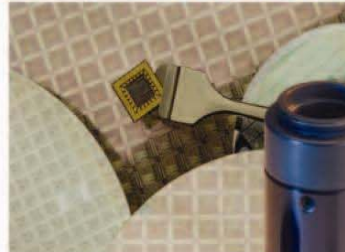




INSPECTION | MACHINE VISION | RESEARCH



OPTEM FMOS

FIXED-MAGNIFICATION OPTICAL SYSTEM

ECONOMICAL AND REPEATABLE
MICRO IMAGING LENSES

QIOPTIQ
Optics with Intelligence

Qioptiq Imaging Solutions

ECONOMICAL MICRO IMAGING

When your application requires the repeatability and simplicity of fixed magnification imaging, specify the Optem FMOS. Leverage the same optical quality, illumination options, expanded functionality and modular flexibility of the field-proven Optem Zoom Lens Systems while enjoying fixed-magnification economy and simplicity.

NEW FMOS FEATURES

Zoom 125 Lower Module Adapter - (33-03-63-000)
Expand the Lower Module functionality of your FMOS with the versatility offered by the Optem Zoom 125 Lens System. Options include motorized fine focus, polarized fiber optic coaxial illumination, and expanded FOV macro imaging across longer working distances.

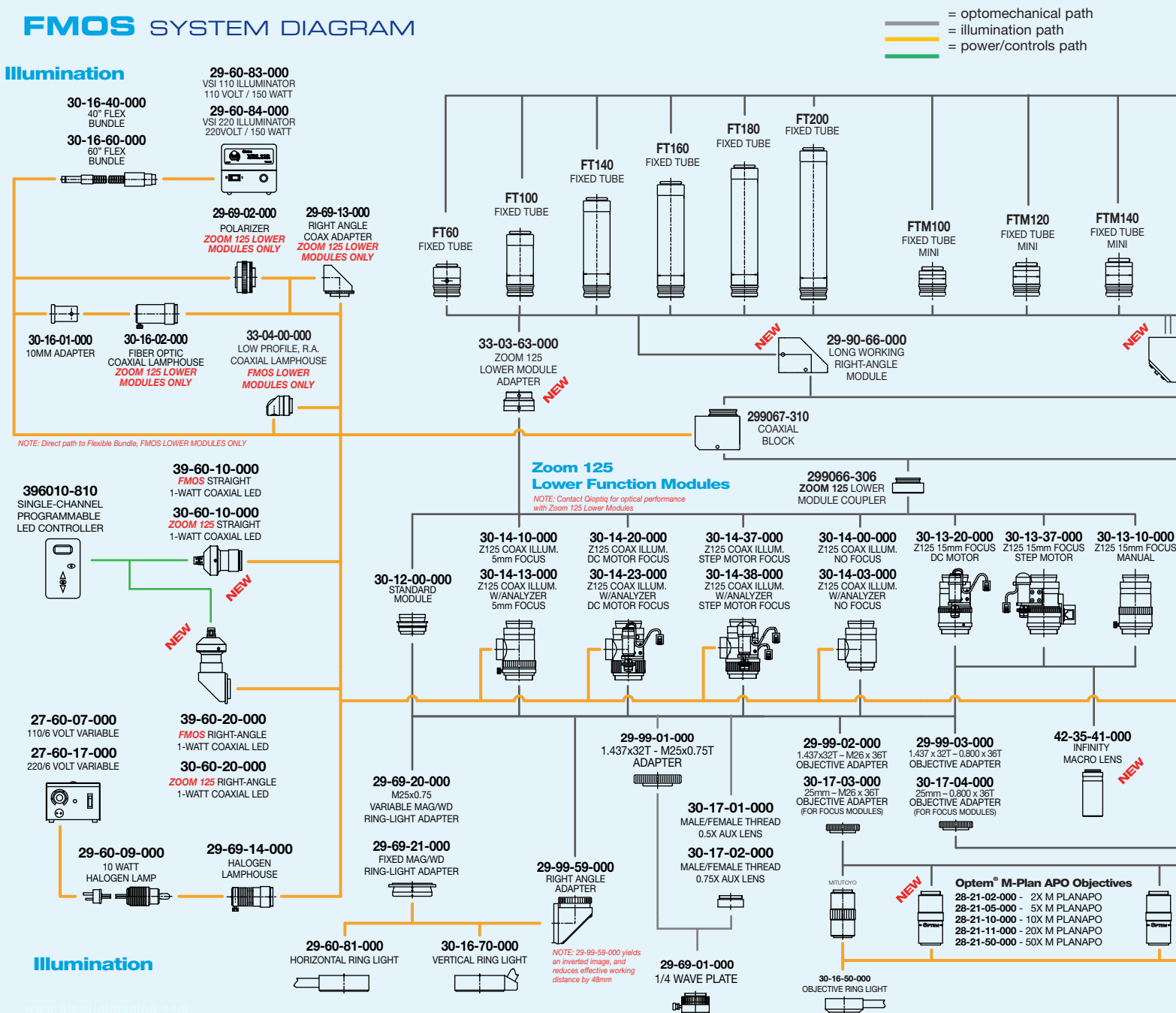
Long-Working, Right-Angle Module - (29-90-66-000)

