

## Universal Kymographs



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BS4 50-7368 Harvard Apparatus  
Universal Kymograph  
with Integral Stimulator

### Universal Kymograph Assembly

This Assembly includes the Universal Kymograph with Stimulator plus a comprehensive set of accessories with a 165 page Applications Manual with detailed instructions for over 30 experiments. Some of the possible experiments include:

#### Frog Heart In Situ Preparation:

- Recording of cardiac activity
- Effect of stimulation of the heart (refractory period compensatory pause)
- Demonstration of conduction path (stimulus ligatures)
- Effects of stimulating the vagus nerve (cardiac inhibition)
- Effect of drugs

#### Muscle-Nerve Preparation:

- Effect of stimulating voltage (simple muscle twitch)
- Effect of stimulation frequency (tetanus)
- Staircase phenomenon (Treppe)
- Effect of repeated stimulation (fatigue)
- Effects of drugs on muscles
- Effect of pre- and after-loading on muscle efficiency

For locust work, a special cork mounting block is supplied, which wedges vertically in the muscle chamber. The accessories for the Kymograph are listed on the following pages.

Catalog No.	\$	Product
BS4 50-7384		Universal Kymograph Assembly, 115 VAC, 60 Hz
BS4 50-7392		Universal Kymograph Assembly, 230 VAC, 50 Hz



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### Universal Kymograph with Stimulator

The Kymograph is the same as described above. The built-in square wave stimulator has a maximum output of 25 volts with less than 25  $\Omega$  impedance. The frequency range is continuously variable from 0 to 100 Hz. There are six preset pulse widths. The output has three selections: continuous, single pulse by push button, and external trigger via the contact arms on the Kymograph spindle. All the controls are located on the front panel.

#### Specifications

Kymograph	Same as Universal Kymograph
Stimulator Specifications:	
Output Voltage	0 to 25 V, continuously variable in 3 ranges, 0 to 250 mV, 0 to 2.5 V and 0 to 25 V
Sockets	2 x 4 mm sockets
Impedance	< 25 $\Omega$ at max. output current of 250 mA
Pulse Width	6 preset widths of 0.05, 0.1, 0.5, 1.2 and 5 ms
Frequency	0.1 to 100 Hz continuously variable in 3 ranges, 0.1 to 1.0 Hz, 1 to 10 Hz and 10 to 100 Hz
Mode Selection	Continuous, single and trigger via contact arms on spindle
Cylinders	Not included, see next page
Base Dimensions	460 x 230 x 220 mm (18.1 x 9 x 8.7 in), H x W x D
Weight	7.5 kg (16.5 lb)

Catalog No.	\$	Product
BS4 50-7368		Universal Kymograph with Stimulator, 115 VAC, 60 Hz
BS4 50-7376		Universal Kymograph with Stimulator, 230 VAC, 50 Hz

### Universal Kymograph

- Two fully adjustable support arms each with a 9.5 mm OD upright rod for mounting accessories
- Adjustable, double contact arms are fitted to the spindle base for external trigger applications (e.g. stimulators)

The Universal Kymograph has a spindle 320 x 19 mm OD (12-1/2 x 3/4 in OD) for mounting a cylinder (not included). The speed range, dependent on circumference of cylinder chosen, is infinitely variable by use of two controls. A manually operated stop is provided to allow the spindle to revolve either continuously or for a single

revolution. The Kymograph is supplied without cylinder or stimulator.

#### Specifications

Speed Range	Infinitely variable from 0.006 to 625 mm/sec with 500 mm circumference cylinder; 0.012 to 1250 mm/sec with 1000 mm circumference cylinder, cylinder not supplied
Spindle Rotation	Either continuous or single revolution using manual start/stop control
Contact Arms	Two fully variable 'opto-triggering' producing a short circuit across 'contract' sockets
Writing Medium	Smoke or ink, dependent on recording cylinder chosen
Cylinders	Not included, see next page
Base Dimensions, H x W x D	460 x 230 x 220 mm (18.1 x 9 x 8.7 in)
Weight	7 kg (15.4 lb)

Catalog No.	\$	Product
BS4 50-7343		Universal Kymograph, 115 VAC, 60 Hz
BS4 50-7350		Kymograph, 230 VAC, 50 Hz