Gas Discharge Tube S 1000624

Instruction sheet

12/12 ALF

1 Tube holder S (not included)
2 4 mm contact pins
3 Glass tube with pump nozzles
4 Holder
5 End cap with fluorescent screen
6 T tube connector
7 Vent valve
8 Vacuum hose

1. Safety instructions

Discharge tubes are capable of producing X-rays at operating voltages ≥ 5kV.

- Do not operate the discharge tubes with voltages in excess of 5 kV.

The discharge tube is a thin-walled glass tube. A damaged tube may implode when evacuated.

- Do not subject the discharge tube to any mechanical stresses and use it with care.
- Check the tube for damage before using it in an experiment.

When the discharge tube is in operation, high voltages may be present at the electrodes.

- Do not attempt any wiring unless the power supply is switched off.

2. Description

The gas discharge tube S is used for observation of electrical discharges in gases under reduced pressure as well as for investigation of cathode beams and canal rays, which appear at low pressure outside the discharge path.

The gas discharge tube is a glass tube which can be evacuated and which has luminescent screens at either end. It is supplied in dismantled form and is intended to be set up on the S-series tube holder (1014525).

3. Contents

1 Glass tube with pump nozzles

2 End caps with fluorescent screen

2 Holders with sealing washers, electrodes with slotted apertures and 4-mm terminal pins

1 Vent valve

1 T-connector

3 Vacuum hoses (2x short, 1x long)

4. Technical data

Polarization voltage:	≤ 5 kV
Discharge current:	1.2 mA approx., depending on gas pressure
Connections:	4 mm contact pins
Tube length:	130 mm x 15 mm diam.
Total length:	280 mm approx.

5. Operation

5.1 Set-up for S-model discharge tube in S-series tube holder (1014525)

- Fit the end caps into the holder (see Fig. 1).

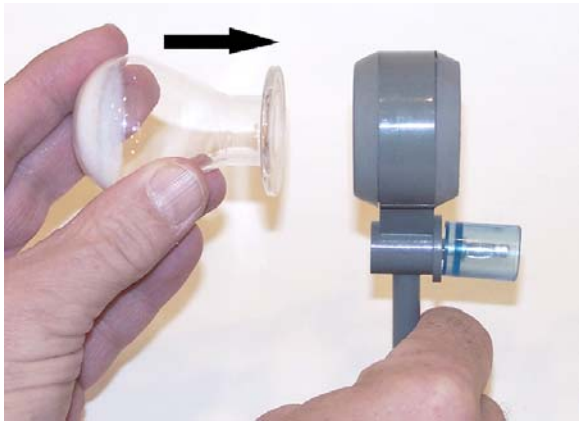

Fig. 1

- Slot both holders into the slit in the tube holder unit and move them all the way to the left or right (see Fig. 2).

Fig. 2

- Insert the glass tube into the holders. In order to ensure that the glass tube is firmly held in place, push the holders slightly towards the centre (see Fig. 3).

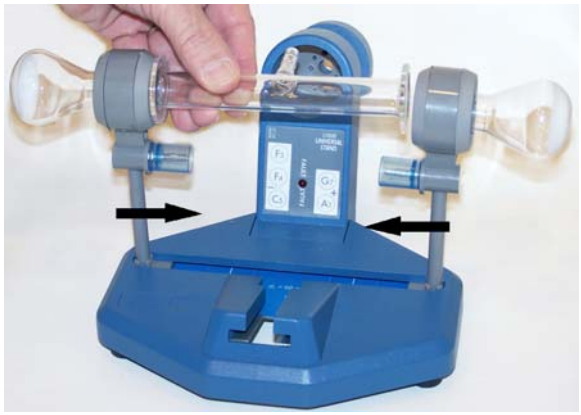

Fig. 3

- Connect the vent valve to the T-connector using a short hose and use the second short hose to connect the connector to the glass tube. Insert the vent valve into the central hole in the tube holder (see Figs. 4 and 5).

Fig. 4

5.2 Experiment instructions

To perform experiments using the gas discharge tube S, the following equipment is also required:

1 Tube holder S 1014525

1 Rotary-vane vacuum pump, two-stage 1003317

2 Experiment lead, safety plug and socket 1002839

1 High voltage power supply, 5 kV (230 V, 50/60 Hz) 1003310

or

1 High voltage power supply, 5 kV (115 V, 50/60 Hz) 1003309

- Connect the hose to the vacuum pump.
- Connect the power supply to the 4-mm terminal pins.
- Apply a voltage of 5 kV to demonstrate luminescent discharges.
- After the operating voltage is applied, evacuate the tube and close the vent valve.
- Darken the room and observe the luminescent phenomena.
- When the experiment is finished, turn off the pump and open the vent valve to let air into the discharge tube.

Gas discharge at low pressure

Depending on the range of pressure, various phenomena may be observed when high voltage is applied:

Pressure range	Phenomena
1013 mbar	No discharge
30 – 10 mbar	Threads of light between cathode and anode
10 – 1 mbar	Dark space in front of the cathode
1 – 10^{-1} mbar	Discharging in layers
10^{-1} – 10^{-2} mbar	Glowing light
10^{-2} mbar	Anode rays and cathode rays, (images of respective slits on fluorescent screens)

Gas discharges with various gases

- Allow a sequence of different gases into the tubes.

The luminescent phenomena will differ depending on the gas used.

- Use a spectroscope to view spectral lines.

Magnetic deflection of anode rays and cathode rays

- At pressures below 10^{-2} millibars, move a permanent magnet towards the tube and observe how it deflects the rays.

Due to the differing masses of the particles involved, the image of the slit on the fluorescent screen does not move much for the anode rays, but the cathode rays are deflected heavily