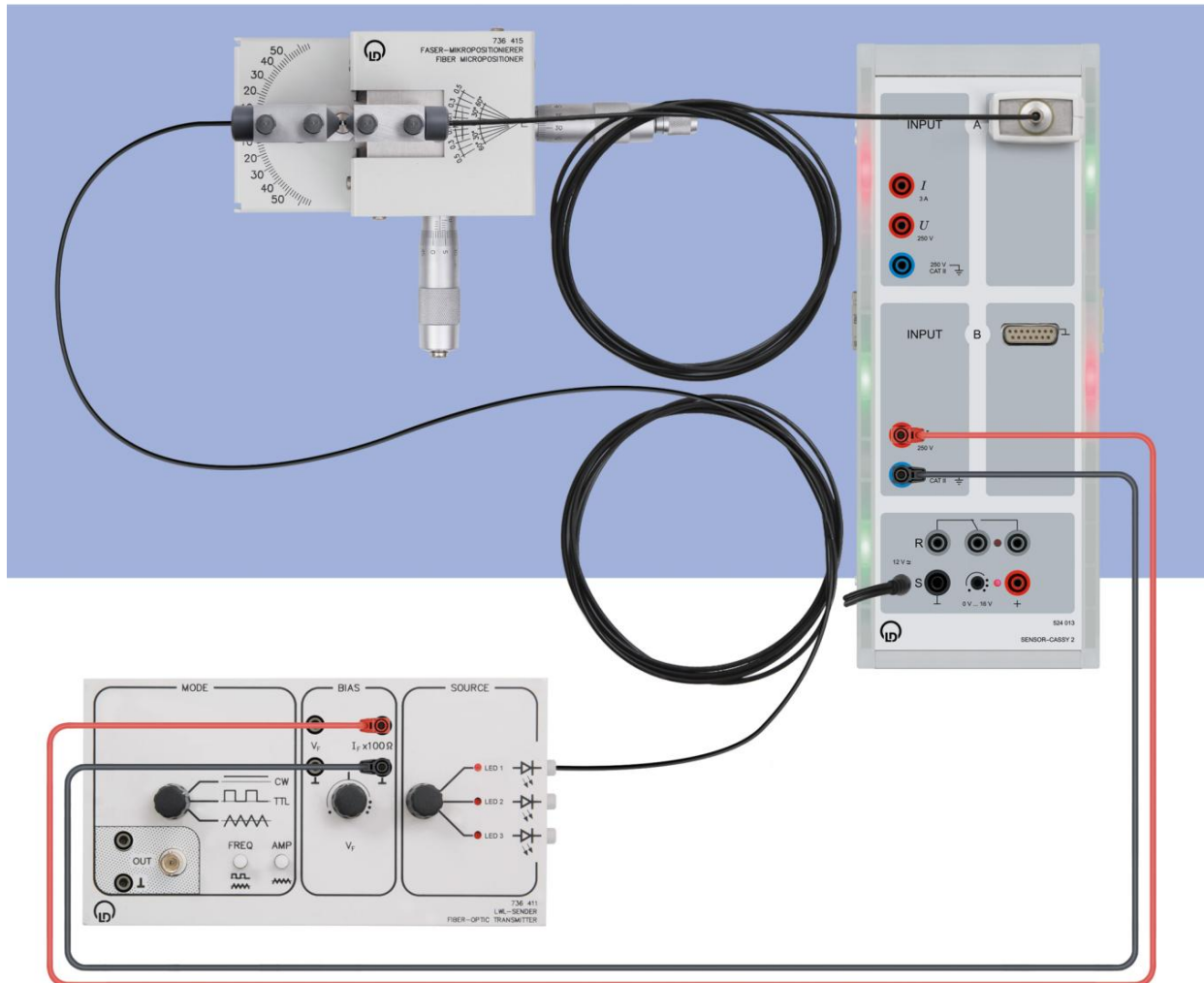


## T 7.2.6 Fiber Optics

### T 7.2.6.1 Experiments with PMMA-Fibers



Signal transmission with fiber optics.

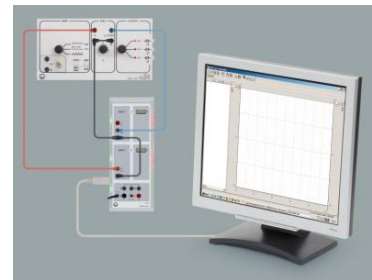
#### Topics

- Characteristics of LED, transimpedance amplifier
- Optical power of the transmitter LED
- Light guidance by fibers, numerical aperture
- Signal transmission with fiber
- Attenuation, fiber coupler, coupling losses
- Preparation of fiber ends
- Reduction of reflexion losses
- Undesired modes

## T 7.2.6 Fiber Optics

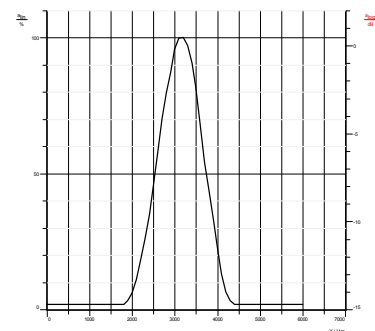
### T 7.2.6.1 Experiments with PMMA Fibers

Modern, line-bound telecommunications is increasingly using dielectric lines as the transmission medium of choice. Lines called optical fibers or waveguides have an enormous transmission capacity which is well-suited for the rapidly growing needs of world-wide communications. Apart from their use in communications engineering, optical fibers are also being used as sensors and in instrumentation technology. In contrast to conventional lines, optical fibers have a whole series of specific advantages including wire-tap security or safety in explosion-hazardous environments.



**CASSY Lab 2**  
Plotting the LED characteristics

This small system permits a well-rounded and complete demonstration of the subject. It includes investigations on the principles of light propagation in multimode optical fibers, the design of optic couplers, the properties of fiber optic transmitter and receiver elements. One particularly clever aspect of the system involves the exercises on preparing the fiber butt joints, and reflexion reduction through polishing. The plastic optical fibers (PMMA) used are robust and thus ideal for student experiments. Quantitative optical power measurements are carried out with the Optical Power Sensor S, cat. no. 524 512,



**CASSY Lab 2**  
Losses for transversal offset

The documentation is available as E-Book.

#### EQUIPMENT LIST T 7.2.6.1

#### Experiments with PMMA Fibers

Quantity	Cat.-no	Description
1	737 411	Fiber-optic Transmitter
1	736 412	Fiber-optic Receiver
1	736 415	Fiber-Micropositioner
1	736 416	Mode Scrambler
1	736 421	Set of Fiber-optic Waveguides and Accessories
1	736 429	Fiber-optic Microscope
1	524 013S	Sensor-CASSY 2 Starter
1	524 0512	Optical Power Sensor S
1	564 481	Book: Experiments with PMMA Fibers

A complete material list including accessories is available on request.

