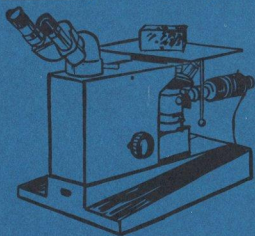


REICHERT
AUSTRIA

METAVERT



Reichert METAVERT

Inverted microscopes are ideally suitable for incident light work, especially in metallography, since the automatic orientation of the specimen simplifies and speeds up the work with the instrument. The microscopes available so far have, however, been either large research instruments or small microscopes which no longer meet the requirements of the modern metallurgical laboratory.

The METAVERT is based on a new approach aimed at improving the optical performance, the instrument stability and the operating convenience. Special importance is attached to the ease of fitting a variety of photomicrography equipments in view of the increasing importance of documentation. At the same time provision is made for adding accessories in stages to suit various applications.

The METAVERT therefore represents a new type of microscope with construction and cost adapted to everyday use while its optical and mechanical performance includes it among the advanced instruments. It is the ideal microscope for medium-size routine and control laboratories, for student use in intermediate and higher teaching establishments, for large laboratories to reduce the load on the existing research microscopes.

Excellent rigidity

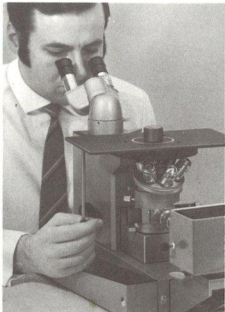
The focusing motions operate only on the nosepiece. The stage and the body do not have to move and are rigidly attached to the heavy base. This results in excellent rigidity and a constant working height for both stage and body.

Adjustable coarse motion stop

Reproducible setting for any particular specimen plane; specially useful when working with immersion objectives.

Ideal observation position

Viewing height of eyepiece: 34 cm.
Stage height: 19 cm.
Arm rests for convenient operation of focusing control and stage.



Vertical camera arrangement

Unrestricted use of all automatic or semiautomatic camera types. Convenient operation, no auxiliary stand required.

Free choice of body

All bodies are interchangeable and rotate on the annular dovetail groove on the stand. All manipulations on stage and specimen are reproduced upright and unversed through the built-in intermediate optics.

Free choice of stage

New universal gliding stage for rectangular or oblique specimen movement—suitable for scanning large and heavy specimens.

Free choice of optics

A carefully selected combination of planachromats, neochromats and fluorite objectives covers the steps of the ASTM Standard over the entire magnification range of $25\times$ – $1600\times$. New large-field eyepieces supplement these objectives and provide plane, high-contrast images up to the edge of the large field.

The following modern contrast techniques are available:

- bright ground
- dark ground
- polarization
- interference contrast

All these techniques can be employed with a single set of parfocalised and centered objectives mounted on the quadruple or sextuple nosepiece.

Free choice of light source

15 W low-voltage lamp for visual examination.

100 W quartz-halogen lamp for photomicrography, especially when using contrast methods.

HBO 50 mercury-vapor lamp for incident-light fluorescence microscopy.
18 W low-voltage lamp on jointed stand for external illumination.



**Bright ground
Polarization**

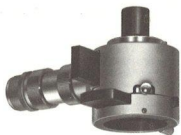
METAVERT S

The standard incident-light equipment with built-in aperture and field iris diaphragm provides for adjustment of Koehler illumination and thereby achieves optimum image contrast.

Polarized light allows rapid recognition and examination of heterogeneous materials and is frequently used also to increase the contrast of individual structural details. Changeover from normal bright ground to polarized light only involves inserting the polarization filter. A slider carries the polarizer which can be rotated a few degrees from its zero position, as well as a neutral filter and a clear opening. The neutral filter protects the microscopist against dazzle when the examination technique is changed. The plain opening permits optimum illumination for photography and microprojection.

