



F-Theta JENar™

# Medium-Power Scan Lenses "Made in Germany"

Scan lenses can be used for high-precision microstructuring, marking and labeling of a wide range of materials.

Jenoptik's JENar™ F-Theta scan lenses are exceptionally well-suited to meet the requirements of highly sophisticated micro and macro machining processes in a wide variety of industries.

Our comprehensive product range includes F-Theta scan lenses for almost all common wavelengths and

geometries and we are constantly striving to enlarge our product portfolio. Rely on our substantial know-how in optical and mechanical design as well as our latest optical test capabilities - challenge our expertise!

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## USP

- Extremely durable: In consequence of specific, low contamination mounting technology, avoidance of adhesion as well as lubricant and assembly in a certified cleanroom
- High precision: Suitable for microstructuring, marking and labeling of a wide range of materials
- Flexible: Quick and easy to integrate into any existing system
- Customized: Available as standard lenses or tailored to your individual requirements

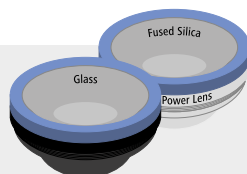
## Fields of Application

- Microelectronics:  
E.g. microstructuring of glass and metal
- Semiconductor industry:  
E.g. micro machining
- Automotive industry:  
E.g. cutting and structuring of composites and metal
- Medicine:  
E.g. blister packaging
- General applications:  
E.g. glass machining, battery welding

## F-Theta Selector

Find the F-Theta lens that meets your application requirements.

Further information → please see page 9



## Contact

Contact worldwide → please see page 7



Find your way into our optics ...

## Technical Parameters & Properties

### F-Theta JENar™ Lens Series.

#### Type: F-Theta Lenses

| Wavelength         | Lens Order Number | Focal Length | Scan Field Diagonal | Max. Full Diagonal Scan Angle | Max. Input Beam Diameter Truncated at 1/e <sup>2</sup> for 2-axis-scan | Focus Size at 1/e <sup>2</sup> Intensity Level |
|--------------------|-------------------|--------------|---------------------|-------------------------------|------------------------------------------------------------------------|------------------------------------------------|
| [nm]               |                   | [mm]         | [mm]                | [°]                           | [mm]                                                                   | [μm]                                           |
| <b>1030...1080</b> | 017700-024-26     | 100          | 93                  | 54                            | 10                                                                     | 19                                             |
|                    | 017700-003-26     | 125          | 80                  | 37                            | 15                                                                     | 16                                             |
|                    |                   | 125          | 93                  | 43                            | 15                                                                     | 16                                             |
|                    | 601926            | 125          | 80                  | 37                            | 15                                                                     | 16                                             |
|                    |                   | 125          | 93                  | 43                            | 15                                                                     | 16                                             |
|                    | 017700-019-26     | 160          | 170                 | 60                            | 10                                                                     | 31                                             |
|                    | 601914            | 160          | 170                 | 60                            | 10                                                                     | 31                                             |
|                    | 017700-018-26     | 170          | 170                 | 57                            | 14                                                                     | 24                                             |
|                    | 017700-017-26     | 255          | 239                 | 53                            | 20                                                                     | 24                                             |
|                    | 601948            | 255          | 239                 | 53                            | 20                                                                     | 24                                             |
|                    | 017700-022-26     | 347          | 354                 | 58                            | 16                                                                     | 46                                             |
|                    | 609661 <b>NEW</b> | 347          | 355                 | 58                            | 15                                                                     | 46                                             |
|                    | 017700-009-26     | 350          | 452                 | 71                            | 15                                                                     | 45                                             |
|                    | 017700-021-26     | 420          | 420                 | 57                            | 15                                                                     | 55                                             |
| <b>515...540</b>   | 017700-209-26     | 100          | 90                  | 53                            | 10                                                                     | 10                                             |
|                    | 017700-202-26     | 102          | 75                  | 43                            | 15                                                                     | 7                                              |
|                    | 017700-203-26     | 108          | 75                  | 40                            | 15                                                                     | 7                                              |
|                    |                   | 108          | 86                  | 46                            | 15                                                                     | 7                                              |
|                    | 017700-206-26     | 170          | 160                 | 54                            | 14                                                                     | 12                                             |
|                    | 017700-205-26     | 255          | 233                 | 52                            | 20                                                                     | 12                                             |
|                    | 017700-208-26     | 330          | 347                 | 58                            | 16                                                                     | 23                                             |
| <b>355</b>         | 017700-207-26     | 420          | 420                 | 57                            | 15                                                                     | 27                                             |
|                    | 017700-401-26     | 53           | 24                  | 24                            | 10                                                                     | 3.5                                            |

The data given are nominal values for the specified application parameters. Jenoptik provides Zemax® BlackBox files for simulating application results for customized parameters (e.g. wavelength, scanner geometry, beam diameter, ...).

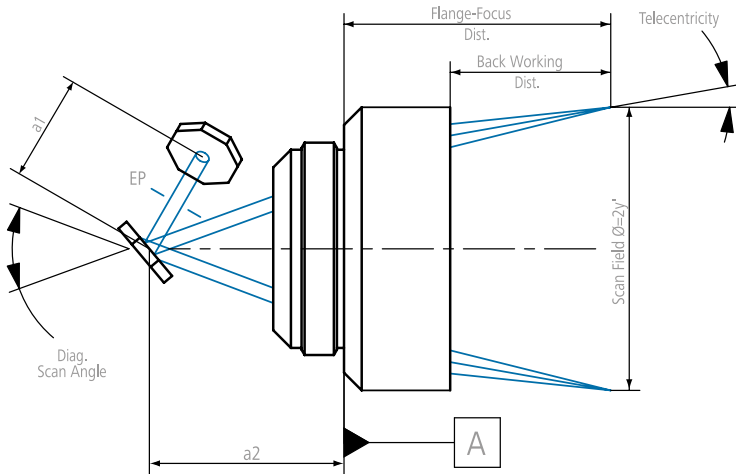
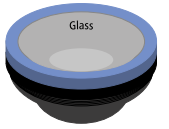
In case of different optical setups please contact us to tune your system.

Back working distance, Flange focus distance, and focal length vary by  $\pm 1.5\%$  due to manufacturing variances.

JENar®: Registered in EU, CN, JP, SG, US

F-Theta: Registered Design in EU, CN, KR, IN, SG, JP, HK, TW

It is our policy to constantly improve the design and specifications. Accordingly, the details represented herein cannot be regarded as final and binding.



