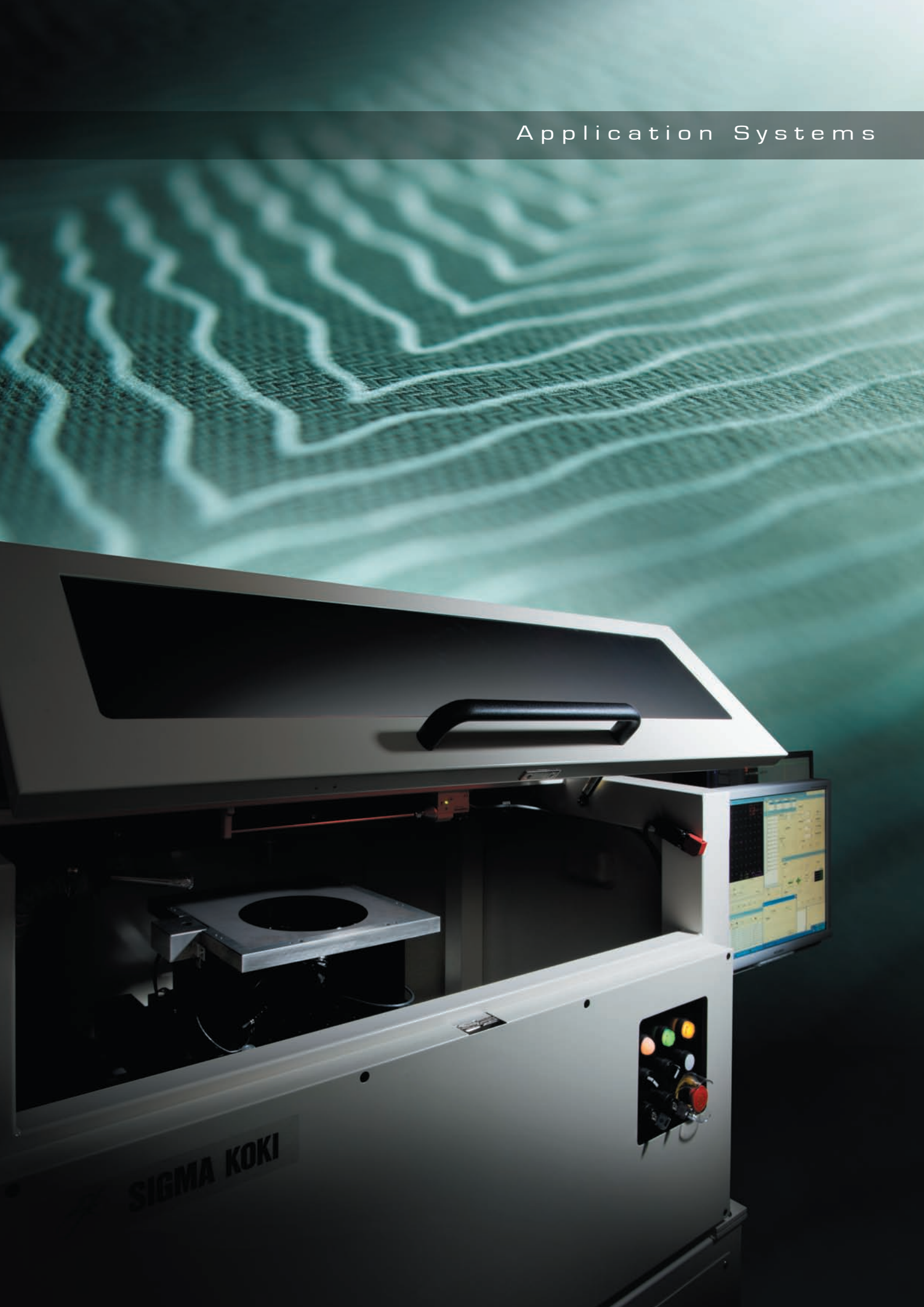
Application Systems



Application Systems | INDEX

Microscope Unit Guide

We provide three different types of observation system.
For the purposes of experiment or work, you can select an appropriate observation system.

■Zoom Microscope
Just mounting the camera can change continuously the magnification from the image of the low magnification and also get the image of high magnification.
It is suitable for observation of those with complex and dense structure, such as semiconductor devices, MEMS and so on.
Moreover, with the longest 500mm working distance, it is quite useful to observe inside of the high-temperature furnace or the vacuum chamber.

■Observation unit with coaxial illumination
Attaching the objective lens for a microscope, it displays an enlarged image on the monitor or laptop PC by using the camera.
By using a compact barrel with ports for illumination, there is flexibility of installation, and it also can be incorporated into the production equipment such as a laser processing machine.
It is quite useful to observe the high magnification in particular.

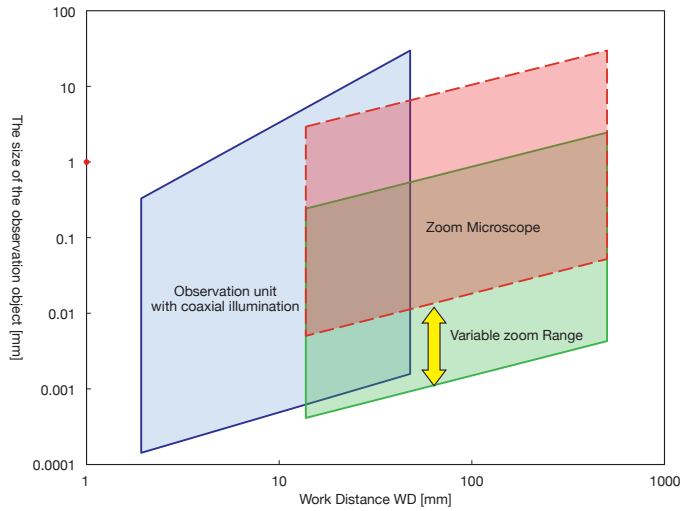
■Stereo Microscope
Since it can obtain the observed image that there is very wide field of view by binocular and a disparity of the left and right eyes, it is suitable for the observation of irregularities such as electronic components and processed parts.
With a long working distance, it is suitable for observation while moving the sample and for the visual inspection by frequent exchanging of a sample.

Performance comparison between the observation unit with coaxial illumination and zoom microscope

Between the size of the subject can be observed and the working distance, there is roughly a proportional relationship.
In general, by increasing the magnification, WD will be shorter.

The observation unit with coaxial illumination is better for the observation of a high magnification because it is possible to replace the objective lens and select WD and the magnification.
It does not have zoom function, but you can observe the fine structure of the sample in an excellent resolution.
However, when using the camera, it will be limited by the resolution of the camera and the monitor side.

The zoom microscope is inferior to the objective lens in the resolution, but by varying the magnification, it can project a size that is easily observed on the monitor.
For the observation size, there is no significant difference from the observation unit with coaxial illumination, you can select the very long WD.



System Diagram

Zoom Microscope

Color Camera

Reference A026

Rear Converter

Reference A016

Controller

Reference A023

Partial Light blocking cassette

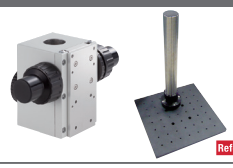
Reference A017

Lens tube with zoom

Reference A014

LED light source

Reference H032 – H034

Focus Block / Pole stand

Reference A016

Ring light guide

* ZOL-15 only
Reference A016

Long working distance objective lenses

Reference A015

Ultra Long working distance objective lenses

Reference A015

Front converter lenses

Reference A015

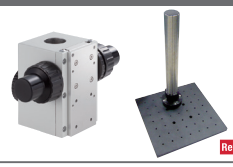
Observation unit with coaxial illumination

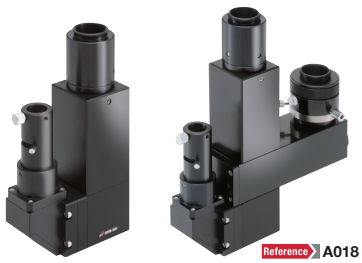
C mount Color Camera

Reference A026

C mount Color Camera

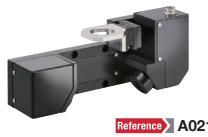
Reference A019

Focus Block / Pole stand

Reference A016

Observation Unit with Coaxial Illumination

Reference A018

Fiber Illumination Systems

Reference H032 – H034

Auto Focus

Reference A021

Adapter Reference A022

Actuator

Reference G116
Reference G072

Dichroic case for laser introduction

Reference A019

Controller

Reference A023

Lens Positioners

Reference A022

Objective Lens

Visible

参照 B194
B195

Ultraviolet

Reference B190

Near-infrared

Reference B192

Near-ultraviolet

Reference B193

3-Wavelengths

Reference B189

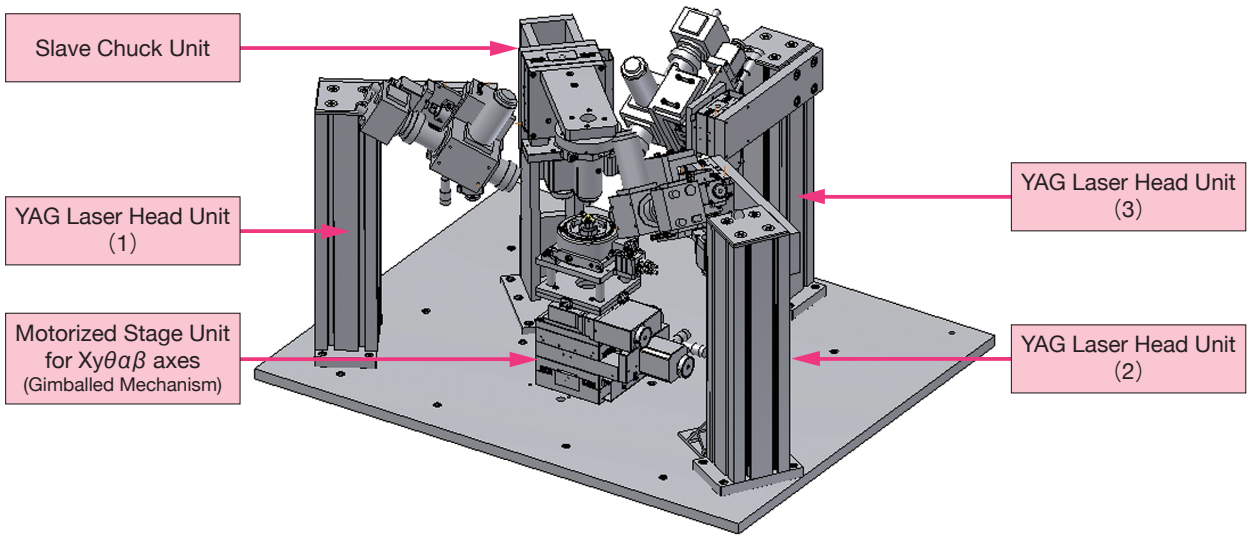
Alignment System Guide

YAG Laser Welding Automatic Alignment System
TOSA/ROSA/BOSA Assembling System

DAS-01AA

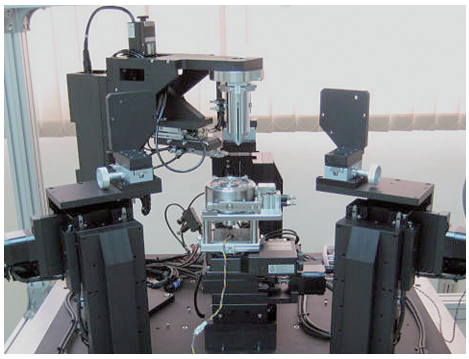
- Assembling (alignment) system for active devices.
- A system equipment that was pursued reliability and cost performance.
- The structure of the device holders offers high repeat-ability and easy installation and removal of devices.
- Compatible with many devices by replacing the device holders.
- Each device holder comes in two types. (Other holders will be quoted separately.)
- You can make alignment algorithms most efficient for each device by yourself.
- Significantly reduced the time required for device assembly with the adoption of a Gimballed fitting mechanism.
- Operation switches are available for remote control of various equipment.
- There is also the ultra-high speed alignment version which utilizes a special optical system. Please contact our International Sales Division for more detail.

System Configuration Example

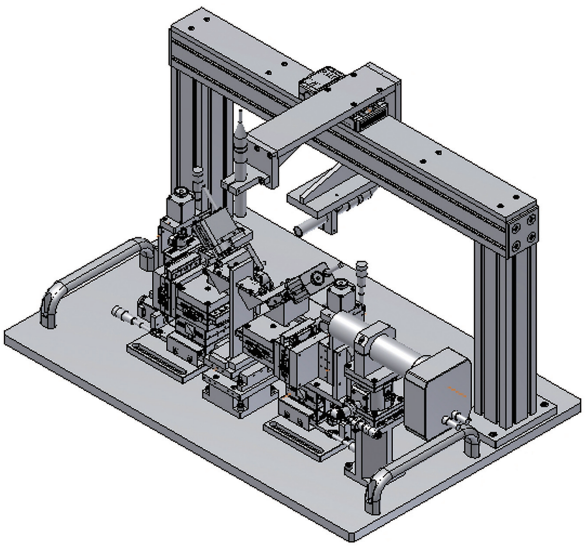


■Configuration Example

Product Name	
Motorized Stage Unit	Multi Controller
YAG Laser Head Unit (1)	Driver Box
YAG Laser Head Unit (2)	Base + Frame
YAG Laser Head Unit (3)	Cable set
Slave Chuck Unit	

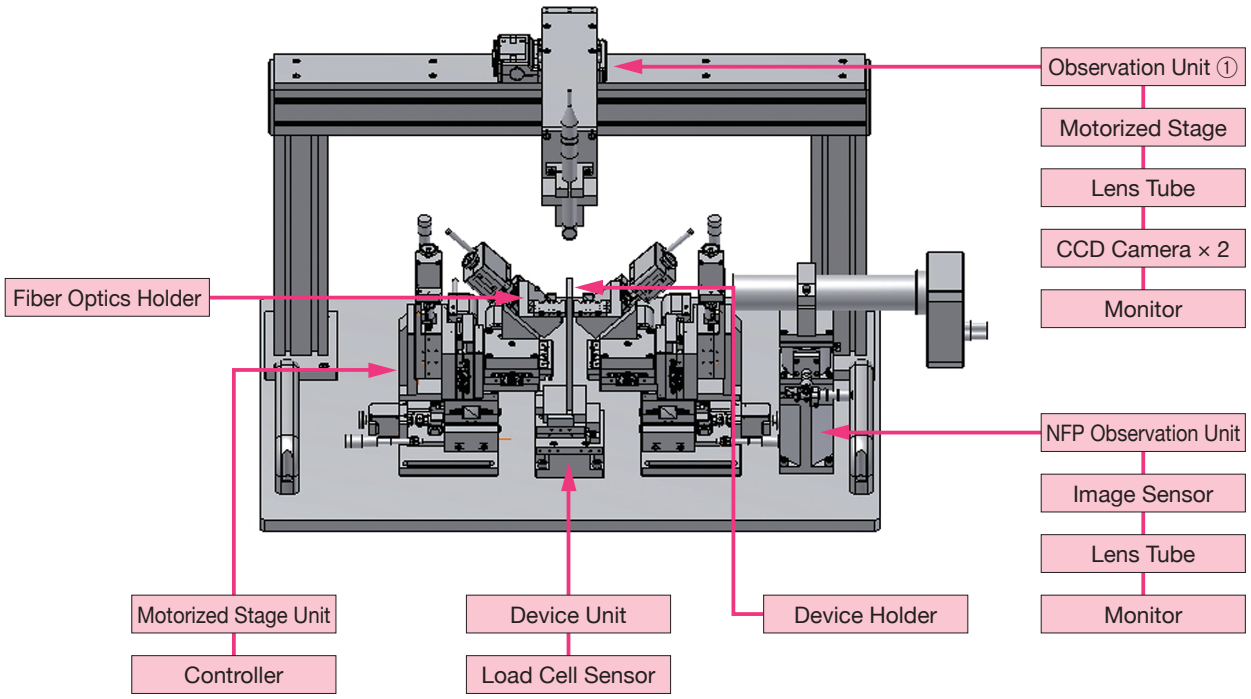


Automated 12-axis Optical Fiber Alignment System Configuration Guide
Waveguide (AWG/PLC) Alignment System



- Assembling (alignment) system for passive devices.
- A system equipment that was pursued reliability and cost performance.
- A 6-axis unit is placed respectively on the entrance and exit sides of the waveguide device to perform automated optical fiber alignment, assessment and assembly of various devices.
- The center device holder station has a contact sensor allowing control of gaps between devices and thickness of UV curing resin.
- Capable of single-fiber array or single-fiber through hole alignment.
- The positioning magnet type fixing system of the device holders offers excellent repeatability and easy installation and removal of devices. Also, having a presetting system, these holders can reduce assembly cycle time.

System Configuration Example

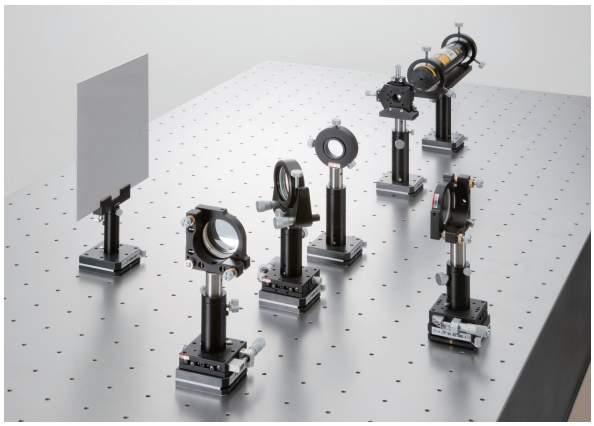


■Configuration Example

Product Name	
Motorized Stage Unit	Multi Controller
Observation Unit ①	Driver Box
NFP Observation Unit	Base + Frame
Device Holder	Stage Cable
Device Unit	GP-IB Cable
Fiber Holder	

Interferometers Guide

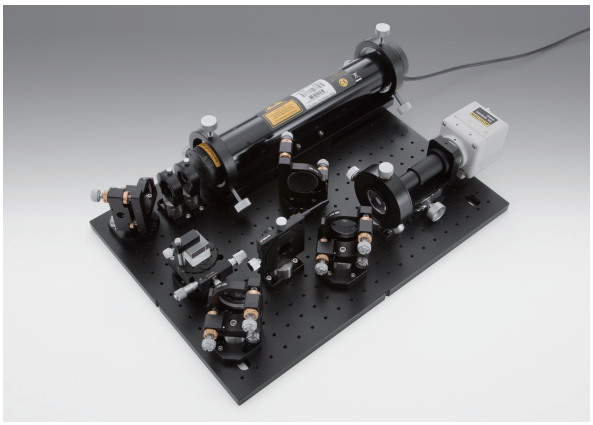
Components



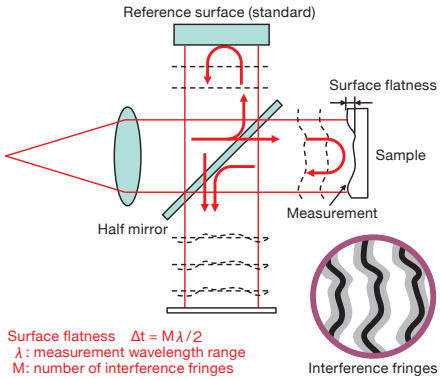
We introduce the interferometer unit of three types such as Michelson interferometer, Mach-Zehnder interferometer and Fizeau interferometer, and the various components composing these units.
Users can freely change the arrangement of the components and also to rearrange to other interferometers It is used in the education field and experiment for training.

D-TOP Optics

For the purpose of more practical experimental tools, we propose an optical system can be made functionally and compactly.
Since D-TOP can use the existing holders, it can change the conventional equipment into a compact type with a small budget.
D-TOP is also advantageous for a good compatibility with compact laser, anti-vibration, and the observation of a smaller sample.
In addition, when moving the optical system assembled and having storage, it is possible to effectively utilize the experiment space.



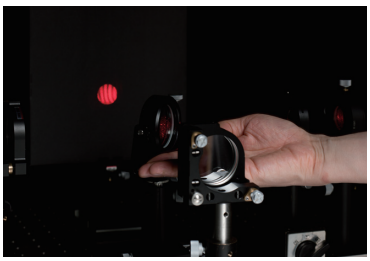
Principle of Interferometer

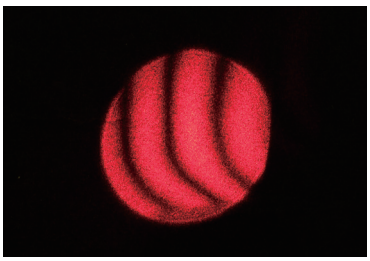


For the first time users of the interferometer, we have summarized the point of alignment of the interferometer. By using drawings and photos, it has been described realistically.
There are useful alignment method and skill that can not be obtained from other sources.

Experimental guidance

Before starting a full-scale experiment in the interferometer, we introduce a simple experiment to understand the features of the interferometer.
It is not required the special equipment or device other than the interferometer.
Users can experience a significant impact on the interference fringes even by high sensitivity of the interferometer and a small environmental change.





APAS (Automatic Polarization Analysis System) Guide

What's a polarization analysis system?

By measuring and analyzing the polarization state, it is possible to analyze the various items such as the internal state and the surface shape of the material, and the optical properties,etc.
Automatic polarization analysis system of Sigma Koki provides the software and an optical system that are combined with a standard light source, optics, holder and detector. And it is available for dedicated measuring device as well as simple evaluation system. Furthermore, we can propose for a wide variety of measurement and evaluation applications.

Polarization measurement software

Simple polarization analysis software "SimpleAPAS"

For corresponding to the extinction ratio and phase difference measurements at specific wavelength such as a laser light, it is software that can also add-on to an existing optical system of the customer.

[Main function]

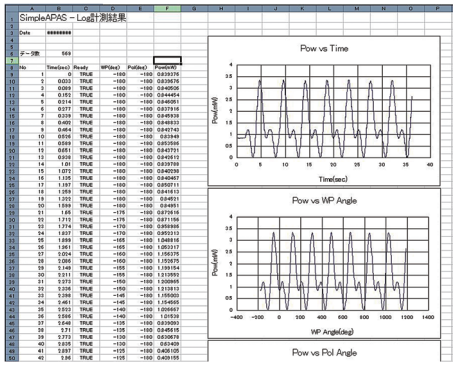
- ○Automatic adjustment for wave plate, the axis direction of analyzer.
- ○Measurement of polarization and phase difference by rotation compensator system
- ○The phase difference measurement by the Senarmont method
- ○Log measurement of each operation

Integrated polarization analysis software "SKPola"

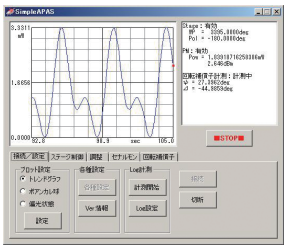
It is the software that supports up to spectral data characteristics in combination with the optical system dedicated to using the UV, Visible and Near-infrared light source.
Since it is available to correspond to both the spectroscopy and single wavelength measurement and also multi-order phase difference measurement, it covers all the primary evaluation items of polarization optics.

[Main function]

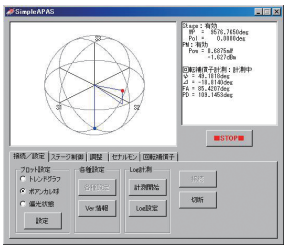
- ○Automatic adjustment of the polarization optical axis direction
- ○Polarization measurement by rotating analyzer method
- ○Spectral transmittance ratio measurement
- ○Phase difference measurement by Senarmont method
- ○Circularly polarized light contrast measurement
- ○Log measurement
- ○Polarization measurement by rotating compensator method
- ○Polarizer transmission polarization ratio measurement



Export to spreadsheet



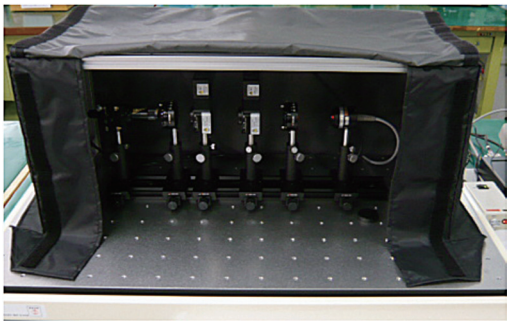
Extinction ratio measurement



Poincare sphere display

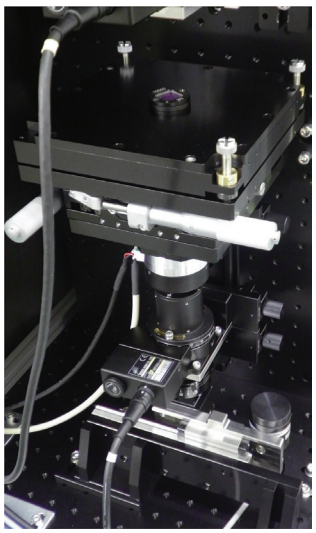
Example of polarization measurement application

For customer's requirements, we can provide customized products and also design newly.



Polarizing film transmission polarization ratio measuring system

Coaxial observation system with phase difference measuring system



Circularly polarized light measuring system

BIO-Photonics Guide

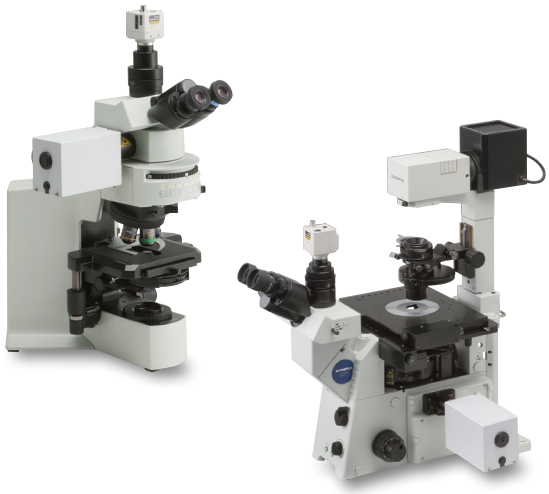
Based on technologies developed in the field of optics, it supports the work using the microscope. It is possible to the customization suitable for a work and a research.

Laser Microscope Systems

- Micro manipulation System
- IR-LEGO Infrared Laser-Evoked Gene Operator

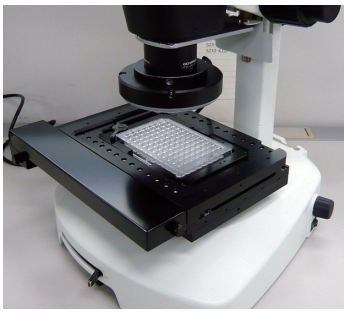
Laser Introduction Units

- Laser Optical tweezers - Mini type
- IR-LEGO Infrared Laser-Evoked Gene Operator

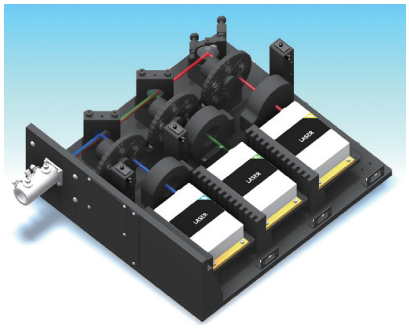


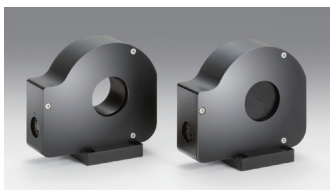
Motorized XY Stage System for microscopes

- BIOS-Light-T (For inverted microscopes)
- BIOS-Light-S (For upright microscope)
  (low cost standard model)
- BIOS-T Series (For inverted microscopes / High-end type)
- BIOS-S Series (For upright microscope / High-end type)
  (Built-in feedback control by optical linear scale)



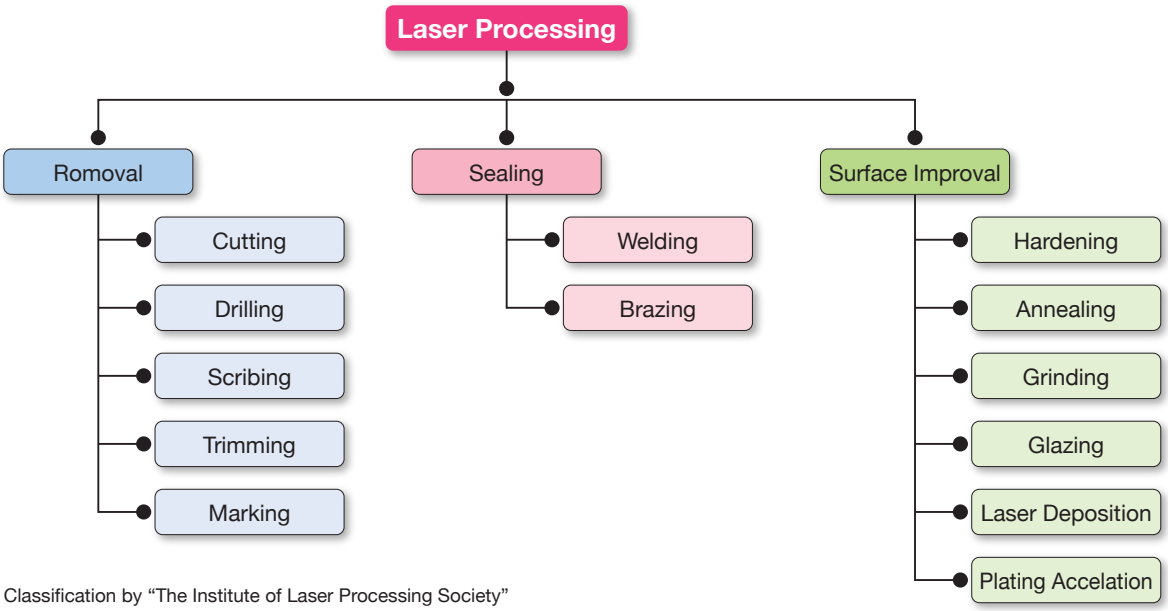
Microscope peripheral equipment (Laser combiner, shutter unit, CCD camera)





Due to commercialization of the laser oscillators with high power and diversification in the field of semiconductor laser, femtosecond laser, and fiber laser, laser processing machines have been using not only for cutting and welding but also for various applications. In addition, by improving the beam quality, maskless processing has been expanding to the microprocessing field.

[Types of laser processing]

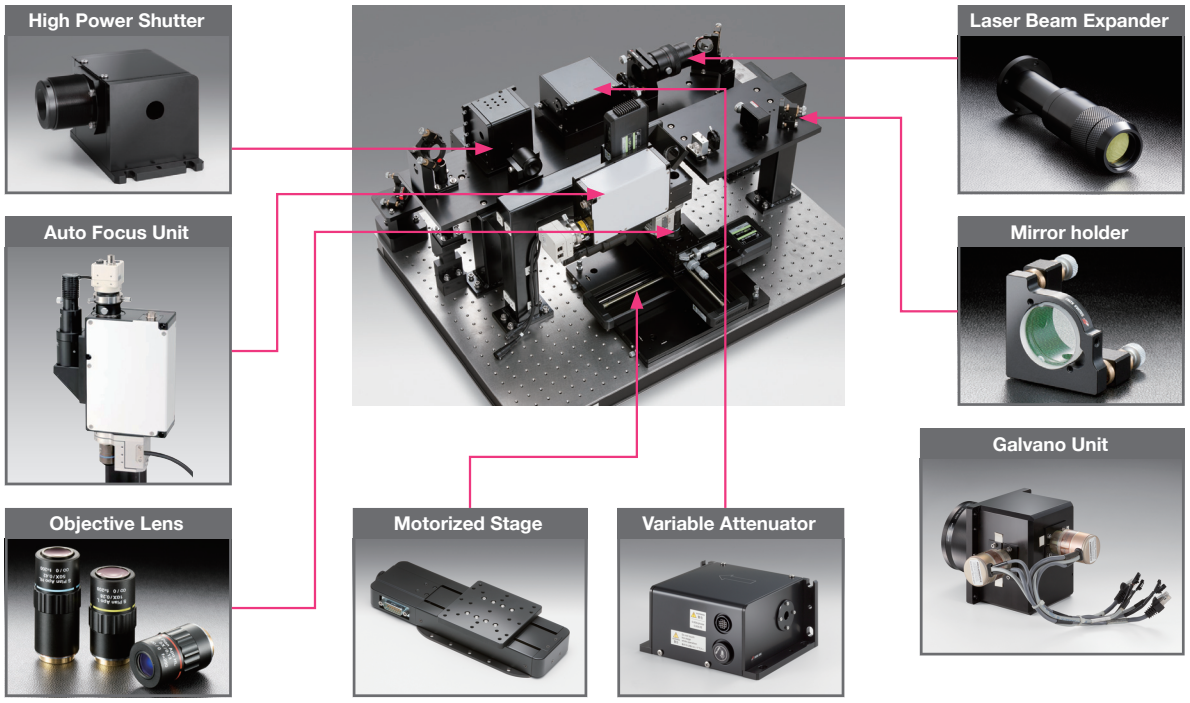


Classification by "The Institute of Laser Processing Society"

Laser processing system as production equipment

There are several considerations to realize the stable laser processing.
They need variable attenuator for the stability of the laser output, laser beam expander for the light focusing performance, high power shutter for the safety of the operator, auto-focus unit for the correction of the focus position corresponding to the low-depth of focus at the time of the focused to the diffraction limit, and selection of the XY stage for good straightness. In addition, in order to improve productivity, it needs a software that is high compatibility with CAD and good operability. System production suitable for a certain purpose is requested.

System diagram



Measurement, Inspection & Power Supply Guide

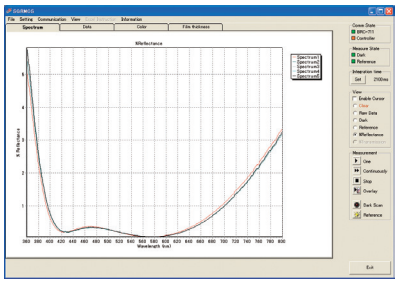
Measurement, Inspection

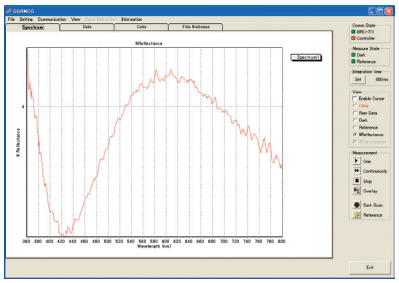
Reflection Measurement Systems
SGRM-200R

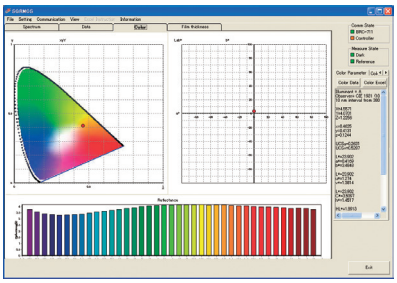
This device allows the measurement of spectral reflectivity in fine areas and curvature surfaces.

For ultra-slim samples such as lenses with curvature or functional sheets, high-speed and high-accuracy measurement of spectral reflectivity can be realized without being affected by reflected light on the rear surface.

Reflection Rate Graph Image







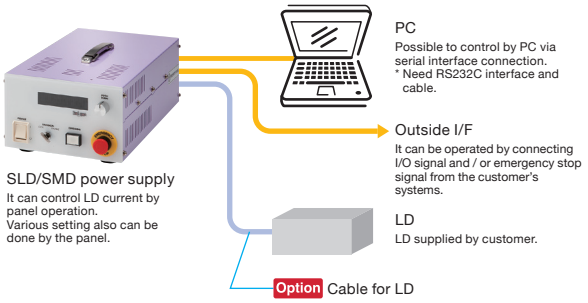
LD Power Supply Series

Power Supply Series

This is the power supply (supporting CW and pulse) for driving the laser diode (LD). The power supply for driving a Peltier element and cooling unit all-in-one type required for driving LD is also part of our lineup.

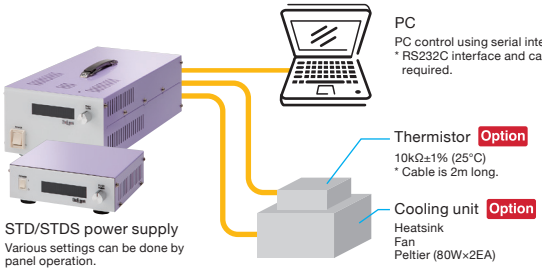
Power supply for LD driving

Precise digital control environment-friendly highly efficient Laser Diode power supply



Power supply for Peltier

Precise digital control highly efficient power supply for peltier optics drive for low electric power and high-power lined up



Zoom Microscope
Ultra Long Working distance Zoom Microscope

LWZ/LWZ-M
ULWZ/ULWZ-M

LWZ/LWZ-M

RoHS Catalog Code W2007

Microscope unit with combination of high resolution objective lenses and 12× zoom range. This single unit covers from the overall image check to the magnified observation.

- The light, compact body is suitable for assembly in a small space.
- A single unit can cover everything from confirmation of the whole image to enlarged observation, with a zoom ratio 12× for optical performance.
- Coaxial epi-illumination, which is regularly mounted on the product, enables the observation of bright fields.
- Dark fields can be observed by using optional products, ring light guides and partial emission cassettes. Reference A017
- The lineup also includes motorized type suitable for embedding in equipment or for automatic measurements.
- Manual type is switching the magnification manually and consisting of the zoom lens tube (SZL) and objective lens (ZOL series).
- Motorized type is switching the magnification by controller and consisting of the zoom lens tube (SZLM), the objective lens (ZOL series), the switching controller (GIP-101) and the zoom control cable (ZCA-2).
- C mount 1/2-inch camera is supported.

Specifications

Manual type Part Number	LWZ-15	LWZ-30	LWZ-50
Motorized type Part Number	LWZ-15M	LWZ-30M	LWZ-50M
Optical magnification	1.25 – 15×	2.5 – 30×	4.16 – 50×
N.A.	0.03 – 0.2	0.06 – 0.36	0.1 – 0.45
WD [mm]	46.2	35.2	14
Image size [mm]	ϕ8 (for 1/2 inch sensor size, C mount)		
Corrected Wavelength range [nm]	400 – 700		
Actual field of view [mm]	6.4 – 0.5	3.2 – 0.3	1.9 – 0.2
Resolution (at Mercury e-line) [µm]	11.18 – 1.68	5.59 – 0.93	3.36 – 0.75
Depth of field (at Mercury e-line) [µm]	±305.6 – ±6.9	±76.4 – ±2.1	±27.5 – ±1.4

ULWZ/ULWZ-M

RoHS Catalog Code W2008

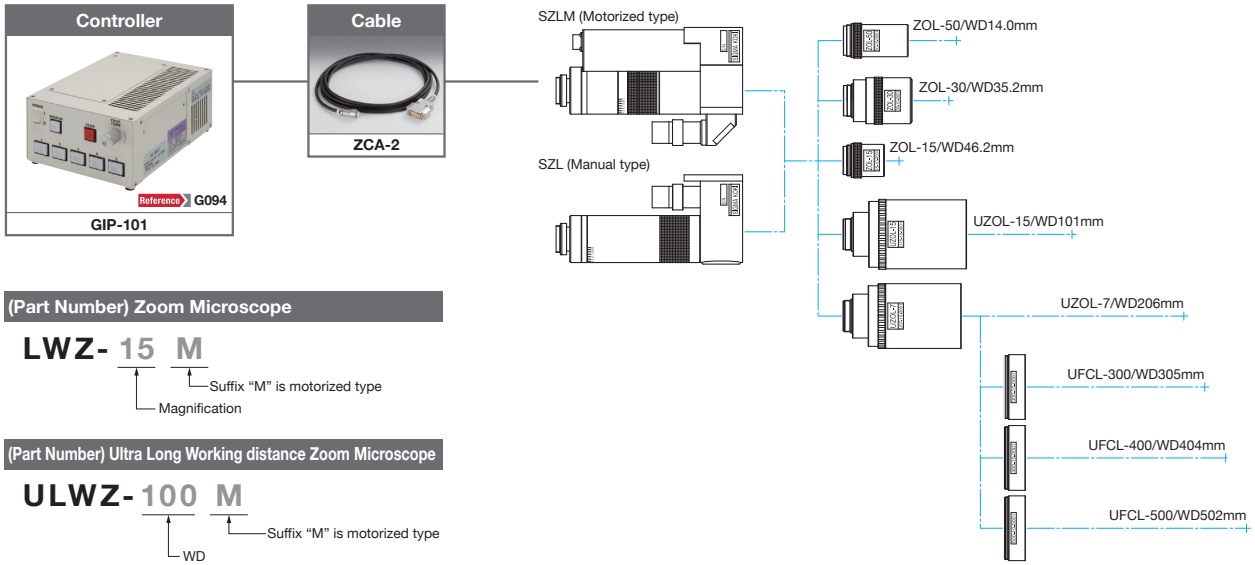
Maximum working distance of 500mm.
Suitable for observing the inside of vacuum chambers and ovens in the special environment.

- Light, compact body is suitable for assembly in a small space.
- A single unit can cover everything from confirmation of the whole image to enlarged observation, with an optical performance of zoom ratio 12×.
- The optical magnification and stroke distance can be easily changed by assembling and or replacing the front converter lens (ULWZ-100 is not supported).
- Coaxial epi-illumination, which is regularly mounted on the product, enables the observation of bright field.
- The lineup also includes an motorized type suitable for embedding in equipment or for automatic measurements.
- Manual type is switching the magnification manually and consisting of the zoom lens tube (SZL) and objective lens (UZOL/UFCL series).
- Motorized type is switching the magnification by controller and consisting of the zoom lens tube (SZLM), the objective lens (UZOL/UFCL series), the switching controller (GIP-101) and the zoom control cable (ZCA-2).
- C mount 1/2-inch camera is supported.

Specifications

Part Number	ULWZ-100	ULWZ-200	ULWZ-300	ULWZ-400	ULWZ-500
Part Number	ULWZ-100M	ULWZ-200M	ULWZ-300M	ULWZ-400M	ULWZ-500M
Optical magnification	1.25 – 15×	0.58 – 7×	0.37 – 4.48×	0.28 – 3.41×	0.23 – 2.74×
N.A.	0.03 – 0.2	0.014 – 0.08	0.009 – 0.052	0.007 – 0.039	0.006 – 0.032
WD [mm]	101	206	305	404	502
Image size [mm]	ϕ8 (for 1/2 inch sensor size, C mount)				
Corrected Wavelength range [nm]	400 – 700				
Actual field of view [mm]	6.4 – 0.5	13.8 – 1.1	21.6 – 1.8	28.6 – 2.3	34.8 – 2.9
Resolution (at Mercury e-line) [µm]	11.2 – 1.7	24.0 – 4.2	37.3 – 6.5	47.9 – 8.6	55.9 – 10.5
Depth of field (at Mercury e-line) [µm]	±305.6 – ±6.9	±1403 – ±43	±3395 – ±102	±5612 – ±181	±7639 – ±269

System Diagram



(Part Number) Zoom Microscope

LWZ- 15 M

- 15: Magnification
- M: Suffix "M" is motorized type

(Part Number) Ultra Long Working distance Zoom Microscope

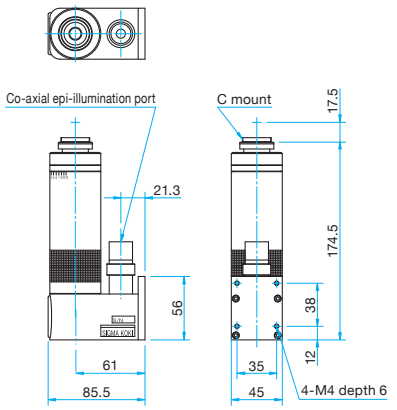
ULWZ- 100 M

- 100: WD
- M: Suffix "M" is motorized type

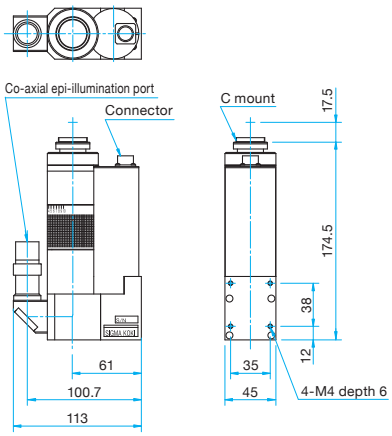
Outline Drawing (in mm)

■Zoom Lens Tube

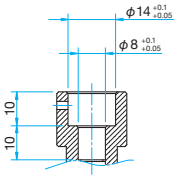
SZL (Manual)



SZLM (Motorized)

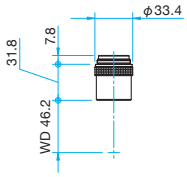


[Detail of co-axial epi-illumination port]

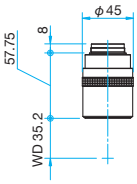


■Long working distance objective lenses

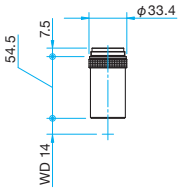
ZOL-15



ZOL-30



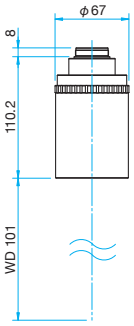
ZOL-50



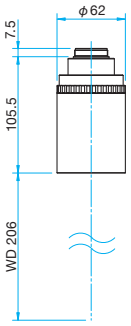
Long working distance objective lenses			
Part Number	ZOL-15	ZOL-30	ZOL-50

■Ultra Long working distance objective lenses

UZOL-15

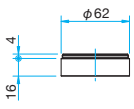


UZOL-7



■Front convertor lenses

UFCL-300/400/500



Ultra Long working distance objective lenses		
Part Number	UZOL-15	UZOL-7

Front convertor lenses			
Part Number	UFCL-300	UFCL-400	UFCL-500

Zoom Microscope Option

Rear converter lens | ZRCL

Catalog Code W2037

By mounting this rear converter lens between the camera and lens barrel, it will be able to enlarge the optical magnification without changing the working distance.

Guide

- A variety of microscope for C-mount compatible and camera are provided. Reference (Microscope, Zoom Microscope, OUCI-2, Camera)

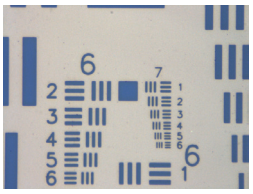
Attention

- It is only for C mount, so it can not be used to the CS mount products such as microscopes, observation systems or cameras.
- Optical performance and resolution will not be improved even if mounting the rear converter lens. It will be depending on the performance of the microscope.

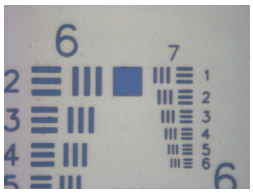
Specifications

Part Number	ZRCL-1.5	ZRCL-2.0
Magnification	1.5×	2.0×
Camera mount (Lens side / Camera side)	C mount	

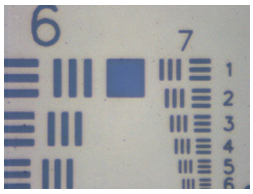
Reference image Zoom Microscope LWZ-15 (Optical Magnification 15x)



Without Rear converter
Observation Field of View About 0.55×0.45mm



ZRCL-1.5
Observation Field of View About 0.37×0.3mm



ZRCL-2
Observation Field of View About 0.28×0.22mm

Ring Light Guide | ZRL-ZOL15

Catalog Code W2038

It is suitable for the case that you do not want to generate a shadow of the lighting from 360° diagonal direction and that you observe the highlighted unevenness of the surface.

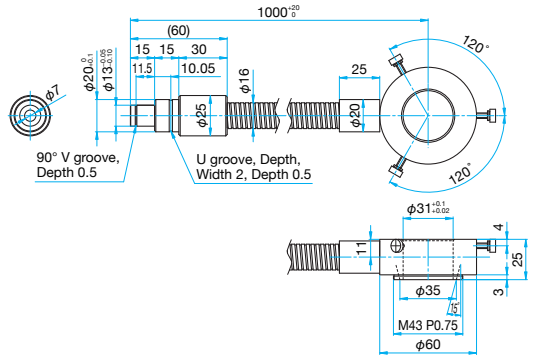
Guide

- A variety of light source is available. Reference (LED light sorce, Tungsten Halogen light sorce and Metal Halide light sorce)

Attention

- This product is only for Zoom microscope (LWZ-15/LWZ-15M). If it is used with other products, there is a possibility that optimal illumination can not be done.

Outline Drawing (in mm)



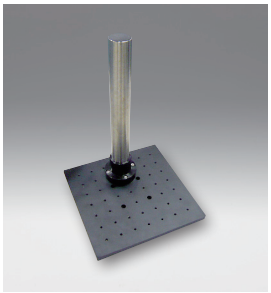
Specifications

Part Number	ZRL-ZOL15
Covering	SUS flexible
Length [mm]	1,000
Bending radius [mm]	60
Inward angle of the light emitted [°]	15
Bundle Diameter [mm]	7
Inner diameter [mm]	31

Focusing unit / Pole stand | ZAS-FAC-PST / PS-S/L

Catalog Code W2039

The focusing unit can be installed to the observation unit with coaxial illumination and Zoom microscope. And it can be used as a microscope stand when combined with the pole stand.



Guide

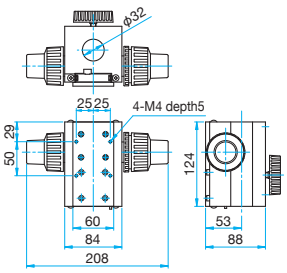
- It can be installed the manual stage by using the M4 holes on the base plate of the pole stand.

Attention

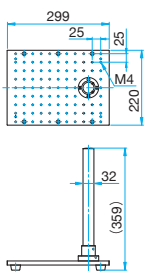
- Screws are not supplied with focusing unit for fixing to observation unit with coaxial illumination and zoom microscope.
- When using a focusing unit and pole stand, please check that required working distance is ensured. ULWZ series is not available for long working distance.

Outline Drawing (in mm)

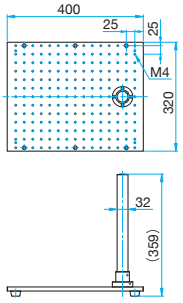
ZAS-FAC-PST



PS-S



PS-L



Specifications

Part Number	ZAS-FAC-PST
Travel [mm]	30

Part Number	PS-S	PS-L

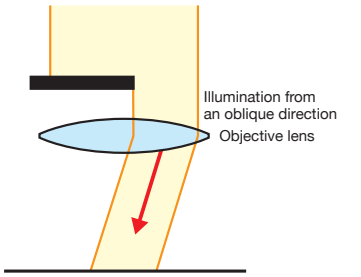
Partial light blocking cassette | ZPSC-T1

Catalog Code W2040

By blocking the co-axial illumination partially, surface is illuminated with grazing-incidence and microscopic asperity is emphasized during observation

Mounted state to the Lens tub

Theory of partial light blocking



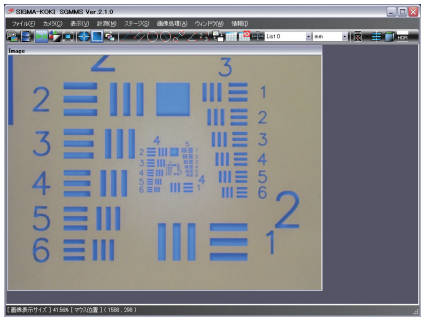
Specifications	
Part Number	ZPSC-T1

Image measurement software | SGMMSE

Catalog Code W2010

This is an integrated software system that easily can be used by a PC mouse, and it enables to carry out image measurement and analysis, image storage, focus synthesis and so on to support the zoom microscope.

- This software is for image processing and measurement with 2.0 Mega pixels USB2.0 Color Camera (SK-TC202USB-AT). Windows® XP / 7 (32bit) is supported.



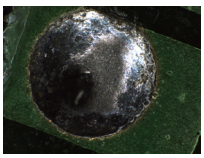
Specifications	
Part Number	SGMMS

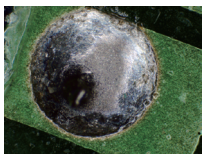
[Measurement functions]

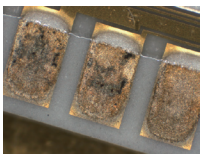
- **Image and video capture**
  Image by BMP, JPG, GIF, and PNG format and Video by AVI format can be saved.
- **Measurement function**
  It easily measures the size of an object by clicking the mouse on the screen. It can measure the distance between two points, the radius and diameter from the point of three or more points, angle, etc.
- **Calibration function**
  11 types of calibration settings can be registered depending on the magnification of the zoom microscope.
- **Camera control**
  Camera's gain, shutter speed, white balance and reversal can be displayed.
- **Line display** (cross line, scale display)

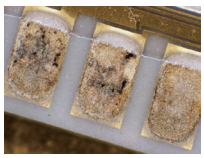
HDR (High Dynamic Range Imaging) Function

When observed objects with different reflection, an image can be obtained by reducing the overexposure and underexposure. It can be taken completely the state of the sample.


Normal image

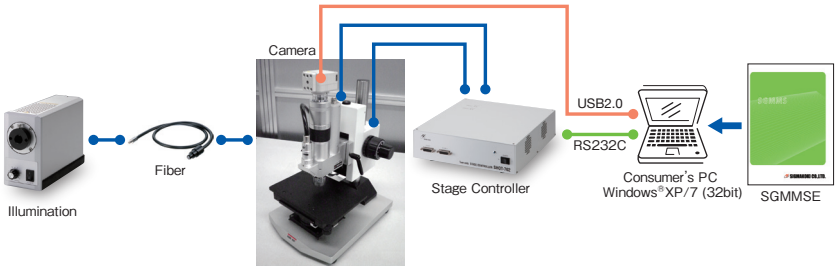

HDR image


Normal image

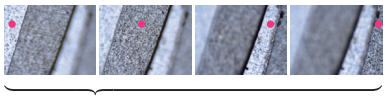

HDR image

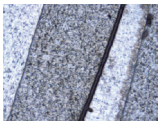
Hyperfocus / 3D display function

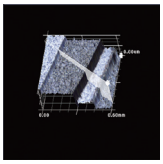
By using the motorized Z-axis stage, it can take an "in-focus" picture over the entire screen. 3D images can be displayed from the image of the composed focus.



Example of Synthetic Image






3D display

Observation unit with coaxial illumination | OUCI-2 RoHS Catalog Code W2012

This compact microscope is a customizable high performance imaging system for use in a wide range of applications from scientific research to industrial production equipment.

- A wide variety of options is available for Infinity corrected optical systems.
- Possible to be combined with a large range of optional parts in accordance with its application.
- Optional parts such as translation stages or Illumination light-source could be found in our catalog.
- Besides products in the catalog, for fine laser processing application, the model for YAG lasers at 266nm, 355nm, 532nm and 1064nm, and also 2 camera ports model at low/high magnification can be available.

Guide

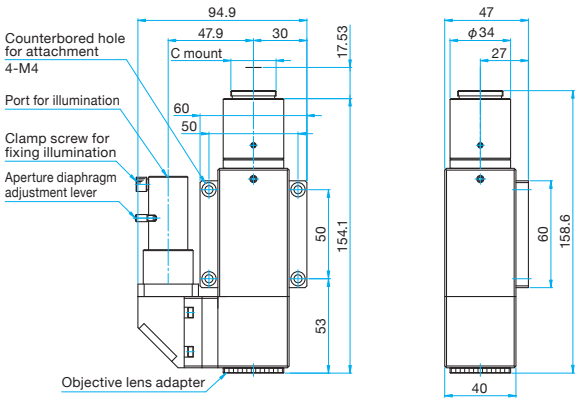
- Support Infinity corrected objective lenses
- Support Olympus made objective lenses at various magnifications as standard
- The coaxial epi-illumination of the light guide enables the observation of bright fields. The contrast of the illuminated light can be adjusted with an aperture stop.

Specifications

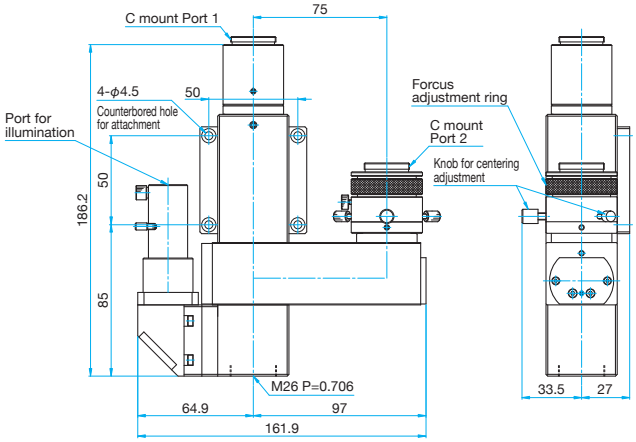
Part Number	OUCI-2	OUCI-M1M1
Camera port	1	2
Imaging lens focal length [mm]	200	200
Camera mount	C mount (less than 2/3)	
Mounting screw for Objective lens	M20.32 P=0.706 M26 P=0.706	

Outline Drawing (in mm)

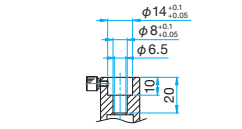
OUCI-2



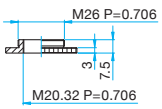
OUCI-M1M1



OUCI-2 and OUCI-M1M1 Common Specification

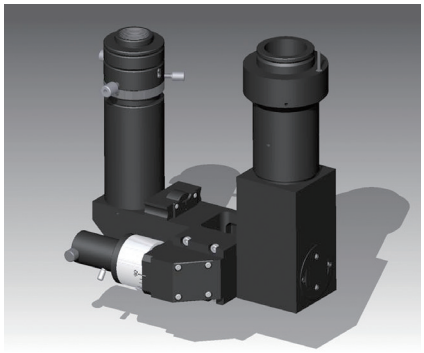


Detail drawing of port for illumination



Detail drawing of objective lens adapter

Reference product / Observcation unit with laser input port



- Please contact International Sales Division for more detail.

Specifications

Wavelemgth range [nm]	YAG Laser 266, 355, 532, 1064
Port	3 (Camera port 1, Illumination port 1, Laser input port 1)
Imaging lens focal length [mm]	200
Camera mount	C mount
Mounting thread for Objective lens	M20.32 P=0.706, M26 P=0.706

Dichroic case for laser introduction | DIMC

Catalog Code W2041

It is a product that is mounted to observation unit with coaxial illumination, and that introducing a laser beam to the observation optical system and coaxial.

Guide

- Laser introduction direction can be adjusted in any direction of 360°. Please check the product instruction manual about the adjustment method. *Not included adjustment tool (Hex wrench).
- The tilt adjustment of the internal mirror can be available. Please check the product instruction manual about the adjustment method. *Not included adjustment tools (Hex wrench and screwdriver).
- Mounting standard of the objective lens is M26 P=0.706, but for mounting the conversion adapter attached to the observation unit with coaxial illumination conversion adapter, M20.32 P=0.706 can be available.
- A wide variety of objective lenses is available. Reference B189 – (Long working distance objective lens, NUV objective lens and NIR objective lens)

Attention

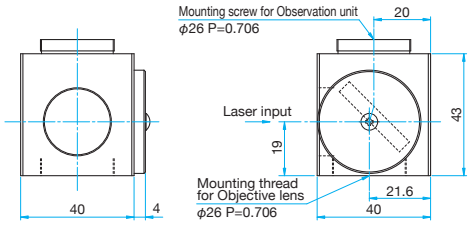
- There is an adjustment mechanism in the internal mirror, but it is for only fine adjustment.
- Incident of the laser beam is requested vertically as much as possible.
- There is a possibility that the image of the coaxial observation in the laser introduction is not clear.

Specifications

Part Number	DIMC-355R	DIMC-532R	DIMC-1064R
Wavelength Range	355	532	1064
Input aperture [mm]	20	20	20
Reflectance [%]	>99.5 (355nm)	>99.5 (532nm)	>99.5 (1064nm)
Laser Damage Threshold* [J/cm^2]	5 (355nm)	8 (532nm)	20 (1064nm)
Mounting screw thread for Observation unit	M26 P=0.706		
Mounting screw for Objective lens	M26 P=0.706		
Weight (Kg)	0.12	0.12	0.12

* Laser pulse width 10ns, repetition frequency 20Hz

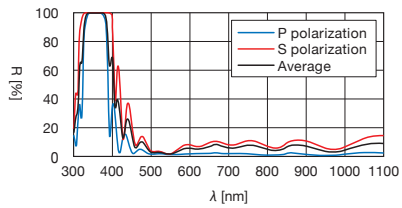
Outline Drawing (in mm)



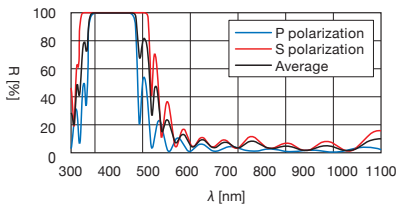
Spectral Distribution

R: Reflectance

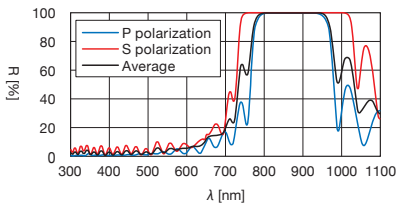
DIMC-355R



DIMC-532R



DIMC-1064R



C mount adapter | CACM

Catalog Code W2042

This is the adapter for attachment to the observation unit with illumination and for the position alignment of the C mount camera. When combining with the dichroic case, it is used for adjustment the focal position of the laser beam entering to the dichroic case and the centering position of the camera or the focusing position.

Attention

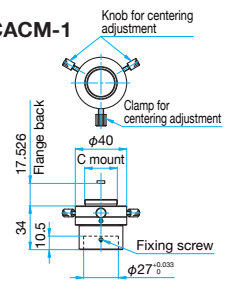
- It does not correspond to a camera other than the C mount. In the case of the CS mount camera, intermediate ring of 5mm thickness is required.
- When mounting to the Observation unit, it needs the hex wrench (1.5mm). The Hex wrench is not included.

Specifications

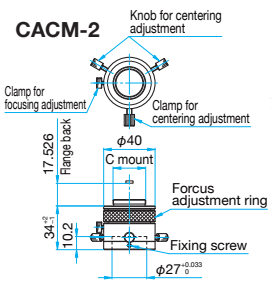
Part Number	CACM-1	CACM-2	CACM-3
Centering adjustment range [mm]	ϕ2	ϕ2	—
Focusing adjustment range [mm]	—	3	3
Weight [Kg]	0.1	0.11	0.08

Outline Drawing (in mm)

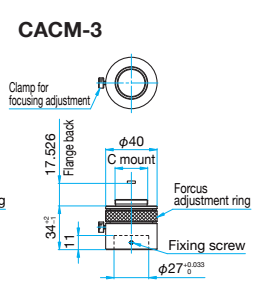
CACM-1



CACM-2



CACM-3



Auto Focus (TTL type) | TAF-SS-OBL-3

RoHS Catalog Code W2014

The TTL method is a built-in laser diode radiates to surface of works through an objective lens, and optical sensor receives its reflected beam also through the objective lens and detects the difference from graticule.

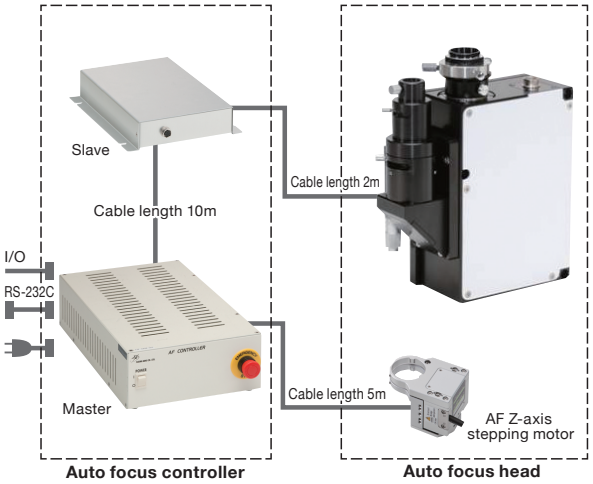
[Characteristics]

- High speed tracking with real-time adjustment the focus by only moving the objective lens.
- The Laser TTL method focusing system can be used for glass and film inspection.
- Small and compact make it easy to be integrated into an inspection equipment system.
- Supports 1/2-inch or less CCD camera (C mount).

Specifications

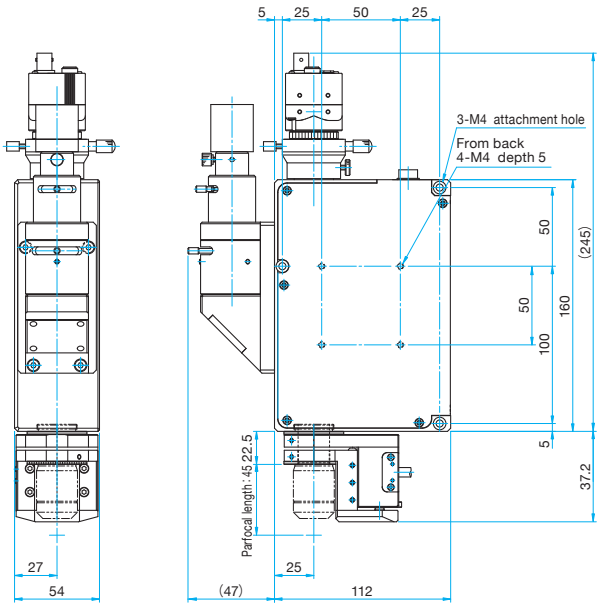
Part Number	TAF-SS-OBL-3
Objective Lens	2× – 100×
Camera	C mount CCD camera (Size is less than 2/3″)
Focusing methods	TTL (Through The Lens), active method by semiconductor laser (equivalent to class 2, light output 2mW or less, wavelength 670nm)
Travel	3mm
Trace Range (Tracking capable range)	2×, 5×, 10× : ±1.5mm 20× : ±500μm 50× : ±250μm 100× : ±100μm
Reproducibility (Focus)	±6.0μm(5×), ±1.0μm(10×) ±0.5μm(20×, 50×, 100×)
Response frequency*	5Hz≦ * The specification differs by the combination of the actuator
Illumination optical systems	Coaxial epi-illumination (aperture stop built in)
Dimension	(W)160 × (H)258 × (D)47mm
Weight (head part)	1.6kg
Focus Actuator	SGSP-OBL-3 (stepping motor driving actuator)

Configuration



Outline Drawing

(in mm)



The focus laser with large spot and laser detector are aligned at a large angle; outside of the objective lens. The focus is maintained by minimizing the error signal generated by the sensor.

