

**Vickers**

**M41 PHOTOPLAN**

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## M41 PHOTOPLAN

The M41 Photoplan is a sophisticated research microscope satisfying the stringent requirements of a universal photographic microscope in the modern research laboratory. The provision of built-in camera optics in conjunction with readily interchangeable 35 mm and large format cameras allows the effortless automatic or timed photography of microscope preparations.

A wide range of advanced optical techniques employed with the M41 fit it as an unexcelled general purpose research microscope for the industrial, university, or medical laboratory. Considerable design effort has been made to ensure that no compromise exists between the requirements of versatility and optimum mechanical and optical performance. The M41 Photoplan combines extreme versatility of technique with superior ease of operation and maximum photographic capability.



Modified sandcast aluminium alloy Franchini etch—Microplan 10X



## STAND

The rigid universal stand has non-slip rubber feet which minimise the transmission of vibration between bench and microscope. The stand is designed with user comfort in mind having easily reached focusing controls and a base which provides two conveniently placed arm rests.

The coarse motion focusing knob is spring counter-balanced so needing very little effort in turning; the graduated fine movement is very free-running but has minimal back lash. The stage carrier may be additionally raised or lowered on a dovetail slide to accommodate objects up to 2.5" in height.

## HEAD

All the microscope head components simply slide and clamp onto "L" shaped carrier brackets which, in turn, slide onto the dovetail provided on the microscope stand. Two head carrier brackets are available: one with a Bertrand lens, one with a slot to take a quadruple filter slider.

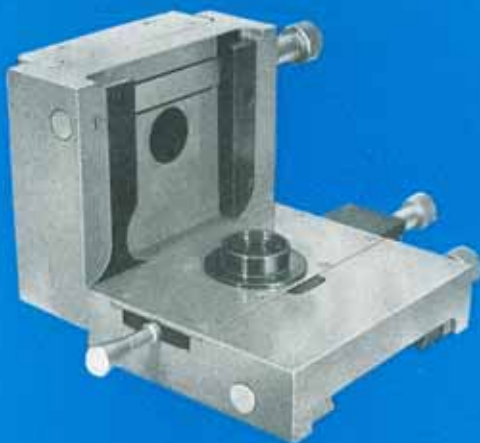
## VIEWING HEAD

The optical system of the binocular head incorporates a three-position beam splitter slide directing:—

- (i) all light to eyepiece tubes
- (ii) 80% light to camera optics, 20% to eyepiece tubes
- (iii) all light to camera optics.

The interpupillary distance between the eyepiece tubes may be set to suit the operator. 160 mm tube length is maintained automatically for each set distance. One eyepiece tube can be focused to accommodate variation between the observer's eyes. The viewing head has a 1.25x magnification factor.

A binocular head with high-efficiency beam splitters and a monocular head are also available.



Head carrier bracket with Bertrand lens



Binocular viewing head

## OBJECTIVE CHANGERS

Objective changers for both incident and transmitted light are mounted on dovetail slides and clamped in position. They rotate on long cones for precise movement and each aperture is accurately located with a click-stop and has a centring device.

## STAGES

Stages are easily interchanged on a broad horizontal dovetail slide. The following types are available:—

150 mm diameter rotating stage with centring screws and circular graduated scale reading to 6' of arc. A mechanical stage can be attached.

Auto-levelling stage, on which the specimen is pressed up against an accurately aligned top plate by spring pressure, thus presenting a level surface to the objective. This stage additionally has a gliding motion and can, if required, be attached to the stage carrier via the circular stage.

Mechanical stages of various sizes are available. 38 x 38 mm square with low-mounted concentric controls: 50 x 75 mm with verniers reading to 0.1 mm and optional top plate.

Large micrometer stage which takes slides 100 x 50 mm or 75 x 25 mm and can be used to measure their features to an accuracy of 5  $\mu$ m. The attachable slide carrier has a 50 mm scale and can be mounted in three positions each 12.5 mm apart in the lateral axis, and 2 positions, 12.5 mm apart in the transverse axis. Special angle measuring eyepieces and graticules suitable for nuclear track work are available.



Square mechanical stage 50 x 75 mm



Square mechanical stage 50 x 75 mm with incident adaptor plate



Plain mechanical stage 38 x 38 mm



Auto-levelling stage



150 mm rotatable polarizing stage with attached mechanical stage

## TRANSMITTED LIGHT OBSERVATIONS

A wide field Köhler illuminator is incorporated in the base of the M41. This together with a pair of field lenses within the base and a substage auxiliary lens can cover the fields of all objectives from 2.5x Microplan to 100x oil immersion.

The transmitted light objective changer is mounted on a dovetail slide to an intermediate carrier which in its turn, slides onto a dovetail on the head carrier bracket. It has five centrable objective apertures.





Achromatic 1.25 N.A. condenser



Research phase condenser



Dark ground condenser

## CONDENSERS

The substage condensers are fitted to dovetail carriers which may be slipped very simply onto horizontal dovetail slides beneath the stage. The following are available:—

Standard achromatic bright field condenser N.A. 1.25, which fills the fields of the objectives from low power scanning to high power oil immersion when used in conjunction with the field and auxiliary lenses. Centring screws are provided.

Standard phase contrast condenser for use with either positive or negative phase objectives. Its N.A. is 0.95 and it has three phase annuli mounted in a revolving click-stop ring. All the phase annuli may be centred to their corresponding objectives by operation of a pair of centring screws. Clear apertures are left in the revolving mount for ordinary bright field work.

Long working distance phase contrast condenser for 10x, 20x and 40x objectives, useful for work with haemocytometers etc.

Dark field condenser for use under oil immersion and with an adjustment collar to cope with differing slide thicknesses. Its corresponding objectives should be fitted with funnel stops or adjustable irises.

Simple 2-lens Abbe condenser N.A. 1.2.

## INCIDENT LIGHT OBSERVATIONS

The incident light revolving objective changer has four centrable apertures. It is mounted by a dovetail on the incident illuminator which, in turn, dovetails onto the underside of the head carrier bracket. Adjustable field and aperture diaphragms and an illuminator focusing lens are provided on the illuminator body.

Alternative objective changers fitted with objectives for dark ground illumination or Nomarski differential interference contrast are also available.

## OPTICS

All Vickers objectives for both transmitted and incident light are parfocal and corrected for 160 mm tube length. Transmitted light objectives are corrected for a cover slip thickness of 0.18 mm where applicable and all objectives of 20x and upwards are fitted with a spring-loaded anti-crash device.

A full range of achromats, flat field objective, fluorites and apochromats is available, together with a series of objectives for polarized light work (strain free) and for long working distances etc.

The incident light dark ground objectives have an achromatic correction and are fitted with an external catoptric illuminator. Their complex design however prevents the addition of anti-crash devices.

The standard eyepieces for the M41 are compensating systems having a high eyepoint and a wide field of view. For measuring or photographic work eyepieces with accessible focal planes for the placement of graticules are provided and where necessary focusable eye-lenses are available.

For special applications a goniometer eyepiece is offered, having a cross line and metal scale and being used for the measurement of angles to an accuracy of 6' of arc. A filar micrometer eyepiece is also available.



The reflector housing simplifies interchange between different modes of illumination and allows the use of combined phase contrast fluorescence techniques

## ILLUMINATION

Two broad dovetail slides are fitted to the rear of the Photoplan stand for the attachment of lamp units for incident and transmitted light.

## STANDARD LAMPHOUSING

This accommodates the 12V 100W tungsten halogen lamp for high intensity white light illumination meeting all the usual needs of visual and photographic work in transmitted and incident light.

It also takes a 50W mercury vapour lamp which gives ultra-violet or blue light for fluorescence work or intense monochromatic light for specialised applications.

For incident light immunofluorescence work a 75W xenon lamp or a 100W mercury vapour lamp can be fitted into the standard lamphouse. Both give illumination at wavelengths appropriate for such stains as FITC.

## LARGE LAMPHOUSING

This accommodates the HBO 200 lamp, a very high intensity source of ultra-violet light which is also suitable for monochromatic work when used with special filters.

Note that when used in transmitted light the large lamphousing must be accompanied by a riser plate to lift the microscope clear of the bench. Appropriate control units can be supplied for all lamps.

## FILTERS

Filters may be employed, either in the filter unit attached to each lamphouse or in the barrier filter slide which fits into the head carrier bracket without Bertrand lens.

The lamphouse filter unit consists of two quadruple revolving filter rings with click-stops as each filter enters the light train. An iris diaphragm is also supplied. A heat filter is permanently mounted in each lamphouse.



Filters are arranged in sets of three for white light work and photography and a choice of filters is offered for fluorescence excitation. One blank is left in each filter ring.

A wide range of head filters is available and suitable combination may be specified by the user.

If further filtration is required in transmitted light 2" x 2" filters may be placed over the microscope base illuminating aperture.

### REFLECTOR HOUSING

A reflector housing attached to the rear of the Photoplan via two dovetail slides permits, by the use of a swivel mirror, a wide combination of illumination systems, e.g.:

Incident and transmitted fluorescence illumination.

Incident and transmitted high intensity illumination.

Incident high intensity illumination with transmitted tungsten halogen illumination.

### CAMERA EQUIPMENT

The cameras for the M41 are mounted directly on the stand on large cones with clamp screws. The beam splitter slider of the integral photographic optics can direct:—

- (i) all light to the camera
- (ii) 20% to automatic J35 photomultiplier, 80% to camera
- (iii) all light to J37 timer photomultiplier.

When used in conjunction with the beam splitter slider in the microscope head the image may be viewed and photographed simultaneously.

Two interchangeable cones, mounted between the camera body and the stand camera aperture give magnifications of 10x or 12.5x respectively to the universal camera assembly (for 35 mm work the magnifications should be halved).

### J35

The J35 allows automatic photography using an electronic circuit which controls the exposure time according to the integrated total of light falling on the photomultiplier. The shutter speed varies from 1/50 sec. to 15 min. and the unit is suitable for films in the speed range 5-3,200 ASA (8-36 DIN) calibrated in 1/3 stops. The unit can be worked manually.

### J37

The J37 exposure timer is used for very low light subjects. A revolver disc allows the unit to sample the field brightness 1/10, 1/100 or 1/500 by area. The exposure time can then be determined and the time set to open and close the shutter.

### CAMERAS

35 mm cameras are available in manual, semi-automatic or automatic forms. They are attached to shutter units mounted on the microscope. An incorporated safety blind prevents accidental exposure. All 35 mm camera bodies have a  $\frac{1}{2}$ x magnification factor.

Manual-lever film wind, speeded shutter with settings for T, B, and speeds from 1 to 1/125 sec. Operated by cable release. For use with cadmium sulphide photometer or no exposure unit at all.

Semi-automatic-electromagnetic shutter, lever film wind. For use with J35 or J37.

Automatic-electromagnetic shutter, automatic film wind with the exposure number being recorded on a frame counter. For use with J35 or J37.

Large format cameras are available in either manual or automatic forms. They are attached to shutter units mounted on the microscope. The camera assembly has a 1x magnification factor. The camera back can be interchanged using a simple clip arrangement.

Films which can be fitted: film and plate holders adaptable to

M.P.P. 4" x 5" back

Polaroid CB100 back

Polaroid J66 4 $\frac{1}{2}$ " x 3 $\frac{1}{4}$ " roll film (attached direct).



Autowind 35 mm camera body



Large format camera assembly with  
Polaroid CB.100 back



Semi-automatic 35 mm camera body



Large format camera assembly with  
Polaroid 800 back



Manual 35 mm camera body



Large format camera assembly with  
the M.P.P. 4" x 5" holder

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