

**Motic®**

MORE THAN MICROSCOPY



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# SMZ161 SERIES

BASIC STEREO MICROSCOPE



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The SMZ-161 model joins Motic's successful SMZ stereo microscope family by using modern manufacturing materials and LED illumination options. A strong optical performance for best imaging results is combined with robust mechanics for a long life time. The SMZ-161 is a stereo microscope especially meant for educational purposes in High Schools and universities, but also works fine in industrial quality control.

The Greenough optical system delivers clear and distortion-free images. Parfocality is ensured while running through the complete zoom range of 6:1. The implemented click-stops allow precise reproduction of magnification steps for measuring purposes. The large working distance gives sufficient space for sample preparation, using the stunning 3-dimensional upright image.

The SMZ-161 stereo microscope may come as a predefined package solution for basic requirements. The flexibility of the system also allows to implement the optics into a more complex setup with boom stand and external light source.

*Your Motic Europe Team*



# SMZ161

BASIC STEREO MICROSCOPE



# THE MECHANICS

STANDS | OPTICAL HEADS



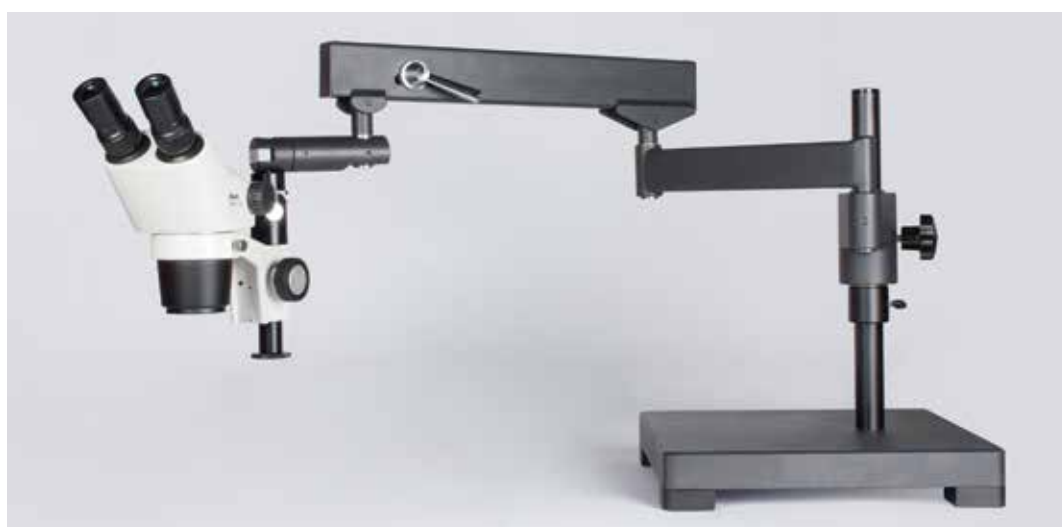
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## FLEXIBILITY FOR A LARGE VARIETY OF SAMPLES

6 predefined packages of the SMZ-161 represent the entry to the SMZ-161 stereo line. The compact Bino/Trino Plain stands are meant to work with an external light source for incident light only. The SMZ161 BL/TL packages come with built-in Halogen illumination for transmitted light (HAL 20W) and incident light (HAL10W). The respective R2LED versions are equipped with 3W LEDs, especially recommended for temperature-sensitive samples. Both incident and transmitted light can be activated and adjusted simultaneously.

Motic's SMZ-161 optical heads come as binocular or trinocular versions with 45° viewing angle. For special experimental setups or OEM cases, a binocular head with 60° viewing angle is also available. The interpupillary distance can be varied from 50-75mm. A diopter adjustment is possible on both eyepiece tubes. The anti-fungus treatment of inner lens surfaces allows to work in humid environments. Once the optical head is placed into the dovetail based focusing mechanism, a smooth focusing and stable focus positions are ensured, while a "slip function" helps to prevent excessive gear extrusion when coming to the upper or lower end positions.

More extraordinary requirements for workplace are fulfilled by the boom stands of the SMZ-161 system. These stands are meant for larger samples, offering more handling freedom. A new slot/groove design helps to stabilize the exact positioning of the optics. For an easier transport, all base plates show an "easy hand-carrying shape". All boom stands require a separate illumination following the requirements of the sample.



# THE OPTICS

OBJECTIVES | EYEPIECES



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## IMPROVED RESOLUTION WITH FLEXIBLE OPTICS

Working with the SMZ-161, it is an easy task to step down from sample overview to minute details. One rotation of the zoom knob gives access to the complete zoom range of 6:1, resulting in a magnification range of 7.5X-45X with standard WF 10X/20mm eyepieces.

Due to the parfocal optical design, a re-adjustment of the focus position is not necessary while zooming. Defined click-stop positions within the continuous zoom allow an exact reproduction of the magnification, a necessary precondition for reproducible measurements.