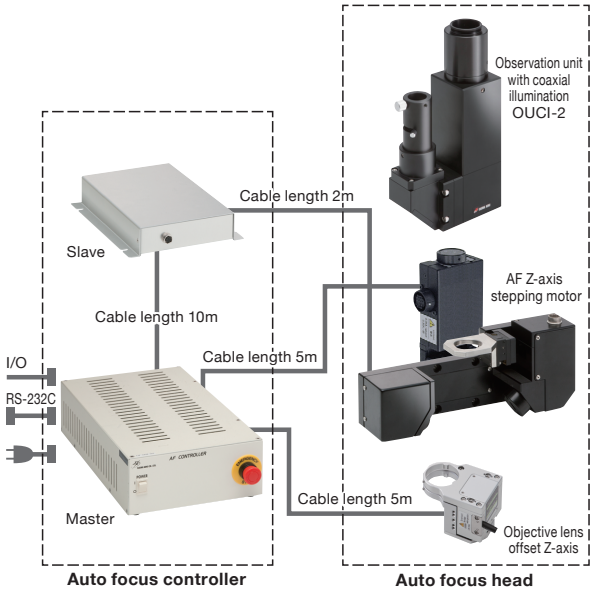
[Characteristics]

- As the observation optical system and auto focus optical system are independent, enabling to be matched with various magnification objective lenses at high accuracy inspection application.
- Support transparent surface such as glass and film inspection.
- Small and compact make it easy to be integrated into an inspection equipment system
- Supports 2/3-inch or less CCD camera (C mount).

Specifications

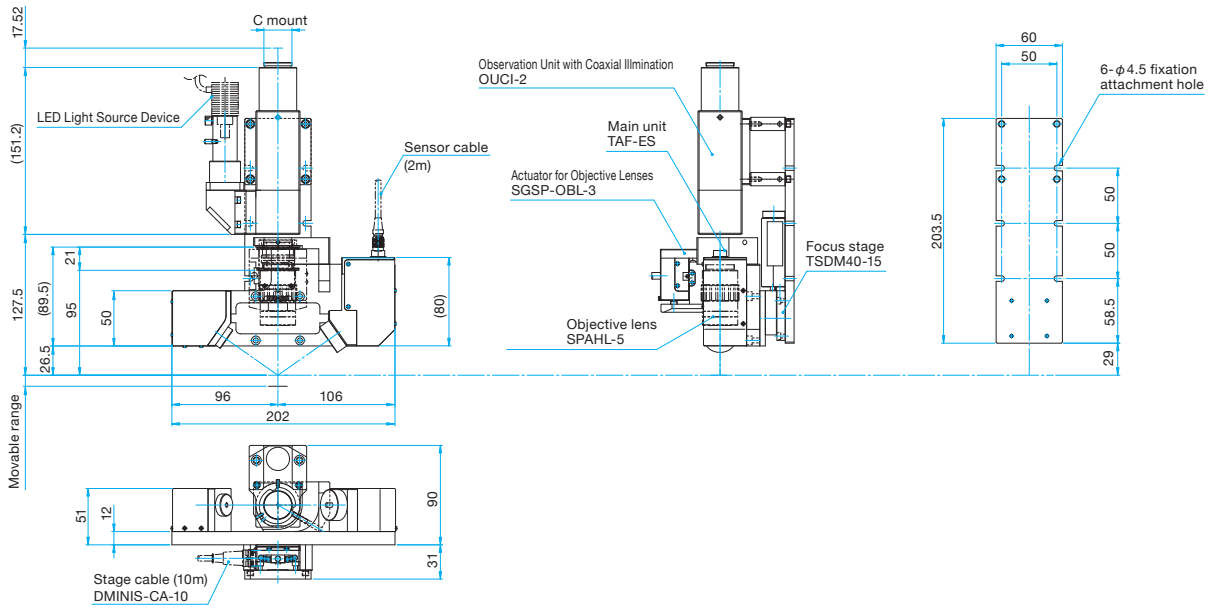
Part Number	TAF-ES-DM-40
Objective Lens	2× – 50× (Outer diameter ϕ32mm WD11mm Objective lens)
Camera	C mount CCD camera (Size is less than 2/3″)
Focusing methods	Off-axis (out of Lens) reflection active system by semiconductor laser (equivalent to class 3R, light output 4.5mW or less, wavelength at 670nm)
Travel	10mm
Trace Range (Tracking capable range)	Regular reflector: ±3mm Transparent body: contact us separately Reference) thickness 0.7mm, glass ±0.3mm
Reproducibility (focus)	±0.5μm
Response frequency	About 5Hz (regular reflector step ±10μm)
Illumination optical systems	Coaxial epi-illumination (aperture stop built in)
Dimension	(W)202 × (H)230 × (D)87mm
Weight (head part)	2.2kg
Focus Actuator	TSDM (stepping motor drive stage)

Configuration



Outline Drawing

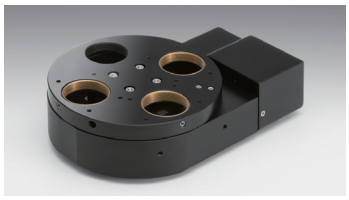
(in mm)

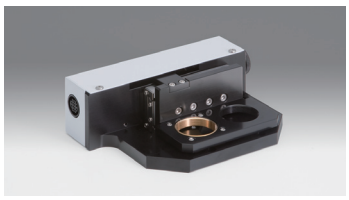


Lens Positioners | LACR/LACS

RoHS Catalog Code W2016

This is an objective lens positioner that realizes both high performance and lower prices with our company's original positioning technology and processing technology developed through the manufacture of stages and other items. We offer the optimiged lens positioner for both manufacturing equipment and inspection equipment that require high throughput.





<Motorized Lens Turret: LACR-4H>

- Motorized turret has better accuracy and durability than traditional turrets due to elimination of mechanical detents.
- Includes 5-phase micro stepping motor and can achieve a resolution of less than a micron at the tip of objective lens.
- When used with the GIP-101 controller, objectives can be switched quickly and accuarately either manually, using the push buttons on the controller, or automati-cally, using the computer interface.

<Lens switching slider: LACS-2H-A>

- Motorized lens switcher is designed to hold 2 objective lenses, to provide precise movements and feasible speed.
- Using our proprietary extended contact bearing design to improve straightness.

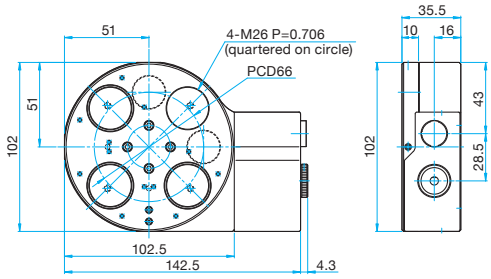
Specifications

Part Number	LACR-4H	LACS-2H-A
Number of switched lens	4 holes (90°×4) (1hole: datum hole, 3holes: one-directional center core adjustment)	2 holes (1hole: datum hole, 1holes: one-directional center core adjustment)
Travel	∞ for both of clockwise and anticlockwise directions	35mm (Switcing distance)
Motor	5-phase stepping motor (0.75A/phase)	5-phase stepping motor (0.75A/phase)
Guide Method	Bearing system	Extended contact bearing
Feeding Mechanism	Worm and worm wheel	Ball screw ϕ4 (1mm lead)
Travel per 1 pulse	0.01° (FULL) / 0.0002° (1/50 DIV)	2μm (FULL) / 0.1μm (20 divided)
Total pulse per table rotation	36,000 pulse (FULL)	—
Positional repeatability	≦0.02deg.	—
Switching reproducibility	≦ +/−3μm (at the tip of objective lens)	≦ ±3μm (by the tip of objective lens)
Maximum travel speed (switch)	60°/sec (A⇒B, about 2.0sec)	35mm/sec (A⇒B, about 1.0sec)
Objective lens size	M26 P=0.706	M26 P=0.706
Load capacity [kg]	2	2
Weight [kg]	0.85	0.7

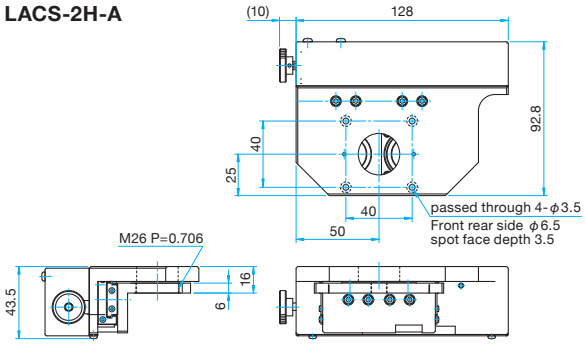
Outline Drawing

(in mm)

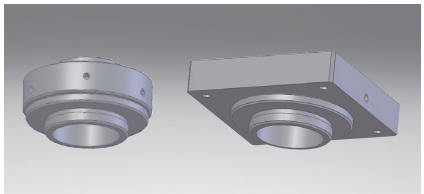
LACR-4H



LACS-2H-A



Adapter | AOR-M26.0/AOS-M26.0



This is the adapter for connecting the lens positioners (electric revolver/lens switching slider) to observation unit with coaxial illumination .

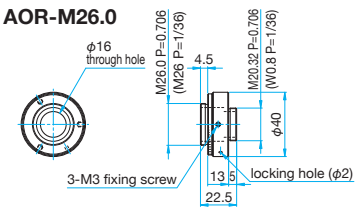
Specifications

Part Number	AOR-M26.0	AOS-M26.0
Compatible models	Motorized Lens Turret	Lens switching slider
Weight [kg]	0.1	0.08

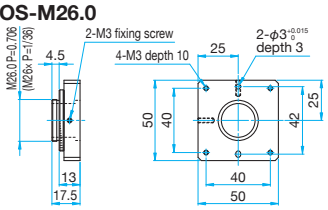
Outline Drawing

(in mm)

AOR-M26.0



AOS-M26.0



Intelligent Positioning System | GIP-101

Catalog Code W9046

A single axis controller with built-in micro-step driver having a 5-point preset function.

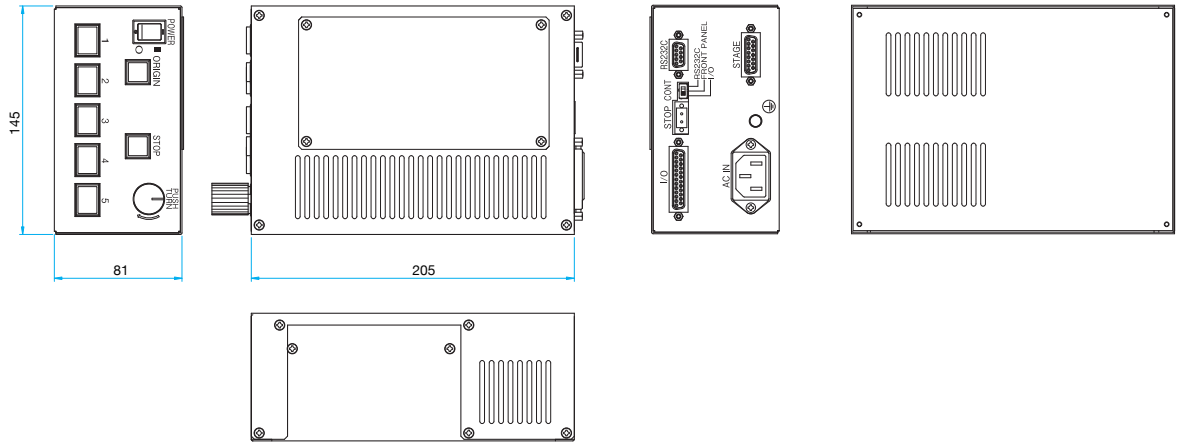
- Compatible with objective lens turrets and other LASER accessory units in addition to motorized stages fitted with 5-phase stepping motor.

Specifications

Part Number	GIP-101
Model	5 Phase Stepping Motor
Motor	0.23 – 0.75 A/phase (Stop Current)
Excitation Method	Micro-step (16 divisions setting of 1 – 250)
Maximum Operating Pulse Rate	22,000
Minimum Operating Pulse Rate	50
Acceleration/Deceleration Time [ms]	20 – 1,000(16 steps)
Interface	RS232C (D sub 9pin: female)
I/O	D-Sub25pin: female (I/O 24V)
Power Supply	AC 100 – 240V ±10% 50/60Hz apparent power 100VA
Operating Environment	Temperature: 0 – 40°C Humidity: 20 – 80% RH (non-condensing)
Weight [kg]	2.0

Outline Drawing

(in mm)



Microscope Systems & Option

Catalog Code W2017

These microscope systems can be utilized for research and development in manufacturing fields with superior cost performance.
They can be freely customized with multiple options.

- Equipped with transmitted illumination and epi-illumination, these microscope systems can adjust the brightness of both types of illumination respectively.
- When used with a C mount adapter (option), capturing of images from a C mount color camera is available.

Specifications

Part Number	Binocular		Trinocular	
	ZMM-45B1	ZMM-45B2	ZMM-45T1	ZMM-45T2
Illumination	Without	Transparent / epifluorescent	Without	Transparent / epifluorescent
Total Magnification	7× – 45× (Zoom Type)			
Working Distance [mm]	100			
Focusing Rack & Pinion Trave [mm]	47			
Weight [kg]	4.8	6.3	5	6.3

C Mount Adapter for Trinocular Scope | SKSZMCTV1/2

This product is for mounting a C mount color camera on a trinocular microscope system. You can capture the images while looking in the eyepieces.

Specifications

Part Number	SKSZMCTV1/2
Camera Mount	C mount
Focal Point Adjustment Range [mm]	4
Weight [kg]	0.08

Guide

▶Various C mount color cameras are available.
Reference A026

Attention

▶Not compatible with cameras other than C mount cameras. To use with a CS mount camera, an intermediate ring of 5 mm thickness is required.

C Mount Adapter for Eyepiece Port | EPCMA

This product is for mounting a C mount color camera on an eyepiece port of a microscope system. It can mount on either a binocular or trinocular type microscope system.

Specifications

Part Number	EPCMA
Camera Mount	C mount
Magnification	0.5×
Weight [kg]	0.1

Guide

▶Various C mount color cameras are available.
Reference A026

Attention

▶Not compatible with cameras other than C mount cameras. To use with a CS mount camera, an intermediate ring of 5 mm thickness is required.

LED Ring Illuminators | SKLIR-1

These illuminates direct light at an angle from oblique of all 360 degree onto the observation target. Suitable for observing the target without a shadow or emphasizing irregularity of the surface.

- These illuminators have long life because LED is used as the light source.
- Use the dial located on the side of the main body to adjust the brightness.

Specifications

Part Number	SKLIR-1
Cable Lengh [m]	1
Power supply	AC100V
Weight [kg]	0.32

Guide

- Can mount on either a binocular or trinocular type microscope system. To mount these illuminators on microscope systems, use illuminator adapter rings that come with the microscope systems.

Attention

- When a ring illuminator adapter is attached, the working distance is shortened by 10 mm. Please make sure that there will be no interference with peripheral equipment beforehand.

Assisted Objective Lenses | SKSZMAO

Please attach these lenses at the end of a microscope system to change the total magnification.

Guide

- Can mount on either a binocular or trinocular type microscope system.

Attention

- Working distance varies. Please make sure that there will be no interference with peripheral equipment beforehand.

Specifications

Part Number	SKSZMAO0.5	SKSZMAO1.5	SKSZMAO2
Magnification	0.5	1.0	2.0
Working Distance [mm]	165	45	30
Weight [kg]	0.08	0.08	0.08

8-inch TFT LCD Monitor | SKH-8003

Output images from a CCD camera (analog output).

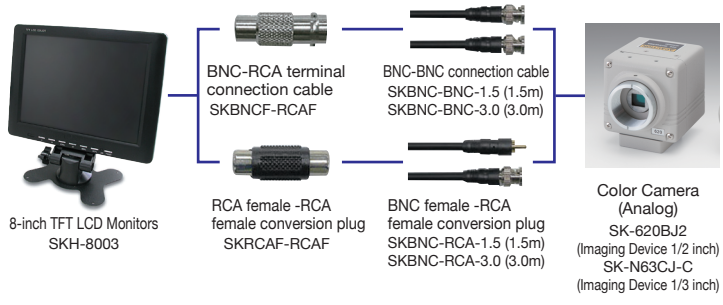
Specifications

Part Number	SKH-8003
Monitor Size	8 inch
Pixels	640×480
VGA Cable	D-Sub15 pin
Image System	PAL/NTSC automatic switching
Power Supply	AC100V – 240V 60/50HZ

Guide

- Accessories: AC adapter × 1, AV cable × 1, VGA cable × 1, stand × 1, remote control × 1
- Various CCD cameras (analog output) are available. Reference A026
- Various connecting cables and conversion plugs are available. Reference A025

Cable / Conversion Plug



Specifications

Product Name	Part Number
BNC-BNC connection cable	SKBNC-BNC-1.5
	SKBNC-BNC-3.0
BNC-RCA terminal connection cable	SKBNC-RCA-1.5
	SKBNC-RCA-3.0
RCA female -RCA female conversion plug	SKRCAF-RCAF
BNC female -RCA female conversion plug	SKBNCF-RCAF

Color Camera | SK/SKDCE/STC

Catalog Code W2043

Three types of interface are available to suit your application.

- **Analog (Bayonet Connector)**
  Best suited for installation in devices because the cable length between the camera and a monitor can be long.

- **USB**
  By installing the viewer software that comes with the camera in a PC, it is easy to save images
  It is provided either 2 million pixels and 5 million pixels according to the required resolution.

- **HDMI**
  The camera can be directly connected to a high-definition compatible monitor. Best suited for visual inspection which requires high resolution and high frame rate.
  Using the remote control unit that comes with the camera, you can display a cross line or shadow mask at any position on the screen, or make adjustments such as brightness (gain) or contrast while looking at the display on the screen.






Specifications

Part Number	SK-N63CJ-C	SK-620BJ2	SK-TC202USB-AT	SKDCE-3	STC-MCA5MUSB3	SK-HD133DV
Interface	BNC	BNC	USB2.0	USB2.0	USB3.0 Super Speed	HDMI connector DIV 1.0 compliant
Imaging Device	1/3 (40 Mega-pixels)	1/2 (40 Mega-pixels)	1/1.8 (200 Mega-pixels)	1/2 (200 Mega-pixels)	1/2.5 (500 Mega-pixels)	1/3 (Hi-Vision)
Chip Size [H×Vmm]	4.9×3.7	6.4×4.8	7.1×5.4	6.7×5.0	5.7×4.28	4.8×2.7
Pixels [H×V]	768×494	768×494	1628×1236	1600×1200	2592×1944	1280×720
Cell Size [H×Vμm]	7.4×6.3	7.4×5.95	4.4×4.4	4.2×4.2	2.2×2.2	3.75×3.75
Frame Rate [ps]	30	30	15	10	14	60
Lens Mount	C mount	C mount	C mount	C mount	CS mount	C mount
Accessory	AC adapter	AC adapter	● Viewer Software (USB camera driver Image loading software)	● Viewer Software (USB camera driver Image loading software)	● Viewer Software (USB camera driver Image loading software) ● C mount conversion adapter	● Remote control unit ● AC adapter
Operating System (OS)	—	—	Windows®XP, Vista, 7 (32bit/64bit)	Windows®XP, Vista, 7 (32bit/64bit)	Windows®XP, Vista, 7 (32bit/64bit)	—
External Dimensions [mm] (excluding connector/protrusion)	36×36×42	51×51×60.5	51×51×46.1	40×38×50	28×28×33.8	40×40×45.8
Weight [kg]	0.065	0.19	0.145	0.15	0.038	0.12

Guide

▶Common
- Various C mount compatible microscopes are available.
  Reference (Microscope systems, zoom microscopes, OUCI-2)

▶Analog (Bayonet Connector)
- Connecting cables and conversion plugs are available.
  Reference A025

▶USB
- The lengths of the accessory cables for connecting SKDCE-3 is 1.5m and SK-TC202USB-AT is 1.8m.
- STC-MCA5MUSB3 comes with a C mount conversion adapter so that it can be used with CS mount microscopes in addition to C mount microscopes.

▶HDMI
- Cables for connecting the camera and a monitor are available.

Part Number	SKHDMI-HDMI-1.8	SKHDMI-HDMI-3.0	SKHDMI-DVI-1.8	SKHDMI-DVI-3.0
Output / Input Cable	HDMI/HDMI	HDMI/HDMI	HDMI/DVI	HDMI/DVI
Cable Lengh(m)	1.8	3	1.8	3

Attention

▶The resolution of the monitor display may not increase depending on the resolution of the microscope or observation system. Please make sure that the resolution of the microscope or observation system is smaller than the camera cell size.

▶The cameras except for STC-MCA5MUSB3 are C mount cameras. They cannot be used with CS mount products (microscopes and lenses).

▶SK-N63CJ-C, SK-620BJ2 and SK-HD133DV come with an AC adapter. Please do not use AC adapters other than the one which comes with the product.

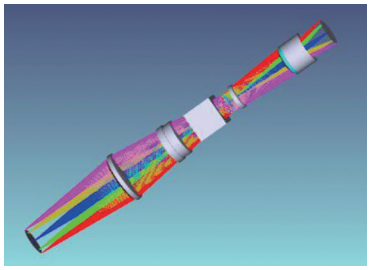
▶To record images from SK-N63CJ-C, SK-620BJ2 and SK-HD-133DV, equipment which can record analog signals and HDMI signals is required.

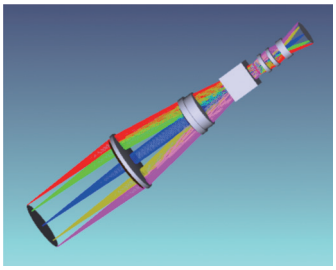
▶STC-MCA5MUSB3 does not come with a cable for connecting with a monitor. Please prepare these by the customer.

The quality control, productivity and cost-effectiveness are highly required in every industry such as semiconductor, electronics, chemicals, packaging, medical equipment, automobiles and consumer goods. The demand for high-precision positioning, measurement, inspection and evaluation with an image processing is increasing. Taking advantage of optical design and manufacturing technology in-house, we bring high-precision and cost efficient Machine Vision optical lens units into the market.

High Resolution Telecentric Lenses

- Support 0.5× to 1.0× optical magnification
- By widening the chromatic aberration correction range to 436nm - 656nm from conventional model, it is possible to achieve high NA and low distortion to capture a clear image.
- A wide field of view in a compact optical design is realized. (Corresponding to the imaging element up to 1.1″.)

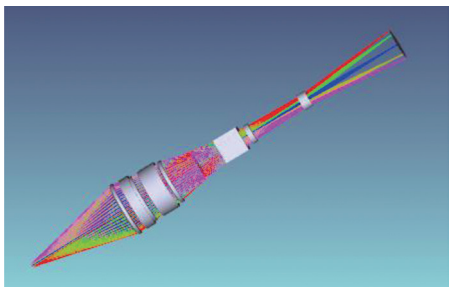




Specifications		
Magnification	1.0×	0.5×
W.D.	65mm	70mm
Barrel length	152.5mm	147.9mm
Imaging element size	≦1.1″	≦1.1″
Telecentricity	0.03°	0.02°
Distortion	0.03%	0.01%
Effective F#	5.5	5
Object side NA	0.091	0.05
Wavelength range	436nm – 656nm	436nm – 656nm

High Magnification Telecentric Lenses

- High magnification (10×) lens with widened chromatic aberration correction range of 436nm - 656nm.
- Realizing the long working distance and low distortion together with NA0.23 comparable to the objective lens, it is possible to capture fine image.
- A wide field of view in a compact optical design is realized. (Corresponding to the imaging element up to 1.1″.)



Specifications	
Magnification	10×
W.D.	55mm
Barrel length	172.5mm
Imaging element size	≦1.1″
Distortion	–0.1%
Effective F#	22
Object side NA	0.23
Wavelength range	436nm – 656nm

Lens units for Machine Vision and Image Transfer

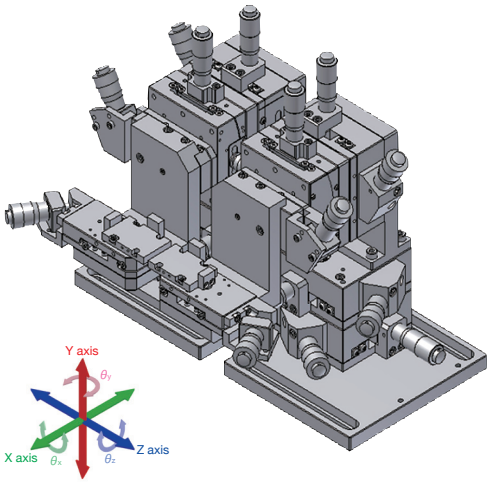
- We offer a wide range of lens line-up to cover various requirements. (Macro lens, Telecentric lens, CCTV lens for industry use, Line sensor lens, etc.)
- Illumination unit, power supply, camera and lens barrel are also available.

Manual 12-axis (6-axis) Optical Fiber Alignment Stage Unit
Motorized 12-axis (6-axis) Optical Fiber Alignment Stage Unit

DAU-080M
DAU-080A

DAU-080M

Catalog Code W2032



Manual 12-axis (6-axis) optical fiber alignment stage units. These units are best suited for alignment of passive devices such as optical waveguide and fiber array.

- Use of the high resolution stages enables alignment with high repeatability.
- The magnet mounting method and the positioning mechanism used in the holders ensure positional repeatability.
- Replacing the holders with compatible holders enables application extension associated with device change. (Fiber holders, fiber rotation holders, fiber array holders, etc.)

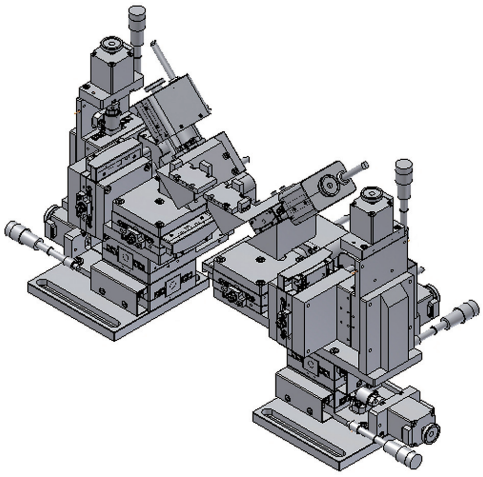
Part Number	Axis
DAU-080M-0	12 axes
DAU-080M-L	6 axes
DAU-080M-R	6 axes

Specifications

Part Number	Axis	X	Y	Z	θx	θy	θz
DAU-080M-L	Travel	Coarse: ±6.5mm Fine: ±0.25mm	Coarse: ±6.5mm Fine: ±0.25mm	Coarse: ±6.5mm Fine: ±0.25mm	±2.5°	±2.5°	±5°
	Resolution	Coarse: 0.01mm Fine: 0.0005mm	Coarse: 0.01mm Fine: 0.0005mm	Coarse: 0.01mm Fine: 0.0005mm	27.8″	27.8″	26.8″
DAU-080M-R	Travel	Coarse: ±6.5mm Fine: ±0.25mm	Coarse: ±6.5mm Fine: ±0.25mm	Coarse: ±6.5mm Fine: ±0.25mm	±2.5°	±2.5°	±5°
	Resolution	Coarse: 0.01mm Fine: 0.0005mm	Coarse: 0.01mm Fine: 0.0005mm	Coarse: 0.01mm Fine: 0.0005mm	27.8″	27.8″	26.8″

DAU-080A

Catalog Code W2033



Motorized 12-axis (6-axis) alignment stage units with six pairs of symmetrical axes.
These units are best suited for alignment of passive devices such as optical waveguide and fiber array.

- Use of the high resolution stages enables alignment with high rigidity and high efficiency.
- The magnet mounting method and the positioning mechanism used in the holders ensure positional repeatability.
- Replacing the holders with compatible holders enables application extension associated with device change. (Fiber holders, fiber rotation holders, fiber array holders, etc.)

Part Number	Axis
DAU-080A-0	12 axes
DAU-080A-L	6 axes
DAU-080A-R	6 axes

Specifications

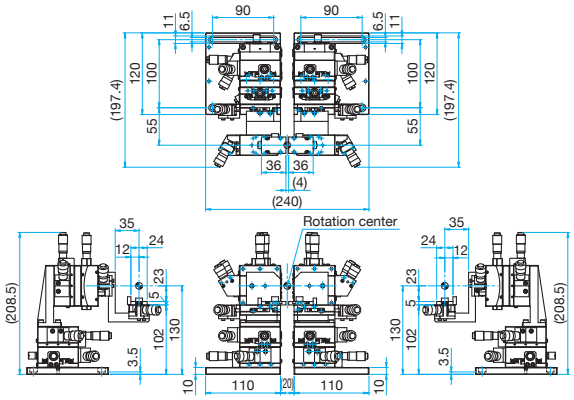
Part Number	Axis		X	Y	Z	θx	θy	θz
DAU-080A-L	Resolution		30mm	30mm	30mm	±9°	±7°	±5°
	Resolution	(Full)	2μm	2μm	2μm	≒0.00229°	≒0.00198°	≒0.0217°
		(Half)	1μm	1μm	1μm	≒0.00115°	≒0.00095°	≒0.0108°
	Positioning Accuracy		<6μm	<6μm	<6μm	–	–	–
	Positional Repeatability		<1μm	<1μm	<1μm	<±0.004°	<±0.004°	<±0.004°
DAU-080A-R	Resolution		±6.5mm	±6.5mm	±6.5mm	±9°	±7°	±5°
	Resolution	(Full)	2μm	2μm	2μm	≒0.00229°	≒0.00198°	≒0.0217°
		(Half)	1μm	1μm	1μm	≒0.00115°	≒0.00095°	≒0.0108°
	Positioning Accuracy		<6μm	<6μm	<6μm	–	–	–
	Positional Repeatability		<1μm	<1μm	<1μm	<±0.004°	<±0.004°	<±0.004°

Outline Drawing

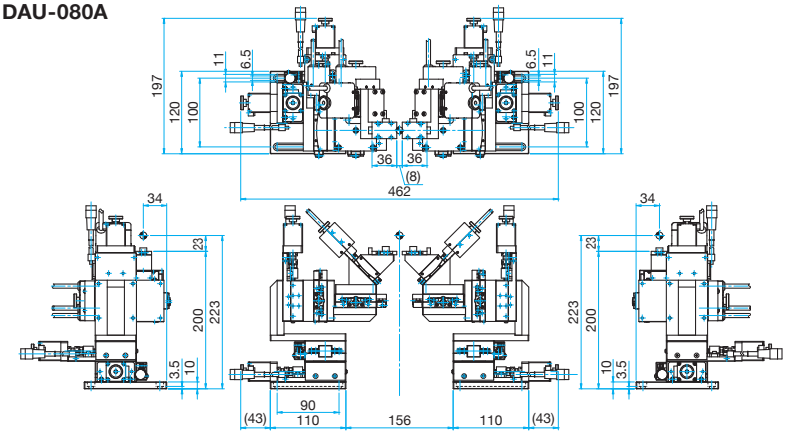
(in mm)

2D CAD 3D CAD

DAU-080M



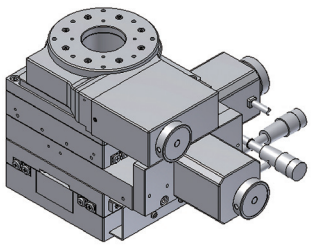
DAU-080A



DAU-120A

Catalog Code W2034

Motorized 3-axis XYθ stage unit required for alignment of TOSA (UV cure adhesive mounting type)/ROSA.



- The Gimballed fitting mechanism unit for YAG laser welding can be mounted.
- It is effective to use this unit in combination with a Z axis stage.
- Use of the high stiffness and high performance stages enabled alignment with excellent repeatability.
- Replacing the holders with compatible holders enables application extension associated with device change. (Fiber holders, fiber rotation holders, fiber array holders, etc.)

Part Number	Axis
DAU-120A	3 axes

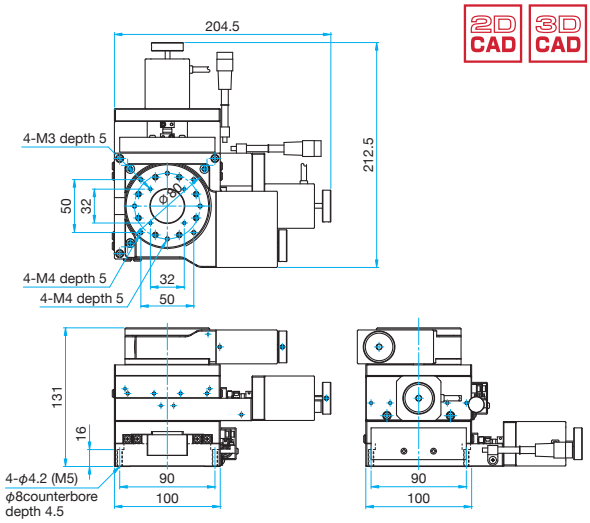
Specifications

Part Number	Axis		X	Y	θ
DAU-120A	Resolution		50mm	50mm	Move in the counterclockwise CCW direction to ∞, and stop at near 0 degree (−2.5°) in the clockwise CW direction.
	Resolution	(Full)	2μm	2μm	0.005°/pulse
		(Half)	1μm	1μm	0.0025°/pulse
	Positioning Accuracy		<6μm	<6μm	0.15°
	Positional Repeatability		<1μm	<6μm	0.02°

Outline Drawing

(in mm)

2D CAD 3D CAD



Multi Controller Micro-step Driver Box with I/O

SMC
SDB

SMC

Catalog Code W2035

Multi controllers developed for controlling alignment systems.

- These controllers come with expansion boards installed, which are necessary for equipment production together with the alignment software developed by Sigma Koki.
- The desktop type FAPC comes with the alignment software ASS-02 installed, and the rack mount type FAPC comes with ASS-04 installed.

Main Specifications

OS	Windows®7
Motion 4axis/1	MC8042P (manufactured by NOVA electronics, Inc.) 4-axis independent control
Motion 8axis/1	MC8082P (manufactured by NOVA electronics, Inc.) 8-axis independent control
AD	PCI-3155 (manufactured by Interface Corporation)/16 bit high speed AD conversion/Single end 16CH, differential 8CH input
GP-IB	PCI-4304 (manufactured by Interface Corporation) IEE 488 compliant GP-IB 1CH type equipped with FIFO

* Option
PCI-2726CM (manufactured by Interface Corporation) (This board can be added when the number of inputs/outputs exceeds the inputs/outputs of the standard driver box.)
- Sink type current drive photocoupler 32 inputs
- Sink type high current open collector 32 outputs

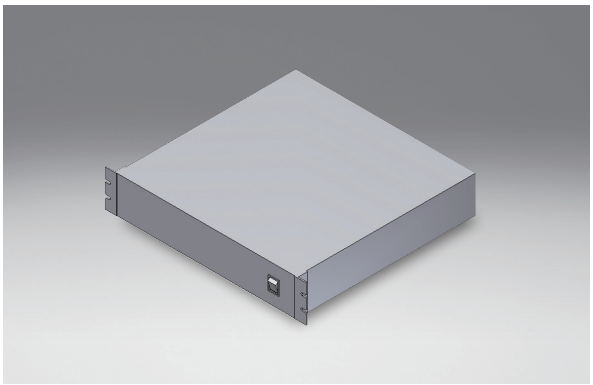
Specifications

Part Number	Axis	Software
SMC-04A2	4 axes	ASS-02
SMC-08A2	8 axes	ASS-02
SMC-08A4	8 axes	ASS-04
SMC-12A4	12 axes	ASS-04
SMC-16A4	16 axes	ASS-04

SDB

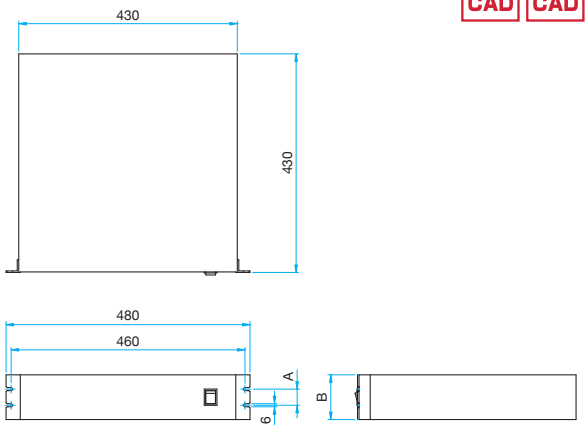
Catalog Code W2036

- Low-profile 19-inch rack mount type (1U).
- These micro-step driver boxes have the same shape, emphasizing extensibility.
- Compact design achieved by built-in drive power supply.
- Capable of setting 16 types of micro-steps, allowing high precision control according to the application.
- It is shipped with such as remote control for peripheral devices, the driving of the solenoid valve, signal tower display, and digital IO required for production equipment.



Outline Drawing (in mm)

2D CAD 3D CAD



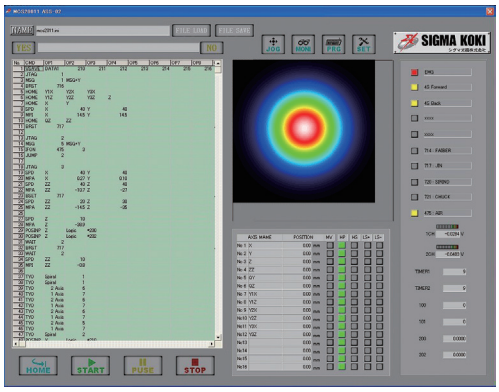
Specifications

Part Number	Axis	A [mm]	B [mm]
SDB-04	4 axes	31.75	88
SDB-08	8 axes	57.1	132.5

Alignment Software

Catalog Code W2037

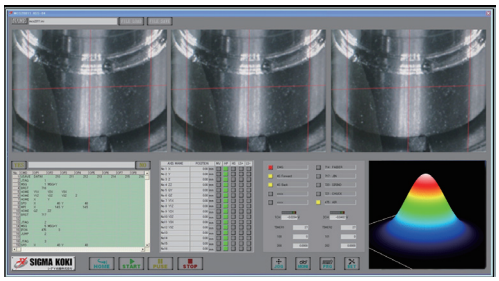
ASS-2



The standard type alignment software which has the functions required for alignment coded into the standard motion control software for multi-axis control.

- Excellent in cost performance, having virtually all commands required for alignment.
- Best suited for device assembly systems which do not require image observation functions.

ASS-4

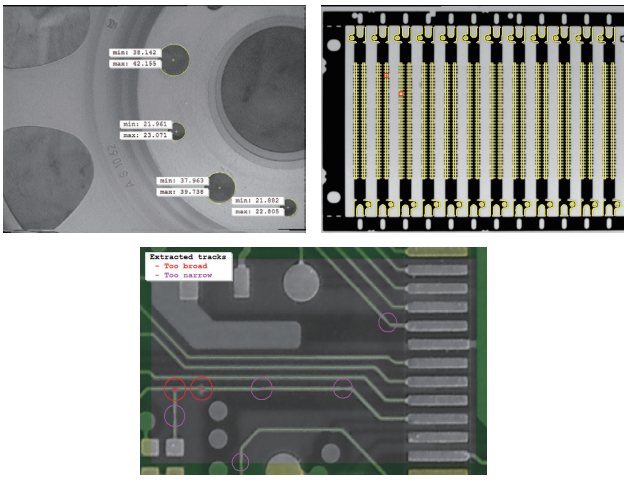


Software with an image impose function added to the alignment software ASS-02.

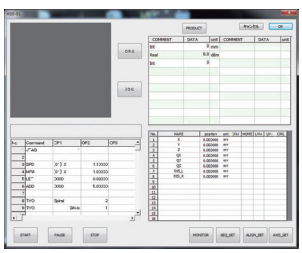
- Best suited for cases where device assembly or experiments cannot be monitored directly and need to be performed while checking images, such as YAG laser welding.
- To manage product devices, this software has a function to save data and output it into a CSV file.

Other Custom-made Software

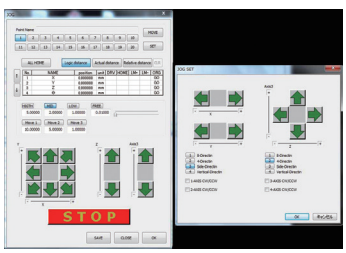
Image of Software



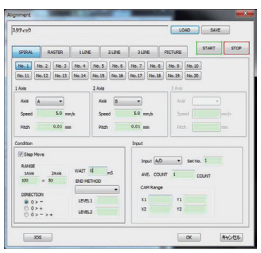
- Control/software unit used for alignment and assembling systems of optical communication modules. We can build software such as image processing software combined with motion control or image observation optical systems, or control software linked with other control equipment. We also provide hardware building and software as a unit or as a total system according to your request. Contact our International Sales Division for more information.



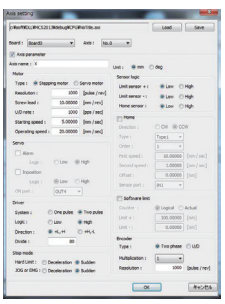
Main



JOG & JOG setting screen



Alignment setting screen



Axis setting screen

Interferometers Technical Note

Guide

It is requested a lot of time and effort, even to experienced professionals, in order to make an optical laboratory system from assembling optical elements, holders and bases.
In addition, it is expected that people who use the optical system for the first time does not know well where and how to treat. And, it will cause trouble.
We offer interferometer and a unit of Schlieren optics which is a base not only to beginner but also for experienced ones who want to save time.

- General Interferometers … A interferometer unit used in the field of education or for teaching practice. Users can freely change component arrangement to assemble various interferometers. It can also be used for simple verification experiments, and is an indispensable item for optical training.
- Fluid Visibility Optics …… It is often confused with an interferometer, but we redesigned the schlieren optical system, which is used for quantitative observation of fluid. We used white light as the light source to enable observation of subtle contrast, and a configuration that allows loading of observed images into a PC.
- D-TOP Optics …… An optical system that is one step more advanced than the general interferometer, and slightly closer to an optical instrument. It is useful for verifying both functionality and compactification. This optical system enables observation of minute samples that the general interferometer cannot check.

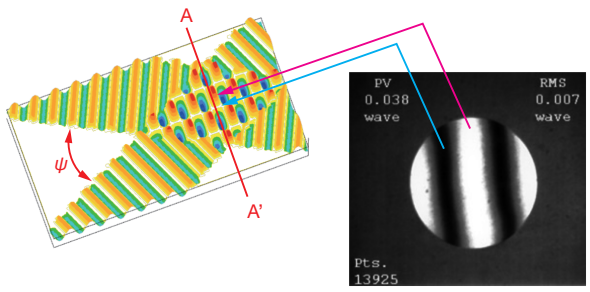
Features of Interferometers

Observation of dynamic phenomena of 1μm or less that are unrecognizable by human senses often uses interferometers. For example, all the basic principles such as surface accuracy measurement of optics, an end measuring machine used for precise measurement of distance or travel, equipment capable of measuring fast and minute changes such as speedometer or vibrometer utilize interference of light.
An interferometer provides high resolution, but the range that an optical system can measure is not so broad. This is because the periodicity of waves makes identification of a phase difference of an integral multiple of waves difficult.
Most of the commercially available interferometry devices consist of an optical system of interferometer and an analysis device for interference signals.
Advanced electronics used in the analysis device enable measurement both with high resolution and broad measurement range.
This chapter introduces interferometers consisting of only an optical system, not fitted with an analysis device for interference signals. The range available for observation is therefore very limited. However these interferometers are sufficient for the purpose of basic interferometry experiments or theory testing. Interference is utilized for practical purposes in many fields. These fields can use the interferometers as basic experiment devices.

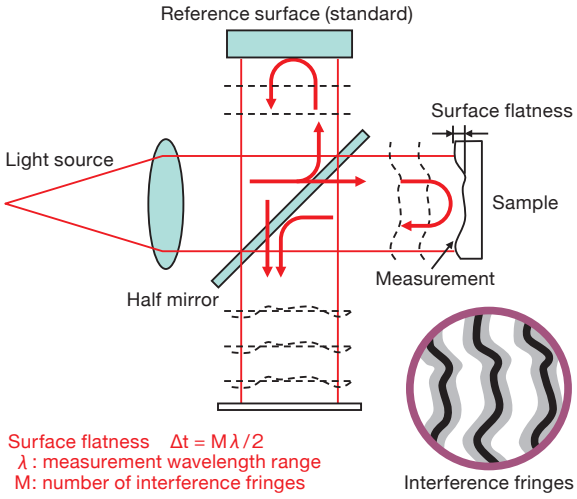
Principle of Interferometer

When you split a light wave having regular periods such as a laser beam into two waves and then recombine them, you can observe an interference phenomenon of light waves. When superimposing the two waves, the resultant wave has a part with amplified intensity and a part with diminished intensity alternately, making fringes of light and dark.
These interference fringes indicate the phase difference between the two optical path lengths, and one fringe is equivalent to the phase difference of the length of light source wavelength (half of the wavelength in the case of round-trip optical path). Since it is impossible to identify components of phases different by an integral multiple of waves of interference fringes, what you can actually observe is limited to either variation of phases different by lower than an integral multiple of waves or continuous phase variation.
The wavelength of the light source is 632.8nm in the case of a He-Ne laser, therefore the one phase between fringes of an interferometer of round-trip optical path becomes very short, 0.3μm. This is why an interferometer is capable of measuring minute displacement or variation.
High sensitivity provides precise measured values however, at the same time detects influences of disturbance such as vibration or air turbulence. To prevent this, experiments need to be performed on a vibration isolator bench or the entire experiment system needs to be shut off from the outside with black-out curtains or the like.

- Interference is a superimposition of two waves.
- Interference fringes appear when waves have regular periods.



Simulation diagram of the two-beam interference



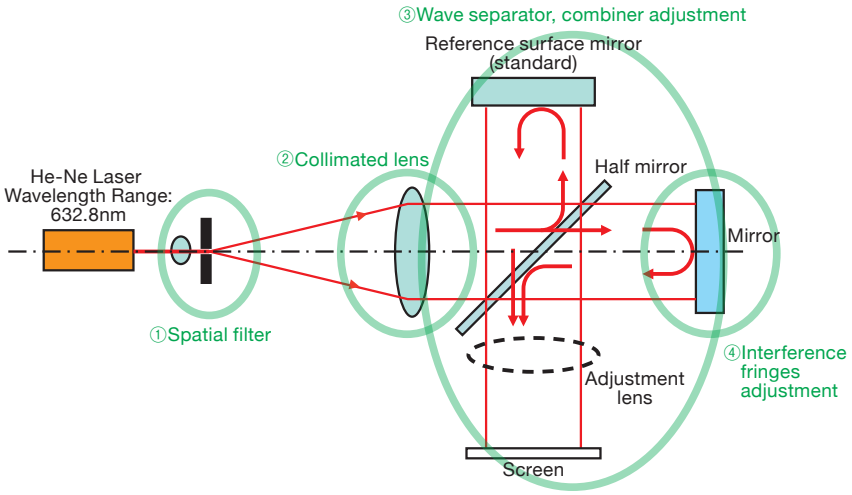
Surface flatness $\Delta t = M\lambda/2$
λ : measurement wavelength range
M: number of interference fringes

To measure surface accuracy with an interferometer, install a sample in one optical path, and superimpose the wavefront reflected by the measuring surface with the plane wave reflected by the reference surface. Interference fringes generated at this time are folded, reflecting the shape of the measuring surface.
The shape of the measuring surface can be found from the amount of fold of these fringes.

Points for Assembly

It is easy to assemble an interferometer once you master the knack of it.
The following are some points that require attention during assembly.

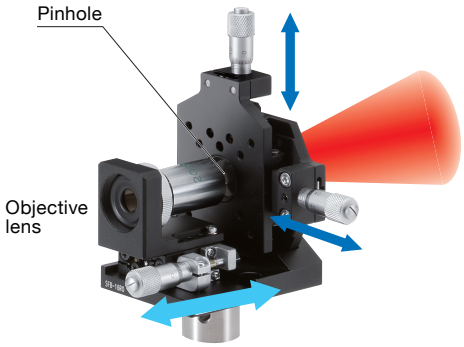
First of all, to align the optical axis of all components, adjust the height of holders using posts and post holders. To make the laser beam horizontal to the installation stand, adjust the angle of a He-Ne laser. Roughly arrange each component while keeping some space required for adjustment of the holders.
To enter light correctly into optics, adjust components in sequence starting from the laser light source.

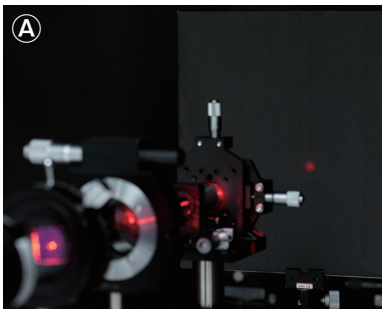


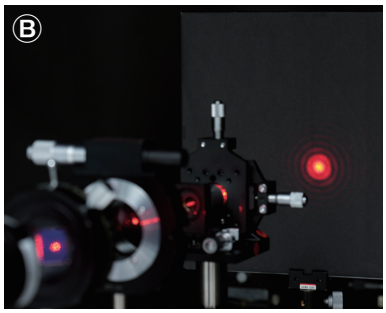
When installing components, firmly fasten various joints or clamps so that holders do not move. Such parts include the coarse/fine switching clamps for elevation and azimuth of a mirror holder, or clamp of a post holder, the on/off of the lever of a magnet base.
If joints or clamps are not fastened, vibrations tend to occur, making stable observation of interference fringes difficult.

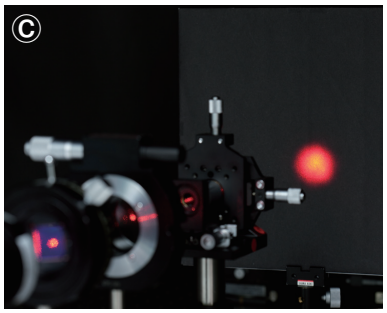
①Spatial Filter Holders

A spatial filter holder is a device consisting of an objective lens and a pinhole, and makes a diverging ray from a laser beam while at the same time eliminating distortion in beam wavefronts or diffraction rings caused by particles to convert it to a clean Gaussian distribution.
Adjust the position of the spatial filter component so that the laser beam can be perpendicular to the center point of the objective lens. Move the pinhole away from the objective lens using the micrometer of the objective lens stage, and find a weak light that passed the pinhole Ⓐ. Then move the vertical and horizontal axes of the pinhole, and find the position where the passed light becomes maximum Ⓑ. When gradually moving the objective lens closer to the pinhole, the light that passed the pinhole becomes bright, but if the objective lens keeps approaching toward the pinhole, the light becomes darker. When it gets darker, adjust the pinhole and find the position where the light becomes bright. Repeat this operation until the brightness reaches maximum and there are no diffraction rings Ⓒ.



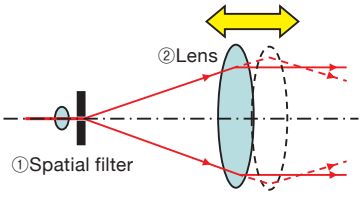


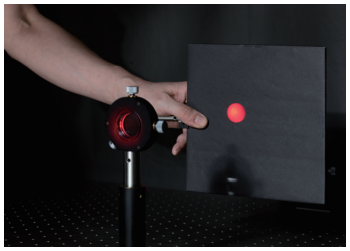




②Collimated Light

The lens component receives light diverging from the spatial filter component, and converts it to thick collimated light.
For collimation adjustment, place a screen at a distance, and adjust the lens position toward the direction of the optical axis so that the beam diameter projected to the screen is the same as the beam diameter immediately after the lens.

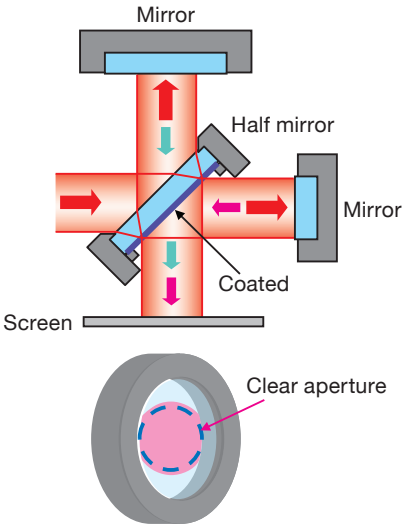




Interferometers Technical Note

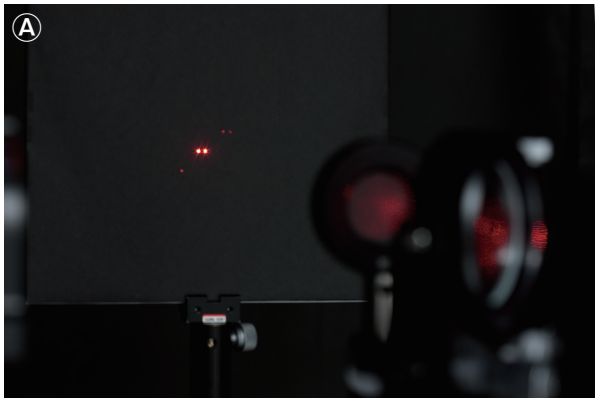
③Splitting of a Beam and Recombination

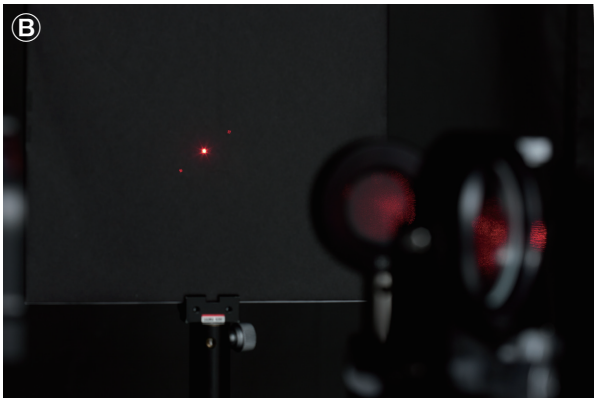
A collimated light is split and re-combined by using a half mirror. A half mirror is positioned so that a beam is flexed to a right angle, but a plate type half mirror causes shade on part of the beam because of its thickness and holder frame, limiting observation of interference fringes to a small area at the center of the half mirror. (It is especially noticeable in a Michelson interferometer.) To solve this problem, attach the half mirror in the reverse orientation (the coated surface faces the retaining ring side) and adjust the half mirror component so that the clear aperture of the transmitted beam is maximized.
* A beamsplitter holder (BHAN) that will not cause shade on a beam even when the coated surface is facing the front is also available. Reference C020
Install the mirror component so that the collimated beam fits in the clear aperture of the mirror, and adjust positioning of each holder so that the two beams are projected on the screen to be over lap at the same size.
When a wedged plate type half mirror is used, a transmitted beam is slightly refracted due to the refractive index of the half mirror. The two optical paths divided by the half mirror, therefore, are not at precisely 90 degrees, but it will not affect measurement or observation of interference fringes.

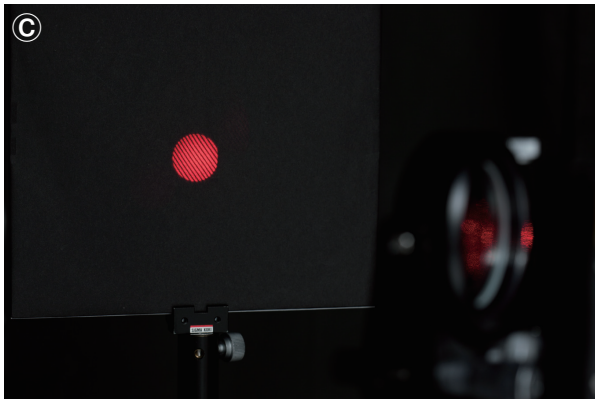


④Angle Adjustment of the Beam

Even if the two beams are perfectly superimposed by the adjustment in ③, interference fringes cannot be observed in most cases. To observe interference fringes, the parallelism of the two beams needs to be set to one minute or less. There are various adjustment methods, but here we introduce one method that uses an adjustment lens.
Prepare an adjustment lens that has a long focal length (adjustment lens component IFC2-AL Reference A040), insert it between the half mirror and the screen, and adjust the lens position so that the focal spots of the beams are on the screen. Picture Ⓐ
To completely superimpose the two spots, make fine adjustment by moving only the mirror of one optical path. Picture Ⓑ (To make the adjustment easier, make the spots as small as possible and somewhat diminish the brightness of the spots.)
You can observe fine interference fringes when you remove the adjustment lens. Picture Ⓒ (Repeat the aforementioned steps until fringes are visible.)
Next, while keeping the interference fringes visible, gradually increase the spacing between fringes by making fine adjustment on one side of the mirror holder. (At this time, if you adjust both mirror holders at the same time, the adjustment may become irreversible.)
Adjustment of the azimuth (θy) of the mirror holder increases or decreases the horizontal spacing between fringes, and adjustment of the elevation (θx) of the mirror holder increases or decreases the vertical spacing between fringes.
The interference pattern most suitable for observation is when the number of vertical or horizontal interference fringes is three or four. Picture Ⓓ







Experiment Method

**After assembling an interferometer, to understand the features of the interferometer, having a simple experiment before entering a full-scale experiment is suggested.
From which, you can acquire a lot of information that cannot be obtained from textbooks or math formulas. The following four experiment methods are simple and do not require any special tools.**

Fringe Control

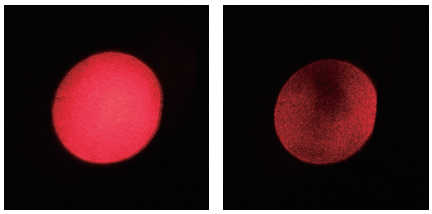
To change the direction of interference fringes, adjust the elevation and azimuth of a mirror. To increase spacing between fringes and make even brightness on the entire surface, further make ultra fine adjustment. The number of fringes indicates the crossing angle of the two beams. When the number of fringes is zero, the two beams are completely parallel.
Then, to increase the number of interference fringes, rotate the mirror. The crossing angle can be found from the number of interference fringes.

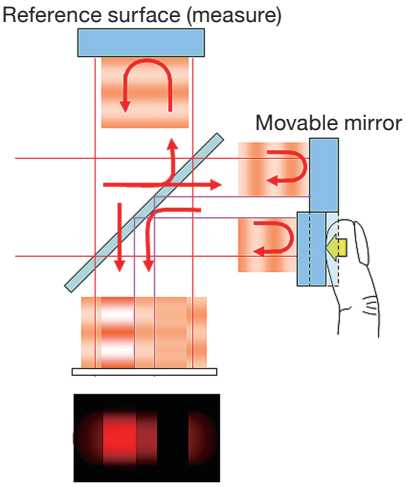
$$\sin\psi = \frac{N\lambda}{2D}$$

N: Number of interference fringes, D: Beam diameter,
ψ: Crossing angle, λ: Wavelength

Phase Shift

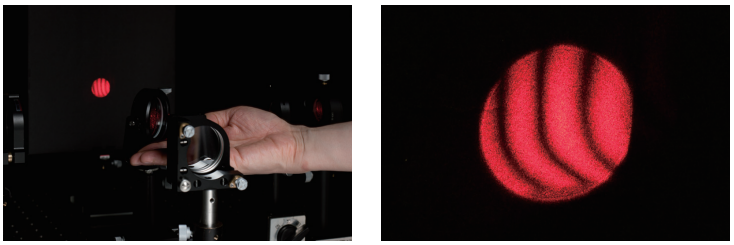
When no fringes are present, if you lightly touch (press) the mirror on one side toward the direction of the optical axis, the brightness of the interference fringes changes drastically. Brighter interference fringes indicate that the phases of two beams match, and darker fringes indicate that the two beams diminish each other because their phases are different by half the wavelength. When moving for half the wavelength, the brightness and darkness alternate.





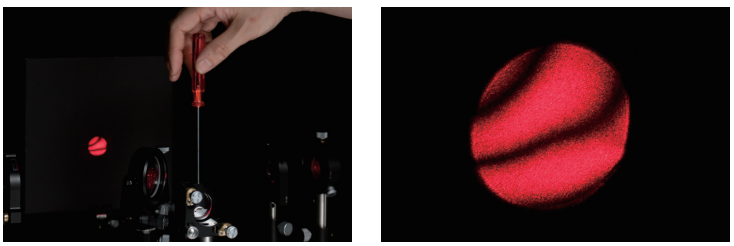
Air Turbulence

If you slowly insert your hand from underneath one optical path of an interferometer, you can observe fringe deflection. This is because the air is warmed by the temperature of the palm, changing the refractive index of the air like a heat haze. Fringe deflection is greater near the palm due to heat dissipated from the palm.



Distortion of the Mirror

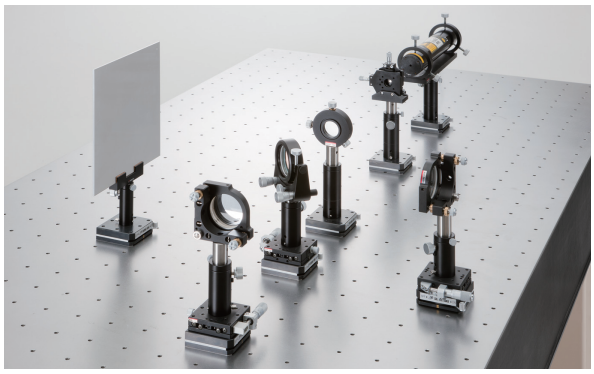
If you tighten and slightly loosen the mirror retaining screw (set bolt) that fixes the mirror on a mirror holder of an interferometer, you can observe changes in the shape of interference fringes. When the screw is strongly tightened, the mirror is distorted by the stress, resulting in distortion of the flat surface of the reflector. The distortion is too minute for humans to detect, but is observed as a drastic change in fringes in the interferometer.

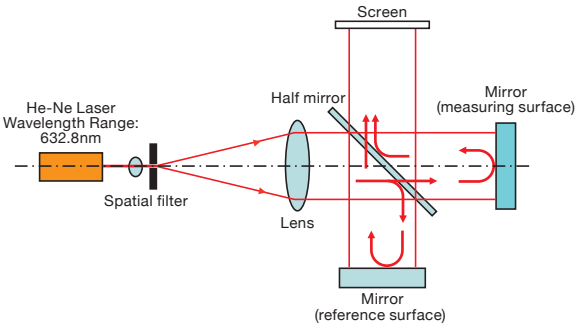


Interferometers Unit

Michelson Interferometer | IFS2-MI-25

Catalog Code W1001



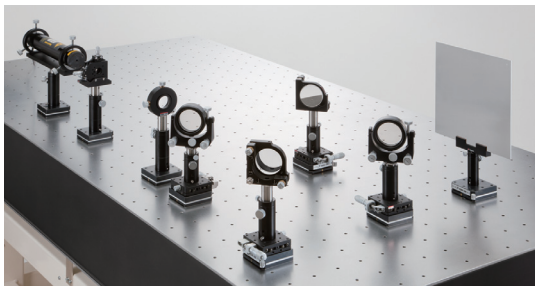


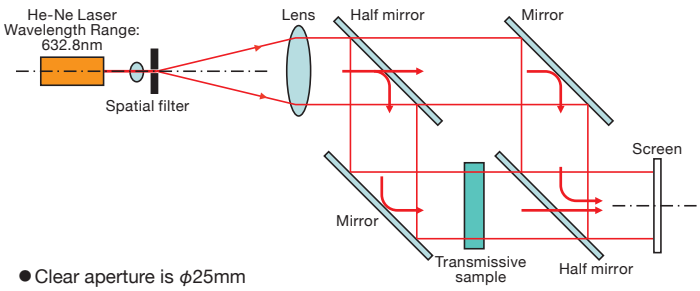
● Clear aperture is ϕ25mm

Product Name	Part Number	Quantity	Optical Axis Height [mm]
Laser Components	**IFC2-L**	1	171
Spatial Filter Component	**IFC2-SF**	1	165
Collimator Lens Component	**IFC2-CL**	1	160
Mirror Component	**IFC2-M**	2	173
Beamsplitter Component	**IFC2-BS**	1	178
Screen Component	**IFC2-SC**	1	222.5

Mach-Zehnder Interferometer | IFS2-MZ-25

Catalog Code W1002



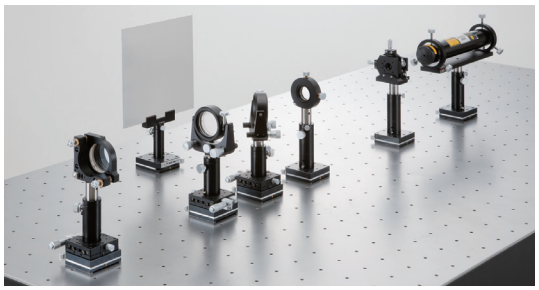


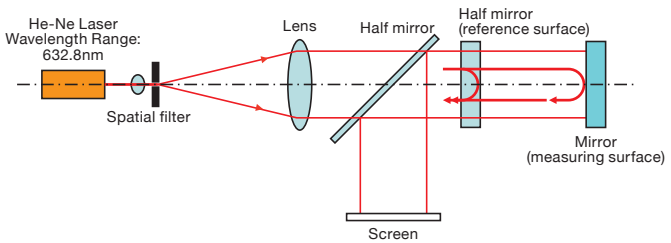
● Clear aperture is ϕ25mm

Product Name	Part Number	Quantity	Optical Axis Height [mm]
Laser Components	**IFC2-L**	1	171
Spatial Filter Component	**IFC2-SF**	1	165
Collimator Lens Component	**IFC2-CL**	1	160
Mirror Component	**IFC2-M**	2	173
Beamsplitter Component	**IFC2-BS**	2	178
Screen Component	**IFC2-SC**	1	222.5

Fizeau Interferometer | IFS2-FZ-25

Catalog Code W1003





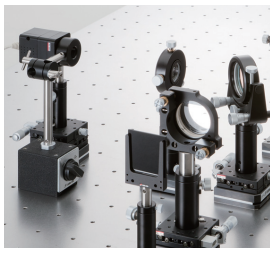
● Clear aperture is ϕ25mm

Product Name	Part Number	Quantity	Optical Axis Height [mm]
Laser Components	**IFC2-L**	1	171
Spatial Filter Component	**IFC2-SF**	1	165
Collimator Lens Component	**IFC2-CL**	1	160
Mirror Component	**IFC2-M**	1	173
Beamsplitter Component	**IFC2-BS**	2	178
Screen Component	**IFC2-SC**	1	222.5

Camera Observation Unit | IFS2-CMR

Catalog Code W1043

You can load interference fringe images onto a PC by replacing the screen component of an interferometer to the imaging lens component and camera component.
Before purchase, check the focus position of the camera and the available range for observation by the camera.
In addition, direct irradiation of laser light will cause saturation due to the high sensitivity of the USB camera. To prevent this, insert a polarization filter for light intensity adjustment on the laser side, and an ND filter on the camera side.

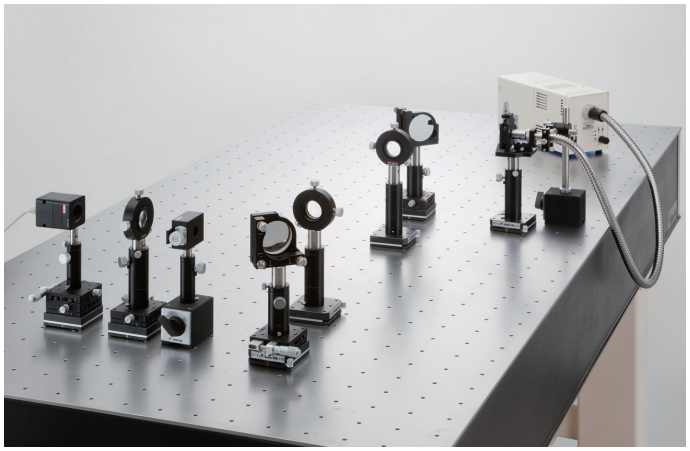


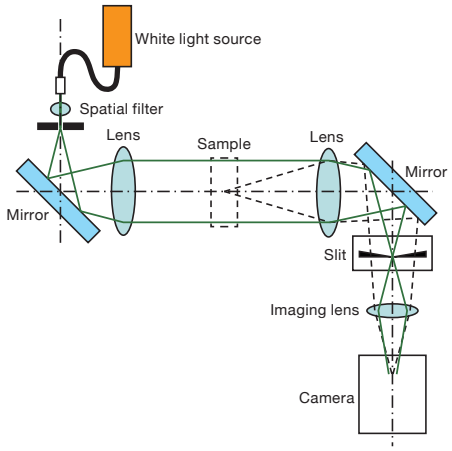
Product Name	Part Number	Quantity	Optical Axis Height [mm]
Polarization Filter Component	**IFC2-PF**	1	175
Imaging Lens Component	**IFC2-KL**	1	178
Filter Component	**IFC2-AF**	1	171
Camera Component	**IFC2-UC**	1	178

Schlieren | SRS

Catalog Code W1005

Optical system for quantitative observation of air flow or streams in glass (striae).
It expresses invisible minute variations in refractive index with intensity of optical luminance.
Projection images of Schlieren can be observed on a monitor using an image sensor.

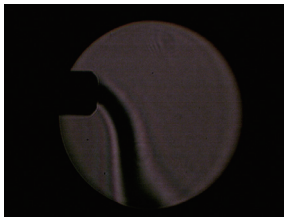




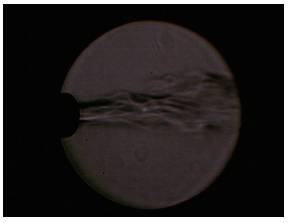
Product Name	Part Number	Quantity	Optical Axis Height [mm]
White Light Source Component	**SRS-WL**	1	171
Iris Diaphragm Component	**IFC2-IR**	1	169.5
Collimator Lens Component	**IFC2-CL**	2	160
Mirror Component	**IFC2-M**	2	173
Slit Component	**SRS-SL**	1	170
Imaging Lens Component	**IFC2-KL**	1	178
Camera Component	**IFC2-UC**	1	178

- Use of white light source provides clear images without irrelevant noises or diffraction fringes.
- Since the intensity of white light is low, requires a darkroom to observe images projected on the screen.
- Allows variations in observation area by changing focal length of the imaging lens or position of a sample, lens or camera. Before purchase, check the observation area.
- The maximum observation area is ϕ27mm. Contact us if you need a larger observation area.

Observation of Air Flow ejected by Air Blower



Ejection Volume is Low



Ejection Volume is High

Components

An optical unit consists of various components.
You can assemble a different optical unit or change the configuration of the unit according to the purpose of an experiment by purchasing additional components. (For example, replacing the screen component with the imaging lens and camera components enables loading of observed images.)
In addition, we offer variety of components required for optical adjustment and safety control.

Laser Component | IFC2-L

Catalog Code W1006

He-Ne laser component excellent in coherence and provides linear polarized beam with stable output
Wavelength: 632.8nm, Output: 1mW

Product Name	Part Number	Quantity	Optical Axis Height [mm]
He-Ne Laser	**05-LHP-111**	1	
Laser Power Source	**05-LPL-911-065**	1	
Laser Holders	**LAH-1**	1	71
Post Holder	**BRS-20-80**	1	80
Magnet Base	**MB-L65C-M4**	1	20
Total			171

Spatial Filter Component | IFC2-SF

Catalog Code W1007

Emits diverging rays of Gaussian distribution without distortion by transmitting a laser beam focused by an objective lens through a pinhole. To provide clean spherical waves, it can remove wavefront distortion caused by dirt on the objective lens or the like from the laser beam.

Product Name	Part Number	Quantity	Optical Axis Height [mm]
Spatial Filter Holders	**SFB-16RO-OBL20-25**	1	65
Post Holder	**BRS-20-80**	1	80
Magnet Base	**MB-L65C-M4**	1	20
Total			165

Collimator Lens Component | IFC2-CL

Catalog Code W1008

Converts spherical waves emitted from the spatial filter holder to collimated light.
Not fitted with a stage.
Focal length: 300mm

Product Name	Part Number	Quantity	Optical Axis Height [mm]
Achromatic Lens	**DLB-30-300PM**	1	
Lens Holder	**LHCM-30**	1	60
Post Holder	**BRS-20-80**	1	80
Magnet Base	**MB-L65C-M4**	1	20
Total			160

Mirror Component | IFC2-M

Catalog Code W1009

Uses an aluminum total-reflection mirror having high surface accuracy, providing straight interference fringes. The mirror component is fitted with a stage for optical axis adjustment or interference fringe phase shift experiments.

Product Name	Part Number	Quantity	Optical Axis Height [mm]
Aluminum Total-reflection Mirror	**TFA-50C08-20**	1	
Kinematic Mirror Holder	**MHG-MP50-NL**	1	35
Post	**RO-20-80**	1	40
Post Holder	**BRS-20-60**	1	60
Linear Stage	**TSD-601S**	1	18
Magnet Base	**MB-L65C-M4**	1	20
Total			173

Beamsplitter Component | IFC2-BS

Catalog Code W1010

Utilizes a plate-type dielectric multi-layer half mirror that provides lower intensity loss by dividing light into transmitted light and reflected light to 1:1.
The beamsplitter component is fitted with a stage for optical adjustment.

Product Name	Part Number	Quantity	Optical Axis Height [mm]
Multi-layer Half Mirror	**PSMH-50C08-10W-550**	1	
Gimbal Mirror Holders	**MHAN-50S**	1	90
Post Holder	**BRS-20-50**	1	50
Linear Stage	**TSD-601S**	1	18
Magnet Base	**MB-L65C-M4**	1	20
Total			178

Screen Component | IFC2-SC

Catalog Code W1011

Projects interference fringes on a □200mm white plate.

Product Name	Part Number	Quantity	Optical Axis Height [mm]
Flare Plate	**BBP-200**	1	100
Square Optics Holder	**KMH-80**	1	42.5
Post Holder	**BRS-12-60**	1	60
Magnet Base	**MB-L65C-M4**	1	20
Total			222.5

Imaging Lens Component | IFC2-KL

Catalog Code W1012

An imaging lens for loading interference fringe images into a camera. Focal length: 50mm
To observe the entire clear aperture ϕ25mm
Sample to imaging lens: 401.5mm
Imaging lens to camera: 57.11mm
Before purchase, check the observation range.
Fitted with a stage for focus adjustment.

Product Name	Part Number	Quantity	Optical Axis Height [mm]
Plano Convex Lens	**SLB-30-50PM**	1	
Lens Holder	**LHCM-30**	1	60
Post Holder	**BRS-20-80**	1	80
Linear Stage	**TSD-601S**	1	18
Magnet Base	**MB-L65C-M4**	1	20
Total			178

Camera Component | IFC2-UC

Catalog Code W1013

Loads observation images into a PC by simply connecting the 1/2″ 2 million pixel USB camera to a USB port of the PC.
The camera component is fitted with an YX axis stage, allowing adjustment of focus and image position.

Product Name	Part Number	Quantity	Optical Axis Height [mm]
USB Camera	**SKDCE-3**	1	19
Inch Screw Thread Post	**ROU-12-80**	1	40
Post Holder	**BRS-12-60**	1	60
Spacer	**SP-127-1**	1	7
Linear Stage	**TSD-602S**	1	32
Magnet Base	**MB-L65C-M4**	1	20
Total			178

Filter Component | IFC2-AF

Catalog Code W1014

An ND filter installed immediately in front of a camera to attenuate the intensity of laser light to 1% because direct irradiation of laser light into the camera causes saturation.

Product Name	Part Number	Quantity	Optical Axis Height [mm]
Absorptive Filter	**AND-20C-01**	1	
Lens Holder	**LHF-20**	1	
Cross Clamps	**CCHN-12-12**	1	14
Post	**PO-12-150**	1	102
Magnet Base	**MB-CB-PB**	1	55
Total			171

Stray Light Block Component | IFC2-BD

Catalog Code W1015

Reflected light from the reverse side of a half mirror or multiple-reflected light inside an interferometer sometimes spread out of a laboratory bench as stray light. This component safely blocks such optical paths. It can also be used as a filter since an absorptive ND filter is used.

Product Name	Part Number	Quantity	Optical Axis Height [mm]
Absorptive Filter	**AND-50S-01**	1	
Filter Holders	**FHS-50**	1	70
Post Holder	**BRS-12-80**	1	80
Magnet Base	**MB-L65C-M4**	1	20
Total			170

Components

Polarization Filter Component | IFC2-PF

Catalog Code W1016

Used for adjusting the intensity of He-Ne laser. Use this component when changing laser intensity continuously for optical axis adjustment or camera brightness adjustment. When two units are used in a line, it can turn down the intensity close to zero.

Product Name	Part Number	Quantity	Optical Axis Height [mm]
Visible Sheet Polarizer	**SPF-30C-32**	1	
Polarizer Holder	**PH-30-ARS**	1	60
Post Holder	**BRS-12-60**	1	60
Magnet Base	**MB-CB-PB**	1	55
Total			175

Iris Diaphragm Component | IFC2-IR

Catalog Code W1017

Used for clipping a beam into a circle, or cutting out unnecessary light to obtain only necessary light.
It is convenient to use the iris diaphragm component as the reference for alignment.

Product Name	Part Number	Quantity	Optical Axis Height [mm]
Iris Diaphragm	**IH-30**	1	54.5
Post Holder	**BRS-12-60**	1	60
Magnet Base	**MB-CB-PB**	1	55
Total			169.5

Slit Component | SRS-SL

Catalog Code W1018

A slit positioned at the focus spot of light transmitted through a sample in Schlieren. Contrast of projected images changes by fine adjustment of slit position or width.

Product Name	Part Number	Quantity	Optical Axis Height [mm]
Adjustable Slit	**PSL-0**	1	55
Post Holder	**BRS-12-60**	1	60
Magnet Base	**MB-CB-PB**	1	55
Total			170

Adjustment Lens Component | IFC2-AL

Catalog Code W1019

Used when correctly overlapping two beams in parallel during interference fringe adjustment.
After superimposing the spots, remove it from the optical path.
Focal length: 300mm

Product Name	Part Number	Quantity	Optical Axis Height [mm]
Plano Convex Lens	**SLB-30-300PM**	1	
Lens Holder	**LHF-30**	1	55
Post Holder	**BRS-12-60**	1	60
Magnet Base	**MB-CB-PB**	1	55
Total			170

White Light Source Component | SRS-WL

Catalog Code W1020

White light source of halogen lamp used as the light source of Schlieren. It will not heat the optical system because light is transmitted by the light guide.
Lamp power consumption: 150W (with intensity adjustment)

Product Name	Part Number	Quantity	Optical Axis Height [mm]
Halogen Light Source	**LS-LHA**	1	
Light Guide	**MSL-1000S-10**	1	
Adjustable Round Lens Holder	**LHA-25**	1	
Cross Clamps	**CCHN-12-12**	1	14
Post	**PO-12-150**	1	102
Magnet Base	**MB-CB-PB**	1	55
Total			171

Steel Honeycomb Optical Tabie | OSDVIO-R-1209M100t(800H)

Catalog Code W6502

Interferometers are highly sensitive and always require vibration isolator benches to eliminate floor vibrations.
Table face: 1,200×900mm, Height: 800mm
Magnetic stainless steel plate
M6 tapped holes 25×25mm matrix
Reference D009

Darkroom Kits | DRU-2017

Catalog Code W6016

When observing interference fringes projected on a screen or Schlieren projection images, the room needs to be dark. In such cases, having a darkroom is convenient. Covering an experiment area is also very effective as a laser safety control.
Size: (W)2,000 × (D)1,700 × (H)2,000mm
Reference D018

Special Order

Catalog Code W1021

In addition to the optical units introduced so far, we will produce custom-made optical units according to your request.
We will flexibly support your request from a holder to fit your sample to a packaged optical instrument.
We will also review the configurations of products in our catalog to suit your experiment.

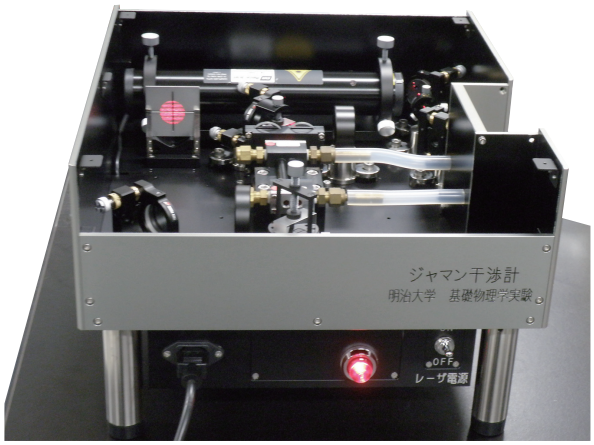


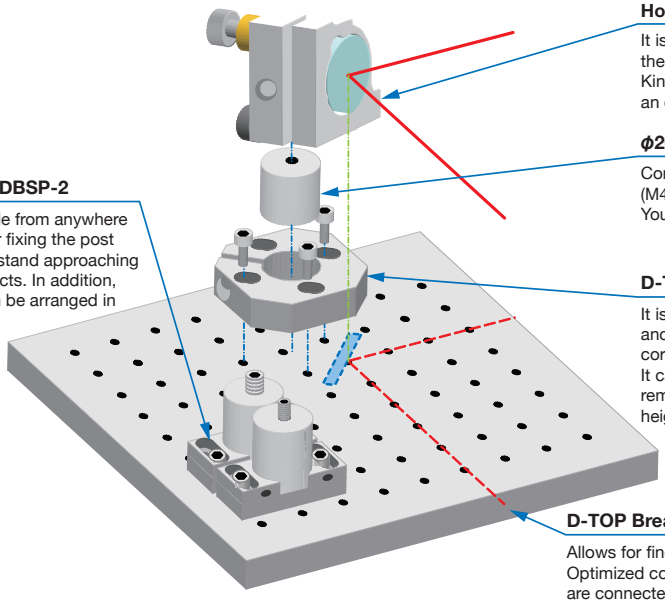
Photo credit: Meiji University, Theoretical Physics Experiment

D-TOP Optics Guide

D-TOP optical system offers a new alternative to the optical experiment. By breaking the stereotype that says "optical system can not be moved due to the heavy and large", we propose a highly stable optical system that is capable of carrying with a compact size.
In case of D-TOP optical system, optical elements and holders, which have been used until now, can be used as it is, you can save the initial investment. Moreover, by replacing the experimental system of surface plate with the D-TOP optical system, it becomes possible to remove or for space saving and enables effective use of the space occupied by the optical system.

[Characteristics of D-TOP]

- Low optical axis (45mm recommended) ... well match to low optical axis laser
- High rigidity ..... less affected by vibration, interferometry is possible at simple vibration isolation
- Advantage for small sample ..... possible approaching between each element, the magnification of image system can be enlarged
- Compact ..... can be carried in a B4 size, and packable in bookshelf
- Easy assembly ..... possible to place accurately a holder by refined and simple structure on the optical axis. Also, possible to change the position of the holder and the height of the optical axis.



Holders
It is available for the use of various holders in the catalog.
Kinematic mirror holder (MHG-MP30-NL) with an offset (20mm) can also be used.

ϕ20 Post Holder | PS20
Compatible with a various mounting holders. (M4 tapped holes, M4 male screw, M6 male screw)
You can freely specify the length of the post.

D-TOP Base plate | DBSP-2
Setting bolt is accessible from anywhere in the four directions for fixing the post stand of ϕ20mm. Post stand approaching is possible until it contacts. In addition, several post stands can be arranged in a narrow space.

D-TOP Base plate | DBSP-1
It is fixed the post stand of ϕ20mm with a slotted and clamping screw. Both the center fixed and correction fixed of the offset of 20mm.
It can be replaced the post stand without removing the base plate. Post stand of minimum height of 9mm is available.

D-TOP Breadboard | DOBC-2632
Allows for fine assembly of the holder (M3-16mm matrix). Optimized compact size (B4 size) to carry. If four plates are connected, it is available to use as breadboard (B2 size).

D-TOP optics can be sold from one base plate. Referring to the configuration of the practical example and module, please select a various device.
There may not be fixed a light source, sample with a special shape and detector in the existing holders. In this case, custom-made base, holder and adapter are available. If D-TOP base and catalog products can be combined, the custom-made manufacturing is reduced, and it is possible for configuration at low cost. If the custom-made holder and base are requested, please inform us the exact shape of each device and the height of the optical axis.
In addition, it is also available for design, production, adjustment and functional verification of the optical system based on the D-TOP optical system.
To meet customers' needs, we will answer to the needs of every stage.

ϕ20 Post Holder | PS20

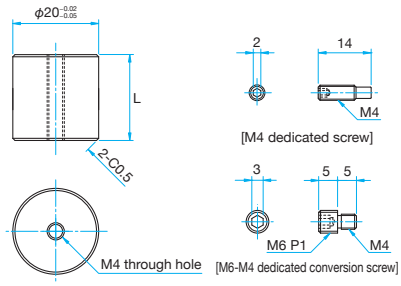
Catalog Code W1039

It is a post stand of ϕ20mm that has been optimized for the low optical axis and compact for D-TOP. It is very useful when holders of different heights of optical axis are adjusted to the same heights of optical axis.

Outline Drawing (in mm)

PS20

M4 dedicated screw ...2 screws
M6-M4 dedicated conversion screw ...2 screws



- L length can be specified in any length. According to the height of the optical axis of the holder, please specify the L dimension.
- Other than the hexagonal socket head cap screws of M4, the mounting of the holder can be mounted to the tap hole of M4 rod and M6 rod by using the screws provided
- It can be used as the rod of 20mm or less (RO-20-L).

Specifications

Part Number	L Specified range [mm]
PS20-L	10≦L≦30

D-TOP Base plate | DBSP-1

Catalog Code W1040

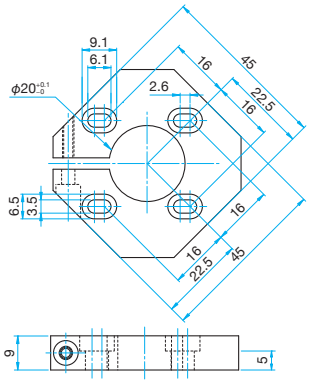
It is a base plate to fix ϕ20mm post stand. By only a little loosing a clamping screw of slotted, it can be replaced holders without changing position and adjusted the height of the optical axis. It is also possible for the offset (20mm) correction between the mounting position of Kinematic Mirror Holder (MHG-MP20-NL/MP25-NL/MP30-NL) and the mirror surface.

- It can be placed that the center of the cube beam splitter (NPCH) and polarization beam splitter (PBS) is arranged on the optical axis (tap sequence of the base).
- By using the long hole (2.6mm shift) in the mounting, it can do fine-tuning the position of the optical element and be used to correct the optical axis deviation.
- Since the post stand is fixed by the clamping screw, it can be fixed at random in the horizontal direction of the optical element.

Outline Drawing (in mm)

DBSP-1

Hexagonal socket head cap screw M3×10…3screws



Guide

▶When it is fixed the long hole with a screw by the side of slotted clamp, it becomes the 20mm offset mounting of MHG series holder.

Attention

▶Slotted was made harder in order to maintain accuracy. Please securely tighten until tighten the post stand does not turn.
▶There are four mounting holes, but please fix either side of slotted without tightening of screw. There are four mounting holes, but please fix either side of slotted without tightening of screw.

Specifications

Part Number	Offset (Diagonal direction) [mm]	Optical Axis Height [mm]
DBSP-1	0 – 2.6, 20 – 22.6	0 – 5

D-TOP Base plate | DBSP-2

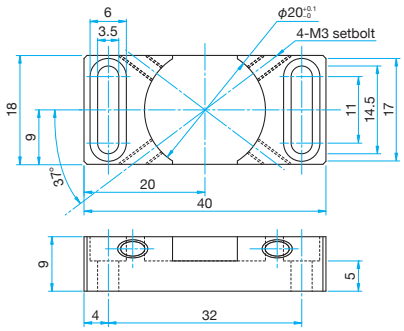
Catalog Code W1041

It is a base plate to fix ϕ20mm post stand. It is used when thin elements such as a lens and a polarizer are placed close to the optical axis. It is a base plate to fix ϕ20mm post stand.

Outline Drawing (in mm)

DBSP-2

Hexagonal socket head cap screw M3×10…2 screw



- Due to the thickness of the base plate, the optical axis height is 5mm raising.
- Since the width is 2mm shorter than a post stand, the interference of the base plate does not cause, even in approaching of optical elements.
- Post stand can be fixed by setting bolt of 1 – 2 positions from the side. It is accessible from any direction because of set bolt attached to the four directions.

Specifications

Part Number	Optical Axis Height [mm]
DBSP-2	5

D-TOP Breadboard | DOBC-2632

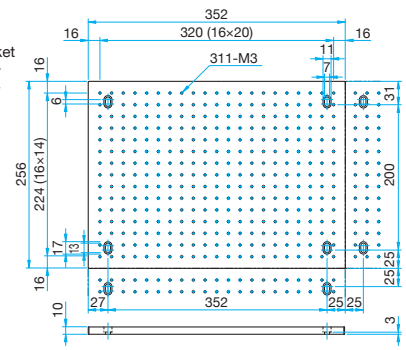
Catalog Code W1042

It is a breadboard of B4 size for D-TOP. To remove wasted space regarding the placement of the existing holders, it adopted a matrix M3-16mm tap hole.
As arranging four breadboards squarely, on the surface plate with prepared M6 tap holes, it can be used as a single breadboard of 704mm × 512mm (poster size).

Outline Drawing (in mm)

DOBC-2632

Hexagonal socket head cap screw M6×8…4 screw



- It can be carried in a state of assembled optical system of B4 size.
- It is designed to fit properly the position of the tap even if four breadboards are combined. (It may slip off the error of the processing and mounting.)

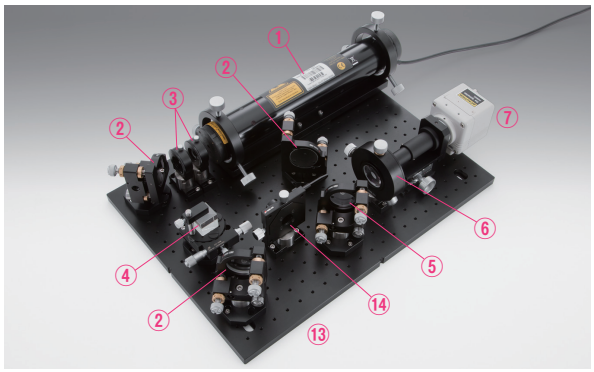
Specifications

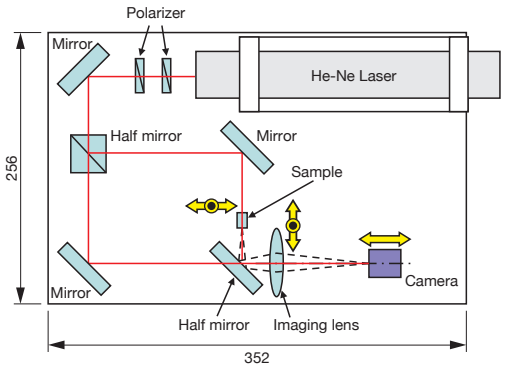
Part Number	Top-mounted	Top-mounted [mm]
DOBC-2632	M3-16mm matrix	10

D-TOP Optical System | DTM

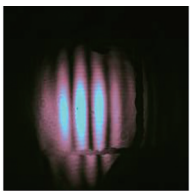
Micro Observation Interferometer | DTM-MMHI

Catalog Code W1004





Sample



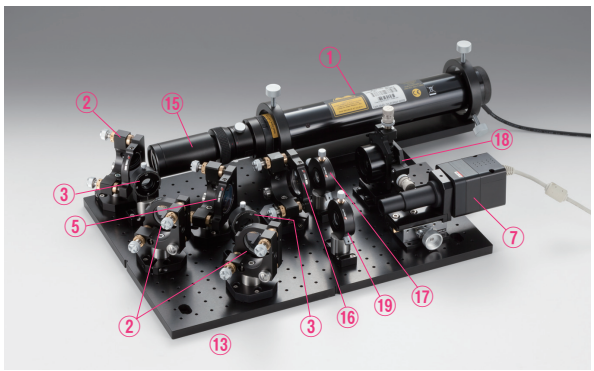
Interference Fringes of Transmitted Wavefronts of the Sample

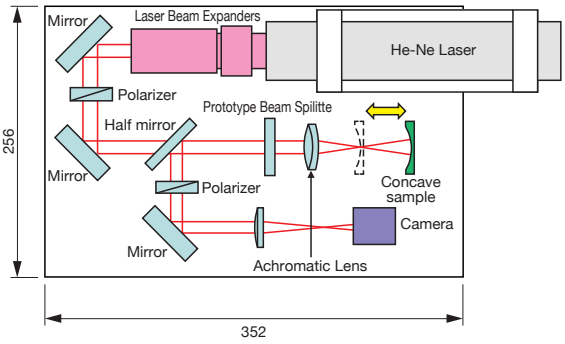
Mach-Zehnder interferometer that can be observed transmitted wavefront of the glass substrate of about 1mm. By using a base of D-TOP, it shortens the distance to the imaging lens from the sample and is imaged an enlarged image of the sample onto the camera. Images captured by the camera can be taken directly to a PC via USB and kept on record about stop and moving images. In addition, it allows to adjust the brightness of the laser by using two polarizing plates and to be observed in the best image without saturation.

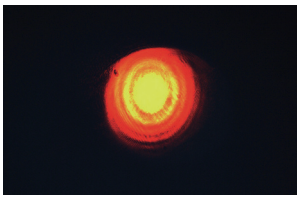
	Product Name	Part Number	Quantity
①	Laser Module	**DTM-05-LHP-111**	1
②	Mirror Module	**DTM-TFA-30C05-10**	3
③	Polarizer Module	**DTM-DTPF-15C-32**	2
④	Cube Half Mirror Module	**DTM-HBCH-20-550**	1
⑤	Plate Half Mirror Module	**DTM-PSMH-30C03-10-550**	1
⑭	Small Sample Holder Module	**DTM-MLF-SF**	1
⑥	Lens Module (Plano Convex Lenses)	**DTM-SLB-30-50PM**	1
⑦	USB Camera Module	**DTM-SKDCE-3**	1
⑬	D-TOP Breadboad	**DOBC-2632**	1

R Measuring Interferometer | DTM-RMFI

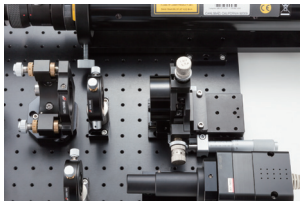
Catalog Code W1022







Interference pattern of concave



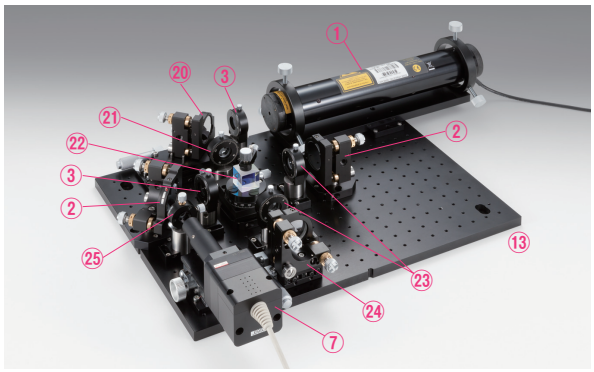
Concave sample and achromatic lens

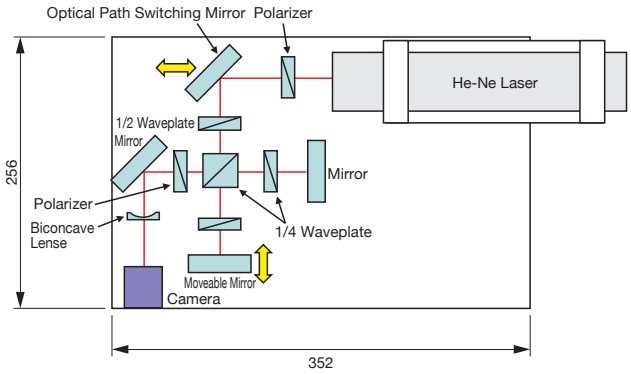
It is a device that uses an interferometer and measures the radius of curvature of the concave surface of the small curvature. There are two positions where can be observed interference fringes reflected on the concave surface. One position is that the focus is on a concave surface of the achromatic lens, and the other position is that the focus is on the center of curvature of the concave surface. When reading the micrometer on the stage carrying the sample, the distance between the two positions can be observed the interference fringes of concave sample, and it can be used to determine the precise radius of curvature.

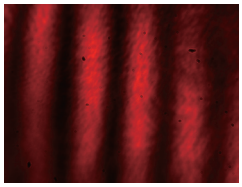
	Product Name	Part Number	Quantity
①	Laser Module	**DTM-05-LHP-111**	1
⑮	Laser Beam Expanders	**LBED-10**	1
②	Mirror Module	**DTM-TFA-30C05-10**	3
③	Polarizer Module	**DTM-DTPF-15C-32**	2
⑤	Plate Half Mirror Module	**DTM-PSMH-30C03-10-550**	1
⑯	Prototype Beam Spliter Module	**DTM-PSM33-30C03-10W-550**	1
⑰	Achromatic Doublets Lens Module	**DTM-DLB-15-50PM**	1
⑱	Cancave Sample Holder Module	**TAT-AD20-TSD-40801S**	1
⑲	Lens Module (Plano Convex Lenses)	**DTM-SLB-15-100PM**	1
⑦	USB Camera Module	**DTM-SKDCE-3**	1
⑬	D-TOP Breadboad	**DOBC-2632**	1

Coherent Length Measuring Machine | DTM-CLMI

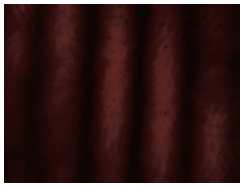
Catalog Code W1023





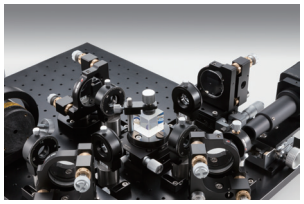


Interference pattern of the optical path difference of 0μm



Interference pattern of the optical path difference of 10μm

As a polarizing Michelson interferometer using PBS and 1/4 wave plate, we have measured the coherent length of the background light of the semiconductor laser. First, it takes the alignment of the interferometer in the He-Ne laser and retracts mirrors on the stage, and then collimating light of the semiconductor laser is incident to the interferometer. After removing the laser light by the polarizing plate, the semiconductor laser is observed only the background light by the camera. By adjusting the movable mirror little by little, it can be found the position that the interference fringes appear. The length of the range that is visible the interference fringes will be coherent length.

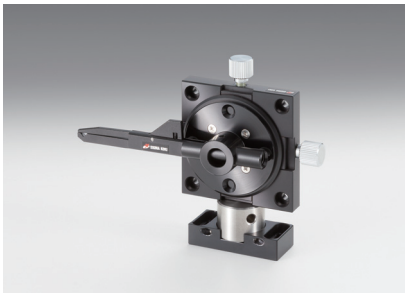


A movable mirror for changing the optical path difference

	Product Name	Part Number	Quantity
①	Laser Module	**DTM-05-LHP-111**	1
③	Polarizer Module	**DTM-DTPF-15C-32**	2
⑳	Optical Path Switching Mirror Module	**TFA-30C05-10-TSD-40801S**	1
㉑	1/2 Waveplate Module	**DTM-WPP-15C-633-2M**	1
㉒	PBS Module	**DTM-PBS-20-6328**	1
㉓	1/4 Waveplate Module	**DTM-WPP-15C-633-4M**	2
②	Mirror Module	**DTM-TFA-30C05-10**	2
㉔	Moveable Mirror Module	**TFA-30C05-10-TSD-401S**	1
㉕	Biconcave Lense Module	**DTM-SLB-10-30NM**	1
⑦	USB Camera Module	**DTM-SKDCE-3**	1
⑬	D-TOP Breadboad	**DOBC-2632**	1

Custom-made

TOP is configured using the catalog product primarily, but it may be requested a adapter, holder and base that are not in the catalog in order to fix a light source, special shape sample and detector. In such a case, if you can tell us the specifications (dimension) of the light source, sample and detector, we can produce the dedicated holder. In addition, for a possible combination of catalog products, we can do the alteration of the products and produce the custom-made connecting plate. Please contact our International Sales Department.



D-TOP Module

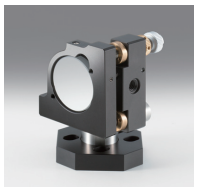
Laser Module | DTM-05-LHP-111

Catalog Code W1024

Module for He-Ne laser of the linearly polarized light with excellent coherence
Wavelength Range: 632.8nm
Output: 1mW
Beam height and angle can be adjusted.

Product Name	Part Number	Quantity	Optical Axis Height [mm]
He-Ne Laser	**05-LHP-111**	1	
Laser Power Source	**05-LPL-911-065**	1	
Laser Holders	**LAH-1**	1	41
Spacer	**LAH-SP**	1	4
Optical Axis Height			45

Mirror Module | DTM-TFA-30C05-10

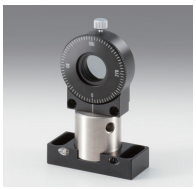


Catalog Code W1025

Module that is bent 90 degrees to the optical path using a mirror with high surface accuracy. Optical axis will be able to match to the center of the mirror.

Product Name	Part Number	Quantity	Optical Axis Height [mm]
Mirror	**TFA-30C05-10**	1	
Mirror Holder	**MHG-MP30-NL**	1	25
ϕ20 Post Holder	**PS20-20**	1	20
D-TOP Base Plate	**DBSP-1**	1	0
Optical Axis Height			45

Polarizer Module | DTM-DTPF-15C-32



Catalog Code W1026

Module for converting the polarization direction and adjusting the light amount.
Extinction Ratio: 10^{-4}

Product Name	Part Number	Quantity	Optical Axis Height [mm]
Visible Polarized Filter	**DTPF-15C-32**	1	
Polarizer Holders	**MPH-15R**	1	20
ϕ20 Post Holder	**PS20-20**	1	20
D-TOPBase Plate	**DBSP-2**	1	5
Optical Axis Height			45

Hybrid Cube Half Mirror Module | DTM-HBCH-20-550

Catalog Code W1027

Module using a half mirror of broadband cube. The branching ratio of reflected light and transmitted light is 1:1.
The ratio remains unchanged even if the polarization state of the incident light is changed.

Product Name	Part Number	Quantity	Optical Axis Height [mm]
Hybrid Cube Half Mirrors	**HBCH-20-550**	1	10
Prism Holder	**KSP-DT**	1	7
θ axis Rotation Stages	**KSP-406M**	1	13
Spacer	**SP-40T**	1	5
ϕ20 Post Holder	**PS20-10**	1	10
D-TOP Base Plate	**DBSP-1**	1	0
Optical Axis Height			45

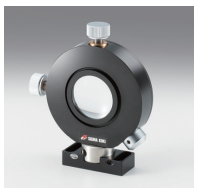
Plate Half Mirror Module | DTM-PSMH-30C03-10-550

Catalog Code W1028

Module using a plate half mirror.
The branching ratio of reflected light and transmitted light is 1:1.
Chromatic aberration and spherical aberration by the thickness of the glass are small.

Product Name	Part Number	Quantity	Optical Axis Height [mm]
Broadband Dielectric Half Mirrors	**PSMH-30C03-10-550**	1	
Mirror Holder	**MHG-MP30-NL**	1	25
ϕ20 Post Holder	**PS20-20**	1	20
D-TOP Base Plate	**DBSP-1**	1	0
Optical Axis Height			45

Lens Module (Plano Convex Lenses) | DTM-SLB-30-50PM



Catalog Code W1029

Modules for forming the sample to the image sensor or focusing the light on the detector
Focal length: 50mm
Clear aperture: ϕ27mm

Product Name	Part Number	Quantity	Optical Axis Height [mm]
Plano Convex Lenses (BK7)	**SLB-30-50PM**	1	
Lens Holder	**LHCM-30**	1	30
ϕ20 Post Holder	**PS20-10**	1	10
D-TOP Base Plate	**DBSP-2**	1	5
Optical Axis Height			45

Camera Module | DTM-SKDCE-3

Catalog Code W1030

Module using a color camera of USB output.
It is possible to project the image to a PC. There is a mechanism to focus by adjusting the camera position, Easy replacement in case of C-mount camera.

Product Name	Part Number	Quantity	Optical Axis Height [mm]
2Mega-pixels USB2.0 Camera	**SKDCE-3**	1	
C-mount Camera Holder	**DTCH-C-20**	1	20
Dovetail Stage	**TARW-25501**	1	22
Base Plate	**DTCBP-4050**	1	3.5
Optical Axis Height			45.5

1/4 (or 1/2) Waveplate Module | DTM-WPP-15C-633-4M (or -2M)

Catalog Code W1031

Module converting the polarization state by using a wavelength plate. 1/4 wavelength plate converts linearly polarized light to circularly polarized, 1/2 wavelength plate rotates the polarization direction.
Wavelength: 632.8nm

Product Name	Part Number	Quantity	Optical Axis Height [mm]
1/4 (or 1/2) Waveplates (633nm)	**WPP-15C-633-4M (or 2M)**	1	
Mini-Polarizer Holders	**MPH-15R**	1	20
ϕ20 Post Holder	**PS20-25**	1	20
D-TOP Base Plate	**DBSP-2**	1	5
Optical Axis Height			45

PBS Module | DTM-PBS-20-6328

Catalog Code W1032

Combined or separated vertically polarized light and horizontally polarized light.
Wavelength Range: 632.8nm

Product Name	Part Number	Quantity	Optical Axis Height [mm]
He-Ne Laser	**PBS-20-6328**	1	10
Prisms Holders	**KSP-DT**	1	7
θ axis Rotation Stages	**KSP-406M**	1	13
Specer	**SP-40T**	1	5
ϕ20 Post Holders	**PS20-10**	1	10
D-TOP Base Plate	**DBSP-1**	1	0
Optical Axis Height			45

Lens Module | DTM-SLB (or DLB) -***-***

Catalog Code W1033

Module that can specify the lineup of achromatic lens or single lens of the outer diameter of ϕ15mm and ϕ10mm.
When selecting a LHCM-10 to the lens holder, due to the interference with ϕ20mm post stand, two washers are inserted in between.

Product Name	Part Number	Quantity	Optical Axis Height [mm]
Lens	**SLB (or DLB) -***-***	1	
Lens Holder	**LHCM-****	1	**
M4 Washers (t=1mm)	**W1 (MLHC-10R only)**	2	2
ϕ20 Post Holder	**PS20-****	1	**
D-TOP Base Plate	**DBSP-2**	1	5
Optical Axis Height			45

Moveable Mirror Module | TFA-30C05-10-TSD-401S

Catalog Code W1034

Module that can vary the optical path length by moving a mirror reflected vertically to a stage.
Travel: ±6.5mm

Product Name	Part Number	Quantity	Optical Axis Height [mm]
Aluminum Mirrors	**TFA-30C05-10**	1	
Mirror Holder	**MHG-MP30-NL**	1	25
Aluminum Spacers	**MSP-4002**	2	4
X axis Steel Extended Contact Slide Stages	**TSD-401S**	1	16
Optical Axis Height			45

Optical Path Switching Mirror Module | TFA-30C05-10-TSD-40801S

Catalog Code W1035

Module that can remove the mirror holder in the long stroke stage from the optical axis.

Product Name	Part Number	Quantity	Optical Axis Height [mm]
Aluminum Mirrors	**TFA-30C05-10**	1	
Mirror Holder	**MHG-MP30-NL**	1	25
Mirror Spacers	**DSP-4080**	1	4
X axis Steel Extended Contact Slide Stages	**TSD-40801S**	1	16
Optical Axis Height			45

Small Sample Holder Module | DTM-MLF-SF

Catalog Code W1036

In order to grab a very small sample, module that is diverted to SELFOC® lens holder.
Sample image size: ϕ15 – ϕ3mm

Product Name	Part Number	Quantity	Optical Axis Height [mm]
Selfoc® Lens Claws	**MLH-SF**	1	
Selfoc® Lens Claws	**MLH-10ADP-2**	1	
Fiber Optics Holders	**FOP-1**	1	25
ϕ20 Post Holder	**PS20-15**	1	15
D-TOP Base Plate	**DBSP-2**	1	5
Optical Axis Height			45

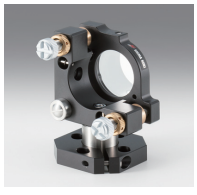
Concave Sample Holder Module | TAT-AD20-TSD-40801S

Catalog Code W1037

Module that can fix the test concave sample and adjust precisely.
Test concave mirror
outer diameter: ϕ20mm
Thickness: –6mm

Product Name	Part Number	Quantity	Optical Axis Height [mm]
Lens Adapters	**TAT-AD20**	1	
Two-axis Pinhole / Objective Holders	**TAT-16DM-M3**	1	30
X axis Steel Extended Contact Slide Stages	**TSD-40801S**	1	16
Optical Axis Height			46

Prototype Beam Splitter Module | DTM-PSM33-30C03-0W-550



Catalog Code W1038

Beam splitter module that is used for the reference surface of the Fizeau interferometer.
To enhance the contrast of the interference fringes, the branching ratio of reflection and transmission is adjusted to 1:2

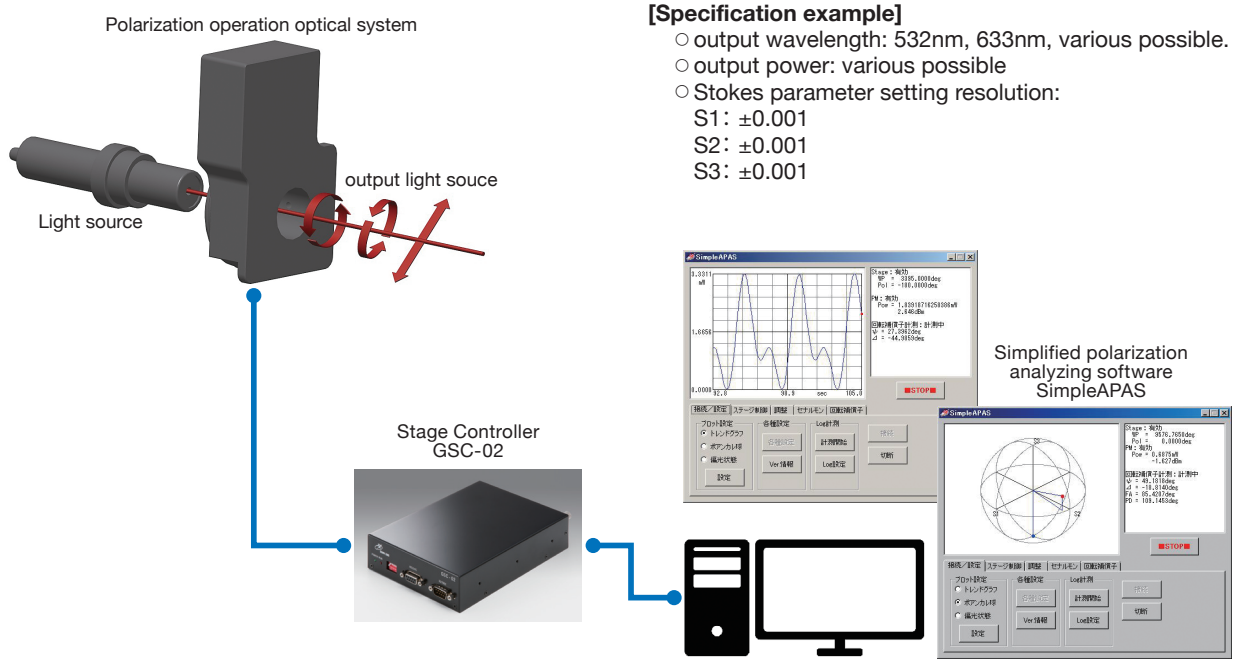
Product Name	Part Number	Quantity	Optical Axis Height [mm]
Dielectric Plate Beam splitters	**PSM33-30C05-10W-550**	1	
Mirror Holder	**MHG-MP30-NL**	1	25
ϕ20 Post Holder	**PS20-20**	1	20
D-TOP Base Plate	**DBSP-1**	1	0
Optical Axis Height			45

APAS: Automatic Polarization Analysis System

[Basic configuration example]
It is a sample configuration of optical system which is the base of various measurement and analysis. It will be also provided the model selection and recombination of the basic configuration to match the performance requirements and purpose of the customer.

Light source of arbitrary polarization

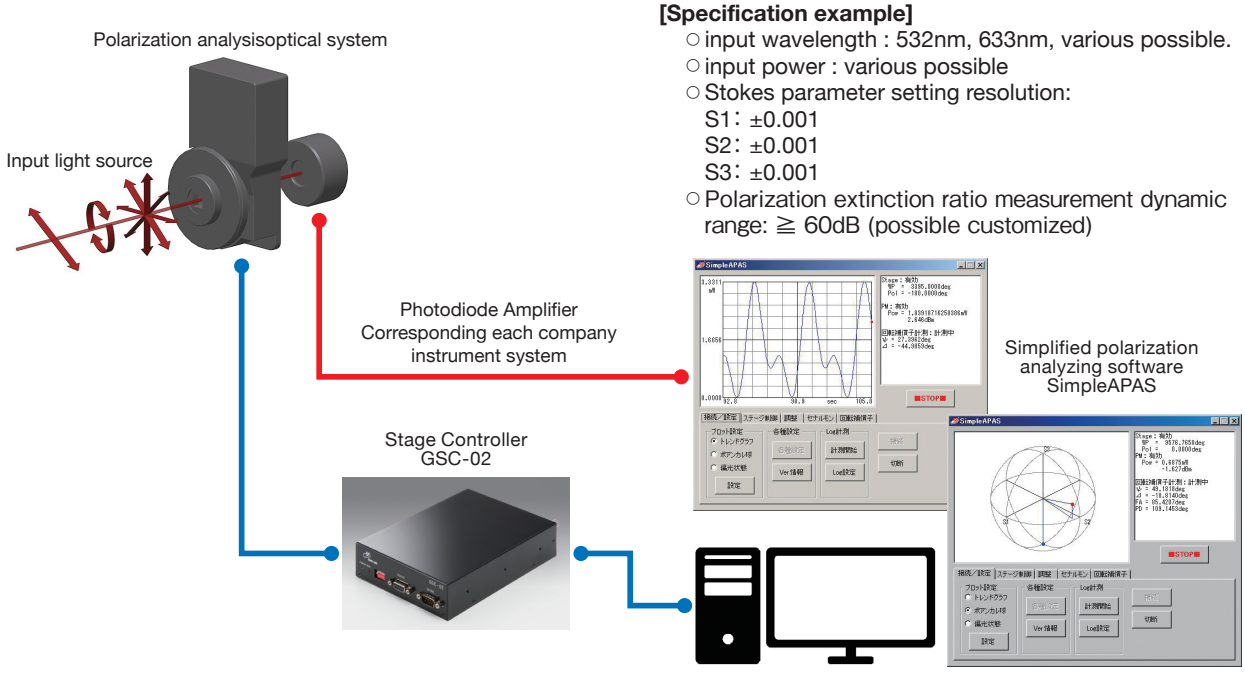
- It is the light source which outputs in an arbitrary polarization state by installing the polarization operation optical system at the rear end of light source.
- All settings related to the polarization are possible such as setting the direction of rotation, aspect ratio and each polarization state of linear polarization, circular polarization and elliptical polarization.
- Because of the dynamic control by PC is possible, it can be used to evaluate the sample of polarization dependence, and polarization compensation in the subsequent stage after passing through the device.



[Specification example]
- output wavelength: 532nm, 633nm, various possible.
- output power: various possible
- Stokes parameter setting resolution:
  S1: ±0.001
  S2: ±0.001
  S3: ±0.001

Polarization measurement system

- It is a measurement system for measuring and analyzing the polarization state of the input light source.
- It can be made a calculation all of the stokes parameter S0 - S3 of the input light source polarization.



[Specification example]
- input wavelength : 532nm, 633nm, various possible.
- input power : various possible
- Stokes parameter setting resolution:
  S1: ±0.001
  S2: ±0.001
  S3: ±0.001
- Polarization extinction ratio measurement dynamic range: ≧ 60dB (possible customized)

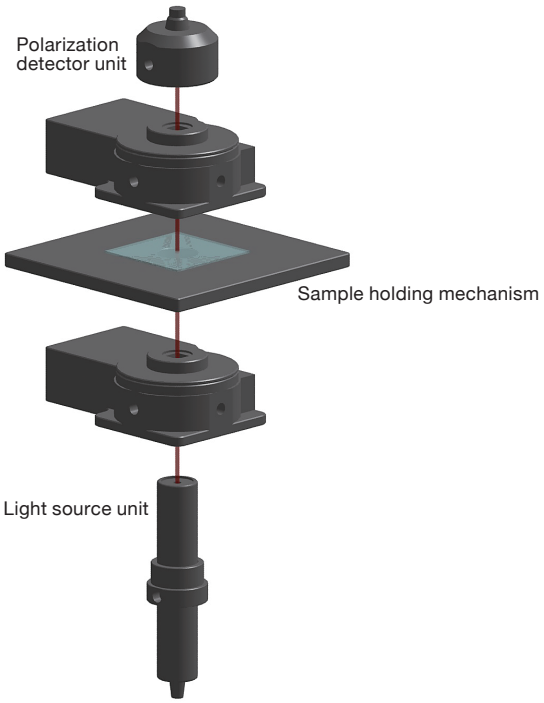
Optical Characteristics Measurement System

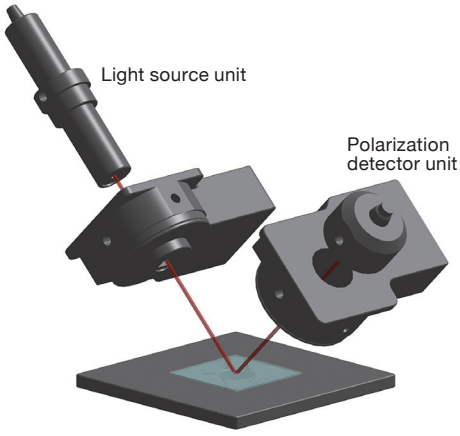
- A composition of system with light source unit, sample holding mechanism and detector unit.
- Configuration that combines a reflective and transmissive type is also possible.
- Reflective type is also usable as an ellipsometer addition to polarization characterization system.

[Specification example]

- ○ Adaptive wavelengths: 532nm, 633nm and others
- ○ Retardation resolution: 0.23deg (*)
- ○ Retardation accuracy: 0.23deg (*)
- ○ Extinction measurement range: ≧60dB (*)

* A model with higher specification is available



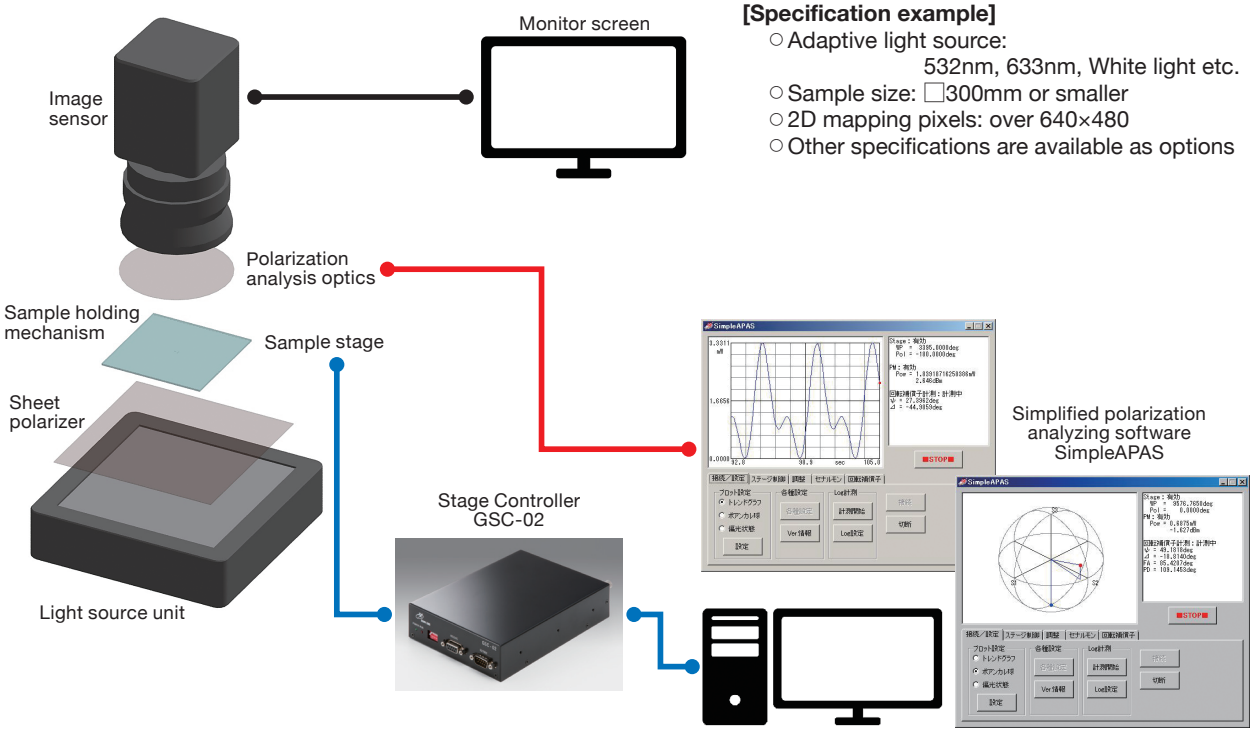


Optical Strain Measurement System

- A device for visualizing internal stress-strain such as striae and processing strain.
- It is possible to capture the video of the distribution of the stress-strain.

[Specification example]

- ○ Adaptive light source: 532nm, 633nm, White light etc.
- ○ Sample size: □300mm or smaller
- ○ 2D mapping pixels: over 640×480
- ○ Other specifications are available as options



APAS: Automatic Polarization Analysis System

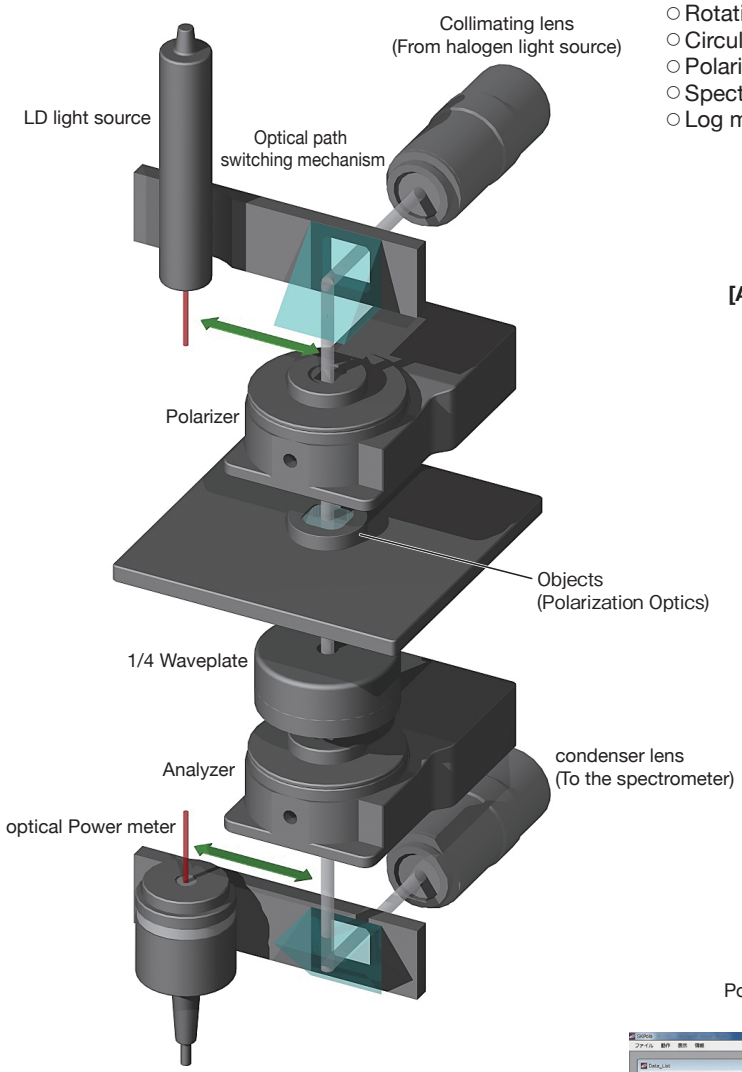
[Circularly polarized light measuring device]
As a measuring device and production equipment, we also provide the production of dedicated device. To achieve both cost reduction and quality and stable performance by using a catalog standard products in main part, in addition, we propose according to customers' applications to improve the throughput by adding the necessary unit as a dedicated machine.

Circularly polarized light measuring device

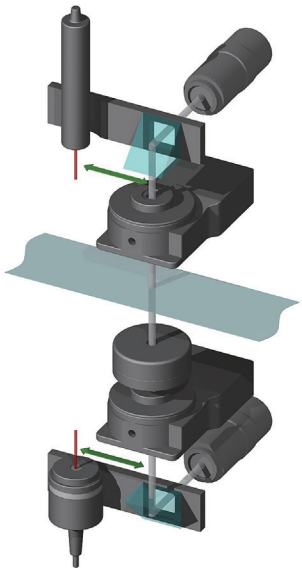
- It is a system for the characterization of polarization optics in transmission optical system of the vertical.
- It can be evaluated all the main characteristics by only setting the sample to the sample bench.
- The spectral phase difference, spectroscopic data of the polarization parameters, and transmission polarization ratio of the polarizer can be measurable.

[Specification example]

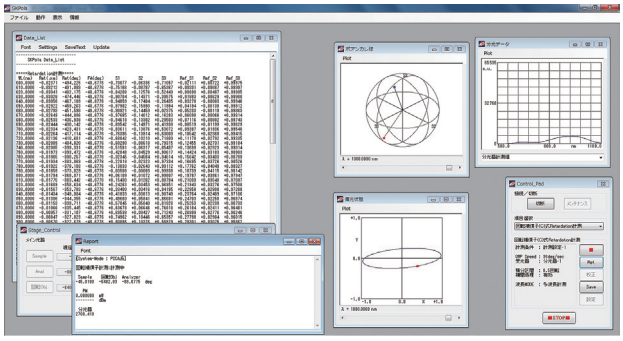
- ○ Automatic adjustment of polarization optics axis direction
- ○ Senarmont type phase difference measurement
- ○ Rotation compensation operator expression polarization measurement
- ○ Rotating analyzer-type polarization measurement
- ○ Circularly-polarized light contrast measurement
- ○ Polarizer transmission polarization ratio measurement
- ○ Spectral transmittance measurement
- ○ Log measurement



[Application example for film type sample]



Polarization measurement system control software
SKPola



Polarization component

We will provide the holder and various polarizing element as a device for assembling and research and experimental applications. From a wide range of line-up, you can choose in accordance with the objectives, specifications and budget.

Polarization Beam splitters

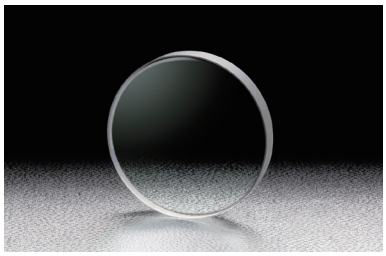
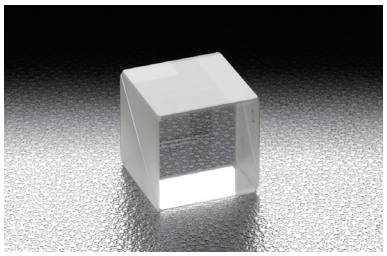
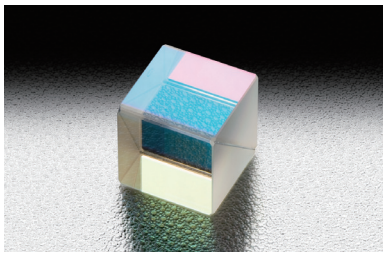


Plate Type Reference B074

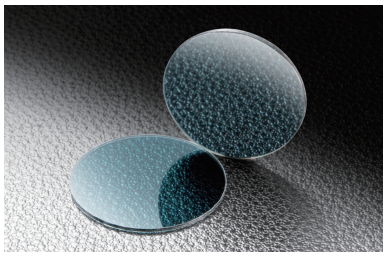


Cube Type Reference B079



High Power Laser Type Reference B076

Polarizer

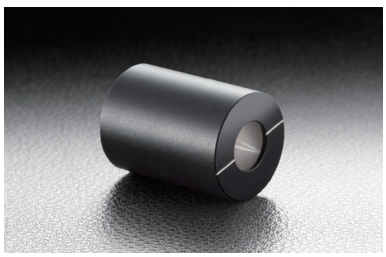


Plastic polarizer Reference B102

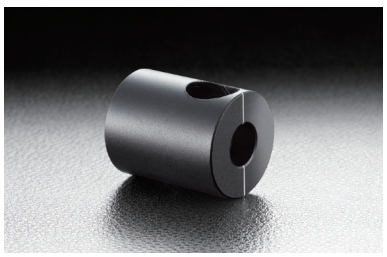
Sheet Polarizer Reference B099

Rochon Polarizer Reference B098

Polarization Prisms



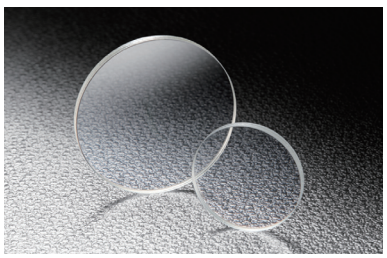
Glan Thompson Prisms Reference B094



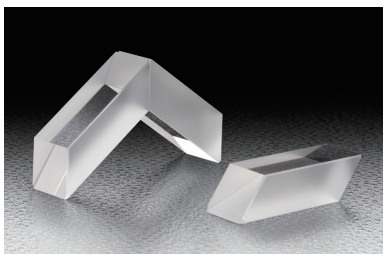
Glan Laser Prisms Reference B095

Waveplates

Quartz Waveplates Reference B087



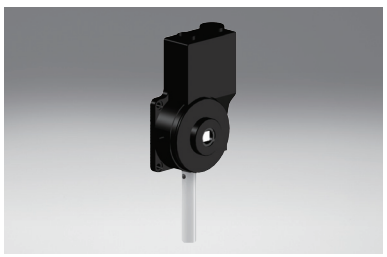
Mica Waveplates Reference B090

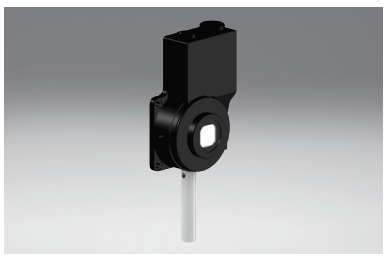


Fresnel Rhomb Waveplate Reference B091

Holders

Polarizer Holders Reference C046





Rotation Motorized Polarizer Holder

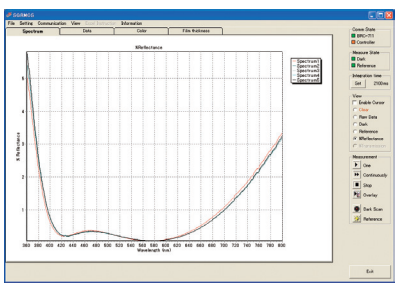
Reflection Measurement Systems | SGRM-200R

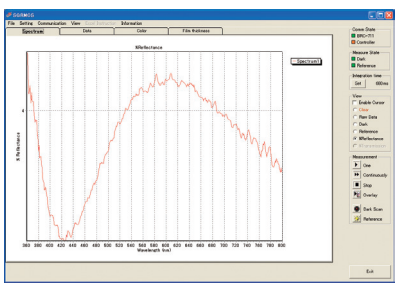
This device allows the measurement of spectral reflectivity in fine areas and curvature surfaces. For ultra-slim samples such as lenses with curvature or functional sheets, high-speed and high-accuracy measurement of spectral reflectivity can be realized without being affected by reflected light on the rear surface.

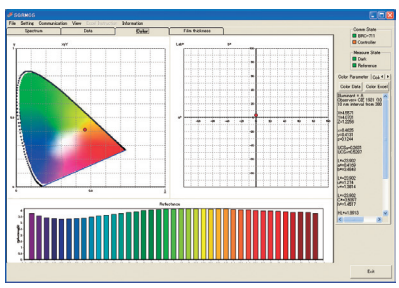
- Allows efficient reflected light into the spectrophotometer fast measurement even at the low reflection samples.
- Blocks reflections from rear surface, giving accurate measurements without special preparation of the sample.
- The 512 element linear PDA, 16bit A/D converter and USB 2.0 interface contributes to high-speed processing.
- The light-harvesting system from fiber to slit and alignment mechanism improve the usage rate of the light amount to maximum, enabling very speedy and highly reproducible measurement.
- Samples a very small area (ϕ50μm) of the surface being measured, making measurement of curved lens surface and coating uniformity possible.
- Data to be saved to an Excel spreadsheet.
- Multiple measurement results to be overlaid for comparison. Fast, Good/Bad analysis

Specifications	
Part Number	**SGRM-200R**
Wavelength Range	360 – 800nm
Object Side N.A,	0.13 (When used with 10× objective lens)
Measurement Area	about ϕ50μm (When used with 10× objective lens)
Measurable Surface Curvature of Object	–2R – –∞, +2R – ∞
Measurement Reproducibility	±0.1% (360 – 450nm) ±0.01% (450 – 750nm) ±0.1% (750 – 800nm)
Readable Resolution	1nm
Measurement Time	Several seconds (depends on the sampling time)
Outer Dimension (Main unit)	(W)230 × (H)530 × (D)460mm
Operating Temperature	18 – 28°C
Ambient Humidity	≦ 60% (Non-condensing)

Reflection Rate Graph Image







Objective Lens

Objects Lens PLAPON1.25×

Measurement range: ϕ400μm

Objects Lens UPLFLN10×

Measurement range: ϕ50μm
for Thin plate: 0.4mm

Objects Lens UPLFLN20×

Measurement range: ϕ25μm
for Thin plate: 0.3mm

Standard Diffusing Reflector

WS-3

* Be used as a standard when measuring the color

Optical Color Glass

V-30

* With calibration data

Spectroscope

Standard specification: wavelength 360 – 800nm

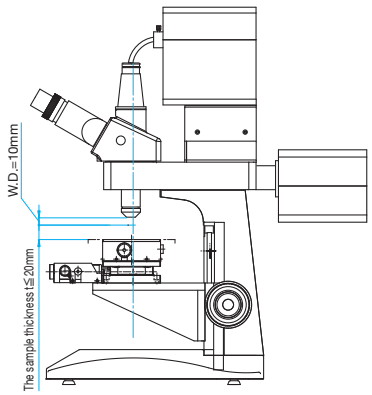
2.0 Mega-pixels USB2.0 Camera

SKDCE-3 Reference A026

Super C Mount Zoom Adapter

NY-CZ
(×0.35 – ×0.7)

Motorized XY Stage for Remote Inspection



Option Parts

Halogen lamp (5 pcs set)
SGRM-200-PCL919

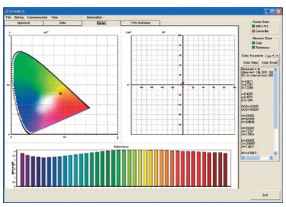
Low reflection rate reference plate
SGRM-G03-09001A OFB-25C05
(rear surface: ground)

High reflection rate reference plate
TFAN-25C05-1-Rdata
(Standard item + Data)

* An electronic data (R%, 330 – 1100nm, angle of incidence 5°, interval 1nm) is attached.

Reflection Measurement Software

- High precision measuring of thin target.
- Measument data overlay function (MAX 64 times)
- Installed the interface function of motorized stage as standard
- Installed the interface software for camera
- Installed export function of data in Excel format
- Installed Good/Bad analysis function
  (be able to set Good/Bad criteria by each 1nm wavelength)
- Added film thickness measuring function.



Controller

2 axis stage controller
SHOT-302GS Reference G102

2 axis stage controller
GSC-02 +
Joystick Terminal
SJT-02 Reference G099, G106

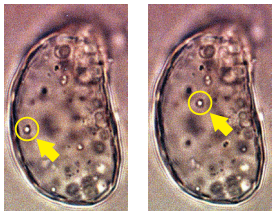
Micro manipulation System | MMS

Catalog Code W2001

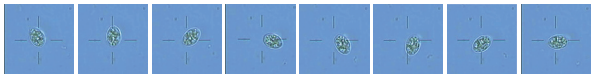
Cells and biomolecules can be freely handled with an optical hand.

- Utilize laser beam to freely trap or remove cells, biomolecules, and etc. with non-contact method.
- 1064nm near-infrared laser trapping minimizes the damage on cells and biomolecules.
- A particle of 1μm can also be trapped.
- Two-beam optical system enables multiple operations such as stretching the micro-object or pressing them each other. Two beams can also be individually controlled.
- Vibration Isolation Table(option) provides you high stability in operation.

■Granule in a living cell is optically trapped.



■Altering orientation of a cell with 2 beams

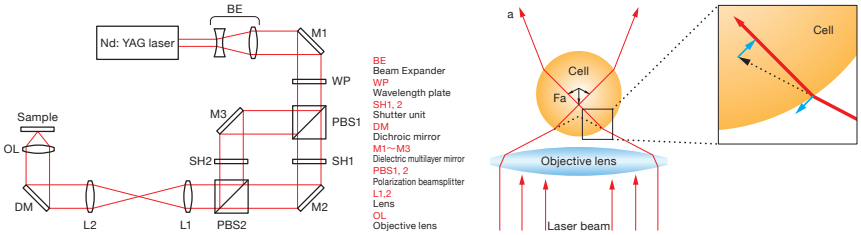


Application Systems
Optics & Optical Coatings
Holders
Bases
Manual Stages
Actuators
Motoeized Stages
Light Sources
Index
Microscope Unit
Alignment
Interferometers
Inspection/ Observation
Bio-photonics
Laser Processing

Laser Optical tweezers

It is a means of wrapping cells or particles or etc., using radiation pressure of light occurred in laser irradiation to an object, like seizing an object with a pair of tweezers, which was first thought up by Arthur Ashkin in 1970s. Recent applications of its feature, the feasibility in trapping particles of μm order, to engineering science, medical science, biology, etc., have been reported and it made the development of this device be watched with keen interest. Sigma Koki's Micro Manipulation System has realized introduction of laser in optical unit by application of Opticsand Opto-mechanics produced by SIGMA KOKI which enabled space-saving and high efficiency.

◎Optical System for 1laser 2beam type



2laser 2beam type / Trapping Laser 2W

Part Number	Equipment Configuration
MMS-1064-2000-2L/2M/2S	Manual 2axis / Shutter
MMS-1064-2000-2L/1M1E/2S	Motorized 2axis / Shutter
MMS-1064-2000-2L/2E/2S	Manual 1axis & Motorized 1axis / Shutte

1laser 2beam type / Trapping Laser 2W

Part Number	Equipment Configuration
MMS-1064-2000-1L/2M/2S	Manual 2axis / Shutter
MMS-1064-2000-1L/1M1E/2S	Motorized 2axis / Shutter
MMS-1064-2000-1L/2E/2S	Manual 1axis & Motorized 1axis / Shutter

1laser 1beam type / Trapping Laser

Part Number	Equipment Configuration
MMS-1064-2000/1M	Manual
MMS-1064-2000/1M/1S	Manual / Shutter
MMS-1064-2000/1E/1S	Motorized / Shutter

*1 Above lists do not include prices for microscope and vibration isolation table.
*2 Please inform us of the maker and part number(model) of your existing microscope before purchase.
*3 Some models of microscopes may not be supported. Please contact the sales department.

Use in combination with Epi-Fluocescence microscopy

Introduction of trapping laser into microscopes allows continued usages of existing Camera Port or Fluorescent Lamp Port. This enables laser trapping while doing Total Internal Reflection Fluorescence Microscopy or Epi-illumination Microscopy.
For customized Dichroic mirrors for different trapping laser or observation wavelength, please contact our International Sales Division.

* All sorts of operating methods and optical systems can be selected to suit sample and research purpose. Supplementary attachment of a piezo actuator, etc is available to operate beams, in addition to manual or motorized control.
* Use in combination with Motorized XY stage for microscope (optional) makes various operations possible.

Reference A060, A061

Laser Optical tweezers - Mini type | LMS

A new lineup of Laser Optical tweezers - Mini type is now available.

- 1064nm near-infrared laser trapping minimizes the damage on cells and biomolecules.
- Laser irradiation is fixed to center of field of view in microscope.
- Downsized optical unit is directly connectable to the microscope port.
- Optional microscope motorized stage system broaden the variety of biological applications.

Advantages of Mini type Laser Optical tweezers

◎Entry model with competitive prices.
◎Directly connected to the existing microscope port, which offers great extensibility.
(Please inform us of the manufacturer and model number of your existing microscope when inquiring.)
◎Upgrading to the full-featured Micro Manipulation System is available.
(Reutilizing the 2W trapping laser and the internal optical elements are possible. Please contact to the sales for details.)
◎Laser optical tweezers are usuful tool for various types of feasibility test and applications of near-infrared irradiation.

Mini Optical tweezers / Trapping Laser 2W

Part Number	Equipment Configuration
LMS-M1064-2000	Basic model / without shutter
LMS-M1064-2000/1S	Basic model / with shutter
LMS-M1064-2000/E	Electric focus model / without shutter
LMS-M1064-2000/E/1S	Electric focus model / with shutter
LMS-AD-NI-BP *1	Adapter for Nikon (Ti, TE2000 supported)
LMS-AD-OL-BP *1 *2	Adapter for Olympus microscopes (IX73, 83 supported)
LMS-AD-OL-RP *1	Adapter for Olympus microscopes right side port (IX71, 81 supported)

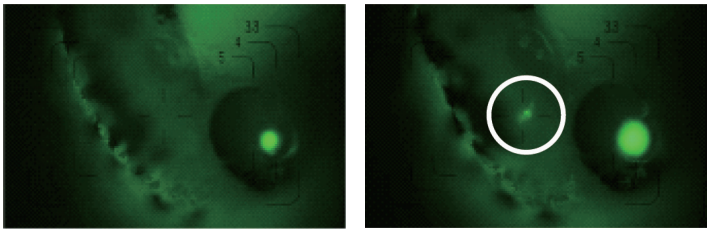
*1 Please select an adapter that fits your microscope.
*2 Some models of microscopes may not be supported. Please contact the sales department.

IR-LEGO Infrared Laser-Evoked Gene Operator | IR-LEGO Systems Catalog Code W2003

A system to trigger expression of desired genes under biological microscope.

- Localized heating feature with 1480nm near infrared laser
- Simultaneous application of laser irradiation and fluorescent observation is possible
- Add-on type system for existing upright/inverted fluorescence microscopes
  (Adaptive models: Olympus BX51, BX61, IX71, IX81 Nikon Ti, TE2000)

■Result of Gene Expression Check Test



Before laser irradiation | After laser irradiation

[Photo credit]
Dr. Shunsuke Yuba, National Institute of Advanced Industrial Science and Technology (AIST)
Dr. Yasuhiro Kamei, National Institute for Basic Biology (NIBB)

What is IR-LEGO ?

Infrared Laser-Evoked Gene Operator (IR-LEGO) is developed as the world's first technology by consolidated research team led by Dr. Shunsuke Yuba at National Institute of Advanced Industrial Science and Technology (AIST). This is a technique to induce specified genes that are under the control of a heat shock promoter at defined time, by heating single cells that consist of genetically-modified organisms, with an infrared laser. IR-LEGO could be adopted to all the genetically-modified experimental organisms that the heat shock promoters function and the internal focus of infrared laser are available. Because of its high efficiency and reproducibility, and less detrimental effect from laser, IR-LEGO is a new and prospective tool for future gene function analysis.

IR-LEGO System (Set up on a vibration isolated table)

Part Number	Equipment Configuration
IR-LEGO-1000	1W, CW laser/Electric focus
IR-LEGO-490	490mW, CW laser/Electric focus
IR-LEGO-490/P	490mW, CW and pulsed laser/Electric focus
IR-LEGO-200	200mW, CW laser/Electric focus
IR-LEGO-200/P	200mW, CW and pulsed laser/Electric focus

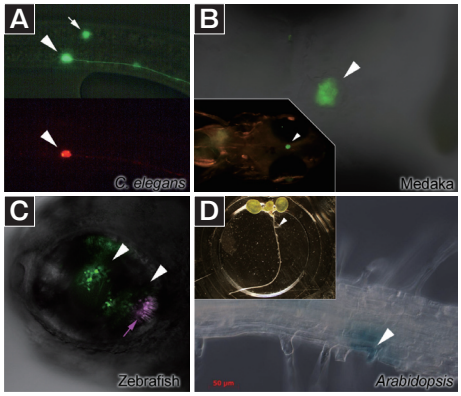
IR-LEGO Mini (Direct installation to a biological microscope)

Part Number	Equipment Configuration
IR-LEGO-1000/mini	1W, CW laser
IR-LEGO-1000/mini/E	1W, CW laser/Electric focus
IR-LEGO-490/mini	490mW, CW laser
IR-LEGO-490/P/mini	490mW, CW and pulsed laser
IR-LEGO-490/P/mini/E	490mW, CW and pulsed laser/Electric focus
IR-LEGO-200/mini	200mW, CW laser
IR-LEGO-200/P/mini	200mW, CW and pulsed laser
IR-LEGO-200/P/mini/E	200mW, CW and pulsed laser/Electric focus
LMS-AD-NI-BP	Adapter for Nikon microscopes (compatible with Ti and TE2000)
LMS-AD-OL-BP	Adapter for Olympus microscopes (compatible with IX73 and IX83)
LMS-AD-OL-RP	Adapter for Olympus microscopes (compatible with IX71 and IX81)

*1 Specify the manufacturer and model of your microscope.
*2 Some models of microscopes are not compatible. Contact our International Sales Division for more information.
*3 Carrying-in and adjustment fees for system setup are required separately.
*4 The electric focus models are equipped with a function to correct the laser focal position based on chromatic aberration of each objective lens (preset system).

Applications of IR-LEGO for Various Species

Utilizing a strain (cell) that carries a heat shock promoter driven transgene, an infrared (IR) laser is irradiated at parts indicated by white arrowhead marks.



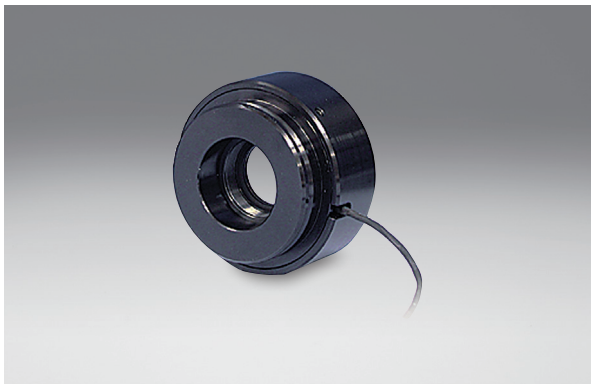
A Example of induced RFP expression by IR laser irradiation on the GFP marked neuron of the nematode (*C. elegans*) The white arrow indicate a neuron not irradiated. The red flourescence by RFP is obtained on a neuron and neuraxon that irradiated by a laser (white arrowhead).
[Photo credit] Dr. Motoshi Suzuki & Dr. Shin Takagi, Nagoya University

B Example of induced GFP expression by IR laser irradiation on a pineal gland of medaka (*O. latipes*) larvae.
[Photo credit] Dr. Tomonori Deguchi, National Institute of Advanced Industrial Science and Technology (AIST)
Dr. Yasuhiro Kamei, National Institute for Basic Biology (NIBB)

C Example of induced Kaede expression by IR laser irradiation (2 points) on a part of zebrafish (*D. relio*) retina. Kaede is partially photoconverted after its expression (purple arrow).
[Photo credit] Dr. Mariko Itoh & Dr. Kohei Hatta, University of Hyogo

D Example of induced GUS expression by IR laser irradiation on lateral root tips of Arabidopsis (*A. thaliana*).
[Photo credit] Dr. Hiroko Urawa & Dr. Kiyotaka Okada, National Institute for Basic Biology (NIBB)

Electromagnetic shutter systems for microscope illumination. Compatible with incorporation into an existing microscope, and easy to install and remove. These shutter systems are best suited for microscopy such as multi-point time lapse microscopy and fluorescence microscopy.



- A release shutter with the aperture size of ϕ24mm is utilized.
- Both one axis and two axis controllers are available.

Specifications

Part Number	Equipment Configuration	System Configuration
BSH2-RIX-2-1	Olympus IX71, IX81, IX73, IX83 (common to transmitted/epi-illumination)	2-axis controller + Release 1 axis
BSH2-RIX-2-2	Olympus IX71, IX81, IX73, IX83 (common to transmitted/epi-illumination)	2-axis controller + Release 2 axes
BSH2-RIX-1-1	Olympus IX71, IX81, IX73, IX83 (common to transmitted/epi-illumination)	1-axis controller + Release 1 axis
BSH2-RTi-2-1	Nikon Ti, TE2000 (for epi-illumination)	2-axis controller + Release 1 axis
BSH2-RTi-1-1	Nikon Ti, TE2000 (for epi-illumination)	1-axis controller + Release 1 axis
BSH2-TTi-2-1	Nikon Ti (for transmitted illumination)	2-axis controller + Release 1 axis
BSH2-TTi-1-1	Nikon Ti (for transmitted illumination)	1-axis controller + Release 1 axis
BSH2-R/TTi-2-2	Nikon Ti (for epi-illumination and for transmitted illumination)	2-axis controller + Release 2 axes
BSH2-TTE-2-1	Nikon TE2000 (for transmitted illumination)	2-axis controller + Release 1 axis
BSH2-TTE-1-1	Nikon TE2000 (for transmitted illumination)	1-axis controller + Release 1 axis
BSH2-R/TTE-2-2	Nikon TE2000 (for epi-illumination and for transmitted illumination)	2-axis controller + Release 2 axes

*1 Please check the model and connection type of your microscope.
*2 These sets come with a shutter connecting cable. (Extension cables are sold separately. Please contact our International Sales Division for more information.)
*3 No interface cable for connection with a PC is included. (Communication cables are sold separately. Please contact our International Sales Division for more information.)
*4 It is also available the production of systems not listed in the catalog.

Shutter Controllers

Catalog Code W4046

<1-axis type: SSH-C1RA>
- Compact controllers that can be operated at hand.
- It is equipped with a standard interface that allows external TTL signal control.
- A foot switch and cable for TTL are optionally available.

<2-axis type: SSH-C2B> Reference C067
- The timer mode allows adjustment of shutter speed, or setting and control of repetitive operations.
- The demo software “SSH-C2B Demo Software” enables easy PC control. (download is available from our website)

Specifications

Part Number	SSH-C1RA	SSH-C2B
Type	1 axis	2 axes
Control	Bulk	Bulk/Timer
Interface	TTL	RS232C/USB/TTL
External Dimensions [mm]	(W)80 × (H)40 × (D)80 *Except for protrusions	(W)220 × (H)75 × (D)180 *Except for protrusions
Weight [kg]	0.3	1.8
Power Supply (Rated)	DC24V *Special AC adapter	DC24V *Special AC adapter
Accessories	AC adapter, TTL, I/F plug, instruction manual	AC adapter, instruction manual

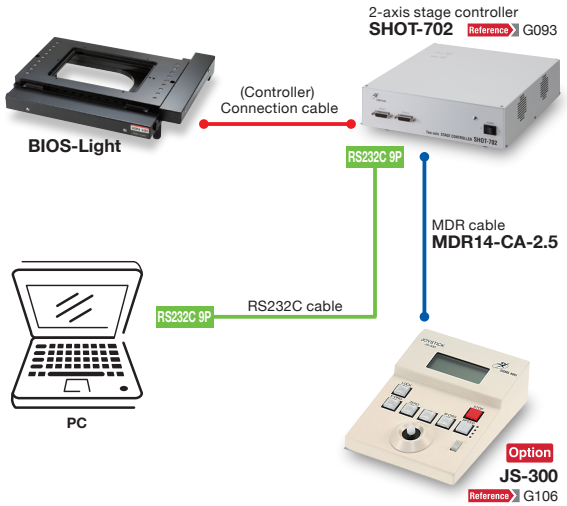
* The appearance and specifications of the product may change without prior notice.

BIOS-Light for inverted microscopes | BIOS-LT-S

Catalog Code W2004

We provide XY stages for microscopes at low prices.

- Comes equipped with sample software for controlling PCs.
- A joystick (option) can be connected to it.
- Can also be used as built-in center aperture type stage.



Specifications	
Travel Distance [mm]	X axis: 110 Y axis: 75
Resolution [μm]	0.1
Positional Repeatability [μm]	±1
Maximum Load Capacity [N]	29.4(3.0kgf)
MAX Speed [mm/sec]	5
Interface	RS232C
Applicable Microscope	Olympus: IX series Nikon: Ti,TE series

Guide

- Pulse control in microstep system
- Content of basic set: XY automatic stage, 2-axis stage controller, connection cable
- An optional joystick controller has a 4-stage speed switching function

Attention

- Please inform us of the maker and part number(model) of your existing microscope before purchase.
- Some models of microscopes may not be supported. Please contact the sales department.

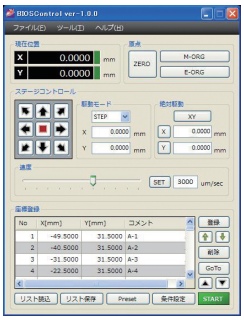
Various Options	
Part Number	Product Name
BIOS-SH-A	Micro plate holder
BIOS-SH-ASP	Micro plate holder
BIOS-SH-B	Universal sample holder
JS-300	Joystick controller
MDR14-CA-2.5	Joystick connection cable
RS232C/STR-3	RS232C cable

Sample Holder

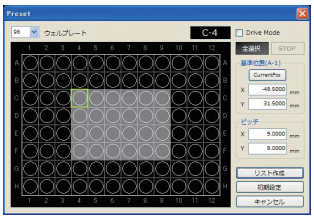
BIOS-SH-A

BIOS-SH-B

Sample Software



Main



operation screen for micro plate

BIOS-Light (for inverted microscopes) Basic set	
Part Number	Equipment Configuration
BIOS-L101T-S	Stage + SHOT-702 + Connection cable (basic set)

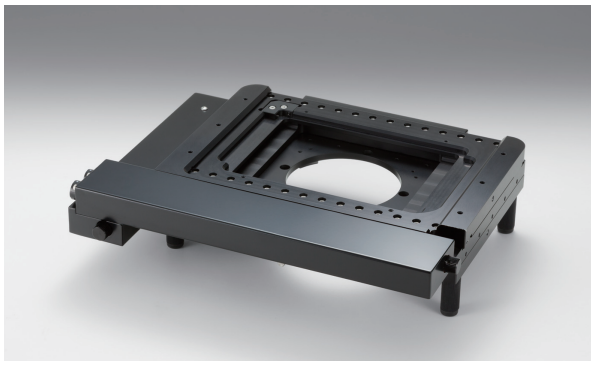
Microscope option set: Olympus IX series	
Part Number	Equipment Configuration
BIOS-L101T-S/AO	Basic set + Adapter
BIOS-L101T-S/AO/J	Basic set + Adapter + Joystick

Microscope option set: Nikon Ti, TE2000 series	
Part Number	Equipment Configuration
BIOS-L101T-S/AN	Basic set + Adapter
BIOS-L101T-S/AN/J	Basic set + Adapter + Joystick

BIOS-Light for upright microscope | BIOS-LS-S

Catalog Code W2031

We provide XY stages for microscopes at low prices.



- Comes equipped with sample software for controlling PCs.
- A joystick (option) can be connected to it.
- Can also be used as built-in center aperture type stage.

upright microscope

Specifications

Travel Distance [mm]	X axis: 110 Y axis: 75
Resolution [µm]	0.1
Positional Repeatability [µm]	±1
Maximum Load Capacity [N]	29.4(3.0kgf)
MAX Speed [mm/sec]	5
Interface	RS232C
Applicable Microscope	Olympus: BX series Nikoc: 80i, 50i, E600 Carl Zeiss: Axioplan2

Guide

- ▶Pulse control in microstep system
- ▶Content of basic set: XY automatic stage, 2-axis stage controller, connection cable
- ▶An optional joystick controller has a 4-stage speed switching function

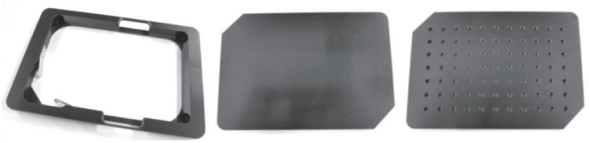
Attention

- ▶Please inform us of the maker and part number(model) of your existing microscope before purchase.
- ▶Some models of microscopes may not be supported. Please contact the sales department.

Various Options

Part Number	Product Name
BIOS-SH-ASP	Micro plate holder
BIOS-SH-DF	Flat plate
BIOS-SH-DF4	Flat plate
JS-300	Joystick controller
MDR14-CA-2.5	Joystick connection cable
RS232C/STR-3	RS232C cable

Sample Holder



BIOS-SH-APS BIOS-SH-DF BIOS-SH-DF4

BIOS-Light (for upright microscope) Basic set

Part Number	Equipment Configuration
BIOS-L101S-S	Stage + SHOT-702 + Connection cable (basic set)

Microscope option set: Olympus BX series

Part Number	Equipment Configuration
BIOS-L101S-S/AO	Basic set + Adapter
BIOS-L101S-S/AO/J	Basic set + Adapter + Joystick

Microscope option set: Nikon 80i, 50i

Part Number	Equipment Configuration
BIOS-L101S-S/AN1	Basic set + Adapter
BIOS-L101S-S/AN1/J	Basic set + Adapter + Joystick

Microscope option set: Nikon E600

Part Number	Equipment Configuration
BIOS-L101S-S/AN2	Basic set + Adapter
BIOS-L101S-S/AN2/J	Basic set + Adapter + Joystick

Microscope option set: Carl Zeiss Axioplan2

Part Number	Equipment Configuration
BIOS-L101S-S/AZ	Basic set + Adapter
BIOS-L101S-S/AZ/J	Basic set + Adapter + Joystick

Motorized XY Stage System for microscopes | BIOS

**Applicable to various microscopes using penetrated illumination (LED illumination) and epi-illumination.
Efficient in all sorts of sample inspections and image acquisitions.
Feedback control by built-in optical linear scale substantializes high accuracy in positioning.**

Application Systems
Optics & Optical Coatings
Holders
Bases
Manual Stages
Actuators
Motoeized Stages
Light Sources
Index
Microscope Unit
Alignment
Interferometers
Inspection/ Observation
Bio-photonics
Laser Processing

Motorized XY stage system for inverted microscopes | BIOS-T series

Catalog Code W2005

Highly accurate motorized stage, Easily mountable on your existing microscope.

- Applicable to various lines of inverted microscopes.
  (Olympus: IX71･IX81･IX70･IX73･IX83, Nikon: TE2000･Ti, and Leica: DMI)
- Convert your existing manual stages into precisely-positioning motorized stages.
- Outstanding in Time-lapse fluorescence observation system.

▲Thin standard type

▲Microplate-compatible type

▲Microplate-compatible type

Standard type (Compatible microscopes: Olympus IX71, IX81, IX70, IX73, IX83 Nikon TE2000, Ti)

Part Number	Resolution [μm]	Travel [mm]	Stage Controller	Joystick Controller	Feedback function
BIOS-406T	0.01	30 (±15)	FC-501G	BJ-02G	○
BIOS-206T	0.1		FC-101G		○
BIOS-106T	0.1		SC-101G		×

Accessories: Middle seat (Olympus), annular ring (Nikon)

Microplate-compatible type (Compatible microscopes: Olympus IX71, IX81, IX70, IX73, IX83 Nikon TE2000, Ti Leica DMI)

Part Number	Resolution [μm]	Travel [mm]	Stage Controller	Joystick Controller	Feedback function
BIOS-425T	0.01	X-axis 110 Y-axis 75	FC-501G	BJ-02G	○
BIOS-225T	0.1		FC-101G		○
BIOS-125T	0.1		SC-101G		×
BIOS-229T	0.1		SHOT-302GS	JS-300	○

Accessories: BIOS-SH-A, BIOS-SH-B
* Applicable to sample holders apart from standard accessories. Please contact us.

▶Regarding travel of and applicability to unlisted microscopes, please contact our International Sales Division.

■Option code

BIOS-□□□T
- OL
- NI
- LI

OL : Olympus IX series
NI : Nikon Ti, TE2000 series
LI : Leica DMI series

Guide

▶Please inform us of the maker and part number (model) of your existing microscope before purchase.

Interchangeable Sample Holder (option)

BIOS-SH-A

BIOS-SH-B

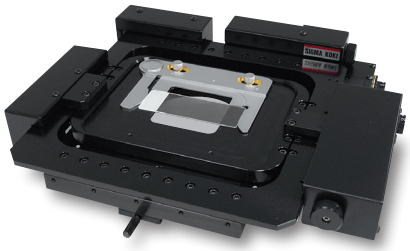
- When using Microplate-compatible type, universal sample holders can be attached or detached for observation purpose of plate or slideglass.

Motorized XY stage system for upright microscope | BIOS-S series

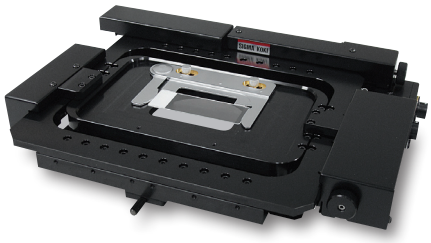
Catalog Code W2006

Highly accurate motorized stage applicable to slideglasses and schales.

- Applicable upright microscopes: Olympus BX51･BX61 Nikon 80i･50i･E600
- Convert your existing manual stages into precisely-positioning motorized stages.
- Thin Type and Thin Long Travel Type are available, considered space for illumination condenser lens.



▲Thin standard type



▲Thin long travel type

▲Long travel type

Thin Standard type (Compatible microscopes: Olympus BX51, BX61 Nikon 80i, 50i, E600 Carl Zeiss Axioplan2)

Part Number	Resolution [μm]	Travel [mm]	Stage Controller	Joystick Controller	Feedback function
BIOS-205S	0.1	30 (±15)	FC-101G	BJ-02G	○
BIOS-105S	0.1		SC-101G		×

Accessories: Adapter for microscope, exclusive spring clip

Thin long travel type (Compatible microscopes: Olympus BX51, BX61 Nikon 80i, 50i, E600 Carl Zeiss Axioplan2)

Part Number	Resolution [μm]	Travel [mm]	Stage Controller	Joystick Controller	Feedback function
BIOS-235S	0.1	X-axis 60 Y-axis 30	FC-101G	BJ-02G	○
BIOS-135S	0.1		SC-101G		×

Accessories: Adapter for microscope, exclusive spring clip

Long travel type (Compatible microscope: Olympus BX51 Nikon E600)

Part Number	Resolution [μm]	Travel [mm]	Stage Controller	Joystick Controller	Feedback function
BIOS-415S	0.01	60 (±30)	FC-501G	BJ-02G	○
BIOS-215S	0.1		FC-101G		○
BIOS-115S	0.1		SC-101G		×

Accessories: Adapter for microscope and software for stage control
* Please be aware of that occasional condenser inteference occurs.

■Option code

BIOS-□□□S

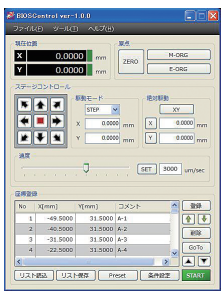
- **OL**
- **NIA**
- **NIB**
- **ZE**

OL : Olympus BX series
NIA : Nikon E600
NIB : Nikon 80i, 50i
ZE : Carl Zeiss Axioplan2

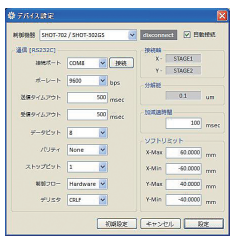
Guide

▶Please inform us of the maker and part number (model) of your existing microscope before purchase.

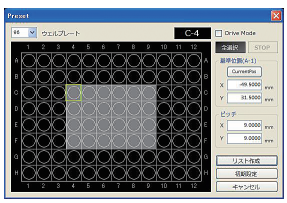
Sample Software for Simple Stage Control (BIOSControl)



Main



Device Setting



Preset

Guide

▶Sample programs are available for download from our website.
BIOSControl
(SHOT-702/302GS, FC-101G/501G, SC-101G)
Micro-Manager (FC-101G/SC-101G)

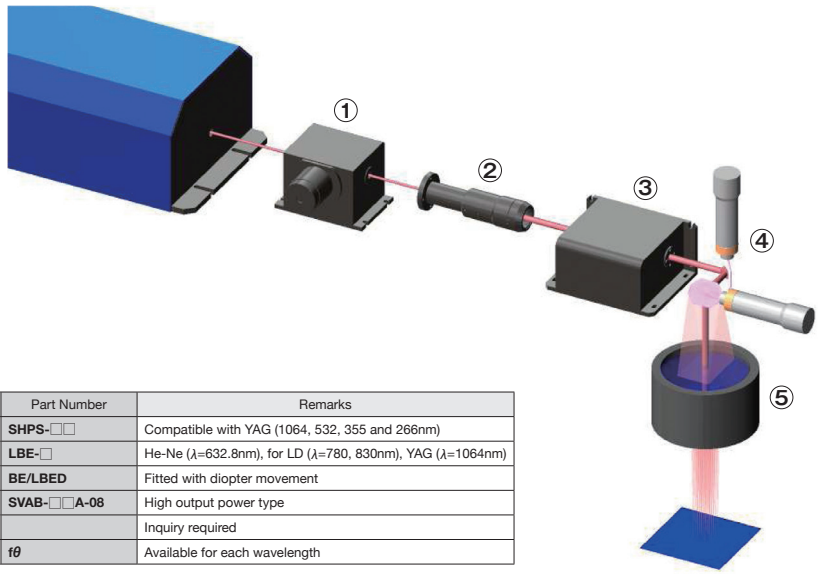
Laser Processing Systems

Scan optical system and Focusing optical system

For the maskless processing, it can do direct drawing processing on the basis of the data like CAD. It is usually classified as scan optical system and focusing optical system. (There is also a hybrid scanning that combines both).

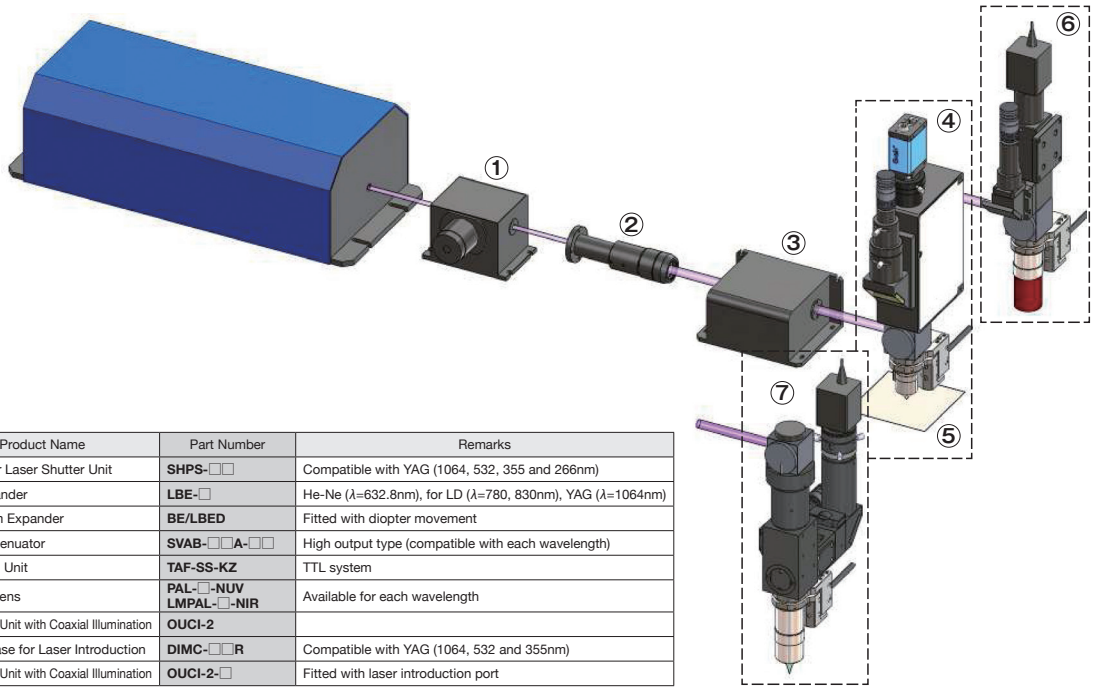
	Scan optical system	Focusing optical system
Scanning method	Galvano scan	Stage scan
Scanning speed	high	low
Scanning area	narrow	wide
Focusing method	fθ Lens	Objective Lens
Focusing spot diameter	few 10μ – few 100μ	submicron – few 10μ
Death of focus	deep	shallow

[Scan Type]



	Product Name	Part Number	Remarks
①	High Power Laser Shutter Unit	**SHPS-□□**	Compatible with YAG (1064, 532, 355 and 266nm)
②	Beam Expander	**LBE-□**	He-Ne (λ=632.8nm), for LD (λ=780, 830nm), YAG (λ=1064nm)
	Laser Beam Expander	**BE/LBED**	Fitted with diopter movement
③	Variable Attenuator	**SVAB-□□A-08**	High output power type
④	Laser Scanning system		Inquiry required
⑤	fθ Lens	**fθ**	Available for each wavelength

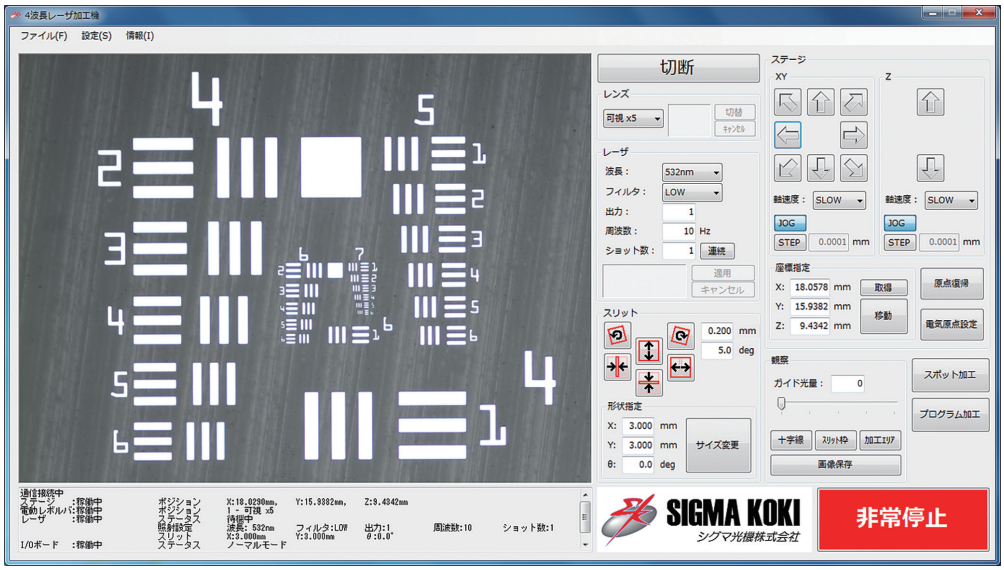
[Focusing System (with Observation System)]

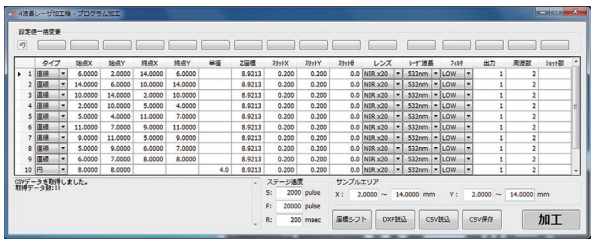


	Product Name	Part Number	Remarks
①	High Power Laser Shutter Unit	**SHPS-□□**	Compatible with YAG (1064, 532, 355 and 266nm)
②	Beam Expander	**LBE-□**	He-Ne (λ=632.8nm), for LD (λ=780, 830nm), YAG (λ=1064nm)
	Laser Beam Expander	**BE/LBED**	Fitted with diopter movement
③	Variable Attenuator	**SVAB-□□A-□□**	High output type (compatible with each wavelength)
④	Auto Focus Unit	**TAF-SS-KZ**	TTL system
⑤	Objective Lens	**PAL-□-NUV LMPAL-□-NIR**	Available for each wavelength
⑥	Observation Unit with Coaxial Illumination	**OUCI-2**	
	Dichroic Case for Laser Introduction	**DIMC-□□R**	Compatible with YAG (1064, 532 and 355nm)
⑦	Observation Unit with Coaxial Illumination	**OUCI-2-□**	Fitted with laser introduction port

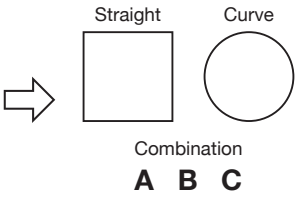
Processing software

It is a software that can set processing pattern and area on the screen while observing the position of processing by camera.
It integrates the set of wavelength switching and irradiation condition of multiple laser, switching of the objective lens, and control of the stage.
It corresponds to drawing CAD data like DXF and to mass production line from prototype applications.



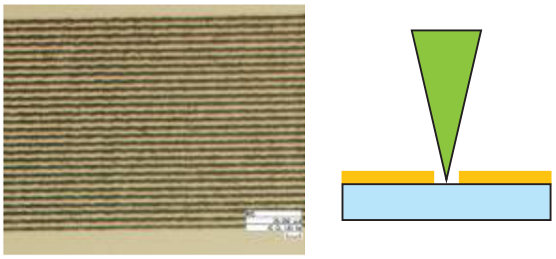


- **Program Operation**
  Stage operation by specifying coordinates
  On Off operation for the laser irradiation
  Easy processing by reading a CSV file
- **Software Joystick**
  Continuous movement
  Step movement

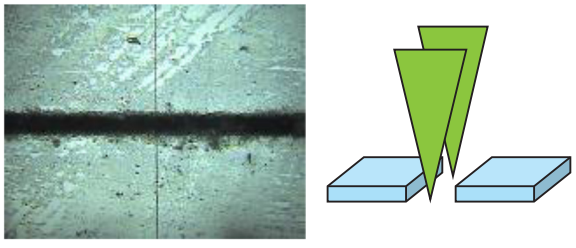


Applications

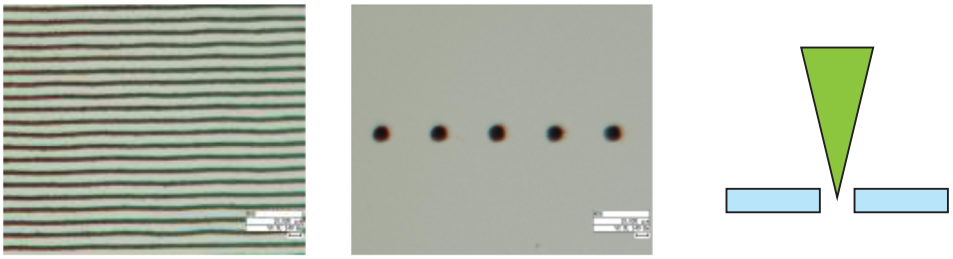
● Removing metal thin film of 10μm or less



● Cutting silicon wafer of about 100μm thickness



● Cutting metal and ceramic of 100 – 500μm thickness, drilling (φ100μm –)



Laser Processing Systems

Shutter for high power laser

Safely interrupt the optical path by the high-power laser mirror and beam.

Specifications	
Part Number	**SHPS-□□**
Wavelengths [nm]	266, 355, 532, 1064
Clear aperture [mm]	ϕ8
Corresponding Output	about 20W
Laser Damage Threshold	5J/cm^2 (@266nm) – 28J/cm^2 (@1064nm)
On-Off Speed	about 200ms

Variable attenuator

Light quantity of the high-power laser can be continuously variable by PBS and wavelength plate

Specifications	
Part Number	**SVAB-□□A-OB**
Wavelengths [nm]	266, 355, 532, 1064
Clear aperture [mm]	ϕ4
Corresponding Output	20W
Laser Damage Threshold	1.0J/cm^2 (@266nm) – 5.1J/cm^2 (@1064nm)
Transmission Range	2 – 93% (@532nm)

Laser beam expander unit

By lens configuration of the air gap, it is possible to correspond to high-power laser and be strict collimation adjustment in diopter correction mechanism.

Specifications	
Part Number	**BE/LBED series**
Wavelengths [nm]	266, 355, 400 – 700, 1064
Laser Damage Threshold	1.4J/cm^2 (@266nm) – 4J/cm^2 (@1064nm)
Magnification	×2 – ×21(@400 – 700nm)
Incident Clear Aperture[mm]	ϕ1.7

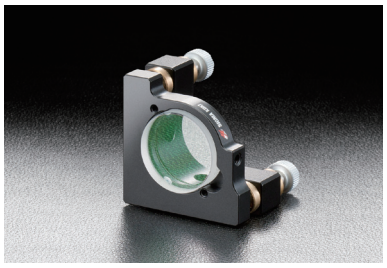
Auto focus unit

By built-in laser sensor, it enables high-speed tracking even for transparent object such as films or glasses.

Specifications	
Part Number	**TAF-SS-OBL-3**
Objective Lens	2× – 100×
Camera	C-mount CCD camera (element size 2/3″ or less)
Travel	3mm
Trace Range (Track Range)	2×, 5×, 10× : ±1.5mm 20× : ±500μm 50× : ±250μm 100× : ±100μm
Repeatability (Focus)	±6.0μm (5×), ±1.0μm (10×), ±0.5μm (20×, 50×, 100×)

Surface accuracy guarantee mirror

Guaranteed surface accuracy in integrated holder, ideal for built-in locking mechanism



Reference B016

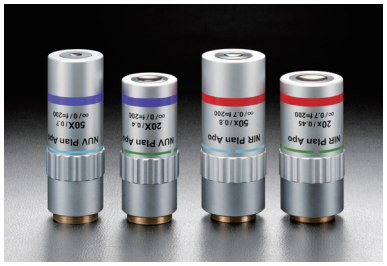
fθ lens

Lineup in each wavelength, scanning area and focal length

Reference B186

Objective lens

For from DUV to the near-infrared and for various processing laser



Reference B192

Barrel unit + laser introduction block

Observation barrel of optimal coaxial epi-illumination for the positioning of the micro-machining

Reference A018

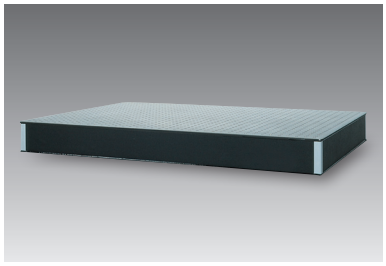
Motorized stage

Plentiful lineup from high precision type to high rigidity long stroke.

Reference G032 –

Base

High rigidity base series to support the stable performance



Reference D012 –

Galvano unit

Drawing high speed laser of high quality reducing the jitter and wobble

* it is available to assembly for each company's galvanometer. Please contact to our international sales division.

Power Supply Series

This is the power supply (supporting CW and pulse) for driving the laser diode (LD). The power supply for driving a Peltier element and cooling unit all-in-one type required for driving LD is also part of our lineup.

■**Simple Operation**
Electric current limit setting and integrated time check can be done from a handle.

■**Electric current limit settings**
Maximum electric current can be set in parameter. It prevents LD damage deriving from malfunction.

■**LD Terminal Short Function**
Function to short between anode and cathode of LD when power is switched OFF is equipped. By doing it,LD can be protected from static electricity, etc.

■**Goggle compatible white display**
Letters can be displayed in white. Superior in legibility even when using laser-protect goggle.

■**Instantaneous power failure detection**
LD can be safely protected by shutdown operation after instantaneous power failure detection, while there is electric current running after power has been cut off.

■**Various Alarm Functions**
Alarm with screen display equipped enables prompt identification of cause and repair.

■**LD operation intergrator**
LD operation intergrator function equipped, which is essential for LD lifecycle management. Zero reset available for LD replacement.

■**Full Interface**
Interface equipped for setting in a system. Freely externally operable.

Power supply for LD driving | SLD

Catalog Code W2025

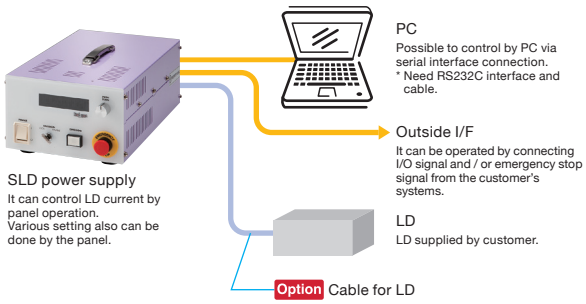
Precise digital control environment-friendly highly efficient Laser Diode power supply

- Developed specifically for LD driving.
- Various functions to protect LD.
- Various alarms such as instantaneous power failure etc..
- Can be controlled using the front panel and by commands from a PC connected via RS232C.
- Includes I/O (Input-Output) for interfacing to external devices and for emergency stop.
- Automatic Current Control for stable operation.

Guide

▶We do handle orders for manufacturing products with special specifications, which are not shown in the catalog.
Please contact our sales department.

System Configuration



SLD Series

Part Number	Max. output voltage [V]	Max. output current* [A]	Input voltage [AC V]	Apparent power [VA]
SLD0350	3	50	85 – 264	500
SLD0450	4	50	85 – 264	600
SLD0635	6.5	35	85 – 264	600
SLD03A0	3	100	85 – 264	800
SLD04A0	4	100	85 – 264	1000
SLD0670	6.5	70	85 – 264	1000
SLD1045	10	45	85 – 264	1000
SLD1338	13	38	85 – 264	1000
SLD06A0	6.5	100	170 – 264	1800
SLD1078	10	78	170 – 264	1800
SLD1365	13	65	170 – 264	1800
SLD2240	22	40	170 – 264	1800

* Minimum current value is approximately 5% of maximum output current.

Option ■Cable for LD

For 50A

Part Number	Cable Length [m]	Applicable Model
LD50-CA-05	0.5	SLD0350, SLD0450, SLD0635, SLD1045, SLD1338, SLD2240
LD50-CA-10	1.0	
LD50-CA-20	2.0	

For 100A

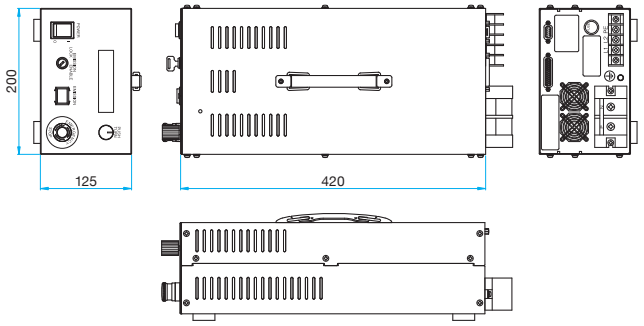
Part Number	Cable Length [m]	Applicable Model
LD100-CA-05	0.5	SLD03A0, SLD04A0, SLD0670, SLD06A0, SLD1078, SLD1365
LD100-CA-10	1.0	
LD100-CA-20	2.0	

Specifications	
Control method	High-frequency switching method for CW only
Output terminal block	M6
Current ripple	<0.1%RMS (for maximum output current) (Within the range of maximum output current x 10% or over)
Current setting accuracy	0.1A
Output current error	<1% (for maximum output current)
Linearity error	<1% (for maximum output current)
Output current temperature character	<0.03%/°C (for maximum output current)
Rise time*	1sec –
Fall time*	1sec –
Operation ambient temperature	0°C – 40°C
Storage ambient temperature	–20°C – 60°C
Ambient humidity	20 – 90%RH (No condensation)
External dimensions	(W)200 × (H)125 × (D)420mm (Excluding projections)
Interface	RS232C, emergency stop interlock, emission interlock, emission etc.
Accessory	Jumper connector AC100V cable (For apparent power 1000VA or less only)

* Please contact our International Sales Division to cut the Rise/Fall time.

Outline Drawing (Units: mm)

SLD Note) Apparent power of 1800VA applies to outlines



Power supply for LD driving (CW or pulse output) | SMD

Catalog Code W2026

Precise digital control and high efficiency power supply for laser diodes

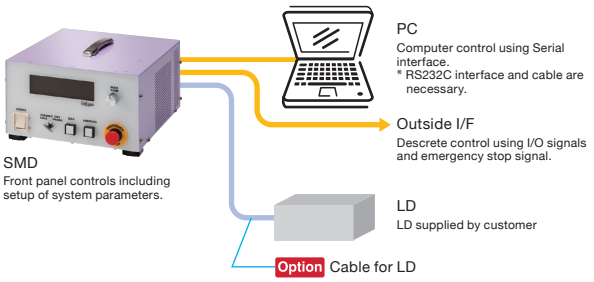
- Designed specifically as a laser diode power supply.
- Pulse or CW diodes can be driven.
- Many LD protection features are included.
- Equipped with various alarm detection systems such as instantaneous power failure detection.
- Fine resolution closed loop current control.
- Arbitrary wave output is available. (30 steps)
- Output can be carried out with an output input signal only.
- Bias control function for setting idle current.

Specifications		
Part Number		SMD
Voltage		4V
Output current		60A (Duty100%)
Output current (pulse)		120A (Duty<50%, pulse width <10ms)
Current ripple		<120mA (rms)
Startup time		<20μs (It depends on load)
Resolution of setting current		0.1A
Frequency		1Hz – 50kHz
Digits of setting frequency		3 digits
Minimum setting pulse width		0.01ms
Minimum setting duty		0.01%
Wave shape		Rectangular or arbitrary (30 steps)
Start emission trigger		Internally set or external input
Hour meter		Emission time
Output of current monitor		0 – 10V DC
Operation temperature		0°C – 40°C
Storage temperature		–20°C – 60°C
Humidity		20 – 90%RH (No condensation)
External dimensions		(W)250 × (H)140 × (H)330mm (Excluding projections)
Interface		RS232C, emergency stop input, current out enable input etc.
Accessories		Jumper connector, AC100V cable
Control mode	CW	Output a set constant or continuous current
	PULSE	Output a pulse current of set current and pulse width (or frequency)
	WAVE	Output an arbitrary wave (set up to 30 steps)
Control method	FRONT PANEL	All control modes are available only from the front panel
	SERIAL I/F	All control modes are available only with RS232C (serial communications)
	ANALOG	The output current is set by the voltage of the SIGNAL IN.
	MOD	The output frequency is set by the frequency of the EXT MOD
	GATE	Control emission on or off with GATE input.
Monitor output signal	SYNC OUT	The current frequency is output to SYNC OUT as a pulse.
	CURRENT MONITOR	The current is output to CURRENT MONITOR as a voltage.
Protection function		Power abnormal, Inside temperature abnormal, output open, External power voltage drop etc.
Fail-safe		Emergence stop,output permission key switch

Guide

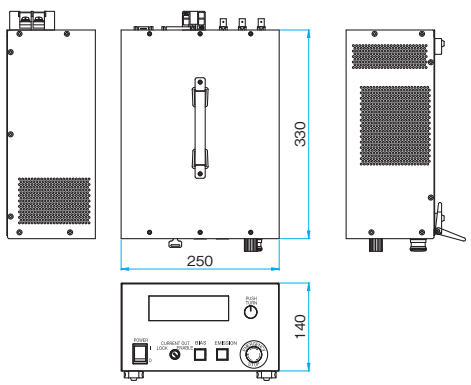
- We do handle orders for manufacturing products with special specifications, which are not shown in the catalog. Please contact our sales department.
- For a cable for the LD, please contact our company separately.

System Configuration



Outline Drawing (Units: mm)

SMD



Power Supply Series

Power supply for Peltier | STD/STDS

Catalog Code W2027

Precise digital control highly efficient power supply for peltier optics drive for low electric power and high-power lined up.

- Measures temperatures with a thermistor or platinum resistance temperature detector, and drives the Peltier device so that the measured temperature becomes the set value.
- Equipped with various alarm detection systems and auto tuning function.
- Temperature measurement accuracy is 0.01°C. Please use A/D inverter for 24bits.
- For the STD type, both a Pt100 and thermistor can be selected using the parameters.

Guide

▶We do handle orders for manufacturing products with special specifications, which are not shown in the catalog. Please contact our sales department.

Specifications for Each Model

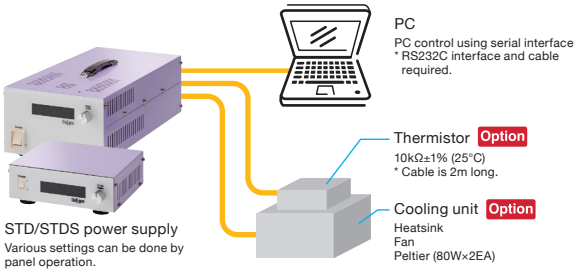
Part Number	Max. output voltage [V]	Max. output current [A]	Input voltage [AC V]	Apparent power [VA]
STDS*	4	1.6	85 – 264	100
STD3609	36	9	85 – 264	600
STD4813	48	13	85 – 264	1000

* STDS: Maximum output is 3W. Temperature sensor is by thermistor only.

Specifications

Measurement part	Applicable sensor	Thermistor or Pt100 (3-wire system) (STDS power supply is for thermister only.)
	Temperature setting accuracy	0.01°C
	AD Converter	24bit
Control part	Control method	Digital PID method
	Control range	–50°C – 150°C (according to sensor)
Operation ambient temperature		0°C – 40°C
Storage ambient temperature		–20°C – 60°C
Ambient humidity		20 – 90%RH (No condensation)
External dimensions	STD power supply	(W)200 × (H)125 × (D)420mm (Excluding projections)
	STDS power supply	(W)200 × (H)205 × (D)65mm (Excluding projections)
Interface		RS232C READY contact output

System Configuration



Option

Part Number	Product Name
TMS-1	Thermistor
CHU-1	Cooling unit

Cooling unit equipped power supply | SXD

Catalog Code W2028

This is a user friendly cooling unit equipped power supply for Laser Diode.

- Laser Diode driver
- Temperature of laser diode is kept at a certain point. (Peltier, its drive circuit, heat sink, and fan equipped.)
- Customized heat sink process can be done for laser diode
- High capacity heat sink and fan adopted will cool down LD under high temperature.
- Customer-supplied fiber couple laser diode is to be installed in this power supply.

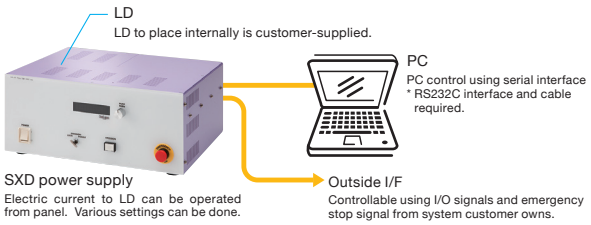
Guide

▶We do handle orders for manufacturing products with special specifications, which are not shown in the catalog. Please contact our sales department.

Example of Performance Specifications

Part Number	SXD
LD Max. output voltage [V]	3
LD Max. outout current [A]	50
Peltier driving voltage [V]	36
Peltier driving current [A]	9
Input AC voltage [V]	85 – 264
Apparent power [VA]	800

System Configuration



LD + Power supply for Photodiode driving | SPD

Catalog Code W2029

Low profile Laser Diode power supply with temperature controller.

- Constant current Laser Diode driver.
- Closed loop temperature controller with built in Peltier driver.
- Includes all essential functions to maintain SLD and STD's performance in a small, low cost package.
- Output currents of 50A and 100A.
- Temperature resolution is 0.01°C. Supports both Pt100 and thermistor as the temperature sensor.
- Peltier driver maximum power of 300W.

Part Number	SPD0350S	SPD03A0S
LD Max. output voltage [V]	3	3
LD Max. output current [A]	50	100
Peltier driving voltage [V]	36	36
Peltier driving current [A]	9	9
Input AC voltage [V]	Single phase 85 – 264	Single phase 85 – 264
Apparent power [VA]	800	1000

Specifications of the LD driving part

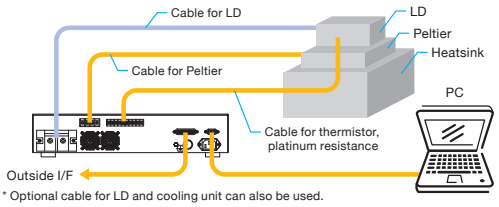
Control method	High-frequency switching method for CW only
Current ripple	Less than 0.1% RMS (FS) (However, it is in the range of more than maximum output current × 10%)
Current setting accuracy	0.1A
Output current error	<1% (for maximum output current)
Linearity error	<1% (for maximum output current)
Output current temperature character	<0.03%/C (for maximum output current)
Rise time*	1sec –
Fall time*	1sec –

* If you want to shorten the rise / fall time, please contact our company separately.

Guide

▶We can receive an order for manufacturing a product with special specifications, which is not shown in the catalog. Please contact the sales department.

System Configuration



* Optional cable for LD and cooling unit can also be used.

Specifications of the Peltier driving part

Measurement part	Applicable sensor	Thermistor or Pt100 (3wire system)		
	Accuracy	0.01°C	AD convertor	24bit
Control part	Control method	Digital PID system		
	Control range	–50°C – 150°C (depends on the sensor)		
Max. current		9A	Max. voltage	36V

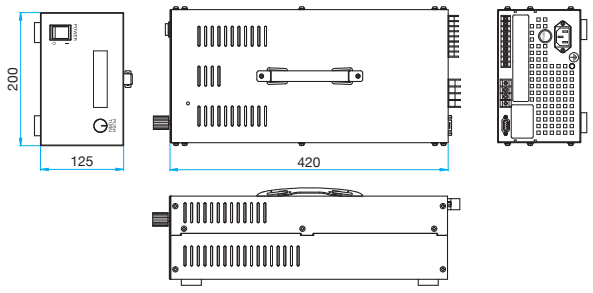
Specifications of SXD/SPD

Part Number	Cooling unit equipped power supply <SXD>	Power supply for Laser Diode + Peltier <SPD>
External dimensions	(W)413 × (H)177 × (D)390mm (Excluding projections)	(W)414 × (H)79 × (D)430mm (Excluding projections)
Operation ambient temperature	Depends on specifications	0° – 40°
Storage ambient temperature	–20°C – 60°C	
Ambient humidity	20 – 90%RH (No condensation)	
Interface	RS232C, emergency stop interlock, emission interlock, emission etc.	
Accessory	Jumper connector, AC100V cable	

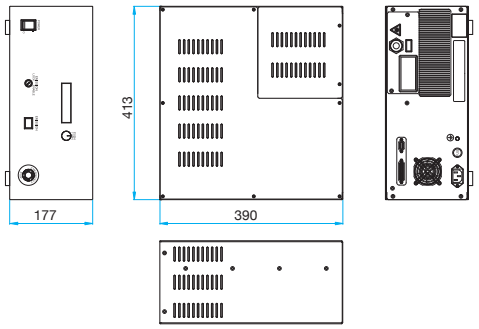
Outline Drawing

(Units: mm)

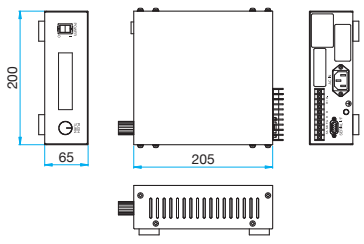
STD



SXD



STDS



SPD