

Instruction Manual for the Lissajou Apparatus

14.12.10

Ae 2185.60

Introduction:

Some may yet recall this app. from a time when oscilloscopes were not commonly used for teaching physics. A small mirror was placed between 2 parallel wires which were stirred by the electromagnetic forces caused by applying AC current to the wires and by a magnet located close to the wires holding the mirror. The sine curve of the current applied was projected up onto a screen by means of a rotating mirror and a light source. Similar arrangements are today used for laser shows, scanning etc.

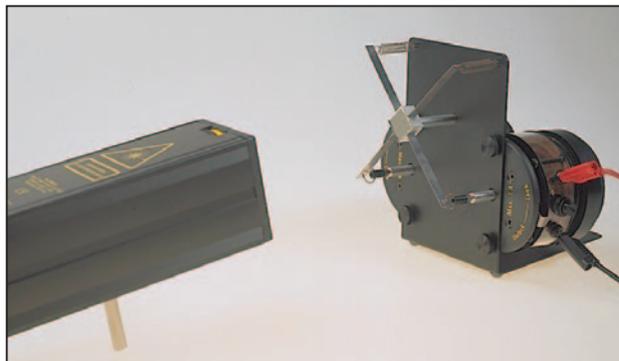
Our "Lissajou Apparatus" has been designed for a set-up incorporating a laser and 2 of our well known vibration generators (no. 2185.00). The mirror is placed in the centre pivoting on a steel ball, and fixed in position by 2 spring steel strips. The 2 steel strips are spring loaded in one end and controlled by each their vibration generator (2 pcs.) in the opposite end. Controlled operation of the 2 vibration generators allows you to control the mirror in an X Y direction and thus controlling the light beam reflected by the mirror.

The "Lissajou Apparatus" no. 2185.60 comprises the following parts:

- 1 pes. Lissajou App.
- 4 pes. Screws for attaching the vibration generators.
- 1 pes. Manual no. Ae2185.60

Required additional equipment:

- 2 pes. Vibration Generator no. 2185.00
- 1 pes. Laser - e.g. no. 2885.00 1 or 2 pes.
Function generator - e.g. no. 2500.50 or 2501.50
- 1 pes. Projection screen if required.



Experiment set-up:

Attaching the vibration generators: The upright part of the Lissajou App. plate corpus has a row of 3 holes in either side. The larger one of the 3 holes are intended for inserting the centre pin of the vibration generator, and the 2 smaller ones for attaching the vibrator by means of the 2 x 2 pes. screws supplied with the app. Insert the vibration generators centre tap from the rear side of the plate corpus, opposite the mirror, and place them thus that the locking device may be freely operated from respectively the left and the right side of the app. While mounting the vibration generators please make sure that their locking devices are set in the "Lock" position.

When the vibration generators has been attached to the app., place the mirror systems plastic bushing over the centre taps steel ball, and then insert the 2 banana plug connectors into the vibration generators drive arms. Make sure that the banana plug connectors are fully pushed in, to secure that the mirror is parallel to the app. plate corpus.

The Lissajou Apparatus is now ready for operation.

Set-up:

Place the app. on a flat surface facing the laser. The laser should be located thus that the inclined laser

beam is ascending towards the mirror. When using a laser type 2885.00/1 0/20 the ascending inclination is achieved simply by mounting one of the two mounting pins supplied with the laser in the laser's foremost mounting hole. The distance between the laser and the mirror surface should be approx. 100 mm. The reflected beam pattern may be projected up onto a screen or a wall located behind the laser. Fine adjusting of the reflected laser beam is done by means of the Lissajou App. fine adjusting screw.

The 2 vibration generators may be controlled by means of signal input from either 1 or 2 function generators. In case only one function generator is available, the second vibration generator may be controlled by applying an AC voltage 0-5 VISO Hz or a DC voltage :1:0-4 V.

When the above described set-up has been arranged, unlock the vibration generators locking device and apply an input signal to the vibrators. The Lissajou App. will now control the reflected laser beam. Depending on the signal applied to the vibrators, the reflected laser beam will draw various patterns on the projection screen, e.g. a circular pattern by applying a sine-shaped AC with the same values for voltage and frequency to each of the 2 vibration generators.

The app. may also be utilized as a measuring system for measuring weak pulses applied to one of the vibrators. I.e. changes in the beam pattern will indicate variations in the applied signal. Supplying the projection screen with an appropriate scale may prove expedient.

CAUTION!

Reflected or direct laser beam can burn the retina and cause permanent damage to the human eye. When arranging the experiment set-up, pay close attention to, that the laser beam intensity is reduced by means of the built-in grey-filter. Do not open the filter up to full until the arrangement has been fully adjusted, and make absolutely sure that the laser beam cannot be directed towards anyone.

Allways lock the vibration generators when the app. is not in use. If you fail to lock the drive arm, the membrane suspension of the drive arm will be ruined due to the partial strain applied to it.