

Mamiya 645 system

With this document (and later on my homepage www.photo-phil.org) I want to give a short overview of the Mamiya 645 system. When I got my camera, lenses and stuff I went looking for information about these. But everything was scattered all over the whole internet ... so I will try to collect everything and put it together to make it easier for newcomers. I hope this helps.

If you have more information or if you find mistakes in this overview, then don't hesitate to contact me. Best would be by e-mail under philip@photo-phil.org.

As I am not an expert on this system (yet) this document will never be completely free of errors so I take no responsibility for that but I will work hard to ensure that data given here are reliable.

Bodys:

Manual focus:

The seven manual focus bodies can roughly be divided in to two generations giving different compatibilities to accessories.

1st Generation:

M645	<i>1975-1987</i>	8sec up to 1/500sec mirror lockup multi exposure non-interchangeable film magazine
M645 1000S	<i>1976-1990</i>	like M645 1/1000sec self-timer DOF preview lever on body
M645J	<i>1979-1982</i>	like M645 without mirror lockup

2nd Generation:

645 Super	<i>1985-1993</i>	plastic housing on metal frame features like M645 1000S interchangeable film backs mirror lockup multi exposure 1/60sec operation without battery
645 Pro	<i>1993-1998</i>	plastic housing on metal frame 8sec up to 1/1000sec mirror lockup multi exposure self-timer interchangeable film backs
645 Pro TL	<i>1999-2006</i>	like 645 PRO Flash-TTL measuring
645E	<i>2000-????</i>	Entry level version without interchangeable film backs Built in metering

Function comparison of MF bodies:

max. time	min. time	changable viewfinder	changable backs	mirror lockup	self timer	multi exposure	DOF preview lever on body	flash sync time	weight with standard lens (80/2.8) and waist level finder
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1st Generation

M645	8 sec	1/500 sec	✓		✓		✓		1/60 sec	1335 gr
M645 1000S	8 sec	1/1000 sec	✓		✓	✓	✓	✓	1/60 sec	1405 gr
M645 J	1 sec	1/500 sec	✓				✓		1/60 sec	1325 gr

2nd Generation

645 Super	4 sec	1/1000 sec	✓	✓	✓		✓		1/60 sec	1260 gr
645 Pro	4 sec	1/1000 sec	✓	✓	✓	✓	✓		1/60 sec	1345 gr
645 Pro TL	4 sec	1/1000 sec	✓	✓	✓	✓	✓		1/60 sec	1350 gr
645 E	4 sec	1/1000 sec			✓		✓		1/60 sec	1340 gr

Accessories for MF cameras:

For 1st Generation:

- Waist level finder, a non-metered prism and different metered prism finders (PD) for M645, M645 1000S, M645J
- Film inserts for 120's and 220's films
- Focussing magnifier
- Angle focusing aid
- Hand grips and pistol-like grip

For 2nd Generation:

- Waist level finder, a non-metered prism (PF 401) and different metered prism finders (FE 401) for 645 Super, 645 Pro, 645 Pro TL
- Different focusing screens (micro prisms, matte, split screen, grid) for 645 Super, 645 Pro, 645 Pro TL
- Power Drive grip with motor winders (N, WG 402, WG 401) for 645 Super, 645 PRO and 645 PRO TL
- Left hand Grip N for 645 Super
- Left hand Grip (GL401) for 645 PRO and 645 PRO TL
- Polaroid film backs
- 135 film cartridge with panoramic adapter
- Electronic cable release

MF 1 st generation			MF 2 nd generation				auto focus					*1
M645	M645 1000S	M645 J	645 Super	645 Pro	645 Pro TL	645 E *2	645 AF	645 AFD	645 AFD II	645 AFD III	645 DF	

viewfinders

waist level finder W	✓	✓	✓									
waist level finder W N				✓	✓	✓						
prism viewfinder P	✓	✓	✓									
prism viewfinder PD	✓	✓	✓									
prism viewfinder PD S	✓	✓	✓									
prism viewfinder N				✓	✓	✓						
prism viewfinder FP401				✓	✓	✓						
prism viewfinder CdS	✓	✓	✓									
AE prism viewfinder *3	✓	✓	✓									
AE prism viewfinder N				✓	✓	✓						
AE prism viewfinder FE401 *4				✓	✓	✓						
AE prism viewfinder FK402 *4				✓	✓	✓						
focusing screen No.1 micro prism	✓	✓	✓									
focusing screen No.2 matte	✓	✓	✓									
focusing screen No.3 grid	✓	✓	✓									
focusing screen No.4 splitscreen	✓	✓	✓									
focusing screen No.5 splitscreen+prism	✓	✓	✓									
focusing screen N type A matte				✓	✓	✓						
focusing screen N type A4 grid				✓	✓	✓						
focusing screen N type B split screen				✓	✓	✓						
focusing screen N type C micro prism				✓	✓	✓						
focusing screen N type E split+prism				✓	✓	✓						
focusing screen matte							✓	✓				
focusing screen grid							✓	✓				
focusing screen micro prism #314474							✓	✓				
magnifier for P, PD, CdS	✓	✓	✓									
magnifier N for prism N, AE N				✓	✓	✓						
angle finder for P, PD, CdS	✓	✓	✓									
angle finder 2 for P, PD, PD S, CdS	✓	✓	✓									
angle finder N for prism N, AE N				✓	✓	✓						
diopter corrections for P, PD, CdS	✓	✓	✓									
diopter corrections for prism N, AE N				✓	✓	✓						
diopter corrections DE401 (-2.5...+0.5)							✓	✓				
diopter corrections DE402 (-2.0...-0.5)							✓	✓				
diopter corrections DE403 (0.0...+3.0)							✓	✓				
magnifying lenses for W	✓	✓	✓									
magnifying lenses for W N				✓	✓	✓						

