

6 Technical Data

6.1 Ensō Prime Lenses

ARRI Ensō Prime	10.5/T2.8	14/T2.5	18/T2.1	21/T2.1
Optical Parameters				
Focal Length	10.5 mm	14 mm	18 mm	21 mm
T-Stop	T2.8 – T22	T2.5 – T22	T2.1 – T22	T2.1 – T22
MOD from sensor plane (minimum marked distance)	270 mm / 10.5"	270 mm / 10.5"	200 mm / 8"	220 mm / 8.5"
MOD from lens front	80 mm / 3.1"	85 mm / 3.3"	39 mm / 1.5"	69 mm / 2.7"
Magnification ratio at MOD	1:10	1:8	1:4	1:4
Entrance pupil position (related to Image plane, in direction to object plane*)	160,3 mm / 6.3"	151,9 mm / 6"	134,3 mm / 5.3"	131,6 mm / 5.2"
Angle of View H-V-D for LF Open Gate	120,8° / 101,3° / 130°	105,2° / 84,6° / 116°	92,3° / 71,4° / 103,5°	83,2° / 63,3° / 94,4°
Angle of View H-V-D for ALEXA 35 Open Gate	106,5° / 85,1° / 116,9°	89,8° / 68,8° / 100,9°	76,5° / 56,6° / 87,7°	68,2° / 49,6° / 78,8°
Size of Object Field for LF Open Gate	423,4 mm / 294,7 mm / 515,9 mm	342,6 mm / 238,5 mm / 417,5 mm	162,8 mm / 113,3 mm / 198,4 mm	169,2 mm / 117,8 mm / 206,1 mm
Size of Object Field for ALEXA 35 Open Gate	315 mm / 216,3 mm / 382,2 mm	252,7 mm / 173,5 mm / 306,6 mm	119,7 mm / 82,2 mm / 145,1 mm	126,8 mm / 87,1 mm / 153,8 mm
Physical Dimensions				
Front diameter	134 / 156 mm	134 / 156 mm	95 mm	95 mm
Max. housing diameter	134 / 156 mm	134 / 156 mm	104,7 mm / 4.1"	104,7 mm / 4.1"
Length from flange	141 mm / 5.6"	141 mm / 5.6"	117 mm / 4.6"	117 mm / 4.6"
Weight (lens only)	2.3 kg	2.1 kg	1.4 kg	1.4 kg
Lens barrel	Aluminum	Aluminum	Aluminum	Aluminum
Interfaces				
Lens mount	LPL	LPL	LPL	LPL
Lens data system	LDS-2 & Cooke /i	LDS-2 & Cooke /i	LDS-2 & Cooke /i	LDS-2 & Cooke /i
Flange focal distance	44 mm	44 mm	44 mm	44 mm

* The plane 44mm behind the LPL mount flange is referred to as the marked image plane.

ARRI Ensō Prime	24/T2.1	28/T2.1	32/T2.1	40/T2.1
Optical Parameters				
Focal Length	24 mm	28 mm	32 mm	40 mm
T-Stop	T2.1 – T22	T2.1 – T22	T2.1 – T22	T2.1 – T22
MOD from sensor plane (minimum marked distance)	230 mm / 9"	230 mm / 9"	250 mm / 10"	280 mm / 11"
MOD from lens front	69 mm / 2.7"	69 mm / 2.7"	89 mm / 3.5"	119 mm / 4.7"
Magnification ratio at MOD	1:4	1:4	1:4	1:4
Entrance pupil position (related to Image plane, in direction to object plane*)	131,8 mm / 5.2"	118,8 mm / 4.7"	119,5 mm / 4.7"	117,2 mm / 4.6"
Angle of View H-V-D for LF Open Gate	75,2° / 56,4° / 86,1°	66,9° / 49,4° / 77,3°	59,7° / 43,6° / 69,8°	49,6° / 35,6° / 58,7°
Angle of View H-V-D for ALEXA 35 Open Gate	60,9° / 43,9° / 71,0°	53,5° / 38,1° / 62,9°	47,3° / 33,5° / 55,9°	38,8° / 27,1° / 46,3°

