

Microsystem 70—the new standard in biological microscopes

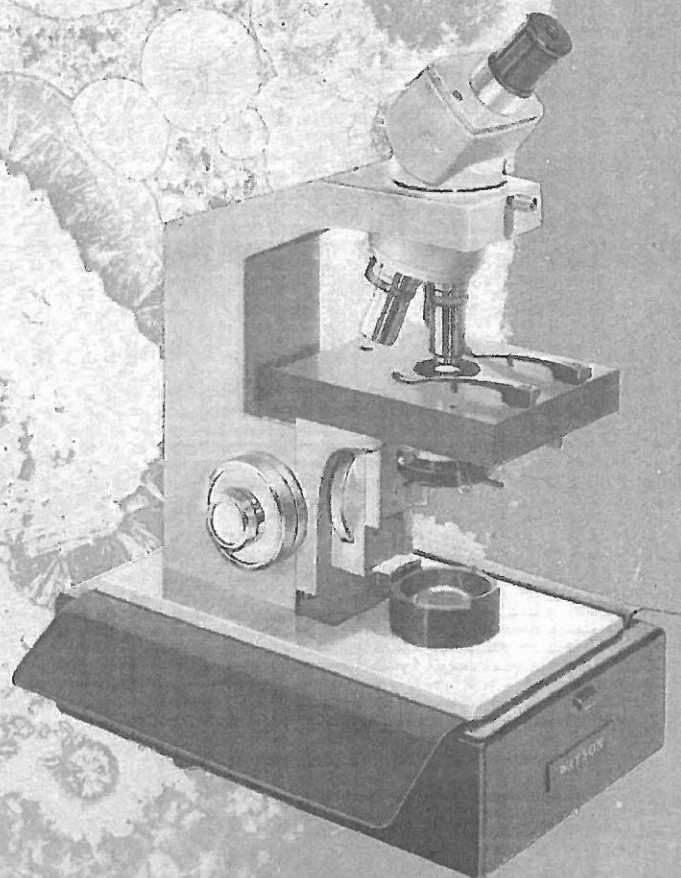
**WATSON**

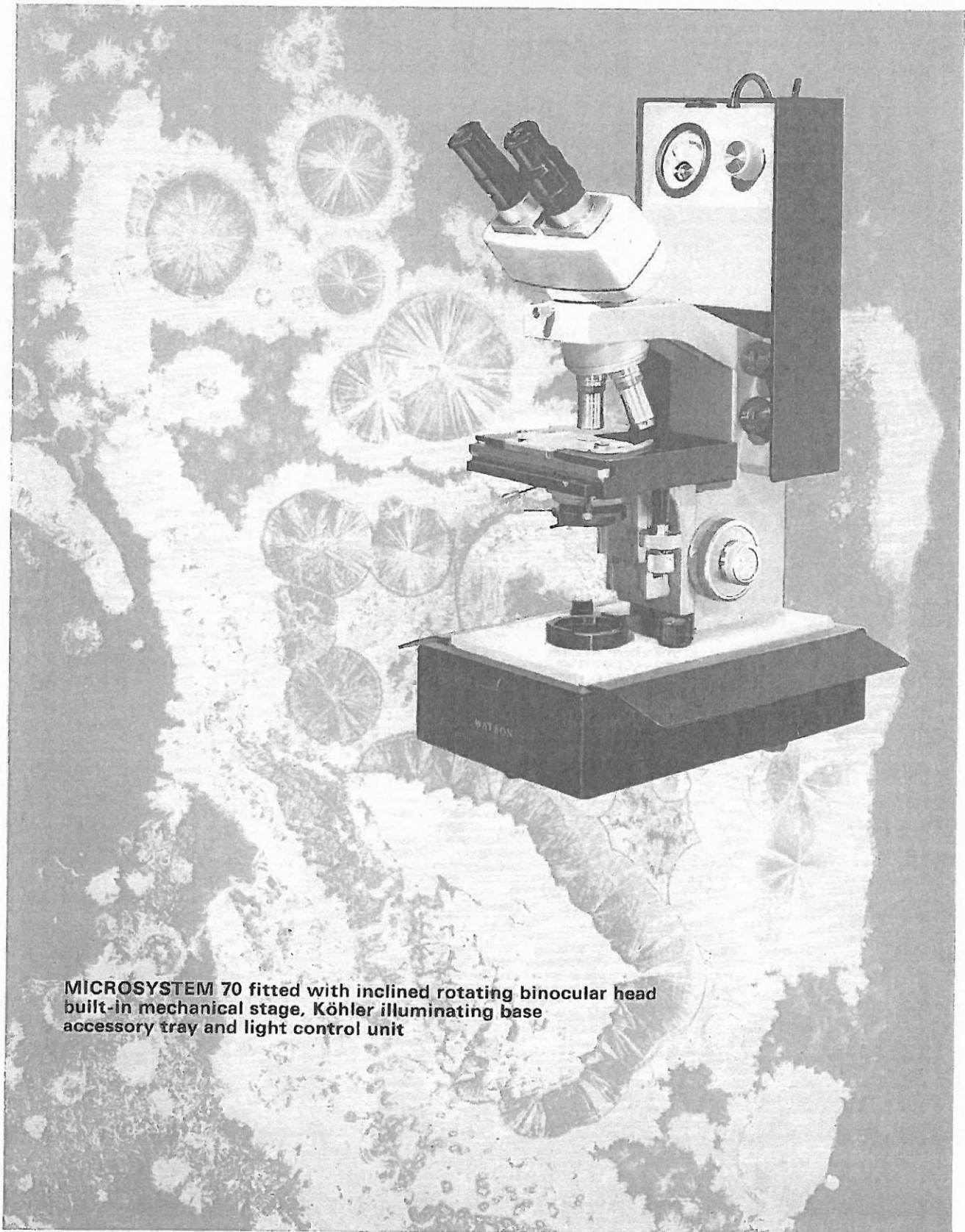
**MICROSYSTEM 70**

## MICROSYSTEM 70

**MICROSYSTEM 70** is a comprehensive range of elegantly styled modular units for assembly as student, routine laboratory or advanced research microscopes. There is a wide, fully integrated choice of accessories, all to the same high standard of convenience, performance and design, and the system takes advantage of a continuing development programme. All units are interchangeable from one System 70 microscope to any other for maximum versatility.

**MICROSYSTEM 70 fitted with inclined rotating monocular head  
plain stage and mains voltage illuminating base**





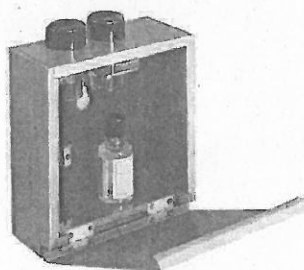
