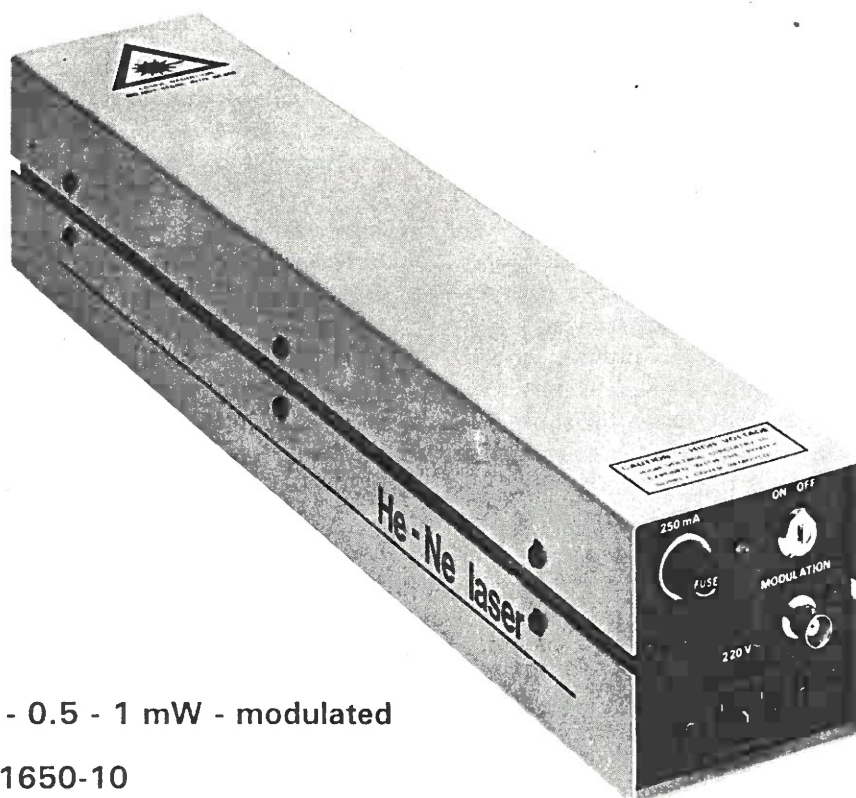




He-Ne laser - 0.5 - 1 mW - modulated

Type 2129-1650-10

This laser is emitting red light with a wavelength of 632.8 nm. The light is coherent which means that the single parts of the light beat as one (are in phase). The laser light is emitted in the same direction as a thin beam with a diameter of appr. 0.49 mm dependent on the distance from the laser. The light is unpolarised but spontaneously and occasionally it changes direction around its longitudinal axis.

The laser light is not more dangerous than any other light but because of its physical qualities, the light can be concentrated in thin beams with a very high intensity (energy) per area unit, - therefore you have to use laser light very carefully. In case of small lasers (up to appr. 5 mW) the element of risk is reduced to eye troubles, if any, as the sensitive retina can be permanently injured in case of unintentional lighting with laser light.

WARNING

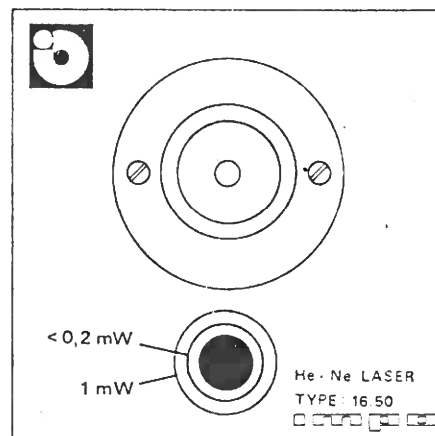
Class 2 laser (IEC 825)

DO NOT STIR INTO THE BEAM!

Laser beams are able to burn the eyes' retina which results in damage to the sight for ever. Avoid getting the laser beam or reflections from reflective surfaces directly in the eye.

