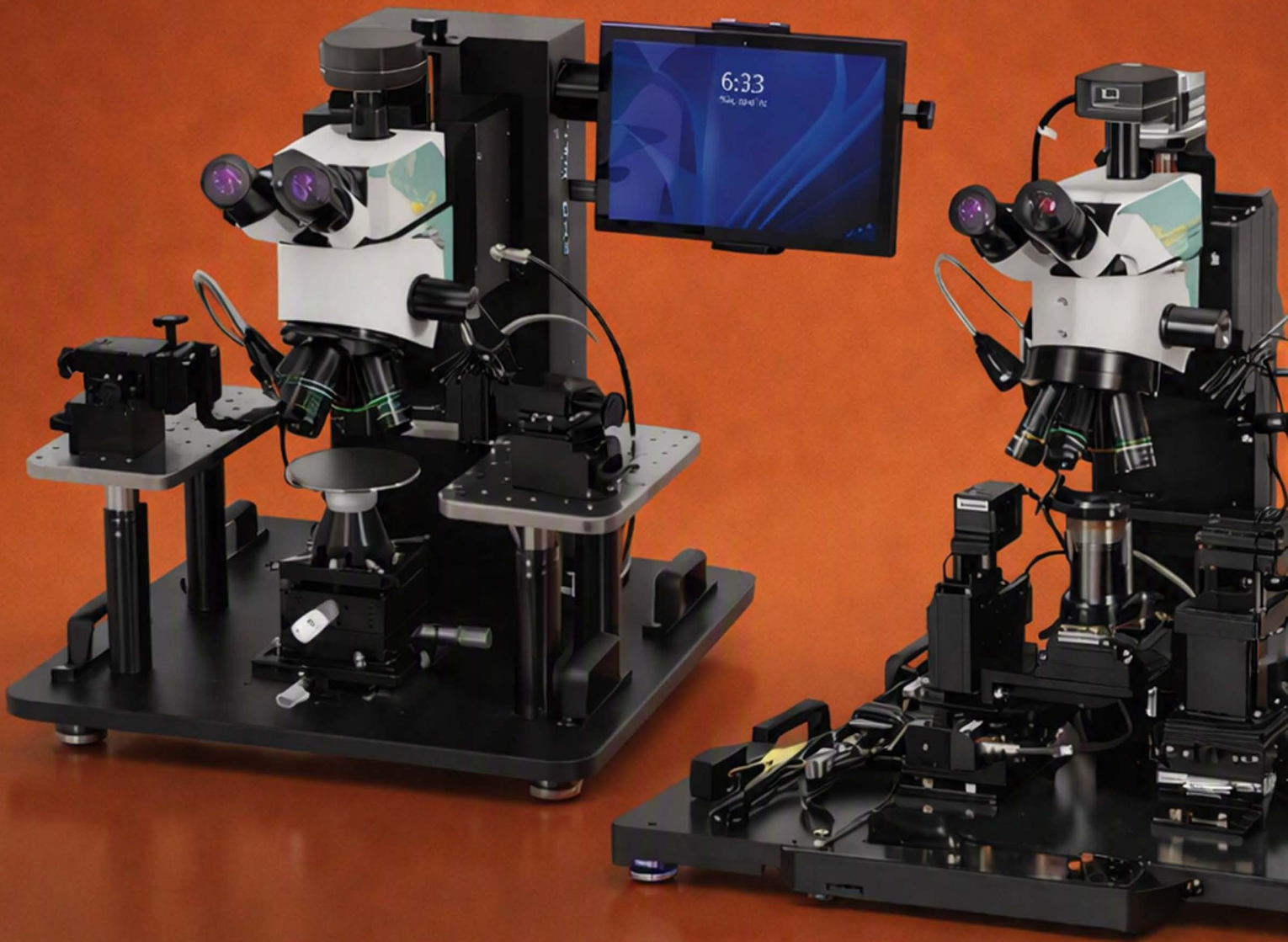




# IMAGING INSTRUMENTS

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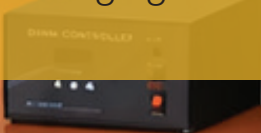




# 02

# IMAGING INSTRUMENTS

Holmarc manufactures precise imaging instruments designed for scientific and industrial use. Our product range includes digital microscopes, fluorescence systems, and interferometers, known for high-resolution imaging and custom design capabilities



## 70 IMAGING INSTRUMENTS

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- 122 Telemicroscope
- 122 Telemicroscope -TM202
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- 126 Confocal Fluorescence Correlation Spectrometer

- 126 Confocal Fluorescence Correlation Spectrometer
- 128 Confocal Fluorescence
- 128 Cross Correlation Spectrometer
- 132 Thermal Lens Microscope - Confocal
- 134 Digital Inline Holography Microscope
- 136 Digital Inline
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- 138 Interferometers
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- 140 Fizeau Interferometer with Encoder Rail System
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# 2D Transfer System

**Van der Waals heterostructure assembly**

**Twisted bilayer and multilayer 2D material research**

**2D material device prototyping**

**Nanoelectronics, optoelectronics, and advanced materials development**



## 2D Transfer System with Digital Microscope

**Model : HO-2DTS-DM-01**

Holmarc's HO-2DTS-DM-01 is a compact and versatile manual 2D transfer system engineered for the fabrication of high-quality 2D heterostructures and twisted-layer assemblies. Designed for precision and ease of use, the system enables reliable stacking and alignment of atomically thin materials. The system features a manual-focusing digital microscope with a 0.7X–4.5X zoom range, extendable up to 2.8X–18X effective magnification using a 4X auxiliary objective. This provides an optimal balance between wide-area viewing and fine-detail inspection during transfer operations.



A high-precision 9-axis stage architecture—comprising an XYZ- $\theta$  substrate stage and an XYZ stamping stage with a tilting platform—offers exceptional freedom in translational, rotational, and angular alignment. This ensures accurate positioning of flakes and precise control of twist angles during heterostructure fabrication. The substrate is mounted on a vacuum-assisted thermal chuck with temperature control from room temperature to 200 °C, enabling stable holding and controlled thermal conditions for efficient pick-up and release processes. An image acquisition software with live measurement capabilities is supplied for real-time monitoring and documentation of the transfer process.

### Key Features

- Manual 2D transfer system for heterostructures and twisted layers
- Digital microscope: 0.7X–4.5X (up to 18X with auxiliary objective)
- High-precision 9-axis stages for accurate alignment
- Vacuum thermal chuck (RT to 200 °C)
- Live image capture and measurement software





**Model HO-2DTS-DM-01**

|                                                                              |                                                       |                                                                                |
|------------------------------------------------------------------------------|-------------------------------------------------------|--------------------------------------------------------------------------------|
| 1. <b>Base plate</b>                                                         | Cast Aluminium with levelling bush                    |                                                                                |
| 2. <b>Digital Zoom microscope with dual post setup with Z focusing stage</b> | Optical system                                        | <b>Finite Corrected</b>                                                        |
|                                                                              | Observation method                                    | Brightfield                                                                    |
|                                                                              | Illumination                                          | <b>Epi-scopic</b> , White LED, Intensity adjustable                            |
|                                                                              | Focusing                                              | <b>Manual</b>                                                                  |
|                                                                              | Zoom system                                           | <b>0.7X – 4.5X</b>                                                             |
|                                                                              | Zoom ratio                                            | 6.5: 1                                                                         |
|                                                                              | Auxiliary objectives                                  | <b>1X and 2X (working distance = 39mm)</b>                                     |
|                                                                              | <b>Effective magnification range (@2X)</b>            | 1.4X to 9X                                                                     |
|                                                                              | FOV (@2X)                                             | 4.07mm x 3.05mm @ 0.7X, 0.63mm x 0.475mm @4.5X.                                |
|                                                                              | Camera                                                | 1/2.5" Color CMOS, 5MP, USB2.0, C-mount, 2.2umx2.2um pixel size                |
|                                                                              | Software                                              | <b>2DTransfer_v01</b> (Live/Image capture, scale bar, measurement, annotation) |
| 3. <b>XYZ theta sample stage with heater &amp; Vacuum chuck (1 set)</b>      |                                                       |                                                                                |
| Rotation stage                                                               | XY Travel                                             | <b>25mm</b>                                                                    |
|                                                                              | Z travel                                              | <b>10mm</b>                                                                    |
|                                                                              | <b>XYZ axes resolution</b>                            | <b>1um</b>                                                                     |
|                                                                              | <b>XYZ axes drive</b>                                 | <b>Digital Micrometer</b>                                                      |
|                                                                              | Construction                                          | Black anodized aluminium alloy                                                 |
| Vacuum chuck and Heater with temperature controller                          | Sample plate diameter                                 | 40mm                                                                           |
|                                                                              | Temperature range                                     | RT – 200°C                                                                     |
|                                                                              | Temperature increment                                 | 1 degree C                                                                     |
|                                                                              | PID Controller                                        |                                                                                |
|                                                                              | Vacuum Pump                                           |                                                                                |
| 4. <b>XYZ Stamping stage with tilting platform (1set)</b>                    | X and Y axis travel                                   | 25mm                                                                           |
|                                                                              | Z axis travel                                         | 10mm                                                                           |
|                                                                              | <b>XYZ axes resolution</b>                            | <b>1um</b>                                                                     |
|                                                                              | <b>XYZ axes drive</b>                                 | <b>Digital Micrometer</b>                                                      |
|                                                                              | <b>Tilting platform drive</b>                         | <b>leadscrew</b>                                                               |
|                                                                              | Construction                                          | Black anodized Aluminium alloy                                                 |
| 5. <b>Glass /sample Holder</b>                                               | Suitable for standard glass slides(75mmx25mm)         |                                                                                |
| <b>Optional Accessories</b>                                                  | 1. 1.5X Auxiliary objective (Working distance = 50mm) |                                                                                |
|                                                                              | 2. 4X Auxiliary objective (Working distance = 10mm)   |                                                                                |

**APPLICATIONS**

- 2D material heterostructure fabrication
- Twisted bilayer and multilayer assembly
- Research in nanoelectronics, optoelectronics, and materials science
- MEMS integration and hybrid structures
- Academic and R&D laboratories
- Graphene and TMD transfer studies

# 2D Transfer System with High Resolution Digital Microscope

## Model : HO-2DTS-DM-02

The HO-2DTS-DM-02 is a precision manual 2D material transfer system designed for deterministic fabrication of 2D heterostructures and twisted-layer stacks. The platform combines advanced optics, multi-axis positioning, and thermal control to support accurate and repeatable transfer processes.

The optical system incorporates a 0.5X–5X high-resolution digital zoom microscope combined with Plan Apochromatic long working distance objectives. With optional long working distance objectives, the effective magnification can be extended from 2.5X up to 250X, providing flexibility for a wide range of transfer tasks. This optical arrangement delivers high image fidelity with minimal aberrations while maintaining sufficient working distance, allowing seamless transition from coarse flake localization to precise alignment during stacking operations.

Transfer precision is achieved through 9-axis stage mechanisms, consisting of an XYZ- $\theta$  substrate stage and an independent XYZ stamping stage with a tilting platform. This arrangement allows precise control of translation, rotation, vertical approach, and angular alignment, which is critical for twist-angle engineering and layer-to-layer registration.

### Key Features

- Manual system for 2D heterostructure and twisted-layer fabrication
- 0.5X–5X digital high resolution zoom microscope with Plan Apo LWD objectives
- High-precision 9-axis stages for comprehensive alignment freedom
- Vacuum thermal chuck with RT to 200 °C temperature control
- Live image capture with on-screen measurement tools

### Applications



- Van der Waals heterostructure assembly



- Twisted bilayer and multilayer 2D material research



- 2D material device prototyping



- Nanoelectronics, optoelectronics, and advanced materials development



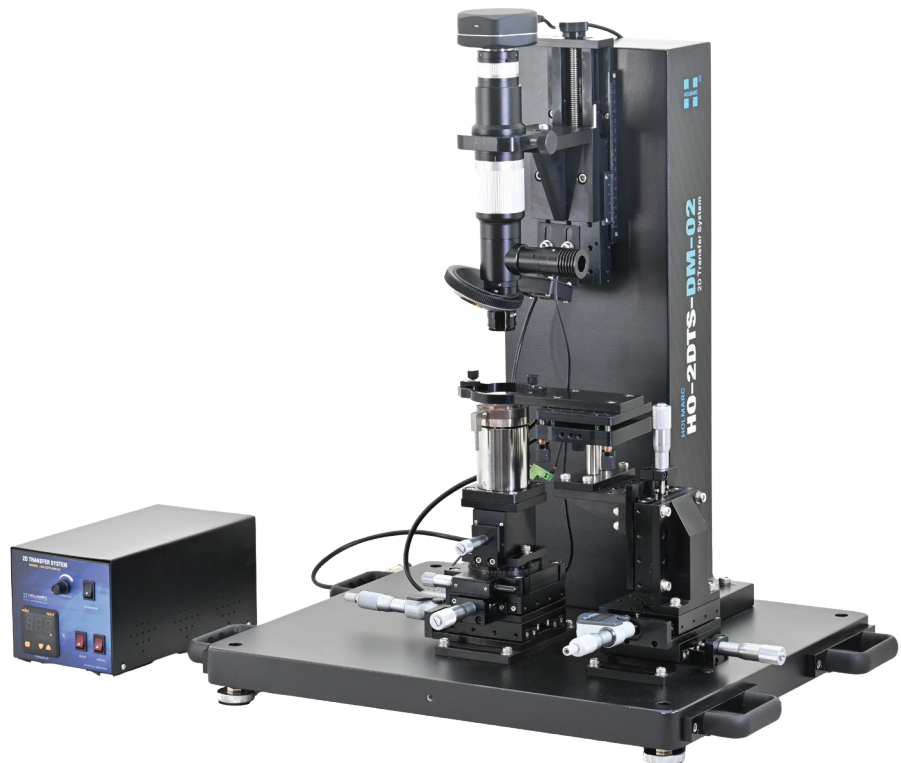
- Graphene and TMD transfer studies.



- MEMS integration and hybrid structures



- Academic and R&D Laboratories





## Model HO-2DTS-DM-02



|                                                                                      |                                                                                   |                                                                                                             |
|--------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| 1. Base plate                                                                        | Cast Aluminium with levelling bush                                                |                                                                                                             |
|                                                                                      | Optical system                                                                    | <b>Microscope objective based Zoom system</b>                                                               |
| 2. Digital High Resolution Zoom microscope with vertical stand and Z focusing stage. | Observation method                                                                | Brightfield                                                                                                 |
|                                                                                      | Illumination                                                                      | <b>Epi-scopic</b> , White LED, Intensity adjustable                                                         |
|                                                                                      | Focusing                                                                          | <b>Manual</b>                                                                                               |
|                                                                                      | Zoom system                                                                       | <b>0.5X – 5X</b>                                                                                            |
|                                                                                      | Zoom ratio                                                                        | 10: 1                                                                                                       |
|                                                                                      | Microscope Objective                                                              | 1. Plan Apo LWD 5X (NA = 0.14, Working distance = 44mm) FOV = 2.28mm x 1.71mm @ 0.5X, 0.228mm x 0.188mm @5X |
|                                                                                      | Effective magnification range (@5X)                                               | <b>2.5X to 25X</b>                                                                                          |
|                                                                                      | Camera                                                                            | <b>1/2.5"</b> Color CMOS, <b>5MP</b> , USB2.0, C-mount, 2.2umx2.2um pixel size                              |
|                                                                                      | Software                                                                          | <b>2DTransfer_v01</b> (Live/Image capture, scale bar, measurement, annotation)                              |
|                                                                                      |                                                                                   |                                                                                                             |
| 3. XYZ theta sample stage with heater & Vacuum chuck                                 |                                                                                   |                                                                                                             |
| Rotation stage                                                                       | Readout                                                                           | <b>0.1 degree</b>                                                                                           |
|                                                                                      | Coarse travel                                                                     | <b>360 degree</b>                                                                                           |
|                                                                                      | Fine travel                                                                       | <b>+/- 4 degree</b>                                                                                         |
|                                                                                      | Drive                                                                             | <b>Micrometer</b>                                                                                           |
|                                                                                      | Construction                                                                      | Black anodized aluminium alloy                                                                              |
| XYZ stage                                                                            | XY Travel                                                                         | <b>25mm</b>                                                                                                 |
|                                                                                      | Z travel                                                                          | <b>10mm</b>                                                                                                 |
|                                                                                      | <b>XYZ axes resolution</b>                                                        | <b>1um</b>                                                                                                  |
|                                                                                      | <b>XYZ axes drive</b>                                                             | <b>Digital Micrometer</b>                                                                                   |
|                                                                                      | Construction                                                                      | Black anodized aluminium alloy                                                                              |
| Vacuum chuck and Heater with temperature controller                                  | Sample plate diameter                                                             | 40mm                                                                                                        |
|                                                                                      | Temperature range                                                                 | <b>RT – 200oC</b>                                                                                           |
|                                                                                      | Temperature increment                                                             | 1 degree C                                                                                                  |
|                                                                                      | PID Controller                                                                    |                                                                                                             |
|                                                                                      | <b>Vacuum Pump</b>                                                                |                                                                                                             |
| 4. XYZ Stamping stage with tilting platform                                          | X and Y axis travel                                                               | 25mm                                                                                                        |
|                                                                                      | Z axis travel                                                                     | 10mm                                                                                                        |
|                                                                                      | <b>XYZ axes resolution</b>                                                        | 1um                                                                                                         |
|                                                                                      | XYZ axes drive                                                                    | <b>Digital Micrometer</b>                                                                                   |
|                                                                                      | <b>Tilting platform drive</b>                                                     | <b>leadscrew.</b>                                                                                           |
|                                                                                      | Construction                                                                      | Black anodized Aluminium alloy                                                                              |
| 5. Glass /sample Holder                                                              | Suitable for standard glass slides(75mmx25mm)                                     |                                                                                                             |
| Optional Accessories                                                                 | 1. Plan Apo LWD <b>2X</b> objective (NA = 0.06, Working distance = <b>34mm</b> )  |                                                                                                             |
|                                                                                      | 2. Plan Apo LWD <b>10X</b> objective (NA = 0.30, Working distance = <b>34mm</b> ) |                                                                                                             |
|                                                                                      | 3. Plan Apo LWD <b>20X</b> objective (NA = 0.35, Working distance = <b>29mm</b> ) |                                                                                                             |
|                                                                                      | 4. Plan Apo LWD <b>50X</b> objective (NA = 0.45, Working distance = <b>17mm</b> ) |                                                                                                             |

# 2D Transfer System with Trinocular Microscope

## Model : HO-2DTS-TM-01

The HO-2DTS-TM-01 from Holmarc is a precision manual 2D material transfer system developed for deterministic fabrication of 2D heterostructures and twisted-layer stacks. The platform integrates advanced optical imaging, multi-axis mechanical control, and thermal management to ensure accurate, stable, and repeatable transfer processes.

The optical system is based on a Trinocular microscope equipped with Plan Apochromatic long working distance objectives. This configuration provides high image clarity with minimal optical aberrations while preserving adequate working distance, enabling smooth transition from wide-area flake identification to fine alignment during stacking operations.

High transfer accuracy is realized through a 9-axis manual stage architecture, comprising an XYZ- $\theta$  substrate stage and an independent XYZ stamping stage with a tilting platform. This arrangement enables precise control over lateral positioning, rotation, vertical approach, and angular alignment, which is essential for twist-angle control and accurate layer-to-layer registration.

The substrate is mounted on a vacuum- thermal chuck with temperature control from RT - 200 °C. The combination of stable vacuum holding and controlled heating supports reliable pick-up, clean release, and improved interfacial quality during transfer.

An integrated image acquisition software with live measurement capabilities allows real-time visualization, alignment verification, and documentation of the transfer process, enhancing operational efficiency and experimental reproducibility.

## Key Features

- Manual system for 2D heterostructure and twisted-layer fabrication
- Trinocular microscope with Plan Apo Long working distance objectives
- High-precision 9-axis stages for comprehensive alignment freedom
- Vacuum thermal chuck with RT to 200 °C temperature control
- Live image capture with on-screen measurement tools

## Applications

-  Van der Waals heterostructure assembly
-  Twisted bilayer and multilayer 2D material research
-  2D material device prototyping
-  Nanoelectronics, optoelectronics, and advanced materials development
-  Graphene and TMD transfer studies.
-  MEMS integration and hybrid structures
-  Academic and R&D Laboratories



**Model HO-2DTS-TM-01**

|                                                                           |                                                                                                                                                                                                                                                                                     |                                                                                                                   |
|---------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>1. Base plate</b>                                                      | Cast Aluminium with levelling bush                                                                                                                                                                                                                                                  |                                                                                                                   |
|                                                                           |                                                                                                                                                                                                                                                                                     |                                                                                                                   |
| <b>2. Trinocular microscope with vertical stand and Z focusing stage.</b> | Optical system                                                                                                                                                                                                                                                                      | Infinity Corrected                                                                                                |
|                                                                           | Observation method                                                                                                                                                                                                                                                                  | Brightfield                                                                                                       |
|                                                                           | Illuminations                                                                                                                                                                                                                                                                       | 1. Epi-scope, White LED, Intensity adjustable<br>2. Angled, White LED, Intensity adjustable                       |
|                                                                           | Eyepiece                                                                                                                                                                                                                                                                            | <b>10X (FN20)</b> , Diopter adjustable                                                                            |
|                                                                           | Viewing head                                                                                                                                                                                                                                                                        | <b>Siedentopf Trinocular</b> , 30O, 48-75mm IP adjustment                                                         |
|                                                                           | Nosepiece                                                                                                                                                                                                                                                                           | <b>Quadruple, Manual</b> , positive precision click stops                                                         |
|                                                                           | Focusing                                                                                                                                                                                                                                                                            | <b>Manual</b>                                                                                                     |
|                                                                           | Microscope Objective                                                                                                                                                                                                                                                                | <b>1. Plan Apo LWD 5X (NA = 0.14, Working distance = 44mm), FOV@eyepiece = 4mm, FOV@camera = 1.14mm x 0.856mm</b> |
|                                                                           | Camera                                                                                                                                                                                                                                                                              | 1/2.5" Color CMOS, 5MP, USB2.0, C-mount, 2.2umx2.2um pixel size                                                   |
|                                                                           | Software                                                                                                                                                                                                                                                                            | 2DTransfer_v01 (Live/Image capture, scale bar, measurement, annotation)                                           |
|                                                                           |                                                                                                                                                                                                                                                                                     |                                                                                                                   |
| <b>3. XYZ theta sample stage with heater &amp; Vacuum chuck</b>           |                                                                                                                                                                                                                                                                                     |                                                                                                                   |
| Rotation stage                                                            | Readout                                                                                                                                                                                                                                                                             | <b>0.1 degree</b>                                                                                                 |
|                                                                           | Coarse travel                                                                                                                                                                                                                                                                       | <b>360 degree</b>                                                                                                 |
|                                                                           | Fine travel                                                                                                                                                                                                                                                                         | <b>+/- 4 degree</b>                                                                                               |
|                                                                           | Drive                                                                                                                                                                                                                                                                               | <b>Micrometer</b>                                                                                                 |
|                                                                           | Construction                                                                                                                                                                                                                                                                        | Black anodized aluminium alloy                                                                                    |
| XYZ stage                                                                 | XY Travel                                                                                                                                                                                                                                                                           | <b>25mm</b>                                                                                                       |
|                                                                           | Z travel                                                                                                                                                                                                                                                                            | <b>10mm</b>                                                                                                       |
|                                                                           | XYZ axes resolution                                                                                                                                                                                                                                                                 | <b>1um</b>                                                                                                        |
|                                                                           | XYZ axes drive                                                                                                                                                                                                                                                                      | <b>Digital Micrometer</b>                                                                                         |
|                                                                           | Construction                                                                                                                                                                                                                                                                        | Black anodized aluminium alloy                                                                                    |
| Vacuum chuck and Heater with temperature controller                       | Sample plate diameter                                                                                                                                                                                                                                                               | 40mm                                                                                                              |
|                                                                           | Temperature range                                                                                                                                                                                                                                                                   | <b>RT – 200°C</b>                                                                                                 |
|                                                                           | Temperature increment                                                                                                                                                                                                                                                               | 1 degree C                                                                                                        |
|                                                                           | PID Controller                                                                                                                                                                                                                                                                      |                                                                                                                   |
|                                                                           | <b>Vacuum Pump</b>                                                                                                                                                                                                                                                                  |                                                                                                                   |
|                                                                           |                                                                                                                                                                                                                                                                                     |                                                                                                                   |
| <b>4. XYZ Stamping stage with tilting platform</b>                        | X and Y axis travel                                                                                                                                                                                                                                                                 | 25mm                                                                                                              |
|                                                                           | Z axis travel                                                                                                                                                                                                                                                                       | 10mm                                                                                                              |
|                                                                           | XYZ axes resolution                                                                                                                                                                                                                                                                 | 1um                                                                                                               |
|                                                                           | XYZ axes drive                                                                                                                                                                                                                                                                      | <b>Digital Micrometer</b>                                                                                         |
|                                                                           | <b>Tilting platform drive</b>                                                                                                                                                                                                                                                       | <b>leadscrew</b>                                                                                                  |
|                                                                           | Construction                                                                                                                                                                                                                                                                        | Black anodized Aluminium alloy                                                                                    |
| <b>5. Glass /sample Holder</b>                                            | Suitable for standard glass slides(75mmx25mm)                                                                                                                                                                                                                                       |                                                                                                                   |
| <b>Optional Accessories</b>                                               | 1. Plan Apo LWD 2X objective (NA = 0.06, Working distance = 34mm)<br>2. Plan Apo LWD 10X objective (NA = 0.30, Working distance = 34mm)<br>3. Plan Apo LWD 20X objective (NA = 0.35, Working distance = 29mm)<br>4. Plan Apo LWD 50X objective (NA = 0.45, Working distance = 17mm) |                                                                                                                   |



# Motorized 2D Transfer System

**(Trinocular Microscope –Brightfield/Darkfield)**  
**Model : HO-2DTS-TM-02BD**

Holmarc's motorized 2D transfer system Model HO-2DTS-TM-02BD is designed for the fabrication of high-quality 2D heterostructures and precisely controlled twisted layers. The system is equipped with a high-resolution trinocular microscope supporting both brightfield and darkfield observation, enabling real-time monitoring of the transfer process with excellent contrast and clarity.

The substrate is mounted on a vacuum-thermal chuck with temperature control from room temperature (RT) up to 200 °C. The combination of stable vacuum holding and controlled heating supports reliable pick-up, clean release, and improved interfacial quality during the transfer process. The vacuum-thermal chuck is mounted on a motorized XYZ-  $\theta$  stage (sample stage), ensuring precise positioning and alignment during the complex transfer operations.

A motorized XYZ stamping stage, combined with a manual tilting platform, enables accurate stamp placement and controlled contact with the substrate. With a total of nine high-precision motion axes, the system offers exceptional flexibility and alignment freedom for complex transfer operations. Both the sample stage (XYZ-  $\theta$ ) and stamping stage (XYZ) are equipped with linear encoders, ensuring high positional accuracy, excellent repeatability, and smooth, reliable motion control.