In addition to the fixed analyser there is provision for a rotating analyser for special investigations and measurements; it can be rotated through 360° and read to 0.1° . Depolarization effects in bodies and cameras are prevented by built-in compensating plates.

Compensators of various design can be inserted into the incident light equipment at 45° .



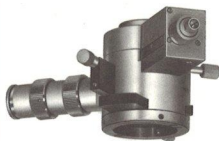
**Bright ground
Dark ground
Polarization**

METAVERT U

Examination in bright ground, dark ground and polarized light.

The UNIVERSAL incident-light equipment provides a combination of these three most widely used techniques.

Dark ground illumination is particularly useful for high-contrast presentation of contours on semiconductor surfaces, grain boundaries on metals, scratches on polished surfaces and various other types of fault which may even be below the resolution limit of the objective. The changeover from one technique to another consists of moving a slider which carries the dark ground diaphragm, the polarizer which rotates through $\pm 5^\circ$, and a neutral filter. The latter protects the microscopist against dazzle when changing from dark ground or polarized light to bright ground. Another aid in the change from dark ground to bright ground is the aperture diaphragm preselector ring. It allows accurate reproduction of the selected position of the aperture iris diaphragm by a simple rotation against a preset stop.



**Bright ground
Polarization
Interference contrast**

METAVERT IK

Examination in interference contrast, polarized light and bright ground. Interference contrast after Nomarski is one of the latest techniques for optical contrast improvement. It can often be employed successfully when normal bright and dark ground illumination, and even phase contrast, are unable to produce satisfactory results. Where structural details exhibit a uniform reflectivity and therefore lack any visible differences in brightness or color, there is still in general some form of surface relief. These extremely fine changes in level, sometimes as small as 30 \AA , can be reproduced as a clear bright-dark 3-dimensional contrast against the background, or can be presented in contrasting interference colors. Corresponding specimen details exhibit similar colors when using color contrast so that they can easily be correlated. Examination in interference contrast can be performed at all standard magnifications from $100\times$ to $1600\times$.

The elements of the interference contrast equipment are permanently fitted to the instrument but can be swung out of the beam.

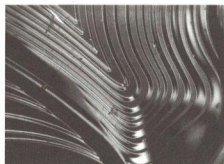
U — AL — Fe — Mn Alloy
bright ground, $200\times$



Al — Mg — Zn Alloy
dark ground, $63\times$



Silicon carbide
interference contrast, $50\times$



METAVERT 111 NH STANDARD 161 B 6

for incident-light work with bright ground illumination

Magnification range 50×–1000×

Stand with rectangular gliding stage

15 W low-voltage lamp

STANDARD incident light equipment

Sextuple nosepiece

Planachromat 4/0,08

Achromat 8/0,15

Achromat 16/0,25

Achromat 40/0,55

Fluorite 80/0,90

Binocular body B

Eyeieces PK 12,5×

Ref. No. 92 02 21

**METAVERT 111 ND
UNIVERSAL-POL 242 B 5**

for incident-light work with bright ground and dark ground illumination by normal and polarized light