To vary the model's magnification range, a complete selection of auxiliary objectives and eyepieces is available - extending the SMZ-161's total magnification from 2.25X up to 180X. The higher magnification eyepieces N-WF 15X/16 and N-WF 20X/13 help to increase the total magnification while keeping the basic working distance of 110mm. Auxiliary objectives with <math><1X</math> magnification may be screwed onto the optical body, while increasing the working distance. Magnification and resolution can be increased with objectives >1X factor.



# THE ILLUMINATION

LIGHT SOURCES | INCIDENT AND TRANSMITTED LIGHT





## FLEXIBILITY FOR OPAQUE AND TRANSPARENT SAMPLES

Illumination in general is a key issue when using a stereo microscope. To reveal all secrets of the sample, the characteristics of the different light sources and illumination methods have to be taken into consideration.

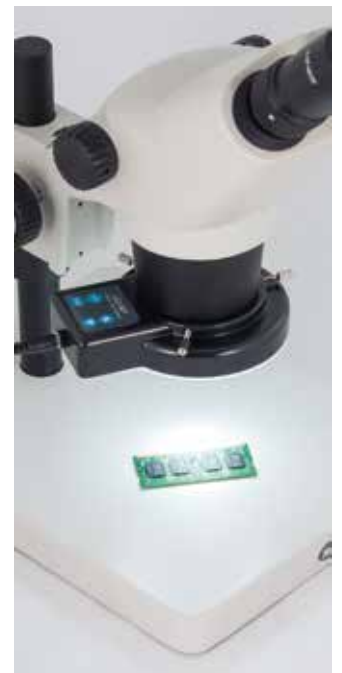
Motic offers a wide range of illumination options to be combined with the SMZ-161 optics. The built-in illumination of the basic stands provide the most compact solution with small footprint for easy storage. Especially for biological samples, Motic recommends its LED versions due to a negligible heat development and minimized impact on living specimens. However, for more demanding applications, a more powerful illumination may be necessary. A ring light solution always is recommended for a shadow-free image as the sample is illuminated from all directions. A segmentable ring light gives additional flexibility for an unilateral illumination.

The visualization of a surface topography needs an oblique or even flat illumination by combining a cold light source with a light guide. Motic's MLC-150 offers more illumination power in combination with maximum flexibility.

MLC-150 FIBER OPTIC ILLUMINATOR



RING LIGHT



# THE ACCESSORIES

STAGES | OPTICAL COMPONENTS



## SAMPLE HANDLING AND ADDITIONAL CONTRAST METHODS

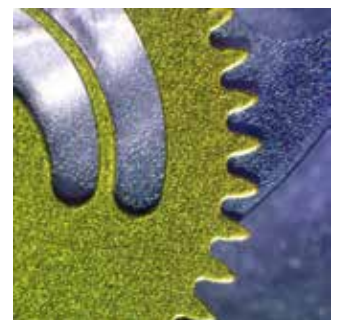
Especially when working with higher magnifications, handling of samples becomes more sensitive to vibrations. An exact positioning for manipulation work with tweezers and needles may also be difficult. Appropriate solutions to increase working comfort are offered with the SMZ-161's optional stage accessories.

The Gliding Stage has to be placed onto the base plate of the stand and allows a smooth multidirectional movement and rotation of the sample.

To analyze the birefringence of transparent materials, a polarizing set-up is required. The respective polarizer/analyzer combination for SMZ-161 is fixed on top of the light exit of a transmitted light stand. Rotation of the polarizer is possible for maximum extinction.

For darkfield applications, a special DF insert is mounted on top of the light exit of the transmitted light stand. The iris diaphragm allows a variation of the illumination angle following the Numerical Aperture of the objective in use.

POLARIZING SET-UP



GLIDING STAGE



# DOCUMENTATION

STANDARD PHOTOMICROGRAPHY | DIGITAL DOCUMENTATION



- INTRODUCTION
- THE MECHANICS
- THE OPTICS
- THE ILLUMINATION
- THE ACCESSORIES
- DOCUMENTATION**
- SPECIFICATIONS



## FLEXIBLE DOCUMENTATION OPTIONS

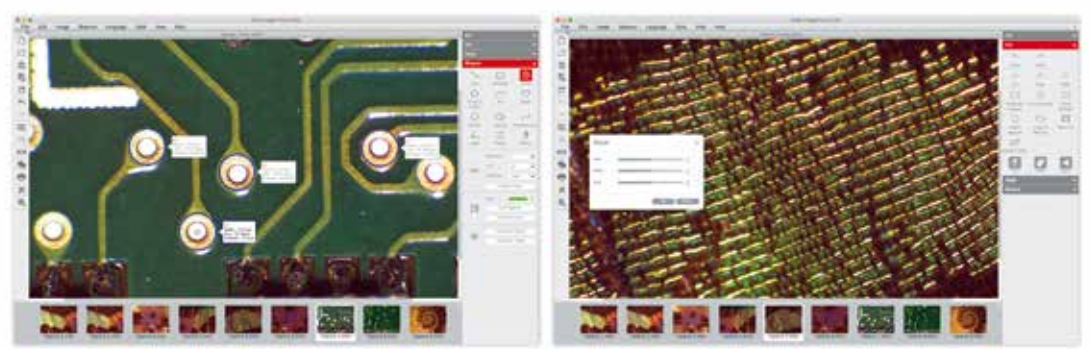
Today, accurate documentation has been established as an important part in natural sciences and industrial quality control. The SMZ-161 models offer a choice of different imaging options.

