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Technical Specification for Inverted Microscope

Microscope Body: Motorized Ergonomic Stand with inbuilt motorized Z-focus drive with minimum step resolution of 10 nm or better. The microscope should have 1.5\1.6X or better intermediate Coded magnification changer for eyepieces and ports. The microscope should have both Coarse and fine focusing knobs in main frame. The system should have a touch screen for necessary control and indications of motorized functions of microscope.

1. Objectives:

a. Semi-Apochromat grade 4x, N.A. 0.13 or more, PH, working distance (WD)16mm or more.

b. Semi-Apochromatgrade10x, N.A.0.30or more,PHWD 15mm or more.

c. Semi-Apochromat grade 20x, N.A. 0.45or more,PHWD 6mm or more.Cover glass correction: 0-2.0 mm.

d. Semi-Apochromat grade 40x, N.A. 0.60 or more,DIC, LWD (long working distance: 2mm-4mm) Cover glass correction: 0-2.0 mm.

e. Semi-Apochromat 40x, N.A. 1.30 or more,DIC,OIL immersion,minimum WD 0.2mm

f. Plan Apochromat 63x, N.A. 1.40 or more, DIC, Oil immersion/ 60x, N.A. 1.40 or more, DIC, Oil immersion.WD minimum 0.12mm.

All objectives with better NA & WD are preferred. All objective lenses should compatible with the provided microscope. All the objective lenses should have appropriate working distance.

DIC: MotorizedAnalyzer Cube ,Polarizer, and necessary DIC prisms for Condenser and Objectives should be offered.

- DICPrism for objective.
- ICT/DIC condenser prism.

2. Transmitted Light system: Transmitted column with Field Diaphragm, equipped with White light LED Illumination (>25000 hrs lifetime) with intensity control by main frame inbuilt knob, Motorized shuttershould be controlled through imaging software.

3. Bertrand lens (for observation of the back focal plan)

4. Imaging Ports: The Microscope body should have motorized

- 100% Eye-piece
- 100% Left Side port
- 100% Right side port.
- 30% eye-piece - 70% side/left portor 20% eye-piece - 80% side/left port
- **Eyepieces & Eyepiece Tube**: Tube, Binocular Ergo 100/0, Variable light path 100% visual/ 0% camera, and 0% visual/100% camera, and 30% visual/70% camera or 20% eye-piece - 80% side/left port,Field of view 22 mm or more, Variable viewing angle 10-15° to 40-45°.

5. Camera: Two cameras are to be provided. One monochrome and one Color. Specs of the two cameras are given below:

A. Camera-1 (Monochrome) Specs:

- **Sensor type:** Front Illuminated Scientific CMOS (sCMOS)
- **Sensor size:** 13.3 x 13.3 mm (18.8 mm diagonal) or higher
- **Quantum efficiency (QE):** 80% or higher.
- **Active pixels (W x H):** 2048 x 2048 (4.2 Megapixel) or higher
- **Color depth:** 30 bit or more
- **Pixel readout rate (MHz):** Slow read 200 (100 MHz x 2 sensor halves) or more, Fast Read 540 (270 MHz x 2 sensor halves) or more.
- **Frame rate:** 90 FPS or more @ 2048 x 2048; 180 FPS or more @ 1920 x 1080, 400FPS or more @ 512 x 512, 25,000 FPS or more @ 2048 x 8 (FCS mode)
- **Read noise (e-) Median [rms]:** 0.9e- or lower @ 216 MHz, 1.1e- or lower @ 540 MHz
- **Readout modes (Shutter control):** Rolling and Global shutter
- **Data range:** 12-bit, 16-bit, 8-bit (optional)
- **Pixel binning:** Hardware binning: 2 x 2, 3 x 3, 4 x 4, 8 x 8
- **Maximum dynamic range:** 30,000:1 or more.
- **Region of Interest (ROI):** Pre-defined Region of Interest (ROI):2048 x 2048, 1920 x 1080, 1392 x 1040, 512 x 512, 128 x 128 User-defined Region of Interest (ROI): Allowed, freely adjustable in 1 or 2 pixel steps up to full resolution
- Along with the above-mentioned features, the unit should be controlled from within the microscope software, it should provide excellent broad coverage of the VIS/NIR region, it

should have 99.5% or more linearity for quantitative accuracy of measurement across the full dynamic range.

