

Universal High Performance Review Microscope



OVERVIEW

The INM100, a user-friendly optical imaging system, combines the highest optical performance and cleanliness while providing consummate instrument safety and ergonomics to allow long periods of fatigue-free work. With the INM100, KLA-Tencor offers the semiconductor and microelectronics industries a reliable, high-performance microscope system. The key features of the INM100 are the field-proven HCS optics, market approved standard of ergonomics, excellent cleanliness, and a fast, intuitive operation.



1. Ergonomic viewing tube
2. Control unit for magnification selection and aperture
3. Z-drive with upper endstop

Ergonomics & User-friendliness

A perfect composition of optics, mechanical features and electronics creates a user-friendly and ergonomic operating environment. The INM100 offers hours of fatigue-free and comfortable work. Using the ergonomic tube, the operator can adjust the viewing angle to obtain the most comfortable position. The layout of the controls is matched to industry-standard specifications for ergonomically designed workstations, and they easily accessible for simple, fast and accurate operation. The optimum contrast is achieved with the automatic diaphragm module facilitating inspection of critical structures. Switching between the various imaging modes is easy and fast by rotating the contrast selection turret. A built-in light adjustment for the 12V/100W halogen lamp is ergonomically placed at the front of the microscope base.

Cleanliness

The INM100 conforms to requirements of a cleanroom Class 1. The streamlined design, devoid of sharp edges using a special non-gassing surface finishing, guarantees an optimum, contamination free air-flow. All motor driven parts are encapsulated (such as the nosepiece revolver). The transparent contamination shield prevents the contamination of the sample by operator generated particles.

Safety of samples

The focus drive has a flexible high-precision mechanical upper end-stop. Easily set, it prevents contact between wafer and objective, eliminating the risk of wafer damage.

KLA-TENCOR SERVICE and SUPPORT

Customer service is an integral part of KLA-Tencor's portfolio that enables our customers to accelerate yield. Our extensive customer service organization collaborates with customers worldwide through the life stages of their factory and tools to achieve the required productivity and performance at the lowest overall cost.

Universal High Performance Review Microscope

KLA-TENCOR CORPORATION
One Technology Drive
Milpitas, CA 95035
phone +1 408 875 3000
www.kla-tencor.com

INM100

Universal High Performance Review Microscope

Optical review of wafers, masks, MEMS,
optoelectronic devices and hard disk substrates



INM 100

Universal High Performance Review Microscope



Ergotube with eyepieces



Second Lamp Housing



Manual stage 8" x 8"



C-Mount adapter HC1x

Ergotubes and eyepieces

Both the Ergotubes FSA-V and FSA-VF have upright, non-reversed images and can be precisely adjusted to individual viewing heights and interpupillary distances. The superb imaging quality also encourages long periods of concentration and ensures reliable results. The HC PLAN 10x/25 large field eyepieces produce a sharp and chrome-free image. The eyepieces have provision for easy graticule insertion.

Illumination and light sources

The INM100 has a built-in incident and (optional) transmitted light path. The entire illumination system from the lamp to the objective has been optimized to the latest criteria in terms of homogeneity, intensity and chromatic correction, providing the basis for powerful and color neutral illumination. The filter magazine takes up to 4 filters, which can be conveniently inserted into the incident light path simply by pushing the individual filter handle.

The INM100 uses a 12V/100W centerable lamp housing for standard incident light illumination. For fluorescence illumination HG 100W or XE 75 W gas discharge lamp is available. The transmitted light option uses a built-in 12V/20W halogen lamp which does not require a separate lamp housing. The INM100 provides a built-in lamp adjustment aid for easy alignment of the incident light sources.

Transmitted Illumination option for transparent objects

The INM100 can easily be equipped with Transmitted Illumination to examine masks or other transparent objects. The condenser system is pre-aligned and vertically adjustable. The aperture diaphragm can be adjusted for optimum contrast.

Mirror housing 106

The optional Mirror Housing 106 is available for the adaptation of a second (e.g. Fluorescence illumination) lamp housing.

Stage

This general-purpose x/y manual stage can be used in both transmitted and reflected light and has a movement range of 8" x 8". The vacuum mask or rotatable wafer holder ensures safe and reproducible sample insertion. A manual stage equipped with magnetic position sensors and a position coordinate display for X and Y and Z is available as an option.

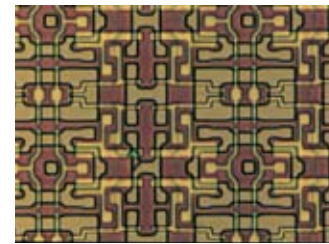
Optionally an optical magnification changer module can be used which acts directly on all visual ports in increments of 1.25x and 1.6x. Overall magnification then ranges from 16x to 5000x allowing the operator to look at the entire chip or concentrate on the frame-filling image of a submicron structure.

TV-Adaptation

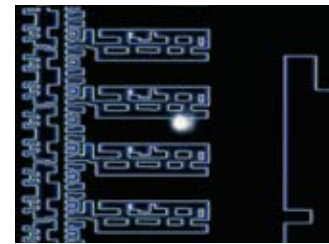
The INM100 has a TV exit port with a completely flat field and excellent chromatic correction. For the adaptation of camera systems of all kinds, adapters from 0.35x to 2.4x (fixed and zoom types) with C-Mount and ENG-Mount are available.

UV and color camera at a time

Two cameras can be connected via the Dual Camera Port. It is then possible to view the UV-Image and the visible light image at a time (Requires UV and VIS Camera).



Brightfield image



Darkfield image



Contamination shown in fluorescence



Resolution pattern with objective UV 150x / 0.90

Contrasting techniques

The use of different imaging modes makes assessment of various problems found in the field of semiconductor manufacturing easier. Typical applications for Brightfield (BF) are the inspection of shapes of structures, layers and etch quality while Darkfield (DF) serves the assessment of edge roughness and surface impurities. Fluorescence (FL) is excellent for the identification of residual resist and contamination. With the Differential Interference Contrast (DIC) mode, changes in topography or refractive index show up as differences in brightness or color depending on how the system is adjusted. UV (365 nm) imaging allows inspection of features as small as 120 nm. Using UV imaging, INM100 meets the demands of the design rules featuring 0.18 µm down to 0.15 µm with regard to resolving power and ultrahigh contrast. The UV

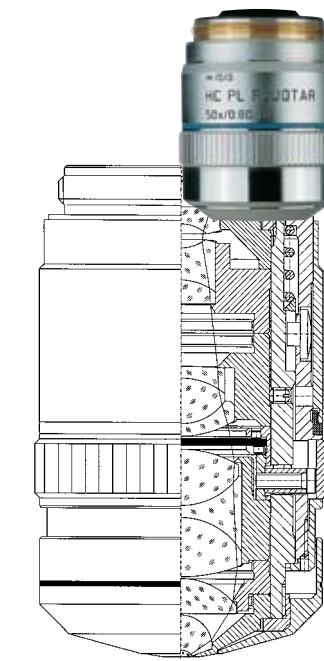
option is upgradeable. The Imaging Contrast unit of the INM100 is easy to operate. Changing from one contrast mode to another is as easy as rotating a wheel.

Ultra-violet optics

Introducing ultra-violet (UV) optics at the wavelength of 365 nm, the INM100 is prepared for the challenge of the next chip generations. This technology moves the user beyond the boundaries of visible light microscopy into a new dimension of optical imaging. Using highest numerical apertures, dry (non-immersion) objectives, the non-destructive, contamination-free inspection of feature sizes as small as 120 nm is now possible with an advanced light microscope.

SPECIFICATIONS

Purpose	Inspection and quality control	Microscope stages	Mechanical stage (205 x 205 mm) with fast positioning handle Mechanical stage (205 x 205 mm) with position sensors and coordinate display
Microscope stand for Incident & Transmitted light	8 Inch stand with built-in transformer for the 12V/100W halogen lamp Motorized objective revolver and programmable aperture diaphragm	Observation tube	Widefield tilting trinocular tube
Flexible sample height	Standard = 25 mm Optional intermediate spacer up to 66 mm	Objectives	Ultra high performing HCS-objectives. Magnification range from 1.6x to 150x
Focusing drive	Switchable coaxial coarse and fine focus drive. Z-travel range 25 mm Coarse focus stroke: 5 mm per rotation Fine focus stroke: 0.1 mm per rotation Ultra fine focus stroke: 0.02 mm per rotation	Eyepieces	HC-PLAN 10x/25
Revolving nosepiece	Motorized sextuple nosepiece, objective selection via conveniently located push-in keys	Options	Transmitted light, DIC, Fluorescence Magnification Changer UV (365 nm) upgradeable Spacer for height extension up to 66 mm
Contrast modes	Brightfield, Darkfield, DIC, Fluorescence and UV (365 nm) selectable via Image Contrast Wheel	Illumination sources	12V/100W halogen (longlife type 2000 h), XE 75 (for Fluorescence)
		Power consumption	160 VA
		Weight	55 kg
		Dimensions	618 x 945 x 550 (WxDxH in mm)



The HCS optics concept

With the growing demand for faster chips with persistently increasing memory capabilities, resulting in continuously shrinking structures, microscope manufacturers are facing the ultimate challenge for optical imaging systems with regard to resolution and contrast. The INM100 microscope applies well-proven optics concept, the HCS. This acronym stands for Harmonic Component System and indicates that all components contributing to the optical performance e.g. objectives, tube lenses, tubes, eyepieces, TV-camera adapters, etc. have been optimized throughout the entire optical system. The HC PL FLUOTAR® objectives with semi-apochromatic correction produces an uncompromisingly bright and high-contrast image. The HCS features higher numerical apertures, optimized field flatness and reduced astigmatism, through an optimized reflected light path and HCS corrected eyepieces.

Objectives

The standard objective series are comprised of N PLAN, HC PL FLUOTAR and PL APO objectives ranging from 1.6x to 150x. Special objective series N PLAN L CORR, PL FLUOTAR L CORR and PL FLUOTAR L with magnifications of 20x, 40x, 50x, 63x and 100x have been designed for special applications such as inspection of masks with pellicles, inspection of bonded chips or LCD inspection. Besides the extremely long free working distances, these objectives offer exceptionally high numerical apertures, excellent resolution and outstanding crisp, bright and high-contrast images for all illumination techniques. The term "CORR" designates objectives with variable cover glass correction, which are particularly suitable for the inspection of LCDs.

Type	Mag./Aper.	FWD	BF	DF	DIC
N PLAN	5x/0.12	14.0	X		-
N PLAN	5x/0.12 BD	13.2	X	X	-
N PLAN EPI	10x/0.25	17.6	X		-
N PLAN EPI	10x/0.25 BD	16.2	X	X	-
N PLAN	20x/0.40	1.1	X		D
N PLAN	20x/0.40 BD	1.1	X	X	D
N PLAN	50x/0.75	0.37	X		D
N PLAN	50x/0.75 BD	0.37	X	X	D
N PLAN	100x/0.90	0.27	X		D
N PLAN	100x/0.90 BD	0.30	X	X	D
PL FLUOTAR*	1.6x/0.05	1.54	X		-
PL FLUOTAR	2.5x/0.07	9.2	X		-
HC PL FLUOTAR	5x/0.15	12.0	X		D1
HC PL FLUOTAR	5x/0.15 BD	12.2	X	X	D1
HC PL FLUOTAR	10x/0.30	11.0	X		D1
HC PL FLUOTAR	10x/0.30 BD	11.0	X	X	D1
HC PL FLUOTAR	20x/0.50	1.27	X		D1
HC PL FLUOTAR	20x/0.50 BD	1.27	X	X	D1
HC PL FLUOTAR	50x/0.80	0.50	X		D
HC PL FLUOTAR	50x/0.80 BD	0.50	X	X	D
HC PL FLUOTAR	100x/0.90	0.27	X		D
HC PL FLUOTAR	100x/0.90 BD	0.30	X	X	D
HC PL FLUOTAR	150x/0.90	0.25	X		C
PL FLUOTAR L	20x/0.40 BD	10.7	X	X	C
PL FLUOTAR L	50x/0.55	8.0	X		C
PL FLUOTAR L	50x/0.55 BD	8.0	X	X	C
PL FLUOTAR L	100x/0.75	4.6	X		-
PL APO	50x/0.85 BD	0.34	X	X	C
PL APO	100x/0.90 BD	0.26	X	X	C
PL APO	150x/0.95	0.20	X		C
PL APO	150x/0.90 BD	0.25	X	X	C