Turn your optical axis 90° for added system orientation flexibility in your application. This simple module integrates between the Upper Tube and Lower Module without sacrificing working distance and maintaining an upright image. Additionally, the LW Right-Angle Module allows you to incorporate Coaxial Illumination, Focus and/or Objectives below the right-angle.

Dual-Magnification Module - (29-90-67-000) Simultaneously incorporate two magnifications and/or cameras above the same subject. The Dual-Mag Module also allows you to incorporate Coaxial Illumination, go to FMOS or Zoom 125 lower modules, or connect direct to Objectives for greater space efficiency. FMOS Fixed Tubes can also be mixed with Zoom 70 Upper Zooms above the Dual-Mag Module for added imaging versatility.



FMOS SYSTEM DIAGRAM



LED Coaxial Illuminators – (39-60-10-000) Optem LED Coaxial Illuminators provide virtually identical illumination as our traditional Halogen and Fiber Optic Coaxial Systems with extended service life and a more compact design.

Optem M-Plan APO Objectives – (28-21-02-000) Select from these new 2X, 5X, 10X, 20X and 50X Long-Working Distance Objectives for high-magnification imaging across exceptionally flat fields free of chromatic aberration. Ideal for metrology applications. Exact replacements for Mitutoyo Series 378 objectives.

Infinity Macro Lens Accessory – (42-35-41-000) Image broader FOVs over working distances of 55mm out to infinity. Requires Zoom 125 manual or motorized Focus Lower Modules.

HOW TO SPECIFY YOUR FMOS

Identify your desired performance parameters within the FMOS Optical Performance Matrix on the back cover. Cross reference **Fixed Magnification Upper Tubes** (*top axis*) with the **Lower Modules or Objectives** (*left axis*) to arrive at the combination of components that yield your desired field-of-view, resolution, or working distance for your chosen camera format.

Once you have determined the **Upper Tube** and **Lower Module**, navigate down through the System Diagram below identifying the part numbers needed to achieve the physical configuration, features and functions desired for your application. **NOTE:** Coaxial Illumination may result in minor changes to the FOV performance of your system (refer to *FMOS Coaxial Illumination Optical Performance Matrix.pdf* located in the FMOS Technical Library online).