*1 The AF bodies feature a fixed prism viewfinder that can be slightly modified

*2 The M645E has a fixed prism viewfinder that cannot be modified

*3 has to be specially configured to work with M645 and M645J

*4 no metering function with 645 Super

Auto focus bodys:

645AF	1999-????	
645AFD	2001-????	
645AFD II	2005-????	
645AFD III	2008-????	same as PhaseOne 645AF
645DF	????-????	same as PhaseOne 645DF, only for digital backs

MF Lenses:

The MF lenses are compatible to all 645 bodies (MF and AF). I just found some comments on incompatibilities concerning the leaf shutter lenses but I have no details on this yet.

- "Sekor C" gives the lens series – but be careful: As far as I know not all "Sekor C" lenses are compatible to the 645 system
- "N" says this is a new version of the lens. Sometime with new calculation, sometimes just slightly modified
- "L" and "LS" says this lens has a leaf shutter integrated into the lens
- "A" says this is a corrected lens similar to APO design, so maybe at an achromatic design
- "D" means this lens is optimized for digital sensors (even if still manual focused)
- "APO" lenses have an apochromatic design
- "ULD" stands for "ultra low dispersion" glasses used
- "E" was the Kit lense for the 645E
- "S" I have no idea about yet.

angle of view	construction elements/groups	aperture range	minimum focussing distance	magnification	filter size	lens hood	dimensions lengthxdiameter	weight
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wide angle

Sekor C 24mm f/4	fisheye	180°	10/8	4 - 22	30cm	x 0.14	none	none	82 x 100mm	785 gr
Sekor C 24mm f/4 ULD	fisheye	180°	10/8	4 - 22	30cm	x 0.14	none	none	82 x 100mm	785 gr
Sekor C 35mm f/3.5		90°	9/7	3.5 - 22	45cm	x 0.11	77mm	none	61.5 x 80mm	445 gr
Sekor C 35mm f/3.5 N		90°	9/7	3.5 - 22	45cm	x 0.11	77mm	none	61.5 x 80mm	445 gr
Sekor C 45mm f/2.8		76°	9/7	2.8 - 22	50cm		77mm	slip on		540 gr
Sekor C 45mm f/2.8 S		76°	9/7	2.8 - 22	45cm		67mm	slip on		475 gr
Sekor C 45mm f/2.8 N		76°	9/7	2.8 - 22	45cm	x 0.15	67mm	slip on	70.5 x 75mm	475 gr
Sekor C 50mm f/4	shift	70°	10/8	4 - 32	45cm	x 0.18	77mm	none	105.5 x 80mm	735 gr
Sekor C 55mm f/2.8		65°	9/6	2.8 - 22	55cm		58mm	screw in		395 gr
Sekor C 55mm f/2.8 S		65°	8/6	2.8 - 22	45cm	x 0.18	58mm	screw in		335 gr
Sekor C 55mm f/2.8 N		65°	8/6	2.8 - 22	45cm	x 0.18	58mm	screw in	59.4 x 70mm	305 gr
Sekor A 55mm f/2.8 N/L	leaf shutter	65°	8/6	2.8 - 22	45cm	x 0.18	67mm		59 x ??mm	482 gr

standard

Sekor C 70mm f/2.8 E		53°	6/4	2.8 - 22	80cm	x 0.11	58mm	screw in	50 x 70mm	285 gr
Sekor C 70mm f/2.8	leaf shutter	53°	6/4	2.8 - 22	80cm	x 0.11	58mm	screw in	50 x 76mm	395 gr
Sekor C 80mm f/1.9		47°	7/6	1.9 - 22	70cm	x 0.15	67mm	screw in	59 x 75.5mm	420 gr
Sekor C 80mm f/1.9 N		47°								
Sekor C 80mm f/2.8		47°	6/5	2.8 - 22	70cm	x 0.15	58mm	screw in		250 gr
Sekor C 80mm f/2.8 N		47°	6/5	2.8 - 22	70cm	x 0.15	58mm	screw in	43.5 x 70mm	220 gr
Sekor A 80mm f/2.8 N/L	leaf shutter	47°	6/5		80cm					

short tele

Sekor C 110mm f/2.8		35°	5/5	2.8 - 22	120cm	x 0.11	58mm	screw in	60 x 70mm	390 gr
Sekor C 110mm f/2.8 N										
Sekor C 120mm f/4 APO		33°	9/8	4 - 32	40cm		67mm		111 x ??mm	745 gr
Sekor C 145mm f/4	soft focus	27°	7/5	4 - 32	150cm	x 0.13	77mm	screw in	115.5 x 81.5mm	900 gr
Sekor C 150mm f/4		26°	5/4	4 - 32	150cm	x 0.12	58mm	build on		440 gr
Sekor C 150mm f/3.5		26°								
Sekor C 150mm f/3.5 N		26°	5/5	3.5 - 32	150cm	x 0.12	58mm	build on	80 x 70mm	420 gr
Sekor A 150mm f/3.8 N/L	leaf shutter	26°	5/5	3.8 - 22	150cm	x 0.12	67mm		81 x ??mm	570 gr
Sekor A 150mm f/2.8		26°	6/4	2.8 - 22	150cm	x 0.12	67mm		107 x ??mm	740 gr
Sekor C 200mm f/2.8 APO		20°	7/5	2.8 - 22	244cm		77mm		143.5 x ??mm	1100 gr
Sekor C 210mm f/4		19°	5/4	4 - 32	250cm	x 0.10	58mm	build on	137 x 70mm	715 gr

long tele

Sekor C 300mm f/5.6		13°	6/5	5.6 - 32	400cm	x 0.09	58mm	build on	164 x 70mm	710 gr
Sekor C 300mm f/5.6 ULD N		13°	6/5	5.6 - 32	400cm	x 0.09	58mm	build on	164 x 70mm	710 gr
Sekor A 300mm f/2.8 APO		13°	9/8	2.8 - 22	350cm		drop in		237 x ??mm	2660 gr
Sekor C 500mm f/8	reflex	8°	7/5	8	400cm	x 0.14	drop in	build on	135 x 101mm	880gr
Sekor C 500mm f/5.6		8°	6/5	5.6 - 45	900cm	x 0.07	105mm	build on	358 x 114mm	2280 gr
Sekor C 500mm f/4.5 APO		8°	11/9	4.5 - 32	500cm		drop in		378 x ??mm	5410 gr

macro

Sekor C 80mm f/4 Macro		47°	6/4	4 - 22	36cm	x 0.50	67mm	none	75 x 79mm	585 gr
Sekor C 80mm f/4 N Macro		47°	6/4	4 - 22	36cm	x 0.50	67mm	none		585 gr
Sekor Macro 120mm f/4 N		33°	9/8	4 - 32	40cm	x1.00	67mm	none	111 x 77.4mm	745 gr
Sekor Macro 120mm f/4 D		33°	9/8	4 - 32	40cm	x1.00	67mm	none	111 x 83mm	845 gr

zoom

Sekor C 55-110mm f/4.5 N		65° - 35°	11/10	4.5 - 32	150cm		67mm		104 x ??mm	800 gr
Sekor C 75-150mm f/4.5		50° - 26°	11/10	4.5 - 32	180cm	x 0.05 - 0.10	77mm	slip on	144 x 83.5mm	975 gr
Sekor C 105-210mm f/4.5		36° - 19°	13/11	4.5 - 32	180cm	x 0.07 - 0.14	58mm	build on	158 x 74.5mm	875 gr
Sekor C 105-210mm f/4.5 ULD		36° - 19°	13/11	4.5 - 32	180cm	x 0.07 - 0.14	58mm	build on		875 gr

accessories

2x teleconverter										
2x teleconverter N										
extension ring No. 1										
extension ring No. 2										
extension ring No. 3										

AF Lenses:

angle of view	construction elements/groups	aperture range	minimum focussing distance	magnification	filter size	lens hood	dimensions lengthxdiameter	weight
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primes

