

OEM/Designer Handbook:

InFocus™ Standard Series

- **Laboratory**
- **Industrial**

InFocus™ Standard Series Modules

General Information. The InFocus Standard Series Modules are internal focusing systems that act independently of the microscope's mechanical focus. InFocus also permits the deliberate defocusing of the microscope so that the mechanical focus can be used to re-establish a new working distance. This means that the InFocus system can be used as a dimensionally stable alternative to old-fashioned drawtubes for spherical correction via tubelength alteration. Unlike a mechanical drawtube, InFocus does not significantly introduce magnification changes with focal translation.

The InFocus Module is available in two versions: **Laboratory** and **Industrial** (Regular and Direct Mount). Optically identical, they differ only configurationally.

The Laboratory type attaches directly to the stand (interfacing the standard observation tube). When the InFocus Module is used with binocular photo tubes, all top-mounted accessories continue to function exactly as before. A rubber "O"-ring acts as both a grip and a point at which a larger replacement "O"-ring can be utilized for connection to a motorized actuator.

The Industrial version operates in exactly the same way as the Laboratory type, but has specific points where clamps with ¼-20 and M4 screws can be used to attach it to breadboards or jigs, making the Industrial type suitable for installation on assembly lines, custom applications or research. In effect, the Industrial type is a complete *internally focusable* microscope in a tube. Objectives interchange on dovetail adapters. It is possible to mount our Coaxial Illuminator as a front to the system.

Setup. The Laboratory InFocus Module is placed into the microscope stand's socket and locked into place. The microscope's observation tube then mounts on top. Next, the InFocus Module must be parfocalled so that when its two reference "arrows" are opposite each other, the focus is set for infinity. The easiest way to do this is to use the InFocus Module with a video camera and monitor. Using a prepared microscope slide as an object, focus should be established for the 40x objective *by the regular mechanical* focus. Then, the 10x objective should be turned into position and focus should be established *by turning the InFocus Focusing Ring*. The process should be repeated at which time the parfocality will be virtually perfect. The rubber "O"-ring should now be pushed UPWARDS, out of its groove and left there for the time being. A piece of vinyl tape may be used to temporarily fix the rotation in place (or one can simply take care not to displace the position). The Reference Ring can now be permanently set by loosening its three setscrews with the supplied #2-56 Allen wrench and rotating it so that both "arrows" line up. Then, the three setscrews should be *gently* locked in place. The "O"-ring should now be returned to fit its groove—but ONLY after the three setscrews have been tightened. The InFocus Module is now ready for use. Turning the Focusing Ring clockwise/counterclockwise adjusts focus in the specimen or object to a different optically sectioned level.

The Industrial InFocus Module can be similarly parfocalled. However, it maybe more convenient to simply find infinity by directing the InFocus (w/ camera mounted) to peer out of a window at a distant object (e.g. a cloud, etc.).

Minus Range Resetting Lens. The Minus Range Resetting Lens is a useful accessory, permitting virtually the full range for minus focusing to be set (at the expense of any plus-rotation). This feature is desirable where and when the InFocus is to be used with low refractive index media or with live cells in water when a oil immersion objective is used atop a cover glass separation. The Minus range Resetting Lens is exchanged for the top Window of the InFocus and screwed in place. Then, the parfocalling procedure must be repeated so that its full range can be obtained.

Uses. Once the InFocus has been parfocalled, it can be used to sweep focus from a fixed position without any external movement of either object or objective. This means that InFocus turns any microscope so equipped into

a micromanipulator-ready instrument. In addition, contact with delicate objects (from wafers to fragile biological cells) can be avoided.

Since the first optical system of any biological microscope is the cover glass/preparation, too-thin or too-thick preparations affect the optical path (and therefore the spherical correction) of the objective. Microscopes can only be set at the factory for one optimum working distance and for only one (0.17mm) cover/preparation thickness in order to assure the best spherical aberration-free image. Consequently, InFocus may also be understood as a means to deliberately defocus the microscope to reset and counter the affects of preparation deviations. When the Focusing Ring is turned in the clockwise direction, thin preparations (or low refractive index media) tend to be spherically corrected for (- direction). Turning the Focusing Ring counter-clockwise focuses or defocuses the microscope in the other (+ direction) for preparations that are generally thick or of high refractive index. When the InFocus is used to deliberately defocus the microscope, the regular mechanical focus can subsequently be used to re-establish the image. Since a new working distance is thereby established other than the standard factory-set 0.17mm cover/preparation thickness, InFocus actually "seeks" a new working distance that is more in keeping with that dictated by a too-thin/too-thick preparation. Note that the InFocus has more travel in the counterclockwise (+) direction because most preparations that deviate from 0.17mm cover/preparation are generally thicker than the norm. The exception is when the Minus Range Resetting Lens is used (see above).

You need not be an optical expert to use InFocus. In fact, InFocus is virtually fool-proof. Simply by turning the Focusing Ring, five positions may be set from its full-minus position 180° to its full-plus position: one image will be captured within a spherical tolerance that yields superb results. This is why InFocus is the world's first active video/photo corrector.

System Configurations and Accessories. The Laboratory type functions with all top mounted observation tube accessories exactly as before. Please consult your microscope manufacturer for details of top-mount accessories.

The Industrial type is a complete system for video and photo imaging. A 2x increase in magnification may be obtained by interfacing the standard C-mount and camera with a DL Tube. The LDS Tube provides a 4x amplification factor. Please refer to system drawings for other accessory details.

If cameras with large sensors/formats up to 36mm x 24mm/43mm diagonal (35mm format) are to be used with the Industrial InFocus, the tube set must be supplemented by a 10x Widefield Eyepiece and either a Unipar (0.3x factor) or a Unipar-Vid (0.2x factor) adapter. The amplification factor is then 3x (or 2x) and is sufficient to cover such large formats without vignetting. In such ways, the Industrial InFocus Module can meet most imaging/recording demands—and still retain its active focusing/spherical correction functions.

Care and Cleaning. The InFocus Module should be treated as the fine optical instrument it is. Care should be taken to keep dust and dirt off external surfaces. If the front element should ever need to be cleaned, use lens tissue moistened by a lens cleaner. NEVER USE SOLVENTS of any kind. The InFocus Module should NEVER be opened. If contaminants enter any inner parts, consult your dealer or INFINITY about cleaning services.

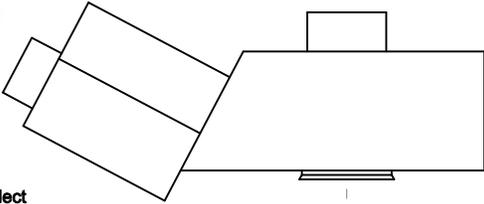
Warranty Service and Questions. Specific details of the warranty are given on the limited warranty statement. In general, all parts and labor are guaranteed for five years. Should the InFocus Module become damaged or need service, return it to your authorized dealer with a letter explaining the problem. If you have additional questions, please do not hesitate to contact your dealer or INFINITY PHOTO-OPTICAL COMPANY directly.

InFocus is a trademark of Infinity Photo-Optical Company.

Laboratory InFocus™ System:

To Major-brand Visual/Video/Photo Accessories

Major-brand observation tube

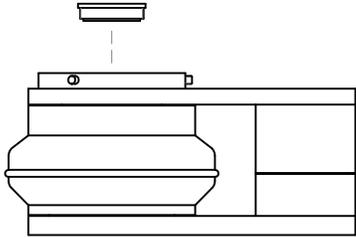


INSERT CENTERING RING. Select one to match the type of microscope:

- A) For Zeiss Axio
- B) For Olympus BH/AX
- C) For Nikon Eclipse
- D) For Leica DAS