| a1<br>Recommended<br>Mirror Separation | a2<br>2 <sup>nd</sup> Mirror to Flange | Telecentricity<br>(only F-Theta   with<br>scanner) | Back Working<br>Distance from last<br>mechanical surface<br>(incl. window) | Mounting<br>Thread | Window<br>Order Number<br>for Spare Part |
|----------------------------------------|----------------------------------------|----------------------------------------------------|----------------------------------------------------------------------------|--------------------|------------------------------------------|
| [mm]                                   | [mm]                                   | [°]                                                | [mm]                                                                       |                    |                                          |
| 13                                     | 43                                     | 8.7   9.1                                          | 87                                                                         | M85x1              | 576230                                   |
| 18                                     | 38                                     | 4.9   5.1                                          | 155                                                                        | M85x1              | 575267                                   |
| 18                                     | 28                                     | 7.2   7.4                                          | 155                                                                        |                    |                                          |
| 18                                     | 38                                     | 4.9   5.1                                          | 155                                                                        | M85x1              | 602019                                   |
| 18                                     | 28                                     | 7.2   7.4                                          | 155                                                                        |                    |                                          |
| 13                                     | 43                                     | 17.1   17.2                                        | 178                                                                        | M85x1              | 576230                                   |
| 13                                     | 43                                     | 17.1   17.2                                        | 178                                                                        | M85x1              | 576234                                   |
| 17                                     | 41                                     | 11.6   11.7                                        | 194                                                                        | M85x1              | 575267                                   |
| 25                                     | 39                                     | 14.3   15.0                                        | 291                                                                        | M85x1              | 575267                                   |
| 25                                     | 39                                     | 14.3   15.0                                        | 291                                                                        | M85x1              | 602019                                   |
| 17                                     | 41                                     | 18.7   18.7                                        | 404                                                                        | M85x1              | 575267                                   |
| 17                                     | 41                                     | 18.2   18.2                                        | 404                                                                        | M85x1              | 575267                                   |
| 23                                     | 25                                     | 23.7   24.0                                        | 395                                                                        | M85x1              | 610826                                   |
| 17                                     | 41                                     | 18.7   18.8                                        | 501                                                                        | M85x1              | 575267                                   |
| 13                                     | 43                                     | 7.7   7.8                                          | 95                                                                         | M85x1              | 576232                                   |
| 18                                     | 36                                     | 4.1   4.9                                          | 133                                                                        | M85x1              | 576228                                   |
| 16                                     | 39                                     | 4.9   5.1                                          | 130                                                                        | M85x1              | 599379                                   |
| 16                                     | 31                                     | 7.1   7.3                                          | 130                                                                        |                    |                                          |
| 17                                     | 41                                     | 10.9   11.0                                        | 195                                                                        | M85x1              | 576228                                   |
| 25                                     | 39                                     | 14.2   14.3                                        | 294                                                                        | M85x1              | 576228                                   |
| 17                                     | 41                                     | 18.4   18.4                                        | 384                                                                        | M85x1              | 576228                                   |
| 17                                     | 41                                     | 19.3   19.3                                        | 485                                                                        | M85x1              | 576228                                   |
| 13                                     | 46                                     | 0.4   1.5                                          | 65                                                                         | M85x1              | 576243                                   |

#### Correct lens storage, cleaning, and handling

Lifetime and performance of optical elements depend critically on the cleanliness and intactness of the optical surfaces. Proper storage, cleaning, and handling are therefore essential. Optical systems should be stored only in their respective original packaging and opened only in a clean environment by trained operators. Disassembly of optical systems on one's own responsibility leads to expiration of warranty. Return of optical systems should only be done using the original packaging.

# F-Theta JENar™ Lens Series

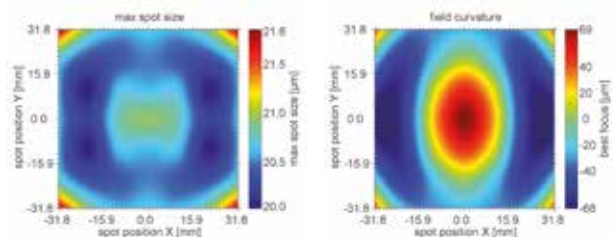
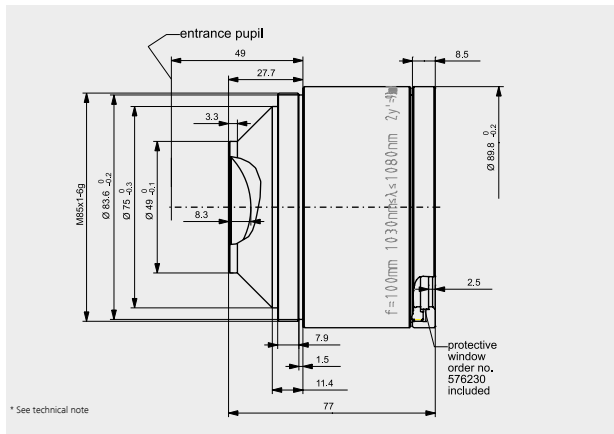
## High Image Quality | Telecentric Lens

| Parameters                                    | JENar™ 100-1030...1080-93<br>F-Theta lens for high image quality | JENar™ 125-1030...1080-80<br>Telecentric lens |
|-----------------------------------------------|------------------------------------------------------------------|-----------------------------------------------|
| Focal length:                                 | 100 mm                                                           | 125 mm                                        |
| Wavelength:                                   | 1030...1080 nm                                                   | 1030...1080 nm                                |
| Scan field ( X x Y ); Ø:                      | (66 mm x 66 mm); 93 mm                                           | (57 mm x 57 mm); 80 mm                        |
| Diagonal scan angle:                          | ± 27°                                                            | ± 18.6°                                       |
| X/Y mirror angle:                             | ± 9.6°                                                           | ± 6.6°                                        |
| Back working distance:                        | 87 mm                                                            | 154.6 mm                                      |
| Flange focus distance:                        | 136.3 mm                                                         | 196.9 mm                                      |
| Input beam Ø 1/e²:                            | 10 mm                                                            | 15 mm                                         |
| Focus size Ø 1/e²:                            | 19 µm                                                            | 16 µm                                         |
| a1   a2:                                      | 13 mm   42.5 mm                                                  | 18.2 mm   37.65 mm                            |
| Telecentricity (only F-Theta   with scanner): | 8.7°   9.1°                                                      | 4.9°   5.1°                                   |
| Group delay dispersion (GDD)*:                | 1710 fs²                                                         | 3670 fs²                                      |
| LIDT coating pulsed; CW*:                     | 5.0 J/cm² * (τ/[ns]) ^ 0.30; 5.0 MW/cm²                          | 5.0 J/cm² * (τ/[ns]) ^ 0.30; 5.0 MW/cm²       |
| LIDT system pulsed; CW*:                      | 5.0 J/cm² * (τ/[ns]) ^ 0.30; 5.0 MW/cm²                          | depending on setup*                           |
| Weight:                                       | 0.7 kg                                                           | 0.86 kg                                       |
| Order Number:                                 | <a href="#">017700-024-26</a>                                    | <a href="#">017700-003-26</a>                 |

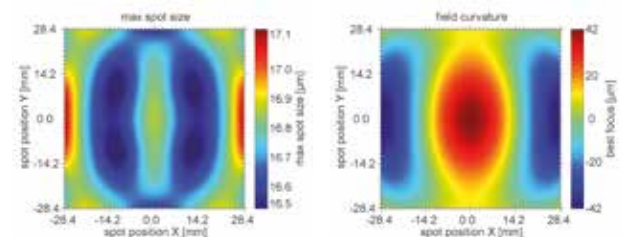
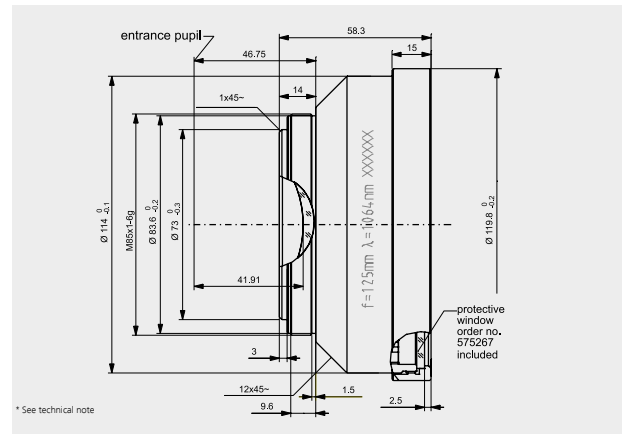
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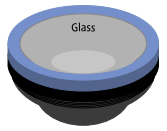
### Specifications