**Standard Photomicrography |** The traditional use of a single lens reflex camera requires a Trinocular version of the SMZ-161. The adaption of the camera consists of a mechanical adapter combined with a photo eyepiece. The necessary T2 adapter specifically fits to the camera model and is supplied by photo specialist shops. This setup delivers high resolution images of small fields.

**Digital Documentation |** The Moticam series of digital c-mount cameras delivers excellent live images, ready for presentations and further storage. All Motic cameras come equipped with proprietary software to transform the SMZ-161 into an analysis and documentation station.

Besides the standard USB cameras, which work through a computer, we offer solutions to fit with every user need. The new Moticam Full HD cameras are ideal for the presentation of High Resolution images on an HDMI screen without computer, as they can be easily controlled with the help of a mouse.

The Wi-Fi models are dedicated to run under tablet and smartphone control through our free “MotiConnect” App, whereas the tablet cameras with touch screen in first instance work as a fixed monitor solution, but may also create a hotspot for remote tablet/smartphone access.



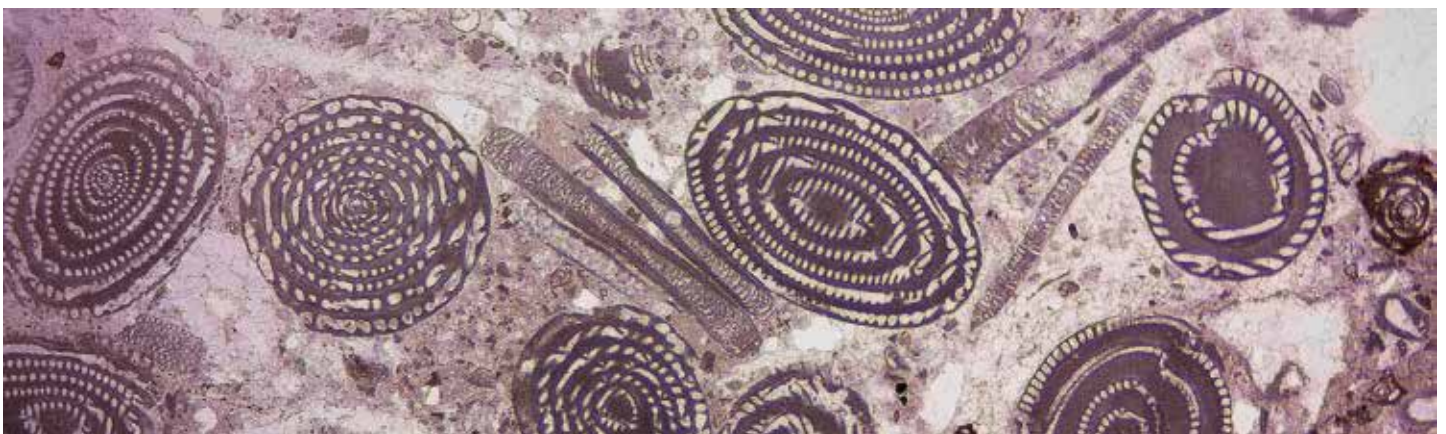
MOTIC IMAGES PLUS 3.0 | Image analysis software for computers

# SPECIFICATIONS

## SMZ161 | OPTICAL DATA

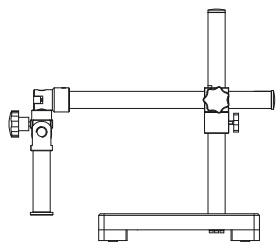
	Standard Objective	2X Auxiliar Objective
Max. Resolution	210 lp/mm	420 lp/mm
Maximum N.A	0.07	0.14
DOF	0.10 mm	0.025 mm

