Telecentric Lenses

- High degree of telecentricity.
- Low optical distortion.
- Maximum, accurate image reproduction.
- 12X Zoom telecentric lens.
- Telecentric video lenses.
- Invarigon-R™ telecentric lenses.
- Macro Invaritar™ tele centric lenses.
- Extra Long Working Distance (ELWD) Macro Invaritar™ telecentric lenses.
- Invaritar Large Field telecentric lenses.
- Telecentric lens accessories.

NAVITAR®

Telecentric Lenses

Navitar Telecentric Lenses

Navitar offers a family of high-performance telecentric lenses for use in machine vision, metrology, and precision gauging applications. All provide low optical distortion and a high degree of telecentricity for maximum, accurate image reproduction, particularly when viewing three-dimensional objects.

Benefits of Telecentric Lenses

One of the most important benefits of a telecentric lens is that image magnification does not change as object distance varies. A telecentric lens views and displays the entire object from the same prospective angle, therefore, three-dimensional features will not exhibit the perspective distortion and image position errors present when using a standard lens. Objects inside deep holes are visible throughout the field, undistorted, therefore, telecentric lenses are extremely useful for inspecting three-dimensional objects or scenes where image size and shape accuracy are critical.

Choose the Best Lens Option for Your Needs

Our machine vision lenses include the 12X Telecentric Zoom lens, TC-5028 and TEC-M55 telecentric video lens, Invarigon-R™, Macro Invaritar™, ELWD Macro Invaritar™, and Invaritar Large Field telecentric lenses.

12X Telecentric

The 12X Telecentric Zoom system allows users to reach a true telecentric condition to within less than 0.3° while maintaining constant perspective and magnification. The 12X Telecentric Zoom provides field coverage from 50 mm down to 4 mm. Optional coaxial illumination allows clear viewing, even when working with mirror-like surfaces.

Telecentric Video Lens

The Navitar TC-5028 telecentric lens is a 50 mm F/2.8 telecentric lens which reduces or eliminates viewing angle error and magnification error while providing high resolution and contrast with low distortion. This compact, lightweight lens can be used with 1/3″, 1/2″ and 2/3″ format cameras and is usable from 0.5X to 1.0X, 1:1.

Navitar also offers the TEC-M55 telecentric C-mount lens for 2/3″ format cameras. This 55 mm F/2.8 telecentric lens maintains constant perspective and magnification.

Invarigon-R™

The Invarigon-R™ family of gauging lenses provides telecentric imaging with a wide selection of magnifications to cover most applications. These rugged, C-mount lenses are the most cost-effective choice for critical inspection and metrology imaging applications. With telecentric performance of less than 0.2° chief ray angle over the entire object field and high-performance multilayer coatings, the Invarigon-R™ lenses provide the highest image clarity, particularly for backlit applications. Lockable aperture adjusts to select the required depth of field and fine focus adjustment provides even sharper images.

Macro Invaritar™

The Macro Invaritar™ telecentric gauging lenses are the best choice for machine vision applications involving significant space limitations. The small footprint fits easily into restricted spaces and the rugged, C-mount design stands up to harsh industrial environments. Telecentric performance is less than 0.25° chief ray angle over the entire object field. Low distortion (<0.1% over the entire object field) provides highly accurate images. Lockable aperture adjusts to select the required depth of field.

ELWD Macro Invaritar™

ELWD (Extra-Long Working Distance) Macro Invaritar™ telecentric lenses provide exceptional telecentric performance of less than 0.1° chief ray angle over the entire object field. This rugged single-piece, C-mount design stands up to harsh industrial environments and is the best choice for machine vision applications where an extra-long working distance is required. Low distortion (<0.5% over the entire object field) provides highly accurate images. Long working distance permits convenient mounting and lockable aperture adjusts to select the required depth of field.

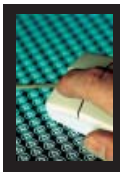
Invaritar™ Large Field

Invaritar™ modular, large-field telecentric gauging lenses provide telecentric performance of less than 0.5° chief ray angle over the entire object field. High-performance multilayer coatings allow the highest image clarity, especially for backlit applications. Low distortion provides for highly accurate images and lockable aperture adjusts to select the required depth of field.

This telecentric lens system is created by combining a base lens with an appropriate attachment lens to achieve the required magnification and field of view. Both C-mount and F-mount base lenses are available to cover most applications. C-mount lenses include fine focus adjustment, providing sharper images.

Available Telecentric Lenses

12X Telecentric	
1-50993*	12X Zoom Lens for Use w/ Telecentric Attachment
1-50387	12X Telecentric Zoom Attachment (straight)
1-50363	12X Telecentric Zoom Attachment (right-angle)
1-50694	12X Telecentric Zoom Attachment (non-coax)
**Please call for motorized options for part number 1-50993.*	
Telecentric Video Lenses	
TC-5028	50 mm F/2.8 Telecentric Video Lens
TEC-M55	55 mm F/2.8 Telecentric Video Lens
Invarigon-R Telecentric Lenses	
59 LGU 013	0.13X Invarigon-R Telecentric Lens
59 LGU 016	0.16X Invarigon-R Telecentric Lens
59 LGU 018	0.18X Invarigon-R Telecentric Lens
59 LGU 022	0.22X Invarigon-R Telecentric Lens
59 LGU 025	0.25X Invarigon-R Telecentric Lens
59 LGU 029	0.29X Invarigon-R Telecentric Lens
59 LGU 031	0.31X Invarigon-R Telecentric Lens
59 LGU 036	0.36X Invarigon-R Telecentric Lens
59 LGU 042	0.42X Invarigon-R Telecentric Lens
59 LGU 050	0.50X Invarigon-R Telecentric Lens
Macro Invaritar Telecentric Lenses	
59 LGM 205	Macro Invaritar Lens, 0.5X
59 LGM 601	Macro Invaritar Lens, 1X
59 LGM 602	Macro Invaritar Lens, 2X
59 LGM 605	Macro Invaritar Lens, 5X
ELWD Macro Invaritar Telecentric Lenses	
59 LGN 702	2X ELWD Macro Invaritar Lens
59 LGN 703	3X ELWD Macro Invaritar Lens
59 LGN 704	4X ELWD Macro Invaritar Lens
59 LGN 705	5X ELWD Macro Invaritar Lens
F-Mount Invaritar Large-Field Base Lenses	
59 LGB 435	F-mount Invaritar Base Lens (72 mm long)
59 LGB 450	F-mount Invaritar Base Lens (57 mm long)
59 LGB 485	F-mount Invaritar Base Lens (68 mm long)
59 LGB 499	F-mount Invaritar Base Lens (117 mm long)
C-Mount Invaritar Large-Field Base Lenses	
59 LGC 516	C-mount Invaritar Base Lens (55 mm long)
59 LGG 925	C-mount Invaritar Base Lens (53 mm long)
59 LGG 935	C-mount Invaritar Base Lens (46 mm long)
59 LGG 950	C-mount Invaritar Base Lens (55 mm long)
Invaritar Large-Field Attachment Lenses	
59 LGH 416	Invaritar Attachment Lens (121 mm long)
59 LGH 431	Invaritar Attachment Lens (206 mm long)
59 LGJ 423	Invaritar Attachment Lens (269 mm long)
59 LGL 428	Invaritar Attachment Lens (275 mm long)



Additional information and product specifications for telecentric lenses available at www.machinevision.navitar.com

Telecentric Lens Accessories

Navitar Telecentric Lenses

Navitar offers several different accessories to enhance the performance of their Machine Vision telecentric lenses. These include: Teleconverters to increase magnification, right angle attachments for viewing of objects up to 360 degrees about the optical axis, fiber bundle collimators to provide collimated backlighting, and anodized mounting brackets for proper mounting of the Invarigon-R™ and Invaritar™ lenses.

Teleconverters and Adapters

When a closer view of objects is required, use the HE15-1 and 2XE in conjunction with our C-mount lenses, or use the 59 LHZ 814 and 820 in conjunction with our F-mount lenses. Mounted between the lens and the camera, these teleconverters increase magnification by 1.4X, 1.5X, or 2.0X. Their compact size has minimum impact on overall lens/camera length.

Right Angle Attachments

These attachments allow Invaritar™ lenses to view objects at right angles to the lens axis. The telecentricity, resolution, low distortion, and high contrast of the lenses are preserved. The attachments can be rotated 360 degrees around the lens optical axis to provide viewing in any direction. These attachments are useful whenever it is difficult to point a lens directly at the object. They are especially helpful when adapting new optics to existing equipment, where space is limited.

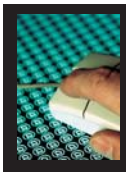
Fiber Bundle Collimator

This unit provides a large collimated beam for lighting machine vision applications. It accepts the output from a standard 59 QLS 700 fiber optic bundle. The uniform, collimated beam is useful for back lighting objects for gaging and feature inspection. The spectral content of the light is controlled by filtering at the fiber optic light source.

To make precise machine vision measurements, correct lighting is essential. Back lighting is useful for measuring the exterior dimension of opaque objects, or to measure the dimensions of holes through opaque objects. With diffuse back lighting, rays from the edges of the field can reflect from the edge of the object and confuse the image. A collimated light source eliminates the confusing rays. This is especially important when the object being measured is smooth and shiny, or when it is round.

Lens Mounting Brackets

Use these brackets to clamp our Invaritar™ and Invarigon-R lenses to your application. This accessory clamps directly around the lens barrel and includes convenient standard-sized tapped mounting holes. The 59 LGP 717 is similar to the 59 LGP 403 except that it was designed for use with the 59 LGN series Extra Long Working Distance Macro Invaritar™ lenses.



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Available Telecentric Lens Accessories

Teleconverters & Adapters	
HE15-1	Teleconverter Lens, 1.5X Adapter
2XE	Teleconverter Lens, 2.0X Adapter
59 LGZ 814	1.4X Teleconverter Lens for LGB Base Lenses
59 LGZ 820	2.0X Teleconverter Lens for LGB Base Lenses
59 LGT 101	Nikon F-mount to C-mount Adapter
Right Angle Attachments	
59 LSF 101	Right Angle Image Folder for 1X Macro Invaritar 50 LGM 601
59 LSF 401	Right Angle Image Folder for Invarigon-R Lenses
Collimator	
59 LGQ 035	Fiber Bundle Collimator
Mounting Brackets	
59 LGP 403	Invaritar Telecentric Lens Mounting Bracket
59 LGP 414	Macro Invaritar Telecentric Lens Mounting Bracket
59 LGP 717	ELWD Macro Invaritar Telecentric Lens Mounting Bracket