B. Camera-2 (Color) specs:

- **Sensor type:**Color CMOS/CCD
- **Sensor size:**1 inch or better
- **True Resolution:** 15 MP or greater non-interpolated
- **Exposure time:** 0.1 millisecond – 60 seconds
- **Frame rate:** 30 FPS or more
- Along with the above-mentioned features, the unit should be controlled from within themicroscope software. The camera should be designed for live cell applications with an operating environmental temperature of +5 °C - +50 °C. The camera should be able to capture crisp images with accurate color reproducibility.

6. Microscope Stage: Motorized X-Y Stage with controller and joystick to control X, Y & Z modules of microscope; having multiple holders to adapt stage inserts for 96 well plates,35 and 60 mm plates, and glass slides.

7. Nosepiece: 780nm or above LED/IR based focus Control for keeping the focus position over time with 6 position Motorized revolving nosepiece. Should be with Motorized multi-position DIC turret / slider.Thenosepiece should have Adaptive Focus Control (AFC)/ Perfect Focus System (PFS) /Definite Focus or equivalent focus stabilization strategy.

8. Condenser: Motorized Universal Condenser suitable for all microscopy techniques such as Phase, DIC, HMC with 7 or more slots and with long working distance of 30mm ormore.Phase module Ph1 & Ph2 should be offered.

9. Motorized Epi-Fluorescence Module: Motorized fluorescence turret with built in shutter (minimum 12ms) and a minimum of 6 position filter cube slots for band pass (Excitation and Emission) interference fluorescent filters.

10. Fluorescence Light Source: Mercury light source with minimum2,000 hrsof life time. The unit should be controlled by same imaging software. Should accompany with remote control for controlling intensity.

11. Excitation Filters:(DAPI, FITC, TRITC, Cy5)

a. Filter Cube DAPI consisting: excitation Filter EX340-380, Dichroic Mirror DM400,

Barrier Filter BA435-485

b. Filter cubeCFP Filter Cube consisting: excitation Filter 436/20, Dichroic Mirror DM455, Barrier Filter 480/40.

c. Filter cubeYFP Filter Cube consisting: excitation Filter 500/20, Dichroic Mirror DM515, Barrier Filter 535/20.

d. Filter Cube TRITC consisting: Excitation Filter EX540/25, Dichroic Mirror DM565, Barrier Filter BA605/55

e. Filter cubeCy5 Filter Cube consisting: excitation Filter 620/60, Dichroic Mirror DM 660, Barrier Filter 700/75.

All filters should be with no pixel shift technology and better transmission efficiency.

12. Micromanipulator

- Manual single arm Micromanipulator for aspiration and injection -3D coarse manipulator equipped with joystick control for X and Y movement.
- Mounting Adapter

13. Software: ImagingSoftware to control all motorized Microscope components, DIC components, XY Stage and Camera's for acquisition of images in Z- Series, Multi-Channel Mode, Time Lapse imaging, multi-point time lapse imaging, full six-dimensional image acquisition and analysis (X, Y,Z, Time, Multi-Channel & Multipoint). Should have modules for Image stitching, tiling and measurement with analysis. Capability for writing macros and RAM capture. Should be equipped with Intensity measurements for line, 2D/3D View, area in multi-dimensional images with features to export to MS Excel.Deconvolution softwareshould be provided.Additional offline software with all the analysis capabilities should be provided.

14. Computer: TwoFactory tested Workstations with minimum 3GHz processor, 16GB RAM, 2GB Graphics Card, 1TB HDD required and 32" LED / TFT Monitor along with Keyboard and Mouse(One for online analysis and another for off line analysis). Any additional components required (for example SSD) for the proper control of the microscope are to be provided for the acquisition computer.

15. Other condition: Microscope, Color Cameras, XY Stage, fluorescence filters and software should be compatible and from single manufacturer for best performance. Scientific CMOS camera should be compatible with same imaging software.

16. Stage Top Incubator: The system should have precision temperature control(30-40^{0}C), high humidity and CO2 concentration (5%) for short/long term cell culture. Integrated operation with imaging software. Complete system, including: Stage top chamber + Temp. controller with built-in digital gas mixer for 100% CO2, Lens heater, Power cables, Extension wire, All essential cables and sensors, Gas tubes. The setup should include:

- - Multi-well plates holder
- - Dish Attachment for 35mm and 60mm dishes
- - Dish Attachment for chamber slide/cover-glass
- - Lid with Feedback Sensor for 35mm and 60mm dish
- - Lid with Feedback Sensor for chamber slide/cover-glass
- - Lid with Feedback Sensor for well-plate

18. UPS Backup for atleast 30 mins

19. Warranty for 2 years from manufacturer

20. The quotation price should be in INR.

21. Delivery Period : Within three months