Qioptiq Imaging Solutions

Mounting

Upper Tube Microscope Stand Mounting Clamps

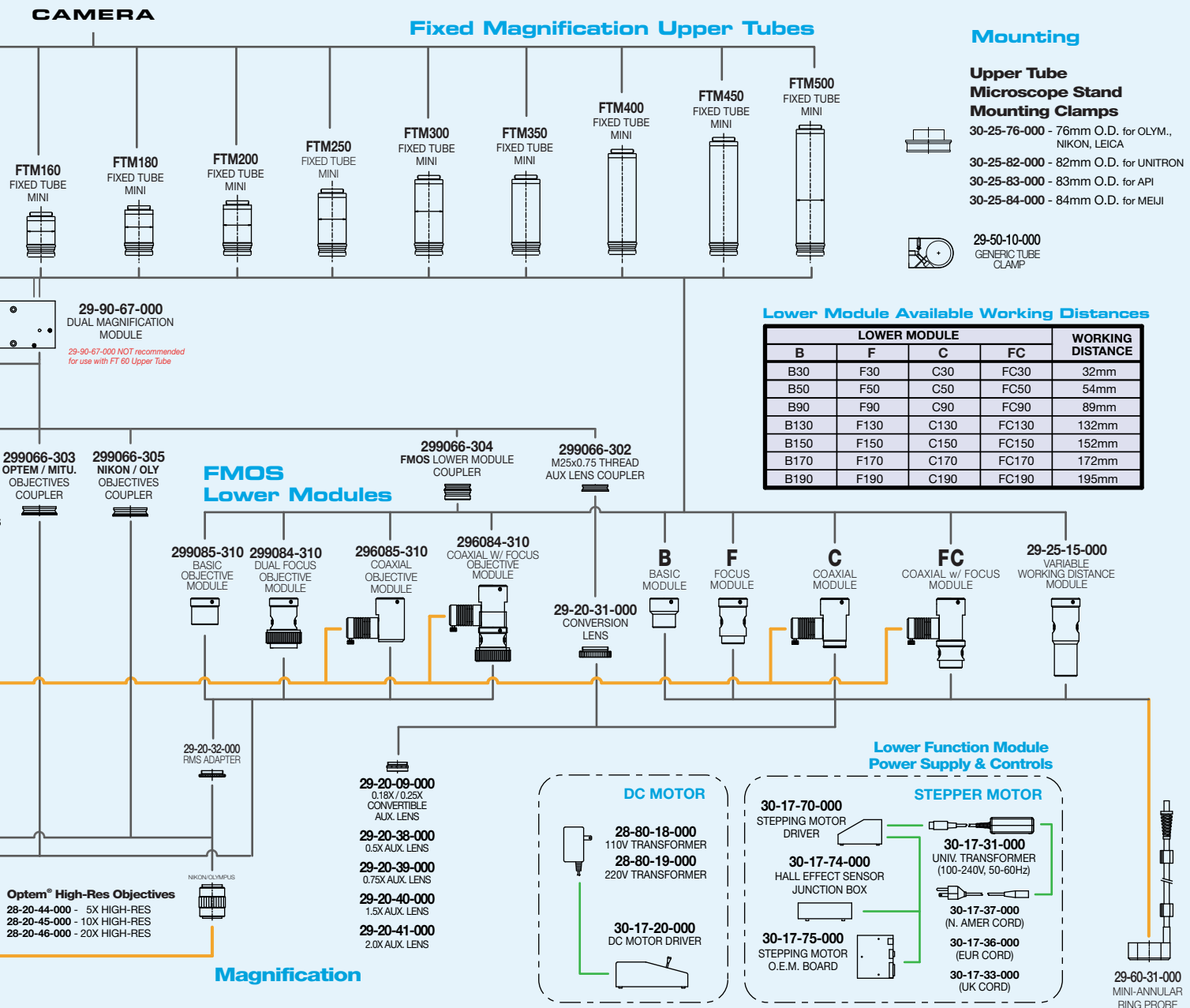
- 30-25-76-000 - 76mm O.D. for OLYM., NIKON, LEICA
- 30-25-82-000 - 82mm O.D. for UNITRON
- 30-25-83-000 - 83mm O.D. for API
- 30-25-84-000 - 84mm O.D. for MEIJI



29-50-10-000
GENERIC TUBE CLAMP

Lower Module Available Working Distances

| LOWER MODULE | | | | WORKING DISTANCE |
|--------------|------|------|-------|------------------|
| B | F | C | FC | |
| B30 | F30 | C30 | FC30 | 32mm |
| B50 | F50 | C50 | FC50 | 54mm |
| B90 | F90 | C90 | FC90 | 89mm |
| B130 | F130 | C130 | FC130 | 132mm |
| B150 | F150 | C150 | FC150 | 152mm |
| B170 | F170 | C170 | FC170 | 172mm |
| B190 | F190 | C190 | FC190 | 195mm |



Substage or Oblique Illumination FMOs Optical Performance Matrix

| | | FT 60 | FT 100 | FT 140 | FT 160 | FT 180 | FT 200 | FTM 100 | FTM 120 | FTM 250 | FTM 300 | FTM 350 | FTM 400 | FTM 450 | FTM 500 | |
|-------------------------------|-------------|---------------|---------------|--------------|-------------|-------------|-------------|---------------|--------------|-------------|-------------|-------------|-------------|-------------|-------------|------|
| B30 F30 FC30 | NA | 0.050 | 0.081 | 0.12 | 0.13 | 0.15 | 0.16 | 0.081 | 0.10 | 0.16 | 0.16 | 0.18 | 0.18 | 0.16 | 0.16 | |
| | Res (lp/mm) | 150 | 244 | 345 | 394 | 450 | 488 | 244 | 300 | 488 | 488 | 488 | 488 | 488 | 488 | |
| | Mag (x) | 1.5 | 2.5 | 3.5 | 4.0 | 4.5 | 5.0 | 2.5 | 3.0 | 6.3 | 7.5 | 8.8 | 10.0 | 11.3 | 12.5 | |
| | DOF (mm) | 0.23 | 0.086 | 0.043 | 0.033 | 0.025 | 0.021 | 0.057 | 0.021 | 0.057 | 0.021 | 0.021 | 0.021 | 0.021 | 0.021 | |
| | FOV (mm) | 1.41 | 1.47 | 1.10 | 1.05 | 0.79 | 0.82 | 0.69 | 1.47 | 1.10 | 1.23 | 0.92 | 0.59 | 0.44 | 0.49 | 0.37 |
| | Cam Format | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" |
| | 1/3" | 2.45 x 2.40 | 1.92 x 1.44 | 1.37 x 1.03 | 1.20 x 0.90 | 0.71 x 0.80 | 0.96 x 0.72 | 1.92 x 1.44 | 1.80 x 1.20 | 1.77 x 0.58 | 0.77 x 0.58 | 0.55 x 0.41 | 0.48 x 0.36 | 0.43 x 0.32 | 0.38 x 0.29 | |
| | 1/2" | 4.27 x 3.20 | 2.56 x 1.92 | 1.83 x 1.37 | 1.60 x 1.20 | 1.42 x 1.07 | 1.28 x 0.96 | 2.56 x 1.92 | 2.13 x 1.60 | 1.02 x 0.77 | 0.85 x 0.64 | 0.73 x 0.55 | 0.64 x 0.48 | 0.57 x 0.43 | 0.51 x 0.38 | |
| | 2/3" | 5.87 x 4.40 | 3.52 x 2.64 | 2.51 x 1.89 | 2.20 x 1.65 | 1.96 x 1.47 | 1.76 x 1.32 | 3.52 x 2.64 | 2.93 x 2.20 | 1.41 x 1.06 | 1.17 x 0.88 | 1.01 x 0.75 | 0.88 x 0.66 | 0.78 x 0.59 | 0.70 x 0.53 | |
| | 1" | 8.53 x 6.40 | 5.12 x 3.84 | 3.66 x 2.74 | 3.20 x 2.40 | 2.84 x 2.13 | 2.56 x 1.92 | 4.08 x 3.31 | 4.27 x 3.20 | 2.05 x 1.54 | 1.71 x 1.28 | 1.46 x 1.10 | 1.28 x 0.96 | 1.14 x 0.85 | 1.02 x 0.77 | |
| B50 F50 C50 FC50 | NA | 0.033 | 0.053 | 0.075 | 0.086 | 0.10 | 0.11 | 0.053 | 0.066 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | |
| | Res (lp/mm) | 98 | 160 | 226 | 258 | 296 | 320 | 160 | 197 | 320 | 320 | 320 | 320 | 320 | 320 | |
| | Mag (x) | 1.0 | 1.6 | 2.3 | 2.6 | 3.0 | 3.3 | 1.6 | 2.0 | 6.3 | 7.5 | 8.8 | 10.0 | 11.3 | 12.5 | |
| | DOF (mm) | 0.53 | 0.20 | 0.10 | 0.077 | 0.059 | 0.050 | 0.20 | 0.13 | 0.050 | 0.050 | 0.050 | 0.050 | 0.050 | 0.050 | |
| | FOV (mm) | 1.41 | 1.47 | 1.10 | 1.38 | 1.04 | 1.07 | 0.80 | 0.96 | 0.72 | 2.21 | 1.68 | 1.84 | 1.38 | 0.88 | 0.66 |
| | Cam Format | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" |
| | 1/3" | 4.80 x 3.60 | 2.88 x 2.16 | 2.06 x 1.54 | 1.80 x 1.35 | 1.60 x 1.20 | 1.44 x 1.08 | 2.88 x 2.16 | 2.40 x 1.80 | 1.15 x 0.86 | 0.96 x 0.72 | 0.82 x 0.62 | 0.72 x 0.54 | 0.64 x 0.48 | 0.58 x 0.43 | |
| | 1/2" | 6.40 x 4.80 | 3.84 x 2.88 | 2.74 x 2.06 | 2.40 x 1.80 | 2.13 x 1.60 | 1.92 x 1.44 | 3.84 x 2.88 | 3.20 x 2.40 | 1.54 x 1.15 | 1.28 x 0.96 | 1.10 x 0.82 | 0.96 x 0.72 | 0.85 x 0.64 | 0.77 x 0.58 | |
| | 2/3" | 8.80 x 6.60 | 5.28 x 3.96 | 3.77 x 2.83 | 3.30 x 2.48 | 2.93 x 2.20 | 2.64 x 1.98 | 5.28 x 3.96 | 4.40 x 3.30 | 2.11 x 1.58 | 1.76 x 1.32 | 1.51 x 1.13 | 1.32 x 0.99 | 1.17 x 0.88 | 1.06 x 0.79 | |
| | 1" | 12.80 x 9.60 | 7.68 x 5.76 | 5.49 x 4.11 | 4.80 x 3.60 | 4.27 x 3.20 | 3.84 x 2.88 | 6.62 x 4.97 | 6.40 x 4.80 | 3.07 x 2.30 | 2.56 x 1.92 | 2.19 x 1.65 | 1.92 x 1.44 | 1.71 x 1.28 | 1.54 x 1.15 | |
| B90 F90 C90 FC90 | NA | 0.021 | 0.034 | 0.048 | 0.054 | 0.062 | 0.067 | 0.034 | 0.041 | 0.067 | 0.067 | 0.067 | 0.067 | 0.067 | 0.067 | |
| | Res (lp/mm) | 62 | 101 | 145 | 163 | 187 | 202 | 101 | 124 | 202 | 202 | 202 | 202 | 202 | 202 | |
| | Mag (x) | 0.6 | 1.0 | 1.5 | 1.7 | 1.9 | 2.1 | 1.0 | 1.2 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | |
| | DOF (mm) | 1.3 | 0.50 | 0.25 | 0.19 | 0.15 | 0.12 | 0.50 | 0.33 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | |
| | FOV (mm) | 1.41 | 1.47 | 1.10 | 1.33 | 1.04 | 1.07 | 0.80 | 0.96 | 0.72 | 3.07 | 2.30 | 1.47 | 1.10 | 1.23 | 0.92 |
| | Cam Format | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" |
| | 1/3" | 6.13 x 4.60 | 3.68 x 2.76 | 2.63 x 1.97 | 2.30 x 1.73 | 1.78 x 1.33 | 1.60 x 1.20 | 3.68 x 2.76 | 3.07 x 2.30 | 1.47 x 1.10 | 1.23 x 0.92 | 1.05 x 0.79 | 0.92 x 0.69 | 0.82 x 0.61 | 0.74 x 0.55 | |
| | 1/2" | 8.10 x 6.00 | 4.80 x 3.60 | 3.43 x 2.57 | 3.00 x 2.25 | 2.67 x 2.00 | 2.40 x 1.80 | 4.80 x 3.60 | 4.00 x 3.00 | 1.92 x 1.44 | 1.60 x 1.20 | 1.37 x 1.03 | 1.20 x 0.90 | 1.07 x 0.80 | 0.96 x 0.72 | |
| | 2/3" | 10.67 x 8.00 | 6.40 x 4.80 | 4.57 x 3.43 | 4.00 x 3.00 | 3.56 x 2.67 | 3.20 x 2.40 | 6.40 x 4.80 | 5.33 x 4.00 | 2.56 x 1.92 | 2.13 x 1.60 | 1.83 x 1.37 | 1.60 x 1.20 | 1.42 x 1.07 | 1.28 x 0.96 | |
| | 1" | 14.67 x 11.00 | 8.80 x 6.60 | 6.29 x 4.71 | 5.50 x 4.13 | 4.89 x 3.67 | 4.40 x 3.30 | 8.80 x 6.60 | 7.33 x 5.50 | 3.52 x 2.64 | 2.93 x 2.20 | 2.51 x 1.89 | 2.20 x 1.65 | 1.96 x 1.47 | 1.76 x 1.32 | |
| B130 F130 C130 FC130 | NA | 0.014 | 0.023 | 0.033 | 0.038 | 0.043 | 0.046 | 0.023 | 0.029 | 0.046 | 0.046 | 0.046 | 0.046 | 0.046 | 0.046 | |
| | Res (lp/mm) | 119 | 199 | 283 | 329 | 398 | 439 | 199 | 244 | 439 | 439 | 439 | 439 | 439 | 439 | |
| | Mag (x) | 0.4 | 0.7 | 1.0 | 1.1 | 1.4 | 1.4 | 0.7 | 0.9 | 1.8 | 2.1 | 2.5 | 2.9 | 3.2 | 3.6 | |
| | DOF (mm) | 2.8 | 1.1 | 0.53 | 0.40 | 0.31 | 0.28 | 1.1 | 0.89 | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | |
| | FOV (mm) | 1.41 | 1.47 | 1.10 | 1.33 | 1.04 | 1.07 | 0.80 | 0.96 | 0.72 | 2.06 | 1.55 | 1.72 | 1.29 | 1.47 | |
| | Cam Format | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | |
| | 1/3" | 8.59 x 6.44 | 5.15 x 3.86 | 3.68 x 2.76 | 3.22 x 2.42 | 2.49 x 1.87 | 2.24 x 1.68 | 5.15 x 3.86 | 4.29 x 3.22 | 2.06 x 1.55 | 1.72 x 1.29 | 1.47 x 1.10 | 1.29 x 0.97 | 1.14 x 0.86 | 1.03 x 0.77 | |
| | 1/2" | 11.20 x 8.40 | 6.72 x 5.04 | 4.80 x 3.60 | 4.20 x 3.15 | 3.73 x 2.80 | 3.36 x 2.52 | 6.72 x 5.04 | 5.60 x 4.20 | 2.89 x 2.02 | 2.24 x 1.68 | 1.92 x 1.44 | 1.68 x 1.26 | 1.48 x 1.12 | 1.34 x 1.01 | |
| | 2/3" | 14.83 x 11.20 | 8.96 x 6.72 | 6.40 x 4.80 | 5.60 x 4.20 | 4.98 x 3.73 | 4.48 x 3.36 | 8.96 x 6.72 | 7.47 x 5.60 | 3.58 x 2.64 | 2.89 x 2.24 | 2.56 x 1.92 | 2.24 x 1.68 | 1.99 x 1.49 | 1.79 x 1.34 | |
| | 1" | 20.53 x 15.40 | 12.32 x 9.24 | 8.80 x 6.60 | 7.70 x 5.78 | 6.78 x 5.13 | 6.12 x 4.62 | 12.32 x 9.24 | 10.27 x 7.70 | 4.93 x 3.70 | 4.11 x 3.08 | 3.52 x 2.64 | 3.08 x 2.31 | 2.74 x 2.05 | 2.46 x 1.85 | |
| B150 F150 C150 FC150 | NA | 0.013 | 0.020 | 0.029 | 0.033 | 0.038 | 0.041 | 0.020 | 0.025 | 0.041 | 0.041 | 0.041 | 0.041 | 0.041 | 0.041 | |
| | Res (lp/mm) | 81 | 131 | 187 | 213 | 258 | 283 | 131 | 163 | 283 | 283 | 283 | 283 | 283 | 283 | |
| | Mag (x) | 0.8 | 1.0 | 1.5 | 1.7 | 2.1 | 2.3 | 0.8 | 1.0 | 1.8 | 2.1 | 2.5 | 2.9 | 3.2 | 3.6 | |
| | DOF (mm) | 3.4 | 1.4 | 0.68 | 0.52 | 0.40 | 0.34 | 1.4 | 1.0 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | |
| | FOV (mm) | 1.41 | 1.47 | 1.10 | 1.33 | 1.04 | 1.07 | 0.80 | 0.96 | 0.72 | 1.96 | 1.47 | 1.68 | 1.26 | 1.47 | |
| | Cam Format | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | |
| | 1/3" | 9.81 x 7.36 | 5.89 x 4.42 | 4.21 x 3.15 | 3.68 x 2.76 | 2.84 x 2.13 | 2.56 x 1.92 | 5.89 x 4.42 | 4.91 x 3.68 | 2.36 x 1.77 | 1.96 x 1.47 | 1.68 x 1.26 | 1.47 x 1.10 | 1.31 x 0.98 | 1.18 x 0.88 | |
| | 1/2" | 12.80 x 9.60 | 7.68 x 5.76 | 5.49 x 4.11 | 4.80 x 3.60 | 4.27 x 3.20 | 3.84 x 2.88 | 7.68 x 5.76 | 6.40 x 4.80 | 3.07 x 2.30 | 2.56 x 1.92 | 2.19 x 1.65 | 1.92 x 1.44 | 1.71 x 1.28 | 1.54 x 1.15 | |
| | 2/3" | 17.07 x 12.80 | 10.24 x 7.68 | 7.31 x 5.49 | 6.40 x 4.80 | 5.69 x 4.27 | 5.12 x 3.84 | 10.24 x 7.68 | 8.53 x 6.40 | 4.10 x 3.07 | 3.41 x 2.56 | 2.93 x 2.19 | 2.56 x 1.92 | 2.28 x 1.71 | 2.05 x 1.54 | |
| | 1" | 23.47 x 17.60 | 14.08 x 10.56 | 10.06 x 7.54 | 8.80 x 6.60 | 7.82 x 5.87 | 7.04 x 5.28 | 14.08 x 10.56 | 11.73 x 8.80 | 5.63 x 4.22 | 4.69 x 3.52 | 4.02 x 3.02 | 3.52 x 2.64 | 3.13 x 2.35 | 2.82 x 2.11 | |
| B170 F170 C170 FC170 | NA | 0.011 | 0.018 | 0.026 | 0.029 | 0.033 | 0.036 | 0.018 | 0.022 | 0.036 | 0.036 | 0.036 | 0.036 | 0.036 | 0.036 | |
| | Res (lp/mm) | 34 | 55 | 77 | 88 | 101 | 109 | 55 | 67 | 109 | 109 | 109 | 109 | 109 | 109 | |
| | Mag (x) | 0.3 | 0.6 | 0.8 | 0.9 | 1.0 | 1.1 | 0.3 | 0.4 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | |
| | DOF (mm) | 4.5 | 1.7 | 0.85 | 0.65 | 0.50 | 0.43 | 4.5 | 3.3 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | |
| | FOV (mm) | 1.41 | 1.47 | 1.10 | 1.33 | 1.04 | 1.07 | 0.80 | 0.96 | 0.72 | 1.47 | 1.10 | 1.23 | 0.92 | 1.10 | |
| | Cam Format | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | 14" | |
| | 1/3" | 11.04 x 8.28 | 6.62 x 4.97 | 4.73 x 3.55 | 4.14 x 3.11 | 3.20 x 2.40 | 2.88 x 2.16 | 6.62 x 4.97 | 5.52 x 4.14 | 2.65 x 1.99 | 2.21 x 1.66 | 1.89 x 1.42 | 1.66 x 1.24 | 1.47 x 1.10 | 1.32 x 0.98 | |
| | 1/2" | 14.40 x 10.80 | 8.64 x 6.48 | 6.17 x 4.63 | 5.40 x 4.05 | 4.80 x 3.60 | 4.32 x 3.24 | 8.64 x 6.48 | 7.20 x 5.40 | 3.46 x 2.58 | 2.88 x 2.16 | 2.47 x 1.85 | 2.16 x 1.62 | 1.92 x 1.44 | 1.73 x 1.30 | |
| | 2/3" | 19.20 x 14.40 | 11.52 x 8.64 | 8.23 x 6.17 | 7.20 x 5.40 | 6.40 x 4.80 | 5.76 x 4.32 | 11.52 x 8.64 | 9.60 x 7.20 | 4.61 x 3.46 | 3.84 x 2.88 | 3.29 x 2.47 | 2.88 x 2.16 | 2.56 x 1.92 | 2.30 x 1.73 | |
| | 1" | 26.40 x 19.80 | 15.84 x 11.88 | 11.31 x 8.49 | 9.90 x 7.43 | 8.80 x 6.60 | 7.92 x 5.94 | 15.84 x 11.88 | 13.20 x 9.90 | 6.34 x 4.75 | 5.28 x 3.96 | 4.53 x 3.39 | 3.96 x 2.97 | 3.52 x 2.64 | 3.17 x 2.38 | |
| B190 F190 C190 FC190 | NA | 0.010 | 0.016 | 0.023 | 0.026 | 0.030 | 0.032 | 0.016 | 0.020 | 0.032 | 0.032 | 0.032 | 0.032 | 0.032 | 0.032 | |
| | Res (lp/mm) | 98 | 158 | 226 | 258 | 296 | 320 | 158 | 199 | 320 | 320 | 320 | 320 | 320 | 320 | |
| | Mag (x) | 0.3 | 0.5 | 0.7 | 0.8 | 0.9 | 1.0 | 0.3 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | |
| | DOF (mm) | 5.8 | 2.2 | 1.1 | 0.84 | 0.64 | 0.55 | 5.8 | 4.2 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | |