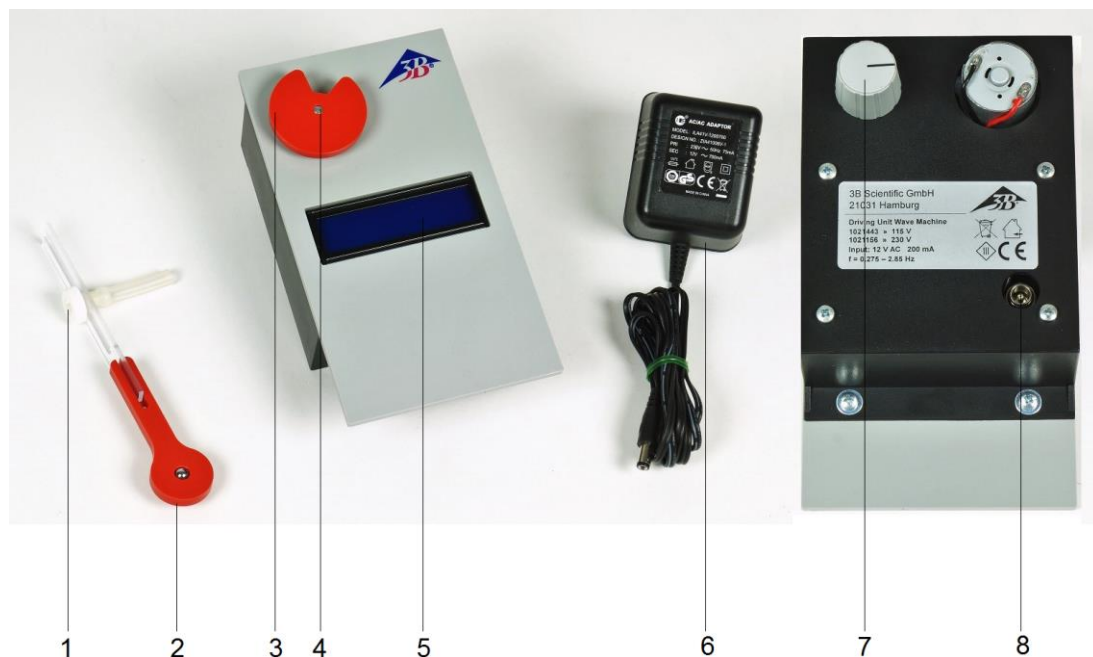


Drive Unit for Wave Machine @230V 1021156
Drive Unit for Wave Machine @115V 1021443

Instruction Sheet

08/17 JS/SD



- 1 Setting screw with coupling hose
- 2 Connecting rod
- 3 Crank disc with two magnetic points
- 4 Retaining magnet

- 5 Frequency display
- 6 AC adapter 12 V AC
- 7 Frequency regulator
- 8 Connection for AC adapter

1. Safety instructions

The drive unit for the wave machine is intended solely for use for its designated purpose.

- Operate the device only in dry areas and only with the included AC adapter.
- Take the device out of service without delay if it is suspected that it is no longer possible to operate the device safely (e.g. in the event of visible damage).

2. Description

The drive unit is used to drive continuously the single module (1003492) constituting the demonstration wave machine with a continuously adjustable frequency.

The coupling between the crank disc and connecting rods uses magnetic locking. Two eccentrically mounted magnets in the crank disc form magnetically held bearing points with the connecting rods. This enables oscillation amplitudes of 5 or 16 mm to be set.

The coupling between the drive unit and one of the pendulum rods of the demonstration wave machine can be made at any location, e.g. on

the right or left end of the demonstration wave machine.

