

BS-1310 Series Monocular Microscope



BS-1310

Introduction

BS-1310 series Monocular Zoom Microscope is an ideal choice for machine vision, industrial inspection, scientific research and education. The design is based on the bilateral parallel light path principle and the modular design concept, with superior optical performance and strong compatibility.

For applications that require different magnification, [Auxiliary Lens](#) or infinity objectives with different magnification can be attached to the front end of the [Middle Zoom Module](#).

For application that require different sensor size, [TV Lens](#) with different magnification can be attached to the back end of the [Middle Zoom Module](#).

The basic module of BS-1310 is [BS-1310A \(without click stop\)](#) and [BS-1310B \(with click stop at main magnifications\)](#), it has 0.8X to 8.0X zoom range and 1:10 zoom ratio. It is a high-quality precision [Monocular Zoom Objective](#) that provides high resolution and large depth of field.

Features

The main features are shown below:

1. Provide basic zoom objective BS-1310A with 0.8X~8.0X zoom range.
2. Large optical zoom ratio: 1:10.
3. Larger NA: 0.02-0.11 (When using 1.00x Auxiliary Lens).
4. Higher resolution: 15.3um-2.45um (When using 1.0X Auxiliary Lens).
5. Larger field of view: 0.89mm-42.86mm (Object plane).
6. Larger sensor size: 2/3" (When using 1X TV Lens).
7. Working distance: 56mm-248mm.
8. With adjustable BFL, parfocal in zoom range.
9. With adjustable center, the image center remains unchanged from 8.0x to 0.8x.
10. Compatible with infinity objectives (both biological and metallographic).

11. Compact size: 194 mm (length)*40 mm (diameter).
12. Auxiliary Lens with 0.35X, 0.50X, 0.75X, 1.00X, 1.50X magnification (Optional).
13. TV Lens with 0.50X, 0.75X, 1.00X magnification (Optional).
14. Brightness adjustable LED Direct Ring Light (Optional).
15. Brightness adjustable LED Direct Ring Polarization Light (Optional).
16. Brightness adjustable LED coaxial illumination (Optional).
17. LED Transmissive Light (Optional).
18. 50mm Bracket Adapter (Optional).

Accessories

1. How to Configure BS-1310 Monocular Zoom Objective

- (1) Confirm the possible range of 1) FOV and 2) Working Distance in the object space to choose the Auxiliary Lens.
- (2) Choose the M26x0.705 to M20x0.705 Objective Adapter, if the M20x0.705 infinity objective is used.
- (3) Confirm the camera Image Area Size, it can be 1) Sensor Size (1/x in inch), 2) Image Diagonal Length, 3) Image Width or 4) Image Height to choose the TV Lens.
- (4) Choose the 50 mm adapter according to the diameter of the hole in the bracket.
- (5) Choose the LED Direct Ring Light Module for the reflective illumination.
- (6) Choose the Coaxial Light Module if coaxial illumination is required.
- (7) Choose the Transmitted Light Module if Transmitted illumination is required.
- (8) Choose the Camera Module.

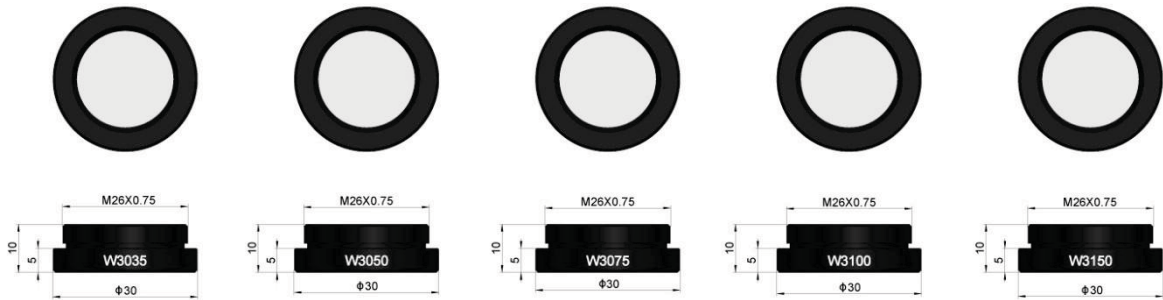
2. Configuration of BS-1310

The available components are listed in Table 1, user can choose any part from the table.

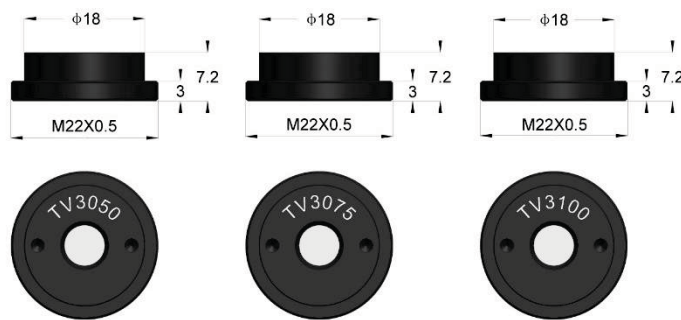
Table 1 BS-1310's Accessories and Its Functions

Module	Order Number	Description
Auxiliary Lens Module	W3035	0.35X Object Lens
	W3050	0.50X Object Lens
	W3075	0.75X Object Lens
	W3100	1.0X Object Lens
	W3150	1.50X Object Lens
	ON-XX	Biological Objective
	ON-YY	Metallographic Objective
	Objective Adapter	M26x0.706 to M20x0.706
Middle Zoom Module	BS-1310	The main body of BS-1310
TV Lens Module	TV3050	0.5XTV Lens
	TV3075	0.75X TV Lens
	TV3100	1.0XTV Lens
Coaxial Light Module	BCL-1A	Coaxial Light Adapter + LED Spot Light
LED Direct Ring Light Module	BAL3-48A	LED Direct Ring Light (65mm outer light)
	BAL3-60A	LED Direct Ring Light (85mm outer light)
	BAL3-48AP	LED Direct Ring Polarization Light
Transmitted Light Module	BTL-37A	LED Transmitted Light
Bracket Adapter		50mm Bracket Adapter (mounting adapter)

Power of light source		POWER-U-12V1A, Power Adapter American Standard
		POWER-E-12V1A, Power Adapter European standard

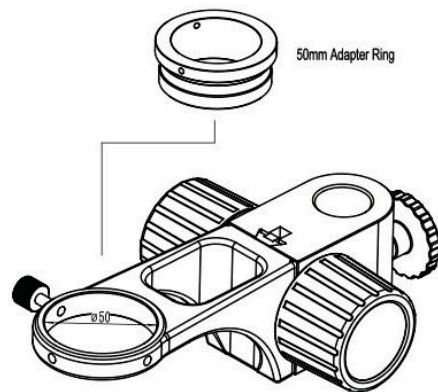


Auxiliary Lens Module



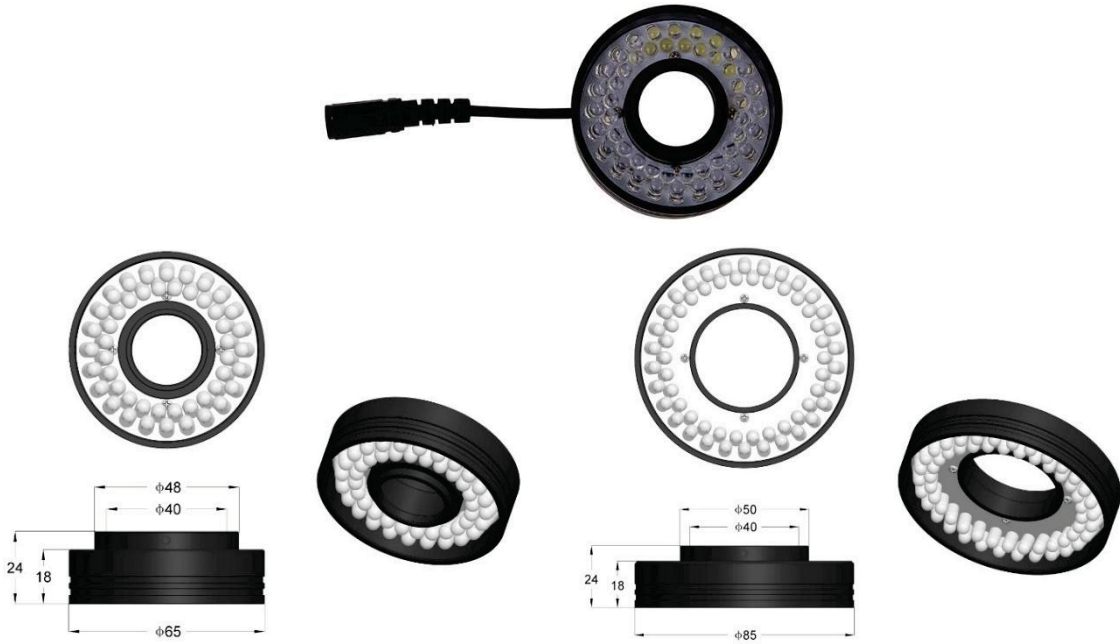
TV Lens Module

The BS-1310 main body consists of [Auxiliary Lens Module](#), [Middle Zoom Module](#) and [TV Lens Module](#). These 3 modules comprise the main [Monocular Zoom Objective](#). User can choose different [Auxiliary Lens](#) and [TV Lens](#) to satisfy the specific requirement. To get good illumination and ensure the image quality, [LED Direct Ring Light Module](#) (Optional) or [Coaxial Light Module](#) (Optional) should be chosen according to the application. To get good and stable support, the [Bracket Adapter Module](#) should be carefully chosen. Finally, to form the [Video Monocular Zoom Objective](#), [Camera Module](#) (Optional) should be chosen. The [Adapter Rings](#) and their relationship with the [Bracket](#) are shown following.



BS-1310 Adapter Ring for the Bracket

The [Direct Ring Light](#), [Direct Ring Polarization Light](#) and the [Coaxial Light](#) are shown in following figures respectively.

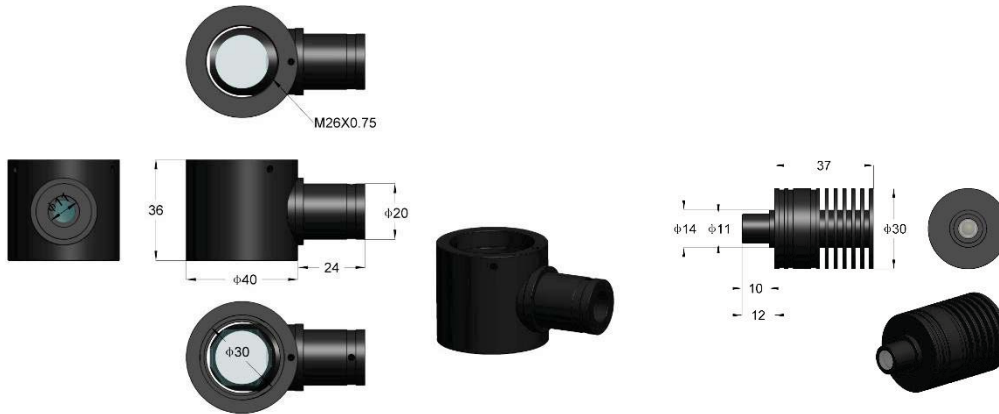


BAL3-48A, BAL3-60A, LED Direct Ring Light.

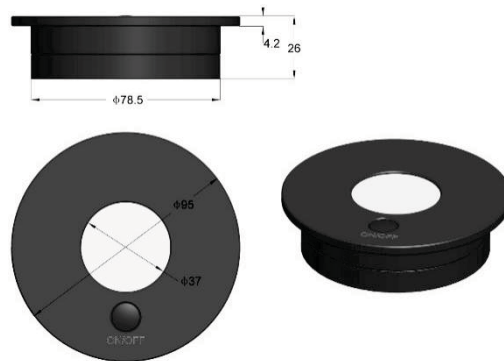


BAL3-48AP, LED Direct Ring Polarization Light





BCL-1A: Coaxial Light Adapter + LED Spot Light



BTL-37A, LED Transmitted Light

Specifications

The specifications of BS-1310 with different [Auxiliary Lens](#) and [TV Lens](#) are shown in [错误!未找到引用源。](#). [Auxiliary Lens](#) and [TV Lens](#) with 1.0x are listed in the left-up cell. Its data is the basis of the other parameters in the whole table.

Table 6 BS-1310A/B and Its Extensions

Auxiliary Lens	Specs	TV Lens					
		1.0X(For 2/3" Sensors) TV100		0.5X(For 1/3" Sensors) TV050		0.75X(For 1/1.8" Sensors) TV075	
		Low	High	Low	High	Low	High
1.0X (86mm WD) W3100	PMAG	0.80X~8.00X		0.40X~4.00X		0.60X~6.00X	
	FOV	13.75mm	1.38mm	15.0mm	1.50mm	13.33mm	1.33mm
	NA	0.018	0.112	0.018	0.112	0.018	0.112
0.35X (248mm WD) W3035	PMAG	0.28X~2.80X		0.14X~1.40X		0.21~2.10X	
	FOV	39.29mm	3.93mm	42.86mm	4.29mm	38.10mm	3.81mm
	NA	0.006	0.039	0.006	0.039	0.006	0.039
0.5X (174mm WD) W3050	PMAG	0.40X~4.00X		0.20X~2.00X		0.30X~3.00X	
	FOV	27.50mm	2.75mm	30.00mm	3.00mm	26.67mm	2.67mm
	NA	0.009	0.056	0.009	0.056	0.009	0.056
0.75X (115mm WD)	PMAG	0.60X~6.00X		0.30X~3.00X		0.45X~4.50X	
	FOV	18.33mm	1.83mm	20.00mm	2.00mm	17.78mm	1.78mm

W3075	NA	0.014	0.084	0.014	0.084	0.014	0.084
1.50X (56mm WD) W3150	PMAG	1..20X~12.00X		0.60X~6.00X		0.9X~9.00X	
	FOV	9.17mm	0.92mm	10.00mm	1.00mm	8.89mm	0.89mm
	NA	0.027	0.168	0.027	0.168	0.027	0.168
Remarks	When using coaxial lighting, low magnification may produce vignetting. When using infinity objectives as Auxiliary Lens Module (adapter available), the PMAG, FOV and NA of the BS-1310 depends on the parameters of the objectives.						

WD: Working Distance;

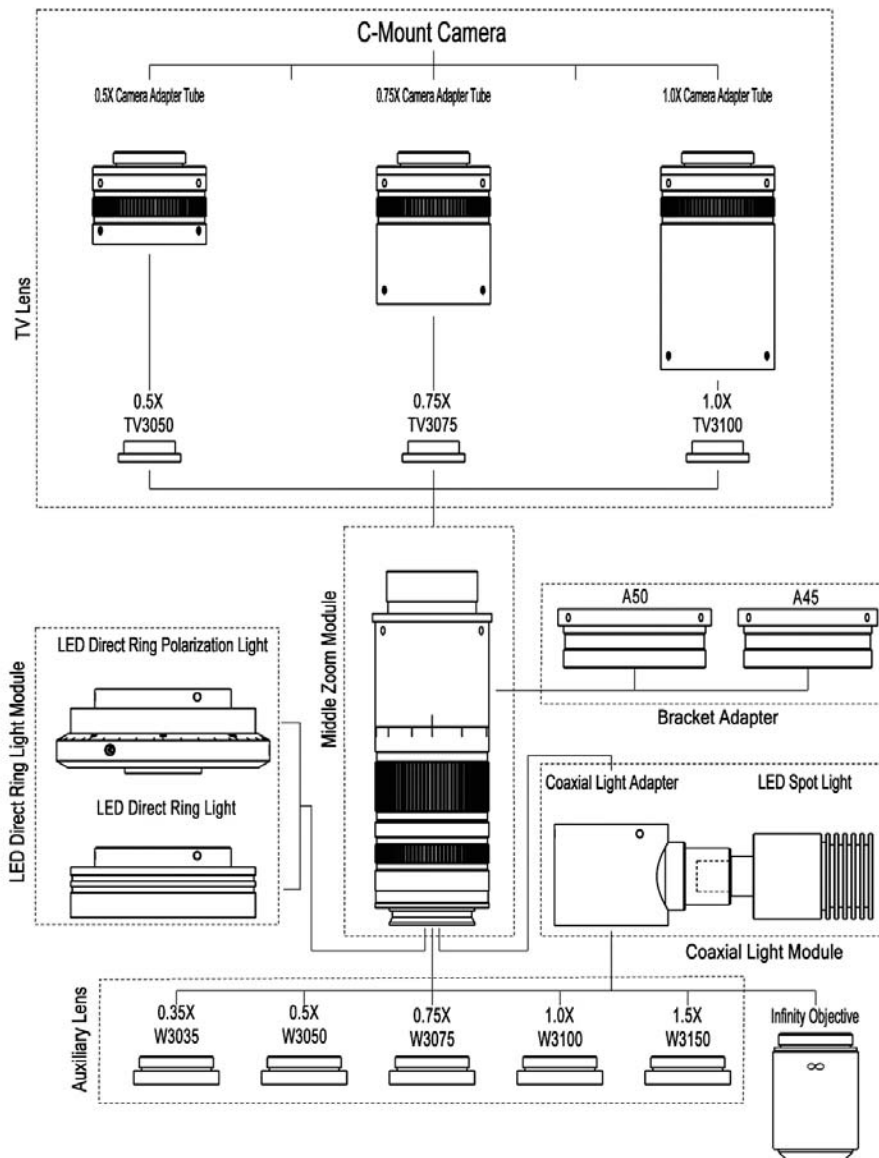
PMAG: Primary Magnification;

FOV: Field of View in the Object side;

NA: Numerical Aperture;

Note: Infinity corrected objectives limit system's usable zoom range due to uneven illumination.

System Diagram



Application

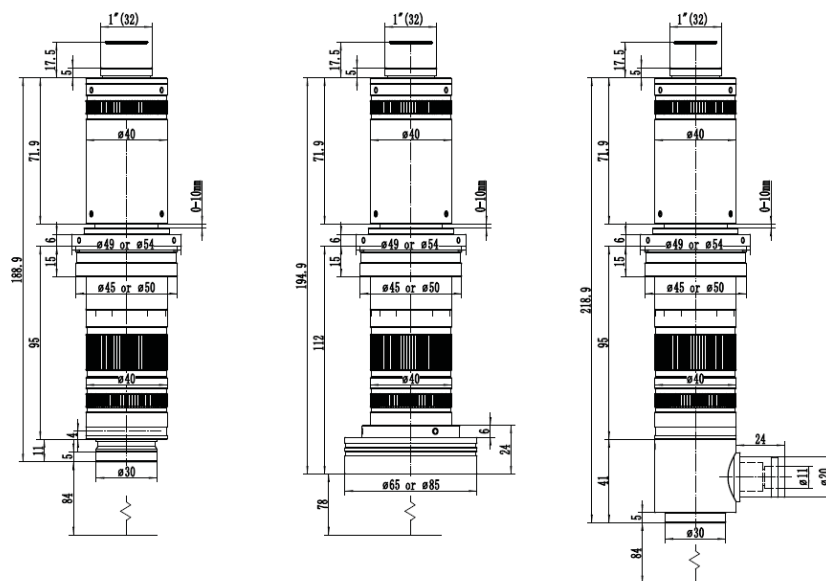
BS-1310 is an ideal choice for most applications that require multiple magnifications or for those that prohibit continual manual refocusing. The applications of the BS-1310 are machine vision, small details inspection, industrial inspection especially electronic components, scientific research, medical industry and education industry.



BS-1310A+BAL3-48A (LED Direct Ring Light Module) +HDMI Camera+ Screen + Stand

Dimension

The dimensions of BS-1310A with different light a) BS-1310A without light module; b) BS-1310A equipped with Direct Ring Light Module, c) BS-1310A equipped with Coaxial Light Module are shown as follows. The length of BS-1310A is 194mm.



Dimensions of BS-1310A with different light

Packing List

The package information of [BS-1310](#) is as follows:



BS-1310 Main Body, including Auxiliary Lens Module, Middle Zoom Module, TV Lens, Camera Adapter Tube and Bracket Adapter

The package information of [BAL3-48A/BAL3-60A](#) is as follows:



BAL3-48A/BAL3-60A, including LED Direct Ring Light and Power Adapter

The package information of [BAL3-48AP](#) is as follows:



BAL3-48AP, including LED Direct Ring Polarization Light and Power Adapter

The package information of [Coaxial Light Module](#) is as follows:

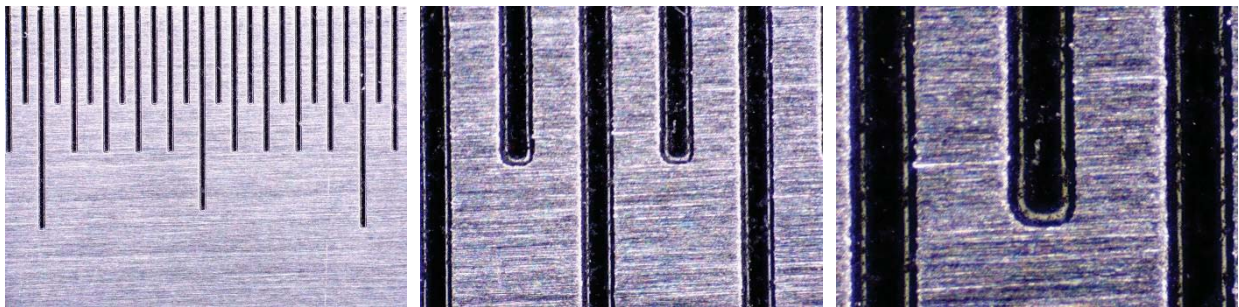


Coaxial Light Module BCL-1A, including Coaxial Light Adapter, LED Spot Light and Power Adapter

Sample Images

Pictures of steel ruler taken with BS-1310A under LED Direct Ring Light illumination.

Left: 0.8X, middle: 4.0X, right: 8.0X



Pictures of CCD taken with BS-1310A.

Left: 0.8X, middle: 4.0X, right: 8.0X