#### JENar™ 100-1030...1080-93



#### JENar™ 125-1030...1080-80





# F-Theta JENar™ Lens Series

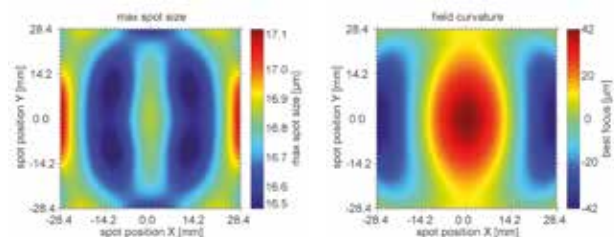
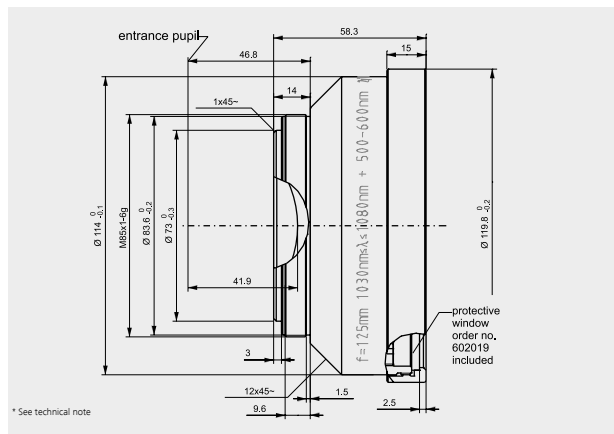
## Telecentric Lens | Large Scan Fields

| Parameters                                    | JENar™ 125-1030...1080-80 + VIS<br>Telecentric lens | JENar™ 160-1030...1080-170<br>Compact F-Theta lens for large scan fields |
|-----------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------|
| Focal length:                                 | 125 mm                                              | 160 mm                                                                   |
| Wavelength:                                   | 1030...1080 nm; T@500...680 nm > 85 %               | 1030...1080 nm                                                           |
| Scan field ( X x Y ); Ø:                      | (57 mm x 57 mm); 80 mm                              | (120 mm x 120 mm); 170 mm                                                |
| Diagonal scan angle:                          | ± 18.6°                                             | ± 30°                                                                    |
| X/Y mirror angle:                             | ± 6.6°                                              | ± 10.7°                                                                  |
| Back working distance:                        | 154.6 mm                                            | 178.4 mm                                                                 |
| Flange focus distance:                        | 196.9 mm                                            | 194.1 mm                                                                 |
| Input beam Ø 1/e²:                            | 15 mm                                               | 10 mm                                                                    |
| Focus size Ø 1/e²:                            | 16 µm                                               | 31 µm                                                                    |
| a1   a2:                                      | 18.2 mm   37.65 mm                                  | 13 mm   42.5 mm                                                          |
| Telecentricity (only F-Theta   with scanner): | 4.9°   5.1°                                         | 17.1°   17.2°                                                            |
| Group delay dispersion (GDD)*:                | 3670 fs²                                            | 934 fs²                                                                  |
| LIDT coating pulsed; CW*:                     | depending on setup*                                 | 5.0 J/cm² * (τ/[ns]) ^ 0.30; 5.0 MW/cm²                                  |
| LIDT system pulsed; CW*:                      | depending on setup*                                 | 5.0 J/cm² * (τ/[ns]) ^ 0.30; 5.0 MW/cm²                                  |
| Weight:                                       | 0.86 kg                                             | 0.38 kg                                                                  |
| Order Number:                                 | 601926                                              | 017700-019-26                                                            |

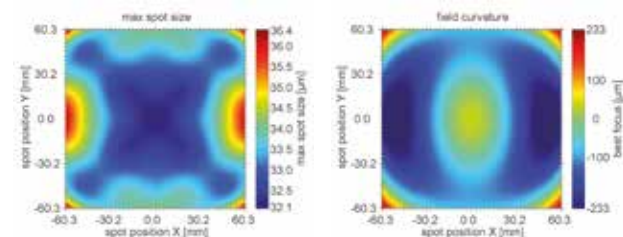
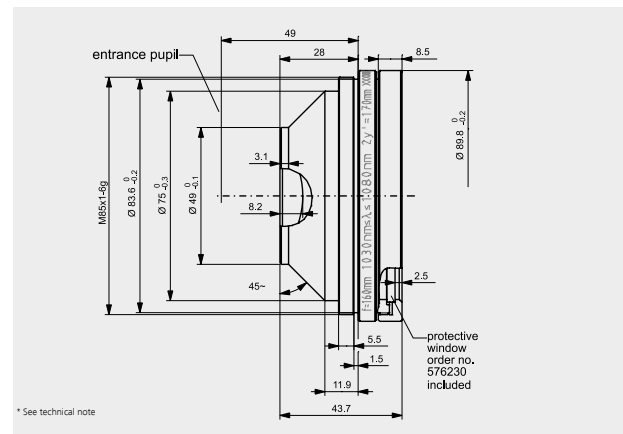
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### Specifications

#### JENar™ 125-1030...1080-80 + VIS



#### JENar™ 160-1030...1080-170



# F-Theta JENar™ Lens Series

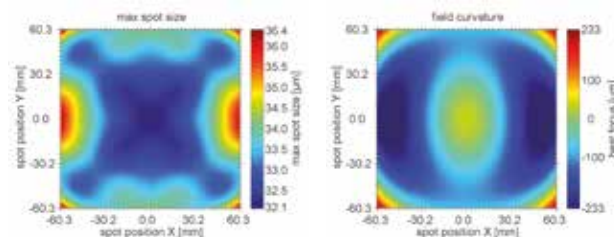
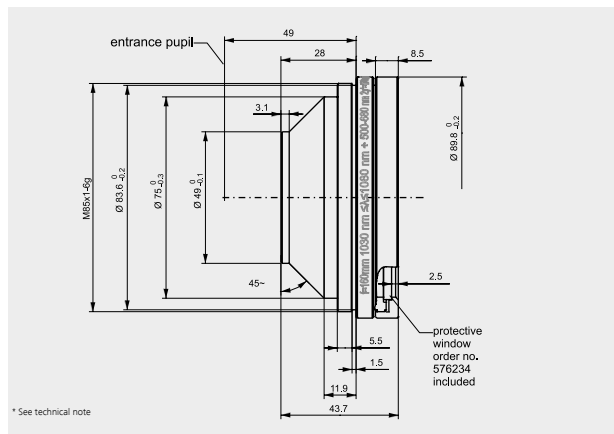
## Large Scan Fields | High Image Quality

| Parameters                                    | JENar™ 160-1030...1080-170 + VIS<br>Compact F-Theta lens for large scan fields | JENar™ 170-1030...1080-170<br>F-Theta lens for high image quality |
|-----------------------------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------------------|
| Focal length:                                 | 160 mm                                                                         | 170 mm                                                            |
| Wavelength:                                   | 1030...1080 nm; T@500...680 nm > 85 %                                          | 1030...1080 nm                                                    |
| Scan field ( X x Y ); Ø:                      | (120 mm x 120 mm); 170 mm                                                      | (120 mm x 120 mm); 170 mm                                         |
| Diagonal scan angle:                          | ± 30°                                                                          | ± 28.7°                                                           |
| X/Y mirror angle:                             | ± 10.7°                                                                        | ± 10.2°                                                           |
| Back working distance:                        | 178.4 mm                                                                       | 194 mm                                                            |
| Flange focus distance:                        | 194.1 mm                                                                       | 243.2 mm                                                          |
| Input beam Ø 1/e²:                            | 10 mm                                                                          | 14 mm                                                             |
| Focus size Ø 1/e²:                            | 31 µm                                                                          | 24 µm                                                             |
| a1   a2:                                      | 13 mm   42.5 mm                                                                | 17 mm   40.5 mm                                                   |
| Telecentricity (only F-Theta   with scanner): | 17.1°   17.2°                                                                  | 11.6°   11.7°                                                     |
| Group delay dispersion (GDD)*:                | 934 fs²                                                                        | 1870 fs²                                                          |
| LIDT coating pulsed; CW*:                     | under investigation*                                                           | 5.0 J/cm² * (τ/[ns]) ^ 0.30; 5.0 MW/cm²                           |
| LIDT system pulsed; CW*:                      | under investigation*                                                           | 5.0 J/cm² * (τ/[ns]) ^ 0.30; 5.0 MW/cm²                           |
| Weight:                                       | 0.38 kg                                                                        | 1.23 kg                                                           |
| Order Number:                                 | <a href="#">601914</a>                                                         | <a href="#">017700-018-26</a>                                     |

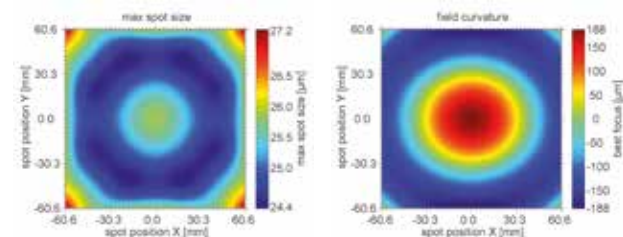
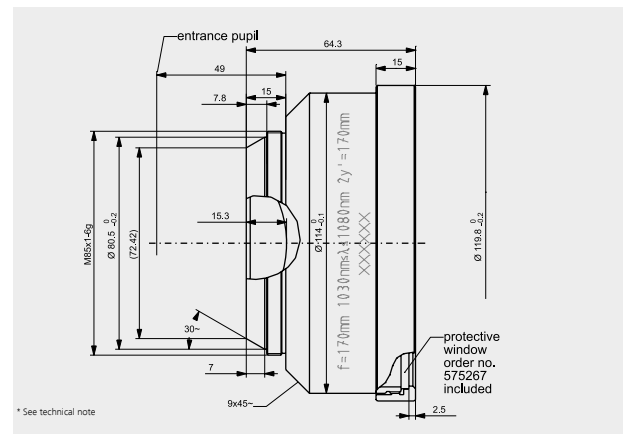
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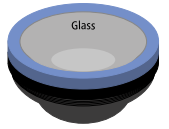
### Specifications

#### JENar™ 160-1030...1080-170 + VIS



#### JENar™ 170-1030...1080-170





# F-Theta JENar™ Lens Series

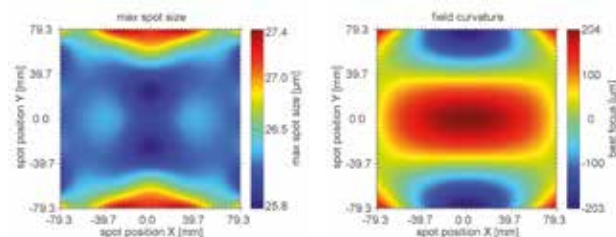
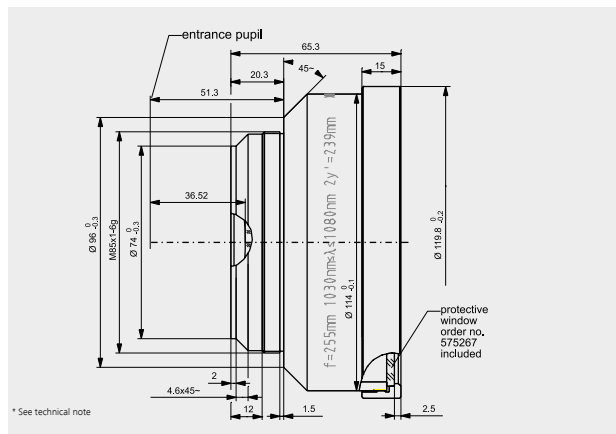
## Larger Beam Diameters and Scan Fields

| Parameters                                    | JENar™ 255-1030...1080-239<br>Lens for larger beam diameters and scan fields | JENar™ 255-1030...1080-239 + VIS<br>Lens for larger beam diameters and scan fields |
|-----------------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| Focal length:                                 | 255 mm                                                                       | 255 mm                                                                             |
| Wavelength:                                   | 1030...1080 nm                                                               | 1030...1080 nm; T@500...680 nm > 85 %                                              |
| Scan field ( X x Y ); Ø:                      | (169 mm x 169 mm); 239 mm                                                    | (169 mm x 169 mm); 239 mm                                                          |
| Diagonal scan angle:                          | ± 26.6°                                                                      | ± 26.6°                                                                            |
| X/Y mirror angle:                             | ± 9.5°                                                                       | ± 9.5°                                                                             |
| Back working distance:                        | 291 mm                                                                       | 291 mm                                                                             |
| Flange focus distance:                        | 336 mm                                                                       | 336 mm                                                                             |
| Input beam Ø 1/e²:                            | 20 mm                                                                        | 20 mm                                                                              |
| Focus size Ø 1/e²:                            | 24 µm                                                                        | 24 µm                                                                              |
| a1   a2:                                      | 25 mm   39 mm                                                                | 25 mm   39 mm                                                                      |
| Telecentricity (only F-Theta   with scanner): | 14.3°   15°                                                                  | 14.3°   15°                                                                        |
| Group delay dispersion (GDD)*:                | 3670 fs²                                                                     | 3670 fs²                                                                           |
| LIDT coating pulsed; CW*:                     | 5.0 J/cm² * (τ/[ns]) ^ 0.30; 5.0 MW/cm²                                      | under investigation*                                                               |
| LIDT system pulsed; CW*:                      | 2.5 J/cm² * (τ/[ns]) ^ 0.30; 2.5 MW/cm²                                      | under investigation*                                                               |
| Weight:                                       | 1.4 kg                                                                       | 1.4 kg                                                                             |
| Order Number:                                 | 017700-017-26                                                                | 601948                                                                             |

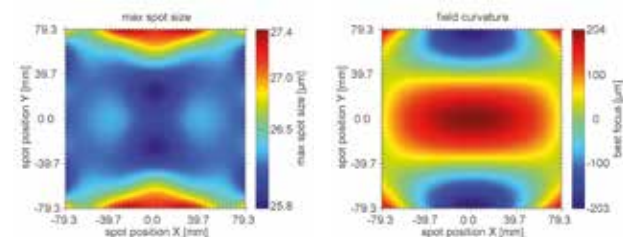
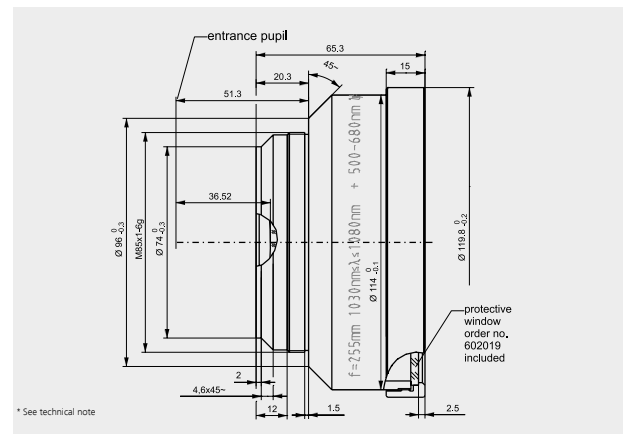
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### Specifications

#### JENar™ 255-1030...1080-239



#### JENar™ 255-1030...1080-239 + VIS



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F-Theta: Registered Design in EU, CN, KR, IN, SG, JP, HK, TW

# F-Theta JENar™ Lens Series

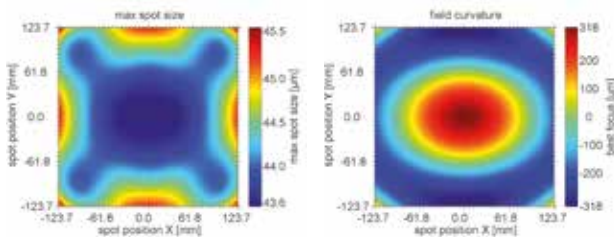
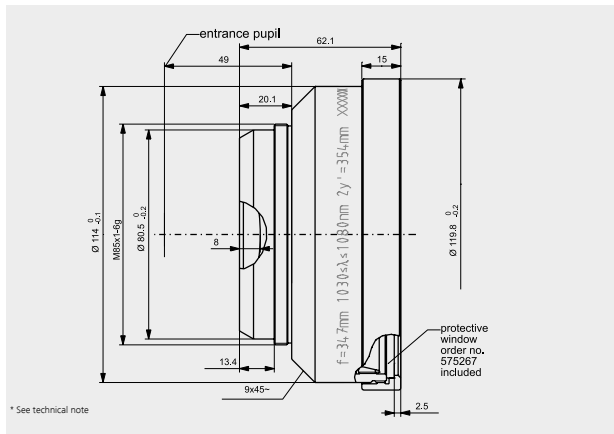
## Large Scan Fields & Reflex Optimized

NEW\*\*

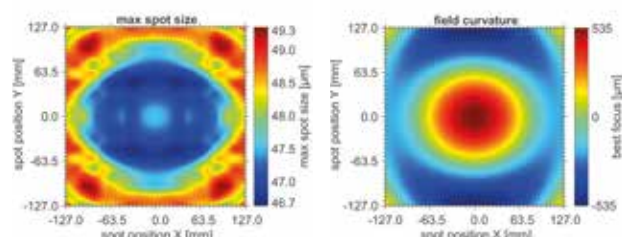
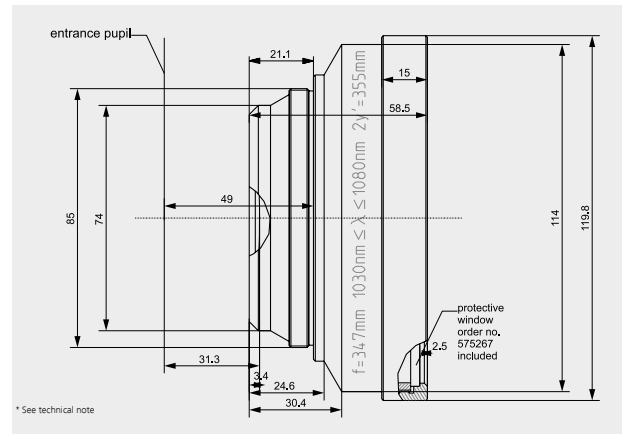
| Parameters                                    | JENar™ 347-1030...1080-354<br>F-Theta lens for large scan fields | JENar™ 347-1030...1080-355**<br>Lens for large scan fields & reflex optimized |
|-----------------------------------------------|------------------------------------------------------------------|-------------------------------------------------------------------------------|
| Focal length:                                 | 347 mm                                                           | 347 mm                                                                        |
| Wavelength:                                   | 1030...1080 nm                                                   | 1030...1080 nm                                                                |
| Scan field ( X x Y ); Ø:                      | (250 mm x 250 mm); 354 mm                                        | (254 mm x 254 mm); 355 mm                                                     |
| Diagonal scan angle:                          | ± 28.8°                                                          | ± 29.1°                                                                       |
| X/Y mirror angle:                             | ± 10.3°                                                          | ± 10.4°                                                                       |
| Back working distance:                        | 403.8 mm                                                         | 403.6 mm                                                                      |
| Flange focus distance:                        | 445.8 mm                                                         | 441 mm                                                                        |
| Input beam Ø 1/e²:                            | 16 mm                                                            | 15 mm                                                                         |
| Focus size Ø 1/e²:                            | 46 µm                                                            | 46 µm                                                                         |
| a1   a2:                                      | 17 mm   40.5 mm                                                  | 17 mm   40.5 mm                                                               |
| Telecentricity (only F-Theta   with scanner): | 18.7°   18.7°                                                    | 18.2°   18.2°                                                                 |
| Group delay dispersion (GDD)*:                | 2140 fs²                                                         | 1880 fs²                                                                      |
| LIDT coating pulsed; CW*:                     | 5.0 J/cm² * (τ/[ns]) ^ 0.30; 5.0 MW/cm²                          | 5.0 J/cm² * (τ/[ns]) ^ 0.30; 5.0 MW/cm²                                       |
| LIDT system pulsed; CW*:                      | 5.0 J/cm² * (τ/[ns]) ^ 0.30; 5.0 MW/cm²                          | 5.0 J/cm² * (τ/[ns]) ^ 0.30; 5.0 MW/cm²                                       |
| Weight:                                       | 1.3 kg                                                           | 1.3 kg                                                                        |
| Order Number:                                 | 017700-022-26                                                    | 609661                                                                        |

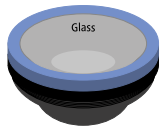
### Specifications

#### JENar™ 347-1030...1080-354



#### JENar™ 347-1030...1080-355





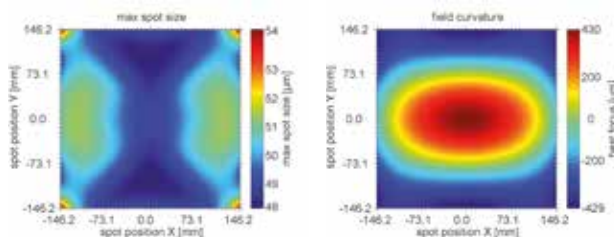
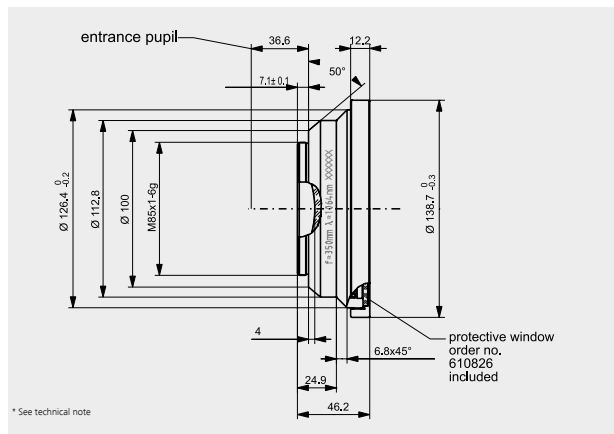
# F-Theta JENar™ Lens Series

## Large Scan Fields

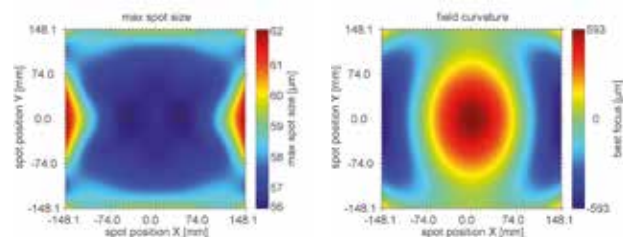
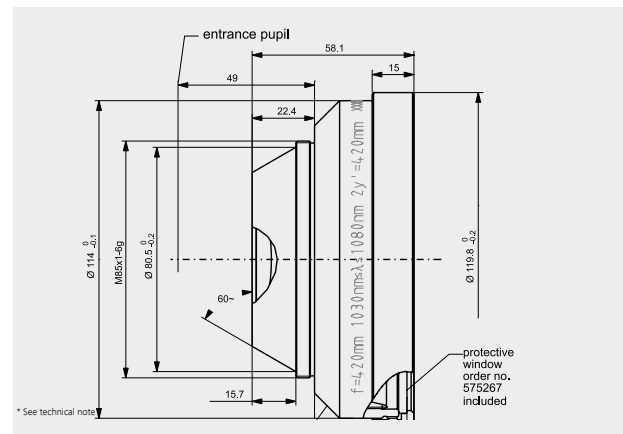
| Parameters                                    | JENar™ 350-1030...1080-452<br>F-Theta lens for large scan fields | JENar™ 420-1030...1080-420<br>F-Theta lens for large scan fields |
|-----------------------------------------------|------------------------------------------------------------------|------------------------------------------------------------------|
| Focal length:                                 | 350 mm                                                           | 420 mm                                                           |
| Wavelength:                                   | 1030...1080 nm                                                   | 1030...1080 nm                                                   |
| Scan field ( X x Y ); Ø:                      | (320 mm x 320 mm); 452 mm                                        | (297 mm x 297 mm); 420 mm                                        |
| Diagonal scan angle:                          | ± 35.5°                                                          | ± 28.5°                                                          |
| X/Y mirror angle:                             | ± 12.7°                                                          | ± 10.2°                                                          |
| Back working distance:                        | 395.4 mm                                                         | 500.6 mm                                                         |
| Flange focus distance:                        | 434.5 mm                                                         | 536.3 mm                                                         |
| Input beam Ø 1/e²:                            | 15 mm                                                            | 15 mm                                                            |
| Focus size Ø 1/e²:                            | 46 µm                                                            | 55 µm                                                            |
| a1   a2:                                      | 23.2 mm   25 mm                                                  | 17 mm   40.5 mm                                                  |
| Telecentricity (only F-Theta   with scanner): | 23.7°   24°                                                      | 18.7°   18.8°                                                    |
| Group delay dispersion (GDD)*:                | 2850 fs²                                                         | 1020 fs²                                                         |
| LIDT coating pulsed; CW*:                     | 5.0 J/cm² * (τ/[ns]) ^ 0.30; 5.0 MW/cm²                          | 5.0 J/cm² * (τ/[ns]) ^ 0.30; 5.0 MW/cm²                          |
| LIDT system pulsed; CW*:                      | 5.0 J/cm² * (τ/[ns]) ^ 0.30; 5.0 MW/cm²                          | 5.0 J/cm² * (τ/[ns]) ^ 0.30; 5.0 MW/cm²                          |
| Weight:                                       | 1.14 kg                                                          | 0.84 kg                                                          |
| Order Number:                                 | 017700-009-26                                                    | 017700-021-26                                                    |

### Specifications

#### JENar™ 350-1030...1080-452



#### JENar™ 420-1030...1080-420



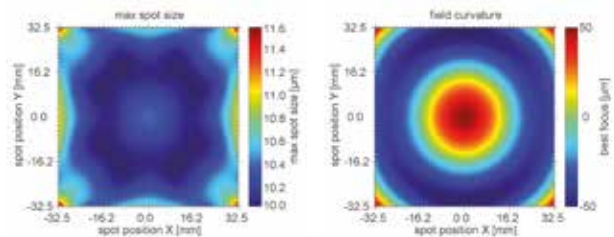
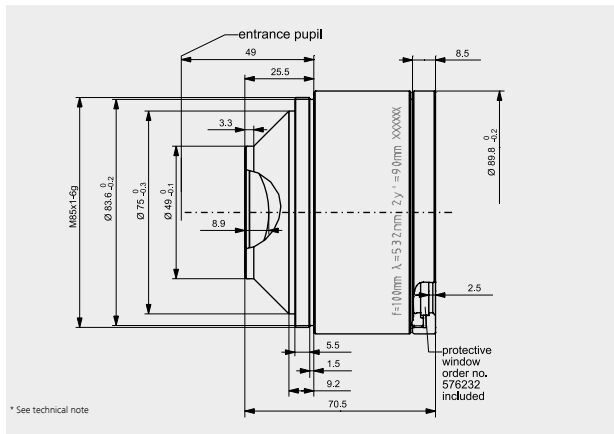
# F-Theta JENar™ Lens Series

## High Image Quality | Telecentric Lenses

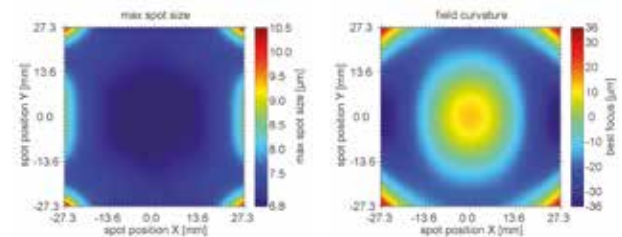
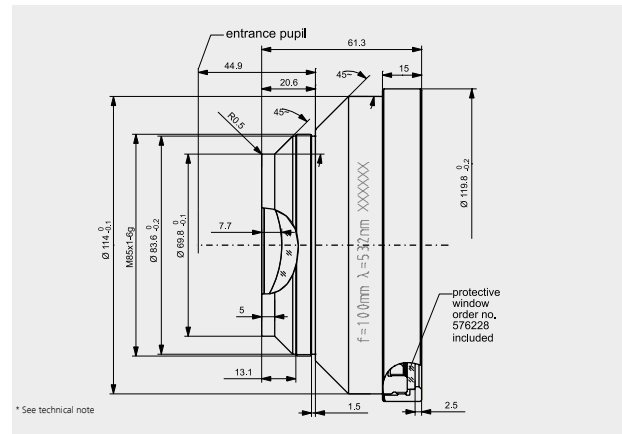
| Parameters                                    | JENar™ 100-515...540-90<br>F-Theta lens for high image quality | JENar™ 102-515...540-75<br>Telecentric lens |
|-----------------------------------------------|----------------------------------------------------------------|---------------------------------------------|
| Focal length:                                 | 100 mm                                                         | 102 mm                                      |
| Wavelength:                                   | 515...540 nm                                                   | 515...540 nm                                |
| Scan field ( X x Y ); Ø:                      | (64 mm x 64 mm); 90 mm                                         | (53 mm x 53 mm); 75 mm                      |
| Diagonal scan angle:                          | ± 26.5°                                                        | ± 21.5°                                     |
| X/Y mirror angle:                             | ± 9.5°                                                         | ± 7.7°                                      |
| Back working distance:                        | 95 mm                                                          | 132.9 mm                                    |
| Flange focus distance:                        | 140 mm                                                         | 173.6 mm                                    |
| Input beam Ø 1/e²:                            | 10 mm                                                          | 15 mm                                       |
| Focus size Ø 1/e²:                            | 10 µm                                                          | 7 µm                                        |
| a1   a2:                                      | 13 mm   42.5 mm                                                | 18 mm   36 mm                               |
| Telecentricity (only F-Theta   with scanner): | 7.7°   7.8°                                                    | 4.1°   4.9°                                 |
| Group delay dispersion (GDD)*:                | 4940 fs²                                                       | 15700 fs²                                   |
| LIDT coating pulsed; CW*:                     | 2.5 J/cm² * (τ/[ns]) ^ 0.35; 2.5 MW/cm²                        | 2.5 J/cm² * (τ/[ns]) ^ 0.35; 2.5 MW/cm²     |
| LIDT system pulsed; CW*:                      | 2.5 J/cm² * (τ/[ns]) ^ 0.35; 2.5 MW/cm²                        | 2.5 J/cm² * (τ/[ns]) ^ 0.35; 2.5 MW/cm²     |
| Weight:                                       | 0.7 kg                                                         | 0.7 kg                                      |
| Order Number:                                 | 017700-209-26                                                  | 017700-202-26                               |

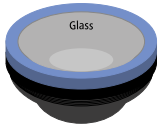
### Specifications

#### JENar™ 100-515...540-90



#### JENar™ 102-515...540-75





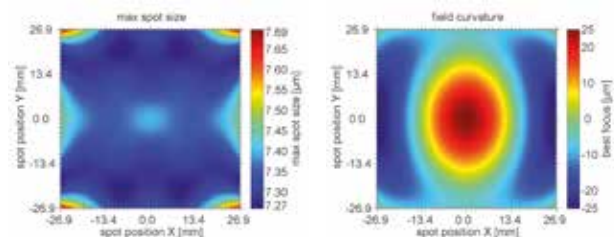
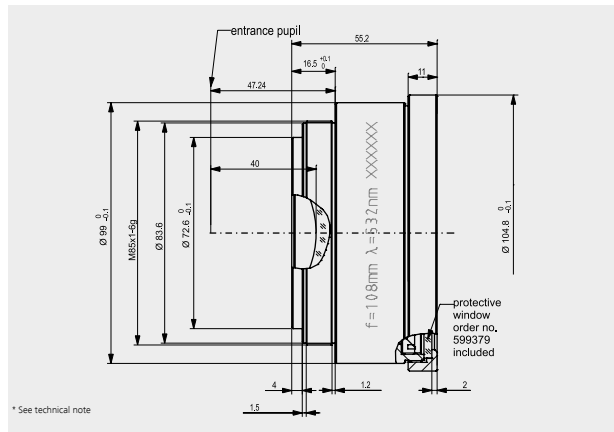
# F-Theta JENar™ Lens Series

## Telecentric Lenses | High Image Quality

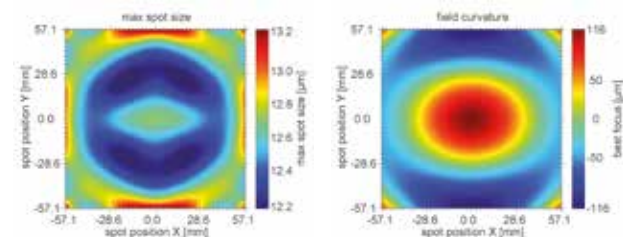
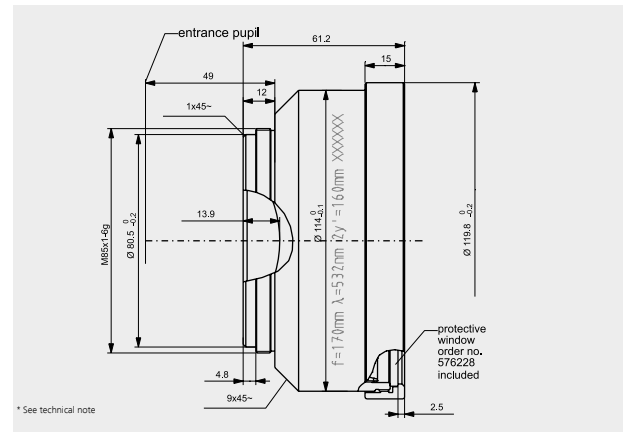
| Parameters                                    | JENar™ 108-515...540-75<br>Telecentric lens | JENar™ 170-515...540-160<br>F-Theta lens for high image quality |
|-----------------------------------------------|---------------------------------------------|-----------------------------------------------------------------|
| Focal length:                                 | 108 mm                                      | 170 mm                                                          |
| Wavelength:                                   | 515...540 nm                                | 515...540 nm                                                    |
| Scan field (X x Y); Ø:                        | (53 mm x 53 mm); 75 mm                      | (113 mm x 113 mm); 160 mm                                       |
| Diagonal scan angle:                          | ± 20°                                       | ± 27°                                                           |
| X/Y mirror angle:                             | ± 7.1°                                      | ± 9.6°                                                          |
| Back working distance:                        | 130.2 mm                                    | 195 mm                                                          |
| Flange focus distance:                        | 168.9 mm                                    | 244 mm                                                          |
| Input beam Ø 1/e²:                            | 15 mm                                       | 14 mm                                                           |
| Focus size Ø 1/e²:                            | 7 µm                                        | 12 µm                                                           |
| a1   a2:                                      | 16 mm   39.2 mm                             | 17 mm   40.5 mm                                                 |
| Telecentricity (only F-Theta   with scanner): | 4.9°   5.1°                                 | 10.9°   11°                                                     |
| Group delay dispersion (GDD)*:                | 14700 fs²                                   | 7100 fs²                                                        |
| LIDT coating pulsed; CW*:                     | 2.5 J/cm² * (τ/[ns]) ^ 0.35; 2.5 MW/cm²     | 2.5 J/cm² * (τ/[ns]) ^ 0.35; 2.5 MW/cm²                         |
| LIDT system pulsed; CW*:                      | 2.5 J/cm² * (τ/[ns]) ^ 0.35; 2.5 MW/cm²     | 2.5 J/cm² * (τ/[ns]) ^ 0.35; 2.5 MW/cm²                         |
| Weight:                                       | 0.9 kg                                      | 1.21 kg                                                         |
| Order Number:                                 | 017700-203-26                               | 017700-206-26                                                   |

### Specifications

#### JENar™ 108-515...540-75



#### JENar™ 170-515...540-160



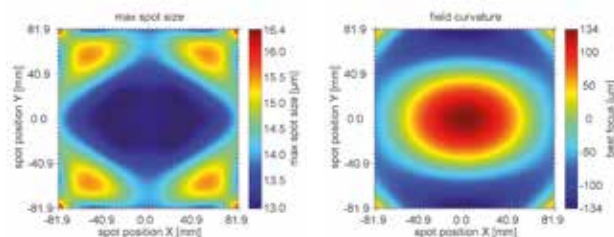
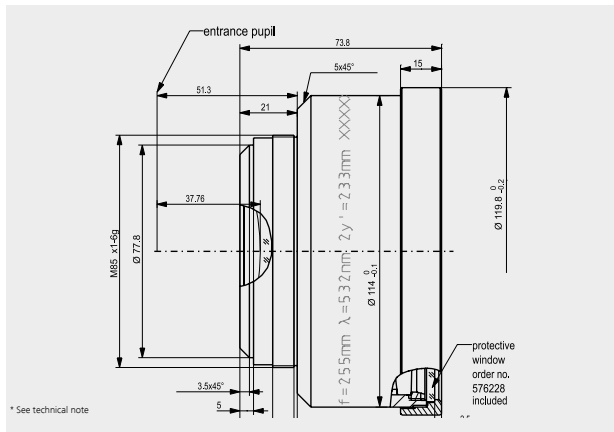
# F-Theta JENar™ Lens Series

## Larger Beam Diameters and Scan Fields | Large Scan Fields

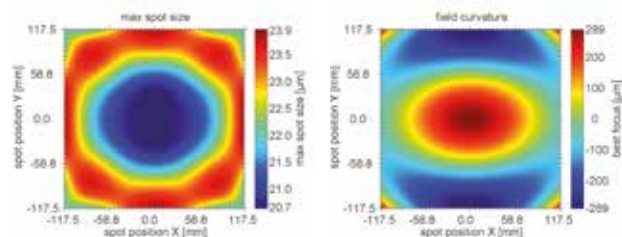
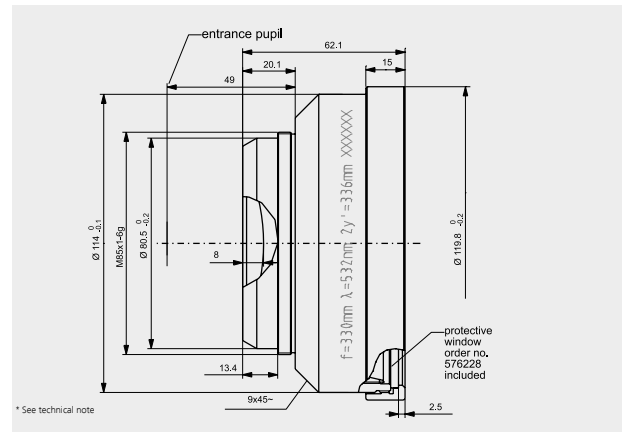
| Parameters                                    | JENar™ 255-515...540-233<br>Lens for larger beam diameters and scan fields | JENar™ 330-515...540-347<br>F-Theta lens for large scan fields |
|-----------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------|
| Focal length:                                 | 255 mm                                                                     | 330 mm                                                         |
| Wavelength:                                   | 515...540 nm                                                               | 515...540 nm                                                   |
| Scan field ( X x Y ); Ø:                      | (165 mm x 165 mm); 233 mm                                                  | (245 mm x 245 mm); 347 mm                                      |
| Diagonal scan angle:                          | ± 26.05°                                                                   | ± 28.8°                                                        |
| X/Y mirror angle:                             | ± 9.3°                                                                     | ± 10.3°                                                        |
| Back working distance:                        | 294 mm                                                                     | 384.1 mm                                                       |
| Flange focus distance:                        | 347 mm                                                                     | 426.1 mm                                                       |
| Input beam Ø 1/e²:                            | 20 mm                                                                      | 16 mm                                                          |
| Focus size Ø 1/e²:                            | 12 µm                                                                      | 23 µm                                                          |
| a1   a2:                                      | 25 mm   39 mm                                                              | 17 mm   40.5 mm                                                |
| Telecentricity (only F-Theta   with scanner): | 14.2°   14.3°                                                              | 18.4°   18.4°                                                  |
| Group delay dispersion (GDD)*:                | 7690 fs²                                                                   | 6810 fs²                                                       |
| LIDT coating pulsed; CW*:                     | 2.5 J/cm² * (τ/[ns]) ^ 0.35; 2.5 MW/cm²                                    | 2.5 J/cm² * (τ/[ns]) ^ 0.35; 2.5 MW/cm²                        |
| LIDT system pulsed; CW*:                      | 1.25 J/cm² * (τ/[ns]) ^ 0.35; 1.25 MW/cm²                                  | 2.5 J/cm² * (τ/[ns]) ^ 0.35; 2.5 MW/cm²                        |
| Weight:                                       | 1.5 kg                                                                     | 1.3 kg                                                         |
| Order Number:                                 | 017700-205-26                                                              | 017700-208-26                                                  |

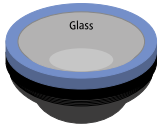
### Specifications

#### JENar™ 255-515...540-233



#### JENar™ 330-515...540-347





# F-Theta JENar™ Lens Series

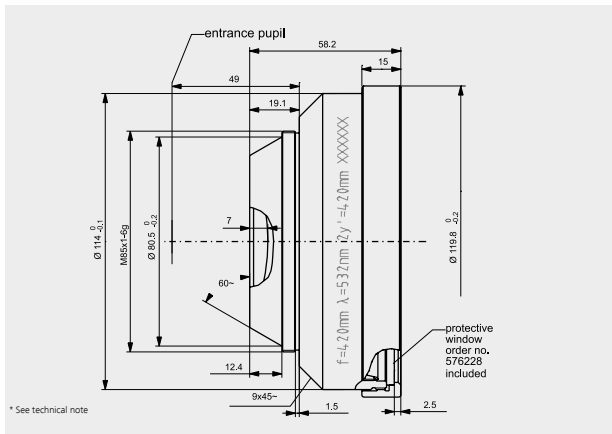
## Large Scan Fields | Short Focal Length

| Parameters                                    | JENar™ 420-515...540-420<br>F-Theta lens for large scan fields | JENar™ 53-355-24<br>Telecentric lens with short focal length |
|-----------------------------------------------|----------------------------------------------------------------|--------------------------------------------------------------|
| Focal length:                                 | 420 mm                                                         | 53 mm                                                        |
| Wavelength:                                   | 515...540 nm                                                   | 355 nm                                                       |
| Scan field ( X x Y ); Ø:                      | (297 mm x 297 mm); 420 mm                                      | (17 mm x 17 mm); 24 mm                                       |
| Diagonal scan angle:                          | ± 28.55°                                                       | ± 12.1°                                                      |
| X/Y mirror angle:                             | ± 10.2°                                                        | ± 4.3°                                                       |
| Back working distance:                        | 485.2 mm                                                       | 64.9 mm                                                      |
| Flange focus distance:                        | 524.3 mm                                                       | 77.48 mm                                                     |
| Input beam Ø 1/e²:                            | 15 mm                                                          | 10 mm                                                        |
| Focus size Ø 1/e²:                            | 27 µm                                                          | 3.5 µm                                                       |
| a1   a2:                                      | 17 mm   40.5 mm                                                | 13 mm   46.48 mm                                             |
| Telecentricity (only F-Theta   with scanner): | 19.3°   19.3°                                                  | 0.4°   1.5°                                                  |
| Group delay dispersion (GDD)*:                | 4860 fs²                                                       | 10800 fs²                                                    |
| LIDT coating pulsed; CW*:                     | 2.5 J/cm² * (τ/[ns]) ^ 0.35; 2.5 MW/cm²                        | 1.0 J/cm² * (τ/[ns]) ^ 0.40; 1.0 MW/cm² *                    |
| LIDT system pulsed; CW*:                      | 2.5 J/cm² * (τ/[ns]) ^ 0.35; 2.5 MW/cm²                        | 1.0 J/cm² * (τ/[ns]) ^ 0.40; 1.0 MW/cm² *                    |
| Weight:                                       | 0.98 kg                                                        | 0.7 kg                                                       |
| Order Number:                                 | 017700-207-26                                                  | 017700-401-26                                                |

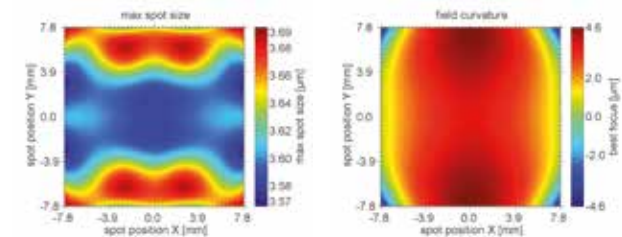
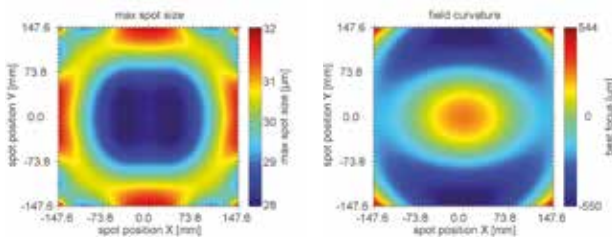
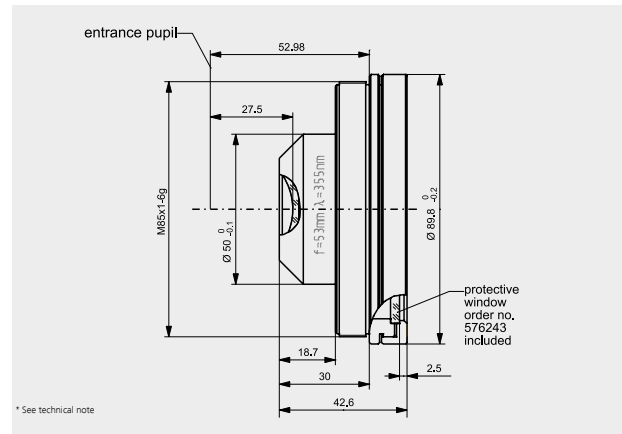
\* not suitable for short pulse (ps) and ultra short pulse (fs) application

### Specifications

#### JENar™ 420-515...540-420



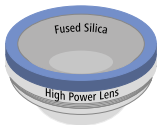
#### JENar™ 53-355-24



JENar®: Registered in EU, CN, JP, SG, US  
F-Theta: Registered Design in EU, CN, KR, IN, SG, JP, HK, TW

# Replaceable Protective Windows for JENar™ Silverline™ High-Power Lenses & F-Theta Lenses.

## Type: Protective Windows



| Wavelength [nm] | F-Theta High-Power Lens | Drawing Number (017700 = *) | Order Number Window |
|-----------------|-------------------------|-----------------------------|---------------------|
|                 |                         |                             |                     |
| 1030...1080     | 017700-025-26           | *-415-32                    | 576225              |
|                 | 017700-026-26           | *-415-32                    | 576225              |
|                 | 609120                  | *-442-33                    | 629206              |
| 900...1100      | 601787                  | *-415-34                    | 602021              |
|                 | 601804                  | *-415-34                    | 602021              |
|                 | 628951 <b>NEW</b>       | 628961                      | 628981              |
| 515...540       | 624103 <b>NEW</b>       | 624104                      | 628062              |
| 355             | 605678 <b>NEW</b>       | *-475-31                    | 576243              |
|                 | 017700-402-26           | *-410-31                    | 576239              |
|                 | 628956 <b>NEW</b>       | 640115                      | 641319              |
|                 | 017700-405-26           | *-442-31                    | 576241              |
|                 | 017700-406-26           | *-415-31                    | 579878              |
|                 | 586840                  | 586855                      | 610829              |
| 266             | 017700-601-26           | *-410-32                    | 610812              |

The stated data are approximate values and can deviate under different conditions during customer's use.  
All data are subject to generally accepted manufacturing tolerances.



# Germanium & Silicon Blanks