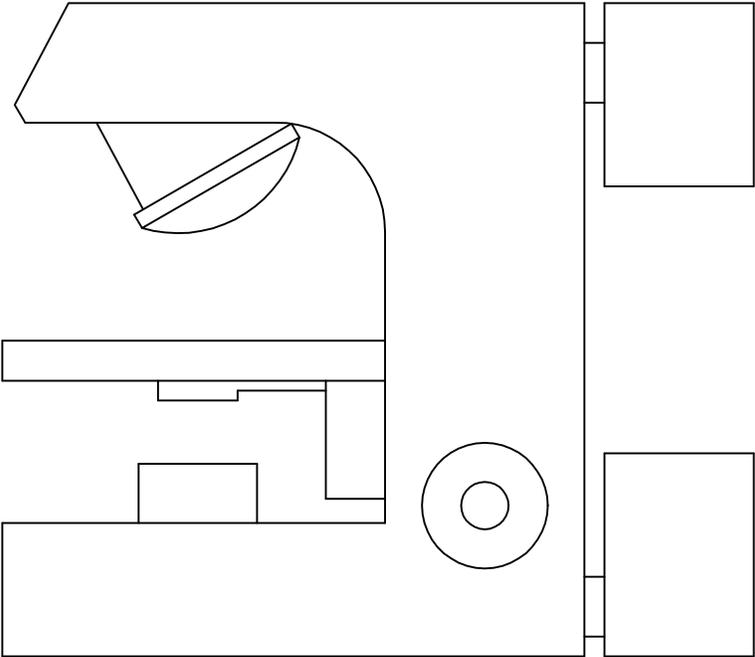


MINUS RANGE
RESETTING LENS:



LABORATORY InFocus BODY

Major-brand Dovetails:



Major-brand microscope

Laboratory InFocus™ System:

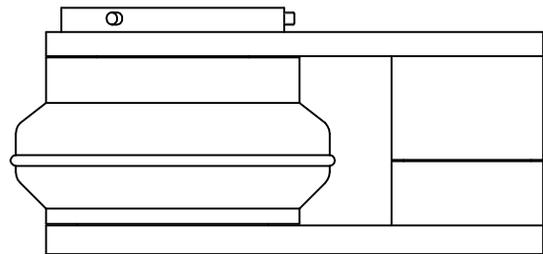
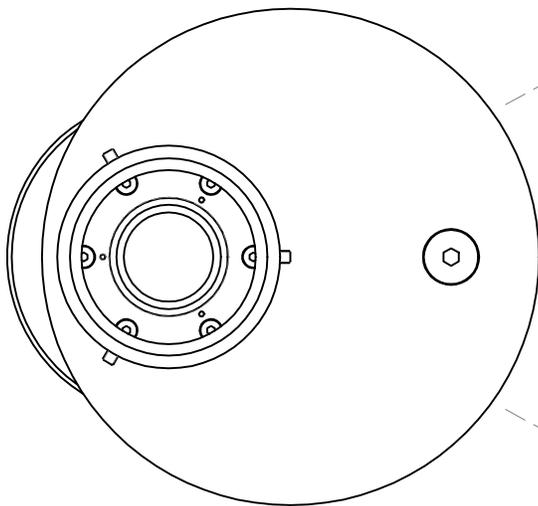
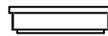
To Major-brand Visual/Video/Photo Accessories

INSERT CENTERING RING. Select one to match the type of microscope:

- A) For Zeiss Axio
- B) For Olympus BH/AX
- C) For Nikon Eclipse
- D) For Leica DAS



MINUS RANGE
RESETTING LENS:



LABORATORY InFocus BODY
(Side View)

LABORATORY InFocus BODY
(Top View)

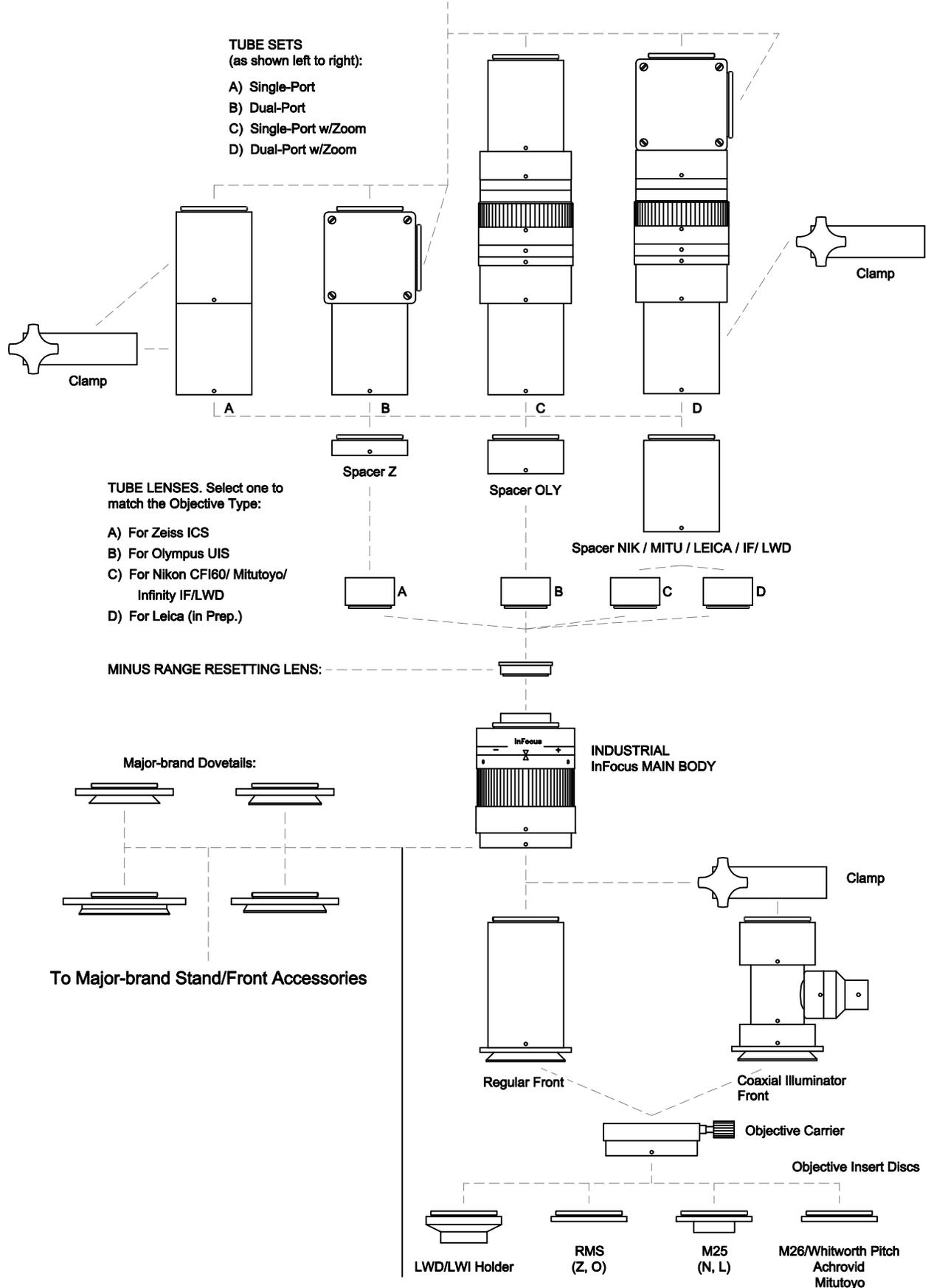
Major-brand Dovetails:



To Major-brand Stand/Front Accessories

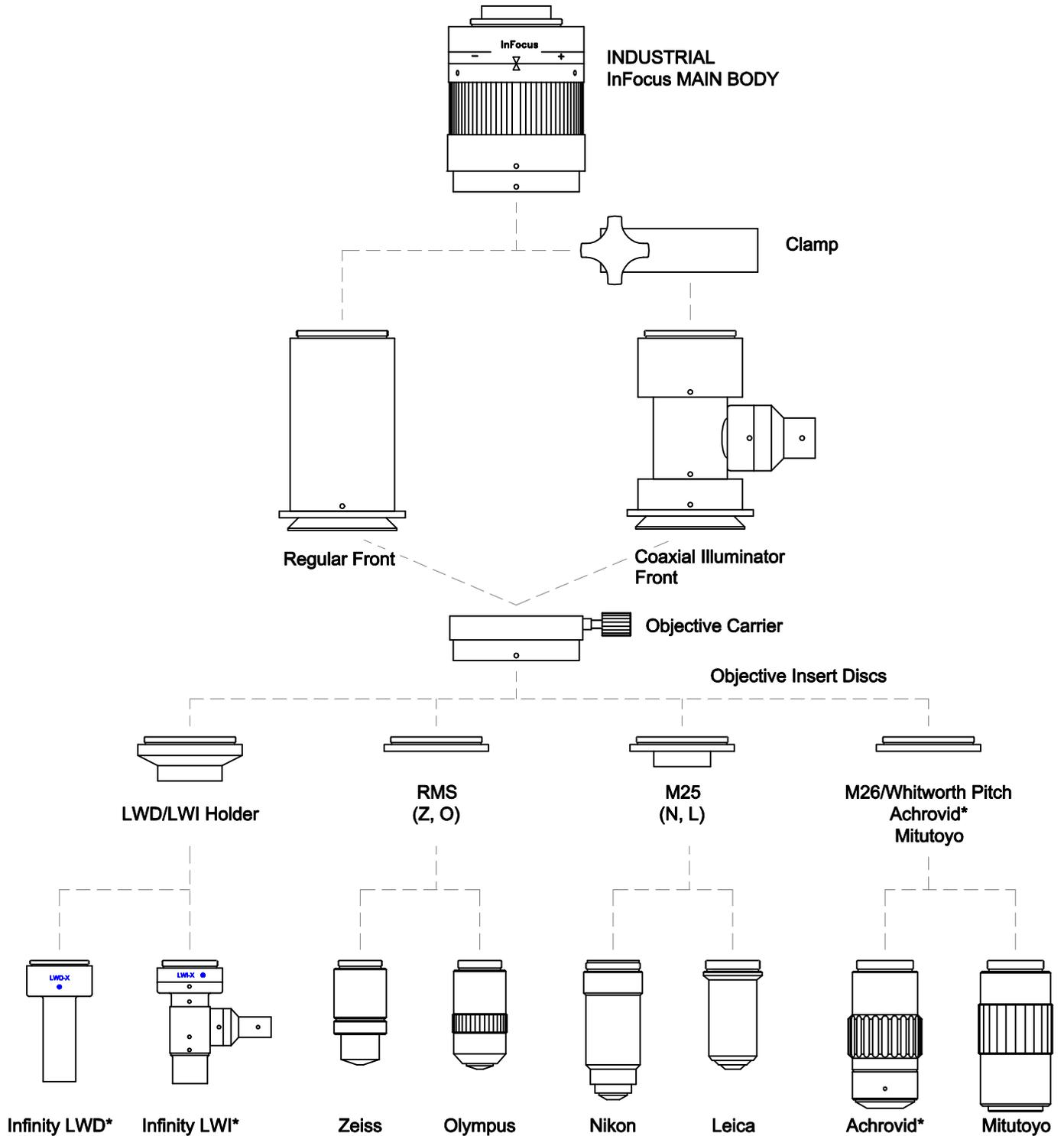
Industrial InFocus™ Modular System:

To Visual/Video/Photo Accessories (please see that drawing page)



Industrial InFocus™ Objective Options

InFocus can be used with virtually any infinity-corrected objective:



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Industrial InFocus™ Direct Mount System:

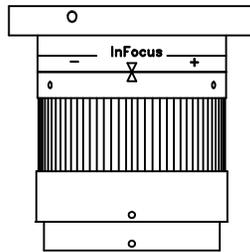
To Major-brand Binocular/Trinocular Observation Tubes

INSERT CENTERING RING. Select one to match the type of microscope:

- A) For Zeiss Axio
- B) For Olympus BH/AX
- C) For Nikon Eclipse
- D) For Leica DAS

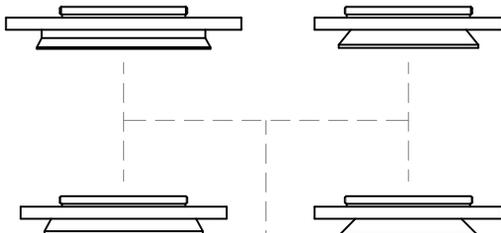


MINUS RANGE
RESETTING LENS:

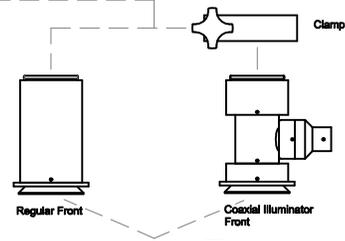


INDUSTRIAL InFocus
DIRECT MOUNT BODY

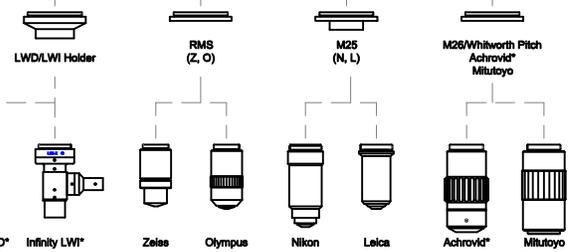
Major-brand Dovetails:



To Major-brand Stand/Front Accessories



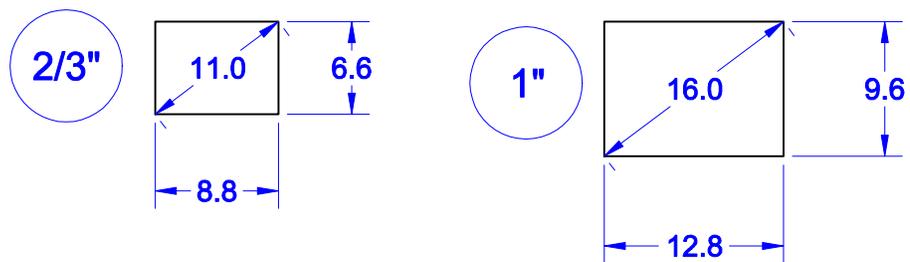
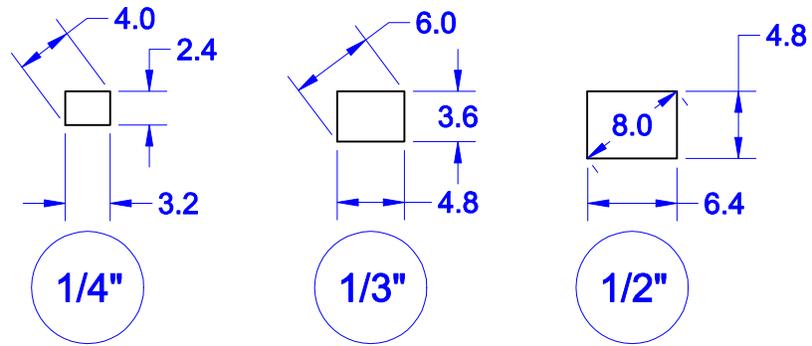
Objective Insert Discs



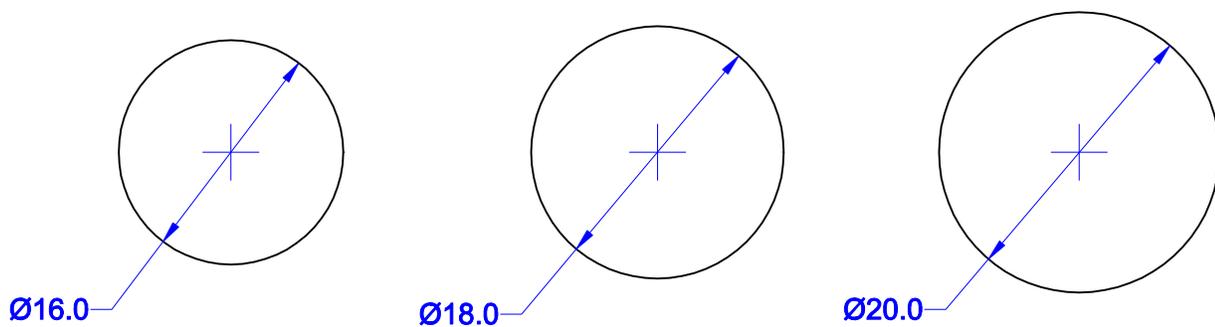
See Industrial InFocus Objective Options

Note: These images have been reduced to fit.

Video Formats/Fields of View (FOV)

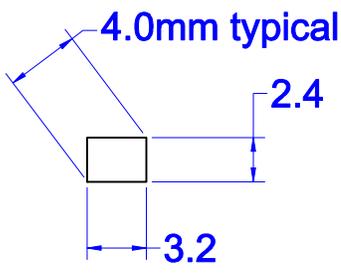
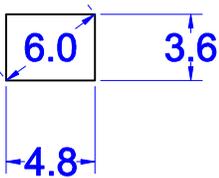
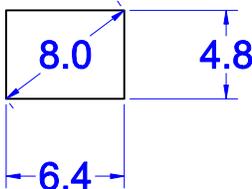
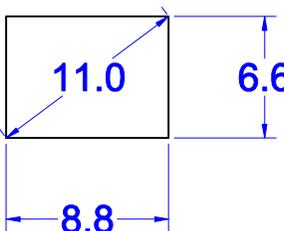
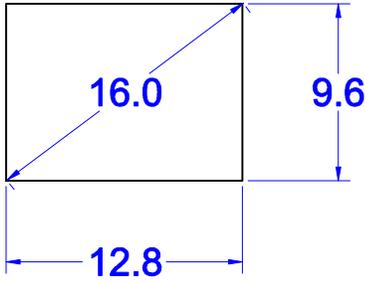


Eyepiece Formats



All dimensions in mm.

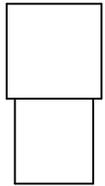
Video Formats

Format	Factor	
1/4"	0.50	
1/3"	0.75	
1/2"	1.00	
2/3"	1.375	
1"	2.00	

Visual



Eyepiece



M62 monocular

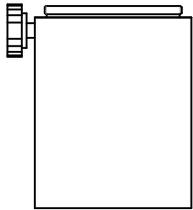
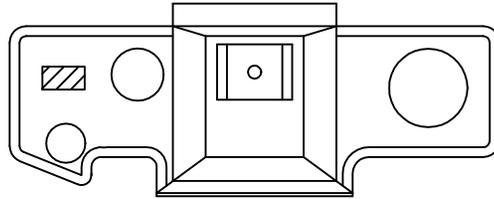
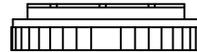


Photo or Large-Format Video

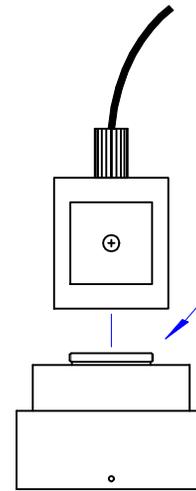
SLR Body (or LF-Video) Camera



T2 mount

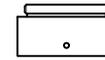


C-mount

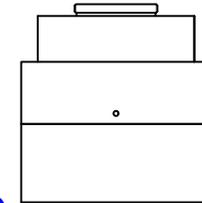


Video

2x DL Doubler



Tele-Tube



(w/ Tele-Tube 0.5x when used to replace 58mm tube and C-mount)

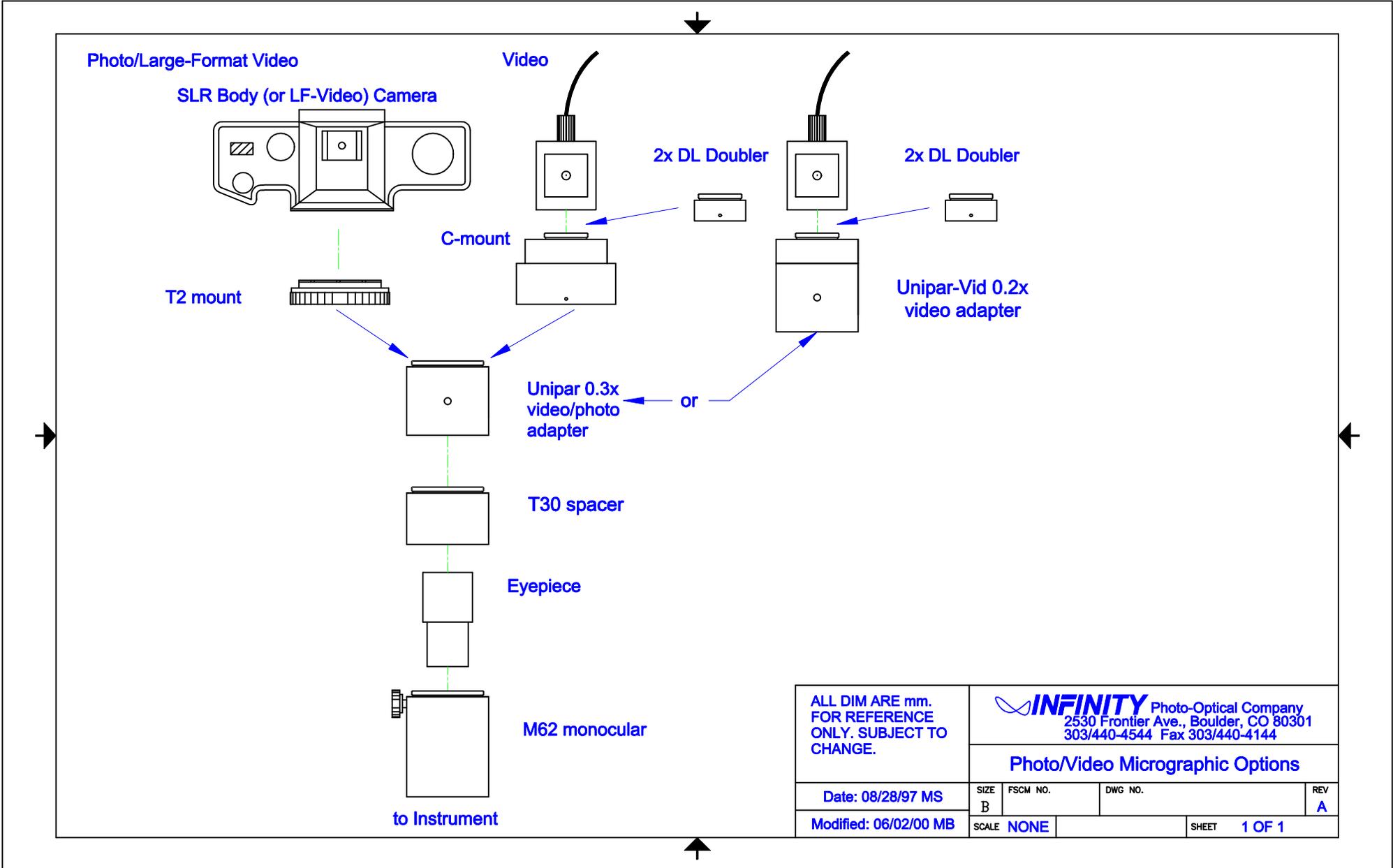
Attach to instrument

ALL DIM ARE mm.
FOR REFERENCE
ONLY. SUBJECT TO
CHANGE.

INFINITY Photo-Optical Company
2530 Frontier Ave., Boulder, CO 80301
303/440-4544 Fax 303/440-4144

Direct-Imaging Options

Date: 08/28/97 MS	SIZE B	FSCM NO.	DWG NO.	REV A
Modified: 06/02/00 MB	SCALE NONE	SHEET 1 OF 1		



Photo/Large-Format Video

SLR Body (or LF-Video) Camera

Video

2x DL Doubler

2x DL Doubler

C-mount

T2 mount

Unipar-Vid 0.2x video adapter

Unipar 0.3x video/photo adapter

or

T30 spacer

Eyepiece

M62 monocular

to Instrument

ALL DIM ARE mm.
FOR REFERENCE
ONLY. SUBJECT TO
CHANGE.

INFINITY Photo-Optical Company
2530 Frontier Ave., Boulder, CO 80301
303/440-4544 Fax 303/440-4144

Photo/Video Micrographic Options

Date: 08/28/97 MS	SIZE B	FSCM NO.	DWG NO.	REV A
Modified: 06/02/00 MB	SCALE NONE	SHEET 1 OF 1		

INFINITY PHOTO-OPTICAL COMPANY LIMITED WARRANTY

INFINITY PHOTO-OPTICAL COMPANY hereby warrants its products to be free from defects in workmanship or materials for the warranty period set forth below. INFINITY PHOTO-OPTICAL COMPANY, at its option, shall repair or replace the defective product without cost to the purchaser, and such repair or replacement shall be the full extent of this express limited warranty. INFINITY PHOTO-OPTICAL COMPANY shall not be liable for any other damages either direct or consequential.

This warranty is made to the original purchaser, and is effective only on new equipment purchased from INFINITY PHOTO-OPTICAL COMPANY, or a dealer authorized by INFINITY PHOTO-OPTICAL COMPANY to sell the product.

This warranty is valid only when the product is returned to the authorized dealer from whom it was purchased, or returned directly to INFINITY PHOTO-OPTICAL COMPANY, freight prepaid, with proof of date of purchase.

This warranty does not extend to any defect, malfunction or failure caused by misuse, abuse or the use of the product with equipment for which it may not have been intended. Any unauthorized repair voids this warranty.

The warranty period for all products manufactured by INFINITY PHOTO-OPTICAL COMPANY is five (5) years from date of original purchase. Parts or components made or sourced from other manufacturers shall be solely covered by that manufacturer's warranty.

The warranty contained herein is the only warranty made by INFINITY PHOTO-OPTICAL COMPANY. Any implied warranty of merchantability and/or fitness for a particular purpose is expressly excluded from this warranty. INFINITY PHOTO-OPTICAL COMPANY shall not be liable for any expense, loss, incidental or consequential damages which may arise in connection with the use of this equipment. Recovery under this warranty is limited to repair or replacement of the equipment as provided above.

INFINITY PHOTO-OPTICAL COMPANY reserves the right to modify designs, equipment and accessories without notice.