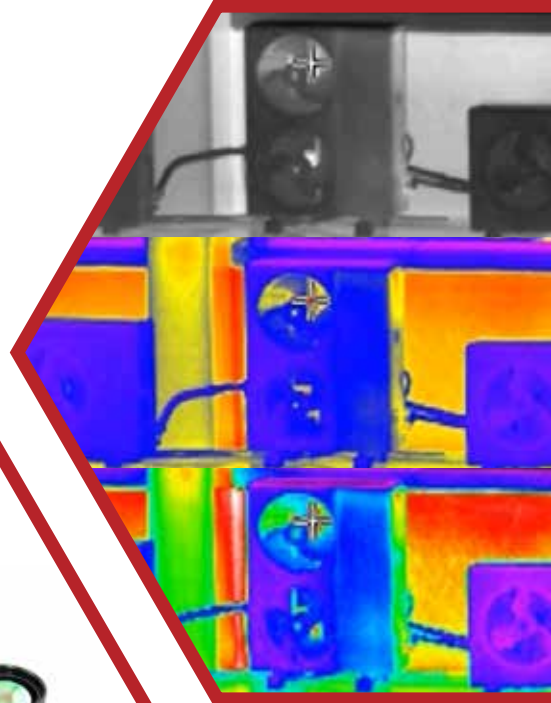




Security



Surveillance

# Infrared Optics

Optical components for infrared imaging

Machine Vision

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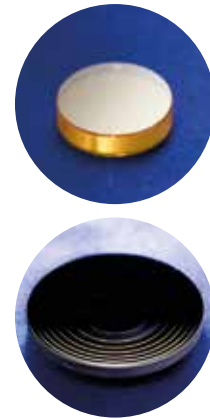
## Infrared Lenses

Infrared (IR) optics are used to collect, focus or collimate light in the near-infrared (NIR), short-wave infrared (SWIR), mid-wave infrared (MWIR) or long-wave infrared (LWIR) spectra. The wavelength of IR optics is ranged between 700 – 16000nm. Wavelength Opto-Electronic offers various IR optics of high performance to use in life-science, security, machine vision, thermal imaging, tactical sports, and industrial applications. We design, develop, prototype, manufacture, and assemble IR systems with our

in-house manufacturing unit using diamond turning with the laser-assisted tool, automated CNC polishing machines, coating, and customized metrology capabilities.



## Diamond Turning Capabilities



Tolerance	Standard	Precision	High Precision
<b>Materials</b>	Crystal: ZnSe, ZnS, Ge, GaAs, CaF2, BaF2, MgF2, Si, Chalcogenide, other IR materials etc.		
	Metal: Cu, Aluminium, Silver, Nickel Plated Mirrors etc.		
	Plastic: PMMA, Acrylic, Zeonex etc.		
<b>Shapes/Geometries</b>	Spherical Surfaces, Aspheric Surfaces, Aspheric Hybrid Surfaces, Cylindrical Lenses, Planar Surfaces, Off-Axis Parabolas, Off-Axis Ellipses, Off-Axis Toroids		
<b>Diameter (Off-Axis)</b>	10mm – 250mm		
<b>Diameter (On-Axis)</b>	5mm – 250mm		
<b>RMS Surface Roughness (For Metals)</b>	15nm	10nm	< 3nm
<b>RMS Surface Roughness (For Crystal &amp; Plastic)</b>	< 15nm	< 7nm	< 3nm
<b>Reflected Wavefront Error (P-V @ 632nm)</b>	$\lambda$	$\lambda/2$	$\lambda/8$
<b>Surface Quality</b>	80-50	60-40	40-20
<b>Coating</b>	Uncoated, Al, UV Enhanced Al, Gold, Silver, Anti-Reflection, Custom Coating etc.		



## Chalcogenide Materials

Chalcogenide materials have a wide transmission range from 0.5 $\mu\text{m}$  to 25 $\mu\text{m}$ , low refractive index temperature coefficient, low dispersion, and versatile glass compositions. These materials allow higher production efficiency by lowering production costs and consumption of scarce resources like Germanium and can be manufactured in batches using precision molding technology.

### Why is this material ideal for Mid-IR Optics?

- Wide transmission range (0.5 –25 $\mu\text{m}$ )
- Low refractive index temperature co-efficient (dN/dT)
- Low dispersion
- Versatile glass composition and properties

### Precision Molding Technology and Chalcogenide Glass

- Can make glass into flat, spherical and aspherical optical lenses
- Has higher production efficiency
- Lower production costs
- Manufacturing of chalcogenide glass lenses is done in batches.

