No.2 OLYMPUS MICROSCOPE CATALOGUE

FOR METALLURGICAL MICROSCOPES AND THE ACCESSORIES

Olympus Metallurgical Microscope Series

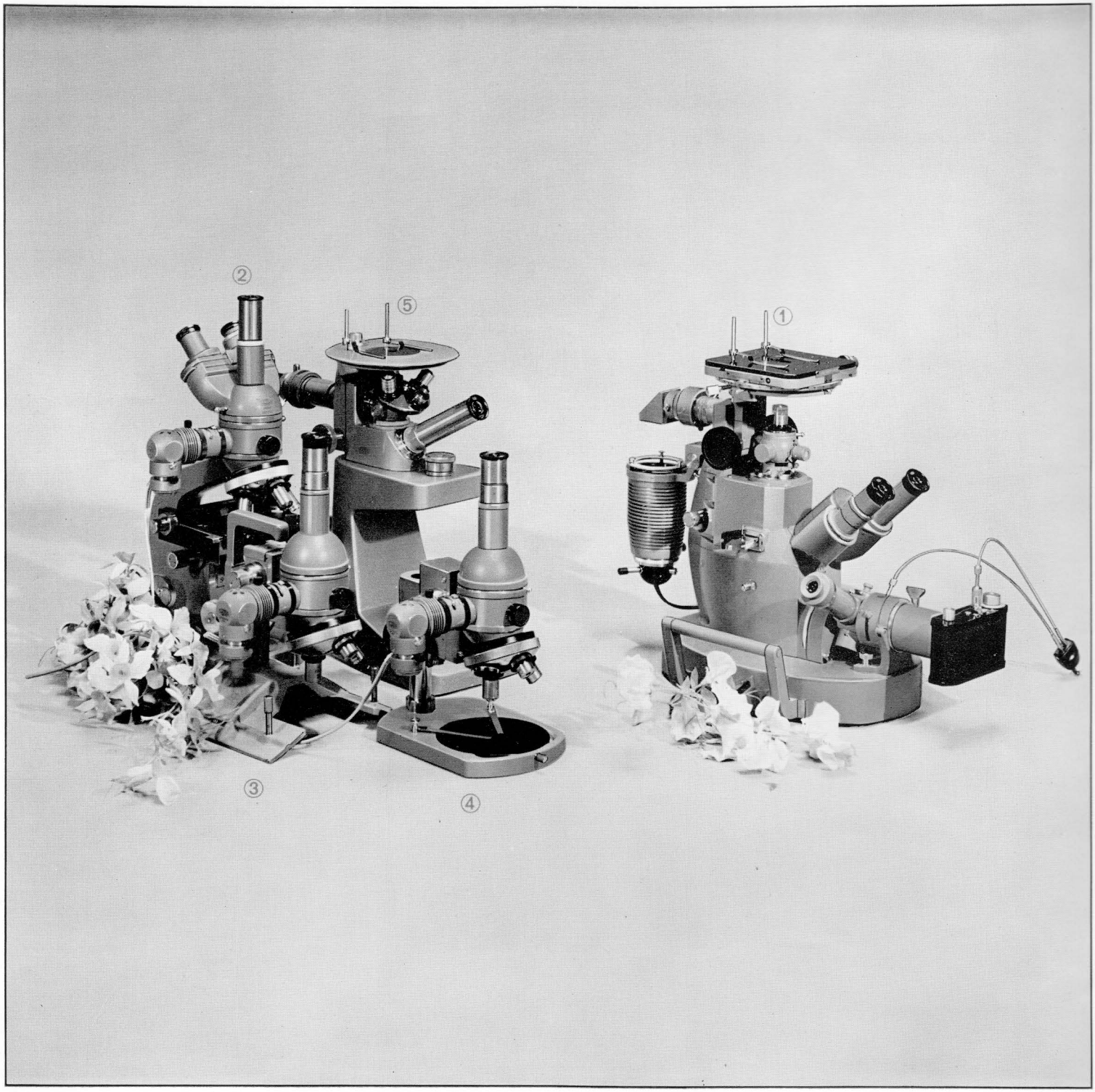
The years of fine craftsmanship in the manufacture of the world's finest microscopes have earned for OLYMPUS of Tokyo the respect of an entire industry. In a field where precision is paramount, Olympus' position of leadership is unchallenged.

Olympus, now, proudly offers its distinctive line of the finest metallurgical microscopes, sensibly priced.

You are cordially urged to compare — We are certain that you need not spend more, to get less than you need.

Metallurgical Microscopes

① Universal microscope model PMF
② Model MF-Tr
③ Roll-microscope model MR
④ Junior type model MJ
⑤ Inverted type model ME