**MICROSYSTEM 70 fitted with inclined rotating binocular head built-in mechanical stage, Köhler illuminating base accessory tray and light control unit**

**MICROSYSTEM 70** combines precision engineering with advanced design and technical innovation. Watson quality mechanical and optical components reduce service needs to a minimum. Easy maintenance throughout a long trouble-free life is a basic design principle. Distribution of controls and the correct work position conform to a strict design logic based on detailed ergonomic analysis, lessening fatigue and the chance of operator error.

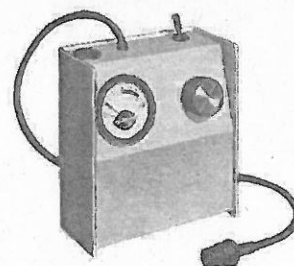




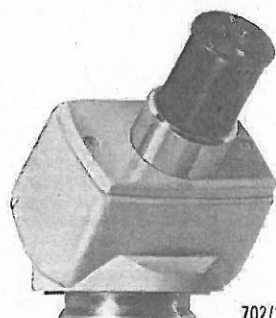
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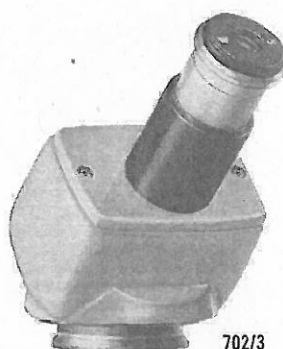
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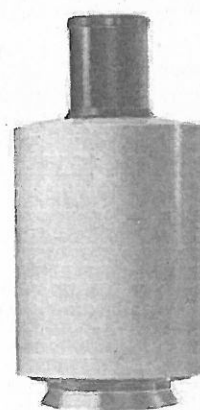
voltmeter light control unit  
part of 705/1



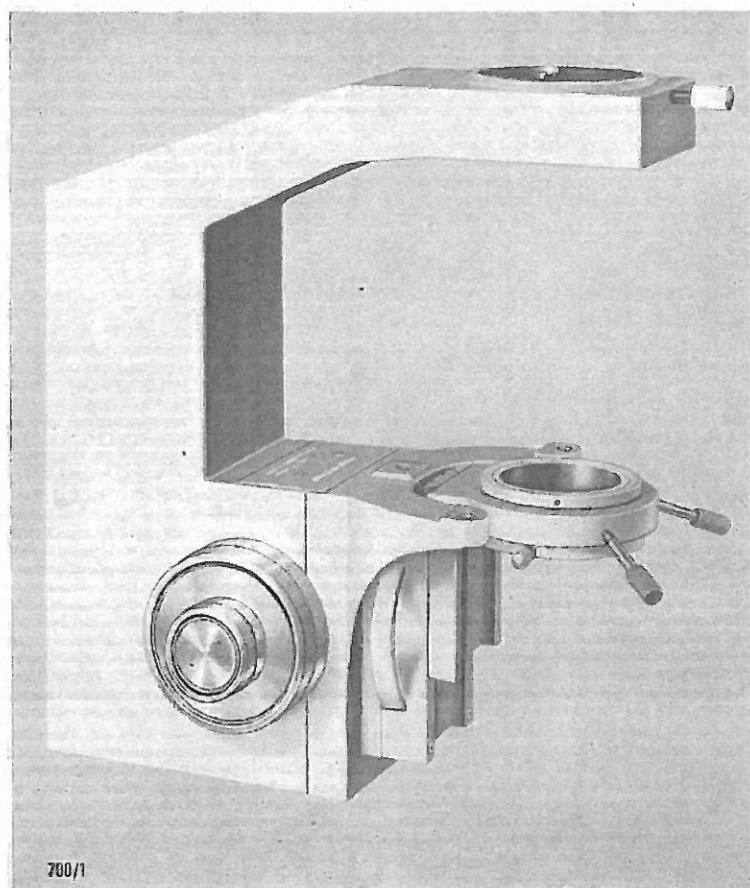
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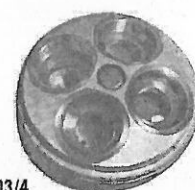
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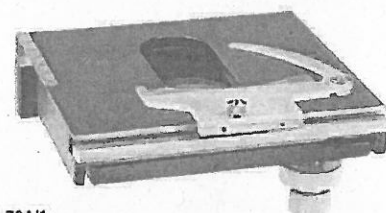
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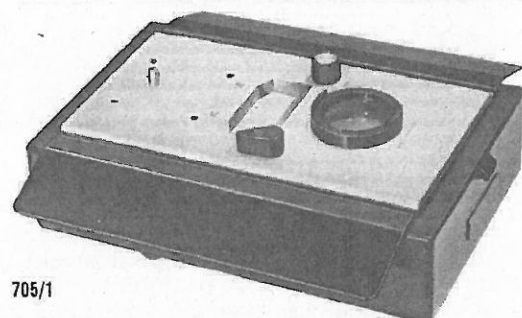
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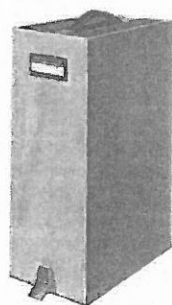
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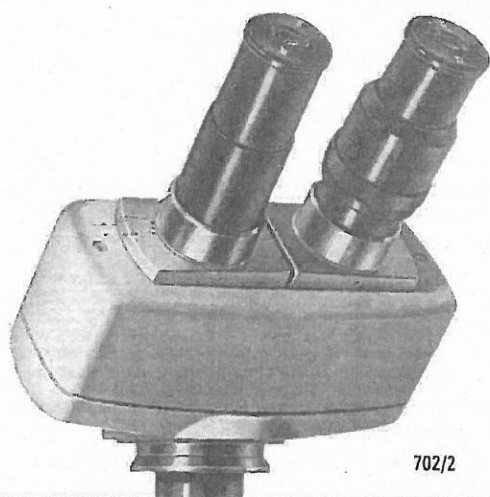
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## LIST OF PARTS

- 700/1 Microsystem 70 stand with concentric coarse and fine controls (stage focusing) and focusing, centring substage. (Stand and base must be specified separately by code numbers)
- 702/1 Inclined rotatable monocular head
- 702/2 Inclined rotatable binocular head
- 702/3 Inclined rotatable monocular head with graduated drawtube
- 702/4 Vertical monocular head
- 703/4 Four-position rotating objective turret
- 703/6 Six-position rotating objective turret
- 704/1 Built-in flat-top mechanical stage with low-placed controls
- 704/2 Plain stage with slide clips
- 704/3 Attachable mechanical stage—fits 704/2
- 705/1 Köhler illuminating base with 6v 30w pre-focus lamp, built-in field iris diaphragm and auxiliary lens; voltmeter light control unit and handrests
- 705/2 Mains voltage illuminating base with 25w lamp and handrests
- 705/3 Low voltage illuminating base with 6v 18w pre-focus lamp, built-in transformer, intensity control, on/off switch, handrests
- 705/4 Plain base with 50mm diameter plane mirror in gymbal mount
- 706/1 Fitted case cover
- 706/2 Accessory tray
- 706/3 Accessory storage box—fits 706/2
- 706/41 Plastic dust cover



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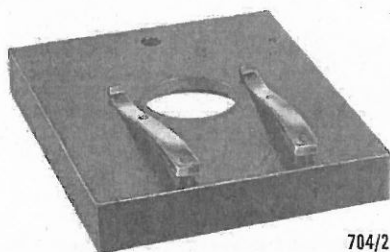


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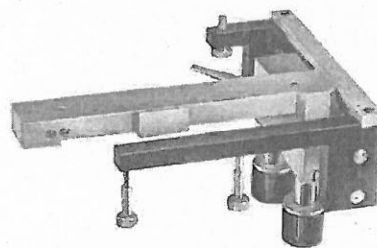
All electrical equipment for Microsystem 70 is intended for 240v AC mains unless otherwise specified at time of order.

**Dimensions and weights** Microsystem 70 complete with fitted case cover width 18.5cm (7.25in) depth 32.0cm (12.25in) height 51.5cm (20.25in)  
 Microsystem 70 with monocular head, mains voltage base, accessory tray and storage box 14.0kg (30.75lbs)  
 Microsystem 70 with binocular head, Köhler base, accessory tray and light control unit 16.5kg (36.5lbs)

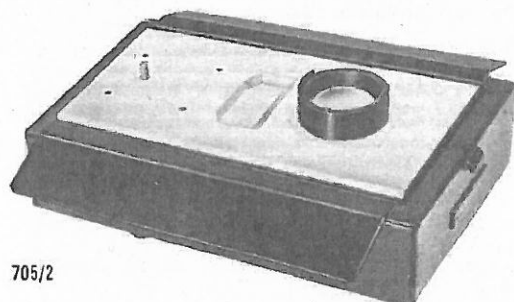
Overseas orders must include a fitted case cover (706/1)



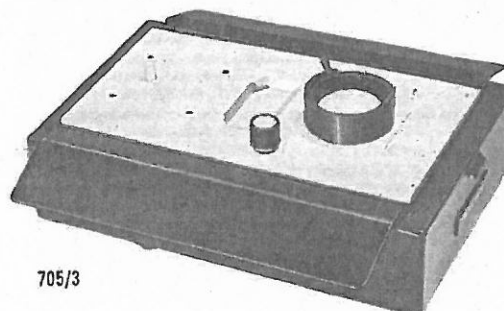
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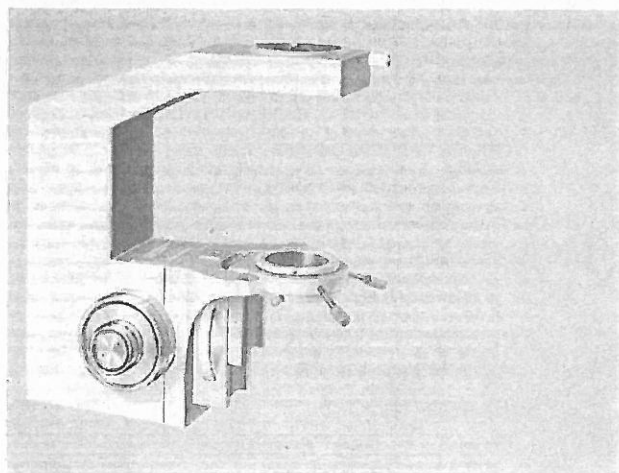
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## STAND

