



TORONTECH



4K SURGICAL MICROSCOPE

4K Surgical Microscope - ToronSM™ 640

Operating Microscope with Integrated 4K Video for Neurosurgery, ENT, and Spine

ToronSM™ 640 4K surgical microscope gives operating teams a stable, high-magnification view of the surgical field with 4K video capture built directly into the optical head. Motorized zoom across a 1:6 ratio and a VarioDist objective covering 200 mm to 630 mm let the surgeon change magnification and working distance without breaking sterile position. Dual 300 W xenon sources deliver coaxial illumination deep into narrow corridors. The system is configured for neurosurgery, ENT, and spine procedures.

Six electromagnetic brakes hold every joint of the balanced cantilever arm and release together from either handle, so repositioning takes one button press and one smooth movement. A 360° rotating assistant tube, an inclinable main binocular tube, and adjustable eyecups let two surgeons work at different postures on the same field. Two programmable touch screens and programmable handles store settings for up to ten users.

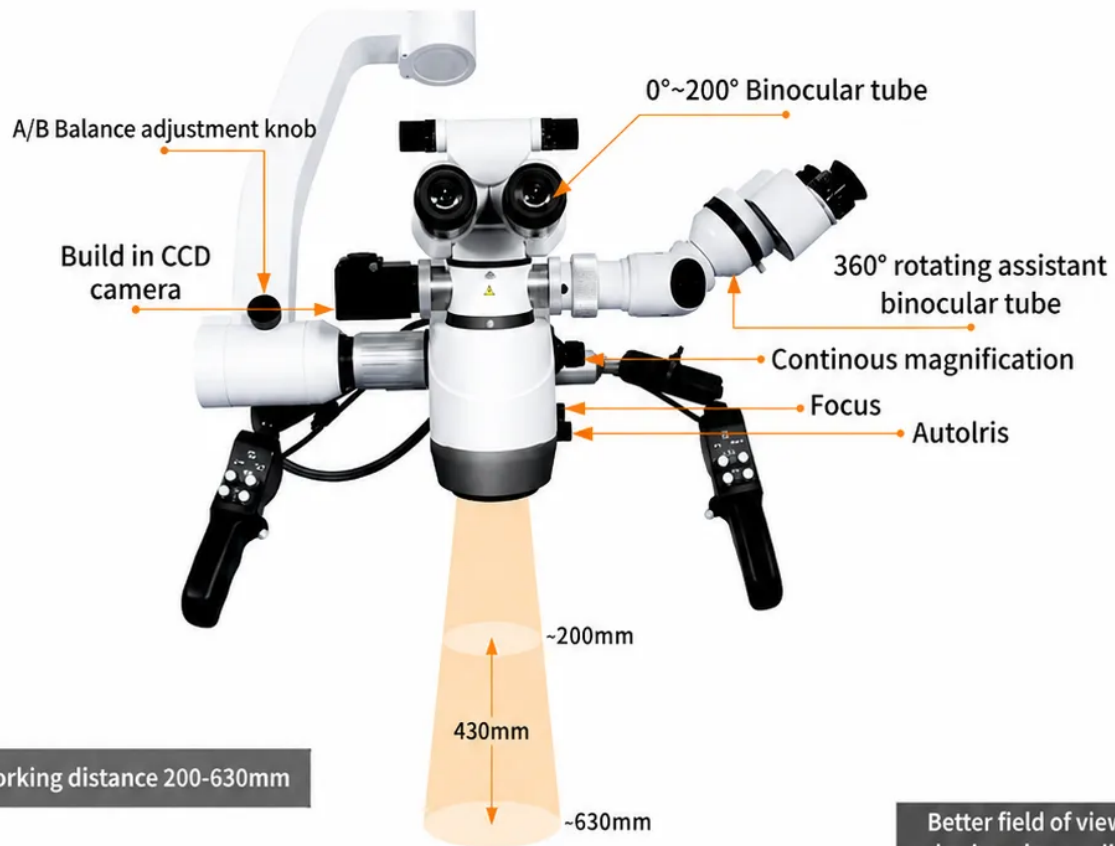
Hospitals adopting the ToronSM™ 640 gain a documentation-ready operating microscope. The integrated 4K CMOS camera records to USB storage and outputs simultaneously over HDMI, DVI, SDI, LVDS, and RJ45 for wall displays, teaching rooms, and surgical video archives. Optional near-infrared fluorescence hardware extends the system to ICG vascular imaging.

APPLICATIONS

4K Surgical Microscope - ToronSM™ 640 Applications

The ToronSM™ 640 supports microsurgical disciplines that depend on high optical resolution, long working distance, and shadow-free coaxial light.

- Neurosurgery: magnified visualization of cortical and subcortical anatomy during tumor resection, aneurysm clipping, and arteriovenous malformation treatment
- Cerebrovascular Surgery: intraoperative assessment of vessel patency during cerebral artery bypass, aided by optional ICG fluorescence imaging
- Spine Surgery: illumination and magnification of the canal and neural elements during decompression, discectomy, and fusion procedures through narrow retractor corridors
- ENT and Otology: middle ear, mastoid, and skull base work where the 200 mm to 630 mm working distance range accommodates deep, angled approaches
- Epilepsy Surgery: precise identification of resection margins in functionally sensitive cortex
- Ophthalmic Surgery: anterior and posterior segment procedures requiring fine focus control and adjustable illumination spot size
- Orthopedic and Reconstructive Microsurgery: nerve repair, vessel anastomosis, and free flap procedures that call for stereoscopic depth perception at high magnification
- Surgical Training and Telemedicine: 4K video output and dual-observer optics for resident teaching, case review, and remote consultation



Better field of view
edge imaging quality

One button autofocus



ASOM - 640



Other similar products



FEATURES

4K Surgical Microscope - ToronSM™ 640 Key Features

The ToronSM™ 640 combines motorized optics, dual-source illumination, and integrated video in one floor-stand platform.

Touch Screen

FI800 fluorescence, WL means off, FL means on, mode changed by touch screen.



12H
Timer



Main lamp

Reset

9H
Timer



Backup lamp

Reset

WL

E



12H
Timer



Main lamp

Reset

9H
Timer



Backup lamp

Reset

FL

E



50 h
Enable timing



Enable main light

Time clearing

50 h
Enable timing



Enable reserve lamp

Time clearing

<<

>>



① User 1

preservation

② User 2

preservation

③ User 3

preservation

④ User 4

preservation

⑤ User 5

preservation

<<

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Xenon lamp timer





50%





⑥ User 6

preservation

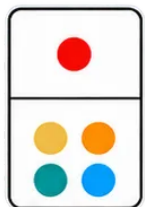


- Six-Point Electromagnetic Braking: all arm and head joints lock and release together from a handle button, giving one-handed repositioning and a firm hold once released
- Motorized 1:6 Zoom with Autofocus: single-button focus and continuous magnification control keep the surgeon's hands on the handles and eyes on the field
- 200 mm to 630 mm VarioDist Objective: electronic focus across the full working distance range removes the need to change objective lenses between procedures
- Dual 300 W Xenon Illumination: a main source plus an on-board backup source, both with lamp-hour counters on the touch screen, reduce the risk of an intraoperative light failure
- Automatic and Manual Spot Tracking: illumination spot size follows magnification in automatic mode or adjusts manually down to an 11 mm minimum for narrow corridors
- Integrated 4K Video with 60 fps Capture: a 1/1.8-inch CMOS sensor records stills and video straight to USB storage and feeds HDMI, DVI, SDI, LVDS, and RJ45 outputs at once
- 0° to 200° Inclined Binocular Tube: adjustable tilt with 48 mm to 78 mm interpupillary range and adjustable eyecups suits surgeons with or without eyeglasses
- 360° Rotating Assistant Tube: a double-sided splitter places the second observer at 90° or 180° to the primary surgeon, with the opposite port free for the camera
- 12.5x High-Eyepoint Eyepieces: extended eye relief keeps the full field visible for surgeons wearing glasses
- Dual Programmable Touch Screens: 7-inch panels display lamp timers, magnification, focal length, and brightness, and store presets for up to ten named users
- Programmable Handle Controllers: left and right grips assign zoom, focus, brake release, image capture, video recording, playback, and brightness to individual buttons
- Optional Programmable Footswitch: duplicates zoom, focus, capture, autofocus, and brightness control for hands-free operation
- Optional Fluorescence Module: 800 nm infrared vascular fluorescence hardware supports ICG imaging, including a fusion display that overlays fluorescence on the live video

- Balanced Cantilever with Electronic Damping: manual balancing on all axes plus damping holds the head steady at high magnification
- X-Y Translator: 80 mm by 80 mm fine positioning with a centering button for precise field adjustment
- Laser-Compatible Design: the head accepts surgical laser use, with a focus lock that maintains alignment when a laser micromanipulator is fitted



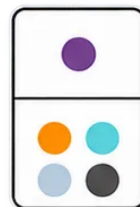
Left Handle Controller



Button diagram

- AF
- Browse pictures
- Short press take pictures / long press take vedios
- Previous picture
- Next picture

Right Handle Controller



Button diagram

- Freeze
- zoom +
- zoom -
- Focus +
- Focus -

THEORY & METHOD

Theory and Method

Surgical microscopes create depth perception by splitting light from a single large objective lens into two separate optical channels, one for each eye. The two channels sample the beam at slightly different angles, and the brain fuses the resulting pair of images into a three-dimensional view. Magnification changes through a Galilean zoom system, a set of movable lens groups that alter the beam path length without shifting focus. The ToronSM™ 640 motorizes that zoom system across a 1:6 range and pairs it with an apochromatic objective that corrects red, green, and blue focus points to a common plane.

Working distance equals the focal length of the objective, so the VarioDist lens changes focus electronically from 200 mm to 630 mm rather than through a swapped lens. Multilayer antireflection coatings raise transmittance to 98% by suppressing the reflections that occur at each glass-to-air surface, which matters across the many elements in a stereo microscope. Light reaches the field coaxially through fiber optics and an aspheric condenser, which converges rays to a tighter, brighter spot than a spherical lens can.

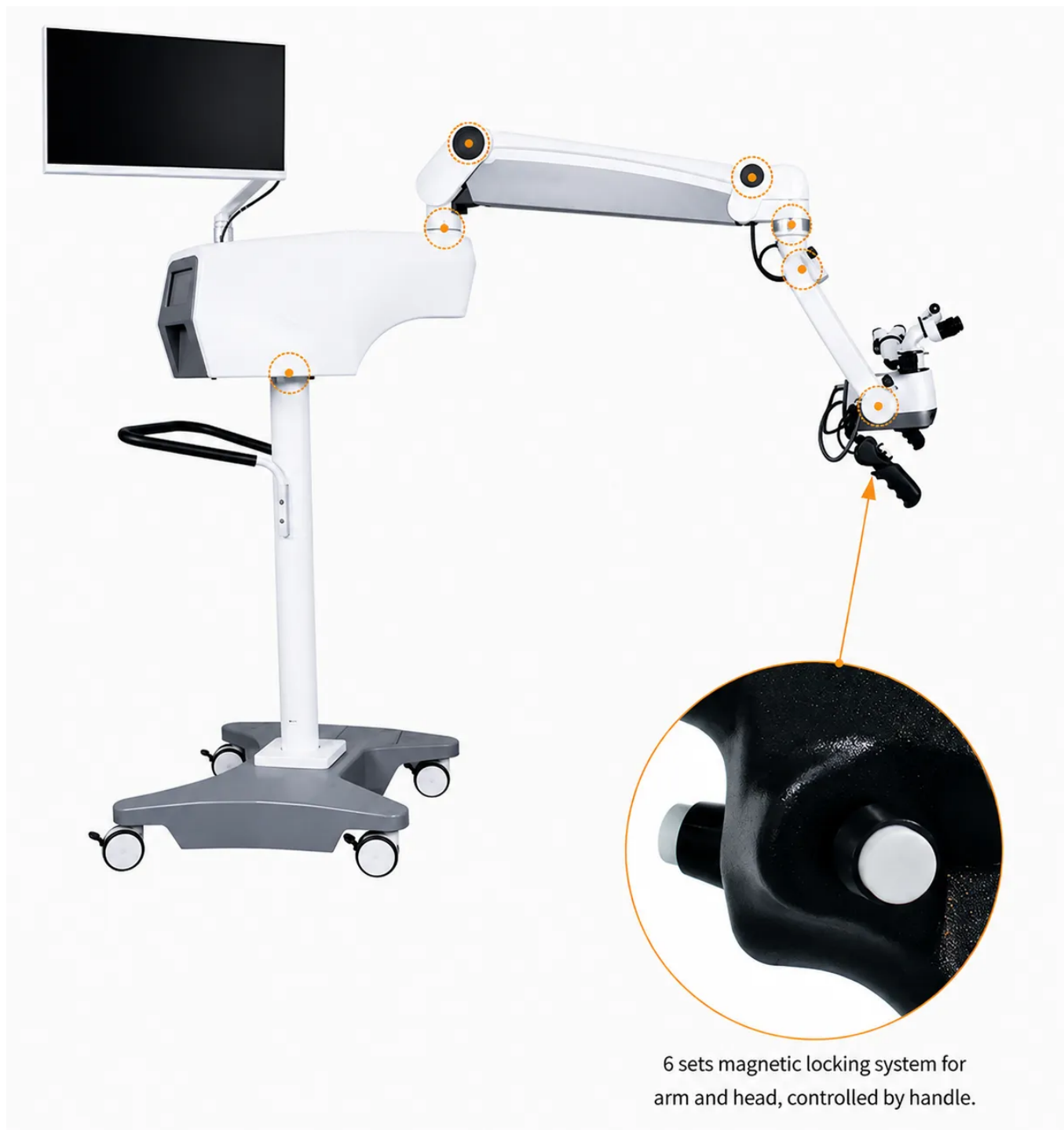
Aperture size governs the trade-off between brightness and depth of field. Opening the iris admits more light but shortens the range of sharp focus, while closing it extends depth at the cost of brightness. The AutoIris function ties aperture and spot diameter to the zoom position, so the illuminated area tracks the field of view automatically and the operator avoids overfilling the wound with light. Near-infrared fluorescence imaging exploits indocyanine green, which absorbs light near 800 nm and re-emits at a longer wavelength that a filtered camera isolates from the visible surgical image.

TECHNICAL SPECIFICATIONS

4K Surgical Microscope - ToronSM™ 640 Technical Specifications

Parameter	Specification
Model	ToronSM™ 640
Application	Neurosurgery, ENT, spine
Magnification	Motorized zoom system, 1:6 zoom ratio
Working Distance	200 mm to 630 mm, motorized multifocal lens, continuously adjustable
Binocular Tube	0° to 200° inclinable
Eyepiece	12.5x / 10x
Interpupillary Distance	48 mm to 78 mm
Diopter Adjustment	+7 D to -7 D or +5 D to -8 D
Field of View	F13.2 mm to F180 mm
Brake System (Head and Arm)	6 sets, electromagnetic
Multifunctional Programmable Handles	Motorized zoom +/-, motorized focus +/-, lock and unlock 3 magnetic brakes, lock and unlock 6 magnetic brakes, video recording, photo capture, image browsing, autofocus, brightness +/-, X-Y movement
Touch Screen	7-inch programmable, displays operating status and main/backup illumination indicators, user profile setting and storage
Assistant Tube	360° rotating
Maximum Resolution	120 line pairs
Illumination System	Coaxial
Light Source	300 W main source and 300 W emergency source
Lamp Switching	Controlled from touch screen
Light Intensity Adjustment	30% automatic intensity increase at maximum magnification; continuous adjustment 0 to 150,000 lux; working-distance dependent brightness limitation; automatic synchronization of light field diameter with magnification

Parameter	Specification
Field of Illumination	Greater than F90 mm
Minimum Spot Size	11 mm
Mount	Floor stand
Maximum Arm Extension	1,980 mm
Height from Objective to Floor	690 mm to 1,452 mm
Cantilever Height Adjustment Range	1,400 mm to 2,240 mm
Minimum Height of Bracket	1,850 mm
Cross Arm Rotation Angle	330°
Cantilever Rotation Angle	330°
Base Size	742 mm × 826 mm
Base Brake System	Four-wheel brake
Optical Transmittance	Up to 98% (multilayer coating)



6 sets magnetic locking system for arm and head, controlled by handle.

Integrated Video System

Parameter	Specification
Image Sensor Size	1/1.8 inch
Image Sensor Type	CMOS
Scanning Method	Progressive
Frame Rate	60 fps
Effective Pixels	3,840 (H) × 2,160 (V)
Horizontal Resolution	≥ 1,700 lines
Vertical Resolution	≥ 1,200 lines
Luminance Response	Linear fitting coefficient $R^2 \geq 0.99$
Signal to Noise Ratio	≥ 50 dB
Spatial Frequency Response	MTF50: 38 C/°, MTF30: 43 C/°
Static Image Tolerance	≥ 150
Minimum Illumination	1 lux at F1.2
Video Coding	H.265
Output Modes	HDMI 2.0, DVI 25+4, SDI 3G, dual 8-bit LVDS, RJ45 1000 Mbit/s, USB 3.0
Storage	Automatic recording to USB drive
Voltage	12 V DC, 2 A
Power Consumption	7.3 W (12 V, 604 mA)
Operating Temperature	5 °C to 40 °C

Parameter	Specification
Working Humidity	30% to 85%, non-condensing
Atmospheric Pressure	700 hPa to 1,060 hPa
Camera Dimensions	Ø25 mm, 148 mm × 100 mm

Accessories and Options

Item	Description
Fluorescence Module	800 nm infrared vascular fluorescence module
Programmable Footswitch	Motorized zoom +/-, motorized focus +/-, video recording, photo capture, image browsing, autofocus, brightness +/-
X-Y Translator	80 mm × 80 mm travel with centering button
Video Adapter	Sony or Canon camera mount
Three-Person Six-Eye Head	Optional microscope head configuration for a third observer
Camera-Assisted Focus	Motorized focus with optional camera-assisted adjustment
Quality Control Software	Integrated software for quality control and traceability

Additional Capabilities

Capability	Description
Laser Compatibility	Compatible with surgical laser use
Laser Focus Lock	Safety mechanism locks focusing during laser micromanipulator use to maintain alignment
Axis Balancing	Manual balancing on all axes
Image Stability	Integrated electronic damping system

Capability	Description
Packaging	Main body box with rack, separate head package box, attachment package box, upper and lower metal plates



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