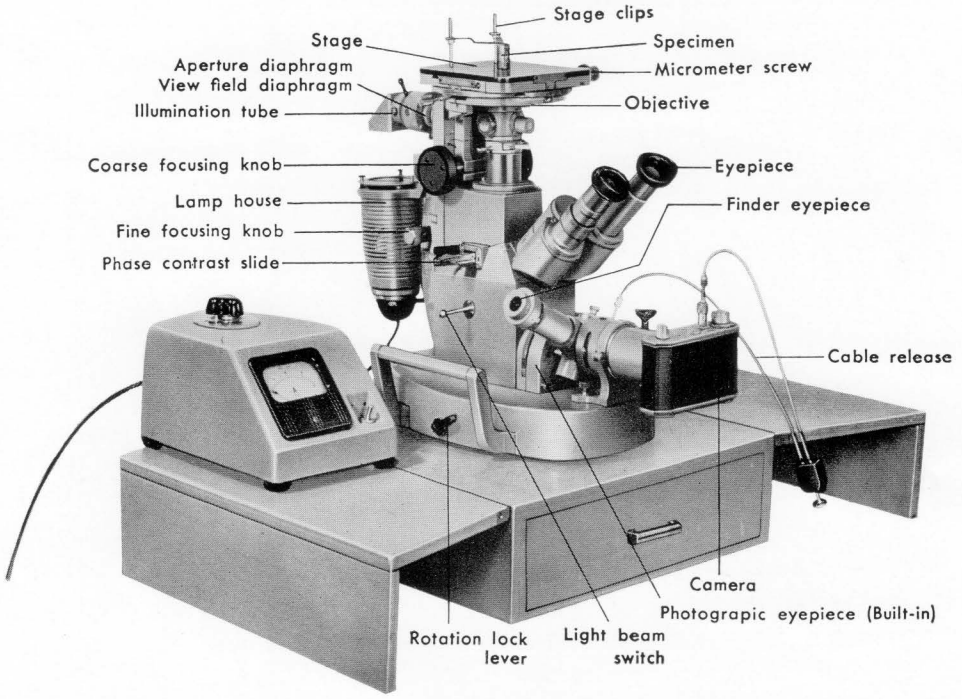


Olympus Universal Metallurgical Microscope Model PMF

is an inverted (Le Chatelier) type microscope, newly and originally designed as a successor to the previous models PMC, PMD and PMS. It is available at moderate price, yet fulfilling exacting requirements in metallurgical as well as photomicrographic works, permitting most reliable and convenient manipulation, as also equipped with a variety of accessories, developed on the basis of our long and fundamental researches.

Dimensions:

Height:	350 mm
Width:	200 mm
Depth:	280 mm
Net Weight:	20 kg



Complete Equipment:

Item	Quantity	
Microscope body	1 pc.	In the cabinet
Objectives M6×, M10×, M40× and M100× (oil immersion)	Each 1 pc.	In the drawer
Objective mount rings for above	Each 1 pc.	〃
Eyepieces for binocular observation BiP7×, BiWF10×, BiP15×, BiK20	Each 1 pair	〃
Centering telescope (CT)	1 pc.	〃
10× viewer	1 pc.	〃
Illuminating lamp bulb (6 V, 5A)	3 pcs.	〃
Phase contrast slide	1 pc.	〃
Stage plates	4 pcs.	〃
Filters: yellow, green, daylight and white-matt	4 pcs.	〃
Stage clips (large and small types)	Each 1 set	〃
Polarizer	1 pc.	〃
Analyser	1 pc.	〃
Cargille oil	1 btl.	〃
Lamp house	1 pc.	〃
Illuminator tube	1 pc.	〃
Photographic unit for 35 mm	1 pc.	In the cabinet
Microscope rest	1 pc.	〃
Hand-rests	1 pair	〃
Stage	1 pc.	〃
Transformer 6 V, 5 A with Ammeter	1 pc.	

Note: Photographic eyepieces P7×, P10× and P15× are built-in inside the microscope body.

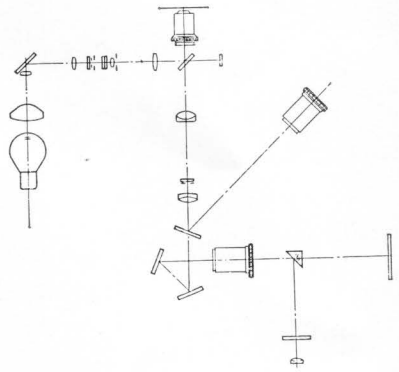
Model PMF

Optical system

Choose appropriate objectives and eyepieces consulting the following table:

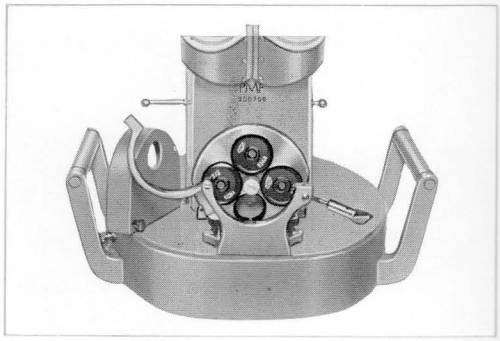
Objectives	Numerical Aperture N. A.	Eyepieces	Total magnifications	W. D.	Real field of view	Depth of focus	Focal length
M 6×	0.11	P 7×	42	13.82 mm	2.90 mm	131.7 μ	27.4
		WF 10×	60		2.90	66.9	
		P 15×	90		1.54	77.0	
		K 20×	120		1.20	42.3	
M 10×	0.25	P 7×	70	6.31	1.80	24.2	18.5
		WF 10×	100		1.80	18.2	
		P 15×	150		0.95	13.5	
		K 20×	200		0.75	11.2	
M 40×	0.65	P 7×	280	0.63	0.45	2.5	5.0
		WF 10×	400		0.45	2.0	
		P 15×	600		0.24	1.52	
		K 20×	800		0.19	1.30	
M 100× (oil immersion)	1.28	P 7×	700	0.35	0.18	0.82	2.1
		WF 10×	1,000		0.18	0.65	
		P 15×	1,500		0.095	0.51	
		K 20×	2,000		0.075	0.44	

W.D. (Working distance) refers to the clearance in mm between the front tip of the objective and the surface of the specimen focused.



Photomicrographic eyepieces

Photographic eyepieces are built-in inside the microscope body. Simply turning of the outside turret up to a particular indication will suffice for changing magnification.

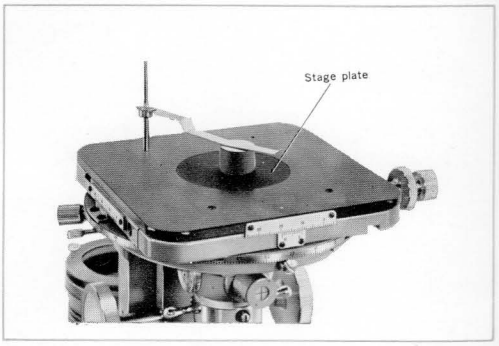


Focusing device

Focusing movement of the specimen is performed by raising and lowering the stage, coarse movement (30 mm) being made by rack and pinion and fine movement by gear mechanism. Incorporation of ball-bearings in the focusing guide assures extremely smooth operation and focusing accuracy of $^1/_{1000}$ mm.

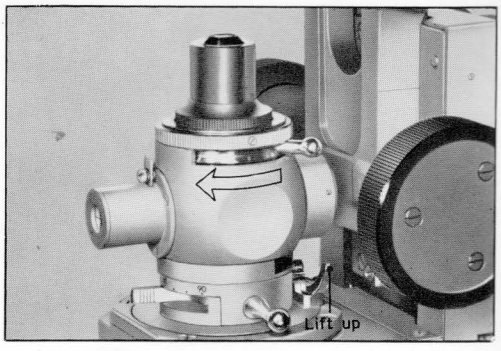
Stage

The square stage (120×120 mm) is equipped not only with a crosswise travelling device (20×20 mm) operated by the coaxial handles, but also with fine motion (3 mm in dia.) and rotating devices. The stage plates are interchanged according to size and form of the specimen to be observed.



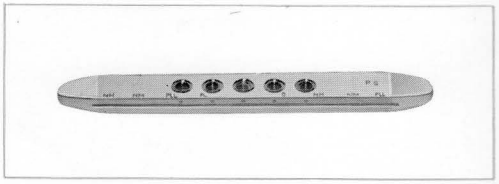
Microscope tube

The tube is driven up and down by constant force of spring action. For changing objective, the tube is pushed down into the microscope body and locked at the bottom, then, when the objective has been changed and the tube is released, it will slowly lift up (air-cushioned) and stop at the previous position, so as to avoid thrusting of the objective front into the specimen and as also to enable uninterrupted observation simply by manipulating the fine focusing knob.



Phase contrast unit

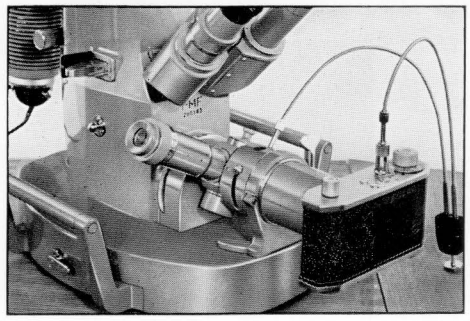
The unit is inserted after swinging aside the cover located on the side of the microscope body. Phase contrast observation is exceedingly advantageous, when image of the specimen exhibits too deficient contrast by use of an ordinary microscope.



Model PMF

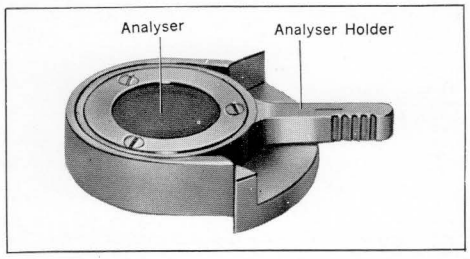
Photographic unit

The unit, exclusively used for this model microscope, is built on the front of the main microscope body and used for taking 36 pictures on a 35 mm film. Photographic eyepieces are built-in inside the microscope body and interchanged by turning the outside turret so that magnification can be changed in 3 steps. They maintain parfocality to each other.



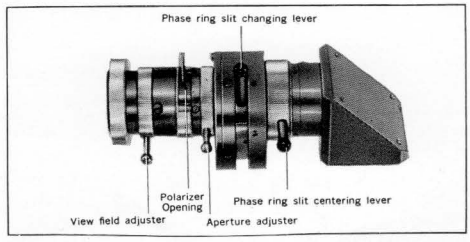
Polarizing unit

The unit is useful, when observing the specimen characterized by double refraction. In this model of microscope, observation and photography by polarized light can be made simply by inserting the polarizer into the illuminator tube and the analyser under the objective mount, eliminating the need for tedious manipulation such as changing eyepiece and objective.



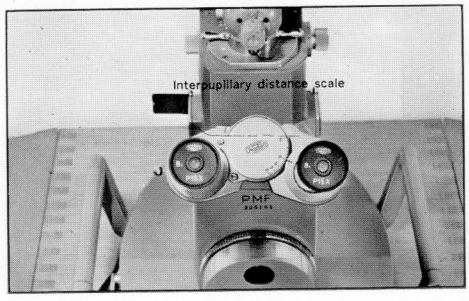
Illuminating unit

As the light source, an incandescent lamp bulb 6 V, 5 A is employed. The condenser system, view field diaphragm, aperture diaphragm, phase contrast ring slit, bulb centering device are all incorporated in the illuminator tube, in the middle of which an opening is provided for inserting the polarizer.



Eyepiece tubes

The microscope is provided with a pair of eyepiece tubes for binocular observation. Interpupillary distance can be regulated in the range of 55-75 mm by adjusting the hinge by hand. Diopter adjustment is accomplished, after the right eye focusing is obtained, by screwing in and out the left-hand eyepiece until exact focusing with the left eye is attained, without moving the fine focusing knob. In this position easy and untired binocular observation may be continued.

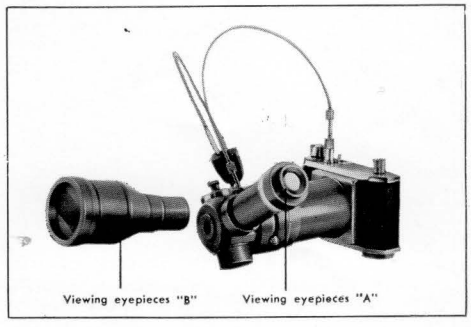


Finder Eyepieces

The following two types of interchangeable finder eyepieces are provided, and they can be attached to a 35 mm photomicrographic equipment according to requirement.

Finder Eyepiece "A".....is for high magnification microscopy using the M40X or M100X objective.

Finder Eyepiece (with projection screen) "B".....is for low magnification microscopy using the M6X or M10X objective. The size of the image on the focusing screen is as same as that of on the film plane.



OPTIONAL ACCESSORY

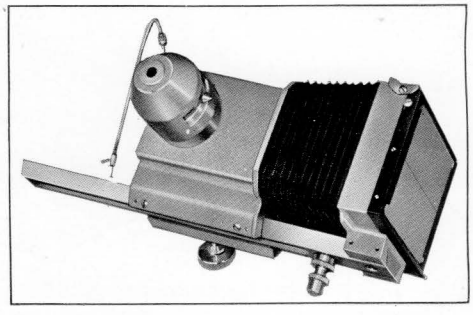
Photomicrographic plate camera attachment Model PM-K

Specifications:

Plate size	82 mm × 102 mm
Length of camera	250 mm — 390 mm

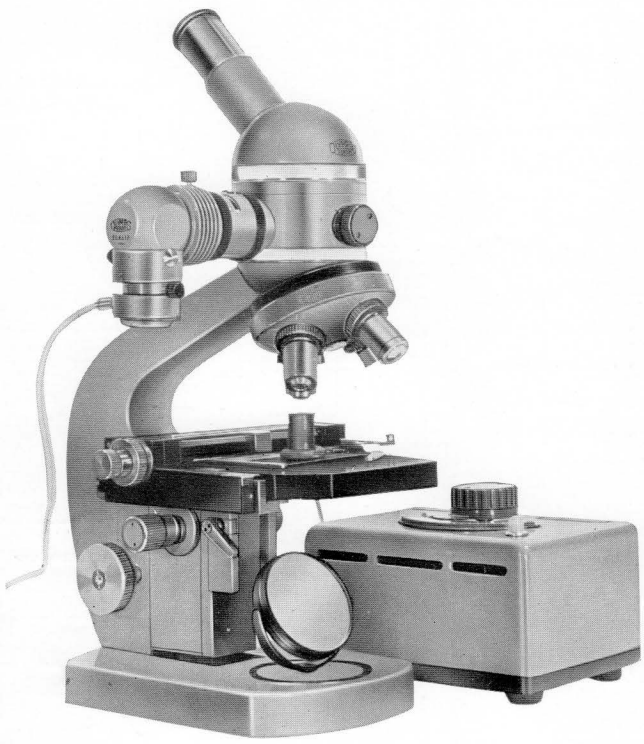
Standard set:

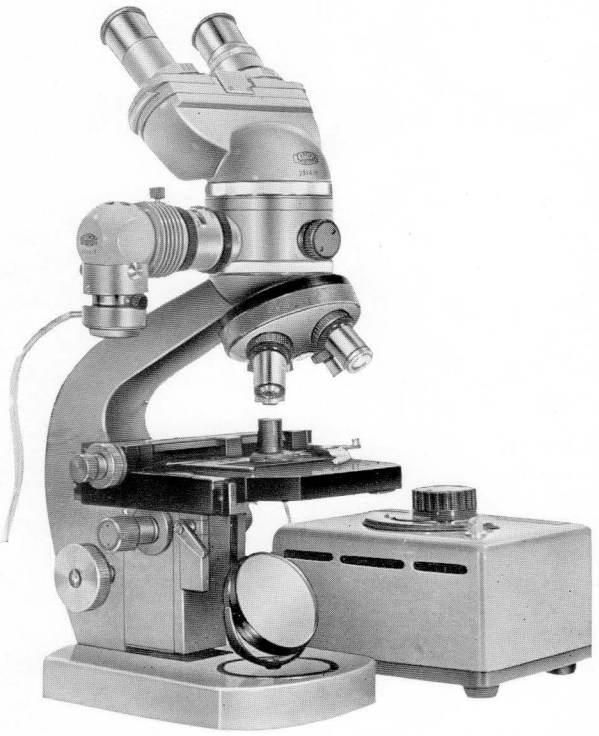
Plate camera body	1 pc.
Focusing magnifier	1 pc.
Plate holder (No. 1-6)	6 pcs.



Olympus is introducing an outstanding metallurgical microscope Model MF, which offers numerous features and highest microscopic performance.

All important controls are located low in one compact zone of convenience to allow fatigue-free manipulation and withstand hard usage.





Model MF

FEATURES

(1) Focusing: Focusing is performed by raising and lowering the stage. Coarse and fine adjustment handles are at the lower part of the microscope for convenience in operation.

(2) Microscopic photography (microphotography): The microscopic body is fixed on the arm, which prevents outfocusing when taking a picture that is usually caused by unintentional sliding of the body.

(3) Easy Observation: The head with an inclination of 45° and rotative through 360° will put the observer free of fatigue and enable the user to observe from any side of the microscope.

(4) Interchangeable Head: Also available are a binocular head for an easy observation and a trinocular head for an immediate microscopic photography while making binocular observation.

(5) Nosepiece: The objective nosepiece is of ball-bearing mechanism and revolves lightly with positive click stops.

(6) Illumination Unit: Includes a compensation lens for low power objective lenses.

OPTICAL SYSTEM

Optical System Characteristics

Objectives	Numerical Aperture	Eyepieces	Total Magnif.	True Fld. of View	Wkg. Dist.	Depth of fld.	Focal length
M6×	0.12	P 7× P10× P15×	42× 60× 90×	2.90 mm 2.14 1.54	13.80 mm	131.7 μ 100.9 77.0	27.4
M10×	0.25	P 7× P10× P15×	70× 100× 150×	1.8 1.3 0.95	6.50	36.4 27.6 20.9	18.5
M40×	0.65	P 7× P10× P15×	280× 400× 600×	0.45 0.33 0.24	0.68	4.14 3.22 2.50	5.0
M100× (oil immersion)	1.30	P 7× P10× P15×	700× 1,000× 1,500×	0.18 0.13 0.095	0.35	0.961 0.760 0.604	2.1

Model MF

SPECIFICATIONS

Weight: Approx. 15.5 kg (body 6.6 kg. transformer 2 kg, cabinet 7 kg.)
Height: Approx. 350 mm
Head: Standard Set: Monocular inclined head (45° from horizontal, rotative through 360°) with a separate straight tube for microphotography.
Special Set: Binocular head (other features same as above)
Trinocular head

Optical Equipment:
(Mechanical Tube Length 200 mm)
Objectives: M6×, M10×, M40×, M100× (oil immersion) ..... 1 each
Eyepieces:
Inclined Monocular Head P7×, P10×, P15× ..... 1 each
Inclined Binocular Head P7×, WF10×, P15× ..... 1 pr. ea.
Inclined Trinocular Head P7×, WF10×, P15× ..... 1 pr. ea.
Microphotography P7×, P10×, P15× ..... 1 each
Nosepiece: for 4 objectives, ball-bearing mechanism with position indicator for each objective
Magnifications: 42× to 1,500×

Illumination Unit:
Light Bulb: 6 V 2A clear and smoked glasses
Illuminator: Radiating, capable of centering the filament, including a compensation lens for low magnification illumination.
Transformer: Graded voltage, 6 V 5 A.

Focusing: Raising and lowering of the stage by the coarse and fine adjustment knobs.
Coarse Adjustment-Rack & pinion.
Fine Adjustment-Lever & microscrew, vertically movable approximately 2 mm with graduated scales of 0.005 mm.

Stage: Square, with a mechanical stage for cross-movement of the specimen, 72 mm east-west and 50 mm north-south.

Reflector: For trans-illumination for low magnification observation.

Filter: 1 each of yellow and green.

Standard Set

1. Body with an inclined monocular head (45° from horizontal), rotative. (Also including a straight tube for microphotography, and illuminator, and a mechanical stage) ..... 1 set
2. Eyepiece, P7×, P10×, P15× ..... 3 pcs.
3. Objectives, M6×, M10×, M40×, M100× (oil-immersion) ..... 3 pcs.
4. Illumination bulb 6 V 2 A (2 each of clear & smoked bulbs) ..... 4 pcs.
5. Transformer, 6 V 5 A ..... 1 set
6. Filters, yellow & green, 1 each ..... 2 pcs.
7. Metal slides ..... 5 pcs.
8. Reflector for trans-illumination for low magnification observation ..... 1 set
9. Cargille Oil ..... 1 btl.
10. S-shaped Spanner ..... 1 pc.
11. Cabinet and plastic cover ..... 1 set

Special Sets

A. Inclined binocular head, MF-Bi (with a separate straight tube for microphotography):

Eyepieces	1 pair each of binocular P7×, WF10×, P15×
Objectives	M6×, M10×, M40×, M100× (oil immersion)
Magnification	42× to 1,500×

B. Trinocular Head, MF-Tr:

Eyepieces	1 pair each of binocular P7×, WF10×, P15× & 1 each of microphotography P7×, P10×, P15×
Objectives	M6×, M10×, M40×, M100× (oil immersion)
Magnification	42× to 1,500×

INVERTED TYPE METALLURGICAL MICROSCOPE Model ME

Creative engineering and quality construction are combined in the COMPACT, INVERTED METALLURGICAL MICROSCOPE MODEL ME.

STANDARD SET

Microscope body with stage, quadruple revolver nosepiece and eyepiece tube	1
Eyepieces: P7×, P10×, P15×	1 each
Objectives: M6×, M10×, M40×, M100× (oil immersion)	1 each
Stage plates	2
Filters: yellow and green	1 each
Polarizer and analyzer	1 each
Lamp bulbs: Clear 6 V. 2 A	2
Frost 6 V. 2 A	2
Wooden carrying case with lock and key	1

Model ME

SPECIFICATIONS

Body: Inverted type with quadruple revolver nosepiece.
Monocular eyepiece tube inclined 30 degrees.

Focusing: Up and down of the stage by the coarse and fine adjustment knobs.
Range of coarse adjustment: 18 mm up and down by rack & pinion.
Range of fine adjustment: 2 mm up and down by ball guide.
Maximum graduation of fine adjustment: 0.002 mm

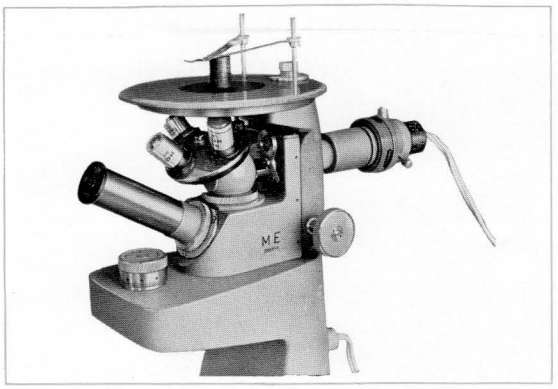
Stage: Manipulated round stage, 144 mm in diameter.
Movement range: 10 mm forward and sideways.

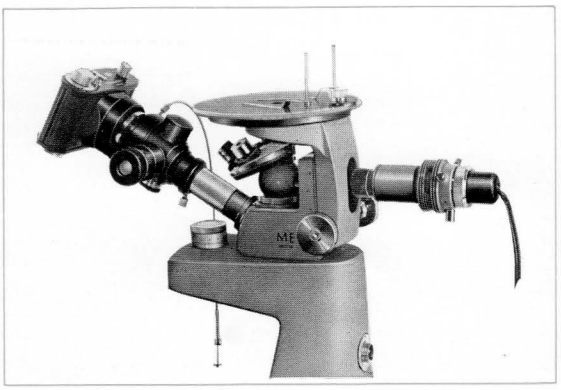
Illumination:
Bulbs: 6 V, 2 A. (clear and frost)
Lamp housing: Two centering screws are provided, by which the lamp filament may be centered.
Built-in swing-out compensator lens for M6×
Transformer: 6 V, 5 A built-in the base.

Optics: Mechanical tube length 200 mm.
Eyepieces: P7×, P10×, P15×
Objectives: M6×, M10×, M15×, M100× (oil-immersion)
Magnification: 42× to 1,500×

Weight: Approx. 11.5 kg. (microscope 5.5 kg, carrying case 6 kg.)

Height: Approx. 350 mm





TRANSPARENT ILLUMINATION (OPTIONAL)

ME microscope is practicable for transparent-light by using Transparent Illuminating Apparatus which is particularly provided.
In this case, detach the Stage-Fixing-Screw and fit the Transparent illuminating apparatus prop up to it. Light source is required to use Lamp House only separated from vertical illuminator.
In case the Mechanical stage is used, utilize the installing hole opening on the stage. However, when transparent-light is used, N.A. 0.42 Condenser is required.

METALLURGICAL MICROSCOPE Model MJ

With the years' experience in development of Metallurgical Microscope, Olympus now presents another new model .....

Model MJ to meet ever increasing exacting demands of scientific research. Compact in size and light in weight ..... it's easy to carry around. Permits examinations on the desk and also on-the-spot examinations of an object in original size and shape in the factories. This is Junior Model of the Olympus Metallurgical Microscope Model MF..... up-to-date in its performance and best suited for the college students and for the technicians on the job.

SPECIFICATIONS

Weight: Approx. 9.5 kg (body 5 kg, transformer 0.5 kg, cabinet 4 kg.)

Height: Approx. 230 mm

Head: Standard Set: Monocular inclined head (45° from horizontal, rotative through 360°)

Special Set: Binocular head
Trinocular head

Optical Equipment:

(Mechanical Tube Length 200 mm)

Objectives: M6×, M10×, M40× ..... 1 each

Eyepieces: Inclined Monocular Head P10×, P15× ..... 1 each
Inclined Binocular Head, WF10×, P15× (paired)... 1 pr. ea.
Inclined Trinocular Head, WF10×, P15× (paired)... 1 pr. ea.
Microphotographic lens P10×, P15× ..... 1 each

Nosepiece: for 4 objectives, ball-bearing mechanism with position indicator for each objective.

Illumination Unit:

Light Bulb: 6 V 2 A clear and smoked glasses

Illuminator: Radiating, capable of centering the filament, including a compensation lens for low magnification.

Transformer: Uniformed voltage 6 V

Focusing: Raising and lowering of the body by the coarse and fine adjustment knobs
Coarse Adjustment-Rack & pinion.
Fine Adjustment-Lever & microscrew, vertically movable approximately 1.2 mm with graduated scales of 0.002 mm.

Stand: Pillar and stage with stage clips and metal stage plate.

Filter: 1 each of yellow and green.

Standard Set

1. Body with quadruple nosepiece and stand ..... 1 set
2. Interchangeable monocular tube inclined 45°, rotative through 360° ... 1 pc.
3. Vertical illuminator ..... 1 pc.
4. Transformer (uniform voltage 6 V) ... 1 pc.
5. Eyepieces: P10×, P15× ..... 1 each
6. Objectives: M6×, M10×, M40× ... 1 each
7. Filter: Green & Yellow ..... 1 each
8. Light bulb: 6 V 2 A/12 W (frosted)... 2 pcs.
   6 V 2 A/16 W (clear)..... 2 pcs.
9. Plastic dust cover ..... 1 pc.
10. Wooden cabinet ..... 1 pc.

Special Sets

A. Inclined binocular head, MJ-Bi (with a separate straight tube for microphotography):

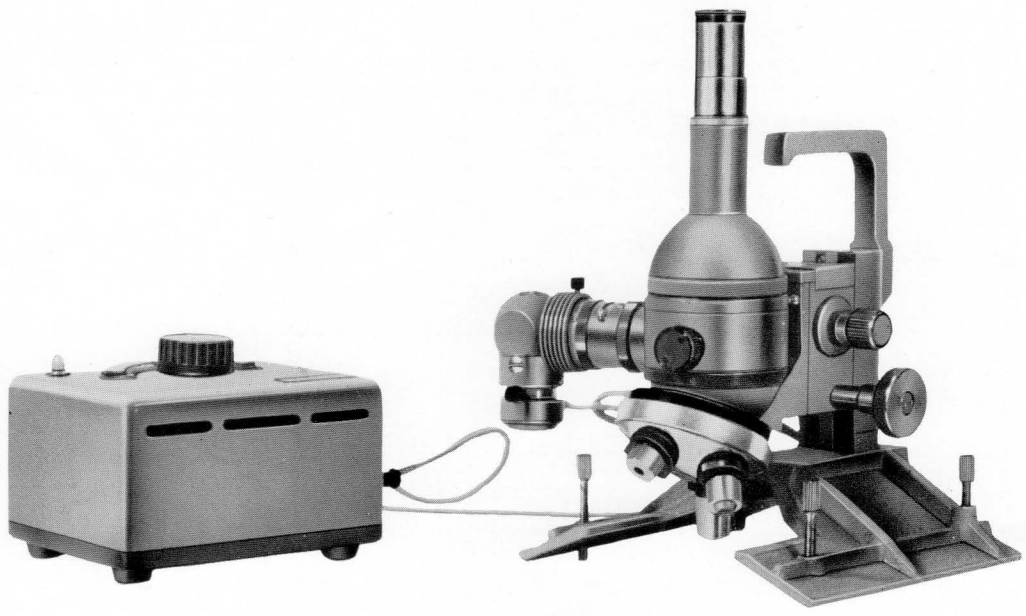
Eyepieces	1 pair each of binocular, WF10×, P15×
Objectives	M6×, M10×, M40×
Magnification	60× to 600×

B. Trinocular Head, MJ-Tr:

Eyepieces	1 pair each of binocular, WF10×, P15× 1 each of microphotographic lens, P10×, P15×
Objectives	M6×, M10×, M15×
Magnification	60× to 600×

METALLURGICAL MICROSCOPE Model MR

On-the-spot quality and structure inspections of any metal goods can be performed in the factory by simply laying this Roll-microscope. Will apply to examine a sort of shaft in rolling-mills, ships, vehicles, turbins, etc., as well as cast iron, iron and steel materials.



FEATURES:

1. Micro-photographic unit can be attached.
2. Easy to carry. All equipment including transformer and photographic attachment can be put in one carrying case.
3. Examination of the object of uneven surface can be performed by adjusting the pins of saddle-shape base
4. Caved part of object can be examined to the depth of approximately 7 mm from bottom of the base

SPECIFICATIONS:

Head: Detachable straight monocular head

Optical Equipment:

Mechanical Tube Length 200 mm
Eyepieces: P7×, P10×, P15×
Objectives: M6×, M10×, M40×
Nosepiece: for 4 objectives, ball-bearing
Magnification: 42× to 600×

Illumination Unit:

Light Bulb: 6 V, 2 A clear and smoked glasses
Vertical Illuminator:
Radiating, capable of centering the filament, including a compensation lens for low magnification illumination.
Transformer: 6 V, 5 A

Focusing: Raising and lowering the microscope body by coarse and fine adjustment knobs.
Coarse Adustment: Rack & Pinion with working range vertically 45 mm.
Fine Adjustment: Double lever system. Working range vertically 2 mm with graduated scale of 0.005 mm.
Filters: Yellow and green, one each.

Base: Saddle-shape base. Can be placed direct on objects. Adjustable to fit any object of roller shape bars having larger diameter than 25 mm, and or plane surface objects.
Object less than 25 mm in diameter can be examined by utilizing normal metal plate for metallurgical microscopy. The whole base is lined with plastic material to protect the object from being damaged.

Case: Carrying case.

OPTIONAL ACCESSORIES

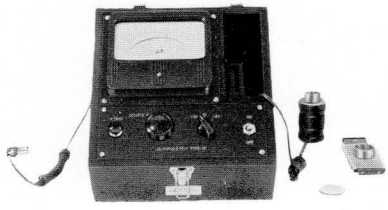
Small Photomicrographic Apparatus, PM-6

The PM-6 is a photomicrographic unit designed exclusively for taking full-size photographs on a 35 mm film. Fits all types of biological and metallurgical microscopes of all makes.

- ○ Shutter speed: B, 1–1/50 sec.
- ○ Size of image: 24 mm × 36 mm
- ○ Specimen can be observed while photographing
- ○ Has insertion opening for photo cell of photomicrographic exposure meter.
- ○ Available for all eyepieces except 5× power.
- ○ Shock-proof shutter prevents shutter vibration and insures no blurred pictures.
- ○ Magnification on the film plane: about 1/3× of total magnifications of microscope.

Photomicrographic Exposuremeter, EMM-IV (equipped with CTR)

This equipment is used for photomicrography in which proper exposure is hard to determine. Exposure failures are especially frequent in color film photomicrography; so use EMM-IV.



Filar Micrometer Eyepiece OSM

Accurate measurement of a minimum of 0.0001 mm is feasible by inserting this eyepiece into the tube of the microscope. When mounting it on monocular inclined head, binocular head or trinocular head, first remove the auxiliary lens on the bottom section, and insert the eyepiece into the eyepiece sleeve.

Metallurgical Plan Achromatic Objectives

M Plan 40×

M Plan 120× (oil immersion)

These two objectives are completely free of spherical aberration and especially suitable for photomicrography.

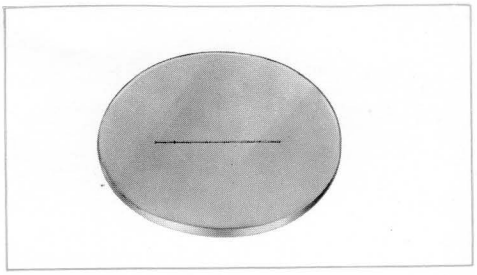
Objectives	Numerical aperture	Focal length	Free working distance
M Plan 40×	0.63	5.07	0.40
M Plan 120×	1.25	1.65	0.17

OPTIONAL ACCESSORIES

Eyepiece Micrometer and Objective Micrometer

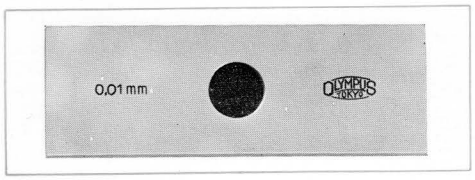
These are used to measure the size of specimens.

(1) Eyepiece Micrometer OEM: A round glass plate, 10/100 mm, 19 mm in diameter.

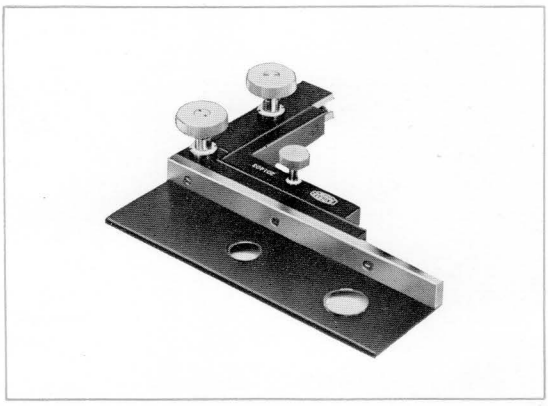


Metallurgical Objective Micrometer MOM

(2) Objective Micrometer MOM: A metal plate with glass disc—1/100 mm, 26×76 mm.

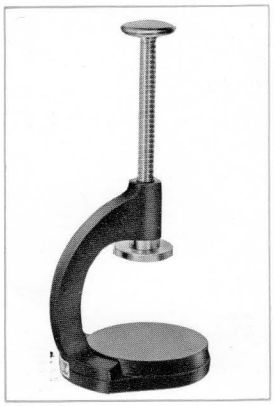


Metallurgical Mechanical Stage MKM



Handpress (for specimen) HP

Place some oil-clay on the metal slide and the specimen on top of it. Press them by the handpress so that the specimen will be right-angled toward the optical axis.

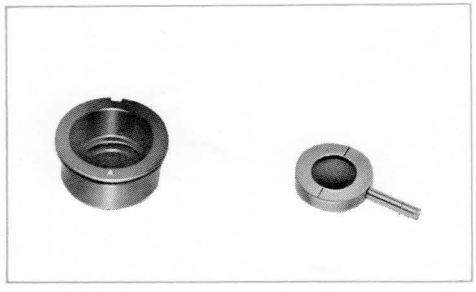


Grain Size Eyepiece WF10X

The grain size eyepiece has 8 grain size charts along the outer edge of the field and by these charts, comparison with the specimen is made rapidly.

Eyepiece WF 10X with Micrometer 10/100 mm, helicoid system

Polarizing unit for models MJ, MR & MF



Lens Container

This is a container specially made for microscope lenses. With a desiccant (silica gel) at the bottom of the container, lenses can be kept completely free of moisture and dust. The plastic top permits to check the lenses from outside without removing the top, and it is very convenient to keep the lenses in order.

Capacity: 7 lenses (up to 57 mm high)
3 filters (up to 33 mm in dia. and 3.5 mm thick)

Olympus optical Co., Ltd. 3-7 Ogawamachi Kanda Chiyoda-ku Tokyo, Japan

British Agents

METALLURGICAL SERVICES

Reliant Works : Betchworth, Surrey, England
Telephone : Betchworth 2 3 6 4

As we are continually improving and developing our products, the equipment supplied may not agree in all details with the descriptions and/or illustrations shown in this catalog.

41.4.5MS
Printed in Japan