Contents:

- 1 Drive unit with frequency display
- 1 Connecting rod with coupling
- 1 AC adapter 12 V AC

3. Technical data

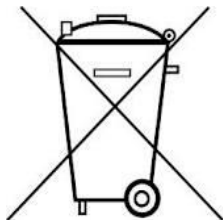
Stroke:	10 mm or 32 mm
Stroke setting:	Magnetic locking
Frequency:	Approx. 275 mHz ... 2.85 Hz
Oscillation period	Approx. 3.63 s ... 290 ms
Frequency regulator:	10-turn potentiometer
Power supply:	12 V AC, 500 mA AC adapter
Ambient temperature:	5 °C to 40 °C
Maximum relative humidity:	80 %
Protection class:	IP20
Dimensions (without stand):	Approx. 60x90x160 mm ³
Mass (inc. AC adapter):	Approx. 640 g

4. Maintenance and storage

- Use a soft, damp cloth for cleaning.
- When storing the device, keep it in dry areas only.

5. Disposal

- When the time comes for the device itself is to be scrapped, it does not belong in the normal domestic waste. If the device is used in private households, it may be disposed of at the local public disposal facilities.
- Observe the applicable regulations for the disposal of electronic waste.



6. Setting up

Additionally required:

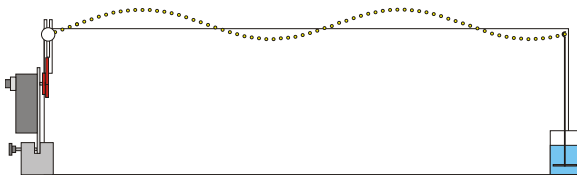
- 1 Stand base 0.9 kg 1001045
- 1 Demonstration wave machine, single module 1003492

- Clamp the drive unit in the stand base and place alongside any one of the pendulum rods of the wave machine.
- Attach the connecting rod to the outer or the inner magnet of the crank disc.
- Pull the coupling hose a few millimetres over the end of the pendulum rod.
- Set the zero position by relocating the setting screw in the yoke of the connecting rod and lock the setting screw.
- Supply the drive unit with power using the AC adapter and set the desired frequency.
- Make fine adjustments to the apparatus such that the connecting rod bends as little as possible during the driving process.



7. Operation

a) Wave propagation without reflection

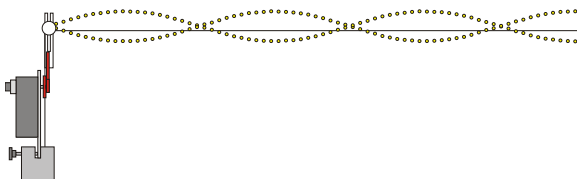


Continuous wave without reflection

Without reflection there can be no standing waves. The waves appear to propagate to infinity.

- Attach the damping pad to the end of the wave machine and fill with water.
- Set any frequency.

b) Standing waves with reflection at the open end



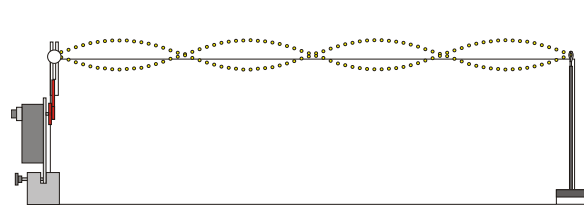
Standing wave ($n = 3$) in the case of reflection at the open end

Resonance occurs when reflection gives rise to an oscillation antinode at the open end and an oscillation node close to the drive side.

The resonant frequencies are at about $f_n = (n + 0.5) \cdot 300$ Hz, $n = 1, 2, 3, \dots$

- Leave the end of the wave machine open.
- Set an appropriate frequency with the frequency regulator and, by slowly varying it, fine tune such that the oscillation antinodes and nodes are as distinct as possible.
- If necessary, select the shorter stroke for higher frequencies.

b) Standing waves with reflection at the fixed end



Standing wave ($n = 4$) in the case of reflection at the fixed end

Resonance occurs when reflection gives rise to an oscillation node at the fixed end and, likewise, an oscillation node close to the drive side.

The resonant frequencies are at about $f_n = n \cdot 300$ Hz, $n = 1, 2, 3, \dots$

- Use the retaining clamp to attach the end of the wave machine to the rod that is included in the delivery of the wave machine.
- Set an appropriate frequency with the frequency regulator and, by slowly varying it, fine tune such that the oscillation antinodes and nodes are as distinct as possible.
- If necessary, select the shorter stroke for higher frequencies.

