

**Nikon**

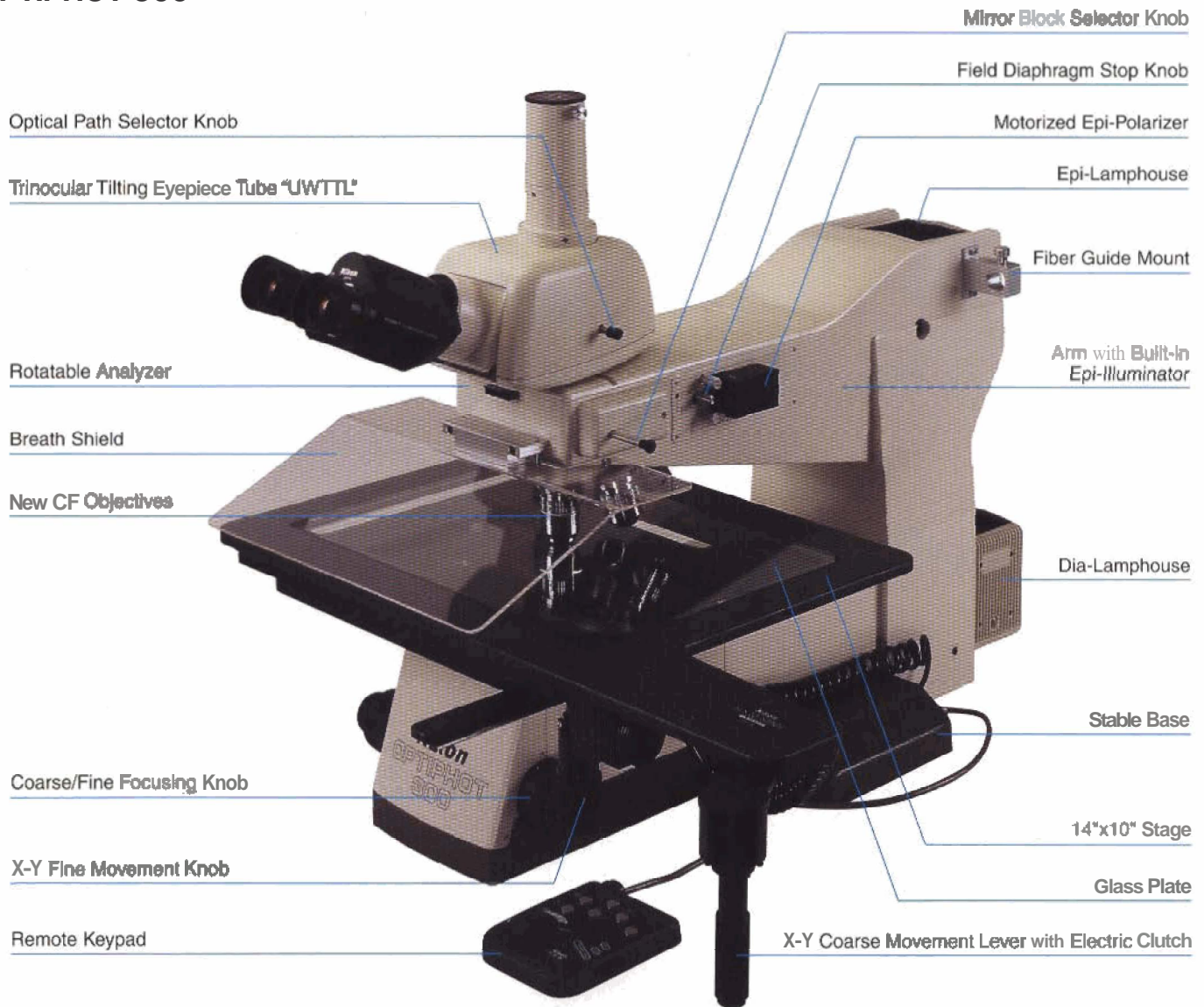
LCD and IC Inspection Microscopes  
**OPTIPHOT 300**



# The proven standard in LCD

When it comes to precision inspection of IC wafers and liquid crystal displays, there's a reliable standard to look up to. The Nikon OPTIPHOT 300. Ergonomically designed, Nikon's precision instrument is a joy to operate and is destined to play an important role in today's high-tech industries. Everything is designed for the operator's maximum comfort — from the extended tilting eyepiece tubes to the positioning of the focusing knobs and stage movement controls. Incorporating CF Objectives and a built-in Epi-illuminator, the OPTIPHOT 300 realizes crisp images with superior contrast even at high magnifications. Frequently performed functions such as focusing, stage movement, nosepiece rotation, episcopic polarizer rotation, episcopic aperture diaphragm stop, **Epi/Dia-illumination** selection and light intensity control can be done below the stage via a remote keypad, minimizing operator-generated contamination. We are confident that you, too, will agree that the Nikon OPTIPHOT 300 is the established standard for all precision inspection tasks.

## OPTIPHOT 300



# and IC wafer inspections

## Remote Keypad

Nosepiece Position Indicator

Nosepiece Rotation Buttons

Episcopic Aperture Diaphragm Stop Buttons

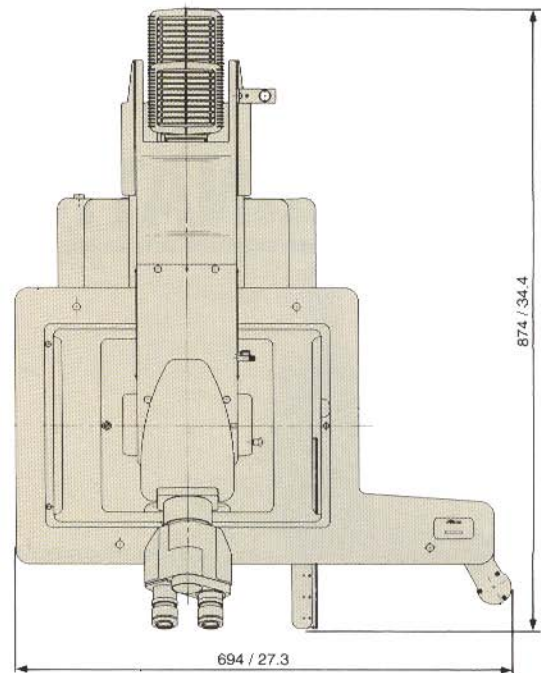
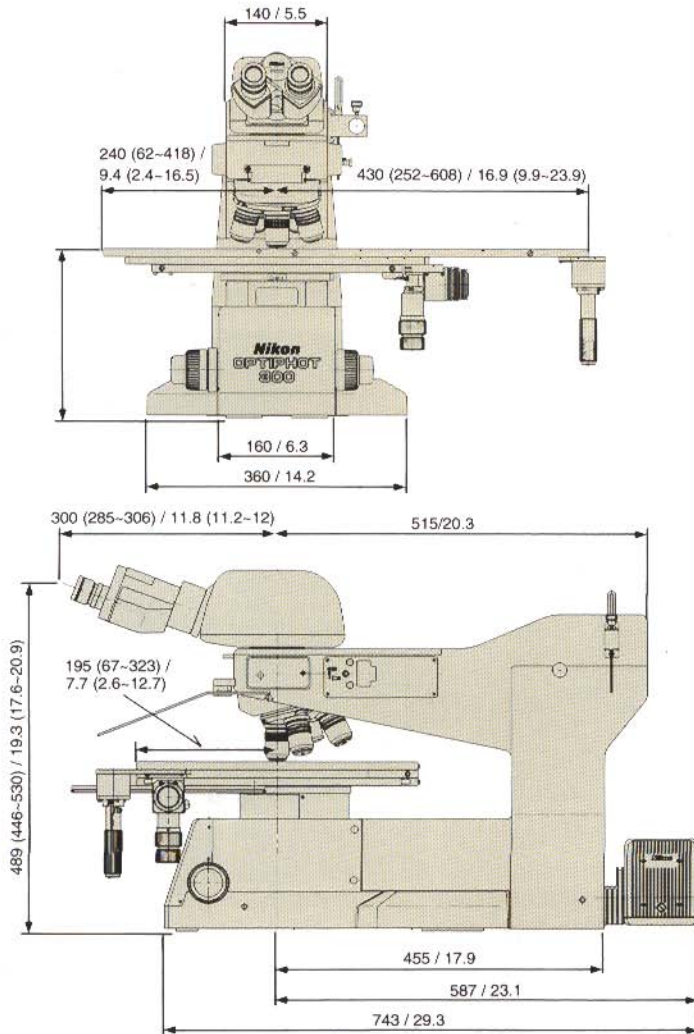
Light Intensity Volume

Episcopic Polarizer Rotation Buttons

Photographic Position

Epi-/Dia-Illumination Selection Switch

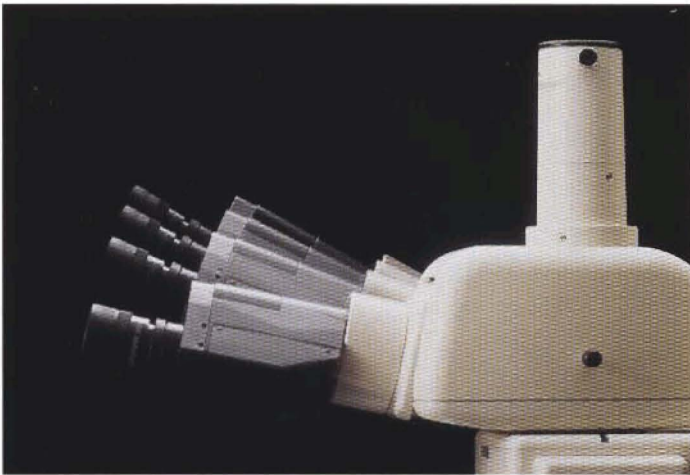
Power Saving Switch



mm / in.

**OPTIPHOT 300**  
with Binocular ER Tilting Tube "BTL"

# ERGONOMIC DESIGN



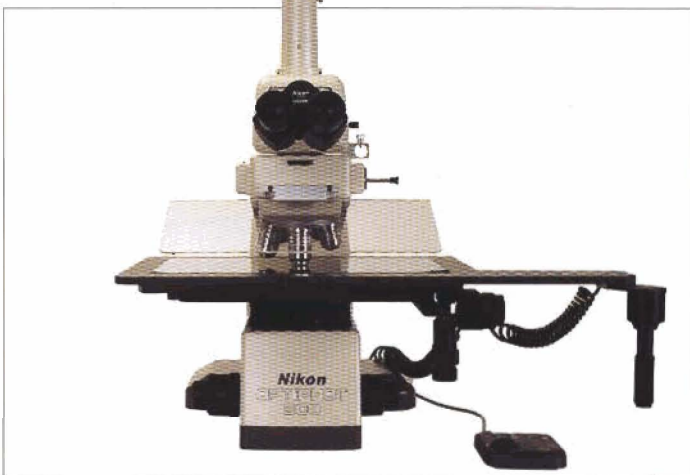
- **Tilting** eyepiece tubes extend beyond the stage, enabling easier, more comfortable specimen observation; there's no need for the operator to **incline** his or her neck repeatedly.
- As **the** operator grasps the stage handle, an electric clutch is released and coarse stage



- movement can be performed. With the handle located at the right side in front, operation is virtually hands-free even when the stage is **moved** to extreme positions.
- Focusing knobs are located in front, just below the stage, for easier operation.
- All frequent operations such as

nosepiece rotation, Epi-aperture diaphragm **stop**, Epi-polarizer rotation, light intensity control and **Epi-/Dia-illumination selection** can be performed through the remote keypad. This makes for greater operating convenience,

# CONTAMINATION-FREE



- Frequent operations can be performed below the stage. This prevents operator-generated contamination from falling onto the specimen.
- Breath shield protects the front of

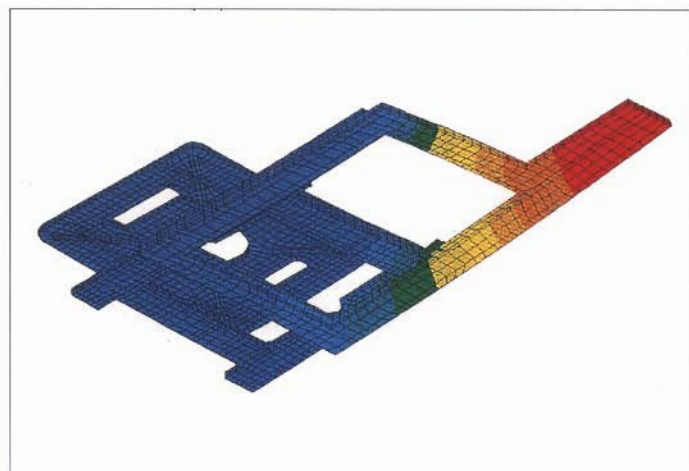
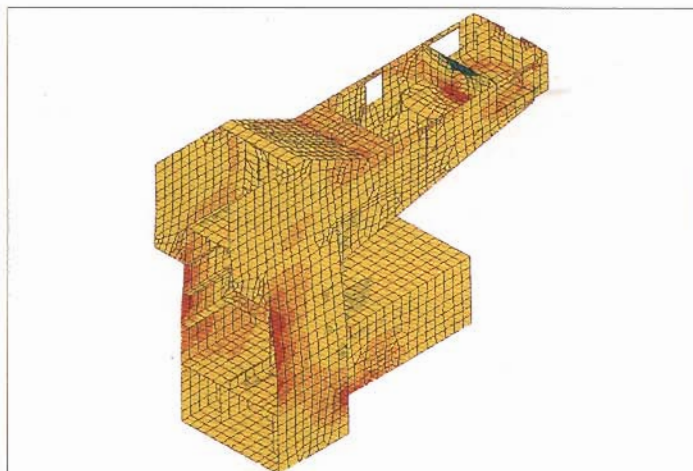


- the microscope from contamination.
- The motor for the newly developed motorized nosepiece is positioned in the center of the **nosepiece** and is covered for protection against particle generation during

nosepiece rotation.

- The stage is protected by an anti-static paint that virtually does **away with dust** accumulation and prevents **IC/LCD circuit damage**.

# RIGID CONSTRUCTION



- The structure of the base, pillar, arm, focusing mechanism and stage has been designed with anti-vibration techniques.
- The Epi-illuminator is built into the

arm to maintain the stability of the microscope arm. This makes it easy to attach photo or TV equipment and to obtain superior pictures and images.

- Because of the large 14"x10" stage, a new focusing guide system has been designed. A large LCD board up to 17" diagonal can be observed.

## CF OBJECTIVES

The CF objectives for the OPTIPHOT series employ an infinity corrected optical system with a simplified design that results in clear observation to the very periphery, even when using intermediate accessories. Nikon applies advanced

multi-coating technology to minimize chromatic aberration and flare and ensure the superior optical quality of the lenses. Furthermore, Nikon's extensive range of CF objectives provides the optimal choice for a wide variety of applications.

### List of Objectives

Type	Magnification	N.A.	W.D. (mm)
CF Plan EPI	2.5x	0.075	8.8
	5x	0.13	22.5
	10x	0.3	16.5
	20x	0.46	3.1
	50x	0.8	0.54
CF Plan EPI ELWD	100x	0.95	0.3
	20x	0.4	11.0
CF Plan EPI SLWD	50x	0.55	8.7
	100x	0.8	2.0
	10x	0.21	20.3
CF Plan Apo EPI	20x	0.35	20.5
	50x	0.45	13.8
	100x	0.73	4.7
	50x	0.95	0.35
CF LCD Plan CR (with cover glass correction 0.6-1.2mm)	100x	0.95	0.32
	150x	0.95	0.2
	200x	0.95	0.2
CF Plan BD	20x	0.4	10.1-10.5
	50x	0.55	7.7-8.2
	100x	0.8	1.1
	5x	0.13	10.0
	10x	0.3	6.5
CF Plan BD ELWD	20x	0.46	3.1
	50x	0.8	0.54
	100x	0.9	0.39
	20x	0.4	11.0
CF Plan Apo BD	50x	0.55	8.2
	100x	0.8	2.0
	50x	0.9	0.42
CF Plan BD DIC	100x	0.9	0.4
	150x	0.9	0.29
	200x	0.9	0.3
	5x	0.13	10.0
	10x	0.3	6.5
CF Plan BD ELWD DIC	20x	0.46	3.1
	50x	0.8	0.54
	100x	0.9	0.39
	20x	0.4	11.0
CF Plan Apo BD	50x	0.55	8.2
	100x	0.8	2.0
	100x	0.8	2.0



CF Plan EPI



CF Plan EPI ELWD



CF Plan Apo EPI



CF Plan BD



CF Plan BD ELWD



CF Plan Apo BD



CF Plan BD DIC



CF Plan BD ELWD DIC

# ACCESSORIES

## Nosepieces

### Nosepieces

The OPTIPHOT 300 offers a choice of three motorized nosepieces: EPI, BD or Universal.



EPI

BD

Universal

## Illumination Systems

### 12V/100W Halogen Illumination System

Standard illumination system for the OPTIPHOT 300.



### 150W Metal Halide Illumination System

The spectral distribution displays characteristics similar to natural light in the visible range. This compact light source provides high-intensity illumination, making it an ideal light source for pinhole illumination.



## Eyepiece Tubes

### Extended Tilting Eyepiece Tubes

Tilting eyepiece tubes extend beyond the stage, enabling easier, more comfortable specimen observation; there's no need for the operator to incline his or her neck repeatedly.

	UW TTL	BTL
Image		Erect
Eyepiece inclination (from horizontal)		10°-30°
Field number	25	20
Adjustable interpupillary distance	51-80mm (2.0-3.1 in.)	
Beam split ratio (observation:photo)	100:0/20:80	—



## Adapter and Mounts

### CCTV Adapter

Nikon offers CCTV adapters for both a standard C-mount thread mount and an ENG-type bayonet mount.

- No relay lenses are necessary with C-mount TV adapter A (can be directly attached).
- A newly developed TV adapter with a built-in reduction relay lens permits observation on the monitor of an area equivalent to the viewfield seen through the eyepiece. Two C-mount and two ENG-mount models each are available for 1/2" (0.45x) and 2/3" (0.6x) CCD camera types.
- The C-mount TV adapter and the ENG-mount TV adapter both require a 1x relay lens.
- The TV zooming C-mount adapter and the CCTV zooming ENG-mount adapter both require a TV zooming lens (0.9-2.25x).



C-mount TV Adapter A



C-mount Types  
0.6x  
(for 2/3" CCD)  
0.45x  
(for 1/2" CCD)



ENG-mount  
0.6x T  
(for 2/3" CCD)



ENG-mount  
0.45x T  
(for 1/2" CCD)

## Filters

### Filters

Two filter types are available: reflected illumination filters (ø25mm), and transmitted illumination filters (ø45mm).

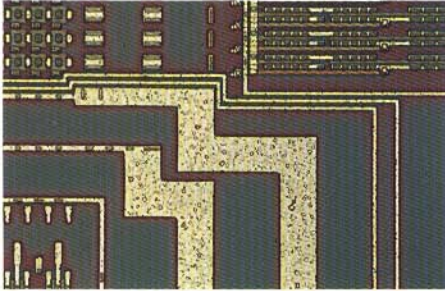


45mm filters



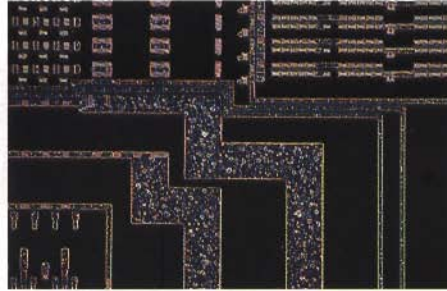
25mm filters

# INSPECTION MODES



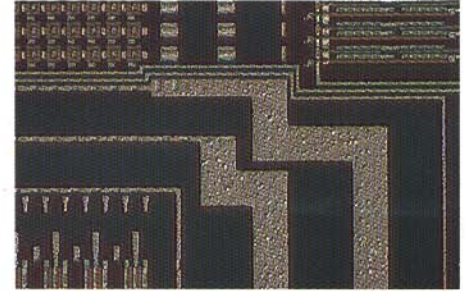
## Brightfield Observation

Brightfield microscopy uses differences in reflection to enhance the natural color and form of specimens.



## Darkfield Observation

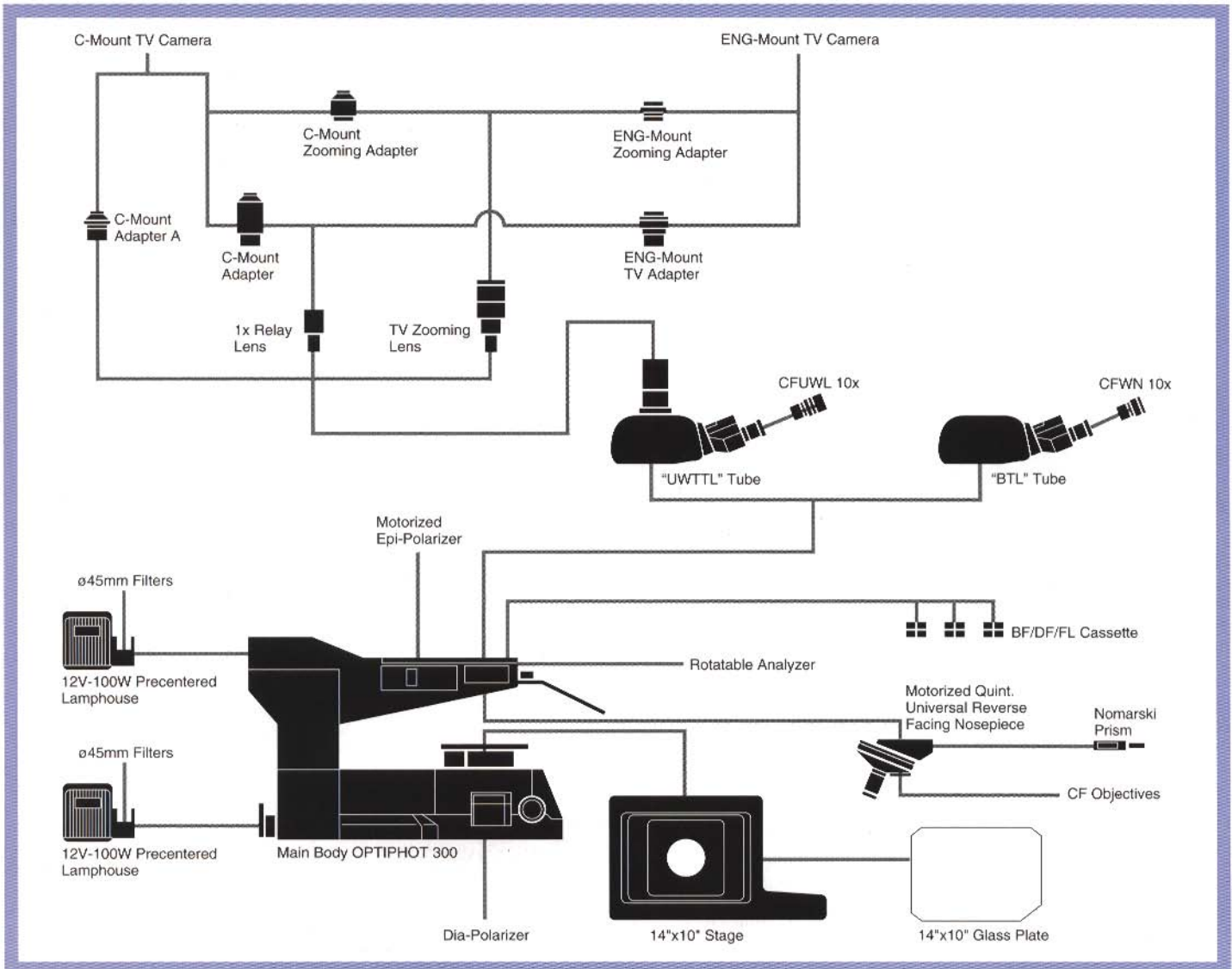
Darkfield microscopy detects tiny flaws, subtle irregularities, impurities and defects on the surface of wafers or masks. It permits highly accurate inspections.



## Nomarski DIC Observation

Differential interference contrast microscopy reveals the tiny flaws in wafers and the subtle irregularities of photo resist pattern as an interference color, thereby allowing three-dimensional observation. DIC represents subtle inclination (differential coefficient) with sharp differential contrast, enabling detection of very small differences in height.

# SYSTEM DIAGRAM



# Specifications

Magnification	50x-1,500x for observation
Mechanical Tube Length/ Parfocal Distance	∞/45mm
<b>Body</b> <b>Nosepiece Focusing</b> <b>Stroke</b> <b>Coarse</b> <b>Fine</b> <b>Increment Guide</b>	Motorized quint. universal reverse facing nosepiece(detachable) 28mm 5.3mm/rotation (torque adjustable) 0.1mm/rotation 1µm 4 guides (two pairs of roller races)
Eyeiece Tube	Binocular ER Tilting Tube "BTL": Field No. 20 Trinocular ER UW Tilting Tube "UWTTL" (including light split 100/0, 20/80): Field No. 25
<b>CF Eyepieces</b> <b>CFWN 10x</b> <b>CFUWL 10x</b>	For "BTL" Tube For "UWTTL" Tube
<b>Stage</b> <b>14"x10" Stage</b>	Cross travel range: 356 x 254mm (14.0 x 10.0 in.) Glass plate size: 398 x 288mm (15.7 x 11.3 in.) Electric clutch for switching between coarse and fine movement
<b>Illumination</b> <b>Epi-Illuminator</b> <b>Mirror Block</b> <b>Aperture Diaphragm</b> <b>Field Diaphragm</b> <b>Filter</b> <b>Lamphouse</b> <b>Diascopic Illuminator</b> <b>Aperture Diaphragm</b> <b>Field Diaphragm</b> <b>Condenser Lens</b> <b>Filter</b> <b>Lamphouse</b>	Accepts 3 cassettes: 1. Brightfield cassette, 2. Darkfield cassette, 3. Fluorescence cassette Motorized by the remote keypad Centering function provided 2 filters may be inserted simultaneously (ø25mm NCB11, ND2 and ND4 provided) Built in the arm, precentered for 12V-100W halogen bulb  Provided Centering function provided N.A. 0.6; 7mm stroke 2 filters may be inserted simultaneously (ø45mm NCB11, ND4 and ND32 provided) Attached to the base, precentered for 12V-100W halogen bulb
CF Objectives	CF BD Plan, CF BD Plan ELWD, CF BD Plan DIC, CF BD Plan DIC ELWD
Remote Keypad	1. Buttons for nosepiece rotation 2. Buttons for Epi-aperture diaphragm stop 3. Buttons for Epi-polarizer rotation 4. Switch for Epi/Dia selection 5. Volume for light intensity adjustment 6. Switch for power saving (for longer life of bulb)
Dimensions (W x D x H) and Weight (Approx.)	690 x 893 x 550mm (27.2 x 35.2 x 21.7 in.); 55kg (121 lbs.)
Power Requirement	AC100/120V ±10%, 50/60Hz

Specifications and equipment are subject to change without any notice or obligation on the part of the manufacturer.  
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