

Union

HISOMET-II

Non-Contact Depth Measuring Microscope System DH2/IMH

Specially designed focus indicator (Target Mark)
facilitates focusing operation greatly. Highly accurate
and repeatable measurement is possible.
No discrepancies between operators occur.



High-Precision Non-Contact Depth Measuring Microscope System



DH2 with Auto Focus unit (optional)



It is possible to supply optical unit
alone for integration into production
line (IMH)

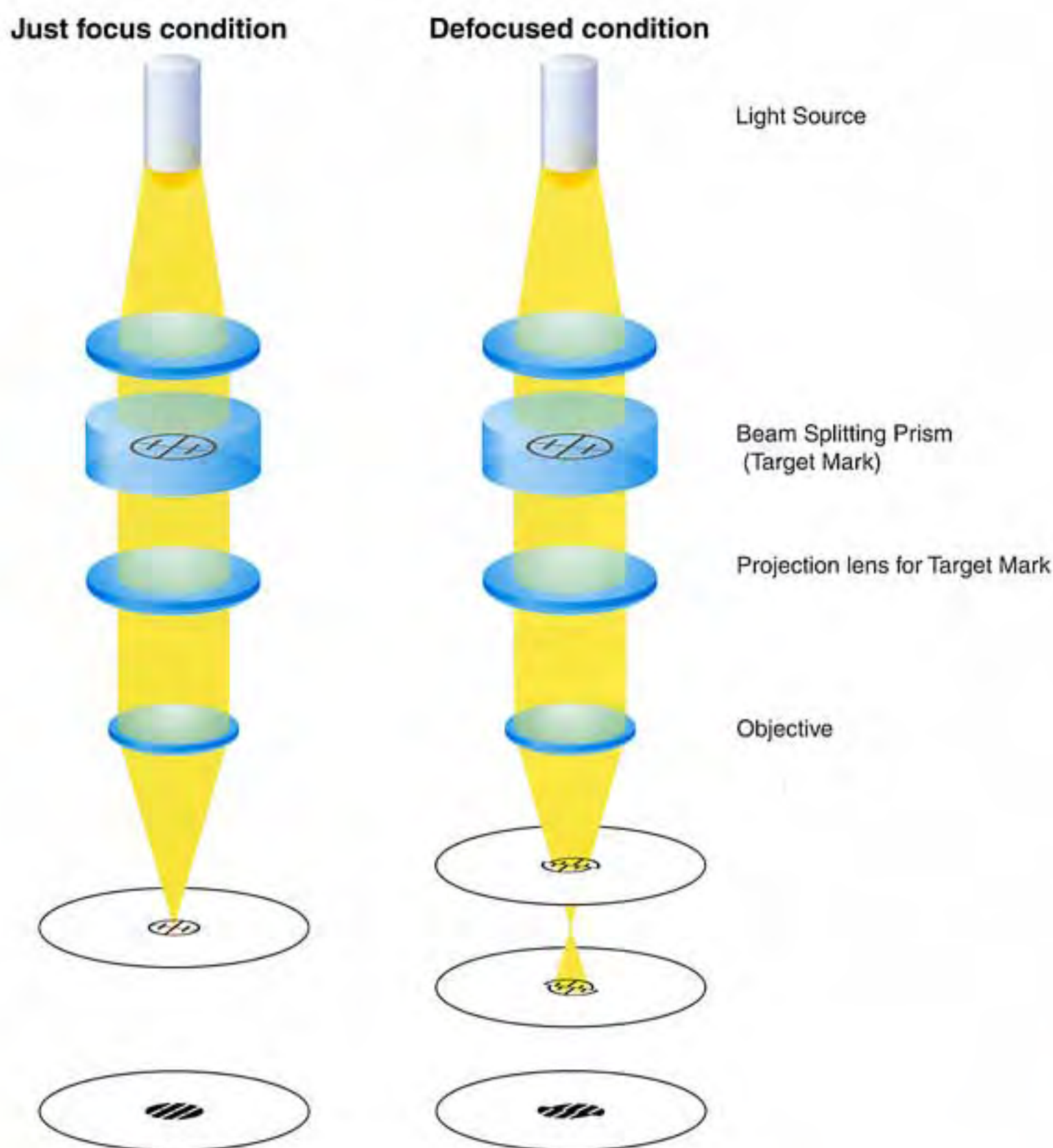


DH2 with Nomarski DIC observation
system (optional)

Features

Principle of measurement

This microscope system offers a precise focus indicator consisting of an index graticule (Target Mark) and a beam splitting prism built into reflecting illumination optical system of microscope. And it has been designed based on the optical principle that at just focus status, of which the upper and lower halves coincide, can be observed above the focused image of a specimen, and that when defocused even slightly, the index line is split into two lines in the upper and lower halves of the graticule.

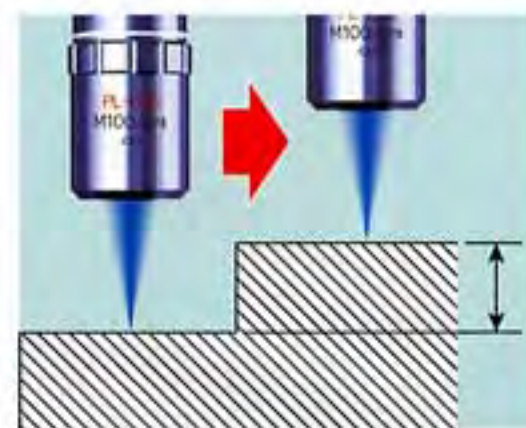


Method of measurement

An exact focal point is secured by confirming that the vertical index lines in the upper and lower halves of the graticule coincide with both of straight lines exactly, rather than by making judgements as to whether image of a specimen surface is blurred or not.

Since this is a unique system that is neither affected by the focal depth of objective lenses nor dependent on the ability of the human eyes to discriminate two points, a focal point can be determined very accurately as compared with other focusing systems.

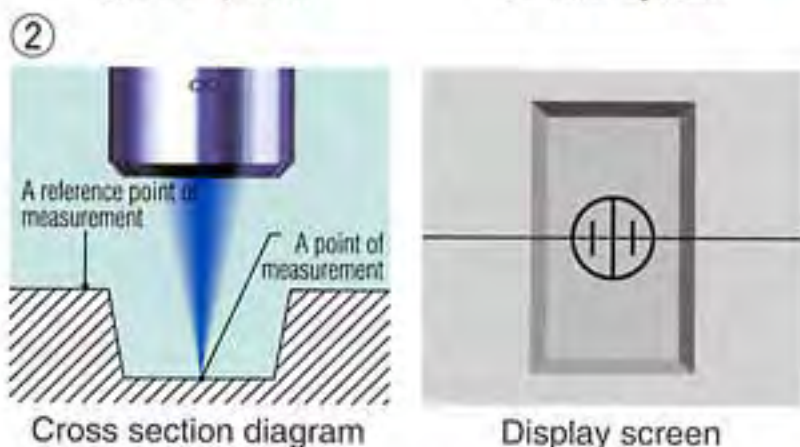
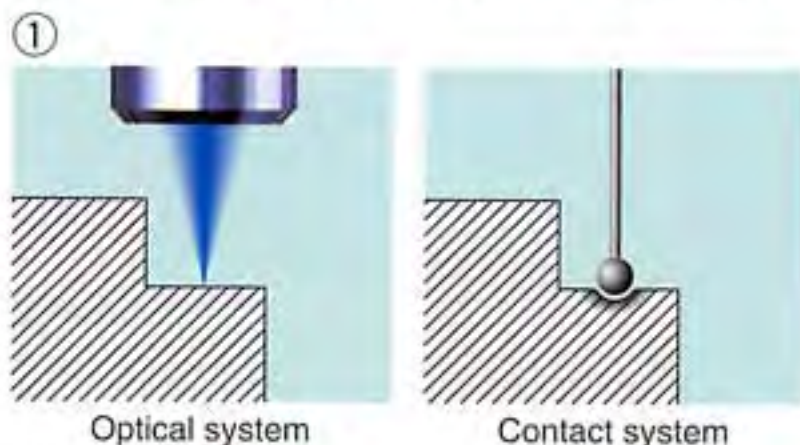
This focusing system and the digital gauge allow non-contact, high precision measurements of step heights between surfaces.