### In-Comparison with Ge, ZnSe & other IR Materials

- Advantageous in resource utilization
- Lower manufacturing and processing costs
- Lower consumption of scarce resources like Ge
- Lenses can be manufactured in batches using precision molding technology than single point diamond turning for Ge, ZnSe and other IR materials

### Available Sizes

- Diameter/Dimension: 10 –100mm
- Thickness: 2 –30mm

Wavelength Opto-Electronic currently produce the following types of IR chalcogenides:

Grade	Glass Composition	$\rho$ (g/cm <sup>3</sup> )
WIRG01	Ge <sub>33</sub> As <sub>12</sub> Se <sub>55</sub>	4.42
WIRG02	Ge <sub>22</sub> As <sub>20</sub> Se <sub>58</sub>	4.41
WIRG03	Ge <sub>20</sub> Sb <sub>15</sub> Se <sub>65</sub>	4.71
WIRG04	As <sub>30</sub> Sb <sub>4</sub> Se <sub>63</sub> Sn <sub>3</sub>	4.72
WIRG05	Ge <sub>28</sub> Sb <sub>12</sub> Se <sub>60</sub>	4.68
WIRG06	As <sub>40</sub> Se <sub>60</sub>	4.63
WIRG07	Ge <sub>10</sub> As <sub>40</sub> Se <sub>50</sub>	4.49
WIRG08	As <sub>40</sub> Se <sub>60</sub>	3.20
WIRG09	Ge <sub>30</sub> As <sub>13</sub> Se <sub>32</sub> Te <sub>25</sub>	4.84



## SWIR Lenses

Shortwave Infrared (SWIR) wavelength band offers unique imaging advantages over visible and other thermal bands. It is quietly earning a growing place in industrial machine vision for electronic board inspection, material/food sorting, solar cell inspection, quality inspection, and in military applications. SWIR lenses are utilized where other detectors or cameras are not sensitive enough for finite detail recognition.

Part Number	Wavelength ( $\mu\text{m}$ )	Focal Length (mm)	Focus Type	F#	BWD (mm)	Mount	Detector
Infra-SW122.5-15	1.5 - 5.0	12	Manual	2.5	33.1	Bayonet	640 x 512, 15 $\mu\text{m}$
Infra-SW252.5-15	1.5 - 5.0	25	Manual	2.5	33.1	Bayonet	640 x 512, 15 $\mu\text{m}$
Infra-SW253.0-17	1.5 - 5.0	25	Manual	3.0	33.1	Bayonet	1024 x 768, 17 $\mu\text{m}$
Infra-SW502.5-15	1.5 - 5.0	50	Manual	2.5	33.1	Bayonet	640 x 512, 15 $\mu\text{m}$
Infra-SW502.3-17	1.5 - 5.0	50	Manual	2.3	39.4	Bayonet	1024 x 768, 17 $\mu\text{m}$
Infra-SW1002.3-17	1.5 - 5.0	100	Manual	2.3	33.1	Bayonet	1024 x 768, 17 $\mu\text{m}$
Infra-SW1002.5-15	1.5 - 5.0	100	Manual	2.5	33.1	Bayonet	640 x 512, 15 $\mu\text{m}$
Infra-SW2002.5-15	1.5 - 5.0	200	Manual	2.5	33.1	Bayonet	640 x 512, 15 $\mu\text{m}$
Infra-SW252.5-30	0.9 - 2.5	25	Manual	2.5	13.5	C-mount	320 x 256, 30 $\mu\text{m}$
Infra-SW352.0-30	0.9 - 2.5	35	Manual	2.0	13.4	C-mount	320 x 256, 30 $\mu\text{m}$
Infra-SW502.0-30	0.9 - 2.5	50	Manual	2.0	13.5	C-mount	320 x 256, 30 $\mu\text{m}$
Infra-SW752.0-30	0.9 - 2.5	75	Manual	2.0	13.5	C-mount	320 x 256, 30 $\mu\text{m}$
Infra-SW1002.0-30	0.9 - 2.5	100	Manual	2.0	13.5	C-mount	320 x 256, 30 $\mu\text{m}$
Infra-SW2002.0-30	0.9 - 2.5	200	Manual	2.0	13.5	C-mount	320 x 256, 30 $\mu\text{m}$



## MWIR Lenses

Midwave Infrared (MWIR) achromatic lenses can be used by designers and researchers working in the  $3\mu\text{m}$  to  $5\mu\text{m}$  spectral region. Providing near-diffraction-limited performance, these lenses are suitable for applications in FTIR (Fourier transform infrared) spectroscopy and MWIR thermal imaging, as well as for use with tunable quantum cascade lasers.

Part Number	Wavelength ( $\mu\text{m}$ )	Focal Length (mm)	Focus Type	F#	BWD (mm)	Mount	Detector
Infra-MW123.0-15	3.0 - 5.0	12.0	Manual	3.0	39.96	Bayonet	1280 x 1024, $15\mu\text{m}$
Infra-MW13.72.0-15	3.0 - 5.0	13.7	Manual	2.0	24.32	Bayonet	640 x 512, $15\mu\text{m}$
Infra-MW253.0-15	3.0 - 5.0	25.0	Manual	3.0	39.96	Bayonet	1280 x 1024, $15\mu\text{m}$
Infra-MW252.0-15	3.0 - 5.0	25.0	Manual	2.0	24.34	Bayonet	640 x 512, $15\mu\text{m}$
Infra-MW252.0-15M	3.0 - 5.0	25.0	Motorized	2.0	24.34	M32 x 1	640 x 512, $15\mu\text{m}$
Infra-MW254.0-15	3.0 - 5.0	25.0	Manual	4.0	22.00	Bayonet	640 x 512, $15\mu\text{m}$
Infra-MW503.0-15	3.0 - 5.0	50.0	Manual	3.0	39.96	Bayonet	1280 x 1024, $15\mu\text{m}$
Infra-MW502.0-15	3.0 - 5.0	50.0	Manual	2.0	22.40	Bayonet	640 x 512, $15\mu\text{m}$
Infra-MW1003.0-15	3.0 - 5.0	100.0	Manual	3.0	39.96	Bayonet	1280 x 1024, $15\mu\text{m}$
Infra-MW1002.0-15	3.0 - 5.0	100.0	Manual	2.0	24.84	Bayonet	640 x 512, $15\mu\text{m}$
Infra-MW1002.0-24	3.0 - 5.0	100.0	Manual	2.0	40.30	Flange	640 x 512, $24\mu\text{m}$
Infra-MW1002.5-15	3.0 - 5.0	100.0	Manual	2.5	38.50	M40 x 1	640 x 512, $15\mu\text{m}$
Infra-MW1004.0-15	3.0 - 5.0	100.0	Manual	4.0	22.00	M34 x 1	640 x 512, $15\mu\text{m}$
Infra-MW2003.0-15	3.0 - 5.0	200.0	Manual	3.0	33.10	Bayonet	1280 x 1024, $15\mu\text{m}$
Infra-MW2004.0-15	3.0 - 5.0	200.0	Manual	4.0	22.00	M34 x 1	640 x 512, $15\mu\text{m}$
IRM7-2.3-640	3.0 - 5.0	7.0	Manual	2.3	32.80	Bayonet	640 x 512, $15\mu\text{m}$
IRM02520-CL90	3.0 - 5.0	25.0	Manual	2.0	37.61	Bayonet	640 x 512, $15\mu\text{m}$
IRM502.0-WD30	3.0 - 5.0	50.0	Manual	2.0	44.00	Flange	1280 x 1160, $15\mu\text{m}$



## LWIR Lenses

Longwave Infrared (LWIR) lens is typically uncooled and therefore, has less sensitivity. It allows the user to see through dust or smoke, which makes them particularly valuable in certain environments and applications. The field of view of a lens depends mainly on the focal length and the detector size.

Part Number	Wavelength (μm)	Focal Length (mm)	Focus Type	F#	BWD (mm)	Mount	Detector
Infra-LW4.81.0-17	8.0 - 14.0	4.8	Manual	1.0	9.0	M34 x 0.75	640 x 480, 17μm
Infra-LW7.51.0-17	8.0 - 14.0	7.5	Manual	1.0	11.0	M34 x 0.75	640 x 480, 17μm
Infra-LW81.0-17	8.0 - 14.0	8.0	Manual	1.0	9.4	M34 x 0.75	640 x 480, 17μm
Infra-LW111.0-17	8.0 - 14.0	11.0	Manual	1.0	11.0	M34x0.75	640 x 480, 17μm
Infra-LW121.0-17	8.0 - 14.0	12.0	Manual	1.0	8.4	M34 x 0.75	640 x 480, 17μm
Infra-LW131.0-17	8.0 - 14.0	13.0	Manual	1.0	11.0	M34 x 0.75	640 x 480, 17μm
Infra-LW141.0-17	8.0 - 14.0	14.0	Manual	1.0	11.0	M34 x 0.75	640 x 480, 17μm
Infra-LW151.0-17	8.0 - 14.0	15.0	Manual	1.0	11.0	M34 x 0.75	640 x 480, 17μm
Infra-LW181.0-17V2	8.0 - 14.0	18.0	Manual	1.0	11.0	M34 x 0.75	640 x 480, 17μm
Infra-LW191.0-17	8.0 - 14.0	19.0	Manual	1.0	11.0	M34 x 0.75	640 x 480, 17μm
Infra-LW191.2-17	8.0 - 14.0	19.0	Manual	1.2	11.0	M34 x 0.75	640 x 480, 17μm
Infra-LW251.0-21	8.0 - 14.0	25.0	Manual	1.0	9.0	M45 x 1	1024 x 768, 17μm
Infra-LW251.0-17V3	8.0 - 14.0	25.0	Manual	1.0	11.0	M34 x 0.75	640 x 480, 17μm
Infra-LW251.0-17	8.0 - 14.0	25.0	Manual	1.0	8.0	M34 x 0.75	640 x 480, 17μm
Infra-LW301.0-17	8.0 - 14.0	30.0	Manual	1.0	8.3	M34 x 0.75	640 x 480, 17μm
Infra-LW351.0-17	8.0 - 14.0	35.0	Manual	1.0	11.0	M34 x 0.75	640 x 480, 17μm
Infra-LW351.2-17	8.0 - 14.0	35.0	Manual	1.2	11.0	M34 x 0.75	640 x 480, 17μm
Infra-LW401.0-17	8.0 - 14.0	40.0	Manual	1.0	11.0	M34 x 0.75	640 x 480, 17μm
Infra-LW401.4-17V2	8.0 - 14.0	40.0	Manual	1.4	9.0	M38 x 1	640 x 480, 17μm
Infra-LW500.8-17	8.0 - 14.0	50.0	Manual	0.8	11.0	M45 x 1	640 x 480, 17μm
Infra-LW501.0-17	8.0 - 14.0	50.0	Manual	1.0	8.3	M34 x 0.75	640 x 480, 17μm
Infra-LW501.0-21	8.0 - 14.0	50.0	Manual	1.0	9.0	M45 x 1	1024 x 768, 17μm
Infra-LW501.0-17V2	8.0 - 14.0	50.0	Manual	1.0	11.0	M34 x 0.75	640 x 480, 17μm
Infra-LW601.0-17	8.0 - 14.0	60.0	Manual	1.0	11.0	M34 x 0.75	640 x 480, 17μm
Infra-LW601.2-17	8.0 - 14.0	60.0	Manual	1.2	11.0	M34 x 0.75	640 x 480, 17μm

Part Number	Wavelength (μm)	Focal Length (mm)	Focus Type	F#	BWD (mm)	Mount	Detector
Infra-LW701.0-17	8.0 - 14.0	70.0	Manual	1.0	8.3	M34 x 0.75	640 x 480, 17μm
Infra-LW751.0-17	8.0 - 14.0	75.0	Manual	1.0	11.0	M34 x 0.75	640 x 480, 17μm
Infra-LW751.0-21	8.0 - 14.0	75.0	Manual	1.0	7.5	M56 x 1	1280 x 1024, 12μm
Infra-LW1001.0-17	8.0 - 14.0	100.0	Manual	1.0	11.0	M34 x 0.75	640 x 480, 17μm
Infra-LW1001.0-21	8.0 - 14.0	100.0	Manual	1.0	7.5	M56 x 1	1280 x 1024, 12μm
Infra-LW1001.4-17	8.0 - 14.0	100.0	Manual	1.4	11.0	M34 x 0.75	640 x 480, 17μm
Infra-LW1001.4-17	8.0 - 14.0	100.0	Manual	1.4	11.0	M34 x 0.75	640 x 480, 17μm
Infra-LW140.12-17	8.0 - 14.0	140.0	Manual	1.2	28.8	Flange	640 x 480, 17μm
Infra-LW1501.0-17	8.0 - 14.0	150.0	Manual	1.0	16.2	Flange	640 x 480, 17μm
Infra-LW1501.2-17	8.0 - 14.0	150.0	Manual	1.2	9.0	M38 x 1	640 x 480, 17μm
Infra-LW251.0-17M	8.0 - 14.0	25.0	Motorized	1.0	13.5	Flange	640 x 480, 17μm
Infra-LW351.0-17M	8.0 - 14.0	35.0	Motorized	1.0	9.1	M34 x 0.75	640 x 480, 17μm
Infra-LW501.0-17M	8.0 - 14.0	50.0	Motorized	1.0	10.0	M60 x 1	640 x 480, 17μm
Infra-LW701.0-17M	8.0 - 14.0	70.0	Motorized	1.0	8.0	M39 x 0.75	640 x 480, 17μm
Infra-LW751.0-17M	8.0 - 14.0	75.0	Motorized	1.0	14.7	M59 x 12 Teeth/inch	640 x 480, 17μm
Infra-LW1001.0-21M	8.0 - 14.0	100.0	Motorized	1.0	13.0	2.313"-36NC-2A	640 x 480, 17μm
Infra-LW1001.0-17M	8.0 - 14.0	100.0	Motorized	1.0	14.5	M60 x 1	640 x 512, 17μm
Infra-LW1001.2-17M	8.0 - 14.0	100.0	Motorized	1.2	11.0	Flange	640 x 480, 17μm
Infra-LW1201.0-17M	8.0 - 14.0	120.0	Motorized	1.0	12.6	M60 x 1	640 x 480, 17μm
Infra-LW1301.2-17M	8.0 - 14.0	130.0	Motorized	1.2	11.0	Flange	640 x 480, 17μm
Infra-LW1501.0-17M	8.0 - 14.0	150.0	Motorized	1.0	14.0	M60 x 1	640 x 480, 17μm
Infra-LW1501.2-17M	8.0 - 14.0	150.0	Motorized	1.2	15.0	Flange	640 x 480, 17μm
Infra-LW2101.3-17M	8.0 - 14.0	210.0	Motorized	1.3	14.1	2.313"-36NC-2A	640 x 480, 17μm
Infra-LW2601.3-17M	8.0 - 14.0	260.0	Motorized	1.3	17.7	Flange	640 x 512, 17μm
Infra-LW3001.3-17M	8.0 - 14.0	300.0	Motorized	1.3	14.1	Flange	640 x 480, 17μm



## Athermal Lenses



The need to maintain focus over a wide range of environmental temperatures is essential to system performance, stability, and high quality. Athermalized lenses kept their performance from changing by means of optical passivity, mechanical activity, and mechanical passivity in a large temperature range. Its configuration will auto-adjust itself when placed at different temperatures.

Part Number	Wavelength ( $\mu\text{m}$ )	Focal Length (mm)	Focus Type	F#	BWD (mm)	Mount	Detector
Infra-LW6.91.0-17A	8.0 - 14.0	6.9	Fixed Focus	1.0	3.24	Flange	640 x 480, 17 $\mu\text{m}$
Infra-LW7.51.0-17A	8.0 - 14.0	7.5	Fixed Focus	1.0	9.00	M25x0.5	640 x 480, 17 $\mu\text{m}$
Infra-LW8.51.2-17A	8.0 - 14.0	8.5	Manual Focus	1.2	10.47	M34x0.5	640 x 480, 17 $\mu\text{m}$
Infra-LW91.0-17A	8.0 - 14.0	9.0	Fixed Focus	1.0	9.11	M34 x 0.5	640 x 480, 17 $\mu\text{m}$
Infra-LW111.0-17A	8.0 - 14.0	11.0	Manual Focus	1.0	11.00	M34x0.5	640 x 480, 17 $\mu\text{m}$
Infra-LW131.0-17A	8.0 - 14.0	13.0	Fixed Focus	1.0	8.77	M25x0.5	640 x 480, 17 $\mu\text{m}$
Infra-LW151.0-17A	8.0 - 14.0	15.0	Manual Focus	1.0	8.00	M34x0.75	640 x 480, 17 $\mu\text{m}$
Infra-LW150.85-17A	8.0 - 14.0	15.0	Fixed Focus	0.9	8.50	M34 x 1	640 x 480, 17 $\mu\text{m}$
Infra-LW151.0-17A	8.0 - 14.0	15.0	Manual Focus	1.0	8.00	M34 x 0.75	640 x 480, 17 $\mu\text{m}$
Infra-LW191.2-17A	8.0 - 14.0	19.0	Manual Focus	1.2	10.47	M34x0.5	640 x 480, 17 $\mu\text{m}$
Infra-LW191.0-17A	8.0 - 14.0	19.0	Fixed Focus	1.0	8.00	M29 x 0.75	640 x 480, 17 $\mu\text{m}$
Infra-LW251.2-17A	8.0 - 14.0	25.0	Manual Focus	1.2	10.47	M34x0.5	640 x 480, 17 $\mu\text{m}$
Infra-LW251.0-17A	8.0 - 14.0	25.0	Fixed Focus	1.0	9.00	M34 x 0.75	640 x 480, 17 $\mu\text{m}$
Infra-LW301.0-17A	8.0 - 14.0	30.0	Fixed Focus	1.0	9.35	M34 x 0.5	640 x 480, 17 $\mu\text{m}$
Infra-LW351.2-17A	8.0 - 14.0	35.0	Manual Focus	1.2	10.47	M34x0.5	640 x 480, 17 $\mu\text{m}$
Infra-LW351.0-17A	8.0 - 14.0	35.0	Fixed Focus	1.0	4.50	M25 x 0.5	640 x 480, 17 $\mu\text{m}$
Infra-LW401.0-17A	8.0 - 14.0	40.0	Fixed Focus	1.0	6.50	M34 x 0.75	640 x 480, 17 $\mu\text{m}$
Infra-LW501.0-17A	8.0 - 14.0	50.0	Fixed Focus	1.0	7.70	M34x0.75	640 x 480, 17 $\mu\text{m}$
Infra-LW601.0-17A	8.0 - 14.0	60.0	Fixed Focus	1.0	8.00	M34 x 0.75	640 x 480, 17 $\mu\text{m}$
Infra-LW601.25-17A	8.0 - 14.0	60.0	Manual Focus	1.3	10.47	M34x0.5	640 x 480, 17 $\mu\text{m}$
Infra-LW701.0-17A	8.0 - 14.0	70.0	Fixed Focus	1.0	11.00	M34 x 0.75	640 x 480, 17 $\mu\text{m}$
Infra-LW751.0-17A	8.0 - 14.0	75.0	Fixed Focus	1.0	5.70	M34 x 0.75	640 x 480, 17 $\mu\text{m}$
Infra-LW751.3-17A	8.0 - 14.0	75.0	Fixed Focus	1.3	11.00	M34 x 0.75	640 x 480, 17 $\mu\text{m}$
Infra-LW1001.0-17A	8.0 - 14.0	100.0	Fixed Focus	1.0	13.50	Flange	640 x 480, 17 $\mu\text{m}$
Infra-LW1001.2-17A	8.0 - 14.0	100.0	Fixed Focus	1.2	9.50	M38.5 x 0.75	640 x 512, 17 $\mu\text{m}$

Part Number	Wavelength ( $\mu\text{m}$ )	Focal Length (mm)	Focus Type	F#	BWD (mm)	Mount	Detector
Infra-LW1001.5-17A	8.0 - 14.0	100.0	Manual Focus	1.5	10.47	M34x0.5	640 x 480, 17 $\mu\text{m}$
Infra-LW1101.3-17A	8.0 - 14.0	110.0	Fixed Focus	1.3	12.29	M59 x 0.75	640 x 512, 17 $\mu\text{m}$
Infra-LW1251.2-17A	8.0 - 14.0	125.0	Fixed Focus	1.2	8.50	M45 x 1	1024 x 768, 17 $\mu\text{m}$
Infra-LW1801.4-17A	8.0 - 14.0	180.0	Fixed Focus	1.4	48.80	Flange	1024 x 768, 17 $\mu\text{m}$
IR7.51.0-12A	8.0 - 14.0	7.5	Fixed Focus	1.0	7.50	M19 x 0.5	320 x 240, 12 $\mu\text{m}$
IR191.0-12A	8.0 - 14.0	19.0	Fixed Focus	1.0	7.50	M19 x 0.5	320 x 240, 12 $\mu\text{m}$
IR4.11.2-12A	8.0-12.0	4.1	Fixed Focus	1.2	14.00	M25 x 0.5	640 x 512, 12 $\mu\text{m}$
IR5.81.2-12A	8.0-12.0	5.8	Fixed Focus	1.2	14.00	M18 x 0.5	640 x 512, 12 $\mu\text{m}$
IR7.11.0-12A	8.0-12.0	7.1	Fixed Focus	1.0	14.00	M34 x 0.75	640 x 512, 12 $\mu\text{m}$
IR9.11.2-12A	8.0-12.0	9.1	Fixed Focus	1.2	17.10	M20 x 0.5	640 x 512, 12 $\mu\text{m}$
IR12.31.0-12A	8.0-12.0	12.3	Fixed Focus	1.0	18.22	M25 x 0.5	640 x 512, 12 $\mu\text{m}$
IR12.81.0-12A	8.0-12.0	12.8	Fixed Focus	1.0	14.00	M34 x 0.75	640 x 512, 12 $\mu\text{m}$
IR181.0-12A	8.0-12.0	18.0	Fixed Focus	1.0	8.80	M22 x 0.5	640 x 512, 12 $\mu\text{m}$
IR191.0-12A	8.0-12.0	19.0	Fixed Focus	1.0	13.50	M30 x 0.5	640 x 512, 12 $\mu\text{m}$
IR241.0-12A	8.0-12.0	24.0	Fixed Focus	1.0	8.80	M22 x 0.5	640 x 512, 12 $\mu\text{m}$
IR251.0-12A	8.0-12.0	25.0	Fixed Focus	1.0	12.50	M25 x 0.5	640 x 512, 12 $\mu\text{m}$
IR351.0-12A	8.0-12.0	35.0	Fixed Focus	1.0	16.50	M34 x 0.75	640 x 512, 12 $\mu\text{m}$
IR501.0-12A	8.0-12.0	50.0	Fixed Focus	1.0	16.50	M34 x 0.75	640 x 512, 12 $\mu\text{m}$
IR521.0-12A	8.0-12.0	52.0	Fixed Focus	1.0	16.50	M34 x 0.75	640 x 512, 12 $\mu\text{m}$
IR601.0-12A	8.0-12.0	60.0	Fixed Focus	1.0	17.70	M34 x 0.75	640 x 512, 12 $\mu\text{m}$
IR751.0-12A	8.0-12.0	75.0	Fixed Focus	1.0	13.50	M34 x 0.75	640 x 512, 12 $\mu\text{m}$
IR1001.2-12A	8.0-12.0	100.0	Fixed Focus	1.2	13.50	M34 x 0.75	640 x 512, 12 $\mu\text{m}$



## IR Zoom Lenses

IR zoom lenses are mostly used in relatively wide outdoor scenes with the aim to increase focal length for getting long-range detection. Since the focal length can be changed during operation, the key part of the scene can be zoomed in and observed, thus providing a better monitoring system. Zoom lenses are being utilized in many industries and fields such as highways, railways and bridges, coastal and border defence, and many other scenarios

Part Number	Wavelength ( $\mu\text{m}$ )	Focal Length (mm)	Focus Type	F#	BWD (mm)	Mount	Detector
Infra-MWZ-15-300	3.0 - 5.0	15 / 300	Motorized	4.0	30.10	Flange	640 x 512, 15 $\mu\text{m}$
Infra-MWZ-30-150	3.0 - 5.0	30 / 150	Motorized	2.0	24.00	Flange	384 x 288, 17 $\mu\text{m}$
Infra-MWZ-30-300	3.0 - 5.0	30 / 300	Motorized	4.0	7.10	Flange	640 x 512, 15 $\mu\text{m}$
Infra-LWZ-10-30	8.0 - 12.0	10 / 30	Motorized	0.85 - 1.00	8.00	Flange	384 x 288, 17 $\mu\text{m}$
Infra-LWZ-10-50	8.0 - 12.0	10 / 50	Motorized	0.70 - 1.00	7.84	Flange	384 x 288, 17 $\mu\text{m}$
Infra-LWZ-12.5-50	8.0 - 12.0	12.5 / 50	Motorized	0.80 - 1.00	7.84	Flange	640 x 480, 17 $\mu\text{m}$
Infra-LWZ-15-60	8.0 - 12.0	15 / 60	Motorized	0.80 - 1.00	13.17	Flange	640 x 512, 17 $\mu\text{m}$
Infra-LWZ-15-100	8.0 - 12.0	15 / 100	Motorized	1.40	7.90	Flange	640 x 480, 17 $\mu\text{m}$
Infra-LWZ-15-120	8.0 - 12.0	15 / 120	Motorized	0.75 - 1.20	18.25	Flange	640 x 512, 17 $\mu\text{m}$
Infra-LWZ-15-150	8.0 - 12.0	15 / 150	Motorized	1.40	17.30	Flange	640 x 480, 17 $\mu\text{m}$
Infra-LWZ-25-75	8.0 - 12.0	25 / 75	Motorized	0.90 - 1.10	7.84	Flange	640 x 512, 17 $\mu\text{m}$
Infra-LWZ-25-100	8.0 - 12.0	25 / 100	Motorized	0.90 - 1.10	22.24	Flange	640 x 480, 17 $\mu\text{m}$
Infra-LWZ-25-100-X	8.0 - 12.0	25 / 100	Motorized	0.80 - 1.10	20.60	Flange	1024 x 768, 17 $\mu\text{m}$
Infra-LWZ-25-125	8.0 - 12.0	25 / 125	Motorized	0.80 - 1.20	18.25	Flange	640 x 512, 17 $\mu\text{m}$
Infra-LWZ-25-225	8.0 - 12.0	25 / 225	Motorized	0.85 - 1.30	14.71	Flange	640 x 512, 17 $\mu\text{m}$
Infra-LWZ-25-225-X	8.0 - 12.0	25 / 225	Motorized	0.85 - 1.30	14.10	Flange	1024 x 765, 17 $\mu\text{m}$
Infra-LWZ-26-105	8.0 - 12.0	26 / 105	Motorized	0.80 - 1.10	8.00	M39 x 0.75	640 x 480, 17 $\mu\text{m}$
Infra-LWZ-27.5-247.5	8.0 - 12.0	27.5 / 247.5	Motorized	0.85 - 1.30	14.71	Flange	640 x 480, 17 $\mu\text{m}$
Infra-LWZ-29-261	8.0 - 12.0	29 / 261	Motorized	0.85 - 1.30	14.71	Flange	640 x 480, 17 $\mu\text{m}$
Infra-LWZ-30-120	8.0 - 12.0	30 / 120	Motorized	0.90 - 1.10	22.24	Flange	640 x 512, 17 $\mu\text{m}$
Infra-LWZ-30-150	8.0 - 12.0	30 / 150	Motorized	0.85 - 1.20	15.54	Flange	640 x 512, 17 $\mu\text{m}$
Infra-LWZ-30-150-X	8.0 - 12.0	30 / 150	Motorized	0.85 - 1.20	14.10	Flange	1024 x 768, 17 $\mu\text{m}$
Infra-LWZ-30-300	8.0 - 12.0	30 / 300	Motorized	0.85 - 1.30	17.40	Flange	640 x 480, 17 $\mu\text{m}$
Infra-LWZ-36-180	8.0 - 12.0	36 / 180	Motorized	0.85 - 1.20	47.51	Flange	640 x 480, 17 $\mu\text{m}$
Infra-LWZ-40-160	8.0 - 12.0	40 / 160	Motorized	0.90 - 1.20	47.51	Flange	640 x 512, 17 $\mu\text{m}$
Infra-LWZ-100-330	8.0 - 12.0	100 / 330	Motorized	1.60	17.40	Flange	1024 x 768, 17 $\mu\text{m}$



## IR Objective Lenses

The infrared objective lens is an integral part of the infrared vision system, which is used to collect radiation in the near-infrared, short-wave infrared, mid-wave infrared, or long-wave infrared spectra, and focus the object on the detector. Information such as temperature distribution and pixel information could be captured and displayed as thermal images.

Part Number	Wavelength ( $\mu\text{m}$ )	Magnification	F#	BWD (mm)	Focus Type	Mount	Detector
<b>Infra-LW256-1X</b>	8.0 - 14.0	1x	1.0	31	Manual	M45 x 1	320 x 256, 25 $\mu\text{m}$
<b>Infra-LW256-1.25X</b>	8.0 - 14.0	1.25x	0.98	31	Manual	M45 x 1	320 x 256, 25 $\mu\text{m}$
<b>Infra-LW256-3X</b>	8.0 - 14.0	3x	1.0	31	Manual	M45 x 1	320 x 256, 25 $\mu\text{m}$
<b>Infra-LW256-5X</b>	8.0 - 14.0	5x	1.0	31	Manual	M45 x 1	320 x 256, 25 $\mu\text{m}$
<b>Infra-LW640-5X</b>	8.0 - 14.0	5x	4.46	11	Manual	M34 x 0.75	640 x 480, 17 $\mu\text{m}$
<b>Infra-LW640-3X</b>	8.0 - 14.0	3x	2.0	11	Manual	M34 x 0.75	640 x 480, 17 $\mu\text{m}$
<b>Infra-LW640-1X</b>	8.0 - 14.0	1x	1.0	11	Manual	M34 x 0.75	640 x 480, 17 $\mu\text{m}$
<b>Infra-IRM1X-15</b>	3.0 - 5.0	1x	2.0	50	Fixed	M60 x 1	1280 x 1024, 15 $\mu\text{m}$
<b>Infra-IRM3X-15</b>	3.0 - 5.0	3x	2.0	50	Fixed	M60 x 1	1280 x 1024, 15 $\mu\text{m}$
<b>Infra-IRM8.2X-15</b>	3.0 - 5.0	8.2x	2.0	50	Fixed	M60 x 1	1280 x 1024, 15 $\mu\text{m}$
<b>Infra-IRM1X</b>	3.0 - 5.0	1x	2.0	40.5	Manual	M48 x 1	640 x 512, 15 $\mu\text{m}$
<b>Infra-IRM2X</b>	3.0 - 5.0	2x	2.0	40.5	Manual	M48 x 1	640 x 512, 15 $\mu\text{m}$
<b>Infra-IRM5XV3</b>	3.0 - 5.0	5x	4.0	39.65	Manual	M42 x 0.75	640 x 512, 15 $\mu\text{m}$



## Fisheye Lenses

Unlike ordinary lenses, the Fisheye Lenses have short focal lengths and a wide-angle field of view, allowing uniform screen brightness. It is used in various fields like security surveillance, consumer electronics, automobiles, and testing technology because it has a steady focus.

Part Number	Wavelength (μm)	Focal Length (mm)	Circular FOV (°)	F#	Focus Type	BWD (mm)	Detector
Infra-FE3.20.8-17	8.0 - 14.0	3.2	125	0.8	Fixed	8.0	384 x 288, 17μm
Infra-FE3.81.0-17	8.0 - 14.0	3.8	180	1.0	Manual	14.2	640 x 480, 17μm
Infra-FE4.41.0-17	8.0 - 14.0	4.4	236	1.0	Manual	13.5	800 x 600, 17μm
Infra-FE4.61.0-17	8.0 - 14.0	4.6	120	1.0	Manual	10.2	640 x 480, 17μm
Infra-FE5.51.0-17	8.0 - 14.0	5.5	73	1.0	Motorized	6.7	388 x 284, 17μm
Infra-FE5.61.0-17	8.0 - 14.0	5.6	180	1.0	Manual	13.5	800 x 600, 17μm



## Dual FOV Lenses

You can switch the field of view (FOV) of dual FOV lenses with the push of a button, changing from a wide to a narrow FOV easily. It allows you to save cost, time, and space by using only one lens instead of multiple lenses for switching FOV.

Part No.	Wavelength (mm)	Dual FL (mm)	Dual F/#	BFL (mm)	Focus Range	Focus Type	Mount	Detector
Infra-2FV-22-75	8.0 - 14.0	75, 22	1.2, 1.1	17.0	10m, 3m	Motorized	Flange	384x288, 25μm
Infra-2FV-44-176	7.0 - 14.0	176, 44	1.0, 1.2	27.1	30m, 5m	Motorized	Flange	640x480, 17μm
Infra-2FV-45-135	8.0 - 12.0	135, 45	1.0, 1.2	21.6	10m, 3m	Motorized	Flange	640x480, 17μm
Infra-2FV-50-150	7.0 - 14.0	150, 50	1.4	66.0	30m, 5m	Motorized	Flange	384x288, 25μm
Infra-2FV-50-200	8.0 - 14.0	200, 50	1.0, 1.2	26.4	50m, 5m	Motorized	Flange	640x512, 17μm

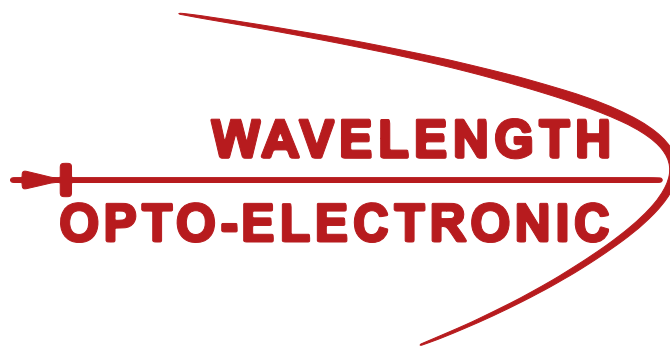


## Sniper Scope Lenses

IR sniper scope lenses lay a targeting reticule over the amplified image at night times. It is also called night vision scope or thermal scope because it uses IR light or amplifies dim light to detect the target at a distance. This is widely used in binoculars, laser rangefinders, compasses, GPS, telescopes, and other navigation devices.

Part Number	Wavelength (μm)	Focal Length (mm)	FOV ( ° )	F#	BWD (mm)	Mount	Detector
<b>Infra-SS191.1-18</b>	8.0 - 12.0	19	34.9 (H) x 24.2 (V)	1.1	18	M45 x 1	640 x 480 - 17μm
<b>Infra-SS251.1-18</b>	8.0 - 12.0	25	24.5 (H) x 18.5 (V)	1.1	18	M45 x 1	640 x 480 - 17μm
<b>Infra-SS251.0-13.3/17.84</b>	8.0 - 12.0	25	24.5 (H) x 18.5 (V)	1.0	13.3/ 17.84	M34 x 0.75/ M38 x 1	640 x 480 - 17μm
<b>Infra-SS381.3-16.99</b>	8.0 - 12.0	38	16 (H) x 12 (V)	1.3	16.99	M26 x 0.75	640 x 480 - 17μm
<b>Infra-SS401.0-14</b>	8.0 - 12.0	40	15.4 (H) x 11.6 (V)	1.0	14	M38 x 1	384 x 288 - 17μm
<b>Infra-SS501.2-18</b>	8.0 - 12.0	50	12.4 (H) x 9.3 (V)	1.2	18	M45 x 1	640 x 480 - 17μm
<b>Infra-SS501.0-17.84</b>	8.0 - 12.0	50	12.4 (H) x 9.3 (V)	1.0	17.84	M38 x 1	640 x 480 - 17μm
<b>Infra-SS751.0-14.2</b>	8.0 - 12.0	75	8.2 (H) x 6.2 (V)	1.0	14.2	M38 x 1	384 x 288 - 17μm
<b>Infra-SS751.0-17.84</b>	8.0 - 12.0	75	8.2 (H) x 6.2 (V)	1.0	17.84	M38 x 1	640 x 480 - 17μm
<b>Infra-SS1001.2-14.2</b>	8.0 - 12.0	100	6.2 (H) x 4.6 (V)	1.2	14.2	M38 x 1	384 x 288 - 17μm
<b>Infra-SS1001.3-18</b>	8.0 - 12.0	100	6.2 (H) x 4.6 (V)	1.3	18	M45 x 1	640 x 480 - 17μm





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