ARRI Ensō Prime	24/T2.1	28/T2.1	32/T2.1	40/T2.1
Size of Object Field for LF Open Gate	157,5 mm / 109,7 mm / 191,9 mm	146,1 mm / 101,7 mm / 177,9 mm	156,5 mm / 109,0 mm / 190,7 mm	152,6 mm / 106,2 mm / 185,9 mm
Size of Object Field for ALEXA 35 Open Gate	119,4 mm / 82,0 mm / 144,8 mm	110,1 mm / 75,6 mm / 133,6 mm	117,5 mm / 80,7 mm / 142,5 mm	115,9 mm / 79,6 mm / 140,6 mm
Physical Dimensions				
Front diameter	95 mm	95 mm	95 mm	95 mm
Max. housing diameter	104,7 mm / 4.1"	104,7 mm / 4.1"	104,7 mm / 4.1"	104,7 mm / 4.1"
Length from flange	117 mm / 4.6"	117 mm / 4.6"	117 mm / 4.6"	117 mm / 4.6"
Weight (lens only)	1.4 kg	1.5 kg	1.4 kg	1.3 kg
Lens barrel	Aluminum	Aluminum	Aluminum	Aluminum
Interfaces				
Lens mount	LPL	LPL	LPL	LPL
Lens data system	LDS-2 & Cooke /i	LDS-2 & Cooke /i	LDS-2 & Cooke /i	LDS-2 & Cooke /i
Flange focal distance	44 mm	44 mm	44 mm	44 mm

* The plane 44mm behind the LPL mount flange is referred to as the marked image plane.

ARRI Ensō Prime	47/T2.1	58/T2.1	75/T2.1	105/T2.1
Optical Parameters				
Focal Length	47 mm	58 mm	75 mm	105 mm
T-Stop	T2.1 – T22	T2.1 – T22	T2.1 – T22	T2.1 – T22
MOD from sensor plane (minimum marked distance)	320 mm / 12.5"	360 mm / 14"	430 mm / 17"	590 mm / 23.5"
MOD from lens front	159 mm / 6.3"	199 mm / 7.8"	263 mm / 9.3"	423 mm / 16.7"
Magnification ratio at MOD	1:4	1:4	1:4	1:4
Entrance pupil position (related to Image plane, in direction to object plane*)	124,5 mm / 4.9"	115,6 mm / 4.6"	119,9 mm / 4.7"	122,7 mm / 4.8"
Angle of View H-V-D for LF Open Gate	42,8° / 30,5° / 51,1°	35,1° / 24,8° / 42,1°	27,6° / 19,4° / 33,4°	19,8° / 13,9° / 23,9°
Angle of View H-V-D for ALEXA 35 Open Gate	33,3° / 23,1° / 39,9°	27,2° / 18,8° / 32,6°	21,2° / 14,6° / 25,6°	15,2° / 10,5° / 18,3°
Size of Object Field for LF Open Gate	149,5 mm / 104,1 mm / 182,2 mm	151,6 mm / 105,5 mm / 184,7 mm	151,4 mm / 105,4 mm / 184,4 mm	150,0 mm / 104,6 mm / 182,2 mm
Size of Object Field for ALEXA 35 Open Gate	113,5 mm / 78,0 mm / 137,7 mm	115,1 mm / 79,0 mm / 139,6 mm	114,7 mm / 78,7 mm / 139,1 mm	114,6 mm / 78,8 mm / 138,9 mm
Physical Dimensions				
Front diameter	95 mm	95 mm	95 mm	95 mm
Max. housing diameter	104,7 mm / 4.1"	104,7 mm / 4.1"	104,7 mm / 4.1"	104,7 mm / 4.1"
Length from flange	117 mm / 4.6"	117 mm / 4.6"	123 mm / 4.8"	123 mm / 4.8"
Weight (lens only)	1.3 kg	1.5 kg	1.5 kg	1.6 kg
Lens barrel	Aluminum	Aluminum	Aluminum	Aluminum
Interfaces				
Lens mount	LPL	LPL	LPL	LPL
Lens data system	LDS-2 & Cooke /i	LDS-2 & Cooke /i	LDS-2 & Cooke /i	LDS-2 & Cooke /i
Flange focal distance	44 mm	44 mm	44 mm	44 mm

* The plane 44mm behind the LPL mount flange is referred to as the marked image plane.