Eyepiece	Magnification (X)	Standard Objectives		Auxiliary Objectives											
		WD 110mm		0.3X		0.5X		0.63X		0.75X		1.5X		2X	
		Mag.(X)	F.N.(mm)	Mag.(X)	F.N.(mm)	Mag.(X)	F.N.(mm)	Mag.(X)	F.N.(mm)	Mag.(X)	F.N.(mm)	Mag.(X)	F.N.(mm)	Mag.(X)	F.N.(mm)
10X/20 high eyepoint eyepiece	0.75	7.50	26.67	2.25	88.89	3.75	53.33	4.73	42.33	5.63	35.56	11.25	17.78	15.00	13.33
	1	10.00	20.00	3.00	66.67	5.00	40.00	6.30	31.75	7.50	26.67	15.00	13.33	20.00	10.00
	2	20.00	10.00	6.00	33.33	10.00	20.00	12.60	15.87	15.00	13.33	30.00	6.67	40.00	5.00
	3	30.00	6.67	9.00	22.22	15.00	13.33	18.90	10.58	22.50	8.89	45.00	4.44	60.00	3.33
	4	40.00	5.00	12.00	16.67	20.00	10.00	25.20	7.94	30.00	6.67	60.00	3.33	80.00	2.50
	4.5	45.00	4.44	13.50	14.81	22.50	8.89	28.35	7.05	33.75	5.93	67.50	2.96	90.00	2.22
10X/23	0.75	7.50	30.67	2.25	102.22	3.75	61.33	4.72	48.68	5.62	40.89	11.25	20.44	15.00	15.33
	1	10.00	23.00	3.00	76.67	5.00	46.00	6.30	36.51	7.50	30.67	15.00	15.33	20.00	11.50
	2	20.00	11.50	6.00	38.33	10.00	23.00	12.6	18.25	15.00	15.33	30.00	7.67	40.00	5.75
	3	30.00	7.67	9.00	25.56	15.00	15.33	18.90	12.17	22.50	10.22	45.00	5.11	60.00	3.83
	4	40.00	5.75	12.00	19.17	20.00	11.50	25.20	9.13	30.00	7.67	60.00	3.83	80.00	2.88
	4.5	45.00	5.11	13.5	17.04	22.5	10.22	28.35	8.11	33.75	6.81	67.50	3.41	90.00	2.56
15X/16 high eyepoint eyepiece	0.75	11.25	21.33	3.375	71.11	5.62	42.67	7.09	33.86	8.43	28.44	16.87	14.22	22.5	10.67
	1	15.00	16.00	4.50	53.33	7.50	32.00	9.45	25.40	11.25	21.33	22.50	10.67	30.00	8.00
	2	30.00	8.00	9.00	26.67	15.00	16.00	18.9	12.70	22.50	10.67	45.00	5.33	60.00	4.00
	3	45.00	5.33	13.50	17.78	22.50	10.67	28.35	8.47	33.75	7.11	67.50	3.56	90.00	2.67
	4	60.00	4.00	18.00	13.33	30.00	8.00	37.80	6.35	45.00	5.33	90.00	2.67	120.00	2.00
	4.5	67.50	3.56	20.25	11.85	33.75	7.11	42.52	5.64	50.62	4.74	101.25	2.37	135.00	1.78
20X/12 high eyepoint eyepiece	0.75	15.00	16.00	4.50	53.33	7.50	32.00	9.45	25.40	11.25	21.33	22.50	10.67	30.00	8.00
	1	20.00	12.00	6.00	40.00	10.00	24.00	12.60	19.05	15.00	16.00	30.00	8.00	40.00	6.00
	2	40.00	6.00	12.00	20.00	20.00	12.00	25.20	9.52	30.00	8.00	60.00	4.00	80.00	3.00
	3	60.00	4.00	18.00	13.33	30.00	8.00	37.80	6.35	45.00	5.33	90.00	2.67	120.00	2.00
	4	80.00	3.00	24.00	10.00	40.00	6.00	50.40	4.7	60.00	4.00	120.00	2.00	160.00	1.50
	4.5	90.00	2.67	27.00	8.89	45.00	5.33	56.70	4.23	67.50	3.56	135.00	1.78	180.00	1.33
20X/13	0.75	15.00	17.33	4.50	57.78	7.50	34.67	9.45	27.51	11.25	23.11	22.50	11.56	30.00	8.67
	1	20.00	13.00	6.00	43.33	10.00	26.00	12.60	20.63	15.00	17.33	30.00	8.67	40.00	6.50
	2	40.00	6.50	12.00	21.67	20.00	13.00	25.20	10.32	30.00	8.67	60.00	4.33	80.00	3.25
	3	60.00	4.33	18.00	14.44	30.00	8.67	37.80	6.88	45.00	5.78	90.00	2.89	120.00	2.17
	4	80.00	3.25	24.00	10.83	40.00	6.50	50.40	5.16	60.00	4.33	120.00	2.17	160.00	1.63
	4.5	90.00	2.89	27.00	9.63	45.00	5.78	56.70	4.59	67.50	3.85	135.00	1.93	180.00	1.44



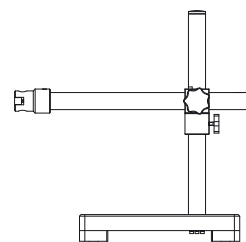
# SPECIFICATIONS

## SMZ161 | BOOM STANDS



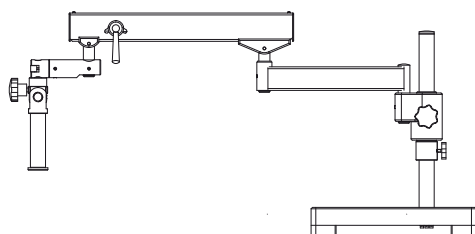
Special Universal stand (squared base)

Base: 300x300x50 mm  
 Vertical pole: Ø32mm  
 Height of vertical pole: 400mm (optional: 600mm)  
 Focusing pole: Ø25mm  
 Max. distance from pole to optical centre: 537mm



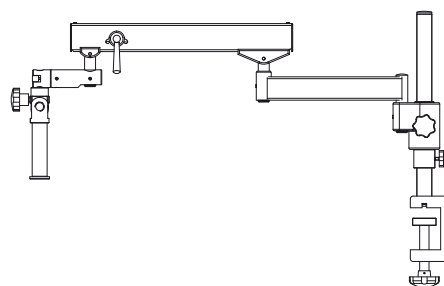
Industrial arm boom stand

Base: 300x300x50 mm  
 Vertical pole: Ø32mm  
 Height of vertical pole: 400mm (optional: 600mm)  
 Industrial arm: Ø16mm  
 Max. distance from pole to optical centre: 537mm  
 Connected with the industrial arm directly without focusing connector



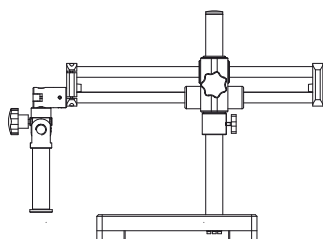
Articulating boom stand

Base: 350x350x58 mm  
 Vertical pole: Ø32mm  
 Height of vertical pole: 400mm (optional: 600mm)  
 Focusing pole: Ø25mm  
 Max. distance from pole to optical centre: 955mm



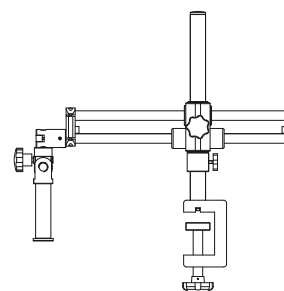
Articulating boom stand (clamp version)

Vertical pole: Ø32mm  
 Height of vertical pole: 400mm (optional: 600mm)  
 Focusing pole: Ø25mm  
 Maximum thickness of table: 75mm  
 Max. distance from pole to optical centre: 955mm



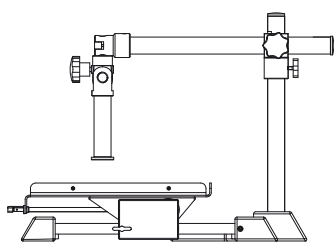
Ball bearing boom stand

Base: 300x300x50 mm  
 Vertical pole: Ø32mm  
 Height of vertical pole: 400mm (optional: 600mm)  
 Focusing pole: Ø25mm  
 Max. distance from pole to optical centre: 575mm



Ball bearing boom stand (clamp version)

Vertical pole: Ø32mm  
 Height of vertical pole: 400mm (optional: 600mm)  
 Focusing pole: Ø25mm  
 Maximum thickness table: 75mm  
 Max. distance from pole to optical centre: 575mm



Manual movement stand

Surface perimeter: 450mm x 350mm  
 X movement: 410mm / Y movement: 220mm  
 Vertical pole: Ø32mm  
 Height of vertical pole: 400mm (optional: 600mm)  
 Focusing pole: Ø25mm

# SPECIFICATIONS

## SMZ161 COMPARISON TABLE



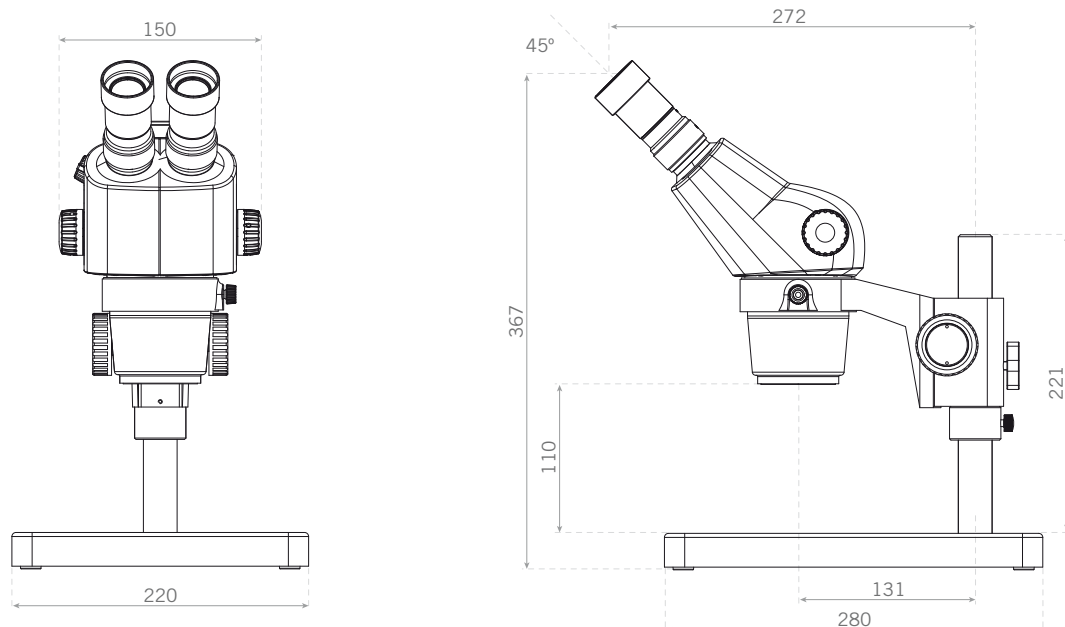
	SMZ161-BP	SMZ161-TP	SMZ161-BL	SMZ161-TL	SMZ161-BLED	SMZ161-TLED
<b>Greenough Optical System</b>	•	•	•	•	•	•
<b>Observation tube</b>						
Binocular head with diopter adjustment on both eyepiece tubes	•		•		•	
Trinocular head with diopter adjustment on both eyepiece tubes		•		•		•
<b>Interpupillary distance: 50-75mm</b>	•	•	•	•	•	•
<b>Trinocular light split: fixed optical split 50:50</b>		•		•		•
<b>Inclination: 45°</b>	•	•	•	•	•	•
<b>Eyepieces: WF10X/20mm</b>	•	•	•	•	•	•
<b>Objectives system: Zoom system, ratio 1:6</b>	•	•	•	•	•	•
<b>Objectives magnification: 0,75X ~ 4,5X</b>	•	•	•	•	•	•
<b>Working distance: 110mm</b>	•	•	•	•	•	•
<b>Stand</b>						
Pole type stand without illumination	•	•				
Pole type stand with incident and transmitted illumination			•	•	•	•
<b>Base</b>						
280x220mm	•	•				
237x170mm			•	•	•	•
<b>Column / Arm</b>						
Ø 25mm, 221mm height	•	•				
Ø 25mm, 205mm height			•	•	•	•
<b>Head holder</b>						
for Ø 25mm column and Ø 76mm head without illumination	•	•				
for Ø 25mm column and Ø 76mm head with incident illumination			•	•	•	•
<b>Coarse focusing system with tension adjustment</b>	•	•	•	•	•	•
<b>Focusing stroke 43mm</b>	•	•	•	•	•	•
<b>Incident illumination</b>						
12V/10W Quartz halogen with intensity control			•	•		
3W LED with intensity control					•	•
<b>Transmitted illumination</b>						
12V/10W Quartz halogen with intensity control			•	•		
3W LED with intensity control					•	•
<b>Internal transformer</b>			•	•	•	•
<b>Accessories included</b>						
Dust cover	•	•				
Black, white and frosted stage plates and dust cover			•	•	•	•
<b>Dimensions</b>						
280x220x367mm	•	•				
237x170x398mm			•	•	•	•



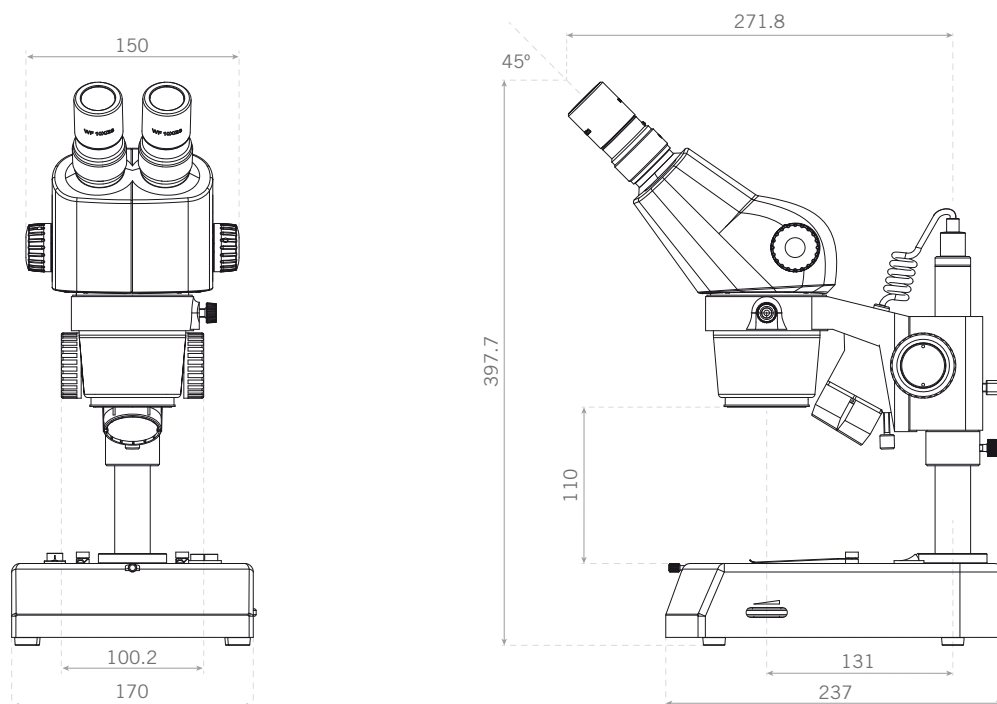
# SPECIFICATIONS

## SMZ161 SCHEMATIC DIAGRAMS

### SMZ-161-BP

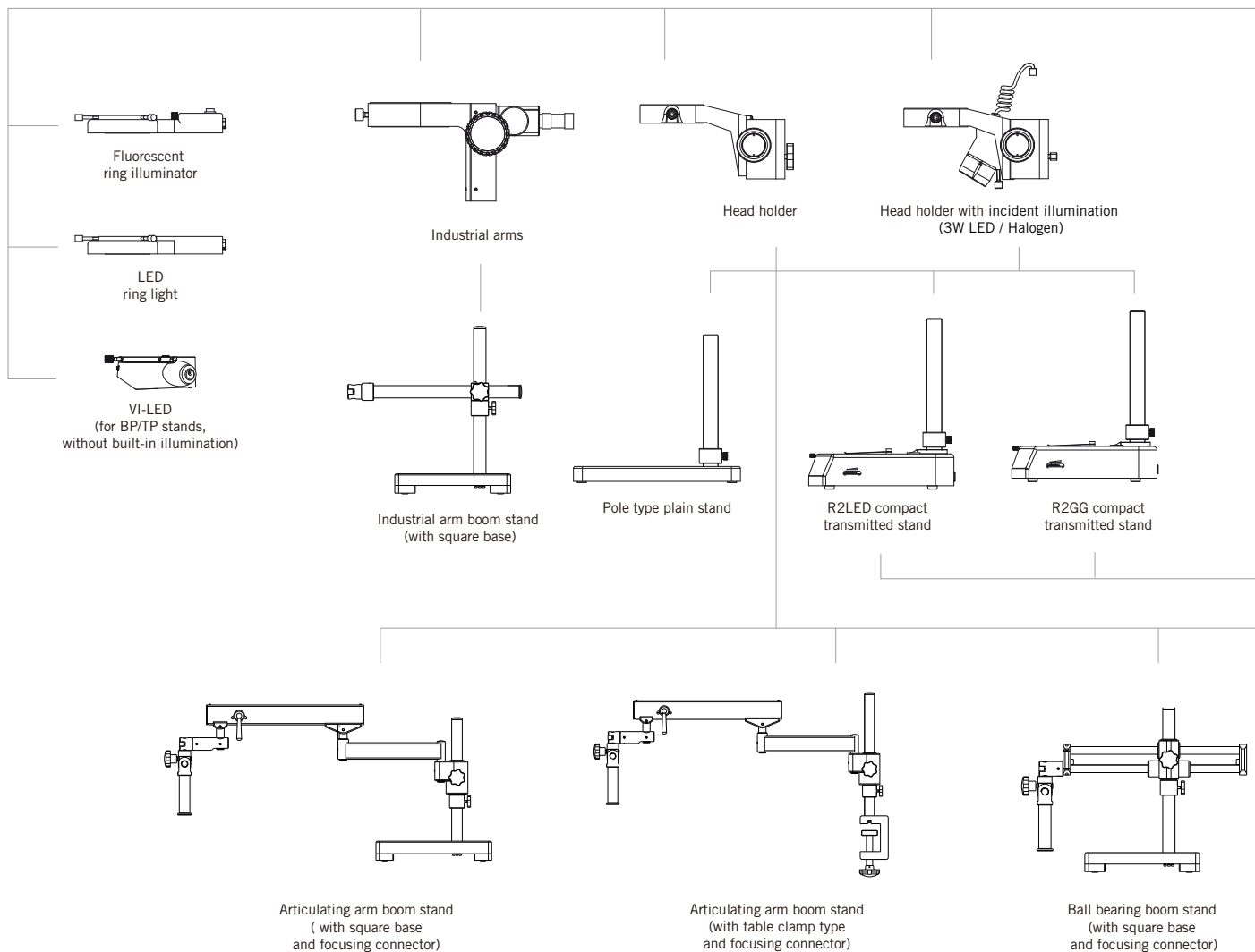
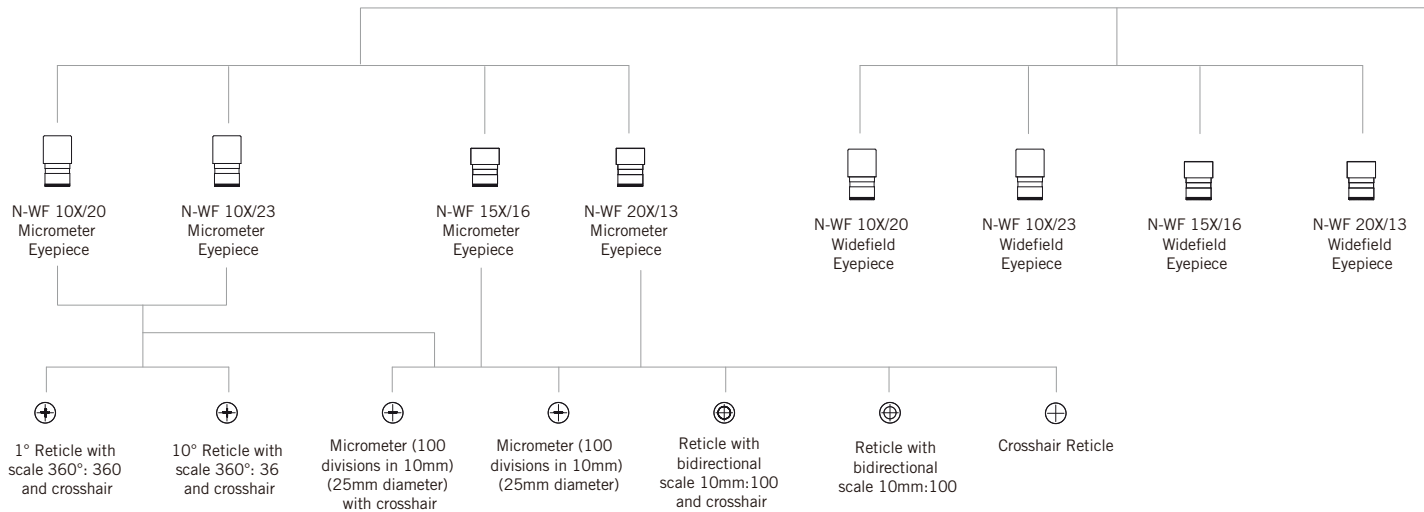


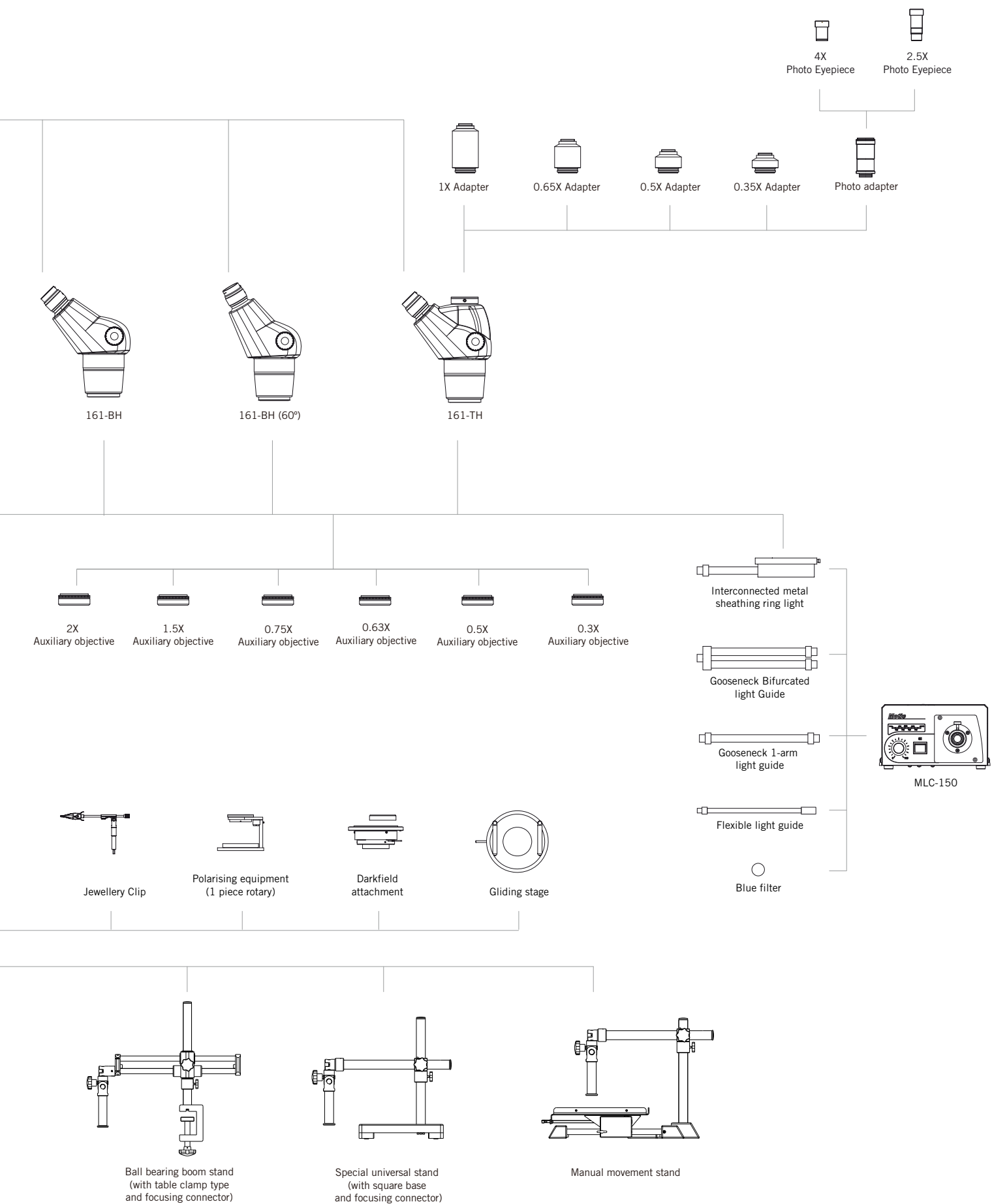
### SMZ-161-BL SMZ-161-BLED



# SPECIFICATIONS

## SMZ161 SYSTEM DIAGRAM





# Motic®

Canada | China | Germany | Spain | USA



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Design Change: The manufacturer reserves the right to make changes in instrument design in accordance with scientific and mechanical progress, without notice and without obligation.

Designed in Barcelona (Spain)

April 2017



Official Distributor: