

**Motic®**

MORE THAN MICROSCOPY



**SMZ168**

**Versatile  
Stereo Microscope  
Solution**



# SMZ168

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Stereo Microscope  
Solution**

**T**he **SMZ168** Stereo Zoom microscope represents **the top-of-the-line** model in Motic's successful SMZ Series of stereo microscopes. Designed for a wide range of **biological** and **material science applications**, the SMZ168's optical quality and versatile accessories will satisfy the most demanding user applications **in both routine and research fields**. From industrial quality control to biological preparation work, the SMZ168 is a durable workhorse model ready for a variety of applications.

Its **Greenough optical system** comes with a large **zoom range of 6.7:1, parfocal at all magnifications**. Its **5-position click-stop** magnification mechanism, implemented into the continuous zoom, enables **precise reproduction of magnifications**, thus simplifying measurements.

An impressive 3-dimensional upright image, combined with an industry leading **working distance of 113mm** in its standard configuration, allows easy manipulation of the sample. Further, the SMZ168 can convert easily into a complete documentation station by combining it with a member of the Moticam camera series.





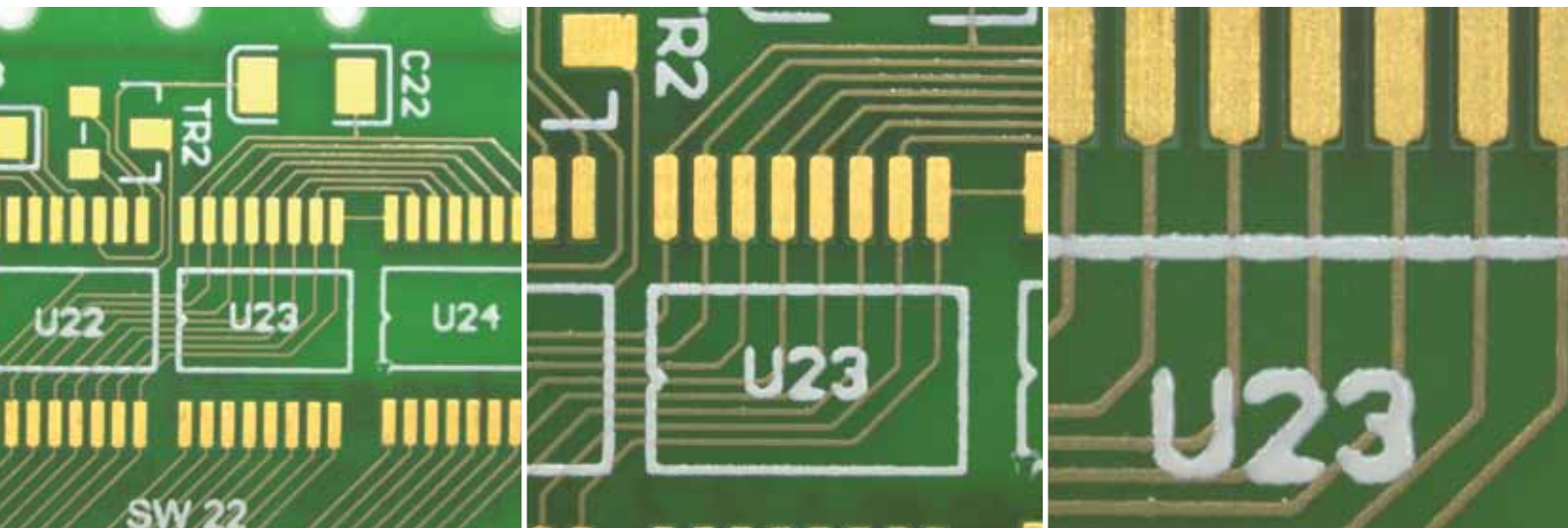


## Zoom Range

With the SMZ168, changing from a macro sample overview down to viewing micro details becomes an easy task. With **one rotation of the zoom knob**, the **complete magnification range** can be easily accessed. Five defined **click-stop positions within this continuous zoom** allow exact reproduction of magnification, a necessary precondition for **precise measurements** - especially for critical measurements done by reticules or digital cameras.

The standard configuration of a 6.7:1 zoom ratio enables a total magnification of 7.5X-50X. No need for re-adjusting the focus while changing the zoom position, the complete optical system is designed for **parfocality through the complete zoom range**.

**To increase the model's magnification range** there is a selection of **auxiliary objectives** and **eyepieces** available. The SMZ168's total magnification range can be extended from 3.8X up to 320X.





## Auxiliary Objectives

The **standard configuration** of the SMZ168 has a **working distance of 113mm**, offering sufficient space for sample manipulation under the microscope. The maximum field diameter (with lowest zoom position and 10X eyepieces) will be 30.7mm.

Higher magnifications can be achieved by using the following auxiliary objectives:

Magnification	W.D. (mm)	Max. Field diameter (with 10X eyepiece)
1.5X	50	20.4
2.0X	34	15.3

To get a larger overview the customer may choose between the following options:

Magnification	W.D. (mm)	Max. Field diameter (with 10X eyepiece)
0.3X	324	102.2
0.5X	192	61.3
0.63X	156	48.7
0.75X	127	40.9





## Eyepieces

The SMZ168's **standard Widefield 10X/23mm** eyepieces come with rubber eye guards to minimize stray light, while increasing viewing comfort for the user. The **high eyepoint principle** of these eyepieces provides spectacle wearers a sharp and true colour image over the complete field of view. Spectacle wearers will also appreciate the **diopter adjustment of +/- 5 dpt** on each eyepiece tube.

Beside the standard 10X eyepiece magnification, the SMZ168 Series also offers eyepieces with **alternative magnifications**:

Description	F.N.
Widefield WF 5X	23
Widefield WF 6.25X	23
Widefield WF 15X	17
Widefield WF 20X	13
Widefield WF 30X	8
Widefield WF 32X	8

## Measuring Eyepieces

For more detailed measuring applications, a series of special eyepieces with built-in reticules are available.



WF 10X/23mm  
with graduated linear line,  
point= 0.2mm/14mm



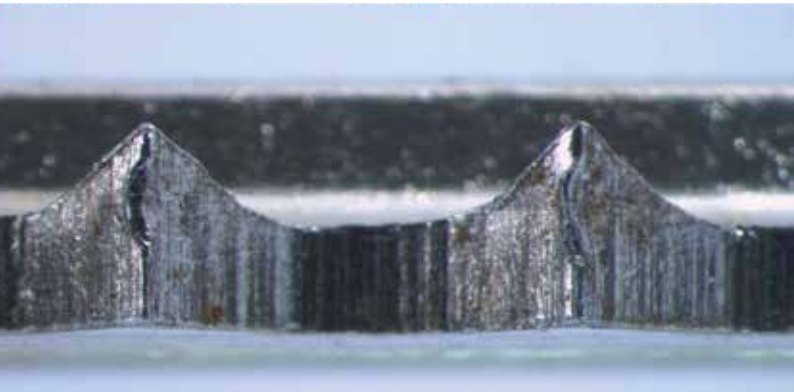
WF 20X/13mm  
with graduated linear line  
and double cross hair,  
point= 0.1mm/10mm



WF 10X/23mm  
with graduated linear line  
and plain cross hair,  
point= 0.1mm/14mm



WF 10X/23mm  
with 360° protractor,  
10° increments



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### 3-D Image

Stereo microscopes have a wide variety of uses in numerous professional applications such as the life sciences, industry, as well as in areas of botany or mineralogy.

The upright image of a stereo microscope is perfect for manipulation work on the specimen; while there is no need for a special preparation of the sample.

Motic's SMZ168 is based on the Greenough Optical System, an optical concept proven for more than 100 years in microscope history. With separated optical paths for both eyes, the SMZ168 delivers **impressive 3-D images, distortion-free**, with an uncompromised high resolving power (220 lp/mm in standard configuration).

## The Working Distance

Sample manipulation is a major activity when using a stereo microscope. For this, the SMZ168's extended working distance will help practitioners when using tweezers, needles or similar dissection tools.

With its standard configuration, the SMZ168 provides a large **working distance of 113 mm**, which can be easily **extended to 324mm** (with additional auxiliary objective 0.3X). Objective magnifications lower than 1X may be compensated by using high magnification eyepieces (up to 32X).

Example:

Standard configuration, eyepieces 10X,  
max. zoom position:

Total magnification 50X

The same total magnification can be  
achieved by:

Objective 0.5X, eyepieces 20X, max.  
zoom position.







## Standard Packages

The standard packages of Motic's SMZ168 come as **Binocular** or **Trinocular** versions with **35° viewing angle**, 10X eyepieces and standard 1X objective. For Industrial inspection or OEM applications, a **special Binocular zoom body with 60° viewing angle** is available.

Both standard zoom bodies can be combined with a **Plain stand** (without illumination) or with a **Transmitted light stand**, integrating an incident & transmitted light illumination. The incident/transmitted light stand may come with 12V/10W Halogen or 3W LED, which can be activated separately and simultaneously.

### The standard packages



SMZ-168-BP

SMZ-168-BL

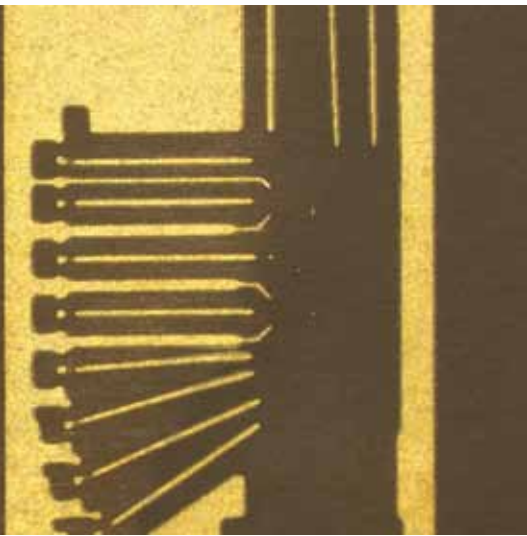
SMZ-168-BLED

SMZ-168-TP

SMZ-168-TL

SMZ-168-TLED

Description	SMZ-168-BP	SMZ-168-BL	SMZ-168-BLED	SMZ-168-TP	SMZ-168-TL	SMZ-168-TLED
Binocular Zoom Body	●	●	●			
Trinocular Zoom Body				●	●	●
Head holder/focusing drive with incident light halogen 12V/10W		●			●	
Head holder/focusing drive with incident light LED			●			●
Head holder/focusing drive without incident light	●			●		
Plain Stand	●			●		
Stand with transmitted light halogen 12V/10W		●			●	
Stand with transmitted light LED			●			●



## Modularity

Besides the standard packages, the SMZ168 also offers a **modular component system** so that the instrument can be configured according to personal preferences and requirements. Stands, optical setup with objectives/eyepieces and further accessories can be combined to freely build to the end-users application requirements.

For larger viewing samples, the standard Plain or Transmitted light stands can be replaced by one of the following stand options, which all **increase user freedom**.

**All these stands require a separate illumination system following the requirements of the sample.**

### 1. Universal stand

- Base  $\varnothing$ : 380mm
- Vertical pole  $\varnothing$ : 25mm
- Height of pole: 200mm
- Focusing pole diameter: 32mm
- Max. distance from pole to optical centre: 465mm

### 2. Special Universal stand

- Vertical pole  $\varnothing$ : 25mm
- Width and length of base: 250mm
- Height of pole: 350mm
- Focusing pole diameter: 32mm
- Max. distance from pole to optical centre: 465mm

### 3. Articulated boom stand, clamp version

- Vertical pole  $\varnothing$ : 36mm
- Focusing pole diameter: 32mm
- Max. distance from pole to optical centre: 780mm

### 4. Articulated boom stand

- Vertical pole  $\varnothing$ : 36mm
- Width of base: 300mm
- Length of base: 300mm
- Focusing pole diameter: 32mm
- Max. distance from pole to optical centre: 780mm

### 5. Ball bearing boom stand, clamp version

- Vertical pole  $\varnothing$ : 36mm
- Focusing pole diameter: 32mm
- Max. distance from pole to optical centre: 638mm

### 6. Ball bearing boom stand

- Vertical pole  $\varnothing$ : 36mm
- Width and length of base: 300mm
- Focusing pole diameter: 32mm
- Max. distance from pole to optical centre: 638mm

### 7. Manual movement stand

- Surface perimeter: 450x350mm
- X movement: 400mm
- Y movement: 210mm







## Illumination

Illumination is one of the most critical elements for the proper use of a stereo microscope. To meet these illumination needs, Motic offers a wide range of illumination options to be combined with the SMZ168 optics.

The **built-in illumination of the basic stands**, whether Halogen or LED, provide the **most compact** and easy illumination options. Especially for **living samples** in biology, **LED** illumination is preferred due to minimal heat development, resulting in minimized impact on the specimen.

However, for more demanding samples, a more powerful or variable solution may be required. A **ring light** might be required for a **shadow-free image**, while the visualization of a surface structure may need a unidirectional illuminator by combining a cold light source with a light guide.

Optional ring lights are:

**2401K Fluorescent ring illumination 220V/12W**  
6400K color temperature (CE)

**LED ring illumination 60T-B dimmable**  
+/- 6800K color temperature (CE)

**LED ring illumination 60T dimmable and segmentable**  
+/- 6500K color temperature (CE)





A **more powerful solution** is provided by the Motic **Cold light source MLC-150**. A variety of light guides for flexible illumination options are also available.



**MLC-150 Fiber optic illuminator**

- 21V/150W Halogen Illumination
- Switching power supply 100-240V (CE)
- Local/remote switch for intensity control
- Color temperature LED read out

Available Light guides for MLC-150:



**Flexible PVC sheathing light guide**

1.5m length with standard straight distal end type



**Ring light guide Ø 61mm**

1m length with Ø 61mm distal end



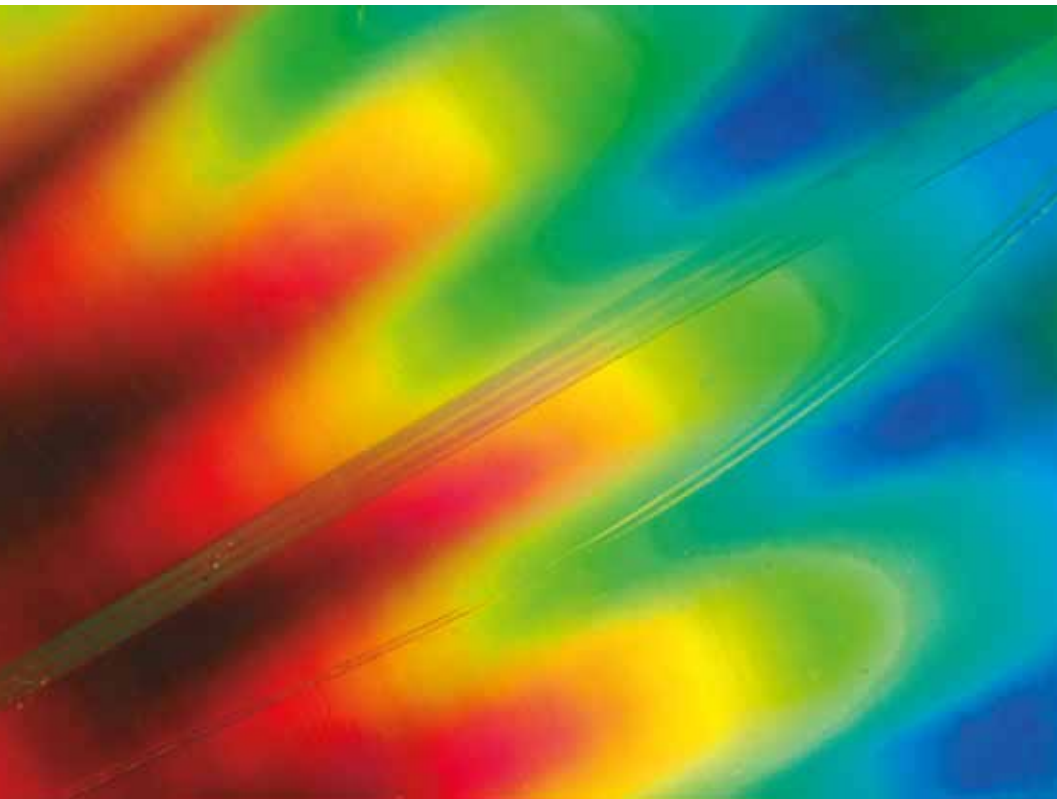
**Gooseneck 1-Arm light guide**

0.5m length with standard straight distal end type



**Gooseneck 2-Arm light guide**

0.5m length with standard straight distal end type



## Accessories

Especially when working with higher magnifications, **handling samples** becomes more difficult. For these demanding samples, an appropriate solution to increase viewing comfort may be found within the SMZ168's optional stage accessories.

### Gliding stage

For smooth multidirectional movement of the sample, a **360° rotatable gliding stage** is available. This stage is **mounted onto the base plate** of a Plain or Transmitted light stand.



### x/y-stage with rotatable insert

An attachable x/y-stage with **76X54mm travel range** enables a precise bidirectional movement. A rotatable insert is available as an option.



### Contrast accessories

#### Polarizer, Analyzer

To analyze the **birefringence of transparent materials**, a polarizing set-up is required. The respective **polarizer** for the SMZ168 is fixed on top of the light exit of a transmitted light stand, while the **analyzer** is clamped on the objective. **Both polarizer and analyzer are 360° rotatable.**

#### Darkfield insert

For Transmitted light, an easy-to-use **Darkfield insert** is mounted **on top of the light exit** of any transmitted light stand (Halogen or LED). The iris diaphragm allows varying the **illumination aperture** according to the numerical aperture of the objective in use.



# Documentation

Accurate image documentation is becoming an industry standard and is an important part in the makeup of the SMZ168 for the natural sciences and industrial markets. The SMZ168 Series offers a wide variety of imaging choices, depending on your sample's requirements.

## Standard Photomicrography

The adaptation of a traditional single lens reflex camera (SLR), today mostly digital, requires a Trinocular version of the SMZ168. The camera adapter consists of a **mechanical component, combined with a photo eyepiece 2X**. The **necessary T2 adapter** which connects to the camera's bayonet mount-type is supplied by the respective camera manufacturer. This setup delivers **high resolution images of small fields**.

## Digital Documentation

A more convenient setup is provided through **Motic's philosophy of easy image digitalization**. The combination of a SMZ168 with a member of the Moticam Series of digital cameras delivers **excellent live images**, which can easily be stored for future usage. **All Motic cameras come equipped with software** to transform the SMZ168 into an analysis and documentation workstation. For the Binocular SMZ168, multiple eyepiece adapters for Motic cameras are available. The Trinocular SMZ168 allows the use of **different camera adapters**, depending on the **chip size** of the camera in use.

Motic offers a **complete range of digital cameras**, starting with a basic resolution of 1.3MP (CMOS) up to the research grade Moticam Pro Line (CCD) with a range of 1 megapixel and beyond, including **Monochrome** and **Cooled versions** where necessary. These Moticam cameras deliver sharp live images with an all inclusive software package for easy post-capture handling, measurement and annotation.

For further details on our range of cameras, as well as on adaptation questions, please contact your nearest Motic office or your local authorized Motic Professional reseller.



**From 0.35X up to 1X:** All CCD adapters come with an **adjustment ring** to set up **perfect parfocality** between visual and on-screen images.





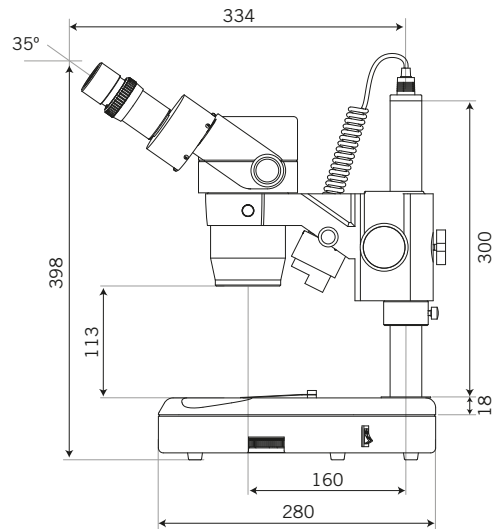
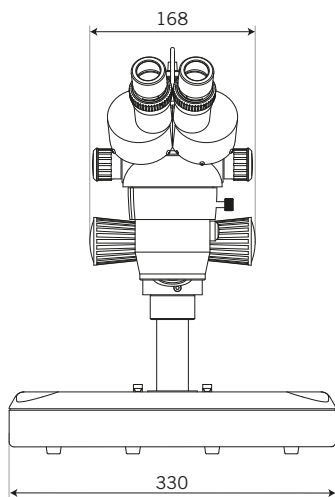
## SMZ 168 Standard Specifications

<b>Model</b>	SMZ-168
<b>Optical System</b>	Greenough Optical System
<b>Optics</b>	Achromatic; Anti-fungus treatment
<b>Observation Tube</b>	Widefield Binocular 35° Widefield Trinocular 35°, light distribution 0:100 left eyetube/trinotube in photo position
<b>Eyepieces</b>	Widefield high eyepoint, WF 10X/23 Diopter adjustment on both eyepiece tubes +/- 5dpt
<b>Interpupillary distance</b>	52-75mm
<b>Zoom Range</b>	Zoom 6.7:1; 5 clickstops
<b>Standard Magnification</b>	7.5X-50X
<b>Working distance</b>	113mm

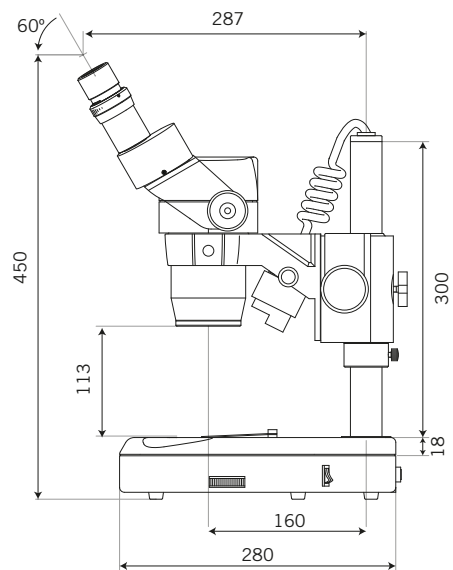
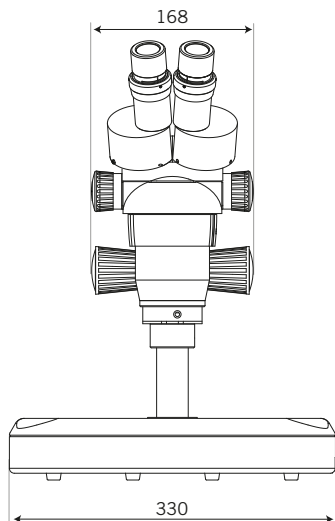


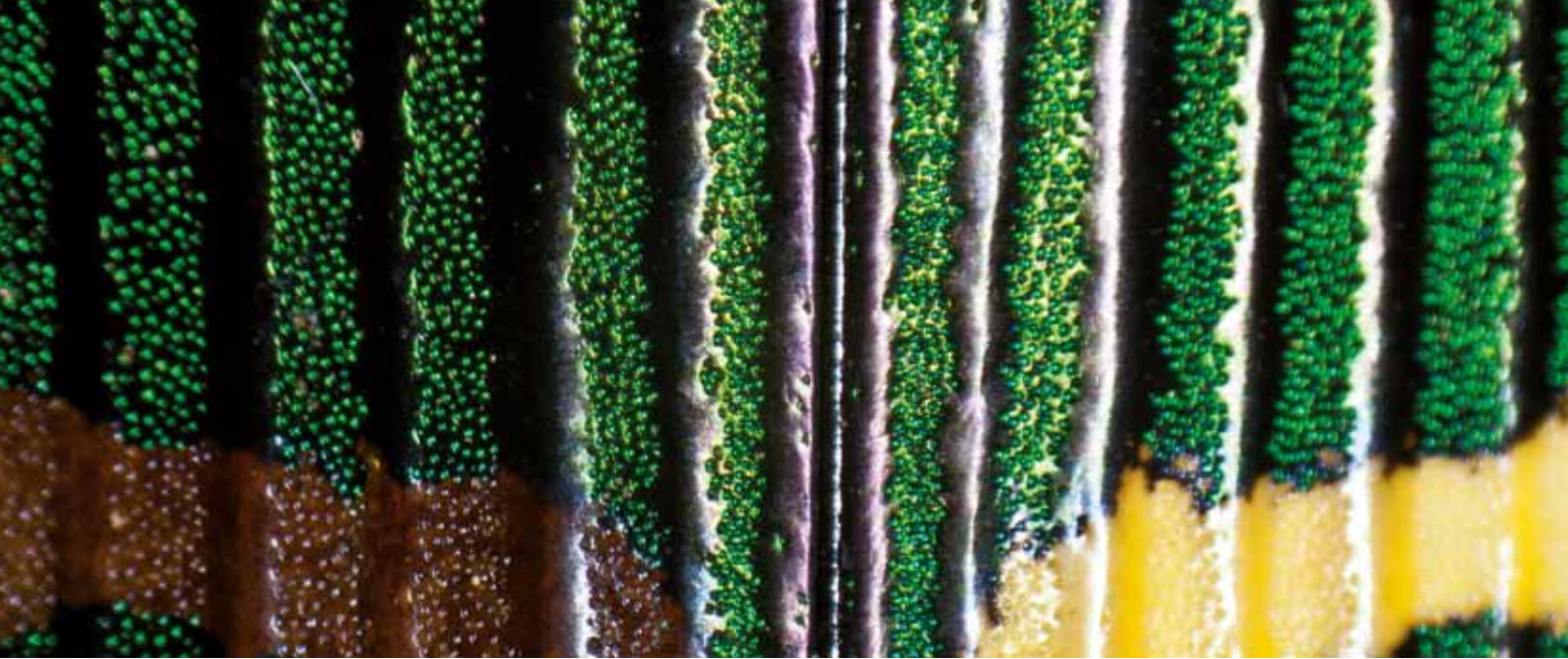
**SMZ 168 Schematic Diagrams** Unit: mm

**SMZ-168-BL Binocular Stereomicroscope**

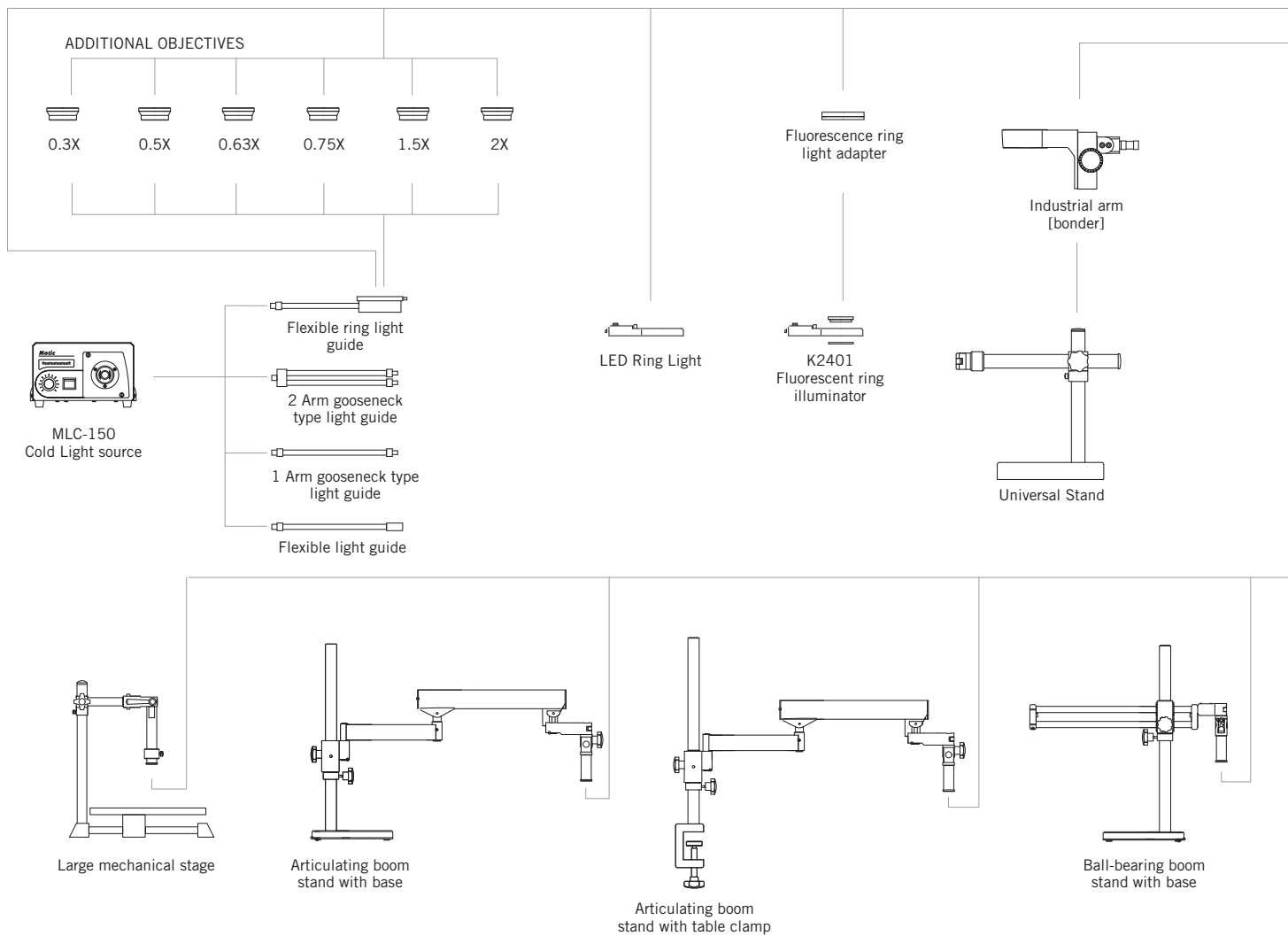


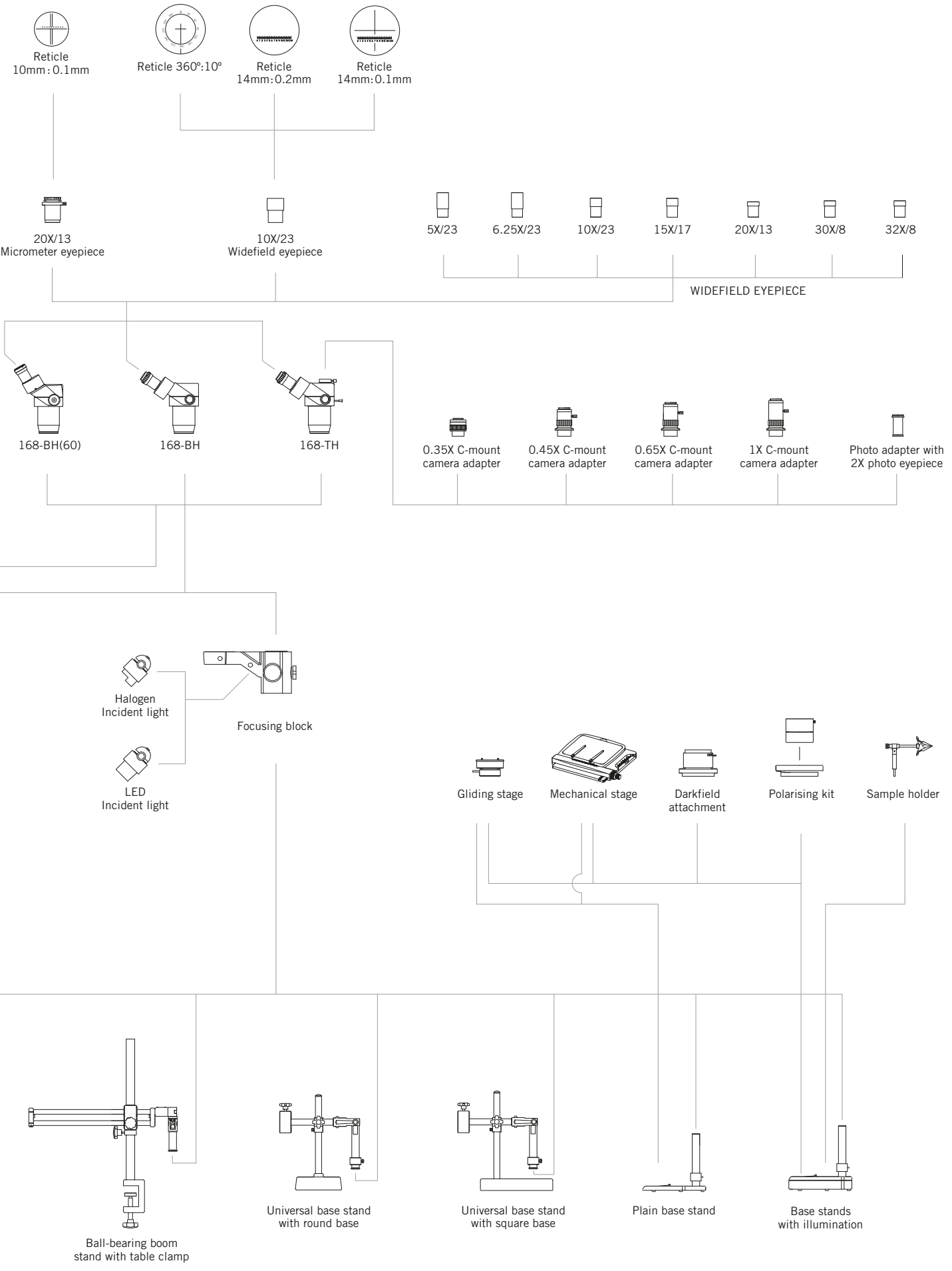
**SMZ-168-BL (60) Binocular 60° Observation Stereomicroscope**





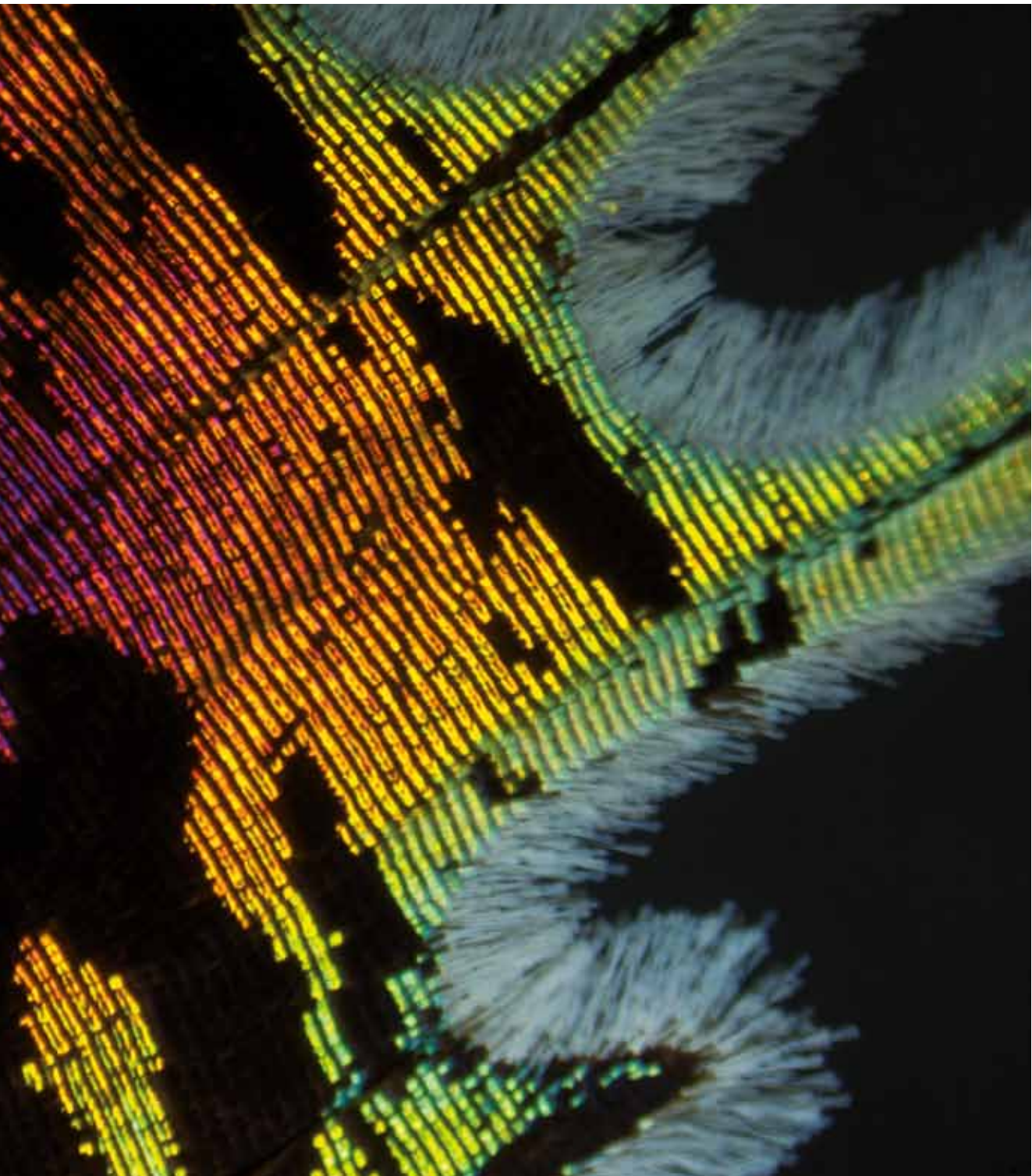
## SMZ 168 System Diagram





# SMZ 168 Optical Data

Eyepiece	Zoom Position	Standard Objective		Auxiliary Objectives											
				0.3X		0.5X		0.63X		0.75X		1.5X		2X	
		WD 113mm		WD 324mm		WD 192mm		WD 156mm		WD 127mm		WD 50mm		WD 34.5mm	
		Mag.	F.N.(mm)	Mag.	F.N.(mm)	Mag.	F.N.(mm)	Mag.	F.N.(mm)	Mag.	F.N.(mm)	Mag.	F.N.(mm)	Mag.	F.N.(mm)
5X/23	0.75	3.8	30.7	1.1	102.2	1.9	61.3	2.4	48.7	2.8	40.9	5.6	20.4	7.5	15.3
	1	5.0	23.0	1.5	76.7	2.5	46.0	3.2	36.5	3.8	30.7	7.5	15.3	10.0	11.5
	2	10.0	11.5	3.0	38.3	5.0	23.0	6.3	18.3	7.5	15.3	15.0	7.7	20.0	5.8
	3	15.0	7.7	4.5	25.6	7.5	15.3	9.5	12.2	11.3	10.2	22.5	5.1	30.0	3.8
	4	20.0	5.8	6.0	19.2	10.0	11.5	12.6	9.1	15.0	7.7	30.0	3.8	40.0	2.9
	5	25.0	4.6	7.5	15.3	12.5	9.2	15.8	7.3	18.8	6.1	37.5	3.1	50.0	2.3
6.25X/23	0.75	4.7	30.7	1.4	102.2	2.3	61.3	3.0	48.7	3.5	40.9	7.0	20.4	9.4	15.3
	1	6.3	23.0	1.9	76.7	3.1	46.0	3.9	36.5	4.7	30.7	9.4	15.3	12.5	11.5
	2	12.5	11.5	3.8	38.3	6.3	23.0	7.9	18.3	9.4	15.3	18.8	7.7	25.0	5.8
	3	18.8	7.7	5.6	25.6	9.4	15.3	11.8	12.2	14.1	10.2	28.1	5.1	37.5	3.8
	4	25.0	5.8	7.5	19.2	12.5	11.5	15.8	9.1	18.8	7.7	37.5	3.8	50.0	2.9
	5	31.3	4.6	9.4	15.3	15.6	9.2	19.7	7.3	23.4	6.1	46.9	3.1	62.5	2.3
10X/23	0.75	7.5	30.7	2.3	102.2	3.8	61.3	4.7	48.7	5.6	40.9	11.3	20.4	15.0	15.3
	1	10.0	23.0	3.0	76.7	5.0	46.0	6.3	36.5	7.5	30.7	15.0	15.3	20.0	11.5
	2	20.0	11.5	6.0	38.3	10.0	23.0	12.6	18.3	15.0	15.3	30.0	7.7	40.0	5.8
	3	30.0	7.7	9.0	25.6	15.0	15.3	18.9	12.2	22.5	10.2	45.0	5.1	60.0	3.8
	4	40.0	5.8	12.0	19.2	20.0	11.5	25.2	9.1	30.0	7.7	60.0	3.8	80.0	2.9
	5	50.0	4.6	15.0	15.3	25.0	9.2	31.5	7.3	37.5	6.1	75.0	3.1	100.0	2.3
15X/17	0.75	11.3	22.7	3.4	75.6	5.6	45.3	7.1	36.0	8.4	30.2	16.9	15.1	22.5	11.3
	1	15.0	17.0	4.5	56.7	7.5	34.0	9.5	27.0	11.3	22.7	22.5	11.3	30.0	8.5
	2	30.0	8.5	9.0	28.3	15.0	17.0	18.9	13.5	22.5	11.3	45.0	5.7	60.0	4.3
	3	45.0	5.7	13.5	18.9	22.5	11.3	28.4	9.0	33.8	7.6	67.5	3.8	90.0	2.8
	4	60.0	4.3	18.0	14.2	30.0	8.5	37.8	6.7	45.0	5.7	90.0	2.8	120.0	2.1
	5	75.0	3.4	22.5	11.3	37.5	6.8	47.3	5.4	56.3	4.5	112.5	2.3	150.0	1.7
20X/13	0.75	15.0	17.3	4.5	57.8	7.5	34.7	9.5	27.5	11.3	23.1	22.5	11.6	30.0	8.7
	1	20.0	13.0	6.0	43.3	10.0	26.0	12.6	20.6	15.0	17.3	30.0	8.7	40.0	6.5
	2	40.0	6.5	12.0	21.7	20.0	13.0	25.2	10.3	30.0	8.7	60.0	4.3	80.0	3.3
	3	60.0	4.3	18.0	14.4	30.0	8.7	37.8	6.9	45.0	5.8	90.0	2.9	120.0	2.2
	4	80.0	3.3	24.0	10.8	40.0	6.5	50.4	5.2	60.0	4.3	120.0	2.2	160.0	1.6
	5	100.0	2.6	30.0	8.7	50.0	5.2	63.0	4.1	75.0	3.5	150.0	1.7	200.0	1.3
30X/8	0.75	22.5	10.7	6.8	35.6	11.3	21.3	14.2	16.9	16.9	14.2	33.8	7.1	45.0	5.3
	1	30.0	8.0	9.0	26.7	15.0	16.0	18.9	12.7	22.5	10.7	45.0	5.3	60.0	4.0
	2	60.0	4.0	18.0	13.3	30.0	8.0	37.8	6.3	45.0	5.3	90.0	2.7	120.0	2.0
	3	90.0	2.7	27.0	8.9	45.0	5.3	56.7	4.2	67.5	3.6	135.0	1.8	180.0	1.3
	4	120.0	2.0	36.0	6.7	60.0	4.0	75.6	3.2	90.0	2.7	180.0	1.3	240.0	1.0
	5	150.0	1.6	45.0	5.3	75.0	3.2	94.5	2.5	112.5	2.1	225.0	1.1	300.0	0.8
32X/8	0.75	24.0	10.7	7.2	35.6	12.0	21.3	15.1	16.9	18.0	14.2	36.0	7.1	48.0	5.3
	1	32.0	8.0	9.6	26.7	16.0	16.0	20.2	12.7	24.0	10.7	48.0	5.3	64.0	4.0
	2	64.0	4.0	19.2	13.3	32.0	8.0	40.3	6.3	48.0	5.3	96.0	2.7	128.0	2.0
	3	96.0	2.7	28.8	8.9	48.0	5.3	60.5	4.2	72.0	3.6	144.0	1.8	192.0	1.3
	4	128.0	2.0	38.4	6.7	64.0	4.0	80.6	3.2	96.0	2.7	192.0	1.3	256.0	1.0
	5	160.0	1.6	48.0	5.3	80.0	3.2	100.8	2.5	120.0	2.1	240.0	1.1	320.0	0.8





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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.



December 2011