ARRI Ensō Prime	150/T2.5	250/T2.8	250/T2.8 1.4x Extender	250/T2.8 2.0x Extender
Optical Parameters				
Focal Length	150 mm	250 mm	350 mm	500 mm
T-Stop	T2.5 – T22	T2.8 – T22	T4 – T22	T5.8 – T22
MOD from sensor plane (minimum marked distance)	770 mm / 30.5"	1300 mm / 4'2"	1334 mm / 4'4.5"	1344 mm / 4'4.9"
MOD from lens front	574 mm / 22.6"	1049 mm / 3'5"	1049 mm / 3'5"	1049 mm / 3'5"
Magnification ratio at MOD	1:4	1:4	1:2.9	1:2
Entrance pupil position (related to Image plane, in direction to object plane*)	131,5 mm / 5.2"	128,3 mm / 5.1"	161,0 mm / 6.3"	172,8 mm / 6.8"
Angle of View H-V-D for LF Open Gate	13,9° / 9,7° / 16,9°	8,4° / 5,9° / 10,2°	6° / 4,2° / 7,3°	4,2° / 2,9° / 5,1°
Angle of View H-V-D for ALEXA 35 Open Gate	10,6° / 7,3° / 12,9°	6,4° / 4,4° / 7,7°	4,6° / 3,1° / 5,6°	3,2° / 2,2° / 3,9°
Size of Object Field for LF Open Gate	148,4 mm / 103,3 mm / 180,6 mm	155,3 mm / 108,5 mm / 188,7 mm	111,9 mm / 77,8 mm / 136,2 mm	78,3 mm / 54,5 mm / 95,3 mm
Size of Object Field for ALEXA 35 Open Gate	113,2 mm / 77,8 mm / 137,3 mm	118,8 mm / 81,8 mm / 143,9 mm	85,3 mm / 58,6 mm / 103,5 mm	56,7 mm / 41,0 mm / 72,5 mm
Physical Dimensions				
Front diameter	95 mm	114 mm	114 mm	114 mm
Max. housing diameter	104,7 mm / 4.1"	115 mm / 4.5"	115 mm / 4.5"	115 mm / 4.5"
Length from flange	152 mm / 6"	207 mm / 8.1"	241 mm / 9.5"	251 mm / 9.9"
Weight (lens only)	1.9 kg	2.9 kg	3.5 kg	3.6 kg
Lens barrel	Aluminum	Aluminum	Aluminum	Aluminum
Interfaces				
Lens mount	LPL	LPL	LPL	LPL
Lens data system	LDS-2 & Cooke /i	LDS-2 & Cooke /i	LDS-2 & Cooke /i	LDS-2 & Cooke /i
Flange focal distance	44 mm	44 mm	44 mm	44 mm

* The plane 44mm behind the LPL mount flange is referred to as the marked image plane.

6.2 Ensō Vintage Elements

Focal length, image circle and T-stop change

When using Ensō Vintage Elements with Ensō Prime Lenses, some basic parameters of the lens system will change. Like a „weak extender“, the focal length of the base lens as well as the size of the projected image and the aperture will change. The factors are given in the following table.

	Focal Length multiplier	Image circle multiplier	T-stop multiplier	Exposure change (stops)	Open aperture
VE 350N	1.099	1.099	1.099	-0.28	2.31
VE 200N	1.063	1.063	1.063	-0.17	2.23
VE 100N	1.03	1.03	1.03	-0.08	2.16
No Filter	1.000	1.000	1.000	0.00	2.1
VE 100P	0.979	0.979	0.979	0.06	2.06
VE 200P	0.959	0.959	0.959	0.13	2.01
VE 350P	0.934	0.934	0.934	0.2	1.96

As an example, you will find a calculation of the influenced optical parameters based on the following lens configuration below:

- Lens: Ensō Prime Lens 35 mm @ T2.1
- Ensō Vintage Element: VE 350P

The results when using the lens configuration from above is as follows:

- Resulting focal length: $35 \text{ mm} * 0.934 = 33,25 \text{ mm}$
- Resulting T-Stop: $T2.1 * 0,934 = T1.96$

With the next SUP of ALEXA 35 and Hi-5 it will be possible to reflect these changes in the camera overlay as well as in the recorded clip metadata. The camera or the Hi-5 will compensate for the above-mentioned changes and display the correct values for focal length and T-stop.