



Leica FS C Leica FS4000

The next generation
of forensic comparison instruments:
Micro and macro easily mastered

Leica
MICROSYSTEMS

Leica Microsystems has already helped convict many criminals

Since the pioneer days of forensic evidence comparison, one name has always stood for quality – Leitz Wetzlar. Over the course of nine decades, Wetzlar comparison devices were constantly developed and improved in co-operation with leading forensic scientists from around the world. The company name has since changed, but the quality has remained the same. Leica Microsystems continues the tradition with its innovative comparison microscopes and macroscopes, the Leica FS4000 and Leica FS C.

Expert and instrument: a perfect pair

Clear and unambiguous evidence down to the smallest detail. Unmistakable, reproducible results: our comparison optics provide you with all these things and more. Leica's comparison devices are convincing because of their state-of-the-art technology and superior ergonomics. This not only benefits your health, but also increases your ability to concentrate. Your knowledge paired up with our instruments make for an unbeatable combination.



Leica Microsystems AG – Winner of the World's First Innovation Award:
German Business Innovation Award 2002

The core feature, the comparison bridge

The greatest ease of use with the highest optical performance capability with superior ergonomics means you can concentrate on what is important – your investigations

Whether it be fibre analysis, toolmark comparison or ballistics, the new comparison bridge allows even better and faster assessment of evidence through optimised comparison techniques with the greatest ease of use. At the touch of a button, you can select from the following observation methods:

- FullScreen left, FullScreen right
- Cross-section image with adjustable horizontal border line
- Cross-section image with adjustable strip for partial combination image
- Colour contrasting of non-conforming structures

Cross-section or combination image comparisons – the new comparison bridge offers both; at the touch of a button

The new freedom in cross-section comparison

The width and position of the border line can be adjusted as the user desires or set as a wide strip, in which both objects can be overlaid according to the combination image principle. The operating knobs are housed in the stand base in the most ergonomically correct manner possible.

Combination image

The complementary function of the colour filters renders uneven object structures in colour. The overlaying details only appear in their original colour in those places where there is no structural deviation.

High light utilisation means excellent reproduction of detail

The newly-designed beam path of the bridge uses the available light in a particularly efficient manner. Compared to its predecessor model, the light intensity has been doubled. The newly-developed beam-splitter prism, which guarantees complete colour neutrality and identical image qualities for the tube eyepiece and photo output, is the greatest contribution to this new level of efficiency.

The zoom function, ingeniously simple

Comparing deformed specimens or temperature-sensitive materials requires that the magnification of the left or right beam path be adapted accordingly. The FS bridge allows a zoom adjustment of +/- 4%. Zooming is as easy as child's play and is reliably safe from maloperation. The calibrated configuration is easily reproducible and is indicated accurately by an LED.



Cross-section comparison of a firing pin impression mark.



Leica Design by Christophe Apothéoz

The Leica FS4000 comparison microscope – comparisons with pinpoint accuracy

Now as before, comparison microscopy is the most versatile method for identification of microscopic evidence in forensics

Evidence may consist of hair, fibres, paint chips or similar items. With magnifications of up to 1000x and a wide variety of optical contrast procedures, such as fluorescence and polarisation, you are properly equipped for every kind of case. The prerequisites are that you have exactly identical magnifications, reproducible illumination, and colour neutrality of the left and right microscope image.

The unimaginably easy-to-use Leica DM4000 B

with fully automatic light management and integrated Variolux colour module, it is the ultimate microscope. Carefully selected optical pairs and reproducible illumination assure the highest possible degree of certainty for your comparisons. Your desired contrast method is available at the touch of a button, the microscope parameters are saved automatically by the software. Of course, Leica offers a wide variety of documentation options, such as photo systems and cameras with dedicated software and high-output image recording, as well as processing and archiving possibilities.





Leica Design by Christophe Apothéoz

The Leica FS C comparison microscope: simultaneous comparison

Highest optical performance, optimum stability, practical automation, custom-tailored configurations

In part because of Leica's co-operative efforts together with the world's leading crime labs, an instrument for forensic investigation has been created that will set new standards for the industry. The Leica FS C – Forensic Solution Comparison. In addition to the excellent ergonomics and ultra-stable design, the Leica FS C offers revolutionary technical innovations such as, for example, the motorised synchronous control of both stages. This allows you to compare evidence simultaneously in x and y without having to do without the complete overview in both part-images. Even pieces of evidence on inclined surfaces can be viewed easily with the simultaneous Z adjustment, as the task of refocusing using the individual focus drives has been made redundant. The ergonomic requirements for fatigue-free microscopy (even over long periods) are fulfilled by the comparison microscope in an impressive way. All operating elements, such as the buttons for selecting the observation modes, the focus buttons, the shaft encoders for the stages etc. lie within easy reach of the user.

The core features of the Leica FSC:

Ergonomics:

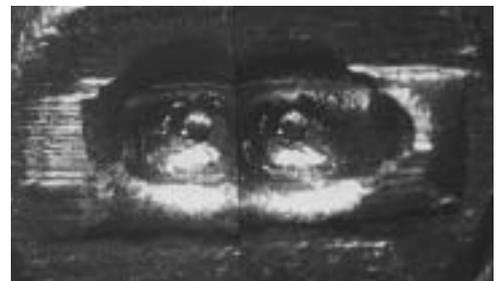
- integrated, adjustable-angle tube monocle
- centralised, ergonomic arrangement of all operational controls
- ergonomic remote control module (Smart Move) for X,Y, Z individually or synchronised
- motorised synchronous adjustment of X, Y and Z
- Ergo-Workstation (Leica FS C, work table and ergonomic chair)
- motorised, height-adjustable comparison bridge

The optics:

- highest optical performance via 4 apochromatic fixed objectives
- encoded 6x turret (also for microscope objectives e.g. PL FL 10x)
- 8 fixed magnification levels with motorised switching
- zoom function of the right comparison channel for deformed specimens
- colour-neutral comparison optics with newly developed prism
- reproducible illumination settings (oblique incident light)
- high-output, remotely controllable cold-light sources for all processes

System integration:

- display of X,Y,Z co-ordinates via PDA organiser
- transfer of all important instrument parameters directly into the database
- remote control of all motorised functions



Cross-section comparison of a striker impression mark.



Brilliant images with new objectives – evidence in perfect light

Optimum handling

Our new forensic workstation proves how carefully we have researched the demands of microscopic workplaces. You can easily adjust the settings of the microscope/macroscope, work table and chair to any body size. The result: relaxing work, even for many hours at a time.

The optical system – discover new horizons

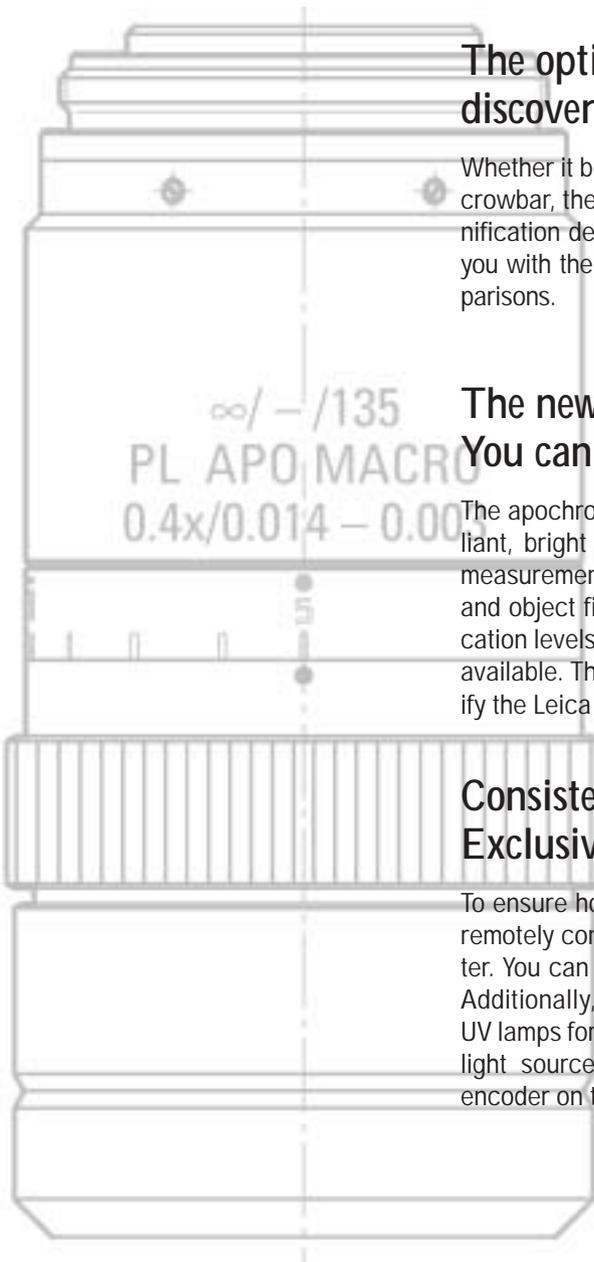
Whether it be the structures of a DVD or the impression mark of a crowbar, these optics are up to any comparison task! With magnification deviation of less than 0.1%, the objective pairs provide you with the highest possible degree of certainty for optical comparisons.

The new apochromatic macro-objectives: You can believe your eyes

The apochromatically corrected objectives provide you with brilliant, bright images in extremely high resolution. Exact optical measurements may be performed at 8 fixed magnification levels and object field sizes from 2.6 mm to 55 mm. For higher magnification levels, Leica's extensive range of microscope objectives is available. These can be used without having to structurally modify the Leica FS C.

Consistent illumination concept – Exclusively cold light sources

To ensure homogenous, reflection-free illumination, we only use remotely controllable cold-light sources with optical fibre and filter. You can also choose from a broad spectrum of accessories. Additionally, special lighting fixtures are available such as UV lamps for examination of documents. The intensity of the cold-light sources can be adjusted conveniently using the rotary encoder on the base of the stand.



Oblique incident light, now with reproducible settings

Gone are the days of wasted time due to adjusting the oblique light illumination devices. The new holders for the oblique incident light are flexibly mountable and allow the reproducible (scaling) setting in 4 axes. Never has it been so easy to match the illumination of the left and right comparison beam paths perfectly. The holders for the oblique incident light are fastened to the objective turrets. When moving the objects, the light cone always remains exactly assigned to the object field.

Coaxial illumination, the illumination device for reflection-free images

For absolutely clear and reflection-free display of fine markings for highly reflective metallic surfaces or plastics, the Leica FS C comparison microscope can be equipped with the new, strong-light coaxial illumination. You will see details which previously could hardly be rendered, such as, for example, evidence on bullets, adhesive tape or audio or videotapes.

Transmitted light, for more transparency

For comparison of transparent or semitransparent objects, such as cross-sections through layers of paint, foil or textile specimens, are perfectly suited for the transmitted light device. The cold-light source with optical fibre guarantees uniform illumination of object fields between 50 mm and 5 mm in diameter. The oblique illumination and polarisation device for rendering double-refracting objects turns this illumination unit into a universal tool.

Universality through modular system

From a 4.5 mm bullet to a shell, from a stamp to a bill of sale, whether a picklock or a crowbar, the Leica FSC offers the optimal retaining device for each specimen.



Conveniently document and archive



Impression (Microsil) of stamp traces on automobile licence plate compared using parallel distribution of light (butterfly view), with the friendly co-operation of the German Federal Bureau of Criminal Investigation.

Documentation and long-term archiving of comparison samples, or the creation of detailed reports with integrated image documents, is at least as important as the actual comparison of evidence using the microscope/macroscope. The Leica comparison instruments offer a variety of solutions and are compatible with the widest variety of peripheral devices.

Microphotography

The Leica MPS30 and Leica MPS60 microphotography systems are foolproof photography machines for quick and sure documentation. The modular accessories range from the standard small photo cartridge (35 mm) to the Polaroid and large-format attachments for 3 x 4 inch, 4 x 5 inch, 6 x 9 cm and 9 x 12 cm formats.

Digital cameras

The recorded image is immediately available and can be further processed electronically, archived or transferred directly via e-mail. Nothing more stands in the way of rapid data transfers. The extensive range of Leica DC cameras harmonises excellently with the Leica IM1000 professional Image Management System. See the "Software and data transfer" chapter of this brochure for additional information.



Software and data transfer

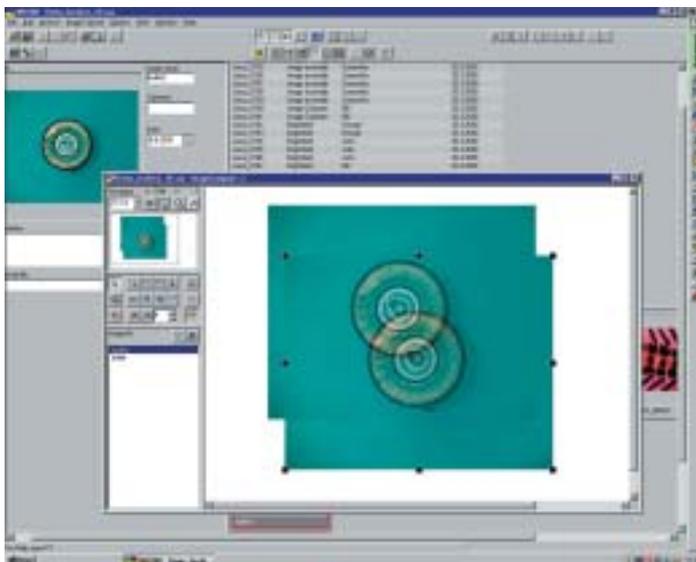
The perfect complement to your analogue or digital camera for image archiving, measuring, analysing or for direct reporting, is the network-compatible Leica IM1000.

With a modular design, it is ultra-flexible and thus can fulfil your needs exceptionally well. Every Leica comparison instrument comes with software for conveniently configuring the instruments and recording images; an image viewer; and controls for the automated functions of the microscope or macroscope. With the click of a mouse, these data can be transferred to the Image Manager and are then available for processing. Of course, you can also import data from pre-existing databases and export data from the Image Manager.

The modular structure allows you to create your custom forensics solution, for example for ballistic investigations or the comparison of toolmarks. The motorised stages of the focusing drives of the Leica FS C, in combination with the instrument-specific software, gives way to completely new applications, such as the wide-area racking out of the specimen with simultaneous image capture in "Mosaic mode." The "Multifocus mode" allows automatic recording of multiple images in the Z direction, and then assembles them into one "optimised depth-of-field" image. This mode is of particular interest for deformed bullets and uneven objects.



22 calibre shell casing (with the friendly co-operation of Peter Lawrence, South Australia Police)



Leica FS C technical data

Stand:

- Stable and warp-resistant cast stand with motorised height adjustment for the comparison bridge carrier (movement 255 mm) motorised stages and motorised focusing.
- Motorised synchronous motion of the stage and the focusing unit over the entire distance
- Built-in power supply for all motorised functions

Focusing:

2 motorised focus drives; focusing speed adjusted to the current magnification
Movement: 25 mm

Stages:

Motorised cross-stages (stage surfaces 220 mm x 160 mm) with openings of 80 mm x 80 mm, removable glass inlays, ergonomic operating buttons for transverse and synchronised movement (50 mm x 50 mm) with optional "Smart Move" remote control module. Bore holes for positioning the adjustable holder, the rotating stages, the large object stages or the bullet holder.

Stackable rotating stages

(Ø 118 mm) with openings (Ø 50 mm), removable glass inlays, clamping device for the stage rotation. Stage carrier with receptacles for revolving polariser.

Inclining rotating stages

(Ø 75 mm) with locking device; inclined up to 45° on every side; ridged surfaces

Large-object stages

(210 mm x 300 mm) with metal plates for thin objects, for example documents; can be placed on cross-stages

Motorised comparison bridge with integrated ergonomic tube

For combination image or cross-section image comparisons with adjustable borderline; variable width of the borderline; combination of cross section image and combination image possible; colour differentiation of abnormal markings during combination image observation. Magnification equalisation of the right beam path possible (+/- 4%) receptacles for microscope objectives 0.4x, 1x, 2x, 4x with adjustable iris diaphragms. Revolving fastener of the oblique incident light holder; slot for insertion of filter slides. Distance between optical shafts: 400 mm

Motorised working table:

- Height adjustment range: 619 mm plus 300 mm movement
- Lifting capacity: 2000 N
- Lifting speed: approx. 12 mm/sec.
- Load capacity: 200 kg
- Control system: up and down switches and by foot switch
- Table area: 1200 mm x 560 mm
- Universal power supply

Tube factor

1x, 1.5x with magnification changer

Field number:

22

Image orientations:

Vertical (portrait) and horizontal (landscape)

Objectives:

Macro-objectives 0.4x, 1x, 2x, 4x and micro-objectives

Eyepieces:

HC PLAN S 10x/22

Magnifications and object fields:

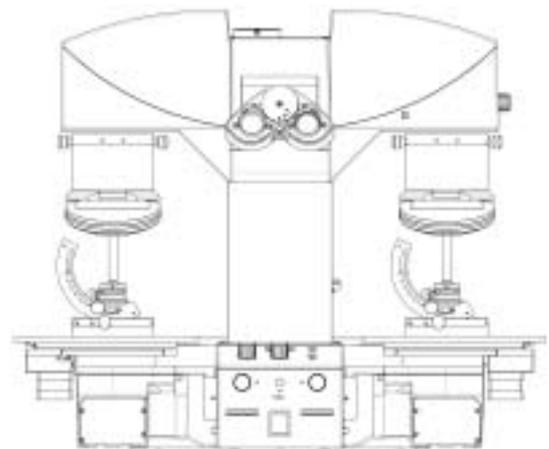
Objective	FAA	10x eyepiece		2/3" camera 0.63x C-mount	
		SFZ	Tot.Mag.	SFZ	Tot.Mag.
0.4x	60	55.0	4.00	43.60	10.10
0.6x	60	36.6	6.00	29.00	15.20
1x	60	22.0	10.00	17.44	25.40
1.5x	60	14.6	15.00	11.60	37.90
2x	60	11.0	20.00	8.70	50.60
3x	60	7.3	30.00	5.80	75.90
4x	60	5.5	40.00	4.40	101.30
6x	60	3.60	60.00	2.90	152.00

Dimensions without camera:

Height 785 mm (maximum; Z column extended)

Width 1035 mm (oblique incident light with maximum extension of articulated arms)

Depth 530 mm (including front operating buttons)



Weight:

45 kg (with basic equipment)

Leica Microsystems – the brand for outstanding products

Leica Microsystems' mission is to be the world's first-choice provider of innovative solutions to our customers' needs for vision, measurement, lithography and analysis of microstructures.

Leica, the leading brand for microscopes and scientific instruments, developed from five brand names, all with a long tradition: Wild, Leitz, Reichert, Jung and Cambridge Instruments. Yet Leica symbolizes innovation as well as tradition.

The companies of the Leica Microsystems Group operate internationally in five business segments, where we rank with the market leaders.

• Microscopy

Our expertise in microscopy is the basis for all our solutions for visualization, measurement and analysis of microstructures in life sciences and industry.

• Specimen Preparation

We provide comprehensive systems and services for clinical histo- and cytopathology applications, biomedical research and industrial quality assurance. Our product range includes instruments, systems and consumables for tissue infiltration and embedding, microtomes and cryostats as well as automated stainers and coverslippers.

• Imaging Systems

With confocal laser technology and image analysis systems, we provide three-dimensional viewing facilities and offer new solutions for cytogenetics, pathology and materials sciences.

• Medical Equipment

Innovative technologies in our surgical microscopes offer new therapeutic approaches in microsurgery. With automated instruments for ophthalmology, we enable new diagnostic methods to be applied.

• Semiconductor Equipment

Our automated, leading-edge measurement and inspection systems and our E-beam lithography systems make us the first choice supplier for semiconductor manufacturers all over the world.

Leica Microsystems – an international company with a strong network of customer services

Australia:	Gladesville	Tel. +61 2 9879 9700	Fax +61 2 9817 8358
Austria:	Vienna	Tel. +43 1 486 80 50 0	Fax +43 1 486 80 50 30
Canada:	Richmond Hill/Ontario	Tel. +1 905 762 2000	Fax +1 905 762 8937
Denmark:	Herlev	Tel. +45 4454 0101	Fax +45 4454 0111
France:	Rueil-Malmaison	Tel. +33 1 473 285 85	Fax +33 1 473 285 86
Germany:	Bensheim	Tel. +49 6251 136 0	Fax +49 6251 136 155
Italy:	Milan	Tel. +39 0257 486.1	Fax +39 0257 40 3273
Japan:	Tokyo	Tel. +81 3 5435 9600	Fax +81 3 5435 9615
Korea:	Seoul	Tel. +82 2 514 65 43	Fax +82 2 514 65 48
Netherlands:	Rijswijk	Tel. +31 70 4132 100	Fax +31 70 4132 109
People's Rep. of China:	Hong Kong	Tel. +852 2564 6699	Fax +852 2564 4163
Portugal:	Lisbon	Tel. +351 21 388 9112	Fax +351 21 385 4668
Singapore		Tel. +65 6779 7823	Fax +65 6773 0628
Spain:	Barcelona	Tel. +34 93 494 95 30	Fax +34 93 494 95 32
Sweden:	Sollentuna	Tel. +46 8 625 45 45	Fax +46 8 625 45 10
Switzerland:	Glattbrugg	Tel. +41 1 809 34 34	Fax +41 1 809 34 44
United Kingdom:	Milton Keynes	Tel. +44 1908 246 246	Fax +44 1908 609 992
USA:	Bannockburn/Illinois	Tel. +1 847 405 0123	Fax +1 847 405 0164

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