Grey filter

This laser is specially made for educational purposes. Alternate arrangements and demonstrations can be the reason for unintended lighting causing eye troubles. To minimize this risk, the laser has been provided with a grey filter which can reduce the light to appr. 10 per cent of full strength. This reduction minimizes the risk considerably but it does not prevent you from a coarse and fine adjustment of the laser in demonstration arrangements. After termination of the adjustment you can open for full strength.



The laser can be placed directly on a solid support or fastened in an optical bench or the like. For mounting two mounting taps can be delivered for use in the thread holes in the bottom of the laser.

The light opening in the cabinet of the laser is

provided with an internal optical thread. If you want a diffusion of the light, an objective from an ordinary biological microscope can be mounted. In case of holograms an objective with a magnification of 40X will be suitable.

The laser is made with laser tube with glass-sealed internal mirrors. The glue used for fixing the mirrors is a glass mixture with a low melting point. You then avoid organic substances such as epoxy or silicone resin which permits a displacement of the proportion of mixture between He and Ne in the tube which means a short life time. Glass-sealed mirrors means a very long storage life and life time (appr. 10,000 hours) without that the laser periodically needs to be switched on.

Be aware of high voltage

If the metal housing of the laser is removed there is access directly to a high voltage circuit. Because of the condensers mounted the high voltage will also be present after having switched off the laser

Connection

1. Turn the key for grey filter in position
2. Put the mains wire into the plug (220 V AC)
3. Turn the key switch, the laser beam will now come from the light opening at the opposite end of the laser.

NOTE

If the light beam starts flashing it might be due to too low mains voltage or overmodulation. (Too much signal on the modulation inlet).

If the laser does not function

1. Check the mains voltage
2. Check whether the fuse is burnt out or is loose

Modulation

This laser can be modulated as the intensity of the laser beam can be weakened proportional to a signal impressed the BNC-bush at the end panel of the laser. This feature can be used for demonstration of signal transference via light either through the air or through light guides. In order to profit maximum of this feature you ought to be able to catch the modulated light by means of a suitable photocell with amplifier. (For instance demodulator No. 2129-1651-10). The laser is provided with a stabilised power supply with a very low noise level. The laser can be modulated by connection of a transistor radio or a

walk-man. The connection is established best between the output for the headphone and the BNC-bush of the laser. The loudspeaker output can also be used but if you turn on too loudly the signal might be distorted.

Be aware of magnetic fields!

Under unfavourable circumstances the laser tube can get into oscillation which results in increased noise level. Oscillation can also occur if heavy magnetic fields influence the laser tube. - Therefore remove any magnets near to the laser. - As the laser contains iron parts, these might act as permanent magnets after having removed the magnet source. This remaining magnetism might cause oscillation but can easily be removed with an external a.c. coil.

A booklet in Danish (2129-1658-00) and German (2129-1658-40) w/examples how to use the laser can be delivered.

SPECIFICATIONS

Voltage	: 220 V +/- 10 per cent a.c., 50/60 Hz, 20 VA
Fuse	: 250 mA slow-acting
Output power	: 0.5 - 1 mW without grey filter : < 0.2 mW with grey filter
Outp.wavelength	: 632.8 nm (red)
Beam dia. (1/e ² points)	: 0.49 mm
Beam div. (full angle)	: 1.7 mrad
Spatial mode	: TEM ₀₀
Outp.polarisat.	: Random
Longitudinal mode spacing	: 1085 MHz
Output power stability	: +/- 5 per cent over 24 hours at constant mains voltage except from longitudinal mode variations
Amplitude noise	: < 3 per cent (w/o filter in receiver) : < 1 per cent (w/filter in receiver)
Temp. range	: 0°C - 50°C (operation)
Temp. range	: -20°C - +60°C (storage)
Rel.air humidity	: 0-95%

Modulation

Degree of modulation	: 10 - 15 per cent
Impedance of the modulation bushing (BNC-bushing)	: 1 kOhm
Modulation signal	: 0 - 1 V _{pp}
Frequency range	: appr. 400 Hz - 16 kHz - 3 dB
Frequency range	: appr. 150 Hz - 35 kHz - 6 dB

Warm-up time

Greater than 50% of normal output at starting-up, full output after 15 min.

Dimensions	: 90 x 490 x 85 mm
Weight	: 3 kg

All specifications are subject to change without notice