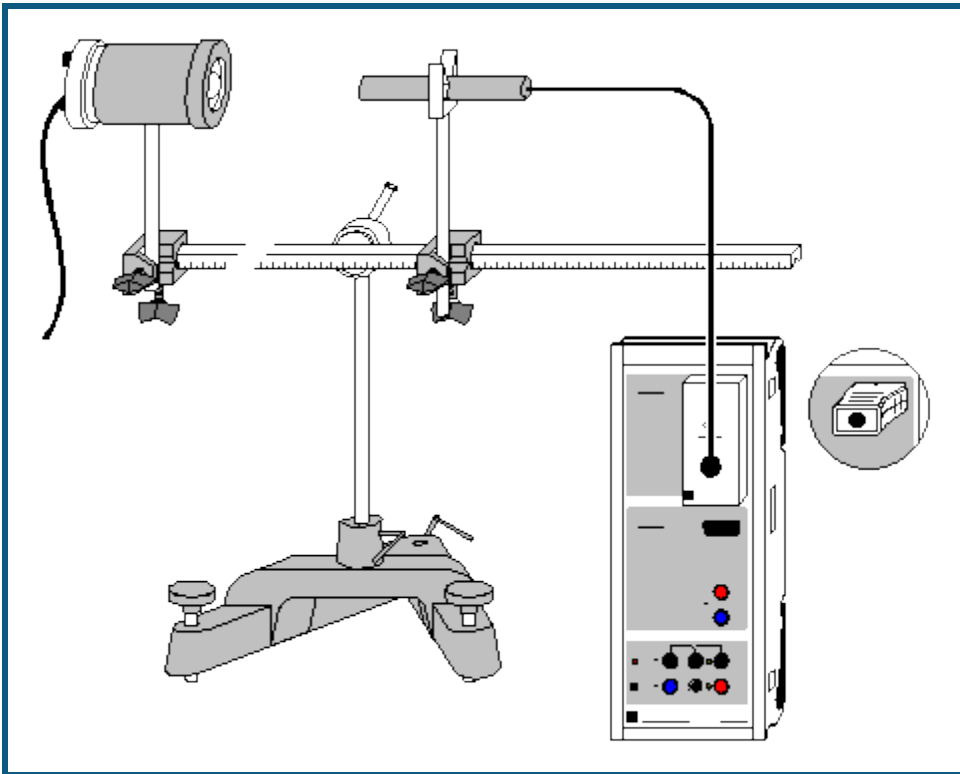# Optics

Light intensity
Quantities and measuring methods of lighting engineering

Determining the luminous intensity as a function of the distance from the light source - Recording and evaluating with CASSY

Description from CASSY Lab 2

For loading examples and settings, please use the CASSY Lab 2 help.

LD DIDACTIC

Inverse square law for light

can also be carried out with Pocket-CASSY and Mobile-CASSY

Experiment description

This experiment measures the illuminance E as a function of the distance d between an incandescent lamp filament and a lux sensor. It demonstrates that E is proportional to $1/d^2$.

Equipment list

1	Sensor-CASSY	524 010 or 524 013
1	CASSY Lab 2	524 220
1	Lux box or Lux adapter S	524 051(1)
1	Lux sensor	666 243
1	Lamp, 6 V, 30 W	450 51
1	Lamp housing	450 60
1	Voltage source, 6 V, 30 W, e.g.	521 210
1	Small optical bench	460 43
2	Leybold multiclamps	301 01
1	Small clip plug	from 590 02ET2
1	Perforated stand rod	590 13
1	Stand base, V-shape, 20 cm	300 02
1	PC with Windows XP/Vista/7/8	

Experiment setup (see drawing)

Set up the lamp housing with lamp and the lux sensor on the optical bench. Attach the lux sensor to the perforated stand rod using the small clip plug. Slide the movable insert of the lamp housing all the way in.

Carrying out the experiment

☐ Load settings
- Enter the correction factor F of your particular lux sensor (stamped on device) by opening Settings EA1, selecting **Correct,** entering the factor and clicking **Correct Factor**.
- Correct the background brightness with Settings EA1, **Correct**, **Correct Offset**.
- Switch on the lamp and set a distance of 10 cm between the lamp filament and the lux sensor.
- Enter this value in the table (click on the column d in the first table row and type in the value).

- Transfer the illuminance value to the table with ⏱.
- Increase the distance in steps, write the distances in the table and accept each new illuminance value with ⏱.

Evaluation

The measurements are displayed in the diagram while the measurement is running. To confirm the inverse square law for light, you can fit a [hyperbola $1/x^2$](#) to the diagram, or alternatively convert the x-axis to $1/x^2$ (click on the axis with the mouse) and fit a [straight line](#).

LD LD DIDACTIC