Advantages

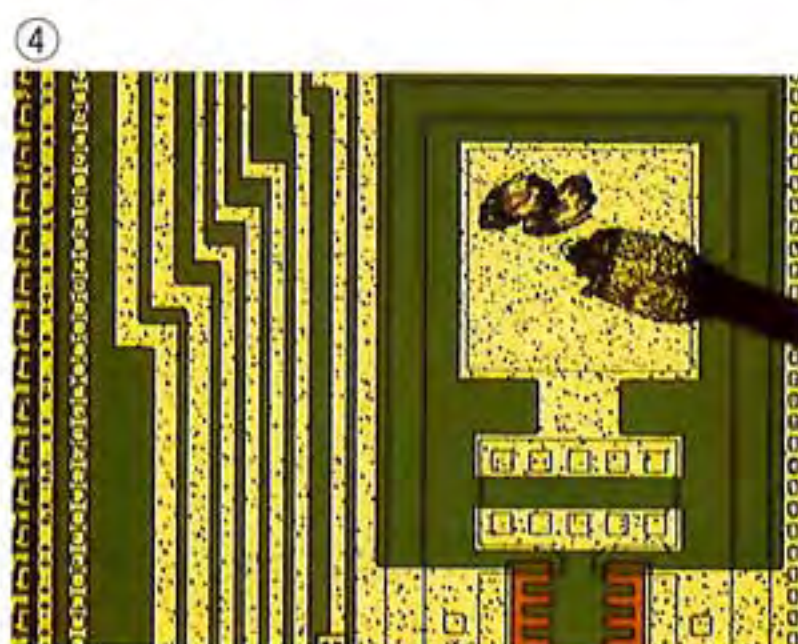
- As a focal point is detected under the non-contact optical method, measurements can be taken without being affected by physical damages to a specimen such as distortion, blow or nicks, etc. (Refer to Diagram-①)
- Since the precise focus indicator based on the "split-target" method has been adopted, highly-accurate depth measurements can be taken simply by coinciding the two halves of the graticule.
- As the operation is so simple, this is the most suitable measuring microscope system for various kinds of applications.
- While observing minute surface condition of a point of measurement, the positional relation between a reference point of measurement and a point of measurement can be confirmed, and measurements can be also taken in the same field of view. (Refer to Diagram-②)
- Measurement accuracy can be improved through the use of high magnification objective lenses. (Refer to Diagram-③)
- Either Black-stripe or White-stripe Target Mark can be chosen as per a condition of specimen surface. Since three kinds of Target Mark status (black-stripe, while-stripe and nothing) can be selected by a lever, the photographs can be taken without the Target Mark if necessary.
- Various models can be configured by the combination of different equipment such as viewing head, measuring stage and other optional items, depending on applications of respective users. (Refer to System Diagram)
- Incorporating DH2's optical system, IMH **NEW PRODUCT** was developed as a smaller and lighter microscope unit having excellent cost-effectiveness, exclusively designed to be integrated into production line or equipment.
- High-precision non-contact depth measurement and Nomarski DIC(Differential Interference Contrast) observation method are available by an another version of this microscope system (DH2N). (Refer to Diagram-④)
- In case of observing transparent, mirror or pearskin finish surfaces with a laser system, focus errors are apt to occur due to diffuse reflection. While, Target Mark can be projected onto such surfaces in case of our optical system, step heights of such specimen surfaces can be measured.



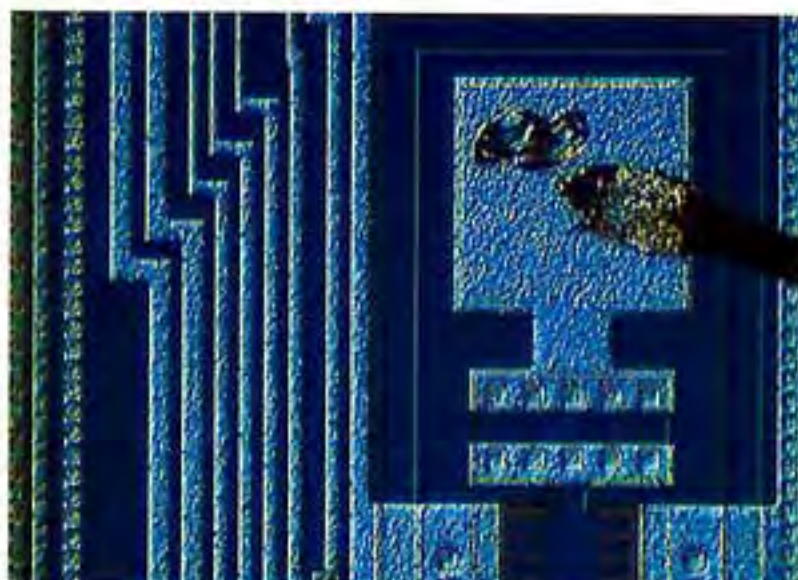
③ Example: measuring height of bonding wire



Through 40X (PLLWDM40X) Through 100X (PLLWDM100X)



Bright field observation



Nomarski DIC observation

Standard Specifications·Composition·Diagram

SPECIFICATIONS

			DH2		IMH		
Microscope Stand & Bracket	Travel	Coarse Adjustable	140mm		—		
		Fine Adjustable	25mm		25mm		
	Height of specimen		150mm(Max.) using 505S stage		—		
	Illuminator	Reflecting	Illumination with Index Graticule Tungsten Lump (8V, 15W)		Illumination with Index Graticule Halogen Lump (15V, 150W)		
		Transmitted	Telecentric Illumination Halogen Lump (6V, 20W)		—		
	Z-axis measuring		1μm Reading, 25mm Travel (ID-F125) 1μm Reading, 10mm Travel (LGB-110S) 0.1μm Reading, 10mm Travel (LGF-0110L)		1μm Reading, 25mm Travel (ID-F125) 0.1μm Reading, 10mm Travel (LGF-0110L)		
Z-axis measuring Accuracy		3σ=1μm (using 40X Objective)		3σ=1μm (using 40X Objective)			
Viewing Head	Erected Binocular		Monocular with TV C-mount Tube		Observation is only for CCD camera.		
	Erected Trinocular		Binocular with TV C-mount Tube				
Objective	PLM10X		N.A. 0.20, W.D. 12.0mm				
Eyepiece NWF10X	NWF10X		Field Number φ16mm with Offset Hair Line Crossed Reticle		—		
Measuring Stage			505S (※1)	505L	510	510D	100D (※1)
	Space for Specimens		φ118mm	φ170mm	280×190mm	280x190mm	φ206mm
	Size of Stage Glass		φ100mm	φ100mm	170×120mm	170x120mm	φ179mm
	Travel (X-Y)		50×50mm	50×50mm	100×50mm	100x50mm (with Linear Scale)	100x100mm (with Linear Scale)
	Measuring Accuracy		X : (4+0.02L) μm, Y : (4+0.02L) μm, L : Travel Distance (mm)				
	Rotation Angle		360°	360°	— (※2)	— (※2)	360°
	Stage Size		150×150×45mm	205×205×95mm	285×205×95mm	285×205×95mm	244×244×83mm

※ 1 : Stage plate is required. ※ 2 : Rotary table (510RS) is available.

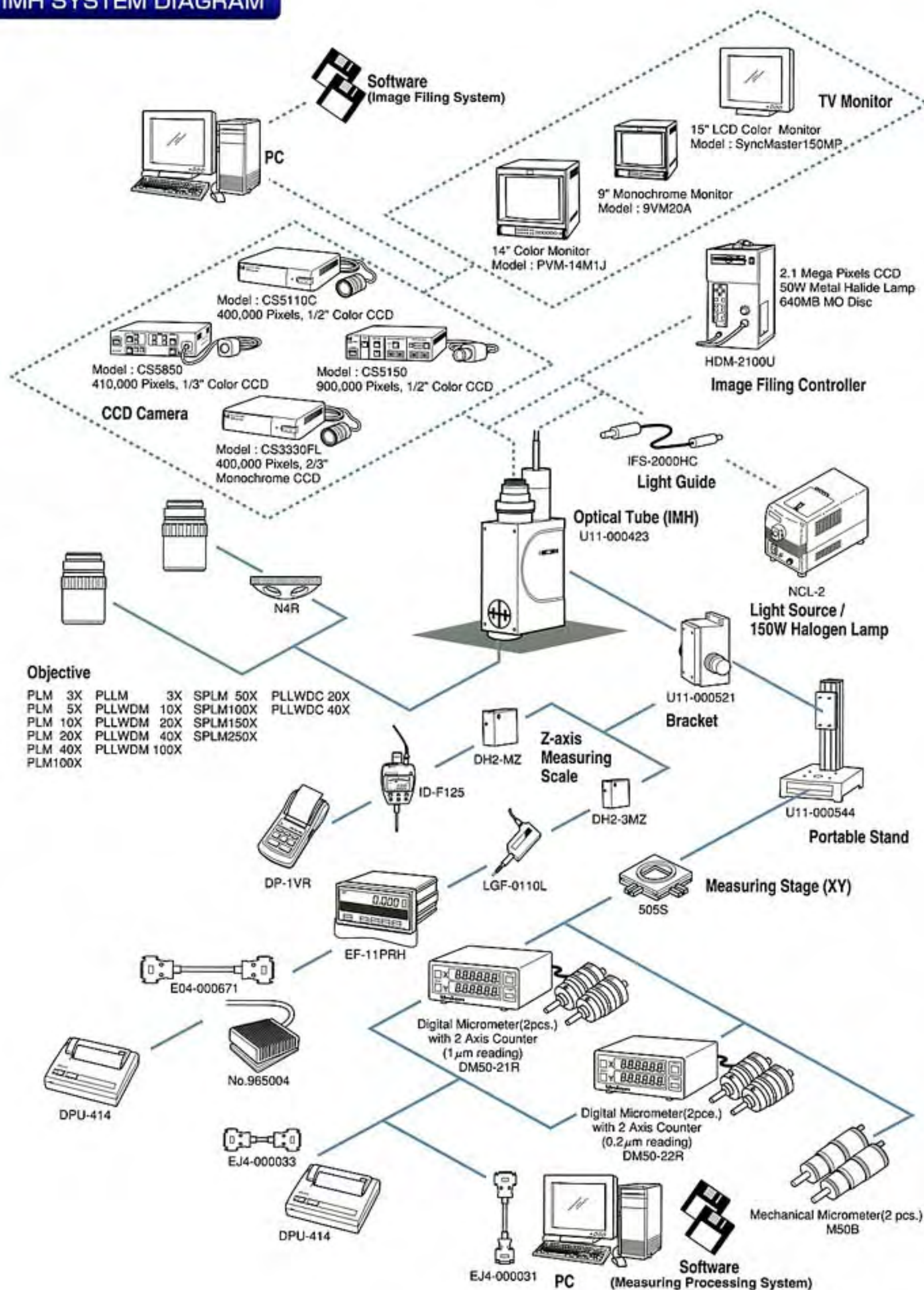
COMPOSITION

Unit	Item	Code No	DH2							IMH		
			C2	C3	T2	T3	T4	T5	T6	A	B	C
Microscope Stand	Stand (Main Body)	DH2-BE	○	○	○	○	○	○	○			
	Portable Stand	U11-000544										○
Bracket / Optical Tube	Standard Bracket	DH2-BR	○	○	○	○	○	○	○			
	Nomarski Bracket	DH2-BRN										
	Optical Tube (IMH)	U11-000423								○	○	○
	Coarse and Fine Adjustable Bracket	U11-000521								○	○	○
Viewing Head	Erected Binocular	DH2-MC	○	○								
	Erected Trinocular	DH2-TR			○	○	○	○	○			
Nosepiece	Quadruple Nosepiece	N4R										
Eyepiece	NWF10X	C104	○	○	○ (x2)	○ (x2)	○ (x2)	○ (x2)	○ (x2)			
Reticle	Offset Hair Line Crossed	G-14M	○	○	○	○	○	○	○			
Objective	PLM10X	BF05	○	○	○	○	○	○	○	○	○	○
	Z-axis Indicator	ID-F125	○	○	○	○	○	(○)	(○)	○		○
	Linear Gauge Adapter	LGB-110S						(○)	(○)			
	Linear Gauge Adapter	LGF-0110L						(○)	(○)		○	
	Digital Counter	DH3-3MZ						(○)	(○)			
Measuring Stage (XY)	Digital Counter	EF-11PRH										
	50x50 Stage	505S	○		○							○
	50x50 Stage	505L		○		○						
	100x50 Stage	510					○					
	100x50 Stage	510D						○				
	100x100 Stage	100D							○			
	Rotary Table	510RS										
	Stage Plate	DH2-SP1	○		○							
XY-axis Measuring Scale	Stage Plate	DH2-SP2										
	Mechanical Micrometer	M50B	○	○	○	○	○					○
XYZ-axis Measuring Scale	2-axis Counter	KC-12R						(○)	(○)			
	3-axis Counter	KC-13R						(○)	(○)			
Option	●Reticle : Dotted & Hair Line Crossed(G-10M), Hair Line Crossed(G-11M), Crossed Line Micro Scale ●Eyepiece : NWF15X(C451), WF20X(C452) ●Objective : PLM3/5/10/20/40/100X, PLLM3X, PLLWDM10/20/40/100X, SPLM50/100/250X, PLLWDC20/40X- Digital Micrometer with 2 Axis Counter : 1μm reading(DM50-21R), 0.2μm reading(DM50-22R) ●Printer : DPU-414 / DP-1VR ●Micropack : 2-D data processing unit (MP-9) ●Foot Switch : 965004 / E04-000708 ●External Load Box : 937327 / 937328 ●Remote Controller : 09CAA335 ●Lamp House : DH2-IT ●Light Source : NCL-2 ●Light Guide : IFS200HC ●Light Guide Adapter : IDL-1 ●Photo Adapter : DH2-C ●Auto Focus Unit : DH2-AF ●CCD Camera											

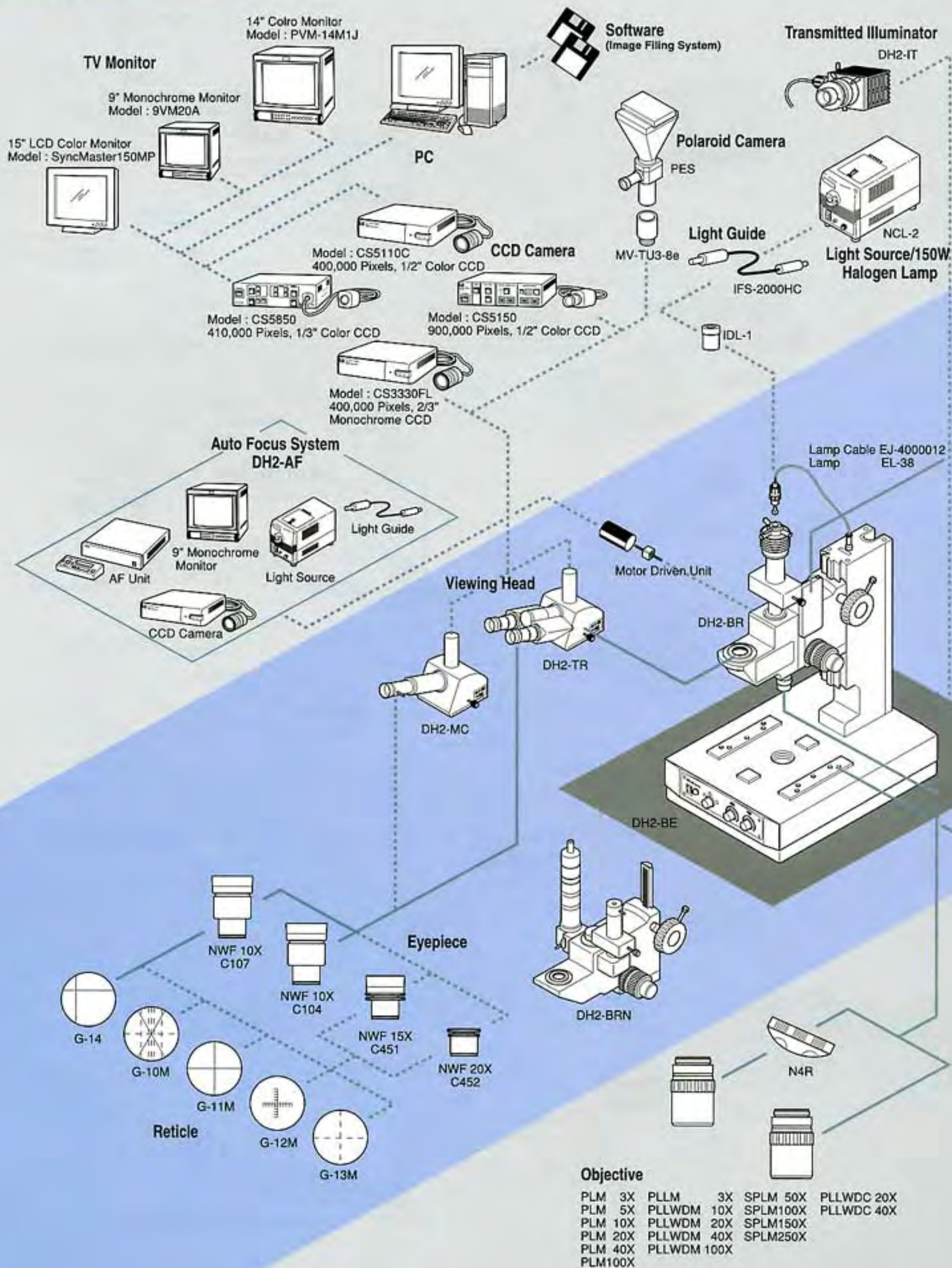
Non-Contact Depth Measuring Microscope System DH2/IMH



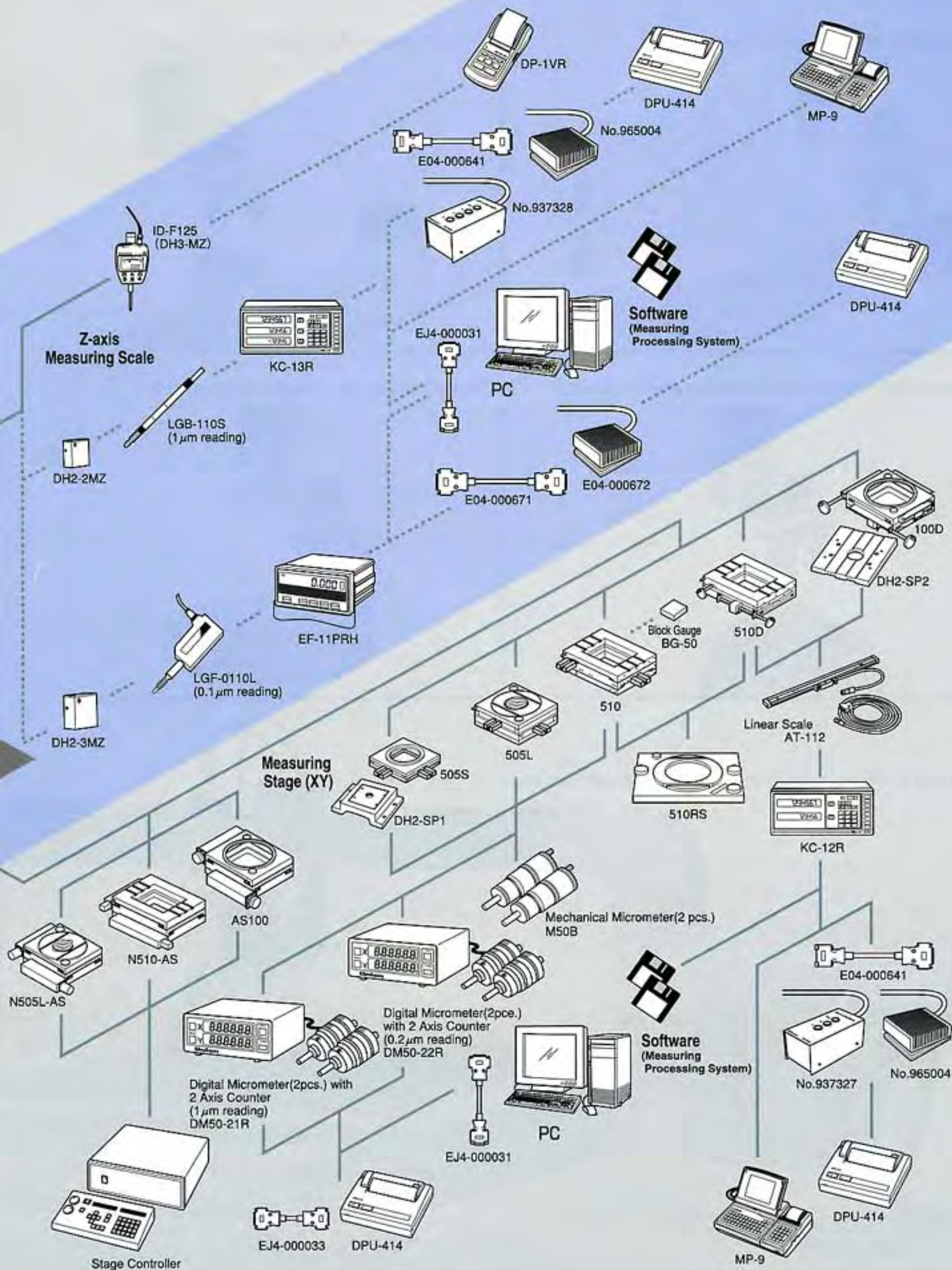
IMH SYSTEM DIAGRAM



DH2 SYSTEM DIAGRAM



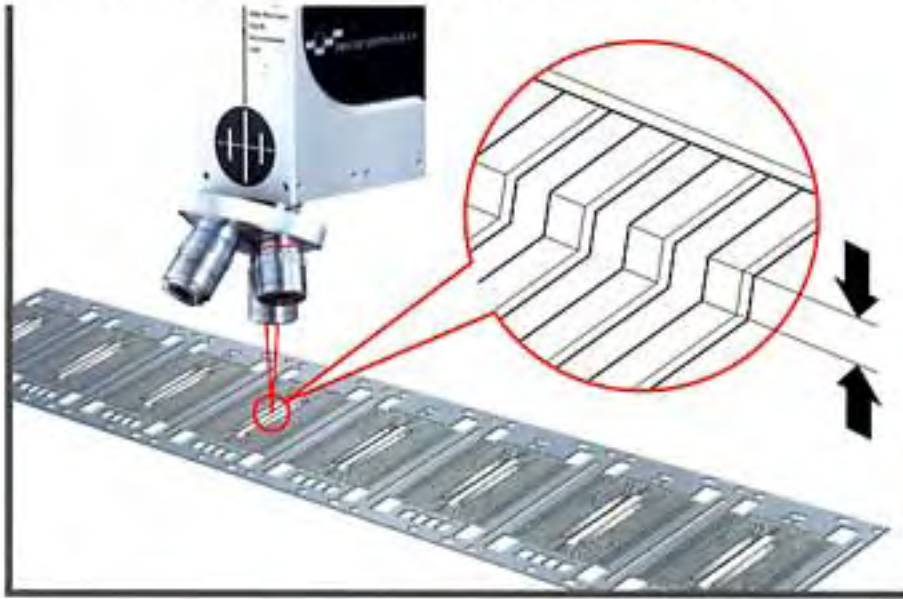
Non-Contact Depth Measuring Microscope System DH2/IMH



Applications

Hisomet(DH2/IMH) has been highly appreciated by users for its accurate measurements, in various fields of industries, such as semiconductor, MEMS, magnetic heads, electronic components, precision parts and the like.

< Measurement of height of lead frame >



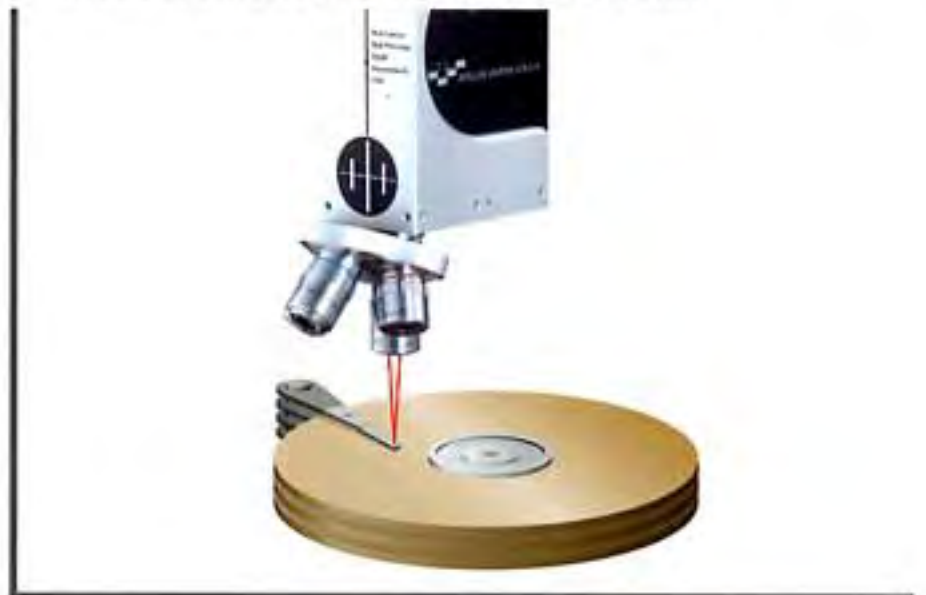
< Measurement of height of motor parts >



< Measurement of projection of head on the VTR drum >



< Measurement of height of HDD arm >

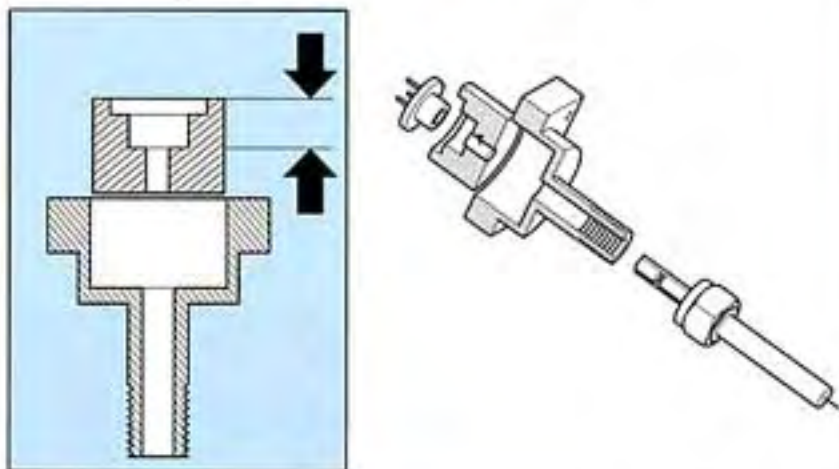


< Example of integration into equipment and production line >

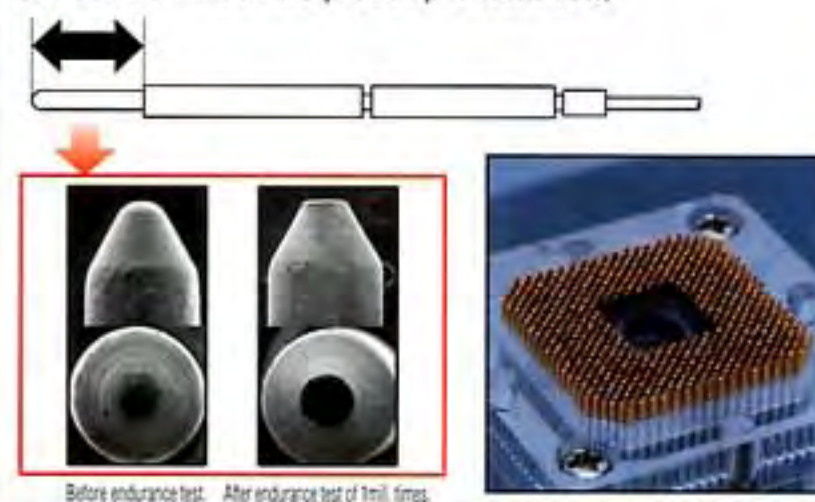




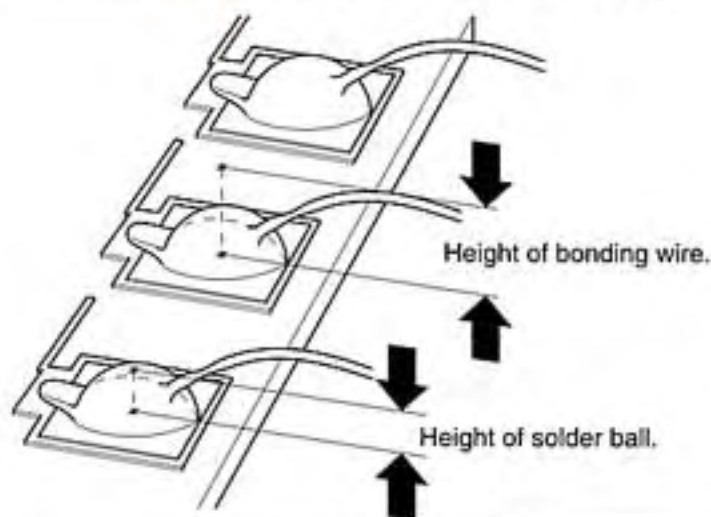
< Measurement of depth of rod lens and connector >
(Low power module)



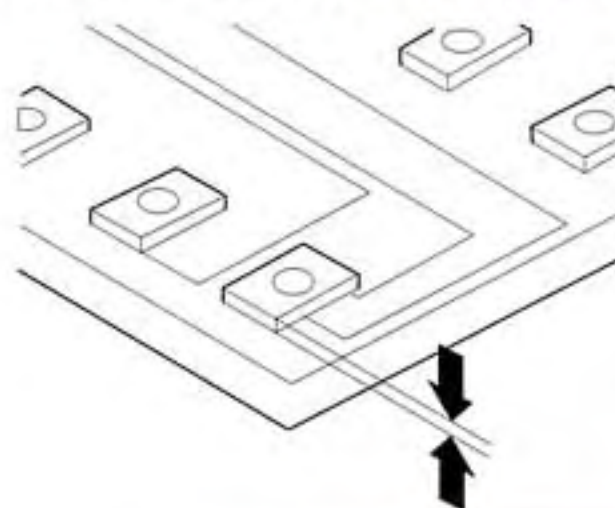
< Measurement of height of IC probe >
(To see how much the probe tip is worn out.)



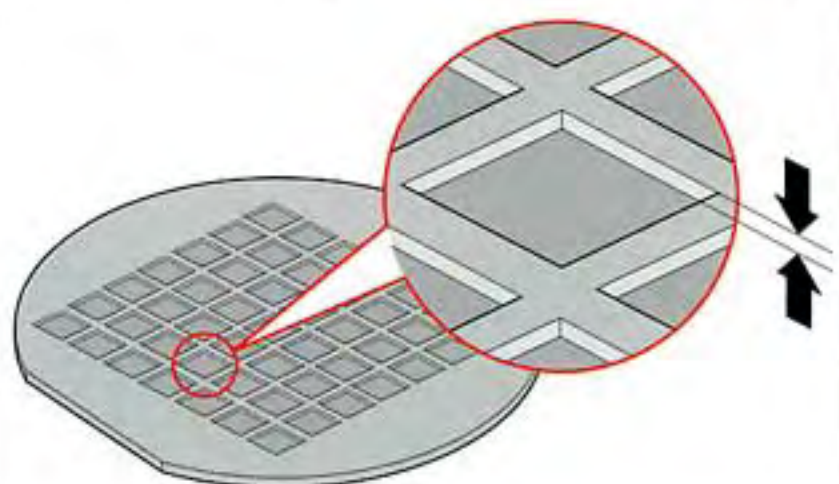
< Measurement of height of bonding wire and solder ball >



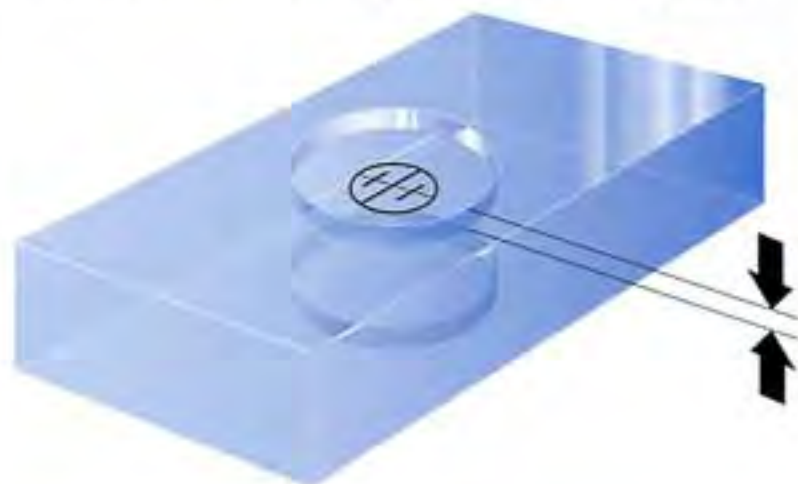
< Measurement of terminal steps on multi-layer PC boards >



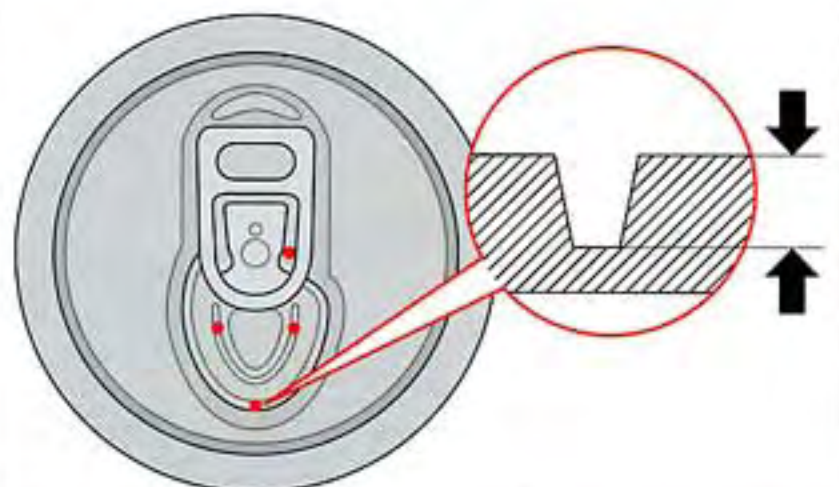
< Measurement of steps on wafers such as Si and GaAs >



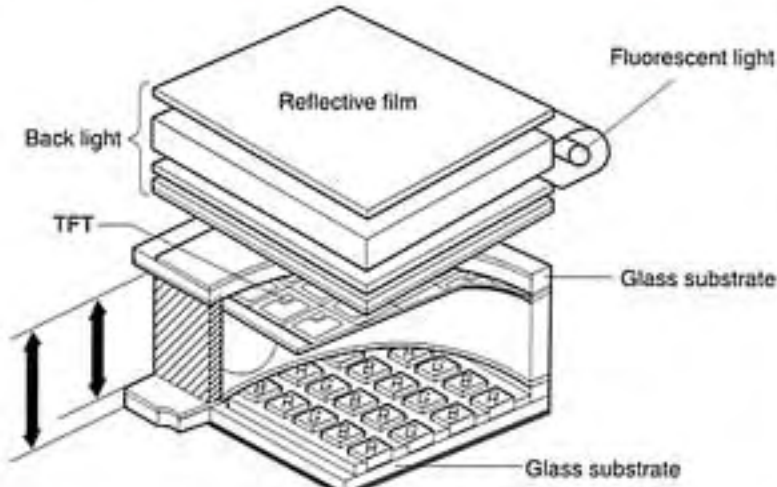
< Measurement of steps on quartz crystal >



< Measurement of recess on the can >



< Thickness of spacer >



Accessories & Optional Items

Objectives

DH2/IMH can be used with following objectives :

«Plan Objectives (PLM series)»

This is the objective in which field curvature aberration is corrected.

Focusing can be done on any given position in the view field.

«Long Working Distance Objectives (PLLWDM series)»

The long distance version of PLM series. Observation at high magnification is easy with this type of objective.

«Plan Apochromat Objectives (SPLM series)»

This objective has the advantages of both Plan Objective and Apochromat objective.

«Glass Corrected Objective (PLLWDC series)»

This objective is used to observe a material under glass. (LCD substrate, etc.) The value of spherical aberration correction is adjustable in accordance with glass thickness.

PLLWDC20X is applicable to glass 0-2.5mm thick.

PLLWDC40X is applicable to glass 0-2.0mm thick.

<Ultra Long Work Distance Objective PLLWDM100X>

—Work Distance of 5.0mm – The Longest in the world!—

with PLLWDM40X



✕ Judgement of Target Mark situation is somewhat difficult with 40X objective.

with PLLWDM100X



○ 100X objective facilitates Target Mark judgement greatly.

○ Ideal for measurement of fine materials.

Item		NA	W.D(mm)
Afocal Corrected Objective			
Plan Objective (∞)	PLM3X	0.075	8.5
	PLM5X	0.10	19.0
	PLM10X	0.20	12.0
	PLM20X	0.40	2.7
	PLM40X	0.35	0.90
	PLM100X(Dry)	0.90	0.28
Long Working Distance Objective (∞)	PLLWDM3X	0.075	29.5
	PLLWDM10X	0.20	24.3
	PLLWDM20X	0.40	11.2
	PLLWDM40X	0.50	10.0
	PLLWDM100X	0.73	5.0
Plan Apochromat Objective(∞)	SPLM5X	0.12	9.0
	SPLM10X	0.25	9.5
	SPLM20X	0.40	2.9
	SPLM50X	0.75	1.5
	SPLM100X	0.90	1.0
	SPLM150X	0.95	0.2
	SPLM250X	0.95	0.3
Special Objective			
Glass Corrected Objective	PLLWDCM20X	0.40	11.2
	PLLWDCM40X	0.50	10.0

※P.D. 45mm

PLM
Plan Objective (∞)



PLLWDM
Long Working Distance (∞)



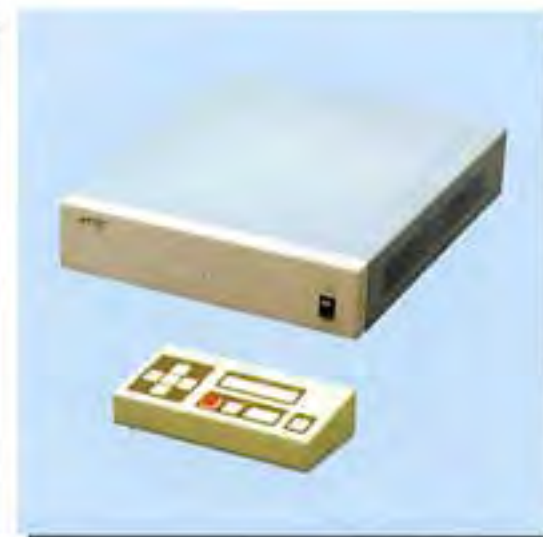
SPLM
Plan Apochromat Objective (∞)



Auto Focus Unit

DH2/IMH can be equipped with automatic focusing unit, which can decrease dependence on human skills and enable objective measuring.

No discrepancies between operators occur. Highly accurate and repeatable measurement is possible.





Z axis measuring scale & counter

ID-F125

- ID-F125 is a low cost Z axis indicator.
- It is capable of judging if the value obtained falls within the tolerance range. In case of the value not coming within the tolerance range, the back light of LCD screen turns on red.
- ID-F125 employs ABS (absolute system). The absolute value is automatically determined at the time of turning on power switch.
- Minimum measuring unit : $1\mu\text{m}$

LGF-0110L/EF-11PRH

- Minimum measuring unit is $0.1\mu\text{m}$.
- Comes with RS232C output terminal.
- The size of counter is 144 x 172 cm (DIN Size). Can be easily integrated into equipment/system.

LGB-110S/KC-13R

- KC-13R is a 3-axis (XYZ) counter with RS232C output terminal.
- Employs the smallest photo detector in the world. Highly accurate measuring can be done.
- Easy operation. Multiple functions.
- Minimum measuring unit : $1\mu\text{m}$

XY axis measuring scale & counter

AT-112/KC-12R

- KC-12R is a two-axis (X/Y) counter with RS232C data output terminal. This counter is for use with stages with linear gauge AT-112 (510D/100D/150D/200D).
- Highly accurate. Simple operation
- Minimum measuring unit: $1\mu\text{m}$

Digital Counter Unit : DM50-21R/DM50-22R

- Each of these units consists of Digital Micro Heads (2 pcs for X & Y) and two-axis digital counter. Comes with RS-232C data output terminal.
- DM50-21R : $1\mu\text{m}$ reading, 50mm x 50mm travel.
- DM50-22R : $0.2\mu\text{m}$ reading, 50mm x 50mm travel.
- Minimum measuring unit: $1\mu\text{m}$



ID-F125



LGF-0110L/EF-11PRH



LGB-110S/KC-13R



AT-112/KC-12R



DMC-21R/22R
DMH-501/502

Other Optional Items

No.9373281/Control Unit

- This is for use with printer and/or other peripherals. Operations including resetting of counter, transmission of PRINT command, changing of sample No., etc., can be done with this control unit alone.

No. 965004/Foot Switch

- This is used to switch on and off printer and other external equipment.

DPU-414/Printer

- This is for printing out of X/Y position indicated on counter. (Foot switch is required for operation of this printer.)

DP-1VR/Printer

- This is for printing of measuring result and performing various calculations. Has various types of advanced functions including not only printing out of measuring data, but also complex statistical calculation, histogram, D-chart drawing, etc.
- Comes with RS232C output terminal.
- Print system is line thermal. High speed. Low noise.



No.9373281 / Control Unit



No.965004 / Foot Switch



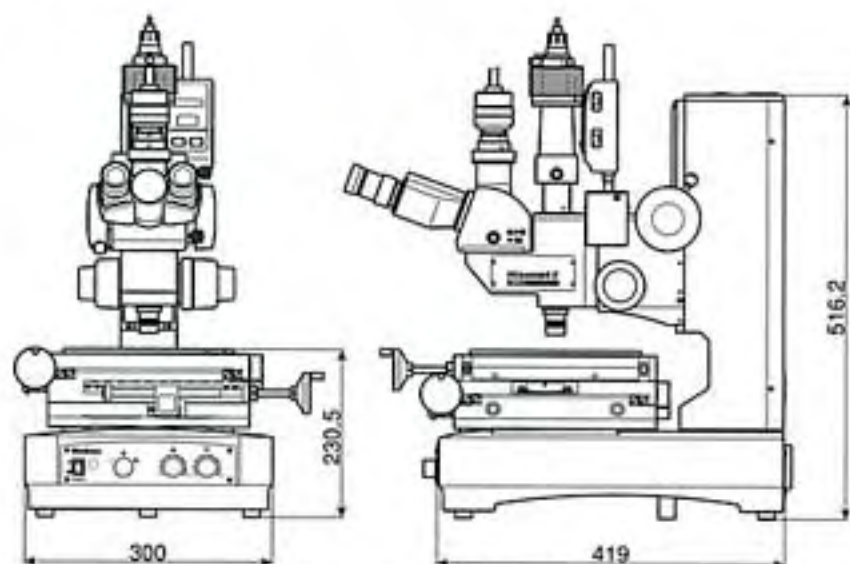
DPU-414 / Printer



DP-1VR / Printer

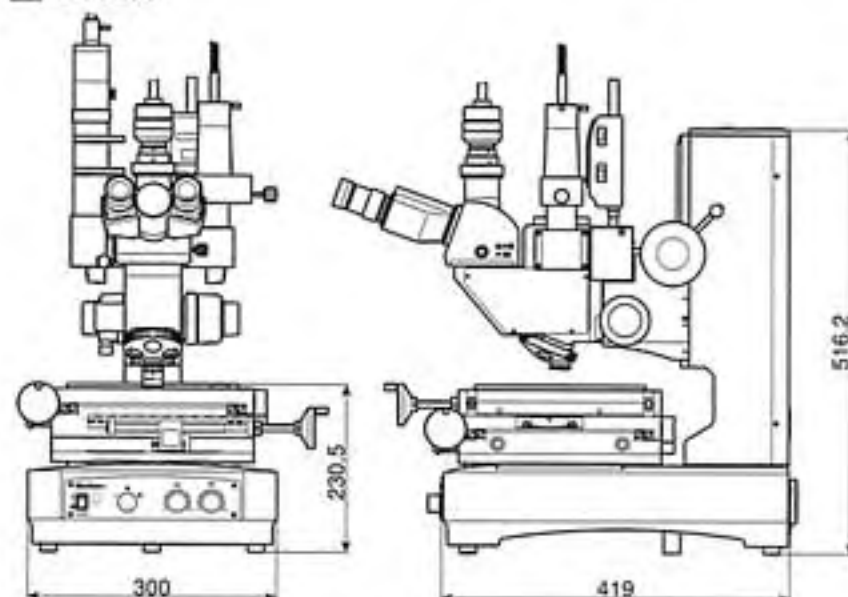
External Dimensions

DH2



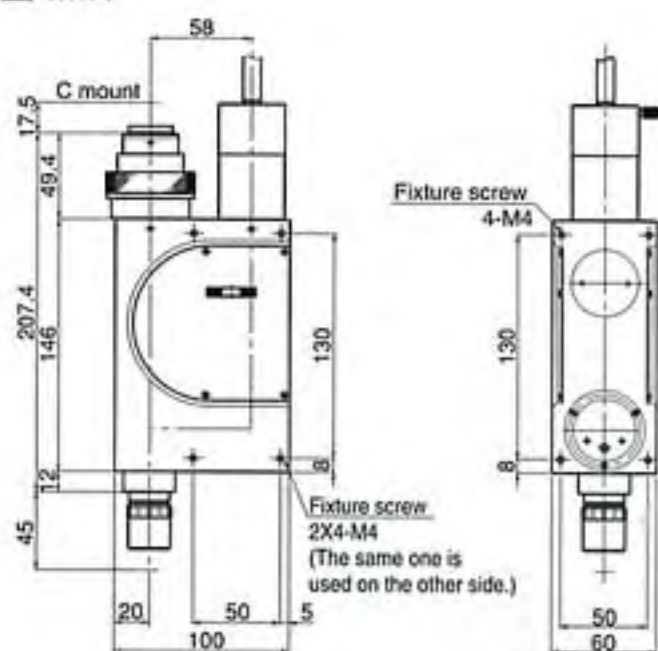
Weight 40kg (exclusive of stage)

DH2N

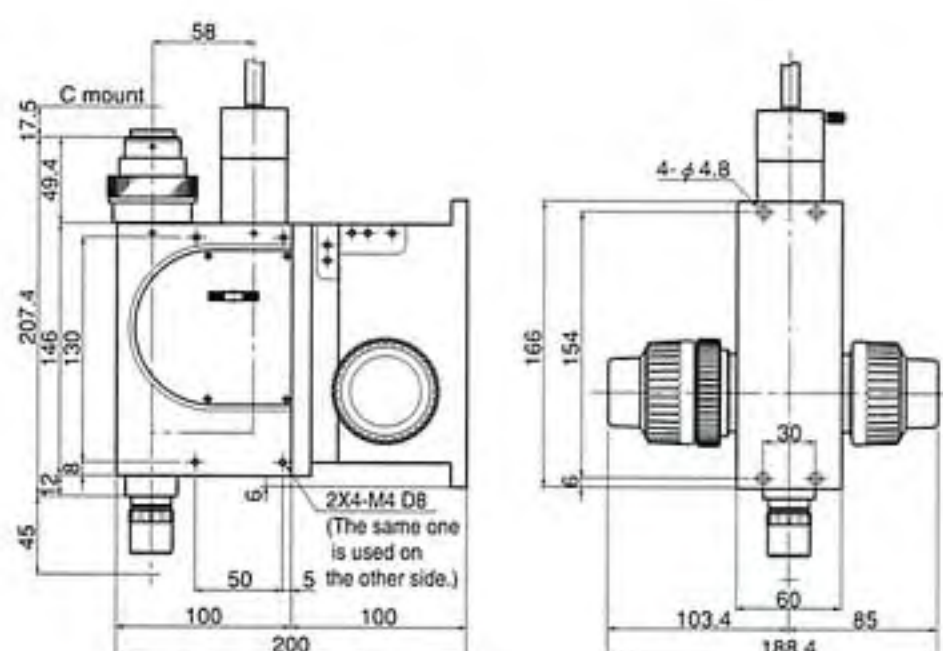


Weight 45kg (exclusive of stage)

IMH



Weight 2kg (optical tube)



Weight 4kg

Stages



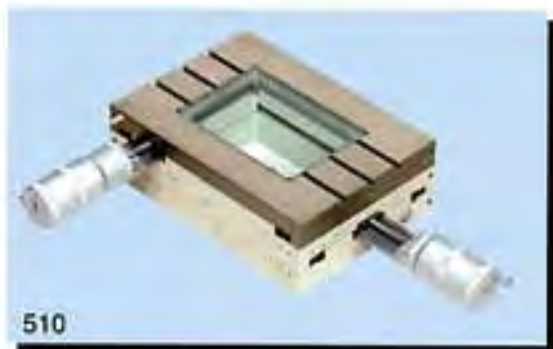
100D



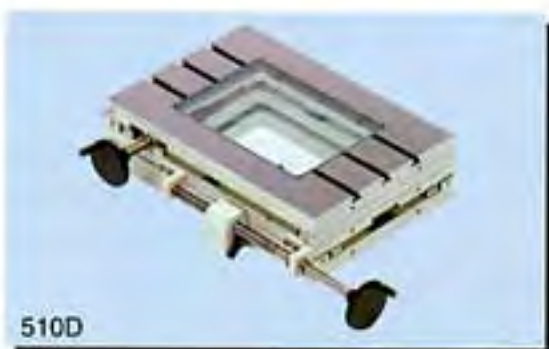
505S



505L



510



510D



Rotary Table 510RS

UNION OPTICAL CO., LTD.

Head Office and Plant No. 19-17, Shimura 2-Chome, Itabashi-Ku, Tokyo 174-0056, Japan
Tel : 81-3-3966-2206 Fax : 81-3-3966-2230

URL; <http://www.union.co.jp> E-mail; sales@union.co.jp

●All specifications are subject to change without prior notice.

Cinv

西努光学仪器有限公司