle and mounting plates



How Do I Begin My Experiment?

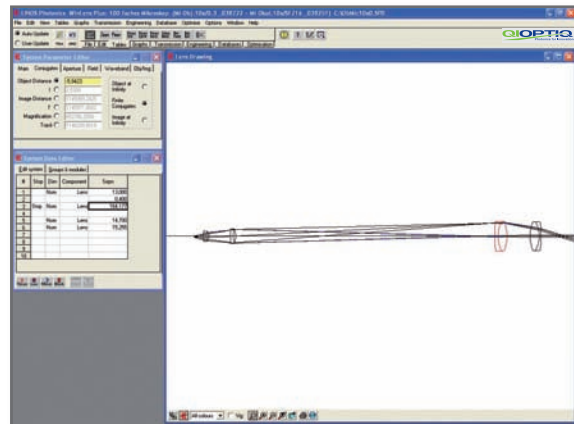
The following pages serve as a checklist for structured planning and design of your setup, to help you reach an optimum, economical solution for your requirements. The first example describes the construction of a basic microscope.

How do I design my optical assembly?

We recommend using optical design software, such as WinLens™ 3D from Qioptiq, to create a simulation. This can be a tremendous help in preparing your optical assembly. This software lets you simulate the desired beam path and analyze the results directly, so you can optimize the setup as needed before finalizing your design.

Furthermore, WinLens™ 3D comes with an integrated database that contains all of the standard Qioptiq optics, as well as other products. Using standard optics helps to keep costs to a minimum, and mounted optics are ready for direct integration in Qioptiq construction systems.

Example: How to construct a basic microscope?



Simulation of the beam path with Qioptiq WinLens™



For detailed information and a free version of the WinLens™ 3D software, point your browser to www.winlens.de.

What optics do I need and which construction system is best?

Your optic diameters and areas of application will play a role in determining the optimum construction system for your requirements. In our example, the Microbench system was chosen.

The following optics are required for this project: One 10x microscope lens and one 12.5x Kellner eyepiece for viewing the intermediate image.

In this example, we have decided not to enclose the beam path. As an alternative, we can recommend the use of the Tube System for a closed construction.



Microscope objective 10x
G03 8722 000

Kellner eyepiece 12.5x
G06 3310 000

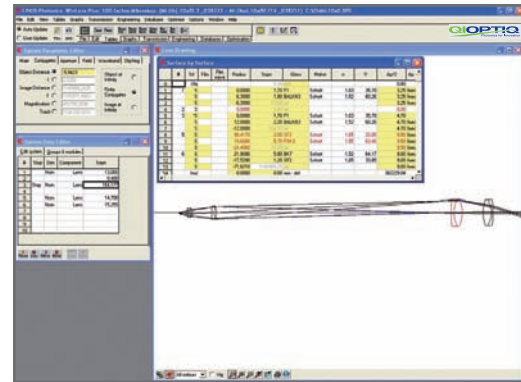
Optical components of microscope construction

How do I position the optics? And what about adjustment?

After the beam path has been laid out and the optics have been selected, the distance between each of the optics must be determined

You can calculate the distances yourself or use the Qioptiq WinLens™ program for this purpose. In this example, WinLens offers the advantage that it determines the required adjustment range on the Z-axis using its on-line optimization feature. This is important for your choice of adjustment components.

Generally, the adjustment range you require and the desired resolution influence the choice of adjustment options.



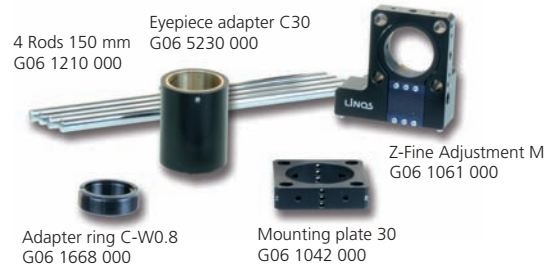
Determining distances between optics with LINOS WinLens™

What mechanical components do I need?

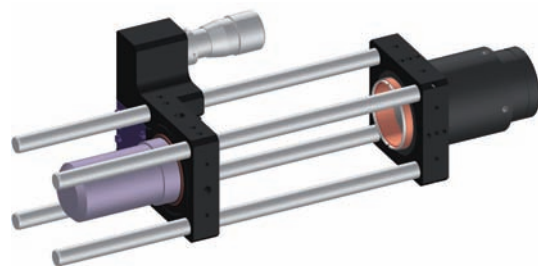
In this example, the length of the structure calls for Microbench rods measuring 150 mm.

In addition, a mounting plate is needed for the Kellner eyepiece. No mounting plate is needed for the microscope lens, since the fine adjuster already has a mount diameter of 25 mm. The threaded ring C-W0.8 is used to fit the microscope lens into the Z-Fine Adjustment M.

The system must have a range of adjustment in order to enable focusing. Adjustment on the Z-axis is possible through simple repositioning of the mounting plate on the rods or, for higher precision, using a Z-Fine Adjustment M as in our example.



Mechanical components for microscope construction

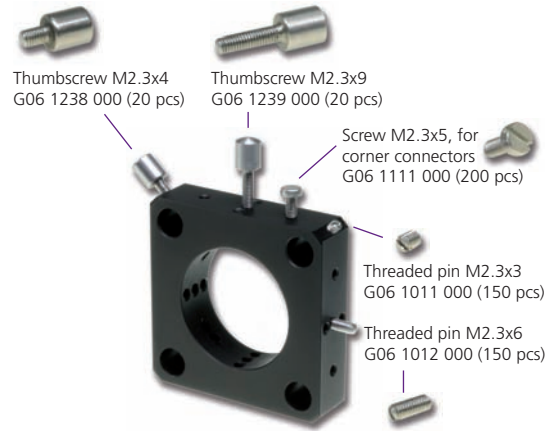


CAD drawing of the construction

You want to design or document the construction in a CAD program? Go to www.qioptiq-shop.com for CAD files in DXF or STEP format. Files are listed at each product.

What accessories do I need?

We recommend ordering the compatible tools, screws, threaded pins, and so forth at the same time you order the system. For the Microbench, for example, we offer special screwdrivers and threaded pins (slotted or headed) that have the Microbench M2.3 thread. The following table shows the accessories used in our example.



Selection options and uses of screws

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| Order No. | Product | Quantity |
|--------------------|--|----------|
| G06 1011 000 | Set of threaded pins, M2.3x3 | 150 pcs |
| G06 1012 000 | Set of threaded pins, M2.3x6 | 150 pcs |
| G06 1090 000 | Screwdriver | 1 pcs |
| Alternativ: | For fastening optics in mount without tools | |
| G06 1238 000 | Set of special screws, M2.3x4 | 20 pcs |
| G06 1239 000 | Set of special screws, M2.3x9 | 20 pcs |

How should my structure be secured?

Qioptiq offers you a broad range of equipment and methods for fastening your construction to a work surface. You can fasten it to a mounting plate using screws, mount it on an optical table or breadboard, or integrate it into an existing instrument of your own.



The end result in our example:
A compact microscope assembly
made from standard LINOS elements

For details on all of these options, please see pages 31 through 35.

How Do I Integrate Spherical Optics?

Mounted spherical optics



The easiest way to integrate spherical optics in the Microbench system is by using mounted optics from the extensive Qioptiq range. Depending on the particular optics, the mounts have an outer diameter of 25, 30 or 35 mm and are ready for installation in the compatible mounting plates, holders and adjustment elements. The mounts are fastened using threaded pins.



Mounted lenses, achromatic lenses, cylindrical lenses and color filters

Mounted spherical optics

For the Nanobench, too, a wide range of mounted optics is available. The outer diameter of the 16 mm mounts corresponds to the mounting diameter of the Nanobench mounting plates, holders, cubes and adjustment elements.


Mounted optics for the Microbench are designated in the catalog and the on-line shop by the special  icon, and Nanobench compatible optics are marked with the  icon.

Unmounted spherical optics

The Microbench system also offers the option of integrating unmounted optics. For unmounted spherical optics with diameters of 25 mm, 31.5 mm, 0.5" and 1" we offer mounting plates with M35 threads and compatible threaded rings.



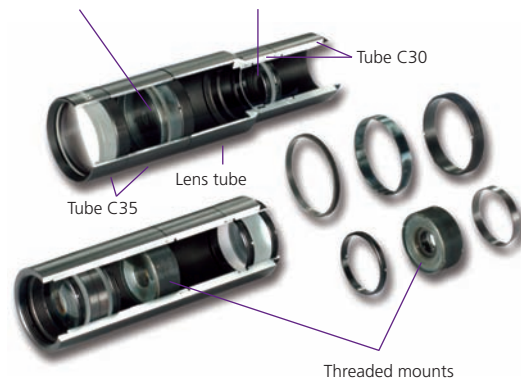
Unmounted spherical optics with diameters of 25 mm, 31.5 mm, 0.5" and 1" in Microbench M35x0.5 mounting plates

 The tube system is constructed for mounting unmounted lenses and achromatic lenses with diameters of 22.4 mm (in Tube C30) or 31.5 mm (in Tube C35). The optics are fixed in the desired position with threaded rings.

For mounting smaller optics with an outer diameter of 6 to 19 mm, you can use threaded mounts. The lens, achromatic or otherwise, is installed in the compatible threaded mount which has outer threads for installing and positioning within the tube. The high precision of the overall system ensures that lenses are centered along the optical axis.

Unmounted optics \varnothing 31.5 fixed with retaining rings M32.5x0.75, G03 6051 014

Unmounted optics \varnothing 22.4 fixed with retaining rings M23.2x0.75, G06 3666 000

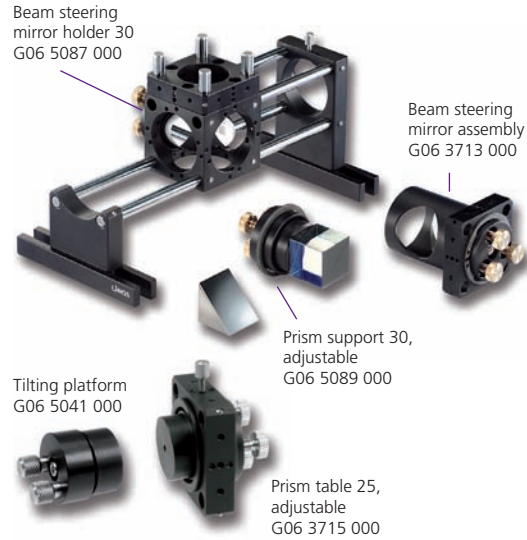


How Do I Integrate Planar Optics?

With adjustment options

If you want to install prisms or beamsplitter cubes in Microbench cubes, we recommend Prism support 30. For oval mirrors and beamsplitter plates, we recommend Beam steering mirror holder 30. To mount prisms, mirrors and cubes in mounting plates, use Tilting platform 25. Prism table 25 comes installed in a mounting plate and can be rotated.

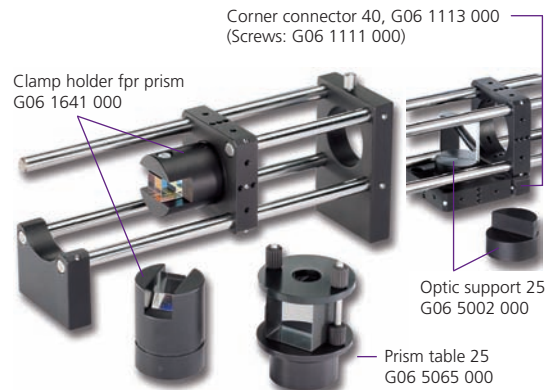
Qioptiq also offers a fully-equipped Beam steering mirror assembly, including front-surface mirror and housing, specially made for adjustment of elliptical mirrors. It is also available with a UV mirror. On all adjustable optics holders, the optics are bonded to the desired holders.




Without adjustment options

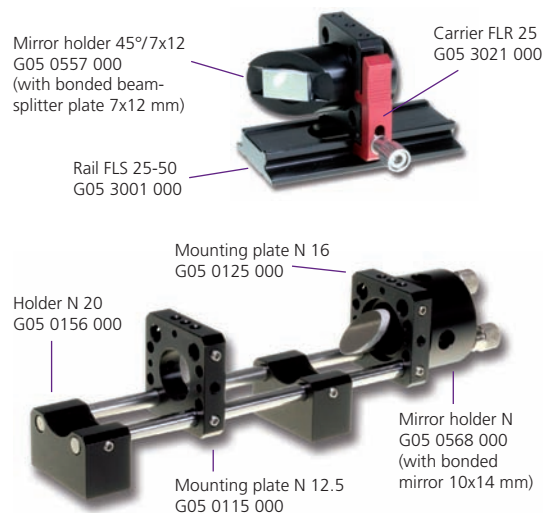
The Clamp holder for prism enables fast and simple mounting of prisms and cubes with a 10 mm edge length. Prism table 25 is the ideal mount for edge lengths of up to 20 mm. On both components, the optics are secured by clamps.

The Optic support 25 is used for mirrors, which are bonded to the guide edge. These mirror mounts can be installed in Mounting plate 25 and in Cube 25.



 For elliptical mirrors of 12.5x18 mm, Mirror holder 45° is the ideal mount, while Mirror mount 45°/ 7x12 is best for beamsplitter plates with dimensions of 7x12 or a mirror diameter of 10 mm. Prisms and cubes that measure 10x10 mm are bonded to the prism carriers.

If you are looking for adjustable optic holders, use our Prism holder N (G05 0569 000) for prisms and cubes and Mirror holder N (G05 0568 000) for mirrors and beamsplitter plates.



How Do I Apply Adhesives?

Preparation

Optics: Use a bulb blower to remove dust and loose dirt. Put a lens-cleaning cloth or another soft cotton cloth (such as Opto-Wipes™) on the optics and use a pipette to apply several drops of alcohol to the cloth. Make sure the alcohol is chemically pure. Then drag the cloth slowly over the optics. To remove fingerprints or similar impurities, proceed as described above or soak a cotton-tipped stick in alcohol and wipe it across the optics in an "S" shaped motion.

Optics holder: The holder must also be cleaned and freed of dust and grease. To do this, wipe it with a soft cloth, using a small amount of a grease-cutting detergent (such as dishwashing liquid) if necessary. Wipe again afterwards with a fresh cloth to remove any residues.

Adhesives

Which types of adhesives you should use depends on the types of optics you wish to cement. For mirrors, use an elastic two-component adhesive for a uniform curing and tension-free hold. For components such as beamsplitter cubes or plates, a UV adhesive is ideal. As the name indicates, UV light is applied to cure the adhesive.

Two-sided tape strips are commonly used in research and development laboratories. These are well-suited for quick experimental setups, particularly if the optic is removed from the carrier afterwards. They are not recommended, however, for long-term use; due to their elasticity and susceptibility to vibration, it is impossible to ensure that the position of the optics is maintained.

To keep the need for cleaning to a minimum, wear latex gloves or lint-free cotton gloves when unpacking and setting up the equipment and make sure all work surfaces are clean.



Applying adhesive in spots between optics and contact surface of the holder



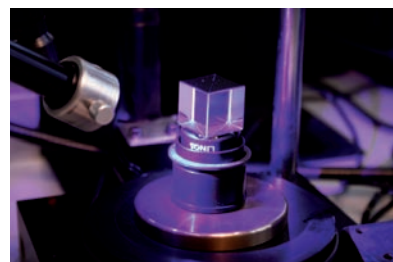
Positioning paper strips as spacers on a mirror mount

Tips for cementing optics

Even if a liquid adhesive is used, the optics can be removed later only if the adhesive is applied in discrete spots on the edge of the optics. Affix the optics holder to your work surface with adhesive strips, making sure the glued surface is on the horizontal plane to prevent slippage, until the adhesive is cured. To ensure an even layer of adhesive, lay two strips of paper as spacers on the optics carrier and press the optics until the adhesive reaches the paper. Once the adhesive has cured, you can remove the paper. This method also prevents the adhesive from leaking out between the optics and the holder when the parts are pressed together. The use of a cotton swab is recommended to prevent damage when aligning and pressing down on the optics.




Pressing down and repositioning a mirror on the fixed mirror mount



Beamsplitter cube illuminated by a UV light source


How Do I Integrate Optics into Existing Setups?

 In addition to standard mounting plates as basic components, Qioptiq offers snap-in (latchable) mounting plates and a magnetic version. They are ideal for adding optical components to an existing system, and make it possible to expand a system without having to remove the rods. With the mounting plates, for example, you can quickly replace optics such as lenses, filters, reticules, and others in the beam path. For unmounted optics with diameters of ½", 1", 25 mm and 31.5 mm, we offer the M35x0.5 snap-in mounting plate (G06 1024 000), in which the optics are mounted with compatible threaded rings.

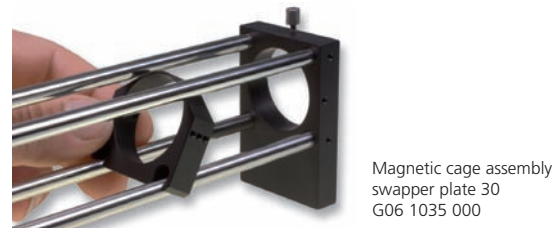
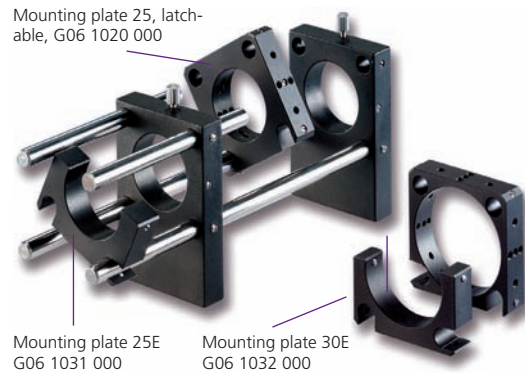
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By mounting the snap-in (latchable) plate in such a way that it can be swiveled, optics can be removed from the beam path without being removed from the setup. Collars are inserted to fix the position of the plate.

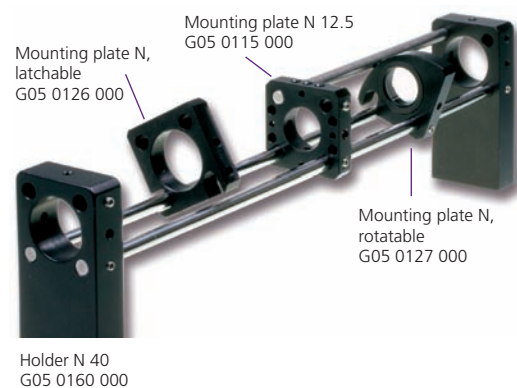
Magnetic mounting plates are easy to fasten between components on a four-rod system. The magnets are strong enough to attach the mount even upside-down.

 For the Nanobench, too, there are a number of options for retrofitting your assembly. Snap-in (latchable) and swiveling (rotatable) mounting plates are the perfect solution for adding mounted optical components to an existing system without having to remove the rods.

With these plates you can quickly switch between different optics in experimental setups. This type of mounting plate is also ideal if you want the option of removing optics from the beam path without removing them from the assembly completely. Simply install the mounting plate so that it can swivel. Collars are inserted to determine the position of the plate.



Use magnetic mounting plates for quickly switching optics.



- Mounting Plate N, snap-in and swiveling versions
- For retroactive installation in 2-rod, 3-rod and 4-rod structures
- For mounted optics with \varnothing 16 mm

How Can I Realize Different Angles in My Setup?

There are a number of options available for setting up angle connections at other than right angles. One is the Connector 80 V, which connects two mounting plates on one level. With this connector you can have the beam branch off diagonally to the axis. The slotted holes enable continuous adjustment of the angle and the mounting plates. The crossed struts help you achieve optimum stability.

Connector 80 V is also ideal for fixing the angle of the swivel connector. The Swivel connector ensures a connection between two mounting plates with no play, and has a pivot range of 120°.

- Connector 80 V for creating variable distances and angled connections
- The Swivel connector has a swivel range of 120° with no play
- Swivel arm with scale for measurable swiveling of Microbench assemblies through $\pm 90^\circ$; direct installation of mounting plates

Another variant for setting up a beam path with a bend is the Swivel arm with scale. This component lets you add angles that you can measure in your Microbench construction. The swivel arm is screwed directly onto an optical table or mounting plate using M6 or 1/4" screws.

This example demonstrates an assembly for measuring the angular intensity distribution of dispersion plates. The dispersion plate, backlit by an LED, is fastened in a Microbench mounting plate in the rotation point of the swivel arm. A photodetector is also installed in a mounting plate and mounted on the mobile part of the swivel arm. This enables quick and easy measurement of any angle.

