The Polarization Analyzer SK010PA-... is a universal measurement and test system for free beam applications and polarization-maintaining fiber optics. It determines, e.g., the state of polarization (SOP) with all four Stokes parameters, the degree of polarization (DOP), and the ellipticity of the beam. The polarization state is displayed online on a Poincaré sphere and as a polarization ellipse.

The polarization analyzer connects to a USB 2.0 port of a standard computer. It does not need an additional power supply.

Sample applications are
- Laser beam coupling to polarization maintaining singlemode fibers [1] + [2]
- Free beam measurements [3]
- Adjustment and evaluation of quarter-wave plates [4]

Laser beam coupling and polarization maintaining fiber evaluation [1] + [2]
PM fibers maintain the polarization state of a linearly polarized input beam if the polarization direction is precisely aligned with either the slow or fast axis of the fiber [2]. Any discrepancies cause the state of polarization to fluctuate with temperature or with fiber placement.

The Polarization Analyzer SK010PA provides sophisticated procedures for the alignment of the incoming polarization direction to the PM fiber axis and for the measurement of the resulting Polarization Extinction Ratio (PER) [2]. Simultaneously, at the output side, the alignment of the connector key to the polarization axis of the emerging beam is measured [1].

Adjustment and evaluation of quarter-wave plates [4]
Quarter wave plates have to be adjusted at either +45 or -45 degrees to the polarization axis to achieve either left or right handed circular polarization. Fiber collimators of series 60FC-Q have an integrated quarter wave plate which can be rotated. The degree of left or right polarization is set with the polarization analyzer. Full rotation of the quarter wave plate produces a figure-of-eight on the Poincaré sphere.
Polarization Analyzer Series SK010PA-...
Multiple Wavelength Ranges 370 – 1600nm
• Interface: USB 2.0 • Power supply via USB

The polarization analyzer series SK010PA—... is a comprehensive universal measurement and test system for free beam applications and laser beam sources with polarization-maintaining fiber optics. It was developed for ease of use by experts in the field.

- USB 2.0-powered device
- Compatible with microscopes for free beam applications, FC-APC adapter included for fiber applications
- Determination of the state of polarization (SOP), with all four Stokes parameters, degree of polarization (DOP), ellipticity, etc.
- Display of the SOP on Poincaré sphere or as polarization ellipse
- Special routines for PM fiber evaluation and alignment

The polarization analyzer is a plug&play device and connects to the USB port of a standard computer. The compact design of SK010PA, with the communication and power supply via USB 2.0, enables its easy integration within existing systems. Alignments and measurements are performed rapidly. A real-time interactive display shows the state of polarization and the oscillating axis of the linearly polarized fraction, as well as the orientation of the connector key index when a fiber cable is attached.

The radiation coupled to the polarization analyzer is collimated, passed through a rotary quarter-wave plate and polarizer before being recorded by a photodetector. The software SKPolarization Analyzer evaluates the components of the Stokes Vector and displays them as points on the Poincaré Sphere and as a Polarization Ellipse.

The standard delivery includes the polarization analyzer, compatible with the microbench system as well as a fiber adapter for FC-APC connectors. Other connector adapters (FC-PC, DIN-AVIO, F-SMA, SMA-905 High Power 5°/8°, E2000) and/or microbench adapters for different diameter optics (12, 25, 32, 45 and 55 mm) can also be supplied.

Fiber end-caps (see pages 15ff) are used at high laser powers or shorter wavelengths to reduce the risk of fiber destruction or fiber photo-contamination.

Particular care is required when polarization maintaining fibers are to be equipped with end-caps. Any mechanical stress induces birefringence and disturbs the polarization maintenance.

The Polarization Analyzer SK010PA series provides optimized test and evaluation routines for standard and end-cap fibers.

For RGBV fibers operated in the full visible spectrum (400-680 nm, see page 20 ff) the type SK010PA-VIS is used.

Application RGBV fibers w. End Caps

Specification:
Type: Polarization Analyzer (Stokes) for fiber and free space applications
- Interface: USB 2.0 or 1.1
- Power Supply: via USB
- Fiber adapter: FC-APC (standard), optional: FC-PC, DIN, AVIO, and ST
- Free beam diameter: max. 4 mm
- Power range: 0.01 – 50 mW
- Sampling rate: 15 Hz
- SOP accuracy: ±0.2° on Poincaré sphere
- PER accuracy: 0.5 dB
- DOP accuracy: 5%
- Warm-up time: 5 min
- Housing: 40x70x82 mm (WxLxH)

Accessories (included):
- USB cable
- Adapter for fiber connectors of type FC-APC
- Adapter for post-mounting
- Analysis software: SK-Polarimeter for WINDOWS 7, Vista/XP (32/64 Bit)
- LabView® DLL included

Order Code: SK010PA - VIS

Order options for Polarization Analyzer Series SK010PA-...

Wavelength range:
- UV: 375 – 450 nm
- VIS: 400 – 700 nm
- NIR: 700 – 1100 nm
- IR: 1100 – 1600 nm

Application RGBV fibers w. End Caps
The initialization step is performed by calling the DLL, although earlier settings from previous measurements can also be kept. Continuous measurement by the polarization analyzer is started using the next function. Only one function call is required to obtain a measurement point from the constant stream of data produced by the polarization analyzer.

There is no restriction on the inclusion of any of the SKPolarimeter software features in a software project produced by or for a customer. This applies to all dialog boxes for the input of different parameters, all graphical displays and the measurement of the extinction ratio of the polarization-maintaining singlemode fibers.

Only three functions are needed from the SKPolarimeter DLL when integrating the Polarization Analyzer into a customized software application.

The initialization step is performed by calling the DLL, although earlier settings from previous measurements can also be kept. Continuous measurement by the polarization analyzer is started using the next function. Only one function call is required to obtain a measurement point from the constant stream of data produced by the polarization analyzer.

There is no restriction on the inclusion of any of the SKPolarimeter software features in a software project produced by or for a customer. This applies to all dialog boxes for the input of different parameters, all graphical displays and the measurement of the extinction ratio of the polarization-maintaining singlemode fibers.
**Configurations**

Standard configuration for connecting FC-APC fibers

Application: Measurement of laser beam polarization in a free beam setup

**Accessories**

Adapter for different fiber connectors (see below)

Adapter plate

For attaching beam optical components with Ø 19.5 mm system mount or with Ø 25 mm compatible with microbench systems

**Order Code**

- 48MC-MP-19.5
- 48MC-MP-25

Further adapters incl. rods, see page 62f

**Order Code**

- 48MC-6-30

**Interface: USB 2.0**

USB cable (max. 5 meters)

Control, data transfer, voltage supply from PC

PC or Notebook with USB 2.0

**Order options for Polarization Analyzer Series SK010PA-...**

**Order Code** SK010PA - VIS

**Wavelength range:**

- UV: 370 – 450 nm
- UVIS: 400 – 700 nm
- VIS: 450 – 800 nm
- NIR: 700 – 1100 nm
- IR: 1100 – 1600 nm

**Dimensions**

Adapter without optics

**Order Code**

- PA - FC-4

**Connector Type:**

- FC-4 (FC-APC, inclined coupling axis)
- FC-0 (FC-PC)
- AVIM-4 (inclined coupling axis)
- AVIM-0
- SMA-4 (High Power SMA-905, 8°)
- SMA-23 (High Power SMA-905, 5°)
- F-SMA-0
- E2000-4 (inclined coupling axis)
- E2000-0

**Wavelength range:**

- 01: 370 – 680 nm
- 02: 680 – 1050 nm
- 03: 1050 – 1650 nm

**Collimating optics:**

- A6.2S: 6.2 mm
- A11: 11 mm

**Order Code**

- 48MC-6-30