Magnification range 25×–500×

Stand with rectangular gliding stage

15 W low-voltage lamp

UNIVERSAL-POL incident-light equipment

Quadruple nosepiece

Planachromat 4/0,08

Epi Achromat 8/0,15 np

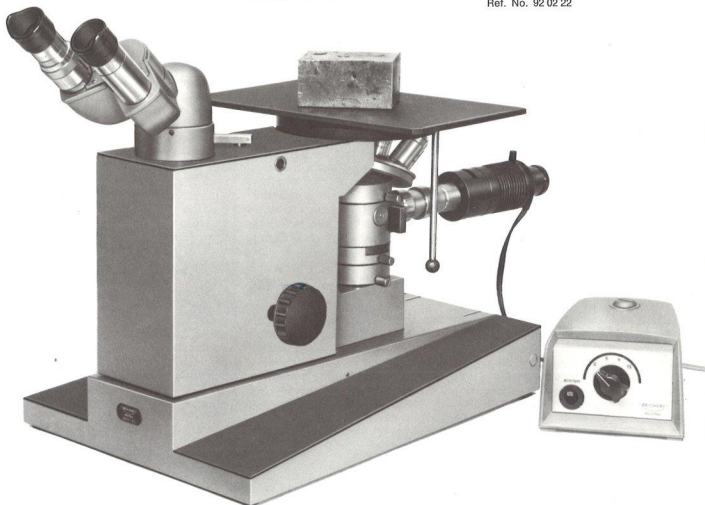
Epi Achromat 16/0,25 np

Epi Achromat 40/0,55 np

Binocular body B

Eyeieces PK 6,3× and PK 12,5×

Ref. No. 92 02 22



Objectives		Ref. Numbers				
		Working distance in mm	Bright ground	Bright ground, polarization, and interference contrast	Bright ground and dark ground	Bright ground, dark ground, and polarization
Plan	4/0.08	5.0	22 82 15			
Achro, Epi	8/0.15	17.12	22 54 15	22 54 65	22 54 16	22 54 66
Achro	10/0.16 *)	11.6	22 63 15			
Achro, Epi	16/0.25	4.8	22 55 15	22 55 65	22 55 16	22 55 66
Achro, Epi	40/0.55	0.7	22 57 15	22 57 65	22 57 16	22 57 66
Fluor	63/0.75	0.29	22 58 15	22 58 65		
Plan	63/0.85 **)	0.27	22 88 15	22 88 65		
Fluor	80/0.90	0.23	22 59 15	22 59 65		
Plan	80/0.90 **)	0.22	22 89 15	22 89 65	22 89 16	22 89 66
Fluor Oil	125/1.30	0.23	22 60 15	22 60 65		
Plan Oil	125/1.25	0.26	22 90 15	22 90 65		

*) special objective for grain size and structure measurement

**) available from 1972

METAVERT 111 US IK-POL 162 B 6

for incident-light work with interference
contrast and bright ground illumination by
normal and polarized light
Magnification range 50 \times –1000 \times

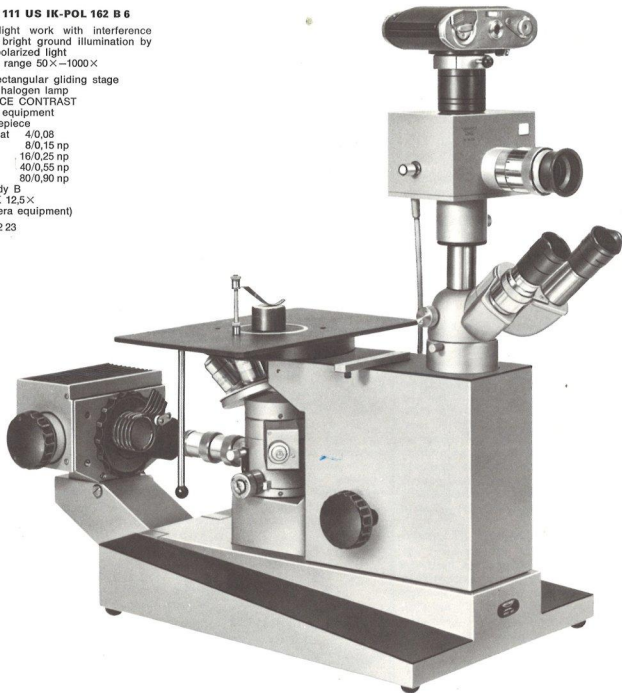
Stand with rectangular gliding stage

100 W quartz halogen lamp
INTERFERENCE CONTRAST
incident-light equipment
Sextuple nosepiece

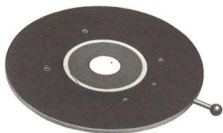
Planachromat 4/0,08
Achromat 8/0,15 np
Achromat 16/0,25 np
Achromat 40/0,55 np
Fluorite 80/0,90 np

Binocular body B
Eyepieces PK 12,5 \times
(without camera equipment)

Ref. No. 92 02 23



		Magnification	
		Eyeiece PK 6,3 \times Ref. No. 25 03 01	Eyeiece PK 12,5 \times Ref. No. 25 06 01
Plan	4 : 1	25 \times	50 \times
Achro, Epi	8 : 1	50 \times	100 \times
Achro, Epi	16 : 1	100 \times	200 \times
Achro, Epi	40 : 1	250 \times	500 \times
Fluor, Plan	83 : 1	400 \times	800 \times
Fluor, Plan	80 : 1	500 \times	1000 \times
Fluor, Plan	125 : 1	800 \times	1600 \times



Universal gliding stages

A patented guidance system permits directed movement in the North-South or West-East direction or in any other desired direction. They are operated by means of a single lever.

The following are available:
stage plate 150 mm diameter
stage plate 150×250 mm



Mechanical stage

A mechanical stage with 75×50 mm movement is attached to a 155×150 mm stage plate. Low coaxial controls are fitted. The stage position can be read to within 0.1 mm.



18 W Low-voltage lamp

It is attached to the side of the microscope on a jointed stand and can be moved in all directions. The illumination can therefore be arranged from above, from the side or from below.



6 V, 15 W Low-voltage lamp

Color temperature 2900° K
Its performance and cost make it suitable for every-day use, for visual examination and for photography in monochrome or color.



Different neutral and color filters can be fitted to reduce the light intensity or provide color contrast.



Lux US lamp housing

The precentered base takes the following:



Halogen lamp 12 V, 100 W

Color temperature 3200° K
This has about 3 times the brightness of the low-voltage lamp and provides a continuous spectrum. It is particularly suitable as light source for color photography, cinemicrography and for all microscopic techniques which require not only bright but also color-correct images (e.g. interference contrast).



Mercury-vapor lamp 50 W

This lamp is intended for fluorescence microscopy.

As light source in the visible range the HBO 50 offers an appreciably greater subjective brightness than the low-voltage lamp. The color reproduction is, however, influenced by the discontinuous spectrum; it is recommended only for monochrome photography of low-brightness specimens or for micro-projection.



Observation and photographic bodies

The bodies are easily and accurately interchangeable on an annular dovetail groove. All bodies, including the binocular body, have a $1\times$ tube factor and constant tube length. The following bodies are available:

inclined monocular body

inclined binocular body

inclined monocular body with photo tube

inclined binocular body with photo tube intermediate photographic body (tube factor $1.25\times$) with beam splitter.



Grain size and structure measuring eyepiece

The following structure standards, mounted in rotating discs, are available for routine grain size measurements: ASTM hexagonal graticule No. 00-12 ASTM irregular graticule No. 00-12 Jernkontoret graticule austenite No. 6 to 14, ferrite No. 6-14.

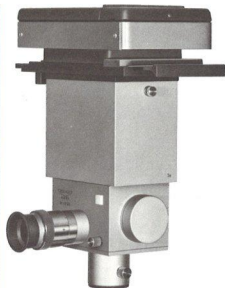
Scale for coarseness of lamellar graphite precipitations in steel according to the Verein Deutscher Eisenhüttenleute und ASTM, Ref. No. 1-8.



Photo Automatic with exposure time indication

Special fully-automatic camera for 24×36 mm photomicrography.

An electronic shutter gives exposure times from $1/250$ sec up to extremely long times. The exposure meter operates either on the entire field or on a single point only. A highly corrected vario lens provides continuous adjustment of the magnification over a 1.6-to-1 range. The film transport operates automatically. Factor keys permit the user to alter the automatically selected exposure time.

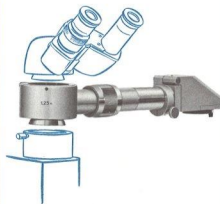


KAM ES with exposure time indication

Semi-automatic camera system for photomicrography at 24×36 mm, 6.5×9 cm and Polaroid $3\frac{1}{4}\times 4\frac{1}{4}$ " as well as for cinemicrography. The electronic shutter gives exposure times from $1/250$ sec. The exact exposure time is set in accordance with a green signal lamp. Any of the Plancompens eyepieces can be used as photo lens. A recording attachment allows signs such as arrows, numbers, clock times to be projected on the film plane.

Remica III, Kam VBX

The cameras for 35 mm and for 6.5×9 cm are mounted on an intermediate fitting with mechanical shutter. The exposure time is measured either with our "Kam ES-phot" electronic exposure meter or with a commercially available exposure meter.



Drawing equipment with image projection

The microscopic image is viewed simultaneously with the drawing surface; copying or high-lighting, of structural details becomes a simple routine task. Drawings, grids etc. can also be projected into the microscope. Tube factor $1.25\times$.



Projection head

All photo lenses can be used. A special Fresnel lens is fitted and ensures uniform illumination. Tube factor $1\times$.

Reichert Instruments

Biology and Medicine

MONOPAN student and teaching microscope
NEOPAN teaching and laboratory microscope
DIAPAN research microscope
ZETOPAN large research microscope
FLUORPAN fluorescence microscope
IMMUNOPAN diagnostic fluorescence microscope
ZETOPAN with BINOLUX large fluorescence equipment
BIOVERT laboratory and research microscope (inverted type)
Me F 2 universal camera microscope (inverted type)
Phase and Anoptral contrast equipment
Interference contrast equipment

Metallurgy and Metallography

METAPAN incident light microscope
METAVERT laboratory microscope (inverted type)
ZETOPAN research microscope
Me F 2 universal camera microscope (inverted type)
High-temperature microscope
TELATOM remote control microscope (inverted type)
Phase and Anoptral contrast equipment
Interference contrast equipment

Petrography and Mineralogy

NEOPAN-POL teaching microscope
NEOPAN-POL II laboratory microscope
DIAPAN-POL large polarization microscope
ZETOPAN-POL polarization research microscope

Thermal Microscopy

THERMOPAN hot and cold stage microscope
-50 to +350° C
THERMO-DIAPAN hot and cold stage microscope
TC 400 control unit, 0 to 410° C
Hotbench +50 to 260° C
VACUTHERM high-speed furnace
+20 to 1800° C
BIOTHERM biological hotplate
+35 to +40° C

Photomicrography

35 mm PHOTO-AUTOMATIC with exposure indication
KAM ES electronic camera system
KAM VBX attachment camera
REMICA miniature camera
Micro cine equipment
Micro flash equipment

Micro Projection and Demonstration

VISOPAN projection microscope
Projection head
Micro television equipment
DIDAKTOSKOP projection attachment
Drawing equipment
Double demonstration eyepiece

Microtomy

Om E sledge microtome
Om S serial section microtome
Om P freezing microtome
Om Z hand microtome

Ultramicrotomy

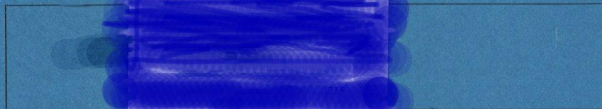
Om U 3 ultramicrotome
Om U 2 ultramicrotome
TM 60 specimen trimmer
HK 120 heating and cooling plate
LP 18 illumination plate
KT 100 polymerisation unit
FM 90 special microscope
REFLEXOMAT accessory for ultramicrotomy
FC 150 low-temperature freezing equipment

Stereo Microscopy

MAK MS, stand with coordinate movement
MAK KS, stand without coordinate movement

Micro Measurements

Micro spectrophotometer
Micro hardness tester
Incident-light interferometer
Micrometer eyepiece
Measuring and counting eyepieces



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