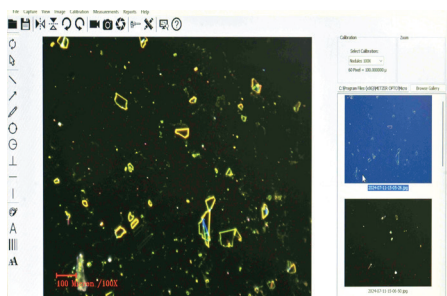
The system is operated through a user-friendly software with live measurement feature for the precise alignment, sample focusing, and microscope objective selection. For enhanced ease of use and intuitive operation, a dedicated joystick console is also provided

## Applications

1. Fabrication of 2D heterostructures (graphene, TMDs, hBN-based stacks)
2. Creation of twisted bilayers and multilayers with controlled twist angles
3. Research on van der Waals heterostructures
4. Quantum materials and nanoelectronics research
5. Optoelectronic and photonic device fabrication
6. Academic and industrial R&D in nanotechnology and materials science
7. Prototyping of next-generation electronic and sensing devices

## Features

- Motorized 2D transfer system
- Trinocular microscope with Brightfield and Darkfield observation
- Linear encoders on both sample and stamping stages.
- Software as well as joystick operations
- Software control for Vacuum-thermal chuck
- Live image acquisition with on-screen measurement tools



**Model HO-2DTS-TM-02BD**

|                                                                           |                                                                                    |                                                                                                                                  |
|---------------------------------------------------------------------------|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>1. Base plate</b>                                                      | Cast Aluminium with levelling bush                                                 |                                                                                                                                  |
|                                                                           | Optical system                                                                     | Infinity Corrected                                                                                                               |
| <b>2. Trinocular microscope with vertical stand and Z focusing stage.</b> | Observation method                                                                 | Brightfield and Darkfield                                                                                                        |
|                                                                           | Illuminations                                                                      | 1. Epi-scope, White LED, Intensity adjustable<br>2. Angled, White LED, Intensity adjustable                                      |
|                                                                           | Eyepiece                                                                           | <b>10X (FN18)</b> , Diopter adjustable                                                                                           |
|                                                                           | Viewing head                                                                       | <b>Siedentopf Trinocular</b> , 300, 48-75mm IP adjustment                                                                        |
|                                                                           | Nosepiece                                                                          | <b>Quadruple, Motorized</b> , software control                                                                                   |
|                                                                           | Focusing                                                                           | <b>Motorized, Joystick and software control</b>                                                                                  |
|                                                                           | Microscope Objective                                                               | <b>Plan Apo Brightfield/Darkfield 10X</b><br><b>NA = 0.30, Working distance = 14mm)</b>                                          |
|                                                                           |                                                                                    | FOV@ <sub>eyepiece</sub> = 1.8mm, FOV@ <sub>camera</sub> = 0.57mm x 0.428mm                                                      |
|                                                                           | <b>Camera</b>                                                                      | <b>1/2.5"</b> Color CMOS, <b>5MP</b> , USB2.0, C-mount, 2.2umx2.2um pixel size                                                   |
|                                                                           | <b>Software</b>                                                                    | <b>2DTransfer_v01</b> (Live/Image capture, scale bar, measurement, annotation, motorized controls, vacuum-thermal chuck control) |
| <b>3. XYZ theta sample stage with heater &amp; Vacuum chuck</b>           |                                                                                    |                                                                                                                                  |
| Motorized rotation stage                                                  | Resolution(open loop)                                                              | <b>0.00125 degree</b>                                                                                                            |
|                                                                           | Resolution(closed loop)                                                            | <b>0.0015 degree</b>                                                                                                             |
|                                                                           | Coarse travel                                                                      | <b>360 degree</b>                                                                                                                |
|                                                                           | Drive                                                                              | <b>Stepper motor</b>                                                                                                             |
|                                                                           | Construction                                                                       | <b>Black anodized aluminium alloy</b>                                                                                            |
| Motorized XYZ stage                                                       | <b>Software control</b>                                                            |                                                                                                                                  |
|                                                                           | <b>XYZ Travel</b>                                                                  | <b>25mm each</b>                                                                                                                 |
|                                                                           | <b>XYZ resolution(open loop)</b>                                                   | <b>7.8 nm</b>                                                                                                                    |
|                                                                           | <b>XY resolution(closed loop)</b>                                                  | <b>1 um</b>                                                                                                                      |
|                                                                           | <b>Z resolution(closed loop)</b>                                                   | <b>50 nm</b>                                                                                                                     |
|                                                                           | XYZ drive                                                                          | Stepper motor                                                                                                                    |
|                                                                           | Construction                                                                       | <b>Black anodized aluminium alloy</b>                                                                                            |
| Vacuum chuck and Heater with temperature controller                       | Software and Joystick control                                                      |                                                                                                                                  |
|                                                                           | Sample plate diameter                                                              | Sample plate diameter                                                                                                            |
|                                                                           | Temperature range                                                                  | RT – 200oC                                                                                                                       |
|                                                                           | Temperature increment                                                              | 1 degree C                                                                                                                       |
|                                                                           | PID Controller                                                                     |                                                                                                                                  |
|                                                                           | Vacuum Pump                                                                        |                                                                                                                                  |
|                                                                           | Software control                                                                   |                                                                                                                                  |
| <b>4. Motorized XYZ Stamping stage with manual tilting platform</b>       | XYZ travel                                                                         | 25mm each                                                                                                                        |
|                                                                           | XYZ resolution (open loop)                                                         | 7.8 nm                                                                                                                           |
|                                                                           | XYZ resolution (closed loop)                                                       | 1 um                                                                                                                             |
|                                                                           | XYZ drive                                                                          | Stepper motor                                                                                                                    |
|                                                                           | Software and Joystick control                                                      |                                                                                                                                  |
|                                                                           | Tilting platform drive                                                             | leadscrew, Manual                                                                                                                |
|                                                                           | Construction                                                                       | Black anodized Aluminium alloy                                                                                                   |
| <b>5. Glass /sample Holder</b>                                            |                                                                                    |                                                                                                                                  |
| <b>Optional Accessories</b>                                               | Suitable for standard glass slides(75mmx25mm)                                      |                                                                                                                                  |
|                                                                           | 1.Plan Apo LWD Brightfield 2X objective (NA = 0.06, Working distance = 34mm)       |                                                                                                                                  |
|                                                                           | 2.Plan Apo LWD Brightfield 5X objective (NA = 0.14, Working distance = 44mm)       |                                                                                                                                  |
|                                                                           | 3.Plan Apo LWD Brightfield 10X objective (NA = 0.30, Working distance = 34mm)      |                                                                                                                                  |
|                                                                           | 4.Plan Apo LWD Brightfield 20X objective (NA = 0.35, Working distance = 29mm)      |                                                                                                                                  |
|                                                                           | 5.Plan Apo LWD Brightfield 50X objective (NA = 0.45, Working distance = 17mm)      |                                                                                                                                  |
|                                                                           | 6.Plan Apo Brightfield/Darkfield 20X objective (NA = 0.50, Working distance = 4mm) |                                                                                                                                  |
|                                                                           | 7.Plan Apo Brightfield/Darkfield 50X objective (NA = 0.55, Working distance = 8mm) |                                                                                                                                  |

# Motorized 2D Transfer System (Trinocular Microscope –Brightfield)

**Model : HO-2DTS-TM-01CM1**

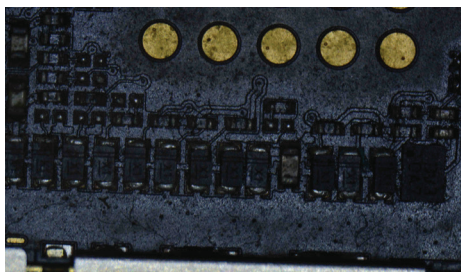
Holmarc's HO-2DTS-TM-01CM1 motorized 2D transfer platform is engineered for the assembly of high-quality 2D material stacks and accurately defined twisted structures. The system incorporates a high-resolution trinocular microscope with brightfield imaging, allowing continuous visual feedback of the transfer process with high contrast and clarity.

The substrate is mounted on a vacuum-thermal chuck with temperature control from room temperature (RT) up to 200 °C. The combination of vacuum clamping and controlled heating facilitates dependable flake pick-up, clean release, and enhanced interfacial integrity during transfer. The chuck assembly is mounted on a motorized XYZ-θ stage, providing precise translational and angular alignment throughout complex transfer sequences.

A motorized XYZ stamping stage, combined with a manual tilting platform, enables accurate stamp placement and controlled contact with the substrate. With a total of nine high-precision motion axes, the system offers exceptional flexibility and alignment freedom for advanced transfer processes. Both the substrate stage (XYZ-θ) and the stamping stage (XYZ) are equipped with linear encoders, ensuring high positional accuracy, excellent repeatability, and smooth, reliable motion control. System operation is managed through an intuitive software that enables live measurements, accurate alignment, focusing, and microscope objective selection. For added operational convenience, a dedicated joystick controller is provided, allowing smooth and responsive manual control for the transfer process,

## Features

1. Motorized 2D transfer system
2. Trinocular microscope with Brightfield observation
3. Linear encoders on both sample and stamping stages.
4. Software as well as joystick operations
5. Software control for Vacuum-thermal chuck
6. Live image acquisition with on-screen measurement tools



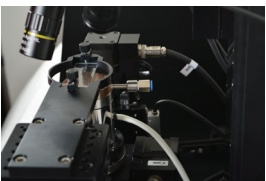
## Applications

1. Fabrication of 2D heterostructures (graphene, TMDs, hBN-based stacks)
2. Creation of twisted bilayers and multilayers with controlled twist angles
3. Research on van der Waals heterostructures
4. Quantum materials and nanoelectronics research
5. Optoelectronic and photonic device fabrication
6. Academic and industrial R&D in nanotechnology and materials science
7. Prototyping of next-generation electronic and sensing devices





**Model HO-2DTS-TM-01CM1**

|                                                                                                                                                             |                                                                                              |                                                                                                                                        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| 1. Base plate                                                                                                                                               | Cast Aluminium with levelling bush                                                           |                                                                                                                                        |
|  <p>2. Trinocular microscope with vertical stand and Z focusing stage.</p> | Optical system                                                                               | Infinity Corrected                                                                                                                     |
|                                                                                                                                                             | Observation method                                                                           | Brightfield                                                                                                                            |
|                                                                                                                                                             | <b>Illuminations</b>                                                                         | 1. Epi-scopic, White LED, Intensity adjustable<br>2. Angled, White LED, Intensity adjustable                                           |
|                                                                                                                                                             | Eyepiece                                                                                     | <b>10X (FN20)</b> , Diopter adjustable                                                                                                 |
|                                                                                                                                                             | Viewing head                                                                                 | <b>Siedentopf Trinocular</b> , 300, 48-75mm IP adjustment                                                                              |
|                                                                                                                                                             | Nosepiece                                                                                    | <b>Quadruple, Motorized</b> , software control                                                                                         |
|                                                                                                                                                             | Microscope Objective                                                                         | <b>Plan Apo 5X</b><br>NA = 0.14, Working distance = 44mm)<br>FOV@ <sub>eyepiece</sub> = 4mm, FOV@ <sub>camera</sub> = 1.14mm x 0.856mm |
|                                                                                                                                                             | <b>Camera</b>                                                                                | <b>1/2.5"</b> Color CMOS, <b>5MP</b> , USB2.0, C-mount, 2.2umx2.2um pixel size                                                         |
|                                                                                                                                                             | <b>Software</b>                                                                              | <b>2DTransfer_v01</b> (Live/Image capture, scale bar, measurement, annotation, motorized controls, vacuum-thermal chuck control)       |
| 3. XYZ theta sample stage with heater & Vacuum chuck                                                                                                        |                                                                                              |                                                                                                                                        |
| Motorized rotation stage                                                                                                                                    | Resolution(open loop)                                                                        | <b>0.00125 degree</b>                                                                                                                  |
|                                                                                                                                                             | Resolution(closed loop)                                                                      | <b>0.0015 degree</b>                                                                                                                   |
|                                                                                                                                                             | Coarse travel                                                                                | <b>360 degree</b>                                                                                                                      |
|                                                                                                                                                             | Drive                                                                                        | <b>Stepper motor</b>                                                                                                                   |
|                                                                                                                                                             | Construction                                                                                 | Black anodized aluminium alloy                                                                                                         |
|                                                                                                                                                             | Software control                                                                             |                                                                                                                                        |
| Motorized XYZ stage                                                                                                                                         | <b>XYZ Travel</b>                                                                            | <b>25mm each</b>                                                                                                                       |
|                                                                                                                                                             | <b>XYZ resolution(open loop)</b>                                                             | <b>7.8 nm</b>                                                                                                                          |
|                                                                                                                                                             | <b>XYZ resolution(closed loop)</b>                                                           | <b>1 um</b>                                                                                                                            |
|                                                                                                                                                             | XYZ drive                                                                                    | Stepper motor                                                                                                                          |
|                                                                                                                                                             | Construction                                                                                 | Black anodized aluminium alloy                                                                                                         |
|                                                                                                                                                             | Software and Joystick control                                                                |                                                                                                                                        |
| Vacuum chuck and Heater with temperature controller                                                                                                         | Sample plate diameter                                                                        | 40mm                                                                                                                                   |
|                                                                                                                                                             | Temperature range                                                                            | <b>RT – 200°C</b>                                                                                                                      |
|                                                                                                                                                             | Temperature increment                                                                        | 1 degree C                                                                                                                             |
|                                                                                                                                                             | PID Controller                                                                               |                                                                                                                                        |
|                                                                                                                                                             | <b>Vacuum Pump</b>                                                                           |                                                                                                                                        |
|                                                                                                                                                             | <b>Software control</b>                                                                      |                                                                                                                                        |
| 4. Motorized XYZ Stamping stage with manual tilting platform                                                                                                | <b>XYZ travel</b>                                                                            | <b>25mm each</b>                                                                                                                       |
|                                                                                                                                                             | <b>XYZ resolution (open loop)</b>                                                            | <b>7.8 nm</b>                                                                                                                          |
|                                                                                                                                                             | <b>XYZ resolution (closed loop)</b>                                                          | <b>1 um</b>                                                                                                                            |
|                                                                                                                                                             | XYZ drive                                                                                    | Stepper motor                                                                                                                          |
|                                                                                                                                                             | Software and Joystick control                                                                |                                                                                                                                        |
|                                                                                                                                                             | <b>Tilting platform drive</b>                                                                | <b>leadscrew, Manual</b>                                                                                                               |
|                                                                                                                                                             | Construction                                                                                 | Black anodized Aluminium alloy                                                                                                         |
|                                                                                                                                                             |                                                                                              |                                                                                                                                        |
| 5. Glass /sample Holder                                                                                                                                     | Suitable for standard glass slides(75mmx25mm)                                                |                                                                                                                                        |
|                                                                                                                                                             |                                                                                              |                                                                                                                                        |
| <b>Optional Accessories</b>                                                                                                                                 | 1.Plan Apo <b>LWD Brightfield 2X</b> objective (NA = 0.06, <b>Working distance = 34mm</b> )  |                                                                                                                                        |
|                                                                                                                                                             | 2.Plan Apo <b>LWD Brightfield 10X</b> objective (NA = 0.30, <b>Working distance = 34mm</b> ) |                                                                                                                                        |
|                                                                                                                                                             | 3.Plan Apo <b>LWD Brightfield 20X</b> objective (NA = 0.35, <b>Working distance = 29mm</b> ) |                                                                                                                                        |
|                                                                                                                                                             | 4.Plan Apo <b>LWD Brightfield 50X</b> objective (NA = 0.45, <b>Working distance = 17mm</b> ) |                                                                                                                                        |

# Probe Station Systems

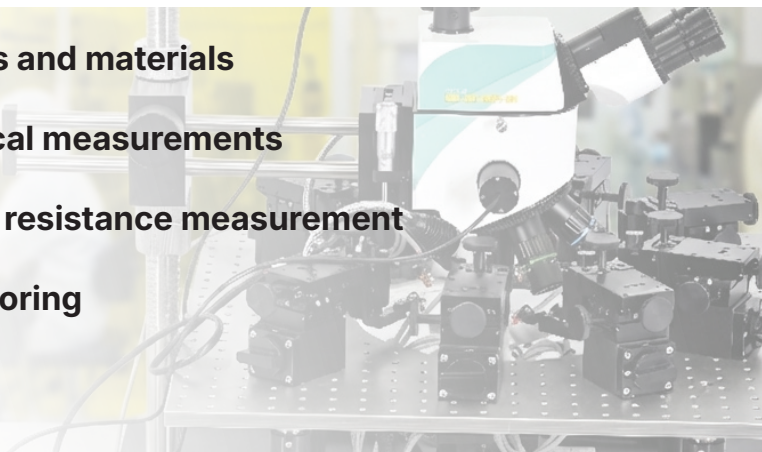
**I-V characterization of devices and materials**

**DC and low-frequency electrical measurements**

**Accurate resistivity and sheet resistance measurement**

**Semiconductor process monitoring**

**Van der Pauw measurements**



## Probe Station System – 2 Probes/4 Probes/8 probes

**Model No. HO-PSM-T01-2M**

**Model No. HO-PSM-T01-4M**

**Model No. HO-PSM-T01-8M**

Holmarc's HO-PSM-T01 series probe station systems are cost-effective platforms designed for electrical characterization, academic research, and early-stage device evaluation. Built around precision mechanics and high-quality optics, the systems are available with 2-probe, 4-probe, and multi-probe configurations, enabling reliable probing of semiconductor devices and microfabricated test structures.

Each probe is mounted on a 4-axis precision micromanipulator with an ON/OFF magnetic base, providing stable, drift-free positioning and smooth fine adjustments during probing. A 4-inch vacuum chuck with an XYZ translation stage is provided for secure mounting and precise positioning of the device under test (DUT).

The probe station is equipped with a trinocular microscope for precise viewing and accurate placement of probe tips on micron-scale contact pads. The optical system employs long working distance Plan Apochromat objectives, delivering excellent color fidelity, high contrast, and sharp resolution—well suited for probing delicate and complex devices with sufficient clearance for probes. A quadruple revolving nosepiece enables smooth magnification changes, and a 5 MP color camera with image acquisition and analysis software supports live imaging, on-screen measurements, image capture, and documentation.

Illumination is provided by a high-brightness white LED light source with intensity control, supporting both epi-illumination and angled illumination modes. This versatile illumination setup enhances the visibility of fine contact pads, metallization patterns, and surface features during probing and inspection.

For flexible imaging, the microscope is mounted on a dedicated XY stage, allowing easy observation of different regions of the DUT without disturbing probe contacts.

Holmarc also offers a comprehensive range of optional accessories for future system upgrades, including vacuum-thermal chucks, cooling chucks, probe station enclosures, high-magnification objectives, triaxial cables, and other accessories—allowing each probe station systems to scale with evolving application requirements.



## HO-PSM-T01-2M

### Features

- Entry-level, cost-effective system
- Suitable for routine measurements, quick checks and teaching labs
- 2 Probes
- 4" Vacuum chuck
- Trinocular Microscopes
- Long working distance apochromatic objectives

### Applications

- Basic I-V characterization of devices and materials
- DC and low-frequency electrical measurements
- Contact resistance & simple device testing
- Wafer-level & Die-level testing
- Failure analysis
- LED & optoelectronic device inspection and testing
- MEMS & sensor characterization
- Device prototyping & R&D



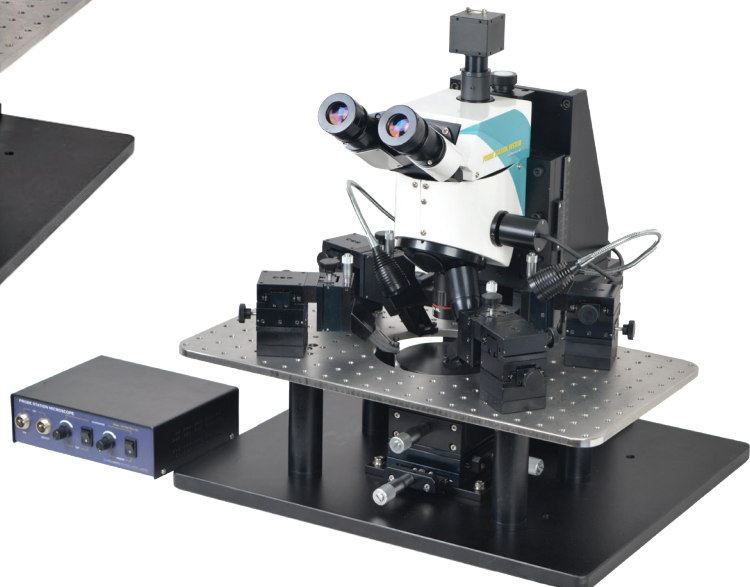
## HO-PSM-T01-4M

### Features

- High accuracy
- No contact resistance
- Suitable for thin-film and semiconductor characterization
- 4 Probes
- 4" Vacuum chuck
- Trinocular Microscopes
- Long working distance apochromatic objectives

### Applications

- I-V characterization of devices and materials
- DC and low-frequency electrical measurements
- Accurate resistivity and sheet resistance measurement
- Semiconductor process monitoring
- Van der Pauw measurements
- Electrical studies of 2D & Nanomaterials
- Temperature dependent electrical studies (\*Requires heating or cooling chuck)
- Wafer-level testing and mapping
- LED & optoelectronic device inspection and testing (\*additional illumination source can be provided for optical characterization)
- MEMS & sensor characterization
- Device prototyping & R&D





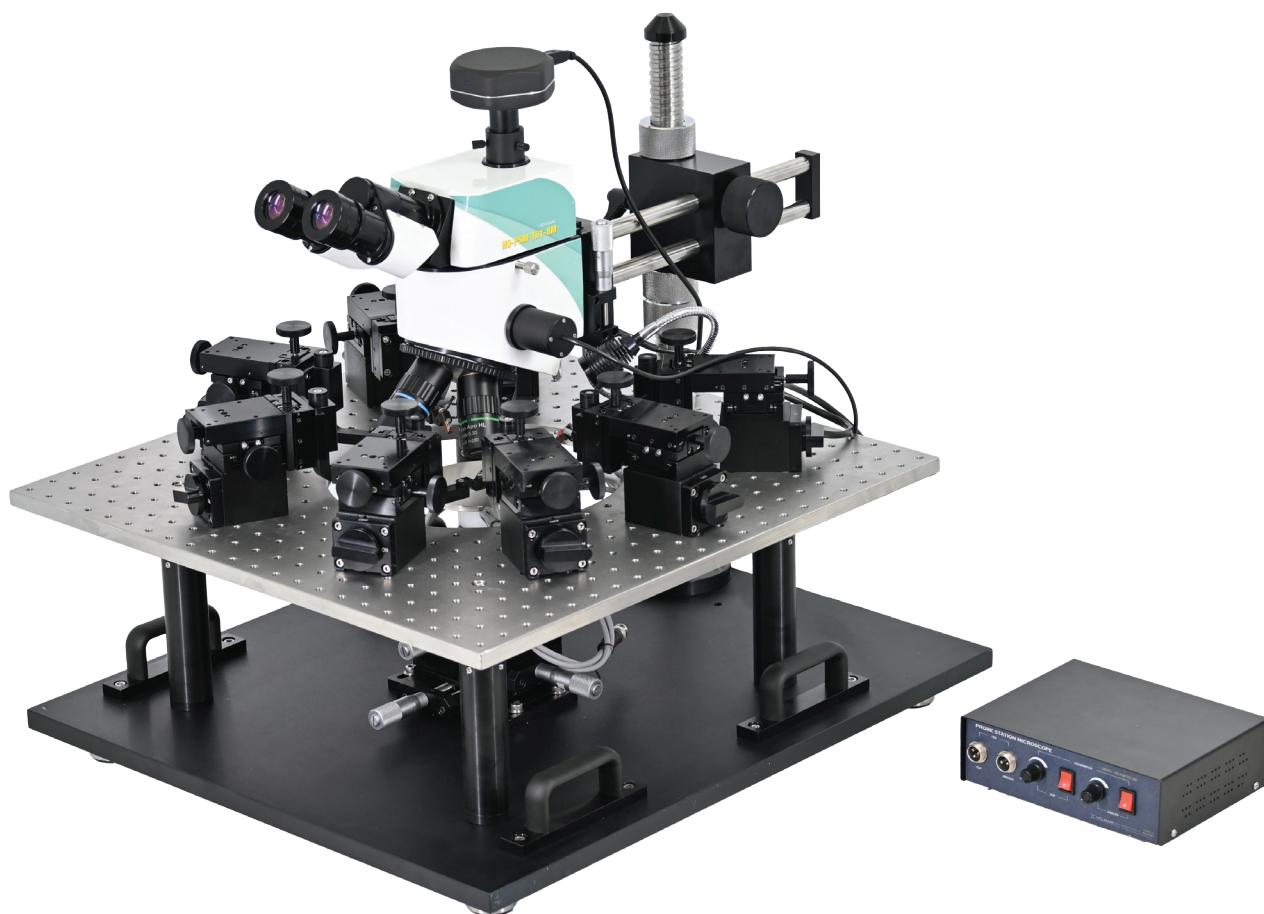
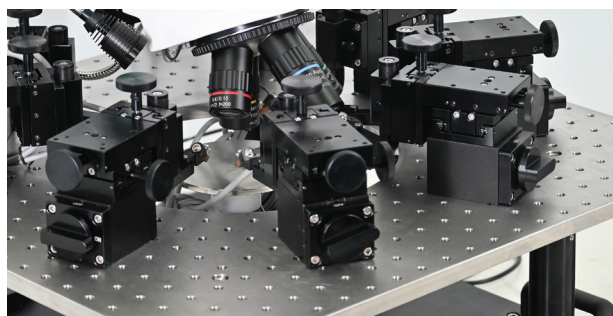
## HO-PSM-T01-8M

### Features

- 8 Probes
- 4" Vacuum chuck
- Suitable for multi-terminal, flexible geometry
- Trinocular Microscopes
- Long working distance apochromatic objectives

### Applications

- Multi-terminal & complex device characterization
- Simultaneous multi-point electrical measurements
- Van der Pauw measurements
- Accurate resistivity and sheet resistance measurement
- Advanced research on 2D & Nanomaterials
- Failure analysis and diagnostics of complete semiconductor devices
- Low noise electrical transport studies in micro devices



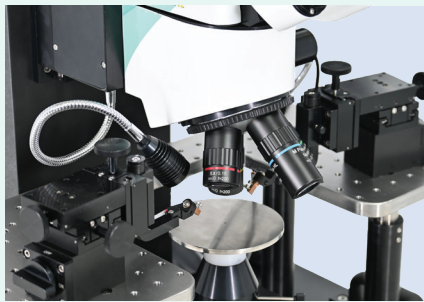
## HO-PSM-T01L

### Features

- Touch screen display
- 2 Probes
- 4" Vacuum chuck
- Trinocular Microscopes
- Long working distance apochromatic objectives

### Applications

- Basic I-V characterization of devices and materials
- DC and low-frequency electrical measurements
- Contact resistance & simple device testing
- Wafer-level & Die-level testing
- Failure analysis
- LED & optoelectronic device inspection and testing
- MEMS & sensor characterization
- Device prototyping & R&D



## Specifications



|                                                                                                |                                                                      |                                                                                                                                                   |
|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Micromanipulators                                                                           | Axes                                                                 | 4 (XYZ & tilt)                                                                                                                                    |
|                                                                                                | XYZ travel                                                           | 25mm                                                                                                                                              |
|                                                                                                | Magnetic base                                                        |                                                                                                                                                   |
|                                                                                                | Probe holder with BNC output (*triaxial outputs are sold separately) |                                                                                                                                                   |
|                                                                                                | 45- degree and 90-degree probe holder                                |                                                                                                                                                   |
|                                                                                                | Model No.                                                            | No of Micromanipulators                                                                                                                           |
|                                                                                                | HO-PSM-T01-2M                                                        | 2                                                                                                                                                 |
| 2. 2Magnetic SS platen, supporting stands, base plate, manual XYZ stage for Microscope (1 set) | HO-PSM-T01-4M                                                        | 4                                                                                                                                                 |
|                                                                                                | HO-PSM-T01-8M                                                        | 8                                                                                                                                                 |
|                                                                                                | HO-PSM-T01L                                                          | 2                                                                                                                                                 |
|                                                                                                |                                                                      |                                                                                                                                                   |
| Microscope XYZ stage                                                                           | Platen                                                               | Magnetic SS                                                                                                                                       |
|                                                                                                | Platen supporting stand                                              | Height adjustable                                                                                                                                 |
|                                                                                                | Base plate                                                           | Cast aluminium with levelling bush                                                                                                                |
|                                                                                                | XYZ travel                                                           | 100mm x 100mm x 100mm                                                                                                                             |
|                                                                                                | Guide way                                                            | Precision ball slide                                                                                                                              |
|                                                                                                | Drive                                                                | Precision lead screw                                                                                                                              |
|                                                                                                | Lead screw                                                           | 1mm pitch                                                                                                                                         |
| 3. XYZ manual sample holder with Vacuum chuck (1set)                                           | Lead screw type                                                      | Ground                                                                                                                                            |
|                                                                                                | Positioning accuracy                                                 | 10um                                                                                                                                              |
|                                                                                                | Construction                                                         | Black anodized aluminium                                                                                                                          |
|                                                                                                |                                                                      |                                                                                                                                                   |
| 4. Probe station trinocular microscope and its support stand(1set)                             | Top plate diameter                                                   | 100mm                                                                                                                                             |
|                                                                                                | X axis                                                               | 25mm travel                                                                                                                                       |
|                                                                                                | Y axis                                                               | 25mm travel                                                                                                                                       |
|                                                                                                | Z axis                                                               | 10mm travel                                                                                                                                       |
|                                                                                                | XYZ resolution                                                       | 10microns                                                                                                                                         |
|                                                                                                | <b>Vacuum chuck</b>                                                  |                                                                                                                                                   |
| 4. Probe station trinocular microscope and its support stand(1set)                             | Optical system                                                       | Infinity Corrected                                                                                                                                |
|                                                                                                | Observation method                                                   | Brightfield                                                                                                                                       |
|                                                                                                | <b>Illuminations</b>                                                 | 1. <b>Epi-scopic</b> , White LED, Intensity adjustable<br>2. <b>Angled</b> , White LED, Intensity adjustable                                      |
|                                                                                                | Eyepiece                                                             | <b>10X (FN20)</b> , Diopter adjustable                                                                                                            |
|                                                                                                | Viewing head                                                         | <b>Siedentopf Trinocular</b> , 30O, 48-75mm IP adjustment                                                                                         |
|                                                                                                | Nosepiece                                                            | <b>Quadruple</b> , Manual, positive precision click stops                                                                                         |
|                                                                                                | Focusing                                                             | <b>Manual</b>                                                                                                                                     |
|                                                                                                | Microscope Objective                                                 | 1. <b>Plan Apo LWD 5X</b> (NA = 0.14, <b>Working distance</b> = 44mm)<br>FOV@ <sub>eyepiece</sub> = 4mm, FOV <sub>camera</sub> = 1.14mm x 0.856mm |
|                                                                                                | <b>Camera</b>                                                        | <b>1/2.5"</b> Color CMOS, <b>5MP</b> , USB2.0, C-mount, 2.2umx2.2um pixel size                                                                    |
|                                                                                                | Software                                                             | <b>Probe_v01</b> (Live/Image capture, scale bar, measurement,annotation)                                                                          |
|                                                                                                |                                                                      |                                                                                                                                                   |

|                                   |                                                                           |                                                                                                                          |
|-----------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| 5. Optional Accessories           | 1. Plan Apo LWD 2X objective                                              | NA = 0.06, <b>Working distance = 34mm</b><br>FOV <sub>eyepiece</sub> = 10mm, FOV <sub>camera</sub> = 2.85mm x 2.14mm     |
|                                   | 2. Plan Apo LWD 10X objective                                             | NA = 0.30, <b>Working distance = 34mm</b><br>FOV <sub>eyepiece</sub> = 2mm, FOV <sub>camera</sub> = 0.57mm x 0.428mm     |
|                                   | 3. Plan Apo LWD 20X objective                                             | NA = 0.35, <b>Working distance = 29mm</b><br>FOV <sub>eyepiece</sub> = 1mm, FOV <sub>camera</sub> = 0.285mm x 0.214mm    |
|                                   | 4. Plan Apo LWD 50X objective                                             | NA = 0.45, <b>Working distance = 17mm</b><br>FOV <sub>eyepiece</sub> = 0.4mm, FOV <sub>camera</sub> = 0.114mm x 0.0856mm |
| v. Probe tips (5 Nos)             | Tip diameter                                                              | 50um                                                                                                                     |
|                                   | Material                                                                  | Tungsten                                                                                                                 |
|                                   | *custom tip diameter down to 10um are available                           |                                                                                                                          |
| vi. POGO tips with holder (5 Nos) | Tip diameter                                                              | ~1mm                                                                                                                     |
|                                   | Gold plated                                                               |                                                                                                                          |
| vii. Vacuum pump – Oil free       | Maximum flow rate                                                         | 45 lpm                                                                                                                   |
|                                   | Maximum vacuum                                                            | 27 inches of Hg                                                                                                          |
|                                   | Power                                                                     | ¼ hp                                                                                                                     |
| viii. Hot Chuck                   | Temperature range                                                         | RT to 200°C                                                                                                              |
|                                   | Temperature accuracy                                                      | ±10°C over 100mm                                                                                                         |
|                                   | Software control                                                          |                                                                                                                          |
| ix. Cooling Chuck                 | Temperature range                                                         | 20°C to 40°C                                                                                                             |
|                                   | Temperature accuracy                                                      | ± 2°C                                                                                                                    |
|                                   | Software control                                                          | * Enclosure is recommended to control humidity and minimize icing.                                                       |
| x. Hot-Cooling chuck              | Chuck size                                                                | 50mm x 50mm                                                                                                              |
|                                   | Temperature range                                                         | -10°C to 200°C                                                                                                           |
|                                   | Temperature accuracy                                                      | ±5°C                                                                                                                     |
|                                   | Software control                                                          | * Enclosure is recommended to control humidity and minimize icing.                                                       |
| xi. Enclosure                     | Material                                                                  | MS with black paint                                                                                                      |
|                                   | Output ports                                                              | BNC connectors (*triaxial connectors are available on request)                                                           |
|                                   | N2 inlet and outlet port                                                  |                                                                                                                          |
|                                   | Vacuum inlet                                                              |                                                                                                                          |
|                                   | Camera USB port                                                           | 1 No.                                                                                                                    |
|                                   | Power socket and switch                                                   |                                                                                                                          |
|                                   | Door with hinges and lock                                                 |                                                                                                                          |
|                                   | Temperature & Humidity sensor                                             |                                                                                                                          |
|                                   | *The cover will not be completely air tight. Minor leakage will be there. |                                                                                                                          |
| xii. Triaxial cable 1.5 meter     | One end                                                                   | coupled to the probe tip                                                                                                 |
|                                   | other end                                                                 | 3 lug male connector                                                                                                     |
|                                   | Impedance                                                                 | 50±5 ohm                                                                                                                 |
|                                   | Operating voltage                                                         | 1000 VRMS/2000 VOC                                                                                                       |
|                                   | Capacitance                                                               | 29.5 pf/FT NOM                                                                                                           |
|                                   | Operating temperature range                                               | -40°C to 75°C                                                                                                            |
|                                   | Leakage current                                                           | <1pA with 0~10V                                                                                                          |



# RF Probe Station System

**Model No. HO-PSS-RF-02**

**Model No. HO-PSS-RF-04**

Holmarc's HO-PSS-RF series RF probe station systems are designed for high-frequency electrical characterization of semiconductor devices directly on wafers or substrates. Available in 2-probe and 4-probe configurations, these systems enable reliable, repeatable, and low-loss RF probing across a wide frequency range.

Each probe is mounted on a precision 3-axis high-frequency micromanipulator arranged in a left/right configuration and equipped with an ON/OFF magnetic base for stable, drift-free positioning. The micromanipulators support a wide range of RF and microwave probes (e.g., GS, GSG, GSSG), offering flexibility across different frequency bands and measurement requirements. A 2-inch square vacuum-thermal chuck, with a temperature range of  $-10^{\circ}\text{C}$  to  $200^{\circ}\text{C}$ , is integrated with an XYZ translation stage for secure mounting and accurate positioning of the device under test (DUT). This configuration makes the system well suited for temperature-dependent RF and microwave characterization. The entire system is housed within an enclosure, providing environmental control (humidity control) and enhanced measurement stability. Systems without heating-cooling and/or enclosures are also available on request.

A trinocular microscope ensures precise probe placement on micron-scale samples. The microscope optical system employs long working distance Plan Apochromat objectives, delivering excellent color fidelity, high contrast, and sharp resolution while maintaining sufficient clearance for RF probes. A quadruple revolving nosepiece enables smooth magnification changes, and a 5 MP color camera with image acquisition and analysis software supports live viewing, measurements, image capture, and documentation. Illumination is provided by a high-brightness white LED light source with intensity control, supporting both epi-illumination and angled illumination modes. This versatile illumination setup enhances the visibility of fine contact pads, metallization patterns, and surface features during probing and inspection. For flexible imaging, the microscope is mounted on a dedicated XY stage, allowing observation of different regions of the DUT without disturbing established probe contacts.

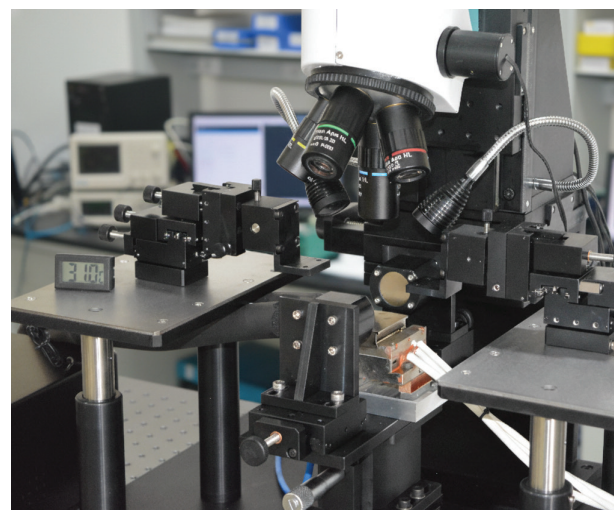
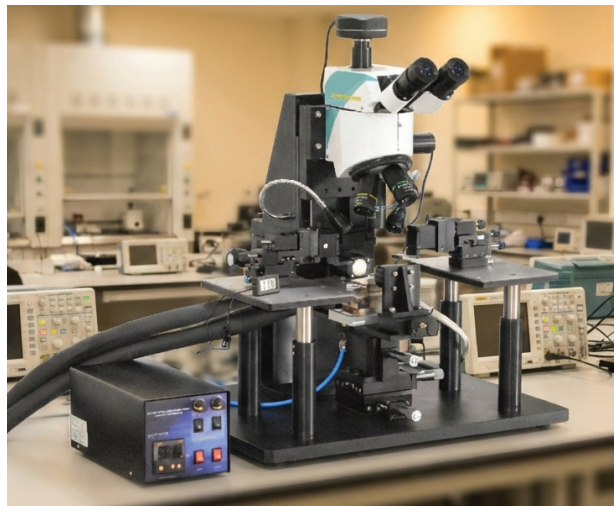
Holmarc also offers a wide range of optional accessories - including hot chuck, cooling chuck, high-magnification objectives, RF cables, external magnetic field options, and other accessories—allowing the HO-PSS-RF series to adapt seamlessly to evolving RF, microwave, and millimeter-wave characterization needs.

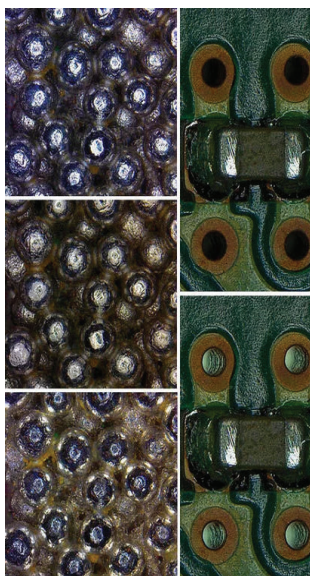
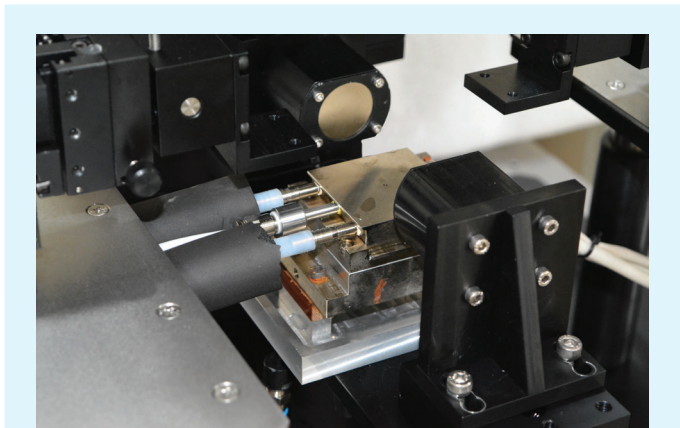
## Features

- High-frequency RF probing
- 3-axis high-frequency micromanipulators
- 2-inch vacuum-thermal chuck – heating/cooling
- Environmental enclosure for humidity control
- Trinocular microscope with Plan Apo LWD objectives

## Applications

- On-wafer RF & microwave characterization
- High-frequency device characterization
- Passive component evaluation
- RFIC / MMIC characterization
- Temperature-dependent RF measurements
- Device modelling and parameter extraction
- Semiconductor R&D and failure analysis





| Specifications                                                                                                                                   |                                                          |                                                                                                                                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1. High-frequency micromanipulators - left/right</b><br><br> | Axes                                                     | 3(XYZ)                                                                                                                                            |
|                                                                                                                                                  | XYZ travel                                               | 0.5" x 0.5" x 0.5"                                                                                                                                |
|                                                                                                                                                  | Drive                                                    | 100 TPI leadscrew                                                                                                                                 |
|                                                                                                                                                  | Magnetic base                                            | Straight configuration for left/right manipulator placement<br>True linear motion, Controls knobs are in-line                                     |
|                                                                                                                                                  | <b>Supports different RF probe heads (GS, GSG, GSSG)</b> |                                                                                                                                                   |
| <b>2. Magnetic SS platen, supporting stands, base plate, manual XYZ stage for Microscope (1 set)</b>                                             | Model No.                                                | No of Micromanipulators                                                                                                                           |
|                                                                                                                                                  | HO-PSS-RF-02                                             | 2 (1 left and 1 right)                                                                                                                            |
|                                                                                                                                                  | HO-PSS-RF-02                                             | 4 (2 left and 2 right)                                                                                                                            |
|                                                                                                                                                  | Platen                                                   | Magnetic SS                                                                                                                                       |
|                                                                                                                                                  | Platen supporting stand                                  | Height adjustable                                                                                                                                 |
| <b>3. XYZ manual sample holder with Vacuum-thermal chuck (1set)</b>                                                                              | Base plate                                               | = Cast aluminium with levelling bush                                                                                                              |
|                                                                                                                                                  | XYZ travel                                               | 100mm x 100mm x 100mm                                                                                                                             |
|                                                                                                                                                  | Guide way                                                | Precision ball slide                                                                                                                              |
|                                                                                                                                                  | Drive                                                    | Precision lead screw                                                                                                                              |
|                                                                                                                                                  | Lead screw                                               | 1mm pitch                                                                                                                                         |
|                                                                                                                                                  | Lead screw type                                          | Ground                                                                                                                                            |
|                                                                                                                                                  | Positioning accuracy                                     | 10um                                                                                                                                              |
|                                                                                                                                                  | Construction                                             | Black anodized aluminium                                                                                                                          |
| <b>4. Probe station trinocular microscope and its support stand(1set)</b>                                                                        | <b>Top plate size</b>                                    | <b>50mm x 50mm</b>                                                                                                                                |
|                                                                                                                                                  | X axis                                                   | 25mm travel                                                                                                                                       |
|                                                                                                                                                  | Y axis                                                   | 25mm travel                                                                                                                                       |
|                                                                                                                                                  | Z axis                                                   | 10mm travel                                                                                                                                       |
|                                                                                                                                                  | XYZ resolution                                           | 10microns                                                                                                                                         |
|                                                                                                                                                  | Temperature range                                        | <b>-10°C to 200°C</b>                                                                                                                             |
|                                                                                                                                                  | Temperature increment step                               | 1 degree                                                                                                                                          |
|                                                                                                                                                  | <b>Software controls</b> for vacuum and temperature.     |                                                                                                                                                   |
|                                                                                                                                                  | Optical system                                           | Infinity Corrected                                                                                                                                |
|                                                                                                                                                  | Observation method                                       | Brightfield                                                                                                                                       |
| <b>Probe station trinocular microscope and its support stand(1set)</b>                                                                           | <b>Illuminations</b>                                     | 1. <b>Epi-scope</b> , White LED, Intensity adjustable<br>2. <b>Angled</b> , White LED, Intensity adjustable                                       |
|                                                                                                                                                  | Eyepiece                                                 | <b>10X (FN20)</b> , Diopter adjustable                                                                                                            |
|                                                                                                                                                  | Viewing head                                             | <b>Siedentopf Trinocular</b> , 30°, 48-75mm IP adjustment                                                                                         |
|                                                                                                                                                  | Nosepiece                                                | <b>Quadruple</b> , Manual, positive precision click stops                                                                                         |
|                                                                                                                                                  | Focusing                                                 | <b>Manual</b>                                                                                                                                     |
|                                                                                                                                                  | Microscope Objective                                     | 1. <b>Plan Apo LWD 5X</b> (NA = 0.14, <b>Working distance=44mm</b> )<br>FOV@ <sub>eyepiece</sub> = 4mm, FOV@ <sub>camera</sub> = 1.14mm x 0.856mm |
|                                                                                                                                                  | <b>Camera</b>                                            | <b>1/2.5"</b> Color CMOS, <b>5MP</b> , USB2.0, C-mount, 2.2umx2.2um pixel size                                                                    |
|                                                                                                                                                  | <b>Software</b>                                          | <b>Probe_v01</b> (Live/Image capture, scale bar, measurement, annotation)                                                                         |
|                                                                                                                                                  |                                                          |                                                                                                                                                   |
|                                                                                                                                                  |                                                          |                                                                                                                                                   |

|                                   |                                                                                   |                                                                           |                                                                                                                          |                     |
|-----------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|---------------------|
| 5.                                |  | Enclosure                                                                 | Material                                                                                                                 | MS with black paint |
|                                   |                                                                                   | Output ports                                                              | BNC connectors, 1.85mm and SMA connectors (*custom connectors are available on request)                                  |                     |
|                                   |                                                                                   | N2 inlet and outlet port                                                  |                                                                                                                          |                     |
|                                   |                                                                                   | Vacuum inlet                                                              |                                                                                                                          |                     |
|                                   |                                                                                   | Camera USB port                                                           | 1 No.                                                                                                                    |                     |
|                                   |                                                                                   | Power socket and switch                                                   |                                                                                                                          |                     |
|                                   |                                                                                   | Door with hinges and lock                                                 |                                                                                                                          |                     |
|                                   |                                                                                   | Temperature & Humidity sensor                                             |                                                                                                                          |                     |
|                                   |                                                                                   | *The cover will not be completely air tight. Minor leakage will be there. |                                                                                                                          |                     |
|                                   |                                                                                   |                                                                           |                                                                                                                          |                     |
| Optional Accessories              |                                                                                   | 1. Plan Apo LWD 2X objective                                              | NA = 0.06, <b>Working distance = 34mm</b><br>FOV <sub>eyepiece</sub> = 10mm, FOV <sub>camera</sub> = 2.85mm x 2.14mm     |                     |
|                                   |                                                                                   | 2. Plan Apo LWD 10X objective                                             | NA = 0.30, <b>Working distance = 34mm</b><br>FOV <sub>eyepiece</sub> = 2mm, FOV <sub>camera</sub> = 0.57mm x 0.428mm     |                     |
|                                   |                                                                                   | 3. Plan Apo LWD 20X objective                                             | NA = 0.35, <b>Working distance = 29mm</b><br>FOV <sub>eyepiece</sub> = 1mm, FOV <sub>camera</sub> = 0.285mm x 0.214mm    |                     |
|                                   |                                                                                   | 4. Plan Apo LWD 50X objective                                             | NA = 0.45, <b>Working distance = 17mm</b><br>FOV <sub>eyepiece</sub> = 0.4mm, FOV <sub>camera</sub> = 0.114mm x 0.0856mm |                     |
|                                   |                                                                                   |                                                                           |                                                                                                                          |                     |
| v. Probe tips (5 Nos)             |                                                                                   | Tip diameter                                                              | 50um                                                                                                                     |                     |
|                                   |                                                                                   | Material                                                                  | Tungsten                                                                                                                 |                     |
|                                   |                                                                                   | *custom tip diameter down to 10um are available                           |                                                                                                                          |                     |
| vi. POGO tips with holder (5 Nos) |                                                                                   | Tip diameter                                                              | ~1mm                                                                                                                     |                     |
|                                   |                                                                                   | Gold plated                                                               |                                                                                                                          |                     |
| vii. Vacuum pump – Oil free       |                                                                                   | Maximum flow rate                                                         | 45 lpm                                                                                                                   |                     |
|                                   |                                                                                   | Maximum vacuum                                                            | 27 inches of Hg                                                                                                          |                     |
|                                   |                                                                                   | Power                                                                     | ¼ hp                                                                                                                     |                     |
| viii. Hot Chuck                   |                                                                                   | Temperature range                                                         | <b>RT to 200°C</b>                                                                                                       |                     |
|                                   |                                                                                   | Temperature accuracy                                                      | ±10oC over 100mm                                                                                                         |                     |
|                                   |                                                                                   | <b>Software control</b>                                                   |                                                                                                                          |                     |
| ix. Cooling Chuck                 |                                                                                   | Temperature range                                                         | <b>-20°C to 40°C</b>                                                                                                     |                     |
|                                   |                                                                                   | Temperature accuracy                                                      | ± 2°C                                                                                                                    |                     |
|                                   |                                                                                   | <b>Software control</b>                                                   |                                                                                                                          |                     |
|                                   |                                                                                   |                                                                           |                                                                                                                          |                     |
|                                   |                                                                                   |                                                                           |                                                                                                                          |                     |
|                                   |                                                                                   |                                                                           |                                                                                                                          |                     |



## Probe Station System – EC (with enclosure)

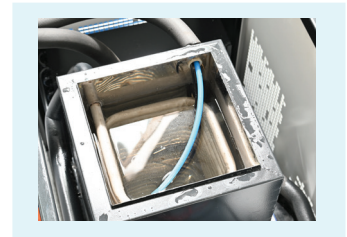
### Model No. HO-PSM-T01-EC

Holmarc's probe station system with enclosure, model HO-PSM-T01-EC, is an advanced measurement platform designed to deliver stable, repeatable, and contamination-free electrical characterization of semiconductor devices, wafers, and advanced materials. The enclosure isolates the probing area from external environmental disturbances such as humidity, dust, air flow, temperature fluctuations, and ambient light, ensuring consistent probe contact and low-noise electrical measurements.

Each probe is mounted on a 4-axis precision micromanipulator with an ON/OFF magnetic base, providing stable, drift-free positioning and smooth fine adjustments during probing. The system is equipped with a 4-inch square vacuum-thermal (cooling) chuck integrated with an XYZ translation stage, enabling secure mounting and precise positioning of the device under test (DUT). The chuck supports a temperature range from  $-20^{\circ}\text{C}$  to  $40^{\circ}\text{C}$ , making the system well suited for temperature-dependent electrical measurements.

The probe station incorporates a trinocular optical microscope with long working distance Plan Apochromat objectives, delivering high-quality images and accurate probe alignment on micron-scale device features. A four-position revolving nosepiece enables seamless magnification changes, while a 5 MP digital color camera with integrated software supports live imaging, measurements, and documentation. The microscope system features coaxial epi-illumination and angled illumination, providing uniform, controlled lighting for enhanced surface visualization.

To enhance observation flexibility, the microscope is mounted on a precision XY traverse, enabling smooth inspection across the device under test without disturbing probe placement or electrical contact.

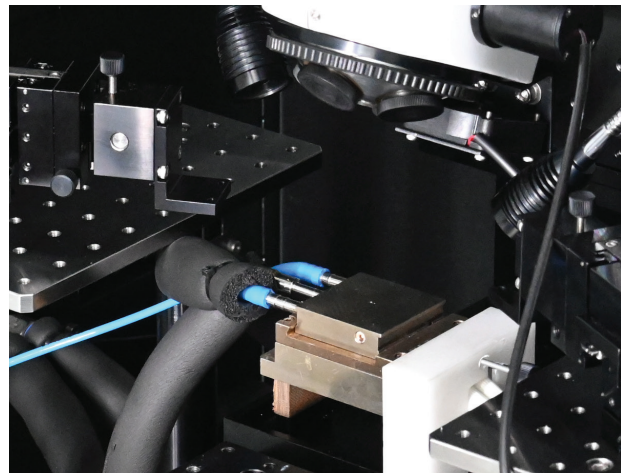


## Features

- Environmental enclosure
- 4-axis precision micromanipulators
- 4-inch square vacuum-cooling chuck
- Trinocular microscope with Plan Apo LWD objectives

## Applications

- Electrical characterization of semiconductor devices
- IV, CV, and low-current measurements
- Temperature-dependent device testing
- Early-stage device development and failure analysis
- Characterization of MEMS, sensors, and microfabricated structures
- Academic research and teaching labs



| Specifications                                                                                                               |                                                                             |                                                                                                                                                     |
|------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1. Micromanipulators – 2 Nos</b><br><br> | Axes                                                                        | 4 (XYZ & tilt)                                                                                                                                      |
|                                                                                                                              | XYZ travel                                                                  | 25mm                                                                                                                                                |
|                                                                                                                              | <b>Magnetic base</b>                                                        |                                                                                                                                                     |
|                                                                                                                              | Probe holder with <b>BNC output</b> (*triaxial outputs are sold separately) |                                                                                                                                                     |
|                                                                                                                              | 45- degree and 90-degree probe holder                                       |                                                                                                                                                     |
| <b>2. Magnetic SS platen, supporting stands, base plate, manual XYZ stage for Microscope (1 set)</b>                         | Platen                                                                      | Magnetic SS                                                                                                                                         |
|                                                                                                                              | Platen supporting stand                                                     | Height adjustable                                                                                                                                   |
|                                                                                                                              | Base plate                                                                  | Cast aluminium with levelling bush                                                                                                                  |
| Microscope XYZ stage                                                                                                         | XYZ travel                                                                  | 100mm x 100mm x 100mm                                                                                                                               |
|                                                                                                                              | Guide way                                                                   | Precision ball slide                                                                                                                                |
|                                                                                                                              | Drive                                                                       | Precision lead screw                                                                                                                                |
|                                                                                                                              | Lead screw                                                                  | 1mm pitch                                                                                                                                           |
|                                                                                                                              | Lead screw type                                                             | Ground                                                                                                                                              |
|                                                                                                                              | Positioning accuracy                                                        | 10um                                                                                                                                                |
|                                                                                                                              | Construction                                                                | Black anodized aluminium                                                                                                                            |
| <b>3. XYZ manual sample holder with Vacuum-cooling chuck (1set)</b>                                                          | <b>Top plate size</b>                                                       | <b>100mm x 100mm</b>                                                                                                                                |
|                                                                                                                              | X axis                                                                      | 25mm travel                                                                                                                                         |
|                                                                                                                              | Y axis                                                                      | 25mm travel                                                                                                                                         |
|                                                                                                                              | Z axis                                                                      | 10mm travel                                                                                                                                         |
|                                                                                                                              | XYZ resolution                                                              | 10microns                                                                                                                                           |
|                                                                                                                              | Temperature range                                                           | <b>-20°C to 40°C</b>                                                                                                                                |
|                                                                                                                              | Temperature accuracy                                                        | ± 1°C                                                                                                                                               |
|                                                                                                                              | <b>Software control</b>                                                     |                                                                                                                                                     |
| <b>4. Probe station trinocular microscope and its support stand(1set)</b>                                                    | Optical system                                                              | Infinity Corrected                                                                                                                                  |
|                                                                                                                              | Observation method                                                          | Brightfield                                                                                                                                         |
|                                                                                                                              | <b>Illuminations</b>                                                        | 1. <b>Epi-scopic</b> , White LED, Intensity adjustable<br>2. <b>Angled</b> , White LED, Intensity adjustable                                        |
|                                                                                                                              | Eyepiece                                                                    | <b>10X (FN20)</b> , Diopter adjustable                                                                                                              |
|                                                                                                                              | Viewing head                                                                | <b>Siedentopf Trinocular</b> , 30O, 48-75mm IP adjustment                                                                                           |
|                                                                                                                              | Nosepiece                                                                   | <b>Quadruple, Manual</b> , positive precision click stops                                                                                           |
|                                                                                                                              | Focusing                                                                    | Manual                                                                                                                                              |
|                                                                                                                              | Microscope Objective                                                        | 1. <b>Plan Apo LWD 5X</b> (NA = 0.14, <b>Working distance = 44mm</b> )<br>FOV@ <sub>eyepiece</sub> = 4mm, FOV@ <sub>camera</sub> = 1.14mm x 0.856mm |
|                                                                                                                              | Camera                                                                      | <b>1/2.5"</b> Color CMOS, <b>5MP</b> , USB2.0, C-mount, 2.2umx2.2um pixel size                                                                      |
|                                                                                                                              | <b>Software</b>                                                             | <b>Probe_v01</b> (Live/Image capture, scale bar, measurement, annotation)                                                                           |
|                                                                                                                              | Material                                                                    | MS with black paint                                                                                                                                 |
|                                                                                                                              | Output ports                                                                | <b>BNC connectors</b> (*triaxial connectors are available on request)                                                                               |
|                                                                                                                              | N2 inlet and outlet port                                                    |                                                                                                                                                     |
| <b>5. Enclosure</b>                                                                                                          | Vacuum inlet                                                                |                                                                                                                                                     |
|                                                                                                                              | Camera USB port                                                             |                                                                                                                                                     |
|                                                                                                                              | Power socket and switch                                                     |                                                                                                                                                     |
|                                                                                                                              | Door with hinges and lock                                                   |                                                                                                                                                     |
|                                                                                                                              | Temperature & Humidity sensor                                               |                                                                                                                                                     |
|                                                                                                                              | *The cover will not be completely air tight. Minor leakage will be there.   |                                                                                                                                                     |
|                                                                                                                              |                                                                             |                                                                                                                                                     |
|                                                                                                                              |                                                                             |                                                                                                                                                     |

|                                          |                                                                    |                                                                                                                          |
|------------------------------------------|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>Optional Accessories</b>              | 1. Plan Apo LWD 2X objective                                       | NA = 0.06, <b>Working distance</b> = 34mm<br>FOV <sub>eyepiece</sub> = 10mm, FOV <sub>camera</sub> = 2.85mm x 2.14mm     |
|                                          | 2. Plan Apo LWD 10X objective                                      | NA = 0.30, <b>Working distance</b> = 34mm<br>FOV <sub>eyepiece</sub> = 2mm, FOV <sub>camera</sub> = 0.57mm x 0.428mm     |
|                                          | 3. Plan Apo LWD 20X objective                                      | NA = 0.35, <b>Working distance</b> = 29mm<br>FOV <sub>eyepiece</sub> = 1mm, FOV <sub>camera</sub> = 0.285mm x 0.214mm    |
|                                          | 4. Plan Apo LWD 50X objective                                      | NA = 0.45, <b>Working distance</b> = 17mm<br>FOV <sub>eyepiece</sub> = 0.4mm, FOV <sub>camera</sub> = 0.114mm x 0.0856mm |
| v. Probe tips (5 Nos)                    | Tip diameter                                                       | 50um                                                                                                                     |
|                                          | Material                                                           | Tungsten                                                                                                                 |
|                                          | *custom tip diameter down to 10um are available                    |                                                                                                                          |
| <b>vi. POGO tips with holder (5 Nos)</b> | Tip diameter                                                       | ~1mm                                                                                                                     |
|                                          | Gold plated                                                        |                                                                                                                          |
| <b>vii. Vacuum pump – Oil free</b>       | Maximum flow rate                                                  | 45 lpm                                                                                                                   |
|                                          | Maximum vacuum                                                     | 27 inches of Hg                                                                                                          |
|                                          | Power                                                              | ¼ hp                                                                                                                     |
| <b>viii. Hot Chuck</b>                   | Temperature range                                                  | RT to 200°C                                                                                                              |
|                                          | Temperature accuracy                                               | ±10°C over 100mm                                                                                                         |
|                                          | Software control                                                   |                                                                                                                          |
| <b>ix. Hot-Cooling chuck</b>             | Chuck size                                                         | 50mm x 50mm                                                                                                              |
|                                          | Temperature range                                                  | -10°C to 200°C                                                                                                           |
|                                          | Temperature accuracy                                               | ±5°C                                                                                                                     |
|                                          | <b>Software control</b>                                            |                                                                                                                          |
|                                          | * Enclosure is recommended to control humidity and minimize icing. |                                                                                                                          |
| <b>x. Triaxial cable – 1.5 meter</b>     | One end                                                            | coupled to the probe tip                                                                                                 |
|                                          | other end                                                          | <b>3 lug male connector</b>                                                                                              |
|                                          | <b>Impedance</b>                                                   | 50±5 ohm                                                                                                                 |
|                                          | Operating voltage                                                  | 1000 VRMS/2000 VOC                                                                                                       |
|                                          | Capacitance                                                        | 29.5 pf/FT NOM                                                                                                           |
|                                          | Operating temperature range                                        | -40oC to 75oC                                                                                                            |
|                                          | Leakage current                                                    | <1pA with 0~10V                                                                                                          |



# Quadrupole Magnetic Probe Station

## Model : HO-QMPS-2000S

Holmarc's Quadrupole Magnetic Probe Station System is a versatile and cost-effective platform designed for electrical characterization, magnetic device testing, and advanced academic and industrial research. The system integrates a precision probe station with a quadrupole electromagnet, enabling accurate electrical probing of devices under a controlled and programmable magnetic field. The integrated quadrupole electromagnet produces a stable, well-defined magnetic field across the sample area and is driven by a PC-controlled bipolar power supply with dedicated software for precise field setting, scanning, and real-time monitoring, ensuring repeatable measurement conditions.

The probe station is configured with four probes, each mounted on a 4-axis precision micromanipulator with an ON/OFF magnetic base. This configuration provides excellent mechanical stability, drift-free positioning, and smooth, fine control during probing operations.

For observation and probe alignment, the system features a digital zoom microscope with a long working distance objective, complemented by a 5 MP color camera and image acquisition software for live viewing and documentation.

The system supports a range of optional accessories, including vacuum-thermal and cooling chucks, high-magnification objectives, and custom probe holders, allowing flexible configuration to meet evolving application needs.

### Features

- PC controlled Quadrupole Electromagnetic
- 4-probe configuration
- Digital zoom microscope with Plan Apo LWD objectives

### Applications

- Electrical characterization of devices under controlled magnetic field
- Semiconductor device probing.
- Characterization of magnetic sensors and MEMS devices
- Research of magnetic materials and thin films
- Early-stage device development and failure analysis
- Academic research and teaching labs



| Specifications                                                                                                               |                                                                                                                                                            |                                                                                                                                                 |
|------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1. Micromanipulators – 2 Nos</b><br><br> | Axes                                                                                                                                                       | 4 (XYZ & tilt)                                                                                                                                  |
|                                                                                                                              | XYZ travel                                                                                                                                                 | 25mm                                                                                                                                            |
|                                                                                                                              | <b>Magnetic base</b>                                                                                                                                       |                                                                                                                                                 |
|                                                                                                                              | Probe holder with BNC output (*triaxial outputs are sold separately)                                                                                       |                                                                                                                                                 |
|                                                                                                                              | 45- degree and 90-degree probe holder                                                                                                                      |                                                                                                                                                 |
| <b>2. Magnetic SS platen, supporting stands, base plate, Z focusing stage and boom stand for Microscope (1 set)</b>          | Platen                                                                                                                                                     | Magnetic SS                                                                                                                                     |
|                                                                                                                              | Platen supporting stand                                                                                                                                    | Height adjustable                                                                                                                               |
|                                                                                                                              | Base plate                                                                                                                                                 | Cast aluminium with levelling bush                                                                                                              |
| <b>3. XYZ manual sample holder with Vacuum-cooling chuck (1set)</b>                                                          | X axis                                                                                                                                                     | 25mm travel                                                                                                                                     |
|                                                                                                                              | Y axis                                                                                                                                                     | 25mm travel                                                                                                                                     |
|                                                                                                                              | Z axis                                                                                                                                                     | 10mm travel                                                                                                                                     |
|                                                                                                                              |                                                                                                                                                            |                                                                                                                                                 |
| <b>4. Digital Zoom microscope and its support stand(1set)</b>                                                                | Optical system                                                                                                                                             | Infinity Corrected                                                                                                                              |
|                                                                                                                              | Observation method                                                                                                                                         | Brightfield                                                                                                                                     |
|                                                                                                                              | Illuminations                                                                                                                                              | 1. <b>Epi-scopic</b> , White LED, Intensity adjustable<br>2. <b>Angled</b> , White LED, Intensity adjustable                                    |
|                                                                                                                              | Zoom range                                                                                                                                                 | <b>0.5X -5X</b>                                                                                                                                 |
|                                                                                                                              | Focusing                                                                                                                                                   | <b>Manual</b>                                                                                                                                   |
|                                                                                                                              | Microscope Objective                                                                                                                                       | 1. <b>Plan Apo LWD 5X</b> (NA = 0.14, <b>Working distance</b> = 44mm) FOV@ <sub>eyepiece</sub> = 4mm, FOV@ <sub>camera</sub> = 1.14mm x 0.856mm |
|                                                                                                                              | Camera                                                                                                                                                     | <b>1/2.5"</b> Color CMOS, <b>5MP</b> , USB2.0, C-mount, 2.2umx2.2um pixel size                                                                  |
|                                                                                                                              | <b>Software</b>                                                                                                                                            | <b>Probe_v01</b> (Live/Image capture, scale bar, measurement, annotation)                                                                       |
| <b>5. Electromagnet (1set)</b>                                                                                               | Design                                                                                                                                                     | Quadrupole                                                                                                                                      |
|                                                                                                                              | Pole diameter                                                                                                                                              | 30mm                                                                                                                                            |
|                                                                                                                              | Pole face                                                                                                                                                  | 15mm                                                                                                                                            |
|                                                                                                                              | Pole piece surface treatment                                                                                                                               | Chrome plating                                                                                                                                  |
|                                                                                                                              | Air gap                                                                                                                                                    | 15mm                                                                                                                                            |
|                                                                                                                              | Magnetic field                                                                                                                                             | 3500 Gs                                                                                                                                         |
|                                                                                                                              | Power supply                                                                                                                                               | Quad system constant current                                                                                                                    |
|                                                                                                                              | Operation                                                                                                                                                  | Manual & PC controlled programmable operation                                                                                                   |
|                                                                                                                              | Software                                                                                                                                                   | Magnet LAB field scan                                                                                                                           |
| Optional Accessories                                                                                                         |                                                                                                                                                            |                                                                                                                                                 |
| <b>1</b>                                                                                                                     | <b>Plan Apo LWD 2X objective</b> , NA = 0.06, <b>Working distance</b> = 34mm FOV <sub>eyepiece</sub> = 10mm, FOV <sub>camera</sub> = 2.85mm x 2.14mm       |                                                                                                                                                 |
| <b>2</b>                                                                                                                     | <b>Plan Apo LWD 10X objective</b> NA = 0.30, <b>Working distance</b> = 34mm FOV <sub>eyepiece</sub> = 2mm, FOV <sub>camera</sub> = 0.57mm x 0.428mm        |                                                                                                                                                 |
| <b>3</b>                                                                                                                     | <b>Plan Apo LWD 20X objective</b> , NA = 0.35, <b>Working distance</b> = 29mm, FOV <sub>eyepiece</sub> = 1mm, FOV <sub>camera</sub> = 0.285mm x 0.214mm    |                                                                                                                                                 |
| <b>4</b>                                                                                                                     | <b>Plan Apo LWD 50X objective</b> , NA = 0.45, <b>Working distance</b> = 17mm, FOV <sub>eyepiece</sub> = 0.4mm, FOV <sub>camera</sub> = 0.114mm x 0.0856mm |                                                                                                                                                 |
| <b>5</b>                                                                                                                     | Tip diameter = 50um                                                                                                                                        |                                                                                                                                                 |
|                                                                                                                              | Material = Tungsten                                                                                                                                        |                                                                                                                                                 |
| <b>6</b>                                                                                                                     | *custom tip diameter down to 10um are available                                                                                                            |                                                                                                                                                 |
|                                                                                                                              |                                                                                                                                                            |                                                                                                                                                 |
| <b>6</b>                                                                                                                     | <b>POGO tips with holder (5 Nos)</b> Tip diameter ~1mm                                                                                                     |                                                                                                                                                 |
|                                                                                                                              | Gold plated                                                                                                                                                |                                                                                                                                                 |
| <b>7</b>                                                                                                                     | <b>Hot Chuck</b> Temperature range RT to 200°C                                                                                                             |                                                                                                                                                 |
|                                                                                                                              | Temperature accuracy ±10°C over 100mm                                                                                                                      |                                                                                                                                                 |
|                                                                                                                              | Software control                                                                                                                                           |                                                                                                                                                 |

# Piezoelectric Probe Station

## Model : HO-PZPSM-T01C

The Piezoelectric Probe Station System is designed for precise measurement of piezoelectric signals from vibration energy harvesting device structures and related piezoelectric materials. The system enables accurate electrical characterization under controlled mechanical excitation, offering high stability, low leakage, and flexible configurability for advanced research and laboratory applications.

The system includes two precision 3-axis micromanipulators with magnetic bases (left- and right-hand operated) for accurate probe tip positioning. A vacuum-thermal chuck with XYZ translation, electrically and thermally isolated from the base unit, ensures secure sample mounting and low-noise measurements.

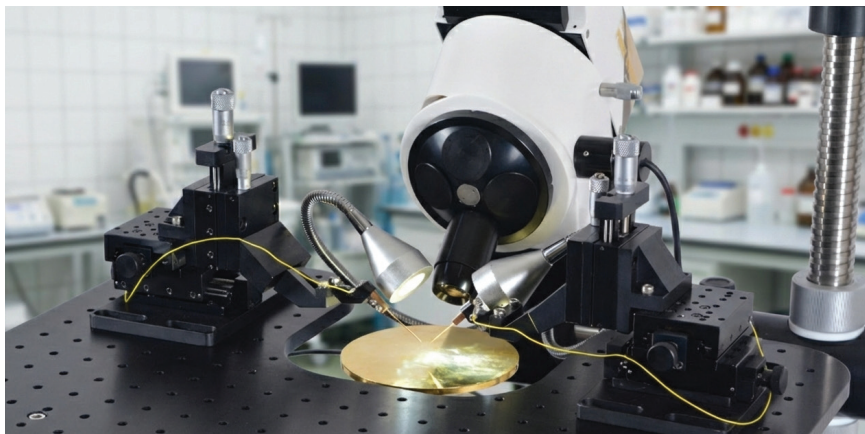
For observation and alignment, the probe station features a trinocular microscope with long working distance Plan Apochromat objectives, a four-position revolving nosepiece, and coaxial and angled illumination. A 5 MP digital color camera with software supports live imaging, measurements, and documentation.

The system also includes a dedicated micromanipulator with attenuator holder, capable of supporting an attenuator weighing up to 500 g. The micromanipulator can be mechanically fixed to the platen for enhanced rigidity. Two types of rigid insulating rods made of PEEK material are supplied for integrating the attenuator through an M6 tapped hole, offering flexibility for different measurement configurations.

An additional sample holder is provided for electrical measurements of metal oxide pellets with diameters ranging from 8 mm to 15 mm and thicknesses from 1 mm to 5 mm. The sample holder consists of two parallel electrodes, one fixed and one movable via a micrometer to establish controlled contact with the sample. The flat, rounded copper contact tips are electrically isolated from the holder body and feature BNC connections for reliable signal transmission. Contact tips with diameters of 5 mm, 7 mm, and 9 mm are supplied with the system.

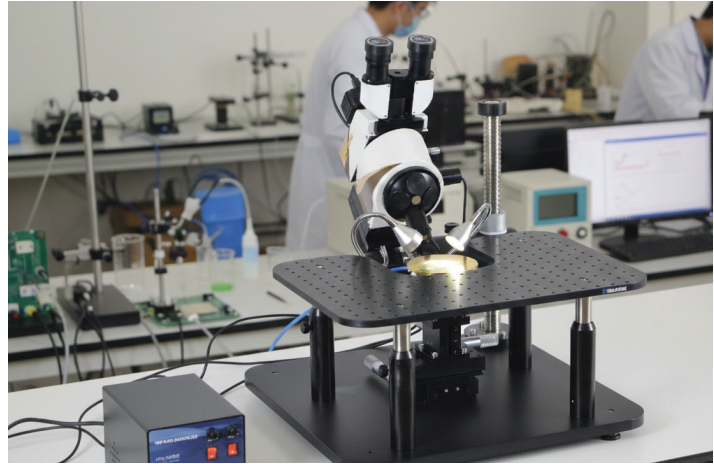
## Features

- Designed for precise measurement of piezoelectric signals
- Low-leakage, low-noise electrical characterization under controlled mechanical excitation
- 2-probe configuration
- Trinocular microscope with Plan Apo LWD objectives
- Dedicated attenuator holder with micromanipulator supporting attenuators upto 500g
- Additional sample holder with adjustable parallel electrodes for pellet-type samples

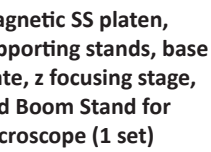
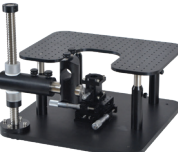
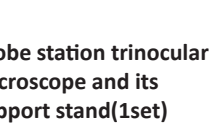
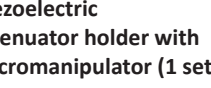


## Applications

- Electrical characterization of devices under controlled magnetic field
- Characterization of piezoelectric vibration energy harvesting devices
- Electrical testing of piezoelectric materials and thin films
- Measurement of piezoelectric response in MEMS and microfabricated structures
- Research on metal oxide pellets and bulk piezoelectric samples
- Academic research, material development, and device optimization
- Laboratory evaluation of low-signal piezoelectric sensors and transducers





| Specifications       |                                                                                     |                                                                                                            |                                                                                                                                                             |
|----------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1                    |    | Micromanipulators – Left/right (1 set)                                                                     |                                                                                                                                                             |
|                      |                                                                                     | Axes                                                                                                       | 3(XYZ )                                                                                                                                                     |
|                      |                                                                                     | XYZ travel                                                                                                 | 25mm                                                                                                                                                        |
|                      |                                                                                     | <b>Magnetic base</b>                                                                                       |                                                                                                                                                             |
|                      |                                                                                     | Probe holder with <b>BNC output</b> (*triaxial outputs are sold separately)                                |                                                                                                                                                             |
|                      |                                                                                     | 45- degree and 90-degree probe holder                                                                      |                                                                                                                                                             |
|                      |                                                                                     |                                                                                                            |                                                                                                                                                             |
| 2                    |    | Magnetic SS platen, supporting stands, base plate, z focusing stage, and Boom Stand for microscope (1 set) |                                                                                                                                                             |
|                      |                                                                                     | Platen                                                                                                     | Magnetic SS                                                                                                                                                 |
|                      |                                                                                     | Platen supporting stand                                                                                    | Height adjustable                                                                                                                                           |
|                      |                                                                                     | Base plate                                                                                                 | Cast aluminium with levelling bush                                                                                                                          |
|                      |                                                                                     | Boom stand and focusing stage for Trinocular Microscope                                                    |                                                                                                                                                             |
|                      |                                                                                     |                                                                                                            |                                                                                                                                                             |
| 3.                   |    | XYZ manual sample holder with Vacuum-Thermalchuck (1set)                                                   |                                                                                                                                                             |
|                      |                                                                                     | Top plate diameter                                                                                         | 100mm                                                                                                                                                       |
|                      |                                                                                     | X axis                                                                                                     | 25mm travel                                                                                                                                                 |
|                      |                                                                                     | Y axis                                                                                                     | 25mm travel                                                                                                                                                 |
|                      |                                                                                     | Z axis                                                                                                     | 10mm travel                                                                                                                                                 |
|                      |                                                                                     | XYZ resolution                                                                                             | 10microns                                                                                                                                                   |
|                      |                                                                                     | Temperature range                                                                                          | RT to 200°C                                                                                                                                                 |
|                      |                                                                                     | Temperature accuracy                                                                                       | ± 10°C                                                                                                                                                      |
|                      |                                                                                     | <b>Software control</b>                                                                                    |                                                                                                                                                             |
|                      |                                                                                     |                                                                                                            |                                                                                                                                                             |
| 4.                   |  | Probe station trinocular microscope and its support stand(1set)                                            |                                                                                                                                                             |
|                      |                                                                                     | Optical system                                                                                             | Infinity Corrected                                                                                                                                          |
|                      |                                                                                     | Observation method                                                                                         | Brightfield                                                                                                                                                 |
|                      |                                                                                     | <b>Illuminations</b>                                                                                       | <b>Epi-scopic</b> , White LED, Intensity adjustable                                                                                                         |
|                      |                                                                                     |                                                                                                            | <b>Angled</b> , White LED, Intensity adjustable                                                                                                             |
|                      |                                                                                     | Viewing head                                                                                               | <b>Siedentopf Trinocular</b> , 30O, 48-75mm IP adjustment                                                                                                   |
|                      |                                                                                     | Nosepiece                                                                                                  | <b>Quadruple, Manual</b> , positive precision click stops                                                                                                   |
|                      |                                                                                     | Focusing                                                                                                   | <b>Manual</b>                                                                                                                                               |
|                      |                                                                                     | Microscope Objective                                                                                       | 1. <b>Plan Apo LWD 5X</b> (NA = 0.14, <b>Working distance = 44mm</b> ) FOV@<br><small>eyepiece</small> = 4mm, FOV@ <small>camera</small> = 1.14mm x 0.856mm |
|                      |                                                                                     | <b>Camera</b>                                                                                              | <b>1/2.5"</b> Color CMOS, <b>5MP</b> , USB2.0, C-mount, 2.2umx2.2um pixel size                                                                              |
|                      |                                                                                     | <b>Software</b>                                                                                            | <b>Probe_v01</b> (Live/Image capture, scale bar, measurement,annotation)                                                                                    |
|                      |                                                                                     |                                                                                                            |                                                                                                                                                             |
| 5                    |  | Piezoelectric attenuator holder with micromanipulator (1 set)                                              |                                                                                                                                                             |
|                      |                                                                                     | Micromanipulator XYZ travel                                                                                | 10mm x 10mm x 10mm                                                                                                                                          |
|                      |                                                                                     | Micromanipulator mounting                                                                                  | Screw fixing to the platen                                                                                                                                  |
|                      |                                                                                     | Provision to holder attenuator of weight up to 500g                                                        |                                                                                                                                                             |
|                      |                                                                                     | Two type of Peek insulating rods are provided to integrate with attenuator                                 |                                                                                                                                                             |
|                      |                                                                                     | <b>Peek insulating rod, type 1</b>                                                                         | One side M6 thread, opposite side provision to fix pogo tips with BNC connector, Qty = 10 Nos                                                               |
|                      |                                                                                     | <b>Peek insulating rod, type 2</b>                                                                         | One side M6 thread, opposite side has flat and polished surfaces of diameters 1mm, 1,5mm and 2mm. Qty = 10 Nos each                                         |
|                      |                                                                                     |                                                                                                            |                                                                                                                                                             |
| 6                    |  | Sample holder                                                                                              |                                                                                                                                                             |
|                      |                                                                                     | (For electrical measurements of metal oxide pellets of diameter 8-10mm diameter and 1 – 5mm thickness)     |                                                                                                                                                             |
|                      |                                                                                     | Two parallel copper electrodes (one is fixed, other is movable via micrometer head to get the contact)     |                                                                                                                                                             |
|                      |                                                                                     | Flat contact tips                                                                                          |                                                                                                                                                             |
|                      |                                                                                     | Contact tips are isolated from sample holder body                                                          |                                                                                                                                                             |
|                      |                                                                                     | Contact tip dimaters = 5mm, 7mm, and 9mm                                                                   |                                                                                                                                                             |
| Optional Accessories |                                                                                     |                                                                                                            |                                                                                                                                                             |



|    |                                      |                                                                                                                       |
|----|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| 1. | <b>Plan Apo LWD 2X objective</b>     | NA = 0.06, <b>Working distance = 34mm</b><br>FOV <sub>eyepiece</sub> = 10mm, FOV <sub>camera</sub> = 2.85mm x 2.14mm  |
| 2. | <b>Plan Apo LWD 10X objective</b>    | NA = 0.30, <b>Working distance = 34mm</b><br>FOV <sub>eyepiece</sub> = 2mm, FOV <sub>camera</sub> = 0.57mm x 0.428mm  |
| 3. | <b>Plan Apo LWD 20X objective</b>    | NA = 0.35, <b>Working distance = 29mm</b><br>FOV <sub>eyepiece</sub> = 1mm, FOV <sub>camera</sub> = 0.285mm x 0.214mm |
| 4. | <b>Plan Apo LWD 50X objective</b>    | NA = 0.45, Working distance = 17mm<br>FOV <sub>eyepiece</sub> = 0.4mm, FOV <sub>camera</sub> = 0.114mm x 0.0856mm     |
| 5. | <b>Probe tips (5 Nos)</b>            | Tip diameter = 50um<br>Material = Tungsten<br>*custom tip diameter down to 10um are available                         |
| 6. | <b>POGO tips with holder (5 Nos)</b> | Tip diameter = ~1mm<br>Gold plated                                                                                    |
| 7. | <b>Vacuum pump – Oil free</b>        | Maximum flow rate = 45 lpm<br>Maximum vacuum = 27 inches of Hg<br>Power = ¼ hp                                        |

# HV-IV Probe System

## Model : HO-PSM-HVIV

Holmarc's HV-IV Probe Station, Model: HO-PSM-HVIV, is a custom-engineered system designed for high-voltage and high-current electrical characterization of semiconductor devices, power electronics, and insulating materials. The system enables safe, stable, and repeatable I-V measurements under high electric fields, making it ideal for research, reliability testing, and device qualification.

Samples are mounted on a vacuum-based brass measurement jig, which is completely electrically isolated from the base plate to minimize leakage currents. Electrical connections are made through high-voltage connectors, and a single probe mounted on a 4-axis precision micromanipulator (X, Y, Z, and tilt) is provided for accurate and controlled probing. The bottom of the measurement jig is grounded, ensuring a stable reference potential and safe operation during high-voltage measurements. Custom-designed measurement jigs can be supplied on request to meet specific application requirements.

For observation and precise probe alignment, the probe station is equipped with a digital brightfield microscope featuring long working distance Plan Apochromat objectives and a four-position revolving nosepiece. Coaxial epi-illumination and angled illumination provide uniform and controlled lighting, while a 5 MP digital color camera with integrated software supports live viewing, on-screen measurements, image capture, and documentation.

The entire system is housed within an environmental enclosure for effective humidity control. Real-time monitoring and logging of humidity and temperature versus time are supported through the integrated software, ensuring stable test conditions and improved measurement reliability during high-voltage operation.

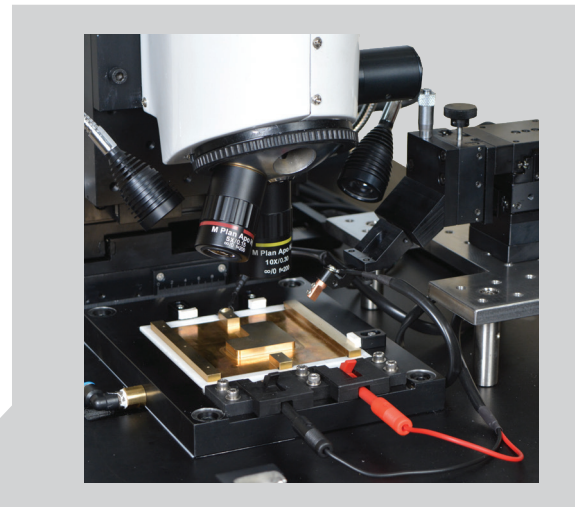
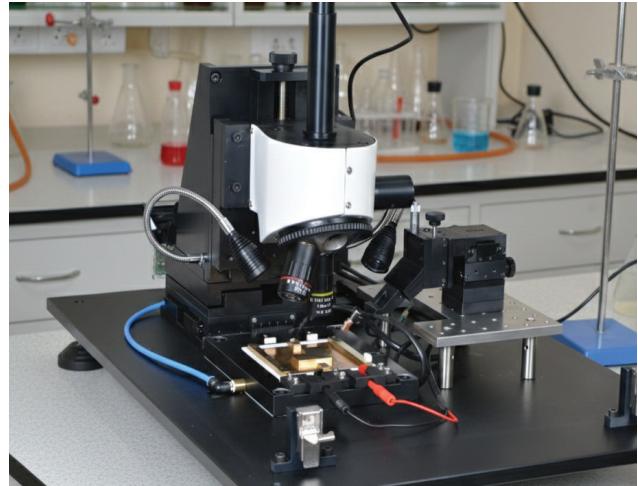
## Features

- Designed for high-voltage and high-current I-V characterization
- Environmental enclosure with software-based real-time monitoring and logging of humidity and temperature vs time
- Measurement jig
- Digital brightfield microscope with Plan Apo LWD objectives
- Grounded jig base for stable reference potential and safe operation.



## Applications

- Electrical characterization of devices under controlled magnetic field
- High-voltage I-V characterization of power semiconductor devices
- Testing of Si, SiC, and GaN-based power devices
- Breakdown voltage and leakage current measurements
- Electrical characterization of insulating and dielectric materials
- Reliability testing and qualification of high-voltage components
- Academic research and industrial power electronics R&D





| Specifications                                                                                                              |                                                                          |                                                                                                                                          |
|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1. Micromanipulator (1 No.)</b><br><br> | Axes                                                                     | 4(XYZ)                                                                                                                                   |
|                                                                                                                             | XYZ travel                                                               | 25mm                                                                                                                                     |
|                                                                                                                             | <b>Magnetic base</b>                                                     | Probe holder with <b>BNC output</b> (*triaxial outputs are sold separately)<br>45- degree and 90-degree probe holder                     |
|                                                                                                                             |                                                                          |                                                                                                                                          |
| <b>2. Magnetic SS platen, supporting stands, base plate, and XYZ stage microscope (1 set)</b>                               | Platen                                                                   | Magnetic SS                                                                                                                              |
|                                                                                                                             | Platen supporting stand                                                  | Height adjustable                                                                                                                        |
|                                                                                                                             | Base plate                                                               | Cast aluminium with levelling bush                                                                                                       |
|                                                                                                                             |                                                                          |                                                                                                                                          |
| <b>Microscope XYZ stage</b>                                                                                                 | XYZ travel                                                               | 100mm x 100mm x 100mm                                                                                                                    |
|                                                                                                                             | Guide way                                                                | Precision ball slide                                                                                                                     |
|                                                                                                                             | Drive                                                                    | Precision lead screw                                                                                                                     |
|                                                                                                                             | Lead screw                                                               | 1mm pitch                                                                                                                                |
|                                                                                                                             | Lead screw type                                                          | Ground                                                                                                                                   |
|                                                                                                                             | Positioning accuracy                                                     | 10um                                                                                                                                     |
|                                                                                                                             | Construction                                                             | Black anodized aluminium                                                                                                                 |
| <b>3. Measurement Jig (1set)</b>                                                                                            | <b>Material</b>                                                          | <b>Brass</b>                                                                                                                             |
|                                                                                                                             | Vacuum chuck                                                             |                                                                                                                                          |
|                                                                                                                             | Electrically isolated from base plate                                    |                                                                                                                                          |
|                                                                                                                             | Teflon stops, HV connectors                                              |                                                                                                                                          |
| <b>4. Digital brightfield microscope and its support stand(1set)</b>                                                        | Optical system                                                           | Infinity Corrected                                                                                                                       |
|                                                                                                                             | Observation method                                                       | Brightfield                                                                                                                              |
|                                                                                                                             | Illuminations                                                            | 1. <b>Epi-scopic</b> , White LED, Intensity adjustable<br>2. <b>Angled</b> , White LED, Intensity adjustable                             |
|                                                                                                                             | Eyepiece                                                                 | 10X (FN20), Diopter adjustable                                                                                                           |
|                                                                                                                             | Viewing head                                                             | <b>Siedentopf Trinocular</b> , 30°, 48-75mm IP adjustment                                                                                |
|                                                                                                                             | Nosepiece                                                                | <b>Quadruple, Manual</b> , positive precision click stops                                                                                |
|                                                                                                                             | Focusing                                                                 | <b>Manual</b>                                                                                                                            |
|                                                                                                                             | Microscope Objective                                                     | 1. <b>Plan Apo LWD 5X</b> (NA = 0.14, Working distance = 44mm) FOV@ <sub>eyepiece</sub> = 4mm, FOV@ <sub>camera</sub> = 1.14mm x 0.856mm |
|                                                                                                                             | <b>Camera</b>                                                            | <b>1/2.5"</b> Color CMOS, <b>5MP</b> , USB2.0, C-mount, 2.2umx2.2um pixel size                                                           |
|                                                                                                                             | <b>Software</b>                                                          | <b>Probe_v01</b> (Live/Image capture, scale bar, measurement, annotation)                                                                |
| <b>5. Enclosure</b><br><br>              | Material                                                                 | MS with black paint                                                                                                                      |
|                                                                                                                             | Output ports                                                             | BNC connectors (*triaxial connectors are available on request)                                                                           |
|                                                                                                                             | N2 inlet and outlet port                                                 |                                                                                                                                          |
|                                                                                                                             | Vacuum inlet                                                             |                                                                                                                                          |
|                                                                                                                             | Camera USB port                                                          |                                                                                                                                          |
|                                                                                                                             | Power socket and switch                                                  |                                                                                                                                          |
|                                                                                                                             | Door with hinges and lock                                                |                                                                                                                                          |
|                                                                                                                             | Temperature & Humidity sensor, data logging via software                 |                                                                                                                                          |
|                                                                                                                             | *The cover will not be completely air tight. Minor leakage will be there |                                                                                                                                          |
|                                                                                                                             |                                                                          |                                                                                                                                          |
| Optional Accessories                                                                                                        |                                                                          |                                                                                                                                          |

|                               |                                                                             |                 |
|-------------------------------|-----------------------------------------------------------------------------|-----------------|
| 1. Plan Apo LWD 2X objective  | NA = 0.06, <b>Working distance = 34mm</b>                                   |                 |
|                               | FOV <sub>eyepiece</sub> = 10mm, FOV <sub>camera</sub> = 2.85mm x 2.14mm     |                 |
| 2. Plan Apo LWD 10X objective | NA = 0.30, <b>Working distance = 34mm</b>                                   |                 |
|                               | FOV <sub>eyepiece</sub> = 2mm, FOV <sub>camera</sub> = 0.57mm x 0.428mm     |                 |
| 3. Plan Apo LWD 20X objective | NA = 0.35, <b>Working distance = 29mm</b>                                   |                 |
|                               | FOV <sub>eyepiece</sub> = 1mm, FOV <sub>camera</sub> = 0.285mm x 0.214mm    |                 |
| 4. Plan Apo LWD 50X objective | NA = 0.45, <b>Working distance = 17mm</b>                                   |                 |
|                               | FOV <sub>eyepiece</sub> = 0.4mm, FOV <sub>camera</sub> = 0.114mm x 0.0856mm |                 |
| 5. Probe tips (5 Nos)         | Tip diameter                                                                | 50um            |
|                               | Material                                                                    | Tungsten        |
|                               | *custom tip diameter down to 10um are available                             |                 |
| 6. Vacuum pump – Oil free     | Maximum flow rate                                                           | 45 lpm          |
|                               | Maximum vacuum                                                              | 27 inches of Hg |
|                               | Power                                                                       | ¼ hp            |

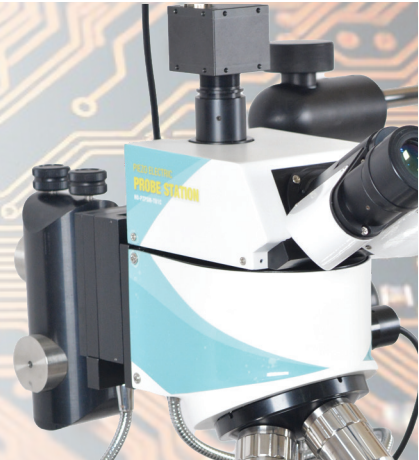
# Inspection Microscope

**Bright-field optical microscopy and digital documentation**

**Laser-assisted imaging and visualization experiments**

**Optical alignment and beam visualization studies**

**Academic teaching and demonstration laboratories**



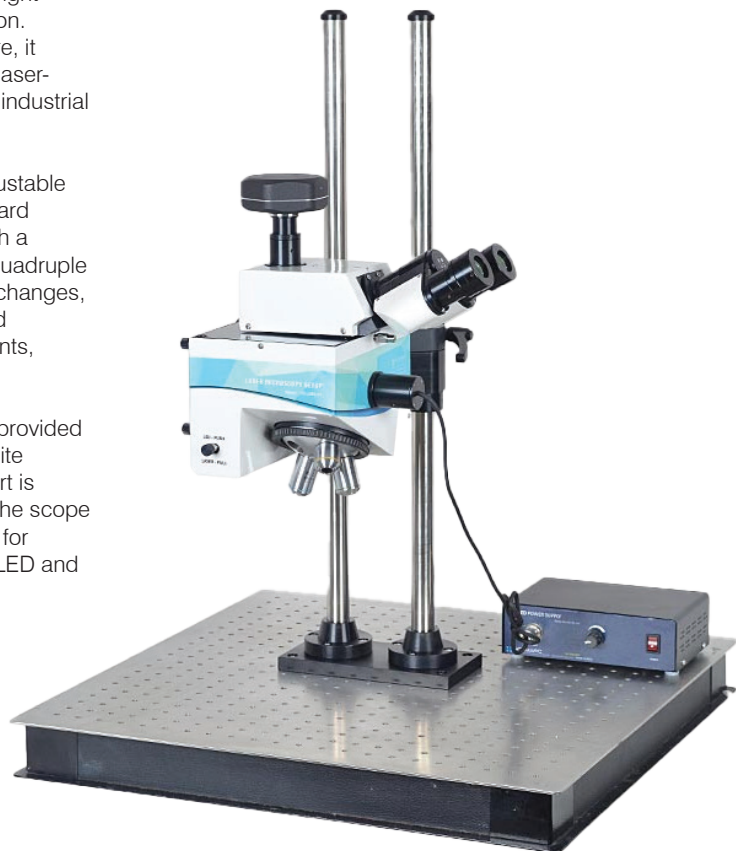
## Laser Microscope

**Model : HO-LMS-01**

The HO-LMS-01 Laser Microscope is a versatile research-grade imaging system that combines high-quality bright-field microscopy with optional laser-based illumination. Designed with a modular and ergonomic architecture, it is ideal for advanced imaging, documentation, and laser-assisted optical studies in research, academic, and industrial laboratories.

The microscope system is mounted on a height adjustable dual rod system. The dual rod system is breadboard mountable. The microscope system is equipped with a Trinocular head and plan achromatic objectives. A quadruple revolving nosepiece enables smooth magnification changes, and a 5 MP color camera with image acquisition and analysis software supports live viewing, measurements, image capture, and documentation.

Two independent port at 180 degrees each other is provided for the sample illumination. One port is fixed with white LED with adjustable intensity option. The second port is provided for external laser excitation (laser is not in the scope of supply). A manual selection provision is provided for selecting between LED and laser illumination. Both LED and laser illumination can't be used simultaneously.



| Specifications                                                                                            |                                                                                                                                         |                                                                                |
|-----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| <b>1. Laser Microscope setup</b><br>The microscope will be mounted on a height adjustable dual rod system | Height adjustable range (Coarse)                                                                                                        | 10-inch to 15-inch                                                             |
|                                                                                                           | Fine adjustable range                                                                                                                   | +/- 25mm                                                                       |
|                                                                                                           | Center distance from the dual rod system                                                                                                | 7.5-inch                                                                       |
|                                                                                                           | Breadboard mountable                                                                                                                    |                                                                                |
| <b>2. Viewing head</b>                                                                                    | Siedentopf trinocular head, 30-degree inclination, 48-75mm IP adjustment                                                                |                                                                                |
|                                                                                                           | Eyepiec                                                                                                                                 | 10X, FN20, dioptre adjustable                                                  |
| <b>3. Nosepiece</b>                                                                                       | Manual, revolving, quadruple with positive precision clip stops                                                                         |                                                                                |
|                                                                                                           | RMS objective threads                                                                                                                   |                                                                                |
|                                                                                                           | Focusing                                                                                                                                | Not available (Can provided upon request)                                      |
| <b>4. Laser mirror (For external laser excitation)</b>                                                    | Mirror dimension                                                                                                                        | Dia. 1" x 6mm thickness                                                        |
|                                                                                                           | Reflectivity                                                                                                                            | > 99% @532nm                                                                   |
|                                                                                                           | Damage threshold                                                                                                                        | >5J/cm2                                                                        |
| <b>5. Sample Illumination</b>                                                                             | The system is equipped with two independent illuminatioin ports positioned 180degree opposite to each other                             |                                                                                |
|                                                                                                           | Port 1                                                                                                                                  | Dedicated for external laser illumination, coupled via a laser line mirror.    |
|                                                                                                           | Port 2                                                                                                                                  | Integrated high bright white LED illumination with adjustable intensity.       |
|                                                                                                           | Co-axial top illumination (Epi-scopic)                                                                                                  |                                                                                |
|                                                                                                           | Infinity corrected optical system                                                                                                       |                                                                                |
|                                                                                                           | Observation method                                                                                                                      | Brightfield                                                                    |
| <b>6. Laser excitation port</b><br>(laser is not in the scope of supply)                                  | Movable 532nm laser line mirror (can we moved away from the optical path during LED illumination)                                       |                                                                                |
|                                                                                                           | Mirror can be replaced with different laser line mirror                                                                                 |                                                                                |
|                                                                                                           | Mechanical selection mechanism to switch between laser or LED illumination (only one illumination can be used (laser or LED) at a time) |                                                                                |
| <b>7 Camera &amp; software</b>                                                                            | Camera                                                                                                                                  | <b>1/2.5"</b> Color CMOS, <b>5MP</b> , USB2.0, C-mount, 2.2umx2.2um pixel size |
|                                                                                                           | Software                                                                                                                                | <b>Micro View_v01</b> (Live/Image capture, scale bar, measurement)             |
| <b>8 Optional Accessories</b>                                                                             | 1. Plan Achromatic 10X (NA = 0.35, WD = 2.37mm)                                                                                         |                                                                                |
|                                                                                                           | 2. Plan Achromatic 40X (NA = 0.85, WD = 0.42mm)                                                                                         |                                                                                |

## Applications

- Bright-field optical microscopy and digital documentation
- Laser-assisted imaging and visualization experiments
- Optical alignment and beam visualization studies
- Academic teaching and demonstration laboratories
- Research in optics, photonics, and materials science
- Industrial inspection and surface observation
- Experimental setups requiring combined microscope and laser integration



# Laser Microscope - 02

## Model : HO-LMS-02

The HO-LMS-02 Laser Microscope is a research-grade imaging platform that combines brightfield microscopy with laser-induced fluorescence imaging. Featuring a modular and ergonomic design, the system is well suited for advanced imaging, documentation, and single-channel fluorescence studies in research and academic laboratories.

The microscope is mounted on a height-adjustable dual-rod support system that is breadboard-mountable, allowing seamless integration into optical benches and experimental setups. It is equipped with a trinocular viewing head and plan achromatic objectives for high-quality imaging. A quadruple revolving nosepiece enables smooth and precise magnification changes. The system is complemented by a 5 MP color camera with image acquisition and analysis software, supporting live viewing, image capture, measurements, and documentation.

For sample illumination, two independent epi-illumination ports positioned 180° opposite to each other are provided. One port is coupled to a high-brightness white LED with adjustable intensity for brightfield observation, while the second port, fitted with a fiber connector (FC/SMA), is dedicated for external laser excitation for fluorescence observation (laser not included in the scope of supply). Both illumination paths operate in an epi-scopic configuration and cannot be used simultaneously.

For epi-fluorescence imaging, the system incorporates a dichroic mirror with an emission filter, which can be retracted from the optical path during LED brightfield operation. Custom dichroic mirror and emission filter combinations are available upon request to support different laser excitation wavelengths.



## Specifications



|                                             |                                                                       |                                                                                                     |
|---------------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| <b>1. Microscope system</b>                 | Optical system                                                        | Infinity corrected                                                                                  |
|                                             | Observation methods                                                   | Brightfield, laser fluorescence                                                                     |
|                                             | Illumination type                                                     | Epi-scopic                                                                                          |
|                                             | Illumination system                                                   | high bright LED, intensity adjustable                                                               |
|                                             | Additional port for laser excitation                                  | Yes                                                                                                 |
|                                             | Nosepiece                                                             | Nosepiece = Manual, revolving, Quadruple with positive precision click stops, RMS objective threads |
|                                             | Viewing head                                                          | Siedentop trinocular head, 30 degree inclination, 48-75mm IP adjustment                             |
|                                             | Eyepeice                                                              | 10X, FN20, dioptre adjustable                                                                       |
|                                             | Focusing                                                              | Manual Z stage                                                                                      |
|                                             | <b>Microscope objectives</b>                                          | 1. Plan Achromatic 10X (NA = 0.35, WD = 2.37mm)<br>2. Plan Achromatic 40X (NA = 0.85, WD = 0.42mm)  |
| <b>2. Height Adjustable dual rod system</b> | <b>Camera</b>                                                         | <b>1/2.5"</b> Color CMOS, <b>5MP</b> , USB2.0, C-mount, 2.2umx2.2um pixel size                      |
|                                             | <b>Software</b>                                                       | <b>Micro View_v01</b> (Live/Image capture, scale bar, measurement)                                  |
|                                             | The microscope will be mounted on a height adjustable dual rod system |                                                                                                     |
|                                             | Height adjustable range (Coarse)                                      | 12cm to 25cm                                                                                        |
|                                             | Fine adjustable range                                                 | +/- 25mm                                                                                            |
|                                             | Center distance from the dual rod system                              | 20cm                                                                                                |
| <b>3. Laser excitation Port</b>             | Breadboard mountable                                                  |                                                                                                     |
|                                             | XYZ sample stage is not included (Can be provided on special request) |                                                                                                     |
| <b>4. Dichroic Mirror</b>                   | Laser is not in the scope of supply                                   |                                                                                                     |
|                                             | Fiber connector                                                       | FC/SMA                                                                                              |
| <b>5. Emission long pass filter</b>         | Laser is not in the scope of supply                                   |                                                                                                     |
|                                             | Movable Dichroic mirror and emission filter                           |                                                                                                     |
|                                             | Reflectivity                                                          | >98%                                                                                                |
|                                             | Reflection wavelength                                                 | 460 – 570nm                                                                                         |
| <b>4. Dichroic Mirror</b>                   | Transmission                                                          | >90%                                                                                                |
|                                             | Transmission wavelength                                               | 607 – 900nm                                                                                         |
| <b>5. Emission long pass filter</b>         | Rejection wavelength                                                  | 200-588nm                                                                                           |
|                                             | Transmission wavelength                                               | 610 – 1650nm                                                                                        |

## Applications

- Bright-field optical microscopy for routing inspection and documentation of samples
- Single channel fluorescence imaging using external laser excitation
- Research in optics, photonics, and materials science
- Quality control and failure analysis
- Experimental setups requiring combined microscope and laser integration

# Trinocular Inspection Microscope with Boom Stand

## Model No: HOCM-MV202

Holmarc's model HOCM-MV202 inspection microscope is equipped with a Zoom microscope mounted on a single arm boom stand. It comes with a Trinocular head with wide field 10X eyepieces and a variable zoom system of 1X-5X. The total magnification will be 10X – 50X with a working distance of 160mm – 70mm. A 5MP CMOS camera with software is also provided the system for digital inspection and measurement. A high bright ring LED is provided as the light source. The 30-degree inclined eyepiece with dioptre adjustable option ensure the comfort observation for all the users including eyeglass wearers. The single-arm boom stand allows to turn the microscope head around two different axes, allowing the user to point the microscope head in various directions. This microscope offers high resolution, wide field of view, large magnifying zoom range and long working distance. It is an ideal inspection instrument for researchers in various industries.

### Software

Microview Pro

### Magnification

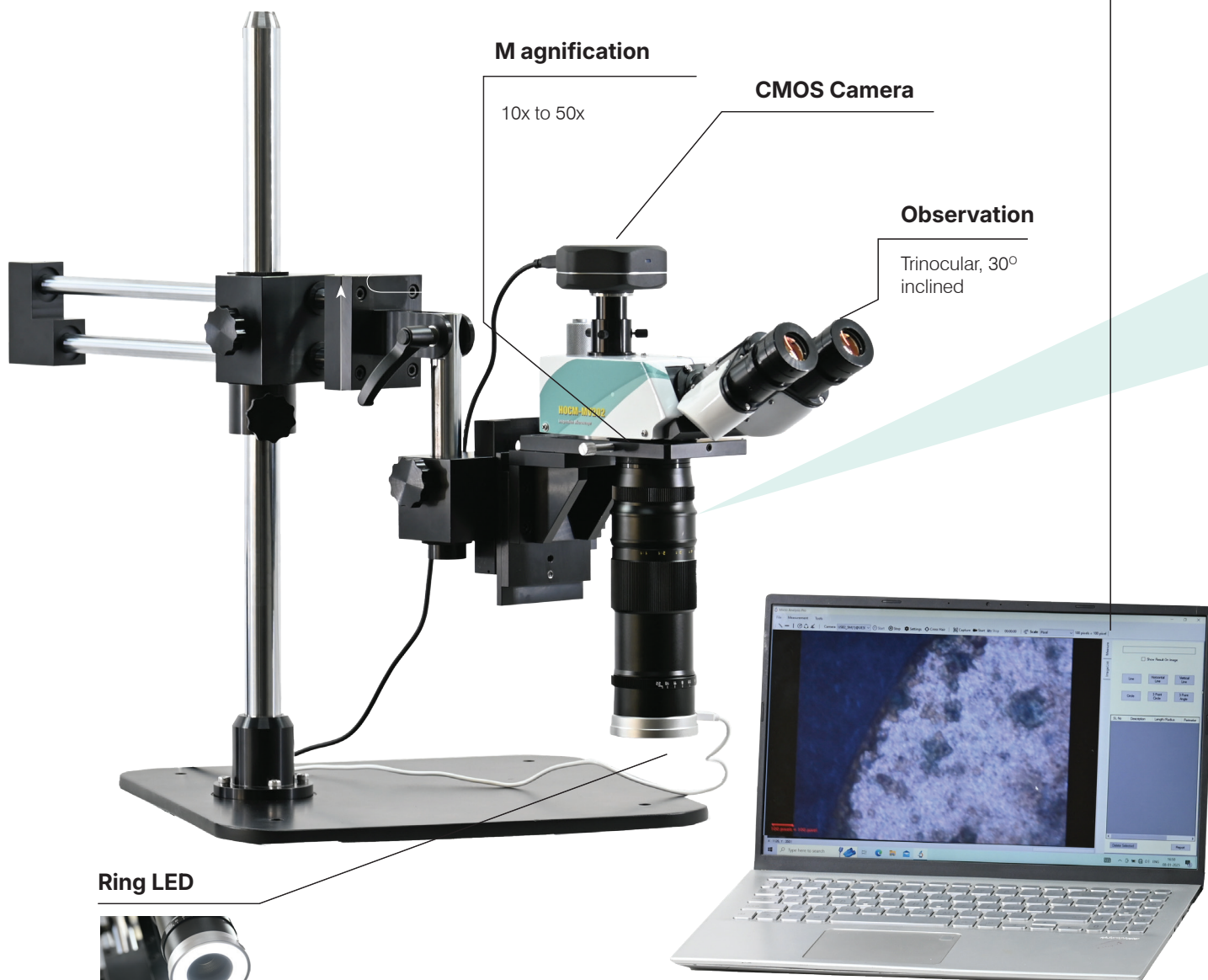
10x to 50x

### CMOS Camera

### Observation

Trinocular, 30° inclined

### Ring LED





## Specifications



|                     |                                                                                |
|---------------------|--------------------------------------------------------------------------------|
| Observation tube    | Trinocular, 30° inclined                                                       |
| Observation         | Brightfield                                                                    |
| Zoom ratio          | 1X – 5X                                                                        |
| Total Magnification | 10X – 50X                                                                      |
| Working distance    | 160mm – 70mm                                                                   |
| Eyepiece            | 10X, FN20, dioptré adjustable                                                  |
| Illumination        | Ring LED                                                                       |
| Camera              | <b>1/2.5"</b> Color CMOS, <b>5MP</b> , USB2.0, C-mount, 2.2umx2.2um pixel size |
| Software features   | <b>Micro View_v01</b> (Live/ Image capture, scale bar, measurement)            |



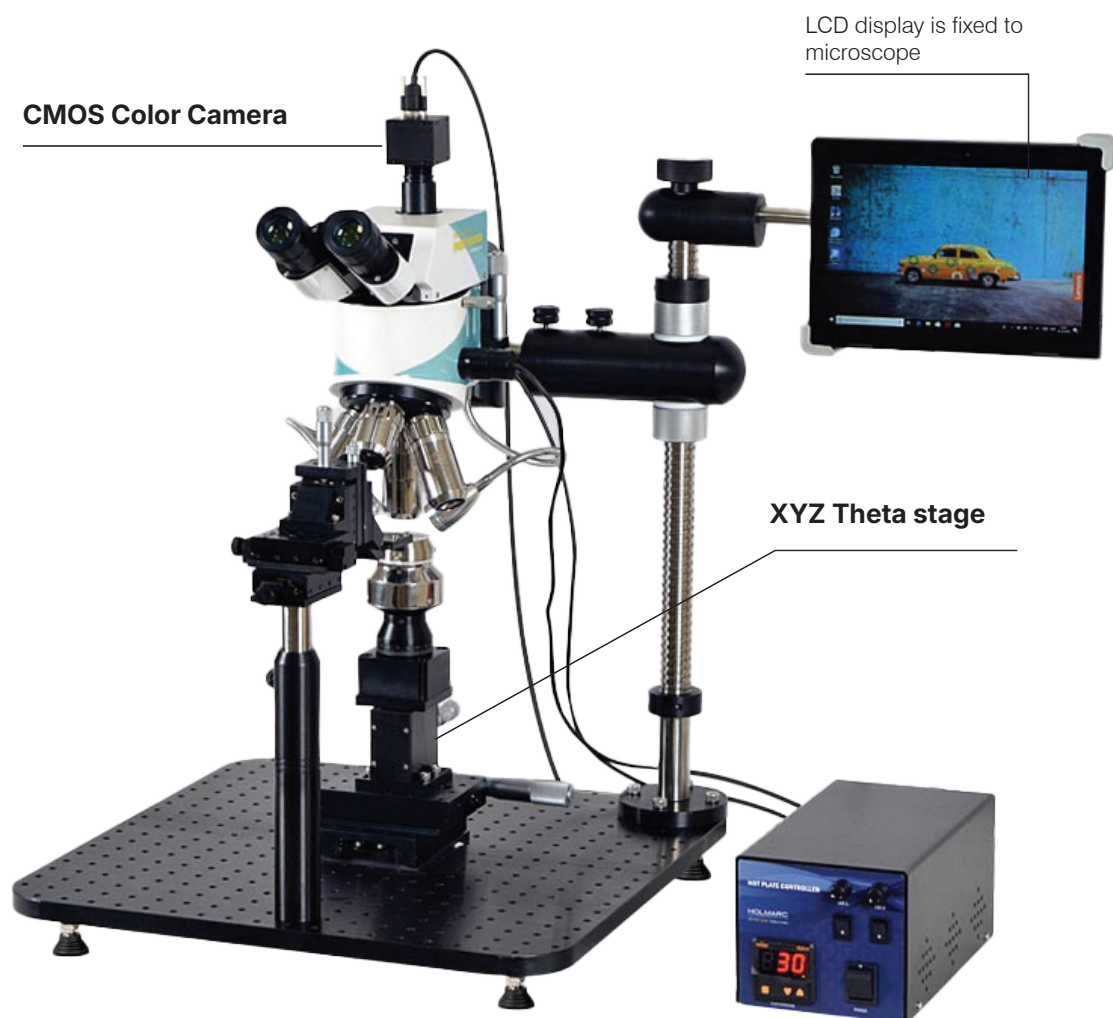


## Work Station with Inspection Microscope & LCD display

**Model : HO-WSPSM-T01CL**

The Work Station with Inspection Microscope is a precision inspection and micro-manipulation system engineered for high-accuracy observation, measurement, and controlled sample processing. It integrates an infinity-corrected trinocular inspection microscope with a precision XYZ-theta positioning stage featuring a vacuum-thermal chuck and an independent four-axis micromanipulator, enabling stable sample fixation, fine positional control, probing, and thermally controlled experimentation with high optical and mechanical stability.

The trinocular microscope is configured with long working distance plan apochromatic objectives, a four-position revolving nosepiece, and co-axial and angled reflected illumination for enhanced surface contrast. Imaging and documentation are supported by a 5 MP digital color camera with software for live viewing and measurements. The XYZ-theta vacuum-thermal chuck provides accurate positioning and temperature control from room temperature up to 200 °C, while the four-axis micromanipulator enables precise probing and micro-transfer applications.



|                                                             |                                                                                                                     |                                                                              |
|-------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 1. <b>Inspection microscope with camera and LCD (1 No.)</b> | Optical system                                                                                                      | Infinity corrected                                                           |
|                                                             | Observation methods                                                                                                 | Brightfield                                                                  |
|                                                             | Illumination type                                                                                                   | Reflected (Co-axial and angled)                                              |
|                                                             | Illumination system                                                                                                 | high bright LED, intensity adjustable                                        |
|                                                             | Nosepiece                                                                                                           | Manual, revolving, Quadruple with positive precision click stops             |
|                                                             | Viewing head                                                                                                        | Siedentop trinocular head, 30° inclination, 48-75mm IP adjustment            |
|                                                             | Eyepeice                                                                                                            | 10X, FN20, dioptrre adjustable                                               |
| 2. <b>Microscope objectives</b>                             | Focusing                                                                                                            | Manual                                                                       |
|                                                             | 1. Plan Apo 5X, NA = 0.15, WD = 44mm, FOV <sub>eyepiece</sub> = 4mm, FOV <sub>camera</sub> = 1.31mm x 0.984mm)      |                                                                              |
|                                                             | 2. Plan Apo 10X, NA = 0.30, WD = 34mm, FOV <sub>eyepiece</sub> = 2mm, FOV <sub>camera</sub> = 0.655mm x 0.492mm     |                                                                              |
|                                                             | 3. Plan Apo 20X, NA = 0.35, WD = 29mm, FOV <sub>eyepiece</sub> = 1mm, FOV <sub>camera</sub> = 0.327mm x 0.246mm)    |                                                                              |
| 3. <b>LCD display</b>                                       | 4. Plan Apo 50X, NA = 0.45, WD = 17mm, FOV <sub>eyepiece</sub> = 0.4mm, FOV <sub>camera</sub> = 0.131mm x 0.0984mm) |                                                                              |
|                                                             | Display                                                                                                             | 10.1" touch screen                                                           |
|                                                             | Display type                                                                                                        | Windows tablet                                                               |
|                                                             | LCD is fixed directly to the system                                                                                 |                                                                              |
| 4. <b>Camera &amp; software</b>                             | Camera                                                                                                              | <b>1/2"</b> Color CMOS, <b>3MP</b> , USB2.0, C-mount, 3.2umx3.2um pixel size |
|                                                             | Software                                                                                                            | <b>Micro View_v01</b> (Live/Image capture, scale bar, measurement)           |
| 5. <b>XYZ Theta stage with Vacuum-thermal chuck (1 set)</b> | Top plate                                                                                                           | <b>40mm</b>                                                                  |
|                                                             | XYZ travel                                                                                                          | 25mm                                                                         |
|                                                             | XYZ resolution                                                                                                      | 10um                                                                         |
|                                                             | Rotation range                                                                                                      | 360 degree                                                                   |
|                                                             | Rotational positioning accuracy                                                                                     | 0.1 degree                                                                   |
|                                                             | Temperature range                                                                                                   | RT – 200°C                                                                   |
|                                                             | PID controller                                                                                                      |                                                                              |
| 6. <b>Sample holder with micromanipulator (1 set)</b>       | Vacuum pump                                                                                                         |                                                                              |
|                                                             | Axes                                                                                                                | 4(XYZ and tilt)                                                              |
|                                                             | XYZ travel                                                                                                          | 25mm each                                                                    |
| 7. <b>Base plate</b>                                        | Sample holding mechanism                                                                                            |                                                                              |
|                                                             | Cast aluminium                                                                                                      |                                                                              |

# Laser Ablation Inspection Microscope

## Model : HO-LAIM-01

Holmarc's Laser Ablation Inspection Microscope (Model HO-LAIM-01) is a specialized optical inspection workstation engineered for detailed visualization and measurement of surfaces modified by laser ablation processes. It is ideal for research laboratories, industrial quality control, and materials science applications where precise assessment of ablation features—such as craters, grooves, and heat-affected zones—is critical.

The system is equipped with an optical microscope with long working distance plan apochromatic 5X objective. This configuration provides excellent flatness across the imaging field and allowing clear observation of micro-features without compromising access or sample clearance. A 5MP CMOS camera with dedicated software offers high resolution digital imaging, on screen measurements and documentation. An LED based co-axial and angled flexible arm illumination provides uniform illumination and optimal image contrast.

The microscope is mounted on a precision digital micrometer-driven XYZ translation stage that serves as the sample platform. The stage enables smooth, accurate positioning, systematic scanning of the sample surface, and reliable revisit capability, making the system well suited for repeatable inspection and process validation tasks.



### Specifications

|                                         |                                         |                                                                       |
|-----------------------------------------|-----------------------------------------|-----------------------------------------------------------------------|
| 1. <b>Microscope unit</b>               | Optical system                          | Infinity corrected                                                    |
|                                         | Observation methods                     | Brightfield                                                           |
|                                         | Illumination type                       | Reflected (Co-axial and angled)                                       |
|                                         | Illumination system                     | high bright LED, intensity adjustable                                 |
|                                         | Objective                               | Plan Apo LWD 5X                                                       |
|                                         | Working distance                        | 44mm                                                                  |
|                                         | Focusing                                | Manual                                                                |
| 2. <b>Microscope positioning stages</b> | Axes                                    | XYZ                                                                   |
|                                         | Travel                                  | 25mm each                                                             |
|                                         | Drive                                   | Digital micrometer                                                    |
|                                         | Rotatable and lockable microscope head. |                                                                       |
| 3. <b>Camera and software</b>           | Camera                                  | 1/2" Color CMOS, <b>3MP</b> , USB2.0, C-mount, 3.2umx3.2um pixel size |
|                                         | Software                                | <b>Micro View_v01</b> (Live/Image capture, scale bar, measurement)    |



# Microscope setup for Nikon Camera

## Model : HO-MS-NIKON

The Holmarc Microscope Setup for Nikon Camera, Model HO-MS-NIKON, is a precision optical imaging solution that enables direct coupling of a Nikon DSLR camera to a research-grade microscope optical train. Designed for high-quality optical documentation and imaging, the system employs long working distance plan apochromatic objectives along with a dedicated Nikon F-mount extension tube, allowing the DSLR to capture true infinity-corrected microscope images without vignetting or distortion.

The setup is based on a Plan Apo WLD infinity-corrected objective offering 10 $\times$  magnification with high numerical aperture and extended working distance, delivering excellent resolution, contrast, and image uniformity. A built-in 200 mm focal-length tube lens relays the corrected microscope image onto the DSLR sensor with unity magnification, ensuring optimal optical performance. The precision Nikon F-mount extension tube provides secure and accurate mechanical coupling between the microscope optics and the camera body.

The camera mount is machined from black anodized aluminium and incorporates M6 tapped support holes, ensuring high mechanical stability during extended imaging sessions and compatibility with additional accessories. Custom magnification objectives can be provided on request.

## Applications

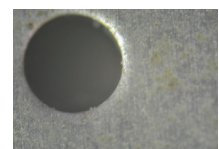
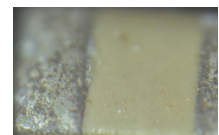
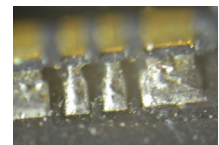
- High-resolution optical documentation using Nikon DSLR cameras
- Research microscopy imaging in materials science and life sciences
- Industrial inspection and quality control imaging
- Educational and training demonstrations
- Imaging of samples requiring long working distance objectives
- Photomicrography for publications, reports, and presentations
- Custom microscopy imaging applications with interchangeable objectives

## Specifications

|                          |                                                         |
|--------------------------|---------------------------------------------------------|
| Microscope configuration | Infinity corrected                                      |
| Microscope objective     | Plan Apo LWD 10X (custom magnification can be provided) |
| Numerical aperture       | 0.30                                                    |
| Working distance         | 34mm                                                    |
| Tube lens                | 200mm                                                   |
| Extension tube           | Nikon F-mount                                           |
| Construction             | Black anodized aluminium                                |

|                      |                                                                      |
|----------------------|----------------------------------------------------------------------|
| Optional Accessories | — 1. Plan Apo LWD 2X objective (NA = 0.06, Working distance = 34mm)  |
|                      | — 2. Plan Apo LWD 5X objective (NA = 0.14, Working distance = 44mm)  |
|                      | — 3. Plan Apo LWD 20X objective (NA = 0.35, Working distance = 29mm) |
|                      | — 4. Plan Apo LWD 50X objective (NA = 0.45, Working distance = 17mm) |

NOTE = include the sample images





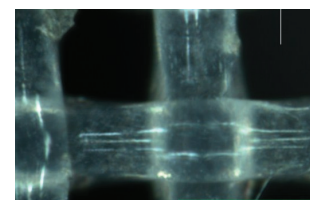
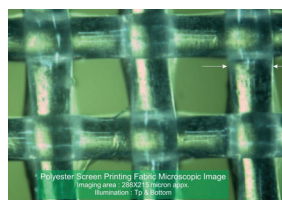
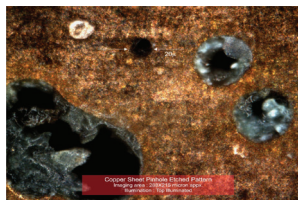
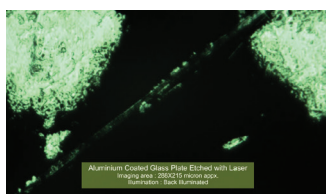
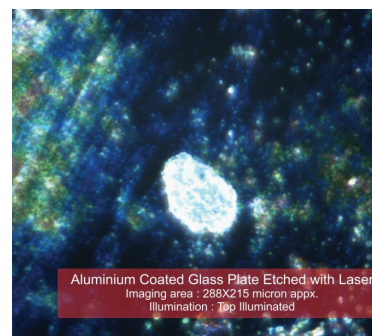
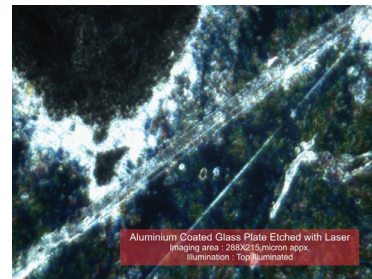
# Digital Inspection Microscope

## Model : DIM213D Series

Holmarc introduces a new and innovative product for digital inspection that offers automated optical inspection, imaging and documentation. Digital inspection microscope HO-DIM213D provide you with a broader range of functionality, flexibility and portability, expanding your capabilities beyond the traditional optical microscope. Our digital inspection product line features high quality digital imaging & video inspection stations and microscopy illumination products. UV to IR, we cover the entire spectrum.

Holmarc Digital Inspection System utilize the finest quality optical components for crisp, accurate and colour correct specimen viewing. Combine these with one of our fine quality CCD or CMOS cameras to build a product documentation station. It is ideal for inspection of a wide range of objects such as synthetic and natural fiber, semiconductor, integrated circuits, solder joints and facilitates various processes such as surface analysis, quality control, defect analysis, metrology, biomedical imaging etc.

A wide range of adapters & auxiliary lenses, cameras, lighting options, video capture cards and stands are available to provide a custom solution.



## SPECIFICATIONS



### Objective

|                          |                            |
|--------------------------|----------------------------|
| Type                     | Infinity Corrected Long WD |
| Magnification            | 20X                        |
| Numerical Aperture NA    | 0.42                       |
| Working Distance         | 20 mm                      |
| Focal Length FL          | 10 mm                      |
| Resolving Power          | 0.7 $\mu$ m                |
| Depth of Focus           | 1.6 $\mu$ m                |
| Angled Illumination Unit |                            |
| Illumination             | LED based                  |
| Type                     | Array                      |
| Colour                   | Pure White                 |
| Luminosity Control       | Continuously variable      |
| Housing Material         | Aluminium                  |

### Back Illumination Unit

|                     |                                                                          |
|---------------------|--------------------------------------------------------------------------|
| Condenser Lens Type | Achromatic Corrected                                                     |
| Numerical Aperture  | 0.55 max. (variable)                                                     |
| Working Distance    | 15 mm                                                                    |
| Illumination        | LED Based                                                                |
| Power               | 3 W                                                                      |
| Colour              | Pure White                                                               |
| Luminosity Control  | Continuously variable                                                    |
| Polarizer           | Linear polarizing film                                                   |
| Housing Material    | Aluminium black anodized                                                 |
| Tube Lenses         |                                                                          |
| Lens Type           | Achromatic Corrected                                                     |
| Focal Lengths       | 200 mm                                                                   |
| Imaging Area        | 288 X 215 micron with 1/ 2.5" sensor, 320 x 240 micron with 1/ 2" sensor |

### Optional

|                      |                                                                          |
|----------------------|--------------------------------------------------------------------------|
| 150 mm FL Tube lense |                                                                          |
| Imaging Area         | 384 X 286 micron with 1/ 2.5" sensor, 426 x 320 micron with 1/ 2" sensor |
| 250 mm FL Tube lense |                                                                          |
| Imaging Area         | 230 X 171 micron with 1/ 2.5" sensor, 256 x 192 micron with 1/ 2" sensor |
| 300 mm FL Tube lense |                                                                          |
| Imaging Area         | 192 X 143 micron with 1/ 2.5" sensor, 213 x 160 micron with 1/ 2" sensor |

### CAMERA SPECIFICATIONS

|                          |                                                                                                             |
|--------------------------|-------------------------------------------------------------------------------------------------------------|
| Sensor                   | CMOS                                                                                                        |
| Sensor Size              | 1 / 2.5"                                                                                                    |
| Interface                | USB 2.0                                                                                                     |
| Pixel Size               | 2.2 x 2.2 micron                                                                                            |
| Maximum resolution       | 2592 x 1944, full resolution mode                                                                           |
| Frame rate at resolution | Frame Rate at Resolution : 7 fps at 2592 x 1944, full resolution 37 fps at 1024 x 768 & 78 fps at 640 x 480 |
| Output bits per pixel    | Selectable, 8 bit, 10 bit or 12 bit                                                                         |
| Dynamic Range            | 70.1 dB                                                                                                     |

# Horizontal Microscope

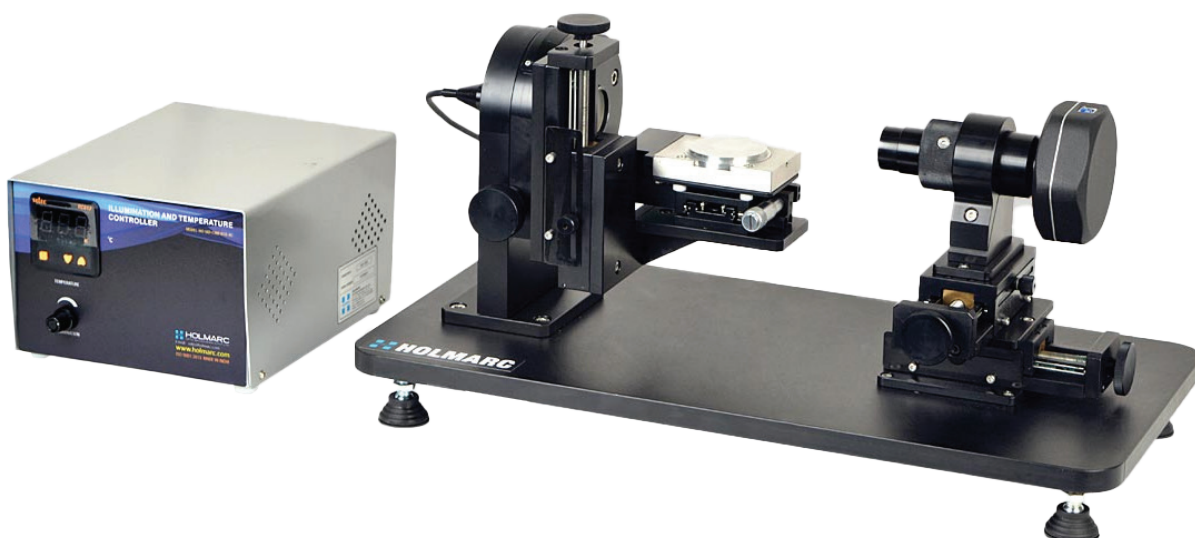
- **Side-view and horizontal inspection of samples in research and industrial laboratories**
- **Viewing and monitoring samples inside vacuum chambers, environmental chambers, or custom enclosures**



## Horizontal Microscope -1

### Model : HO-HM-CB

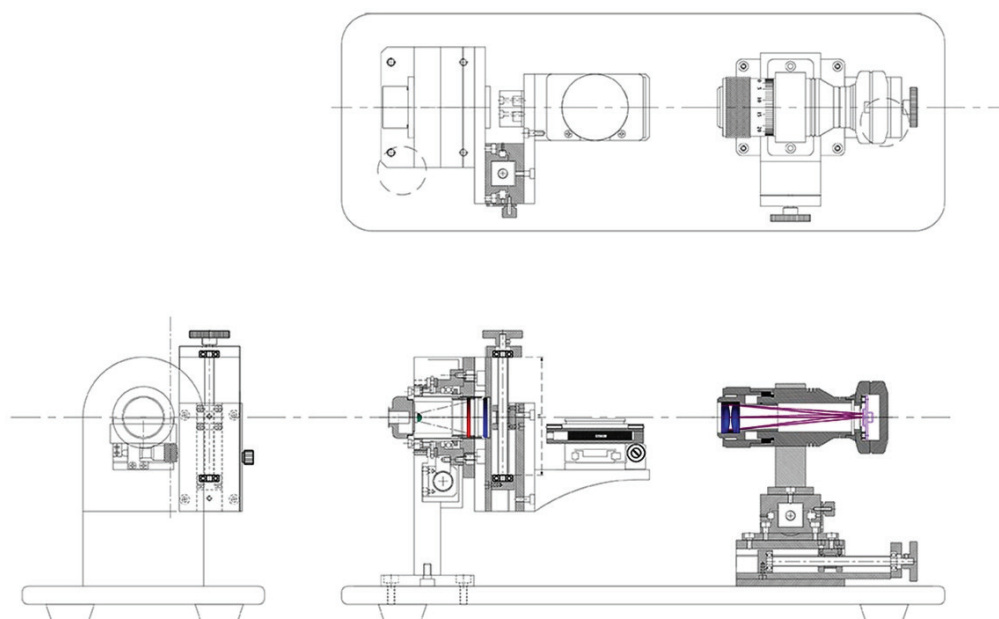
Holmarc's horizontal microscope model HO-HM-CB is a precision optical imaging instrument engineered for advanced horizontal observation and analysis. Designed in a robust horizontal configuration, the system delivers clear and detailed imaging using a 1X imaging lens integrated with a 5 MP camera, providing a generous working distance of approximately 80 mm and a field of view of 5.7 mm × 4.28 mm at 1X magnification. Illumination is achieved through a high-brightness white LED with a diffuser and adjustable intensity, ensuring uniform transmitted-light illumination with excellent contrast and clarity for a wide range of specimens and materials. Smooth focusing is enabled by a translating stage with 50 mm travel, while the telescope tube offers full 360-degree rotation with a secure locking mechanism for flexible sample positioning. The system is equipped with a dedicated sample heating stage featuring a 40 mm diameter plate, capable of precise temperature control from room temperature up to 250 °C with 1 °C resolution, making it suitable for experiments requiring controlled thermal conditions. Dedicated imaging software is included for live viewing, image capture, measurement, and report generation, completing a versatile horizontal microscopy solution.



|                                                                                                                |                                |                                                                                |
|----------------------------------------------------------------------------------------------------------------|--------------------------------|--------------------------------------------------------------------------------|
| <b>Specifications</b><br><br> | Microscope type                | Horizontal configuration                                                       |
|                                                                                                                | Imaging Instruments            | <b>1X</b> - adjustable with in small range                                     |
|                                                                                                                | Working distance               | ~80mm                                                                          |
|                                                                                                                | Field of view                  | 5.7mm x 4.48mm                                                                 |
|                                                                                                                | Illumination                   | Backlight (transmitted)                                                        |
|                                                                                                                | Illumination source            | High bright white LED with diffuser, Intensity adjustable                      |
|                                                                                                                | Trasnaltion stage for focusing | 50mm travel                                                                    |
|                                                                                                                | Center height from base        | 170mm                                                                          |
|                                                                                                                | Base plate                     | Black anodized aluminium                                                       |
|                                                                                                                | Camera                         | <b>1/2.5"</b> Color CMOS, <b>5MP</b> , USB2.0, C-mount, 2.2umx2.2um pixel size |
| <b>Sample heating stage</b>                                                                                    | Software                       | <b>Micro View_v01</b> (Live/Image capture, scale bar, measurement)             |
|                                                                                                                | Plate diameter                 | 40mm                                                                           |
|                                                                                                                | Temperature range              | RT – 250°C                                                                     |
|                                                                                                                | Temperature incremental step   | 1°C                                                                            |
|                                                                                                                | PID controller                 |                                                                                |

## Applications

- Plant biology and botany studies, including root growth, seed germination, and gravity-sensing experiments under natural orientation.
- Imaging of liquid samples, droplets, and interfaces for surface tension and fluid behavior studies
- Temperature-dependent experiments such as phase transitions, polymer softening, and material deformation using the heating stage
- Observation of biological and chemical processes requiring controlled thermal conditions
- Educational demonstrations and laboratory teaching where horizontal sample orientation is essential
- Specialized research setups where vertical microscopes are impractical
- Industrial inspection and analysis of samples requiring long working distance and side-view imaging





## Horizontal Microscope -2

### Model : HO-HM1X-5X

Holmarc's horizontal microscope model HO-HM1X-5X is a high-performance optical imaging system designed for precise horizontal observation across research, industrial, and educational applications. Engineered with an advanced apochromatic optical design, the microscope offers continuously variable magnification from 1X to 5X, delivering excellent image resolution, colour accuracy, and contrast over a wide range of working distances. The long working distances provides ample clearance for large or complex samples while maintaining stable, high-quality imaging.

The system incorporates flexible illumination options, including adjustable LED ring illumination and coaxial illumination, ensuring uniform and application-specific lighting for brightfield observation. Smooth and precise focusing is achieved through a manual rack-and-pinion mechanism, while the integrated XYZ positioning stage enables accurate microscope translation with fine resolution. Dual rotation stages allow full 360-degree yaw and  $\pm 45$ -degree roll, facilitating comprehensive microscope orientation and multi-angle inspection. The adjustable optical axis height further enhances flexibility for custom experimental configurations and seamless integration with breadboard-mounted systems.

A 5 MP CMOS camera with dedicated imaging software is included for live viewing, image capture, measurement, and documentation. The imaging lens features a Nikon F mount, allowing compatibility with a wide range of third-party cameras such as DSLR cameras and high-speed cameras including the Photron Mini UX100, extending the system's versatility for advanced imaging applications.



**Specifications**

|                                |                                                                                                                                                                                                                      |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Magnification                  | <b>1X – 5X</b>                                                                                                                                                                                                       |
| Minimum working distance @5X   | <b>100mm</b>                                                                                                                                                                                                         |
| Minimum working distance @1X   | <b>272mm</b>                                                                                                                                                                                                         |
| Optical design                 | Apochromatic 12 elements with 8 groups                                                                                                                                                                               |
| Camera mount type              | <b>Nikon F</b>                                                                                                                                                                                                       |
| Iris                           | Manual type                                                                                                                                                                                                          |
| Aperture                       | Maximum – f/2,8, Minimum – f/32                                                                                                                                                                                      |
| Illumination systems           | 1. Ring LED illumination, adjustable intensity<br>2. Co-axial illumination, adjustable intensity                                                                                                                     |
| Focusing                       | Manual, rack and pinion                                                                                                                                                                                              |
| Positing system                | Manual XYZ with two rotation stages                                                                                                                                                                                  |
| XYZ travel                     | 25mm each                                                                                                                                                                                                            |
| Rotation stage 1 (Yaw)         | 360 degree, Manual                                                                                                                                                                                                   |
| Rotation stage 2 (Roll)        | 45 degree, Manual                                                                                                                                                                                                    |
| Optical axis height adjustment | 150mm – 300mm                                                                                                                                                                                                        |
| Mounting provision             | Breadboard mountable                                                                                                                                                                                                 |
| Camera                         | <b>1/2.5"</b> Color CMOS, <b>5MP</b> , USB2.0, C-mount, 2.2umx2.2um pixel size<br>(* without camera is also available, Any camera with Nikon F mount can be mounted,<br>Examples :- DSLR cameras, Photron MiniUX100) |
| Software                       | <b>Micro View_v01</b> (Live/Image capture, scale bar, measurement)                                                                                                                                                   |

**Field of view with Holmarc 5MP camera**

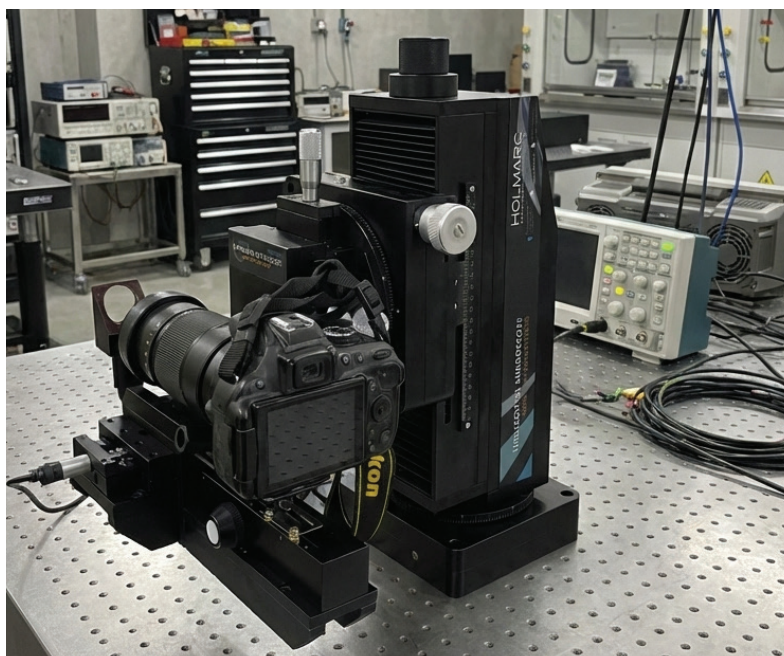
|     |                     |
|-----|---------------------|
| @1X | = 5.7 mm x 4.27 mm  |
| @2X | = 2.85 mm x 2.14 mm |
| @3X | = 1.9 mm x 1.43 mm  |
| @4X | = 1.42 mm x 1.07 mm |
| @5X | = 1.14 mm x 0.86 mm |

**Field of view with Photron MiniUX100 (not in the scope of supply)**

|     |                      |
|-----|----------------------|
| @1X | = 12.8 mm x 10.24 mm |
| @2X | = 6.4 mm x 5.12 mm   |
| @3X | = 4.27 mm x 3.41 mm  |
| @4X | = 3.2 mm x 2.56 mm   |
| @5X | = 2.56 mm x 2.05 mm  |

**Applications**

- Side-view and horizontal inspection of samples in research and industrial laboratories
- Viewing and monitoring samples inside vacuum chambers, environmental chambers, or custom enclosures
- Material science studies including deformation, fracture, and surface interaction analysis
- Observation of large, bulky, or irregularly shaped samples requiring long working distance
- Educational demonstrations and laboratory training in advanced microscopy concepts
- High-speed and time-resolved imaging applications when used with compatible external cameras
- Custom experimental setups on optical breadboards for multidisciplinary research.



# Telemicroscope

- Long working distance
- Variable Magnification
- Superior image quality
- Co-axial Illumination for In depth viewing



## Telemicroscope -TM202

**Model : HOCM-TM202**

The HOCM-TM202 Telemicroscope from Holmarc Opto-Mechatronics is a long working distance imaging system designed for microscopic observation of small areas located far from the optical head. It enables non-contact, high-resolution imaging of objects positioned inside furnaces, ovens, cylinders, or other inaccessible environments where conventional microscopes cannot be used.

The system offers simplified slide-based focusing for easy and precise adjustment over large distances. Magnification and field of view depend on the working distance, allowing flexible inspection by repositioning the instrument. Coaxial illumination provides uniform lighting along the optical axis, making it especially effective for imaging deep cavities and reflective surfaces.

The TM202 is ideally suited for sessile drop observation, high-temperature deformation studies, and inspection of small features in confined or harsh environments. A 5 MP CMOS camera with integrated software enables live image viewing, on-screen measurements, and image

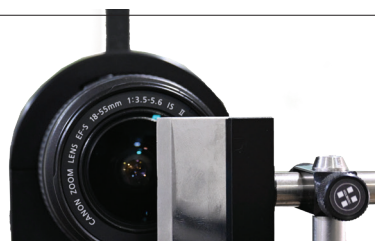


## Specifications



|                                   |                                                                                    |
|-----------------------------------|------------------------------------------------------------------------------------|
| Type                              | Super long working distance                                                        |
| Magnification                     | 1X - 5X                                                                            |
| Minimum Working Distance          | 272mm (1X) - 100mm (5X)                                                            |
| 2X magnification working distance | 200 mm                                                                             |
| Optical Design                    | Achromatic 12 Elements in 8 Groups design                                          |
| Focusing Type                     | Two cam movement with fine focusing                                                |
| Illumination Options              | Co-axial & angled                                                                  |
| Illumination                      | High bright warm white 3W LED                                                      |
| Travel                            |                                                                                    |
| Vertical                          | Max 1100 mm (Tripod based) 500 mm using rack and pinion and 600 mm slide movement. |
| X - Y                             | 25 mm (10 micron resolution)                                                       |
| Rotation                          |                                                                                    |
| Roll                              | 45°                                                                                |
| Yaw                               | 360°                                                                               |

## CAMERA SPECIFICATIONS



|                                  |                                                                             |
|----------------------------------|-----------------------------------------------------------------------------|
| Optical format                   | 1/2.5" CMOS                                                                 |
| Active imager size               | 5.70 mm x 4.28 mm, 7.13 mm diagonal                                         |
| Active pixels                    | 2592 x 1944 (5Mp)                                                           |
| Pixel size                       | 2.2 x 2.2 um                                                                |
| Color filter array               | RGB Bayer pattern                                                           |
| Shutter type                     | Global reset release (GRR), Snapshot only, Electronic rolling shutter (ERS) |
| Maximum data rate / master clock | 96 Mp/s at 96 MHz (2.8 V I/O)                                               |
| Frame rate                       |                                                                             |
| Full resolution                  | Programmable upto 15 fps                                                    |
| VGA (640 x 480 with binning)     | Programmable upto 70 fps                                                    |
| ADC resolution                   | 12- bit, on-chip                                                            |
| Pixel dynamic range              | 70.1 dB                                                                     |
| Operating temperature            | -30°C to +70°C                                                              |
| Power consumption                | 381mW at 15 fps full resolution                                             |
| FOV with the above camera        |                                                                             |
| 1X imaging area                  | 5.7 x 4.27 mm                                                               |
| 2X imaging area                  | 2.85 x 2.138 mm                                                             |
| 3X imaging area                  | 1.9 x 1.425 mm                                                              |
| 4X imaging area                  | 1.42 x 1.069 mm                                                             |
| 5X imaging area                  | 1.14 x 0.855 mm                                                             |



# Telemicroscope

## Model : HO-TLM-01C

HOLMARC Telemicroscope TM 208 Series is designed for imaging very small area from a distance of 200-2000 mm. It allows microscopic imaging at a considerable distance from the object.

It can image a small area of unreachable places which cannot be measured with ordinary instruments. The main application of the instrument is observing the sessile drops in furnaces. It can also be used for temperature deformation study of hot object in the oven. The coaxial illumination in this unit helps for imaging the small parts of inside the cylinder. Ordinary illumination may not work for such application.

Telemicroscope has a built-in slide focusing adjustment. This eliminates the complex focusing jobs. The magnification and field of view depend on the distance from the lens to object. Bringing the Telemicroscope as close as possible to the object will maximize magnification and give you the smallest field of view.

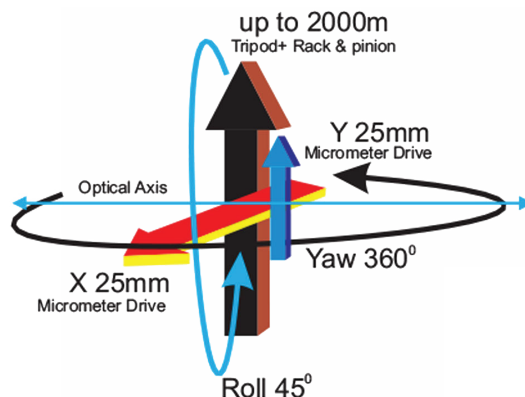
### Features

- Long working distance
- Variable Magnification
- Superior image quality
- Easy to set
- Co-axial Illumination for
- In depth viewing
- Roll, Yaw rotation stages
- XY Micrometer Drive

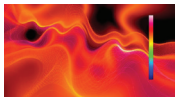
### Specifications

|                        |                                                                                    |
|------------------------|------------------------------------------------------------------------------------|
| Working distance range | 200 - 2000 mm                                                                      |
| Field of view          | Detector size and W.D dependable min. 1000micron for 1/4" CCD @ 200 mm W.D         |
| Magnification          | 5X variable within the limit                                                       |
| Focusing Type          | Two cam movement with fine focusing                                                |
| Illumination           | Co-axial & angled                                                                  |
| Options                |                                                                                    |
| Illumination           | High bright warm white 3W LED                                                      |
| Travel                 |                                                                                    |
| Vertical               | Max 1100 mm (Tripod based) 500 mm using rack and pinion And 600 mm slide movement. |
| X - Y                  | 25 mm (10 micron resolution)                                                       |
| Rotation               |                                                                                    |
| Roll                   | 45°                                                                                |
| Yaw                    | 360°                                                                               |

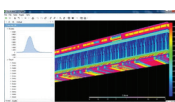
### Telemicroscope Movements



Thermal Analysis



Stress Analysis



Micro level positioning of  
long distant objects



Crack Monitoring etc



## Boom Arc Stand for Cameras



### Model HO-BAS-01

|                                 |                                   |
|---------------------------------|-----------------------------------|
| Load carrying capacity          | 4.5 Kg                            |
| XY fine travel using micrometer | 25 mm (For fine adjusting camera) |
| Horizontal coarse travel        | 600 x 600 mm (XY)                 |
| Vertical coarse travel          | 750 mm                            |



### Telemicroscope with Boom Stand MODEL HO-TLM-OIB

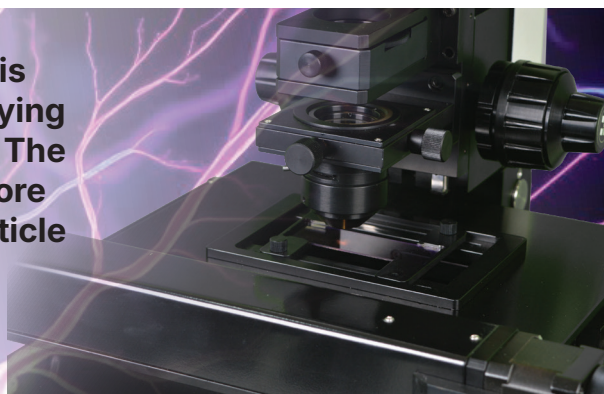


### Telemicroscope with Co-axial Illumination Unit MODEL HO-TLM-OIC



# Confocal Fluorescence Correlation Spectrometer

**Fluorescence correlation spectroscopy is nowadays a widely applied tool for studying intracellular dynamics and interactions. The cross correlation technology is much more advanced version to study the nano particle molecules.**



## Confocal Fluorescence Correlation Spectrometer

**Model : HO-SP-MFCS2C**

Holmarc Confocal Fluorescence Correlation Spectrometer is a microscope with fluorescence correlation spectroscopy (FCS) attachment for capturing molecular dynamics processes in cells, solutions and nano structures. This innovative product is developed with technology from Tata Institute of Fundamental Research (TIFR), Mumbai, a laboratory world-renowned for innovation in the area of FCS. The instrument is also available without the imaging microscope option for solutions study. The instrument is designed for maximum sensitivity through a careful design of the optical path and attentive selection of the optical components and light detectors. We have used two DPSS lasers in the instrument which are 532nm & 405nm with variable power output. Single laser configuration is also available.

The laser line clean up filters used in the instrument assures noise level in the laser output to bare minimum. The Optical paths are carefully designed so that the lasers can be used independently without changing any Opto-mechanical or Optics component in the path. Lenses, Mirrors etc are carefully chosen to minimize any aberration or any losses. Dichroic filters, band pass filters, emission filters etc are sourced from best suppliers in the world for matching the laser output and sample data acquisition requirements. High NA (1.20), water immersion Microscope Objective is used for microscopy. These super apochromat objectives, fully compensate for both spherical and chromatic aberrations from the UV to the near infrared region. Their sensitivity to fluorescence emission ensures the acquisition of sharp, clear images, without color shift, even in bright field and Nomarski DIC observations. We have used the Single Photon Counting APD for detection of fluorescence. It detects single photons of light over 400 nm to 1060 nm wavelength range - a range and sensitivity that far outperforms a photomultiplier tube. The fiber-coupled Single Photon Counting APD used has a peak photon detection efficiency of more than 65% at 650 nm over 180  $\mu\text{m}$  diameter. The photodiode is both thermoelectrically cooled and temperature controlled, ensuring stabilized performance despite ambient temperature changes..

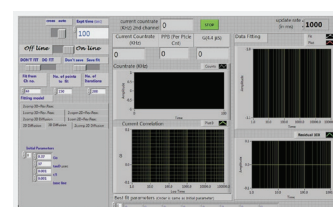
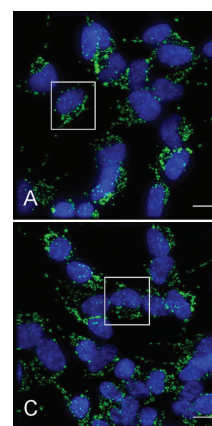
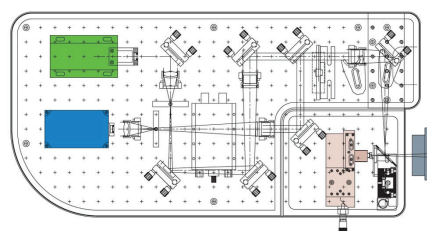
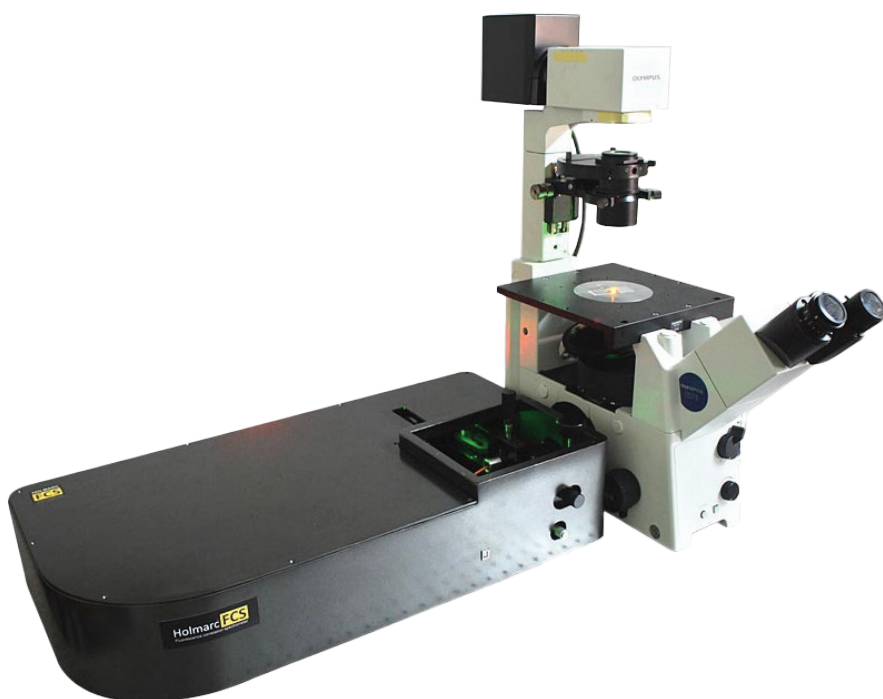


Fig. Optical Layout of two photon excitation confocal fluorescence correlation spectrometer

## Digital Correlator card

The digital Correlator card used in the instrument requires no external power supply and can be used for both auto and cross correlation. The instrument is placed in a light proof box which ensures minimum light leakage during operation. The signal output is coupled to 25 microns Optical fiber which is fixed on a XYZ Fiber positioner. The fiber position can be finely adjusted without opening the cover. The fine tuning of the output signal can be done by observing the detector output. The instrument has two options. The system can be integrated with a commercial fluorescence microscope for microscopic specimens. It can be used with our innovative non-imaging confocal assembly for solution studies. User friendly software is supplied along with the equipment which is developed in Lab View, shows live count rate and displays the current correlation. The software has the capability to fit FCS data to multiple diffusion models, either online or offline. The software is developed by Tata Institute of Fundamental Research (TIFR), Mumbai. The system is installed on a 6 X 4 Feet Optical Tabletop which rests on pneumatic air isolated support. This ensures ground vibration isolation during operation. All the Opto - mechanical devices used in the setup are carefully chosen for stability and reliability. The instrument is one of the most sensitive ever developed, yet the price is affordable for acquisition by individual research laboratories. An FCS spectrometer with lifetime measurement option down to 100 ps (using time correlated single photon counting) is coming soon! The current instrument will be ungradable to the lifetime option.



## SPECIFICATIONS

### Instrument Features

Precise Manual alignment of the detection Fiber

1 or 2 colour excitation using 532 nm and 405 nm DPSS Laser with Power adjustable Option. Alternative wavelengths are available on request.

Time resolution down to 12.5 ns

### Measurements

Fluorescence Correlation Spectroscopy

One channel or dual-channel data acquisition for auto or cross correlation

Online correlation display

Online data fitting with multiple models

Conventional fluorescence imaging

### Light Source

532 nm and 405nm low noise laser

Max Power Output : 50 mW with Intensity Control Knob

Beam divergence : < 1.5mrad

### Detector

Single Photon Counting Module

### Correlator Card

Real time digital Correlator

### Optics

Equipment integrated with Infinity corrected inverted research microscope : MODEL IX71

Optical Mirrors Coated with Broadband visible, MgF2. All lenses are aberration free, achromatic and coated.

A set of neutral density filters included 0.2, 0.3, 0.5, 1.0, 2.0, 3.0 OD mounted on a filter wheel for controlling the excitation power.

### Objective

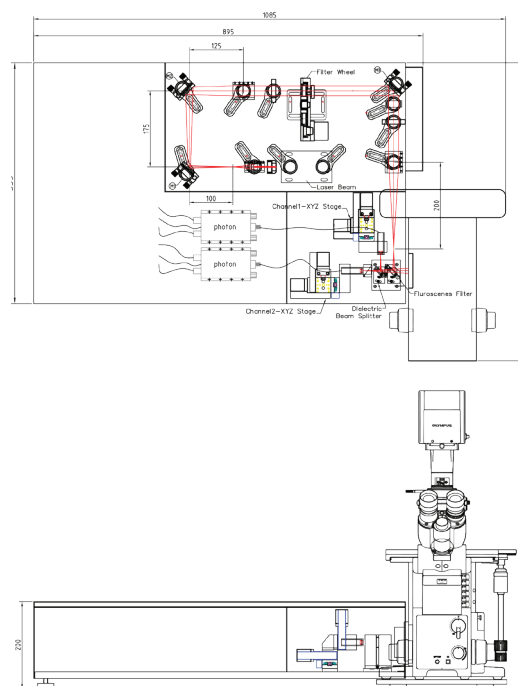
Water immersion 60 X / 1.2, WD 0.28 mm with correction collar



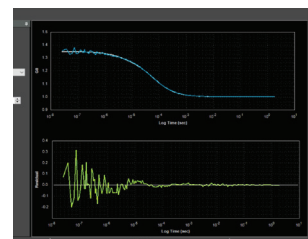
# Confocal Fluorescence Cross Correlation Spectrometer

**Model : HO-FCCS**

Fluorescence correlation spectroscopy is nowadays a widely applied tool for studying intracellular dynamics and interactions. The cross correlation technology is much more advanced version to study the nano particle molecules. It can be considered as the direct extension of confocal fluorescence spectroscopy. Holmarc Confocal Fluorescence Cross Correlation Spectrometer is a microscope with fluorescence cross correlation spectroscopy (FCCS) attachment for capturing molecular dynamics processes in cells, solutions and nano structures. This innovative product is developed with technology from Tata Institute of Fundamental Research (TIFR), Mumbai, a laboratory world-renowned for innovation in the area of FCCS. The instrument is designed for maximum sensitivity through a careful design of the optical path and attentive selection of the optical components and light detectors. We have a DPSS lasers as the light source in the instrument with wavelength 655nm of variable power output



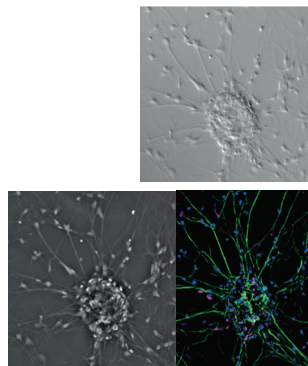
**Cross fit data of Atto 655 sample**



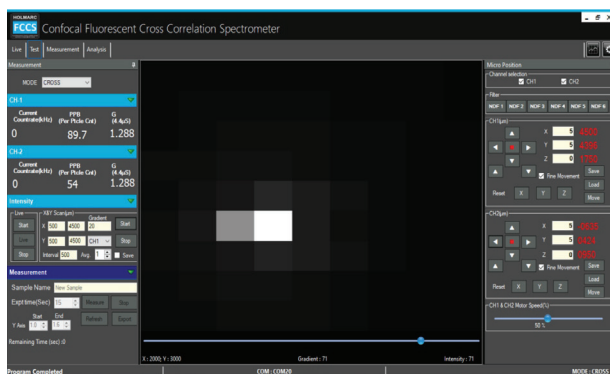
## Explanation on Optical layout

We have used 655nm 50mW extreme low noise DPSS laser with adjustable intensity. The laser line interference filter (Laser cleanup filter) is placed in front of the laser to avoid the other wavelengths if present. We need to expand the laser beam and collimate it. For beam expansion a 5X Microscope objective is used on a spatial filter mount. The expanded beam falls on the 450 mirror M1 the reflected parallel beam from M1 then falls on M2. An achromatic triplet lens is used to make the collimated beam. The light from M2 falls on a 400mm focal length triplet at a distance of 400mm from the 5x microscope objective to get collimated output beam. The collimated beam is then made to fall on a motorized filter wheel, which consists of 5 different filters. Then we have a variable aperture to adjust the beam diameter. This collimated, diameter adjusted beam again need to be focused. The reflected beam from mirror M3 is then passed through a triplet focussing lens of 200mm focal length. This focussed beam is made to fall on a dielectric beam splitter which reflects only 655nm and transmits the other wavelengths if any. This reflected monochromatic light is then detected by the inverted microscope and the light reaches at the 60X microscope objective which passes beam of light into the sample placed above the objective. The reflected light from the fluorescent sample is then made to pass through the same dielectric beam splitter and filtered out using a fluorescent filter placed the light path. This output fluorescent light is then again made to fall on a dielectric beam splitter with a 50/50 coating. Both reflected and transmitted light is then coupled to two different fibers of 25micron diameter. The position of the fiber can be controlled with the help of XYZ fiber positioners so that maximum light is coupled to the fiber. The transmitted light is known to be channel 1 and the reflected light is called channel 2. The output of both channel 1 and channel 2 is fed to two different photon detectors (2 different Avalanche photodiodes) which counts the photos emitted from the sample. These photon detectors are then coupled with two different correlation cards so that an electrical output can be obtained on your computer screen installed with FCCS software using a USB cable

**Our confocal microscopes for top-class biomedical research provide imaging precision for subcellular structures and dynamic processes.**



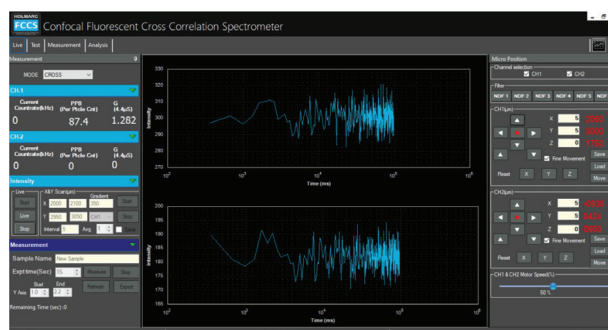
## XY Scan in 500 micron interval



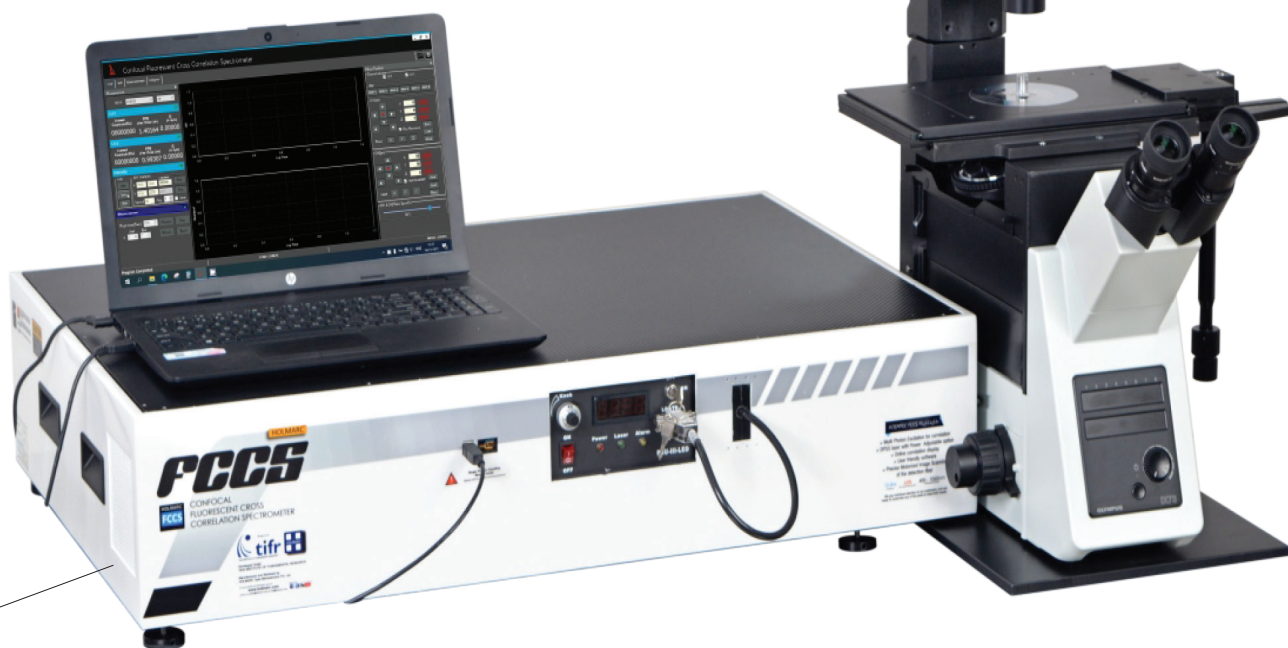
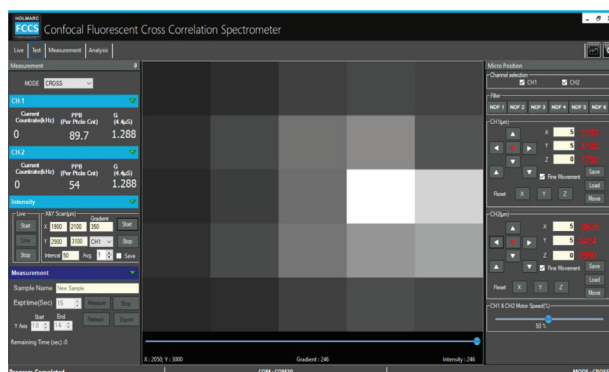
## Quantitative information

Diffusion coefficients,  
Hydrodynamic radii,  
Average concentrations,  
Kinetic chemical reaction rates,  
Singlet-triplet dynamics.

## Live photon count as a graphical variation



## XY scan over 50 micron interval



## SPECIFICATIONS

## 1. Optical Detection Head OPTION 1

|                         |                                                                                                                     |
|-------------------------|---------------------------------------------------------------------------------------------------------------------|
| Optical configuration   | Inverted                                                                                                            |
| Mechanical Design       | Based on Rod Assembly                                                                                               |
| Objective Type          | Infinity Corrected                                                                                                  |
| Nosepiece               | single                                                                                                              |
| Objectives              | 60x confocal objective lens<br>MRD07602 CFI Plan Apochromat VC 60XA WI N.A. 1.20, W.D. 0.29mm                       |
| Manufacturer            | Nikon<br>OR<br>Olympus U plan super apochromat water immersion objective 60X/1.2, WD 0.28 mm with correction collar |
| Tube lense focal length | 200mm                                                                                                               |
| Sample stage            | Manual                                                                                                              |
| Travel                  | 100x100mm                                                                                                           |
| Focusing                | Manual with coarse and fine adjustment                                                                              |
| Z Resolution            | 1 Micron                                                                                                            |

## 2. LASER

|                        |            |
|------------------------|------------|
| Wavelength             | 532nm-50mW |
| output power stability | <1%        |
| cw, line width         | <1nm       |
| beam diameter          | <2mm       |
| beam divergence        | 1.5mrad    |

(tunable output power via control knob)

## 3. Detector

|                                   |                                                      |
|-----------------------------------|------------------------------------------------------|
| Excelitas                         | Single Photon Counting Module with FC Connector      |
| Model                             | SPCM-AQRH-13FC                                       |
| Wavelength range                  | 400nm to 1060nm                                      |
| Peak PDE                          | > 70% @ 650 nm                                       |
| Active area                       | 180 $\mu$ m                                          |
| Dynamic Range                     | > 35 Mcps                                            |
| Output pulse width                | 10ns                                                 |
| Dark Count Rate                   | <250pcs                                              |
| Dead time (count rate below 5M/c) | 22ns                                                 |
| Connector                         | With FC/PC adaptor for fiber pigtails                |
| Supply                            | 5V included                                          |
| Cooling                           | Thermoelectrically cooled and temperature controlled |
| Case operation Temperature        | 5°C -70°C                                            |

## 4. Correlator Card. - Auto- correlations.

|                     |                                                     |
|---------------------|-----------------------------------------------------|
| Minimum sample.     | 12.5 ns                                             |
| Real-time channels. | 288                                                 |
| Delay time range    | 12.5ns to 45minutes in multiple tau channel layout. |
| Input signal        | standard TTL pulses, One BNC connectors             |
| Power               | 12V DC powered                                      |

Dynamic-link library (DLL

Multiple tau channel layout ( sample time denoted at T, data width W):

First 16 channels: T = 12.5ns, W = 1 bits, delay times T to 16\*T;

Second 8 channels: T = 2\*12.5ns, W =2 bits, delay times 9\*T to 16\*T

Third 8 channels: T = 4\*12.5ns, W = 3 bits, delay times 9\*T to 16\*T

Fourth 8 channels: T = 8\*12.5ns, W = 4 bits, delay times 9\*T to 16\*T

Sample time doubles every 8 channels and data width increment 1 bit to prevent overflow. The longest delay time is about 45minutes.Intensity limits

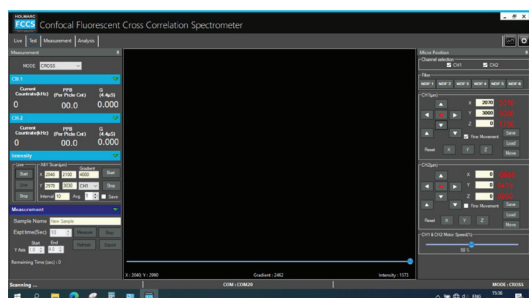
Maximum intensity integrated over 480ns: 80 MHz. Clipping will happen if the input intensity exceeds the maximum.

## 1. Optical Assembly / Receiving - Transmission Module

Opto-mechanics & beam shaping optics  
Optical Filters, Filters and dichroics



|                                                                                                                                                                                   |                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| Manufacturer                                                                                                                                                                      | Semrock or Chroma |
| Optomechanical assembly for the correlation confocal measurements                                                                                                                 |                   |
| Customized optomechanical assembly - Optics include colour corrected triple-lens for the collimation, kinematic mounts and XYZ motorized fibre positioner etc.                    |                   |
| <b>1. Optical Fibers</b>                                                                                                                                                          |                   |
| Single core 25,50 & 100Micron VIS-NIR 1m length FC terminated Fiber Optic Patch Cord, Core Diameter 25,50 & 100Micro , Wavelength Range of 320-1600nm, Numerical Aperture NA 0.22 |                   |
| Index of Refraction nd - Core : 1.458, nd - Cladding : 1.441                                                                                                                      |                   |
| Acceptance Angle                                                                                                                                                                  | 25.4°             |
| Connector                                                                                                                                                                         | FC                |
| HOLMARC FCS Analysis software                                                                                                                                                     |                   |
| Holmarc FCCS software application can be downloaded or retrieved from the CD that received with purchase of the spectrometer.                                                     |                   |



|                                                                                                                                                                                                                                                                                                                 |                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| Optical system                                                                                                                                                                                                                                                                                                  | Infinity Corrected Confocal Upright Microscope                          |
| Microscope Design                                                                                                                                                                                                                                                                                               | Double side Nosepiece Turret                                            |
| Tube Length                                                                                                                                                                                                                                                                                                     | 200mm                                                                   |
| Nosepiece                                                                                                                                                                                                                                                                                                       | Revolving objective nosepiece (Nosepiece have slots for filter sliders) |
| Minimum Operating System / Hardware requirements:                                                                                                                                                                                                                                                               |                                                                         |
| Processor                                                                                                                                                                                                                                                                                                       | Pentium Dual Core or above @2GHz or above.                              |
| Operating System                                                                                                                                                                                                                                                                                                | Windows 7 or Higher                                                     |
| RAM                                                                                                                                                                                                                                                                                                             | 2GB or greater.                                                         |
|                                                                                                                                                                                                                                                                                                                 | USB 2.0 Host Controller required                                        |
| <p>"CROSS" or "AUTO" cross option mode of operation will results in a cross correlation of both transmitted and reflected light and auto provides you a correlation curve of the transmitted light from the sample. click on Test, and then start to check whether sufficient light is coupled to the fiber</p> |                                                                         |

Nowadays several studies are going on biological systems, to address the smallest functional units of biological systems we need sensitive techniques. Among those techniques that allow even single molecule measurements are atomic force microscopy (AFM) or fluorescence spectroscopy. Fluorescence correlation spectroscopy (FCS) is one of the many different modes of high resolution spatial and temporal analysis of extremely low concentrated biomolecules. FCS is a correlation analysis of fluctuations of the fluorescence intensities. This method is based on the detection of single molecules excited to fluorescence in diffraction limited confocal volume elements and the time correlation of stochastic events. A sensitive detector records single photons emitted by the dye molecules. The result is an intensity trace representing random noise. Correlation functions are used to extract information about diffusion times and number of molecules in the sample. Physical models describe the source of the fluctuations and are fitted to the correlated data to quantify the information. If only one type of fluorescent dye and one detector are used, the method is called autocorrelation. To increase the flexibility of the method, two dyes and detectors can be used. This method is called cross-correlation. The measurement of translational diffusion is probably the simplest measurement which can be performed with FCS. The most frequent application of FCS consists in assaying molecular interactions (binding/debinding). The method is best suited to study the binding of a small compound (e.g. a ligand) to a bigger molecular object (e.g. the ligand's receptor). By the use of cross-correlation protein-protein interactions (e.g. receptor dimerization) can be examined.

When we comes to fluorescence cross correlation setup we make use of either two different laser sources of two different excitation beams from the sample to analyse it. In our setup we make use of cross correlation setup with a single laser source and two excited beams to analyze the sample.

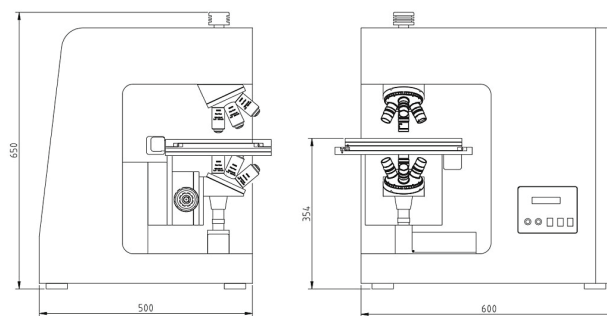


# Thermal Lens Microscope - Confocal

**Model : HO-TLM-C218**

Holmarc developed a 532nm laser microscope based on the thermal lens effect induced by a coaxial beam comprised of excitation and probe beams. The scheme allows the measurement of absorption factors down to  $1.2 \times 10^{-7}$  in a  $0.35 \mu\text{m}^3$  volume by use of a heating laser power of 200 mW incident upon the sample. Results prove that a 450 nm axial resolution is possible when a water immersion objective lens with a N.A. of 1.2 is used.

Thermal lensing provides high-sensitivity measurements for thermal and spectroscopic characterization or detection and imaging of low-absorption samples. Thermal-lens microscopy combines the high sensitivity of photothermal techniques with the lateral and axial resolution of conventional microscopy. The thermal lens generated by a heating beam induces a change in divergence and beam-waist position of a probe beam that are detected with the help of an aperture placed in the path of the beam in front of a photodetector. With this detection method the signal is maximum when the thermal lens is located at a distance of one heating beam's Rayleigh range from the probe beam's waist; it is null when the thermal lens lies in the plane of the probe beam's waist.

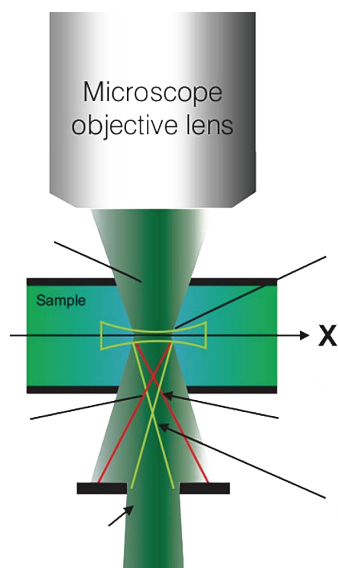


## Uses

Thermooptical methods make it possible to obtain information on the parameters of a material related to heat propagation (thermal conductivity, heat capacity, refractive index, density, viscosity, etc.) directly from the development of the signal in time after the onset of irradiation.



## Laser



200mW 532nm low noise DPSS laser is used as the excitation (pump laser) and 5mW low noise 650nm diode laser used as probe laser. Before entering in to the objective both lasers are pass through a spatial filter and a beam expander for maximum laser spatial and coherence correction.



## Specifications



|                             |                                                                                                   |
|-----------------------------|---------------------------------------------------------------------------------------------------|
| Optical system              | Infinity Corrected Confocal Upright Microscope                                                    |
| Microscope Design           | Double side Nosepiece Turret                                                                      |
| Tube Length                 | 200mm                                                                                             |
| Nosepiece                   | Revolving objective nosepiece (Nosepiece have slots for filter sliders)                           |
| Objectives                  | Plan Apo Infinity-Corrected Long WD Objective                                                     |
| Focus control               | Software controllable                                                                             |
| Substrate Scanning          | Motorized MTS series precision X Y Scanning stage                                                 |
| Travel X Axis               | 100 mm                                                                                            |
| Travel Y Axis               | 100 mm                                                                                            |
| Sample Positioning          | Equipped with Tilting & Aligning Stage                                                            |
| Resolution                  | 1Micron                                                                                           |
| Z axis travel               | 20 mm                                                                                             |
| Resolution                  | 1 Micron                                                                                          |
| Excitation laser source     | 532 nm DPSS                                                                                       |
| Laser Power                 | Low noise output 200 mW                                                                           |
| Spatial filtering unit      | Objective lens based                                                                              |
| Spot size                   | 1 - 5 Micron                                                                                      |
| Intensity control           | Continuously Variable through PC                                                                  |
| Optical power feedback unit | Yes                                                                                               |
| Focus control               | Software controllable                                                                             |
| Light level control         | 4096 levels                                                                                       |
|                             | Probe laser source wavelength 650 nm with motorized Relative Focal Plane Adjustment               |
| Motorized Polarizer rotator | Glan Thompson                                                                                     |
|                             | Laser Beam Precision Intensity Control Accessory                                                  |
| Light chopper               | Frequency 10 - 5000Hz                                                                             |
| Detector                    | Silicon Photo Diode                                                                               |
| Interface                   | PC based                                                                                          |
| Alignment camera            | 5MP 1/2.5" CMOS camera                                                                            |
| Active Pixels               | 2592H × 1944V                                                                                     |
| Pixel Size                  | 2.2 um × 2.2 um                                                                                   |
| Field of view (mm)          | 2.5 x 1.9 mm                                                                                      |
| Optical Imaging resolution  | 1 μm (horizontal / lateral imaging)                                                               |
| Software                    | Image analysis software IMAGE Pro Ver. 2.25                                                       |
| Image processing            | Background compensation, contrast enhancement & image filtering, particle size determination etc. |

# Digital Inline Holography Microscope

**Particle size analysis**

**Particle tracking in 3D**

**Cell biology, 3D dynamic analysis of cells**

**Study of ice crystal habits in could chamber.**



## Model : HO-DIHM-HT01

Holmarc's Digital In-line Holography microscope, model HO-DIHM-HT01, is a powerful imaging device that allows for the digital reconstruction of complex objects (amplitude and phase) from a single intensity image captured by passing coherent light through it.

Holmarc's DIHM is equipped with a transmission type in-line geometry. A coherent point light source illuminates the sample, and a CMOS camera records the 2D interference pattern created by the scattered light (object beam) with non-scattered light (reference beam). The software then computes the field backward to different planes to numerically recreate the samples' 3D structure from the recorded 2D interference pattern. For 3D reconstruction, the software employs a single shot phase unwrapping algorithm. The DIHM's broad depth of field allows it to image large volumes with equivalent resolution and to image particles at different depths simultaneously without the use of mechanical scanning.

The HO-DIHM-HT01 can be used both in-situ and ex-situ to image particles ranging in size from sub-microns to several millimetres. It records the interference pattern using a 405nm diode laser with pinhole assembly as a point light source and Sony's 1/1.8" 3.17Mpix CMOS IMX174 sensor. The 134 fps USB3.0 sensor delivers great image quality and low noise performance. The distance between the sample to pinhole and sample to camera is adjustable from the software. A motorized ND filter wheel is provided in front of the laser to adjust the laser power for different sample conditions. DIHM\_V01 is an easy-to-use programme that allows you to save, rebuild, and analyse each hologram frame.

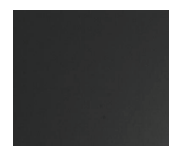
## SPECIFICATIONS

|                                  |                                                                        |
|----------------------------------|------------------------------------------------------------------------|
| DIHM configuration               | Horizontal Laser                                                       |
| Light source                     | 405nm diode laser (50mW)                                               |
| Sample illumination beam profile | Plane wave front (Collimated beam)                                     |
| Intensity control                | Motorized variable ND filter, via software                             |
| Spatial filter assembly          | Microscope objective based                                             |
| Collimating optics               | Multi-element design, Spherical aberration corrected                   |
| Source to sample distance        | Fixed                                                                  |
| Sample to Camera distance        | Adjustable up to 200 mm, motorized movement, adjustable via software   |
| YZ Sample stage                  | Manual, Provision to hold optical chamber of 8cm x 4cm x 1cm or higher |

## Features

- Unique single shot high resolution and accurate quantitative imaging capability (patented technology).
- No phase shifting required thus removing the need for piezo stages.
- Quantitative phase imaging without staining of cells.
- Full diffraction limited resolution performance.
- Digital holography as well as transmitted LED bright field observation.

## Samples



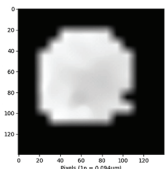
Hologram -  
Single frame



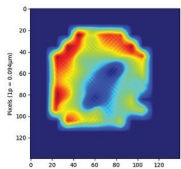
Binary  
particle map



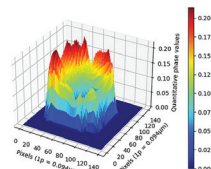
## PARTICLE SAMPLES



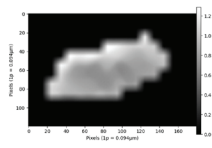
Particle 1 - Amplitude



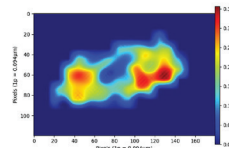
Particle 1 - Phase



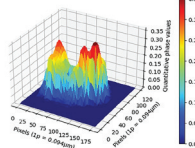
Particle 1 - 3D Phase



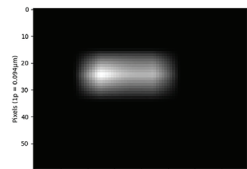
Particle 2 - Amplitude



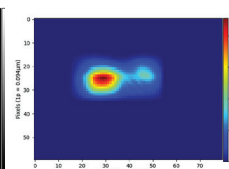
Particle 2 - Phase



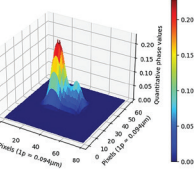
Particle 2 - 3D Phase



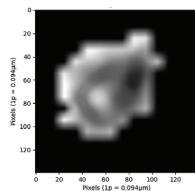
Particle 3 - Amplitude



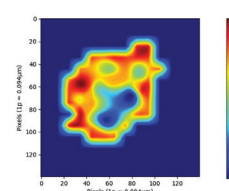
Particle 3 - Phase



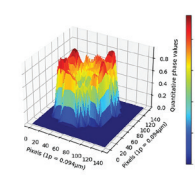
Particle 3 - 3D Phase



Particle 4 - Amplitude



Particle 4 - Phase



Particle 4 - 3D Phase

## XY Sample Stage

Manual 8cm x 4cm x 1cm or higher with  
Provision to hold optical chamber



## Camera specifications

|                                 |                                                                                                                                                                   |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sensor type                     | CMOS Mono                                                                                                                                                         |
| Sensor size                     | 14.158 mm x 7.500 mm<br>(16.02 mm diagonal)                                                                                                                       |
| Pixel size                      | 3.45 µm Full resolution<br>= 4104 x 2174 Pixels<br>(8.92 Mpix)                                                                                                    |
| Shutter                         | Global shutter                                                                                                                                                    |
| Sensor characteristic           | Linear Readout mode<br>= Progressive scan                                                                                                                         |
| Sensor model                    | Sony IMX267                                                                                                                                                       |
| ADC                             | 12 bit                                                                                                                                                            |
| Gain (Master / RGB)             | 24X / 4X                                                                                                                                                          |
| Pixel clock range               | 99 MHz - 395 MHz                                                                                                                                                  |
| Frame rate freerun mode         | 33                                                                                                                                                                |
| Frame rate trigger (Continuous) | 33                                                                                                                                                                |
| Frame rate trigger (maximum)    | 33                                                                                                                                                                |
| Exposure time (Min - Max)       | 0.027 ms - 1000 ms                                                                                                                                                |
| Long exposure (Maximum)         | 30000 ms                                                                                                                                                          |
| Power consumption               | 1.6 W - 3.9 W                                                                                                                                                     |
| Image memory                    | 128 MB                                                                                                                                                            |
| Interface connector             | USB Type-C, Screwable                                                                                                                                             |
| Power supply                    | USB cable                                                                                                                                                         |
| Lens mount                      | C - Mount                                                                                                                                                         |
| Dimensions                      | 34 mm x 44 mm x 47 mm                                                                                                                                             |
| Software                        | DIHM_V02                                                                                                                                                          |
| Software features               | Image grabbing,<br>Continuous mode<br>recording, Frame by<br>frame processing,<br>Movie mode<br>processing, image<br>measurements,<br>motorized stage<br>controls |

- Particle size analysis
- Particle tracking in 3D
- Cell biology, 3D dynamic analysis of cells
- Study of ice crystal habits in could chamber
- Microfluidics
- Marine biology
- Deformation analysis
- Refractive index characterization
- Ferroelectric metrology
- Electro-chemistry



# Digital Inline Holography Microscope

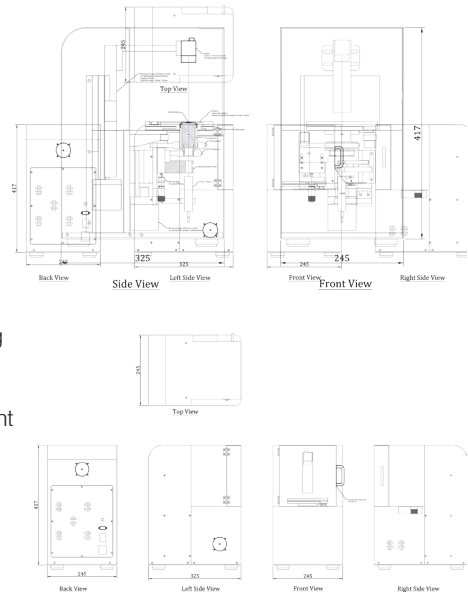
## Model : HO-DIHM-T01

Holmarc's Digital In-line Holography microscope, model HO-DIHM-T01, is a powerful imaging device that allows for the digital reconstruction of complex objects (amplitude and phase) from a single intensity image captured by passing coherent light through it.

Holmarc's DIHM is equipped with a transmission type in-line geometry. A coherent point light source illuminates the sample, and a CMOS camera records the 2D interference pattern created by the scattered light (object beam) with non-scattered light (reference beam). The software then computes the field backward to different planes to numerically recreate the samples' 3D structure from the recorded 2D interference pattern. For 3D reconstruction, the software employs a single shot phase unwrapping algorithm. The DIHM's broad depth of field allows it to image large volumes with equivalent resolution and to image particles at different depths simultaneously without the use of mechanical scanning.

## Specifications

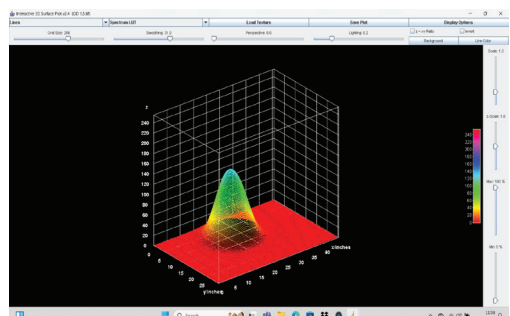
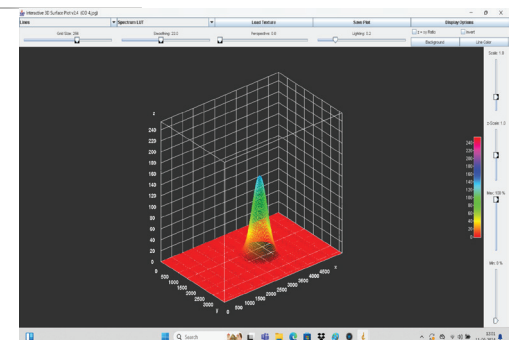
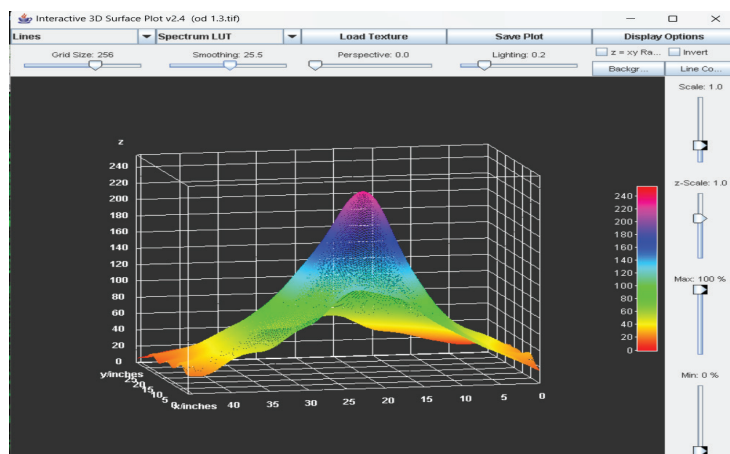
|                           |                                                         |
|---------------------------|---------------------------------------------------------|
| DIHM Type                 | Transmission, Upright Geometry                          |
| Light source              | 405nm diode laser, 50 mW                                |
| Point source assembly     | Microscope objective + pinhole assembly                 |
| Software                  | DIHM_V01                                                |
| Phase unwrapping          | Single shot algorithm                                   |
| Camera                    | 1/1.8", 3.17MP, CMOS, Mono USB3.0, SONY, Global Shutter |
| Pinhole - sample distance | Adjustable, motorized, controls via software            |
| Sample - Camera distance  | Adjustable, motorized, controls via software            |
| Laser power               | Adjustable via motorized ND filter                      |



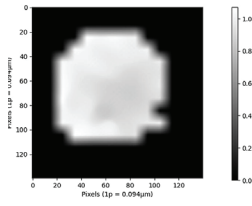
- Particle size analysis
- Particle tracking in 3D
- Cell biology, 3D dynamic analysis of cells
- Study of ice crystal habits in cold chamber.
- Microfluidics
- Marine biology
- Deformation analysis
- Refractive index characterization
- Ferroelectric metrology
- Electro-chemistr

## Software

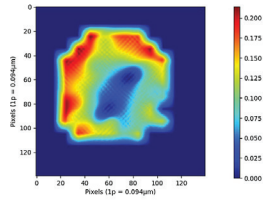
DIHM\_V01 with Single shot algorithm



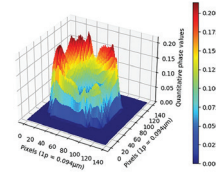
## PARTICLE SAMPLES



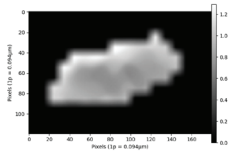
Particle 1 - Amplitude



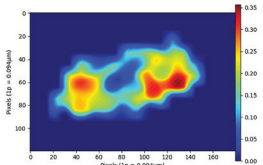
Particle 1 - Phase



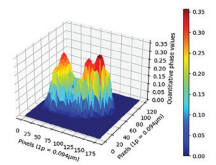
Particle 1 - 3D Phase



Particle 2 - Amplitude



Particle 2 - Phase

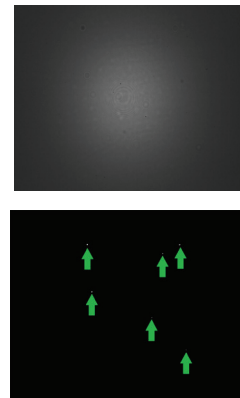


Particle 2 - 3D Phase

Model : HO-DIHM-T01



## Samples



# Interferometers

**Shearography / Speckle Shear Interferometry**

**Quantitative Phase Imaging (QPI)  
Speckle Metrology**

**Wavefront Slope and Aberration Measurement**



## Fizeau Interferometer

**Model : HO-OFIZ-215**

Most versatile interferometer, Fizeau enables measurements of flat and spherical surfaces using non contact configuration. Its reference and measurement optical paths are the same, making this a compact, vibration-resistant system. Fizeau Interferometer is in a way similar to a Fabry-Perot interferometer as both consist of two reflecting surfaces. In a Fizeau interferometer, however, the second surface is usually totally reflecting. An angled beam splitter captures the reference and measurement beams.

Holmarc Fizeau interferometer has open and vertical configuration. It is made suitable for routine measurements of both flat and spherical surfaces. DPSS laser is used as the light source. Optical layout in vertical direction makes the placement of test components easy. The fringes are captured by CCD camera and analyzed by a computer. This equipment can be used for quality control of optics in manufacturing as well as for routine inspection in laboratories.

Fizeau Interferometer is one of the simplest and most versatile interferometers and is popular for routine measurement of both flat and spherical surfaces. It is used to measure optical components such as flats, prisms, lenses, or precision metal parts such as bearings, sealing surfaces or polished ceramics. Measurements can be made using the static fringe analysis software. The interferometer basically comes with high optical quality of  $\lambda/20$  reference flat. The reflection from the test surface interferes with the reflection from the reference flat, producing the fringes. The shape and the quality of the fringes depends on the surface quality of the test flat. The fringes are digitalized using a high resolution CCD camera. By analyzing the fringes we can obtain the P-V flatness, RMS flatness, 3D surface plot etc.

The Instrument is designed vertically to fix the test sample easily. The tip / tilt test base allows the test sample to align with the reference surface. High quality aberration corrected optical design enhances performance. The reflection flats and reference spheres are optional. Custom solutions are also possible on request.



## SPECIFICATIONS

|                |                                                  |
|----------------|--------------------------------------------------|
| Sample size    | $\leq 100$ mm                                    |
| Reference flat | $\lambda/20$ P V 100 mm diameter 25 mm thickness |
| Accuracy       | $\leq \lambda / 20$ PV                           |
| Laser source   | DPSS 5.0 mW 532 nm                               |
| Alignment      | By Tip / tilt sample base                        |
| Camera         | CCD Res. 1280 x 1024                             |
| Analysis       | Using fringe analysis software                   |
| Weight         | Approx. 25 Kg                                    |
| Power supply   | 220V, 50Hz                                       |

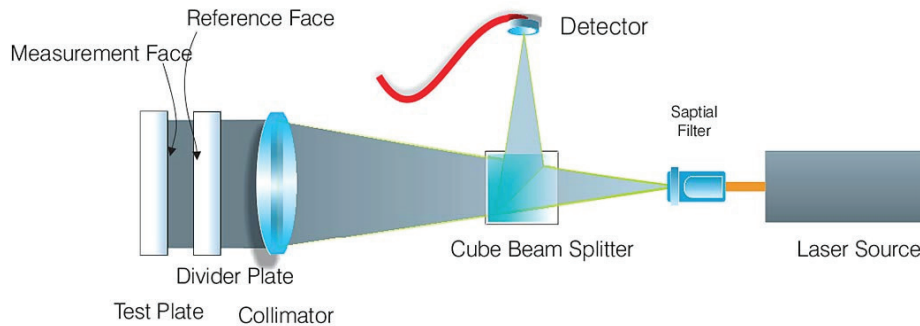
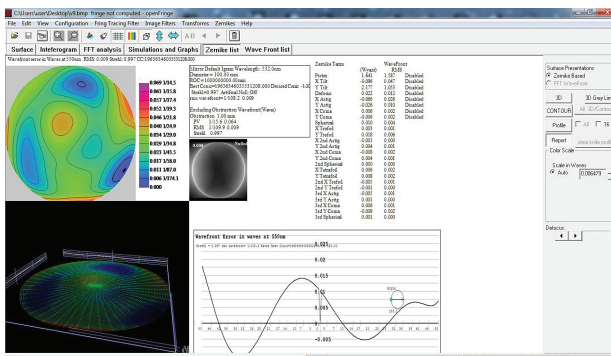
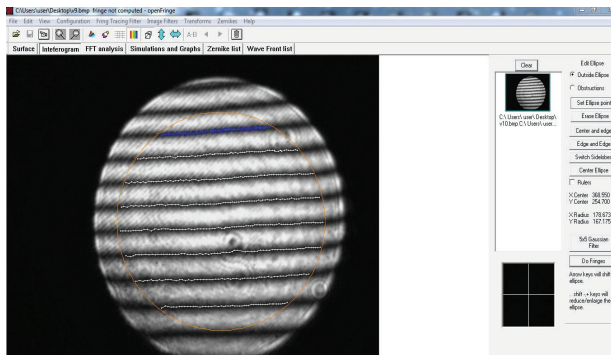


Fig. Fizeo Interferometer Schematic

## Software



- DPSS Laser Source 532nm (5 mW),
- Spatial Filter Assembly
- Beam Splitter
- Collimating lens with mount
- Reference Flat with mount
- Test Flat mount
- Zoom lens with CCD etc.

- High precision flatness measurement is possible
- Static fringe analysis software is used
- The instrument is built upright, so the test sample can be fixed easily
- High quality aberration corrected optical components are used



# Fizeau Interferometer with Encoder Rail System

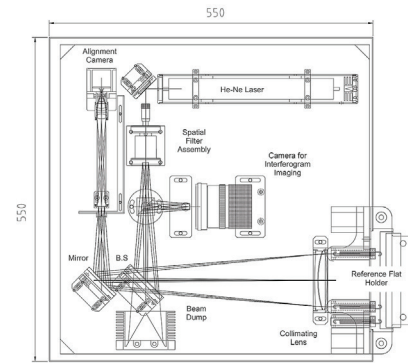
**Model : HO-OFIZ-216A**

Fizeau Interferometer is one of the simplest and most versatile interferometers and is popular for routine measurement of both flat and spherical surfaces. It is used to measure optical components such as flats, prisms, lenses, or precision metal parts such as bearings, sealing surfaces or polished ceramics. Measurements can be made using the static fringe analysis software. The interferometer basically comes with high optical quality ( $\lambda/20$ ) reference flat. The reflection from the test surface interferes with the reflection from reference flat producing fringes. The shape and quality of the fringes depends on surface quality of the test flat. The fringes are digitalized using a high resolution CCD camera.

By analyzing the fringes we can obtain the P-V flatness, RMS flatness, 3D surface plot etc. The tip / tilt test base allows the test sample to align with the reference surface. High quality aberration corrected optical design enhances performance. Holmarc's autocollimator has stainless steel body and high precision optics with LED illumination. A kinematic stage with two axes tilt movements hold the instrument on horizontal plane. Different types of accessories are also provided for performing different applications. Customer can choose the required accessories from the optional accessories list.

## SPECIFICATIONS

|                     |                                                             |
|---------------------|-------------------------------------------------------------|
| Max Sample Size     | $\leq 100$ mm                                               |
| Reference optics    | Accepts any standard Bayonet mounts                         |
| Accuracy            | $\leq \lambda/20$ PV                                        |
| Laser Source        | DPSS 5.0 mW / 632.8 He-Ne laser                             |
| Beam Expander       | 60x Microscope objective with pinhole                       |
| Collimating lens    | 500 mm Focal length, 100 mm diameter Achromat lens          |
| Alignment           | Camera based                                                |
| Camera 1            | 3.0 Megapixels CCD with selectable resolution               |
| Camera 2            | 5.0 Megapixels CCD with selectable resolution               |
| Analysis            | Using Fringe Analysis Software (Open fringe & Quick fringe) |
| Weight              | Approx. 25 Kg                                               |
| Power supply        | 220 V, 50 Hz                                                |
| Translation stage   | Manual linear translation stage with optical encoder        |
| Travel & Resolution | 1200 mm Travel length and 2 Micron resolution               |
| Encoder Output      | With the pc interface and software                          |



## Optical Setup

Spatial filter assembly and a positive achromatic lens are used to expand and collimated the He-Ne laser. After the collimating lens the reference flat is fixed. The light reflects back from the Reference flat. A cube beam splitter is placed near the beam expander which reflects the reflected light to the zoom lens and CCD. One portion of this reflected falls on camera 1 which is used for align mode. The reflected light from the test sample also retrace the same path and interfere.



# 4F Sagnac Shear Interferometer

## Model : HO-SIS-S01

Holmarc's 4f Sagnac shear interferometer, model HO-SIS-S01, is a high-stability, common-path imaging system that integrates a 4f lens assembly within a Sagnac loop to generate laterally sheared, interfering wavefronts. Owing to its common-path geometry, the system offers exceptional immunity to mechanical vibrations and air turbulence, providing significantly higher phase stability than conventional Michelson or Mach-Zehnder interferometers. This makes the HO-SIS-S01 ideally suited for shearography, quantitative phase imaging, and speckle metrology applications where robustness and repeatability are critical.

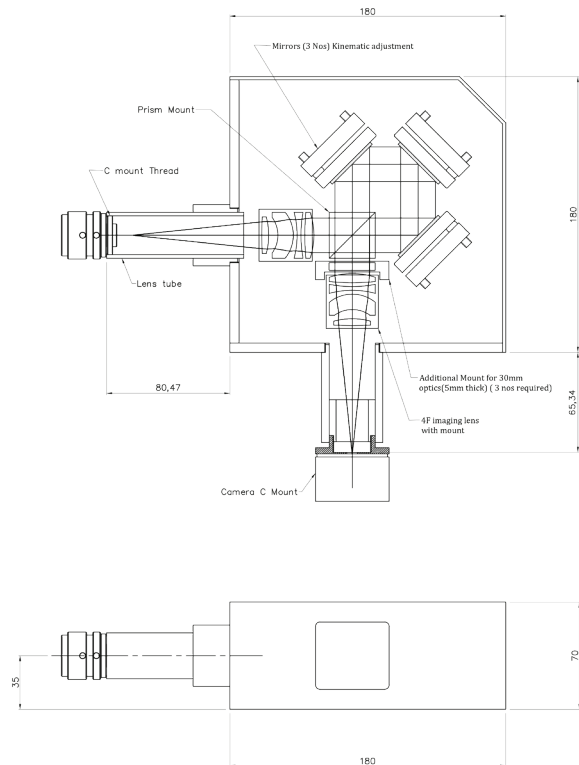
The optical system is based on a precise 4f imaging geometry formed by two lens assemblies. This configuration ensures accurate relay imaging of the wavefront and creates a well-defined Fourier plane between the lenses. The Fourier plane allows the introduction of spatial filters, phase elements, or controlled beam modifications, enabling fine adjustment of shear magnitude and interferometric sensitivity to suit different measurement requirements.

An imaging lens first captures the image of the test object, defining the angular field of view of the system. The first lens assembly of the 4f relay collects this image, after which a beam splitter divides the beam into clockwise and counter-clockwise paths within the Sagnac loop. Both beams propagate through the same optical components in opposite directions, ensuring that external disturbances affect them equally and are inherently cancelled upon recombination. The second lens assembly then focuses the recombined image beams onto the camera sensor for stable interference recording.

Lateral shear is introduced by precisely tilting a mirror in the optical path, producing interference fringes that are proportional to the spatial derivative of the wavefront. This enables sensitive measurement of wavefront gradients, surface strain, and phase variations, making the HO-SIS-S01 a powerful and reliable tool for advanced optical metrology and non-destructive evaluation.

## SPECIFICATIONS

|                                                                                |
|--------------------------------------------------------------------------------|
| 4f imaging lens assembly (2 set).                                              |
| 38mm mirror with Kinematic mirror mounts (3 sets)                              |
| Metallic cube splitter with tilting mount (1 set)                              |
| SM1 Threaded mount for 32mm optics (5mm thick) (3 set)                         |
| C-mount provision for imaging lens (imaging lens can be provided upon request) |
| Enclosure with tripod adapter                                                  |
| LabVIEW codes                                                                  |
| Camera = 1/2.5" Color CMOS, 5MP, USB2.0, C-mount, 2.2umx2.2um pixel size       |
| Software = Microview_v01 (Live/Image capture, scale bar)                       |



## Applications

- Shearography / Speckle Shear Interferometry
- Quantitative Phase Imaging (QPI)
- Speckle Metrology
- Wavefront Slope and Aberration Measurement
- Non-destructive testing and deformation analysis using digital shearography
- Vibration, strain, and stress measurement of mechanical and structural components
- Research and Industrial Metrology



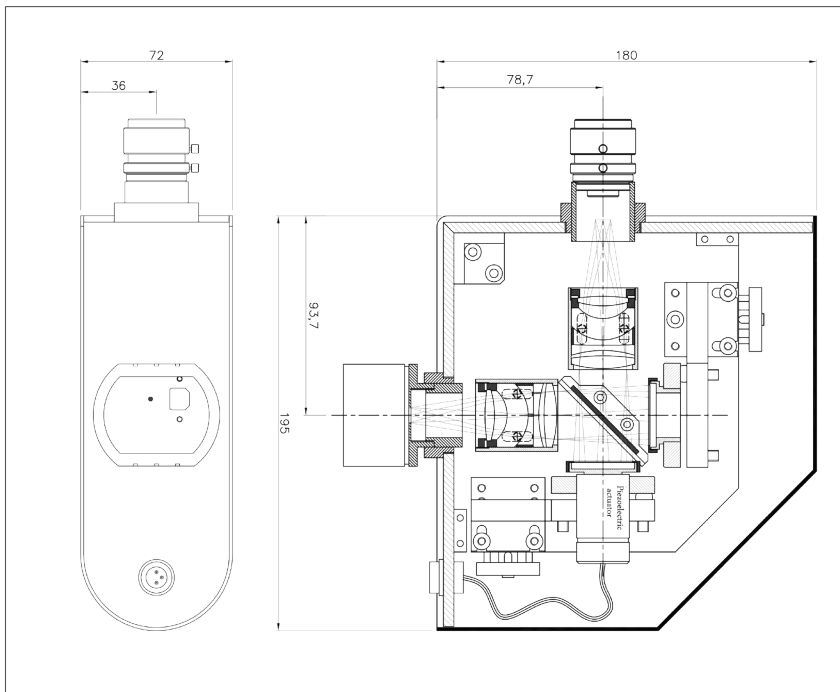
## 4F Michelson Shear Interferometer

### Model : HO-SIM-M01

Holmarc's 4f Michelson shear interferometer, model HO-SIM-M01, is a precision optical measurement system designed for high-sensitivity phase-gradient and aberration analysis. The system integrates a Michelson interferometer with a 4f imaging architecture to generate controlled lateral shearing of the optical wavefront while preserving high imaging quality. Interference between two slightly displaced replicas of the same wavefront enables accurate detection of subtle phase variations without the need for an external reference beam.

The 4f optical relay, formed by two identical lenses separated by twice their focal length, ensures distortion-free, unity-magnification transfer of the wavefront from the test plane to the interferometer. Within the Michelson configuration, the wavefront is split into two arms and reflected by precision mirrors. A finely adjustable tilt or lateral displacement introduced in one arm produces a well-defined shear between the recombining beams, resulting in interference fringes that encode local phase differences across the wavefront.

Compared to conventional Michelson interferometer-based shearography systems, which are limited to a fixed maximum field of view of approximately 28 degrees, the 4f Michelson architecture provides a larger and more flexible field of view. In this configuration, the angle of view is determined solely by the imaging lens and sensor size, allowing the system geometry to be easily adapted by selecting appropriate optics or detectors. This design makes the HO-SIM-M01 a compact, cost-effective, and versatile solution for quantitative wavefront and deformation analysis. The system is well suited for applications such as non-destructive testing, vibration analysis, strain measurement using digital shearography, optical component evaluation, and research and industrial metrology.



**Specifications**

|                                                                                                           |                                                                 |
|-----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| 3.5mm fixed focal length imaging lens, C-mount (1 No.)(custom imaging lens can be provided upon requests) |                                                                 |
| 4f imaging lens assembly (2 set).                                                                         |                                                                 |
| 30mm mirror with Kinematic mirror mounts (1 No.)                                                          |                                                                 |
| 30mm mirror with Kinematic mirror mount and piezo actuator (1 No.)                                        |                                                                 |
| Metallic plate splitter with tilting mount (1 set)                                                        |                                                                 |
| Enclosure with tripod adapter                                                                             |                                                                 |
| LabVIEW codes                                                                                             |                                                                 |
| Camera                                                                                                    | 1/2.5" Color CMOS, 5MP, USB2.0, C-mount, 2.2umx2.2um pixel size |
| Software                                                                                                  | Microview_v01 (Live/Image capture, scale bar )                  |
|                                                                                                           |                                                                 |
|                                                                                                           |                                                                 |
|                                                                                                           |                                                                 |
|                                                                                                           |                                                                 |

**Optional Accessory**

|                                    |                                                                                                                                |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| 1 Motorized Disc loading mechanism | Model No. HO-MDLM-01                                                                                                           |
| Actuator type                      | Motorize Motorized Linear actuator with reduction gear mechanism to push center of a circular disc which is fixed on the edge. |
| Test specimen mount                | Circular fixed along edges                                                                                                     |
| Test specimen diameter             | 60mm                                                                                                                           |
| Test specimen thickness            | 5mm                                                                                                                            |
| Drive                              | <b>Stepper motor</b>                                                                                                           |
| Axial load                         | ~100Kg                                                                                                                         |
| Position accuracy                  | 1 micron                                                                                                                       |
| Linear encoder resolution          | 1 micron                                                                                                                       |
| Maximum travel                     | 10mm                                                                                                                           |
| Lead screw pitch                   | 4mm                                                                                                                            |
| PC control software                | Actuator can be controlled through PC. LabVIEW code will be provided                                                           |
| Software features                  | 1. Set actuator displacement, 2. Increment and decrement of displacement at steps of minimum 1 microns                         |





Designed @ HOLMARC Design LAB  
Cochin, May 2025



## State of the art manufacturing Quick turn customization

Holmarc is unique in its ability to design, prototype, and manufacture under one roof .  
We have well-developed optic, mechanical & electronics fabrication facilities and thin film coating unit.  
Contact us for assistance with your manufacturing needs.

# 5000+

With more than 5000 products, Holmarc Opto-Mechatronics Ltd. stands at the forefront of scientific and engineering innovation. Our comprehensive range—from precision optics to advanced laboratory instruments—empowers research, education, and industry. With 150–200 new products introduced annually, our commitment to innovation and quality ensures reliable performance and long-term value.

### Product Group

Optical Tables, Breadboards & Enclosures | Rail carriers & Accessories | Optomechanics  
Positioning Devices | Optics | Analytic Instruments | Imaging Devices  
Optical Fibers, Positioners & Accessories | Optical Sources & Detectors | Spectroscopy  
Bio-Lab Instruments | Life Science | Thin Film Lab Equipments | Holography | Physics Instruments



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