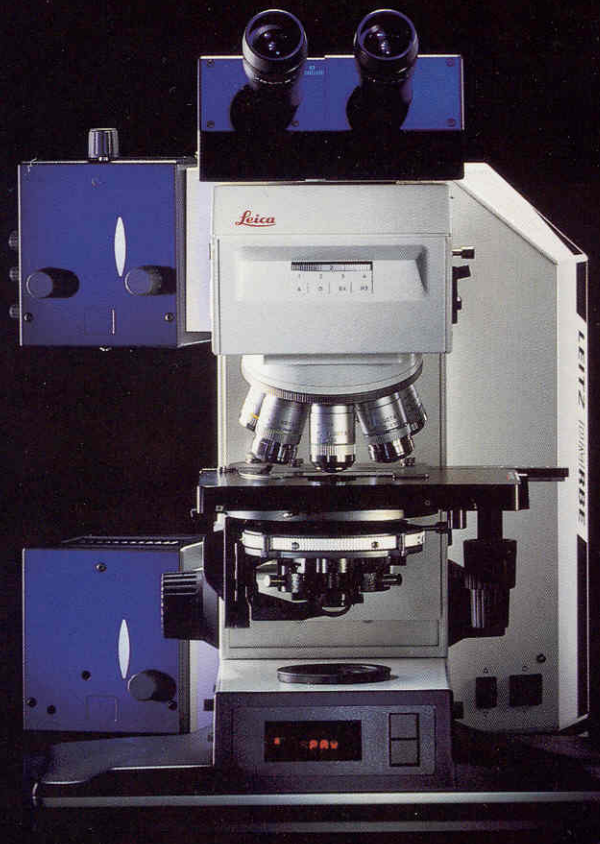
DAS Mikroskop

LEITZ DMRB/E



The microscope for biology/medicine

Leica

DAS Mikroskop
LEITZ DMRB/E

The workstation

DAS Mikroskop
LEITZ DMRB/E* optimized for biological applications is part of the new line of microscopes with infinity optics from Leica Wetzlar: *DAS Mikroskop* LEITZ DMR.

Due to its consistently modular design, *DAS Mikroskop* DMRB/E can be equipped for individual requirements. You can now put together your own personal microscope, ideally suited to the job you are doing.

This means:

- *individual choice of tube*
- *a microscope for observation can be upgraded for TV applications or for automatic photomicrography*
- *motor focus with coded objective nosepiece*

All accessories for *DAS Mikroskop* LEITZ DMR are freely interchangeable.

* E = electronic focus

DAS Mikroskop for biological application

As a transmitted light microscope for applications in biology and medicine, *DAS Mikroskop* LEITZ DMRB/E is prepared for all contrast techniques. Just add the components you actually need to produce the desired optical contrast:

- *septuple nosepiece*
- *upgradable for fluorescence*
- *interchangeable condensers*
- *optional Bertrand lens*
- *interchangeable tubes*
- *fluorescence version with incident light axis*

DAS Mikroskop LEITZ DMRB/E is available with integrated incident light axis for those who work with fluorescence.


LEITZ DMRBE
Leica

The Optics

Universal optics with infinite tubelength

Objectives with infinite image distance have a light path parallel to the optical axis for one point in the centre of the field of view. This is also known as an infinite light path. The tube lens concentrates this parallel light path into one point in the centre of the image. Additional optical elements such as beamsplitters, DIC-prisms, analysers and compensators can be introduced into this infinite light path between the objective and the tube lens without disturbing the focus position of the objective and the tube lens, i.e. object or image. This principle is called infinite tubelength and has the advantage that all techniques in incident and transmitted light can be used on one microscope with so-called universal optics.

A set of 7 universal objectives for transmitted/incident light can be fitted onto one nosepiece. This means that switching from incident to transmitted light and vice versa only requires the press of a button to turn the nosepiece.

Leica in Wetzlar was the first to introduce the infinite tube system for incident light microscopes in 1931. Other manufacturers took many decades to follow its example.

We have continued to develop this system and are now able to present the third generation of infinite objective systems, which will help you obtain even more accurate results in a far shorter time than before: DELTA optics.

DELTA optics – the new Leica philosophy of chromatic correction

Imaging lenses are never free of aberrations, but most of these can be eliminated by a combination of lenses.

There are 2 types of chromatic aberration:

- *Axial chromatic aberration; light of different wavelengths is focused at different points along the optical axis*
- *Lateral chromatic aberration; the blue portion of the object is magnified more than the red portion, causing colour fringes*

Both axial and lateral chromatic aberrations are fully corrected in the infinity objectives and the corresponding tube lens.
That means: all imaging planes are chrome-free.

Pupil position of the objectives

The higher the magnification, the shorter the focal length of an objective – the rear focal plane, i.e. the exit pupil of the objective becomes nearer and nearer to the front lens.

For transmitted and incident light interference contrast ICT/ICR the geometry of the beam-splitting or -uniting DIC-prism must be matched to this pupil position. This means that each objective magnification should really have its own DIC-prism, or the height of the prism ought to be adjusted every time the objective is changed.

However, the new range of objectives has 4 standardized pupil positions labelled from A to D so it is easy to switch the right prism. As some objectives have the same pupil positions, 2 – 3 objective prisms are sufficient for a complete IC outfit. The prisms are suitable for both transmitted and incident light.

All Leica Wetzlar objectives are made of specially chosen glass types to keep lens strain to a minimum. The polarization-optic phase differences caused by residual strain are in the Angstrom to nanometre range, i.e. in atomic dimensions. All pupil-regulated objectives are therefore suitable for interference contrast work.

The working distances of all the dry objectives are as large as possible. For immersion objectives, however, the working distance must be as small as possible to minimize the influence of the temperature of the immersion layer on image quality.

If the working distance of the objective is smaller than 2 mm, the front part of the objective has telescopic spring-loading to avoid damage to the object and objective in case of operation errors. The front part of immersion objectives can even be pushed in and locked to prevent oil dropping on objects when the nosepiece is rotated.

New eyepiece concept

The eyepieces are all suitable for viewing with and without spectacles.

Eyecups are mounted on the eyepieces for viewers without spectacles to ensure exact coordination of the eye and microscope pupil positions for fatigue-free viewing.

Spectacle wearers just remove the eyecups to access the exit pupil of the microscope.

All new-generation Leica eyepieces have provision for easy graticule insertion without special tools.

Eyepieces

The new LEICA L PLAN largefield eyepieces produce a sharply defined and chrome-free intermediate image:

The size of the visual field can be chosen independently of the viewing tube to suit the user's requirements.

The field sizes have been chosen to ensure efficient microscopy.

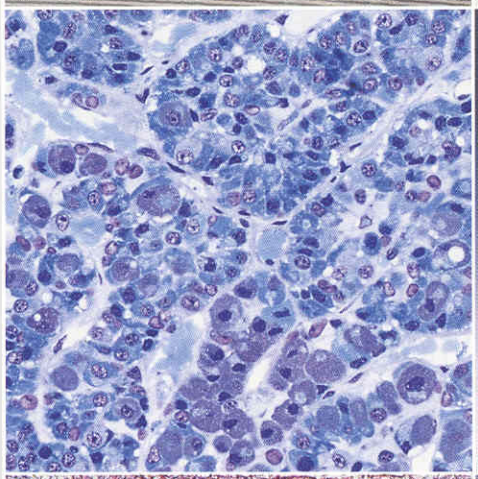
The following different eyepieces are available.

- *LEICA L PLAN 8x/25 M*
- *LEICA L PLAN 10x/20 M*
- *LEICA L PLAN 10x/25 M*
- *LEICA L PLAN 12.5x/16 M*
- *LEICA 16x/14 M*



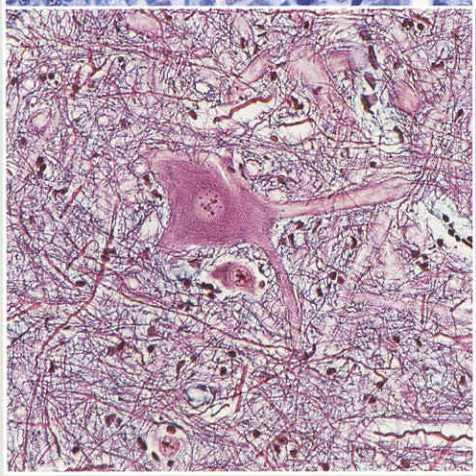




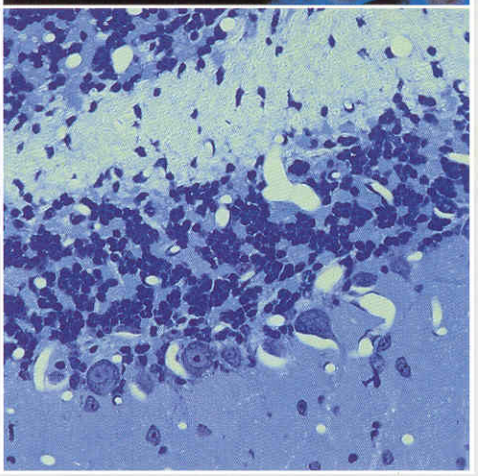












DELTA Optics
∞ optics with chrome free correction

Pitvitary gland, pig

Spinal cord, cat

DELTA optics
N PLAN series

DELTA optics
PL APO series

DELTA optics
eyepieces

DELTA optics
PL FLUOTAR® series

Hela-cells, AMCA/EB

Cerebellum, rat

The Light

Illumination

Up to 4 light sources can be fitted to *DAS Mikroskop* LEITZ DMRB and DMRBE:

- *2 x TL*
- *2 x TL/2 x IL*

Switchable mirrors allow fast and accurate changeover between different light sources, e.g. gas discharge and halogen lamp (fluorescence and IGS viewing) or halogen lamps with different intensity settings (change between BF and Phaco/ICT viewing).

Instead of a second light source a flash unit can be directly adapted, i.e. without any extra work such as the attachment of a mirror housing. This is switched automatically when the LEITZ DMRD photo system is triggered. Flash photography operation now takes on a completely new dimension.

Particularly important for everyday routine work:

- *lamphousings are fitted to the side of the microscope for easy centering*
- *integrated centering aid for IL*
- *lamphousing 105 with 12 V 100 W halogen lamp*
- *lamphousing 105 Z with interchangeable lamp sockets for 12 V 100 W, Hg 50 W, Hg 100 W (stabilized/non-stabilized), Xe 75 W*

The following systems are available:

- *switchable mirror on the side or back*
- *motorized switching of mirror on the side or back*
- *fixed lateral mirror*

If only the two rear light sources are used, a mirror is not required. The mirror systems can be used in both IL and TL. Two (switchable) mirror systems are therefore necessary for the configuration with 4 light sources. Filter adapters, in which filters can be inserted, are offered as options for all light sources. There is therefore wide scope for individual variation of lighting effects.

Built-in power supply

The 12 V 100 W built-in power supply feeds 2 independently switchable light sources. It is therefore possible to switch between two halogen lamps, no matter to which of the four ports they are connected. Not only the familiar switchover between IL and TL, but also, for example, switching from TL to TL with different filters is now possible in a fraction of a second. Simultaneous IL/TL illumination is easily achieved by connecting an external transformer.

Brightness is adjusted by 5 – 12 V analog potentiometer, guaranteeing exact matching of the light intensity to the specimen properties without entering the red area of the lower lamp voltage. An engageable neutral density filter for high intensities is integrated in the microscope stand.

Illumination light path

The whole illumination system from the lamp right down to the object has been optimized to the latest criteria in terms of homogeneity, intensity and chromatic correction, providing the basis for powerful and colour-neutral object illumination.

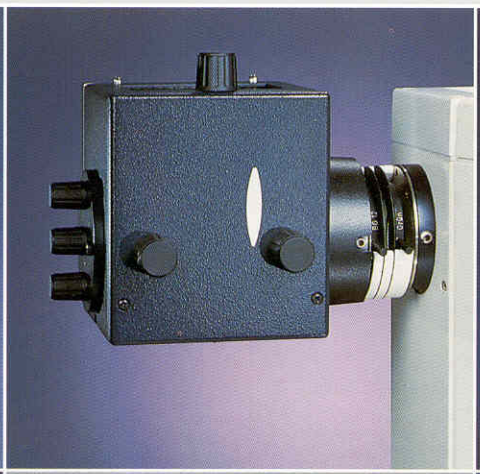
- *the illumination optics are encapsulated as protection against dust*
- *field and aperture diaphragms are accommodated in the microscope base*

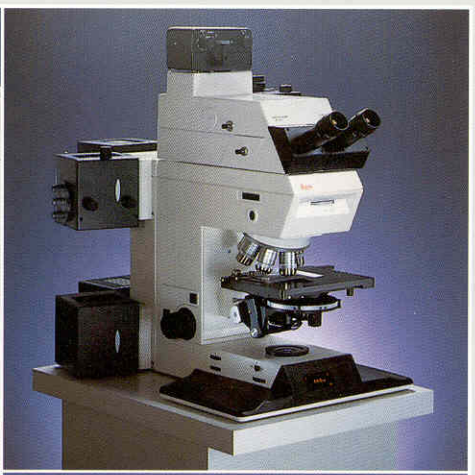
The field and aperture diaphragms are integrated in the base of the stand for easy operation. In this position, the contrast enhancement function of the aperture diaphragm remains fully effective even at low magnifications. Unlike conventional systems, Koehler illumination is therefore possible for low magnifications as well.

Optional filter magazines taking 4 standard filters each are available for the IL and/or TL axis for convenient light filtering. Together with the filter adapters at the light source, you can use these to create your very own quality of light.

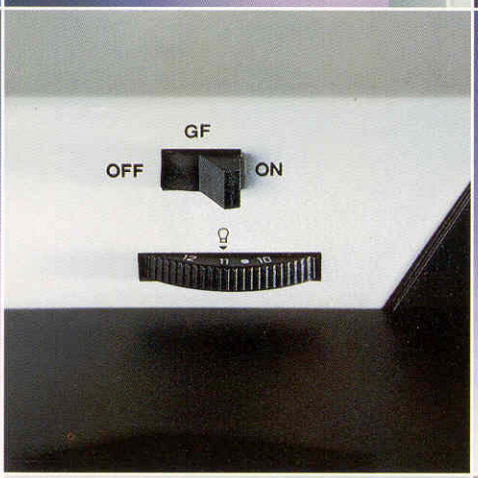
- *filters switched by ergonomically located keyfield*
- *one or more filters can be switched into the light path at the same time*

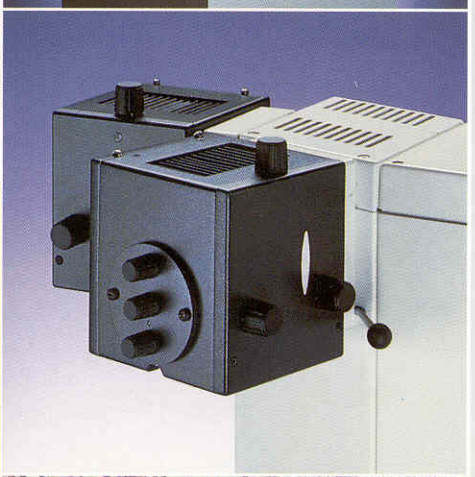


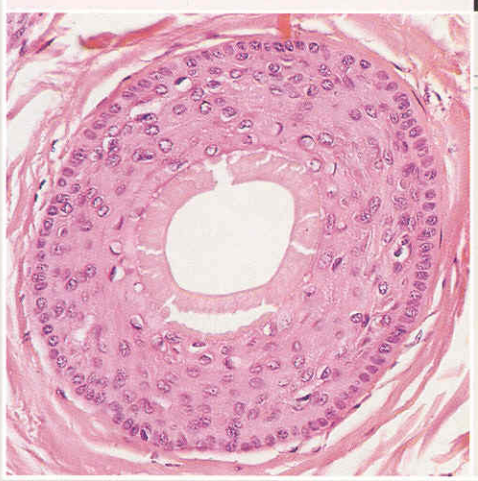


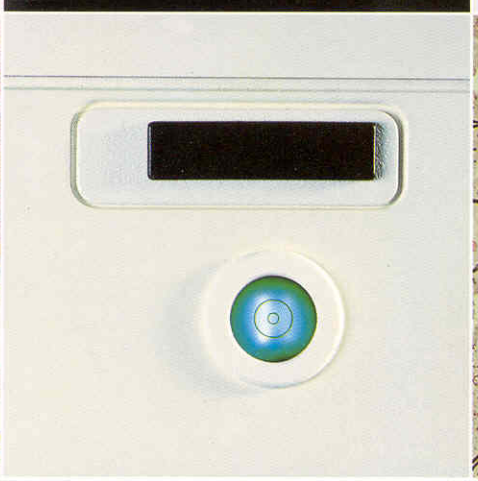














LEITZ DMRB with 2 light sources

Illumination mirrors

Human skin

Lamphousing 105 Z with filter adapter

Light control

Light centering device

LEITZ DMRBE (Fluorescence) with 4 light sources

2 lamphousings 105 Z with switchable mirror

Kidney, rat

The Light

3 condenser systems for TL illumination

UCE condenser

- *a condenser with hinged cap for objectives from 1.6 x – 100 x. The field diaphragm takes over the function of the aperture diaphragm for the 1.6 x – 6.3 x range, so even for the 1.6 x objective correct stopping down of the aperture is possible*

UC condenser

- *a luxury condenser for objectives from 2.5 x – 100 x, featuring dual hinged lens system to retain diaphragm functions (Koehler illumination). When the condenser top is swung out, two auxiliary lenses automatically move into the light path.*
- *reproduction of light intensity and Koehler illumination when objectives are changed by factor 4 with a patented technique of Leica Wetzlar*

When switching from

- *2.5 x to 10 x*
- *5 x to 20 x*
- *10 x to 40 x*

and engaging the hinged lens, neither the Koehler illumination setting nor the light intensity need readjusting.

Both condensers

- *are highly efficient due to a new hinged mechanism for the condenser front lens*
- *need not be lowered for viewing at low magnifications*

2 interchangeable light ring turrets are available for both condensers:

- *5-position turret for BF, DF, Ph1, Ph2, Ph3*
- *8-position turret for BF, DF, Ph1, Ph2, Ph3, 3 DIC positions or BF, –, Ph1, Ph2, Ph3, 4 DIC positions*

The contrast elements are easily adjusted by the user with the centering keys on both condensers.

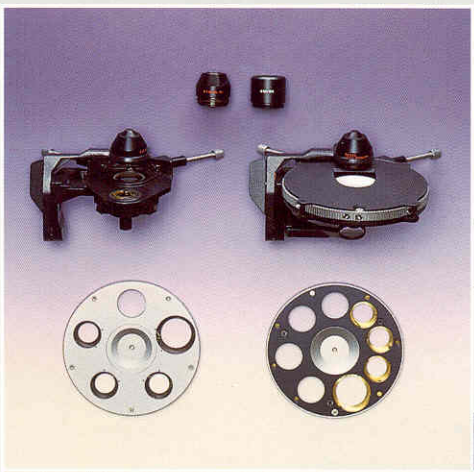
Either the UC or UCE condenser can be used on LEITZ DMRX/E, and be fitted with one of the following condenser tops:

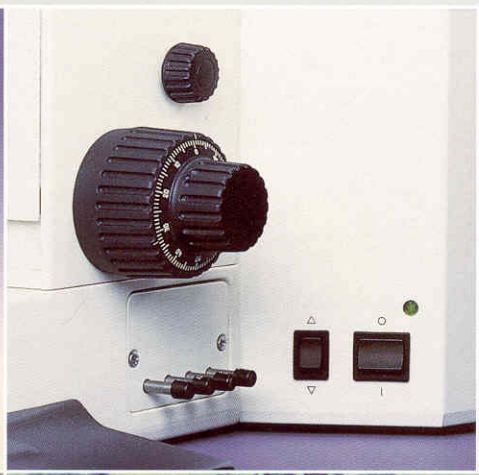
- *0.90 S1*
- *P 0.90 S1*
- *P 1.40 OIL*
- *0.50 S15*

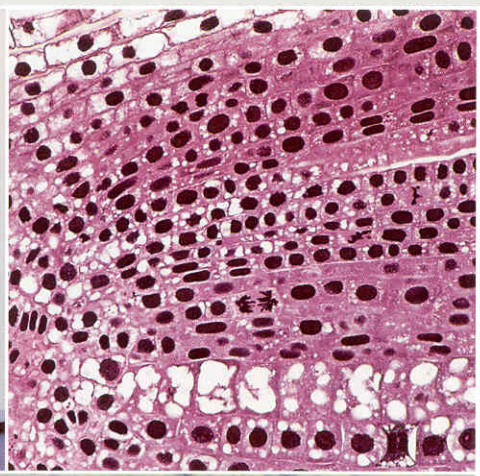
DF condenser

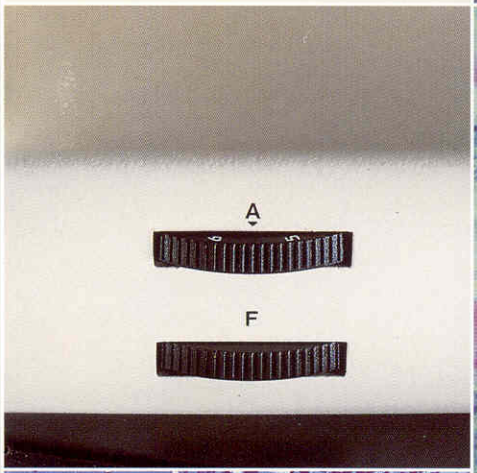
For most demanding dark-field applications there are two DF condensers:

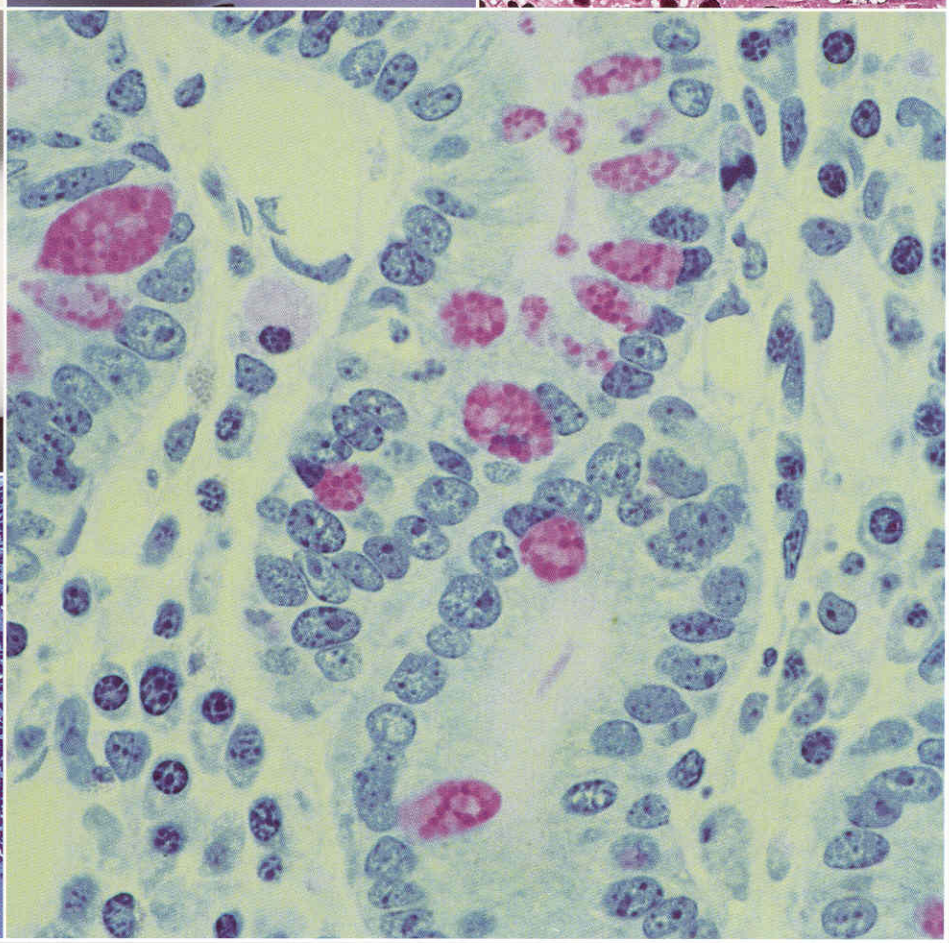
- *D 0.80 – 0.95*
- *D 1.20 – 1.44 OIL*

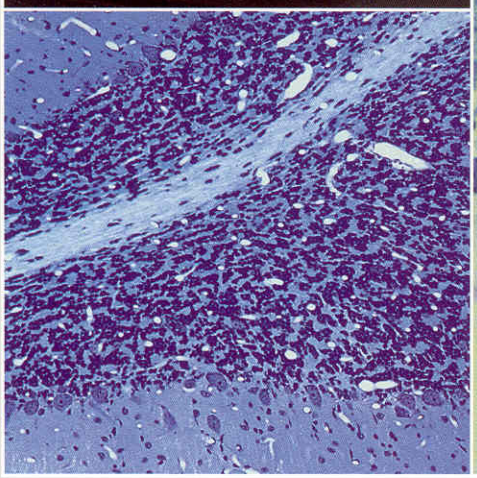












Condensers UCE/UC with 5-/8-position disc

Aperture- and field-diaphragm

Cerebellum, rat

Filter magazine, transmitted light

Small intestine, guinea pig

Onion root

The Contrast

Biological applications

DAS Mikroskop
LEITZ DMRB/E is prepared for all contrast techniques in transmitted light and several in incident light. The components for these contrast techniques are optional, so you can choose exactly the combination you need.

Darkfield contrast

► *UC/UCE universal condensers, 5- or 8-position light ring turret and a DF insert.*

Higher quality results are obtained with the special DF condenser D 0.80 – 0.95 or the DF condenser D 1.20 – 1.44 OIL for higher apertures.

Phase contrast

► *UC/UCE condensers and 5- or 8-position turret.*

A maximum of 3 light rings are required. The newly designed Phaco objective series feature

► *higher contrast and crisper definition.*

The optional integration of a Bertrand lens in the microscope stand permits quick checking of the light ring adjustment. The required centering keys are kept in a safe place in the condenser.

Polarization contrast

► *polarizer mount on condenser holder*

► *analyser slide in the upper part of the stand.*

A whole-wave compensator is cemented to one side of the analyser, so that Pol colour contrast can also be easily obtained.

Differential Interference Contrast

► *Differential Interference Contrast (DIC) is produced with standard objectives, as all our standard objectives are low in strain*

A total of 40 objectives are available for DIC.

The DIC-prisms for the illumination side are inserted in the 8-position turret of the UC or UCE condensers. On the objective side they are accommodated in an (optional) turret plate in the objective nosepiece to allow fast switching from brightfield or phase contrast to DIC.

Fluorescence

Up to four fluorescence filter systems (optimally matched combination of excitation filter, dichroic mirror and suppression filter) can be inserted horizontally in the dovetail guide of the ball-bearing turret plate of the incident light illuminator.

► *when switching from one filter block to another, image displacement is below the resolving power of a 35 mm film (double exposure!)*

For those extremely delicate yet precise applications where double exposure of two wave lengths is required, *DAS Mikroskop* LEITZ DMRB/E is the researchers choice.

A diaphragm module for insertion in the illuminating incident light path contains a light stop, centrable field diaphragm and switchable BG 38 filter for red attenuation of the background of the field of view in incident light fluorescence. An optional diaphragm module also has a variable aperture diaphragm which is useful for IGS observation, for example.

An extensive range of filter blocks for all fluorescence techniques is available for *DAS Mikroskop* LEITZ DMR, including a system for Texas Red and simultaneous viewing of double staining such as FITC/Texas Red and FITC/phycoerythrin (PE).

The newly designed semi-apochromatic P Fluotar objectives are ideal for obtaining a bright, high-contrast fluorescence image against a dark background.

Only glass types with low autofluorescence and high transmission in the uv range were used for these objectives. Their high numerical apertures result in bright fluorescence on a dark background with high optical resolution, enhanced contrast, colour purity and pin-sharp clarity over a visual field of at least 25 mm.

Combi contrast

Apart from the usual techniques, microscopes fitted for IL and TL also allow the use of combined contrast.

For example, TL Phaco can be combined with IL IGS. Other combinations are also sometimes useful, depending on the specimen and the application.

The chart opposite shows all the possibilities and the configurations.

There are up to 40 different combinations of contrast techniques for the LEITZ DMRB/E.













LEITZ DM/RBE (Fluorescence) with DIC (filtercube-changer open)

Polarizers, transmitted light

Polarizers, reflected light

Reflected light diaphragm modules

Bertrand lens

Filtercubes and beamsplitters

The Contrast

New device for image overlay and macroscopy

External pictures can be reflected into the microscope using the 50/50 beamsplitter prism in the FSA 25 E viewing and photo tube.

The pictures can be superimposed on the microscope image or individually observed and recorded in the microscope.

Reflection optics are supplied for this purpose with an adapter for the overlay of 35 mm slides. A set of slides with linear measurement scales, line patterns for grain and particle size determination and marker arrows is also available.

You can also make your own overlays by reproducing original measurement and tolerance patterns, special line patterns or logos on a 35 mm negative.

The reflection optics allow the adaption of the MACRO-DUAL ZOOM system with an even greater variety of possibilities, such as:

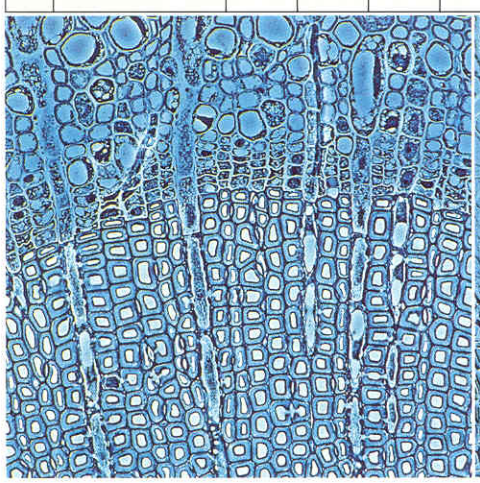
- ▶ *overlay of line patterns, rasters, logos, identification data*
- ▶ *macroscopic investigations*
- ▶ *microscopic drawing of object structures*
- ▶ *reproduction of text or pictures*

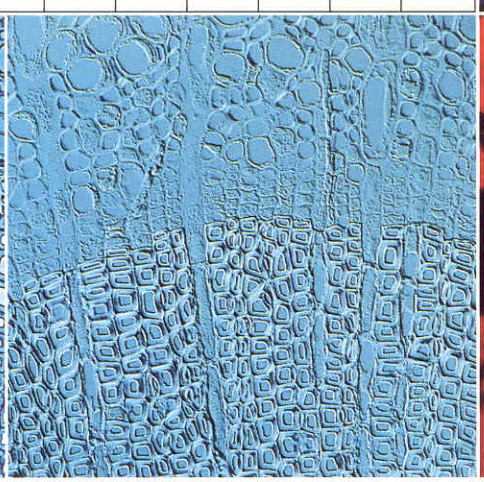
Using the standard pair of eyepieces, Plan L 10 x/25, the magnification range in the viewing tube is between 1.25 x and 12 x.

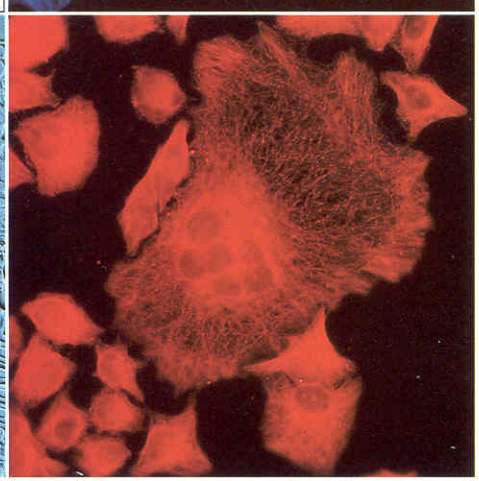
The visible object field for an eyepiece field of view of 25 mm is between 20 mm and 180 mm.

The image scale is continuously adjustable.

LEITZ DMRB/E LEITZ DMRB/E FLUORESCENCE		INCIDENT LIGHT									
			HF	DF	SB	ICR	POL-CONT.	POL	FLUO	IGS	INTER-FERENCE
TRANSMITTED LIGHT			●		●	●	●		●	●	
	HF	●	●		●	●	●		●	●	
	DF	●	●		●	●	●		●	●	
	PHACO	●	●		●	●	●		●	●	
	DIC	●	●		●	●	●		●	●	
	POL-CONTRAST	●	●		●		●		●	●	
	POL										







Contrast combinations

Pine, phaco

Pine, DIC

Hela-cells, FITC

Hela-cells, AMCA

Hela-cells, TEXAS RED

The Innovation

Electronic focus

Electronic focusing is a completely new feature in microscopy.

The focusing steps Coarse – Medium – Fine – Extra fine are easily switched by keystroke to adapt the microscope to the specimen and objective magnification. As part of this adaptation process, the "intelligent" objective nosepiece "remembers" the chosen step for each objective and switches automatically when an objective is changed. This memory also has an override facility so you can switch to a different step whenever you want by pressing a key. The fine focusing has resolutions of 1.5 µm, 0.7 µm and 0.1 µm.

As an alternative to the electronic focus, LEITZ DMR models are also available with conventional mechanical focus.

Electronic parfocality

After only one calibration an electronic parfocality of 0.1 µm is automatically established when an objective is changed.

Front-Display

The magnification of an objective is included during calibration. An easy to read front-display then indicates the magnification when the objective is turned into the light path.

Alternatively, the display can be switched to indicate the ± distance from the set upper threshold (focal plane), telling you how far you have gone above or below the focal plane. Values are displayed in µm increments (µm accuracy can therefore be achieved for thickness measurements).

The memory function of the calibration, the focus steps and the threshold are all independent of the mains or battery power supply and are therefore storable for an unlimited time. Unlike many memory systems, this solution requires no changing of batteries.

RS-232-C interface

All LEITZ DMR stands with electronic focus have an intelligent RS-232-C interface as preparation for connection to a computer.

The following functions are supported via the RS-232-C connection:

- ▶ *motorized focusing*
- ▶ *intelligent objective nosepiece*
- ▶ *secondary magnification (zoom) (for Variotube and LEITZ DMRD)*
- ▶ *photomicrography (for LEITZ DMRD)*

Focus finder (Semi-autofocus)

In addition there is a which fast adjustment enables the stage to be lowered at the press of a button to an individually set lower threshold (end position), e.g. for specimen/objective change, immersions etc. The upper end position can be set exactly in the focus, so that at the touch of a button, it is possible to travel right to the focal plane after an objective has been changed (semi-autofocus). No more troublesome searching for the focal plane after switching from survey magnification to high resolution oil immersion! This function is made possible by the parfocality switching of the objective nosepiece.

Objective nosepiece

LEITZ DMRB/E microscopes are equipped with a fixed septuple nosepiece.

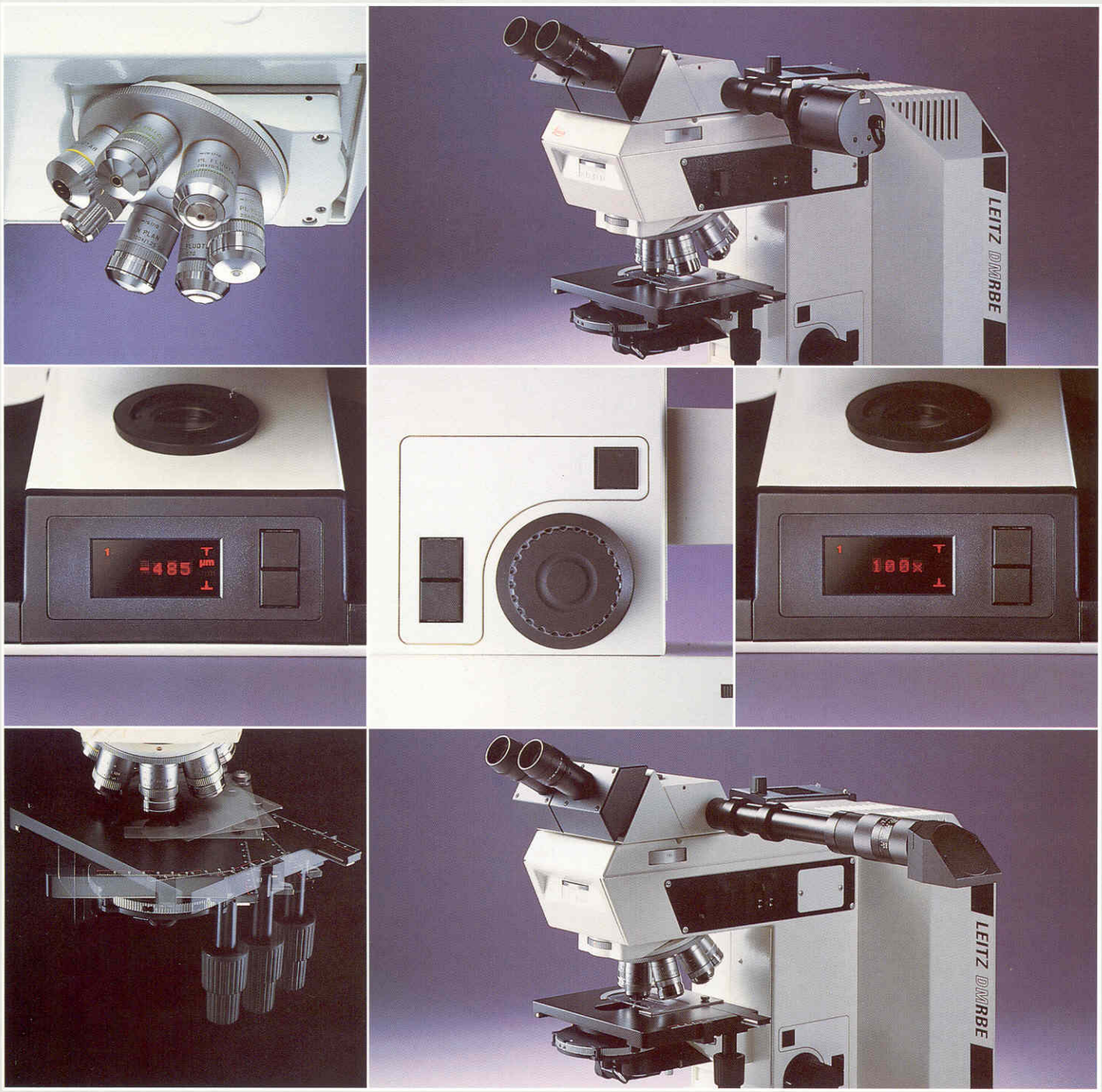
The nosepiece for the "E" models is coded for identification of the objective in the light path.

Standard specimen stage for biological applications featuring coaxial, vertically adjustable controls

The standard stage is a fixed mechanical stage with 110° rotation.

Besides the smooth, precise and easy-running stage movement, the vertically adjustable coaxial controls are extremely convenient to operate for effortless specimen scanning. Microscopy is also facilitated by the stage's 110° rotation facility, allowing:

- ▶ *easier positioning of specimen details for photomicrography*
- ▶ *more accurate alignment of graticules to microstructures*



Septuble objective nosepiece

Display of electronic focus

Turnable mechanical stage

Tube FSA 25 PE with diapositive overlay device

Electronic focus controls

Tube FSA 25 PE with macro-device

Display of electronic focus

Image documentation

A new universal range of observation and documentation tubes have also been designed for *DAS Mikroskop* LEITZ DMR which can be used on any of the DMR stands.

Universal features:

- *all tubes can be fitted for either 20 or 25 field of view*
- *each phototube can be equipped with either 1 or 2 photo exits*
- *each phototube can be used on any of the DMR stands*

Of course, all the tubes offer automatic tubelength compensation when the individual interpupillary distance is set. The following variants are available to suit different applications:

- *BSA 25 viewing tube*
- *FSA 25 P phototube*
- *FSA 25 PR phototube with additional back reflection for the ORTHOMAT® E and MPV*
- *FSA 25 PE phototube with additional exit for the macro device and diapositive overlay*

In principle all microscope stands can be used for documentation, i.e.

- *photography*
- *video*
- *PC documentation*

Motorized Variotube

Ultra convenient for sophisticated microscopy, featuring:

- *2 exits for TV and MPS camera attachments, switched by motor*
- *motorized zoom system 0.9 x – 2.5 x with freely programmable magnification steps e.g. for metallographic standard magnifications*
- *motor-switched beamsplitter 100 % vis., 100 % photo, 50 % vis./50 % photo*
- *intermediate image access for graticules at all exits*
- *diapositive, mask and macro overlay facilities*
- *adjustable viewing height*
- *field of view up to 28 mm*

The LEITZ DMRD fully automatic photo system

Besides offering the functions of the motorized Variotube, the LEITZ DMRD is a fully automatic, processor-controlled photo system for large format and 35 mm cameras with:

- *1 TV exit*
- *2 camera exits for 35 mm and large format*
- *processor-controlled exposure metering, integral or by a new 49-field measurement system*
- *fully automatic flash unit*
- *RS-232-C interface for storing photographic data on PC*

Photo TV module

The photo TV module fits neatly onto the FSA 25 P and FSA 25 PE phototubes, forming a rigid link with the microscope for vibration-free photography.

It offers:

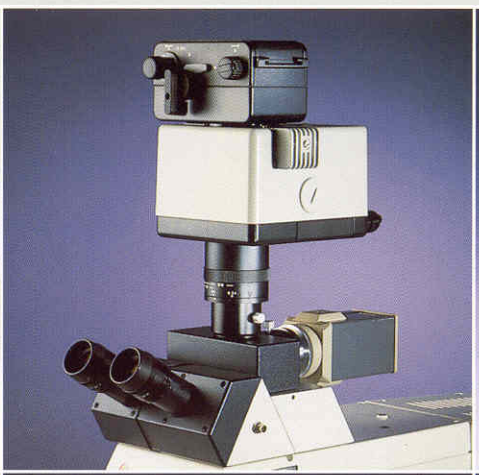
- *1 TV exit*
- *2 camera exits for 35 mm and large format*
- *1 intermediate image plane access for graticules for photo/TV*
- *overlay facilities via FSA 25 PE tube*
- *two-step magnification changer 2.5 x (standard) and 3.2 x*
- *integrated automatic exposure mechanism with integral and spot measurement*

MPS and ORTHOMAT® E microscope cameras

These cameras are LEITZ DMR adaptable by using the following components:

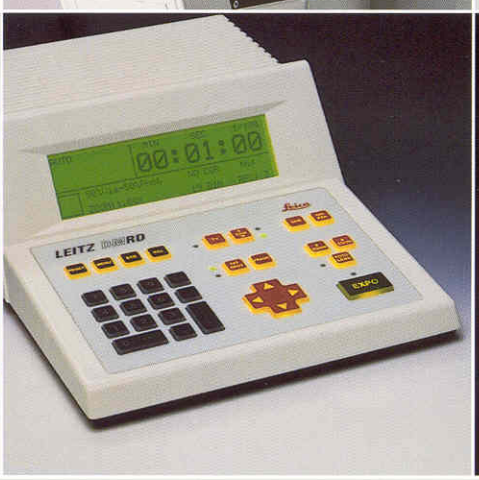
Attached to the FSA 25 P, FSA 25 PE (MPS) and FSA 25 PR (ORTHOMAT® E) phototubes.

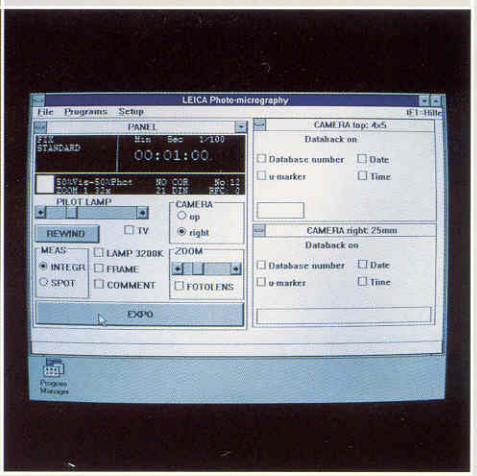
Further details on photo systems are given in the special brochure on image documentation.







Tubes

PC-aided photography

Automated phototube LEITZ DMRD

TV-adapter with 2 exits

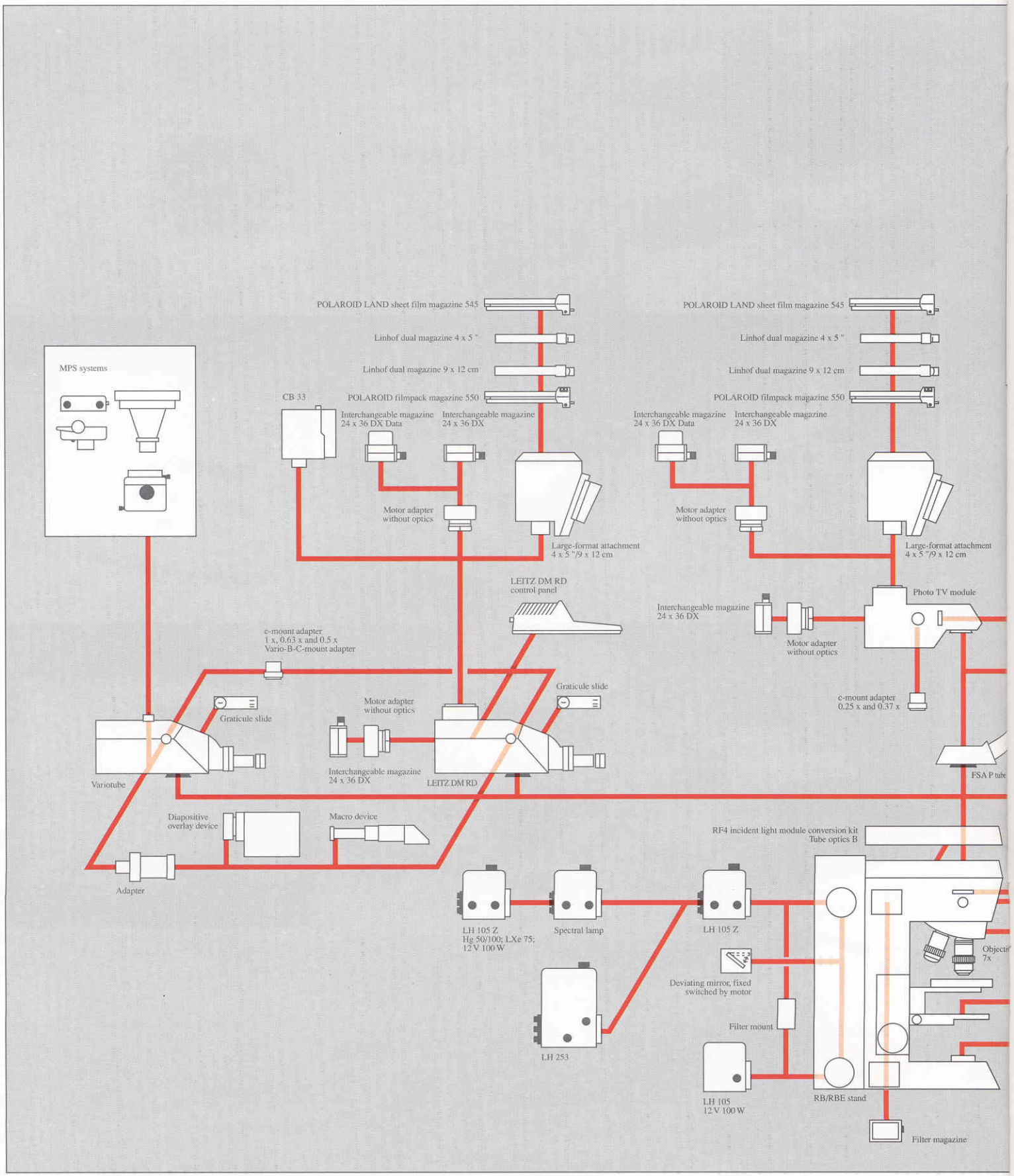
Photo-TV-module

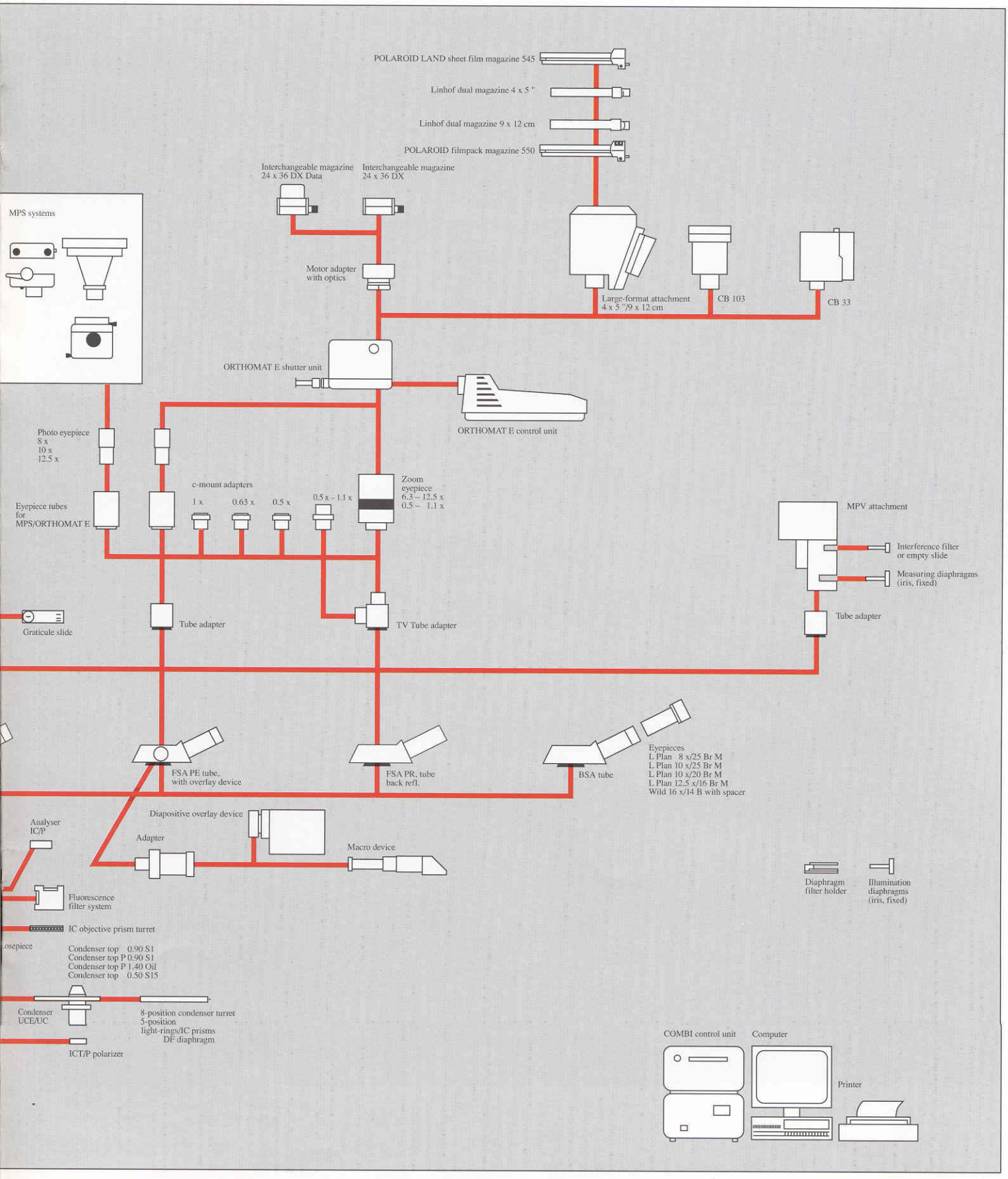
Control unit LEITZ DMRD

Variotube 28 VPE

Control unit PTM

LEITZ DMRD PC-menue


MPS systems
POLAROID LAND sheet film magazine 545
Linhof dual magazine 4 x 5 "
Linhof dual magazine 9 x 12 cm
POLAROID filmpack magazine 550
CB 33
Interchangeable magazine 24 x 36 DX Data
Interchangeable magazine 24 x 36 DX
Motor adapter without optics
Large-format attachment 4 x 5 "/9 x 12 cm
POLAROID LAND sheet film magazine 545
Linhof dual magazine 4 x 5 "
Linhof dual magazine 9 x 12 cm
POLAROID filmpack magazine 550
Interchangeable magazine 24 x 36 DX Data
Interchangeable magazine 24 x 36 DX
Motor adapter without optics
Large-format attachment 4 x 5 "/9 x 12 cm
LEITZ DM RD control panel
c-mount adapter 1 x, 0.63 x and 0.5 x Vario-B-C-mount adapter
Interchangeable magazine 24 x 36 DX
Motor adapter without optics
Photo TV module
c-mount adapter 0.25 x and 0.37 x
Graticule slide
Motor adapter without optics
Graticule slide
Variotube
Interchangeable magazine 24 x 36 DX
LEITZ DM RD
FSA P tube
Diapositive overlay device
Macro device
RF4 incident light module conversion kit Tube optics B
Adapter
LH 105 Z Hg 50/100; LXe 75; 12 V 100 W
Spectral lamp
LH 105 Z
Objecti 7x
Deviating mirror, fixed switched by motor
Filter mount
LH 253
LH 105 12 V 100 W
RB/RBE stand
Filter magazine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POLAROID filmpack magazine 550
Interchangeable magazine 24 x 36 DX Data
Interchangeable magazine 24 x 36 DX
MPS systems
Motor adapter with optics
Large-format attachment 4 x 5 "/9 x 12 cm
CB 103
CB 33
ORTHOMAT E shutter unit
ORTHOMAT E control unit
Photo eyepiece 8 x 10 x 12.5 x
c-mount adapters
1 x
0.63 x
0.5 x
0.5 x – 1.1 x
Zoom eyepiece 6.3 – 12.5 x 0.5 – 1.1 x
Eyepiece tubes for MPS/ORTHOMAT E
MPV attachment
Interference filter or empty slide
Measuring diaphragms (iris, fixed)
Graticule slide
Tube adapter
TV Tube adapter
Tube adapter
FSA PE tube, with overlay device
FSA PR, tube back refl.
BSA tube
Eyepieces
L Plan 8 x/25 Br M
L Plan 10 x/25 Br M
L Plan 10 x/20 Br M
L Plan 12.5 x/16 Br M
Wild 16 x/14 B with spacer
Analyser IC/P
Diapositive overlay device
Adapter
Macro device
Diaphragm filter holder
Illumination diaphragms (iris, fixed)
Fluorescence filter system
IC objective prism turret
osepiece
Condenser top 0.90 S1
Condenser top P 0.90 S1
Condenser top P 1.40 Oil
Condenser top 0.50 S15
Condenser UCE/UC
8-position condenser turret
5-position light-rings/IC prisms
DF diaphragm
ICT/P polarizer
COMBI control unit
Computer
Printer

Your personal microscope system
DAS Mikroskop LEITZ DMR

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- *Cryostats*
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Advantages for all users

- *Integrated modularity offers flexibility and saves time*
- *Modular combination of optical, mechanical and electronic components allows efficient adaptation to individual requirements*

DELTA optics with 3 complete series of optics

- *Superb results due to outstanding quality*
- *Optimum contrast and extremely high resolution*
- *Chrome-free correction*
- *Universal optics for transmitted and incident light*

Innovations

- *Individual illumination through possibility of connecting up to 4 light sources simultaneously*
- *Electronic focus with coded septuple objective nosepiece*
- *RS-232-C interface for connection of a computer*
- *Exact repositioning of focal plane after objective change with semi-autofocus*
- *Ergonomic operation through telescopic stage controls and 110° stage rotation*
- *Fully automatic photo system LEITZ DMRD for large format and 35 mm cameras*

Please refer to the "DELTA optics" list for further details of our range of objectives (code no. 913 754).

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Part-No. 501-053
Printed in Germany VIII/92/FFX/K.

Printed on chlorine-free bleached paper