### 700/1 Stand, focusing mechanism, substage

The term 'stand' applied to Microsystem 70 does not include any illuminating base: alternative bases are listed separately

The heart of every System 70 microscope is a robust girder-type die-cast stand designed to support the optical head and objective turret rigidly and conveniently with complete freedom from vibration.

Provision is made for a massive pillar that locates firmly in the base of the stand to support photographic or other accessories.

Integral concentric coarse and fine controls, located conveniently low on both sides of the stand provide smooth, light, stage focusing. The coarse adjustment is based on a wide, correctly proportioned dovetail slide and tension can be adjusted to the user's preference. Fine focus is achieved by a unique twin beryllium copper spring parallelogram movement with no sliding parts, completely free from lost-motion and totally inhibiting side movement so that stage rigidity is outstanding. (The focusing mechanism is the subject of Watson patents).

Substage focusing is by a smooth, precise cam operated by a large knurled ring accessible without removing the hands from the focusing controls.

Easily adjusted thumbscrews provide condenser centring on every stand. Where it is desirable to restrict access to condenser centring adjustments (eg in student microscopes) socket screws can be provided to special order. (The substage mechanism is covered by Watson patents).

All movements have been exhaustively life-tested. The complete coarse and fine focus mechanism is quickly and easily removed for service or replacement if necessary through inadvertent damage—an important advantage in a busy or isolated laboratory.

## ILLUMINATING BASES

### 705/2 Mains voltage illuminating base

A simple 25w source operated directly from mains supply (200/250v or 100/120v to order) to provide a diffuse source accurately aligned to the optical axis of the microscope. Used with an Abbe condenser, the mains illuminator evenly fills the field of low power objectives and is adequate for all normal student biological work.

### 705/3 Low voltage illuminating base

Similar to mains base but fitted with 6v 18w bulb and continuously variable intensity control with on/off switch. Transformer and rheostat are conveniently built into the base. Recommended for bright field work at all magnifications with either monocular or binocular head.

### 705/32 Accessory field iris

An attachable lens with field iris can be used with either the mains or low voltage base to give simplified, fully controlled illumination at low cost. The accessory fits directly on the filter carrier of the lens mount.

### 705/1 Köhler illuminating base

A well-corrected optical system provides powerful Köhler illumination accurately adjusted to the optical axis and well protected from accidental misalignment. Controlled, even illumination is provided for a binocular system and all objectives from  $\times 3/11$  to  $\times 100/1.3$  with adequate intensity for dark ground, phase contrast, photomicrography etc.

A simple control introduces an auxiliary lens built into the base to change from low to high magnification range without tedious re-adjustments to condenser or other optical elements. The field iris remains focused in both ranges.

The 6v 30w lamp has a specially designed filament and is supplied fitted with a prefocus flange. An accurately centred lampholder withdraws from the rear of the base for easy precise lamp replacement. A separate control unit provides continuously variable intensity and includes a voltmeter. Information relating lamp voltage to expected life and colour temperature is supplied in the instruction manual. For convenience the control unit can stand freely on the bench, be wall-mounted or located in the accessory tray on the microscope stand—in which position it clears the case.



**General features** All the bases described above share the following features

- 1 The quality of illumination provided is such that secondary adjustments including auxiliary condenser lenses (swing out or other pattern) are made unnecessary.
- 2 Robust, rigid frame, finished in black nylon.
- 3 Handrests, also finished in durable, clean nylon carefully designed to support the hands in the most convenient, most comfortable position for stage and focusing controls. The handrests can be instantly removed if not required and fold neatly against the limb for case storage. The locating slots are sealed against dust whether handrests are in use or not.
- 4 The lens mount includes a simple filter carrier for standard 50mm  $\times$  50mm (2in  $\times$  2in) filters.





## OPTICAL HEADS

### 702/1 Inclined monocular head

In common with all Microsystem 70 heads, the inclined monocular head attaches to the limb by a specially designed mount which offers smooth, 360° rotation and ensures accurate optical alignment between any head and any microscope. The head has unit magnification and maintains the standard 160mm tube length.

### 702/3 Inclined monocular head with drawtube

A sliding drawtube makes possible continuous variation of tube length from 145mm to 175mm to correct for cover glass or mountant thickness—especially important with high power dry objectives. It may also prove helpful when measuring objects with an eyepiece graticule.

### 702/2 Inclined binocular head

Converging eyepiece tubes; extensive tests have shown that many observers find difficulty in fusing the images with conventional parallel binocular tubes and the same experiments suggest that image fusing is easy and comfortable when the tubes converge at a small angle. A convergence of 5° included angle has been found satisfactory for all users. Eyepiece tubes are sealed against entry of atmospheric dust to prevent contamination of the prisms at every change of eyepieces. All moving parts and bearings, including the push-pull interocular adjustments, are protected against dirt and damage.

The binocular head has a magnification factor of 1.5 and anti-reflection coatings are used on all air to glass surfaces for minimum glare and good image contrast. The head rotates through 360° on a smooth bearing that preserves accurate centring. An alternative collimated binocular head which maintains constant tube length for all interocular settings is described with the photographic equipment for Microsystem 70.

### 702/4 Vertical monocular head

For use in photomicrography and other specialised applications—eg particle sizing with an image-shearing eyepiece.

## STAGES

### 704/2 Plain stage

The plain stage measures 114mm × 140mm (4½in × 5½in). It is vibration resistant, finished in durable matt black and provided with patented quick action polystyrene stage clips.

### 704/3 Attachable mechanical stage

Rigidly attached to the plain stage by three thumbscrews, the attachable stage fits quickly and easily to any Microsystem 70 microscope without individual adjustment. Controls are low-placed for comfort and are contained within the base area of the microscope for protection and easy case fitting. A special quick-loading slide clip is provided. The operating mechanism is based on flexible stainless steel tapes spring-loaded to eliminate lost movement. No dovetail slides are used and the mechanism compensates automatically for wear in use. Speed of travel is the same in both directions and has been chosen to give both precise control at the highest magnifications and rapid slide movement when scanning at low powers. The range is 75mm × 25mm (3in × 1in) with scales and verniers on both movements.

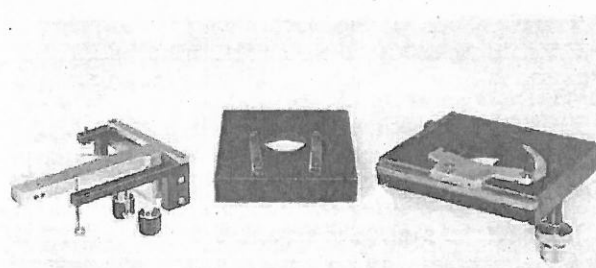
### 704/1 Built-in mechanical stage

An original Watson design, the new stage combines speed and convenience in use with outstanding long life characteristics. The top (moving) plate rests easily on a kinematic bearing to which mechanical load is applied by small magnets. Drive in both x and y planes is by entirely new friction mechanism with automatic compensation for wear, completely eliminating troublesome rack and pinion movements and costly dovetail slides. (The mechanism is the subject of Watson patents).

Stage movements are smooth, easy and precise by co-axial, low-placed controls located ergonomically in relation to handrests and focus controls.

The quick-loading slide holder designed for one handed action, can be easily removed to provide a large flat surface for extended objects.

Movements are 75mm × 50mm (3in × 2in) and scales with verniers read to 0.1mm in each direction. Standard slides 3in long and from 1in to 2in wide can be used; holders for certain other sizes to special order.



## OBJECTIVE TURRETS

### 703/4 Four position

Special purpose machines recently developed by Watson have achieved new levels of accuracy in objective centring and parfocalling. Parallel engineering development now makes possible an objective turret machined to the same close tolerances. Special low friction bearings are used round the periphery and an entirely new indexing device has been designed. The mechanism has been intensively life-tested.

### 703/6 Six position

Alternative six position turret : factory fitting only.



## GENERAL ACCESSORIES

### 706/1 Fitted case cover

The case cover provides a convenient means of storing and carrying the microscope. It fits any of the three illuminating bases with which it makes a dust proof seal and to which it can be locked. Faced with elegant polished beech, the sides are plain and free from projection (eg hinges) and the handle is recessed in the top of the cover for easy stacking. Its slim lines make minimum demands on storage space. A holder for identification is provided and a plastic dust cover is an optional extra.

The case has been designed also to take up minimum space on the bench when the microscope is being brought into use or put away.

### 706/2 Accessory tray

The tray provides storage for up to 4 extra eyepieces and a means of locating either the accessory storage box or the light control unit for the Köhler base.

The tray can stand freely on the bench or be mounted on the stand in which position it clears the case cover.

### 706/3 Accessory storage box

To store spare objectives, immersion oil, tissues and other small accessories.

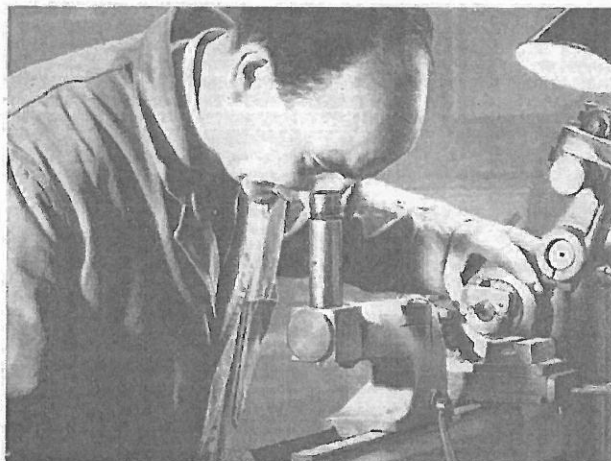
The box, which has a magnetic catch, can be wall-mounted, free standing or located in the accessory tray.

### 706/41 Plastic dust cover

An efficient protection from dust where it is necessary to leave the microscope on the bench for periods without replacing it in the fitted case cover.

## DEVELOPMENT PROGRAMME

Phase contrast equipment  
Photographic equipment including automatic cameras  
Light distributor  
Photo-visual binocular head  
Fluorescence microscopy equipment  
Polarising accessories  
Projection heads  
Research microscope with quartz iodine source and built-in meters for colour temperature and exposure control  
Flat field objectives  
Magnification changer  
Episcopic illuminators



## OPTICAL COMPONENTS

All Watson optical components are manufactured to the highest possible standards of performance and mechanical reliability. Special purpose machinery guarantees accurate centring and parfocality. These are achieved by thread-cutting on purpose-built optical jigs. All units are fully interchangeable from one System 70 microscope to any other. Objectives conform to the new British standards defining screw thread and parfocal distance of 45mm. High power objectives are spring-loaded for added protection. There is a wide choice of category and of magnification with appropriate eyepieces and condensers.

Watson have pioneered new techniques in the application of high speed electronic computers to optical design to facilitate greatly the computation of new lenses and the addition to the range of new objectives, including a flat field series and high eyepoint, wide field eyepieces.

The same thoughtful attention to detail that characterises the total design concept of Microsystem 70 is strictly applied to every component of each unit to guarantee convenience, simplicity and performance of the highest possible order. The design conforms to international standards wherever practicable.

## MICROSYSTEM 70 PUBLICATIONS

Available now

**Illustrated Guide:** a pictorial introduction to Microsystem 70. Profusely illustrated with photographs and diagrams.

**Optical components for Microsystem 70:** objectives, eyepieces and condensers are fully described and tabulated, and there is a discussion on Watson objective types together with notes on the choice of objectives for specific purposes.

**A new microscope reviewed** by H. M. Malies (reprinted from 'The Microscope and Crystal Front', Jan/Feb 1966)

Available shortly

**Phase contrast equipment for Microsystem 70**  
**Photographic apparatus for Microsystem 70**

Prices of all components are contained in the Microsystem 70 price list together with a selection of suggested outfits for specific purposes.