Sekor AF 28mm f/4.5 D asph.		102°	14/10	4.5 - 32	35cm	x 0.15	frame		136x90mm	885 gr
Sekor AF 35mm f/3.5		90°	9/7	3.5 - 22	35cm	x 0.16	77mm		62x84mm	480 gr
Sekor AF 45mm f/2.8 D		76°	9/7	2.8 - 22	45cm	x 0.14	67mm		73.5x77mm	530 gr
Sekor AF 55mm f/2.8		65°	7/6	2.8 - 22	45cm	x 0.18	58mm		65.5x77mm	445 gr
Sekor AF 55mm f/2.8 LS D	leaf shutter	65°	7/6	2.8 - 22	45cm	x 0.18	72mm		77.6x86.5mm	630 gr
Sekor AF 80mm f/2.8 D		47°	6/5	2.8 - 22	70cm	x 0.15	67mm		51.5x80.5mm	330 gr
Sekor AF 80mm f/2.8 LS D	leaf shutter	47°	6/5	2.8 - 22	70cm	x 0.15	72mm		67.6x86.5mm	500 gr
Sekor AF 110mm f/2.8 LS D	leaf shutter	35°	6/5	2.8 - 22	90cm	x 0.16	72mm		83.3x86.5mm	635 gr
Sekor AF 150mm f/3.5		26°	5/5	3.5 - 32	150cm	x 0.12	58mm		80.5x79mm	540 gr
Sekor AF 150mm f/2.8 IF D		26°	8/7	2.8 - 22	100cm	x 0.19	72mm		120x85mm	780 gr
Sekor AF 210mm f/4 ULD IF		19°	7/5	4 - 32	200cm	x 0.13	58mm		141x86mm	750 gr
Sekor AF 300mm f/4.5 APOIF		13°	8/8	4.5 - 32	300cm	x 0.11	77mm		213x99mm	1430 gr

zoom

Sekor AF 55-110 f/4.5		65° - 35°	11/10	4.5 - 32	150cm	x 0.04 - 0.08	67mm		110x86.5mm	870 gr
Sekor AF 75-150 f/4.5 D		50° - 26°	11/10	4.5 - 32	100cm	x 0.09 - 0.16	77mm		145x86mm	1140 gr
Sekor AF 105-210 f/4.5 ULD		37° - 19°	13/11	4.5 - 32	150cm	x 0.09 - 0.18	58mm		158 x 82mm	990 gr

Interchangable Backs:

For the film-backs one has to distinguish between the roll-film-holder (film-back) and the roll-film-insert (where the film reels are). The first generation of MF-645's don't have interchangeable film backs. Here only the inserts are used. These inserts (different ones for 120 and 220 films) are the same that also fit into the respective film-backs of the second generation (Super, Pro, ProTL). Super and Pro(TL) have slightly different backs regarding the design but with the same functionality so they can be used mixed. This second generation system also allows using a 24x36mm film back (which has its own special insert) or a Polaroid-back. The AF cameras use a different type of film back and insert that cannot be mixed with the MF system.

	resolution	display	Built-in memory	M645 super M645 Pro M645 ProTL	M645AF	M645AFD AFD I AFD II
Mamiya						
ZD Back	22 MPix	OK	OK	---	---	OK
M18/22/31	18/22/32 MPix	OK	OK	---	---	OK
PhaseOne						
IQ series	40 – 80 MPix	OK	OK	---	OK	OK
P+ series	31 – 60 MPix	OK	OK	---	OK	OK
Achromatic+	39 MPix (B+W)	OK	OK	---	OK	OK
H series	6-22 MPix	---	---	---	OK	---
LEAF						
Aptus series	28/33 MPix	OK	OK	---	---	OK
Aptus II series	22 – 80 MPix	OK	OK	---	---	OK
Valeo series	6-22 MPix	OK(ext)	OK	---	---	OK
Volare/Cantare	6 MPix	---	---	OK	---	---
Hasselblad						
CFV II	16 MPix	OK	OK	---	---	---
CFV 39/50	39/50 MPix	OK	OK	---	---	---
CF 39 (MS)	39 MPix	OK	OK	OK	OK	OK
Sinar						
eSpirit 65 LV	32 MPix	OK	OK	---	---	OK
eVolution75H/86H	33/49 MPix	---	---	OK	OK	OK
eMotion75H	33 MPix	OK	OK	---	---	OK
Sinarback	6-22 MPix	---	---	OK	OK	---
Kodak						
DCS Pro Back 645M	16 MPix (square)	OK	OK	---	OK	OK
Jenoptik Eyelike Precision						
M6 / M11 / M16	6/11 MPix (rect) 16 MPix (square)	---	---	OK	OK	---
MegaVision						
S3 Pro	6 MPix	---	---	OK	OK	---
Imacon						
Flexframe 3020/4040	6/16 MPix	---	---	OK	---	---

Comparison of focal length and equivalent aperture:

format	"4/3"	APS-C	35mm	645	6x6	6x7	6x9
width [mm]	12	16,7	24	42	56	56	56
height [mm]	17,3	25,1	36	56	56	69	89
diagonal [mm]	21,1	30,1	43,3	70,0	79,2	88,9	105,2

focal length [mm]	6	8	12	19	22	25	29
	7	10	15	24	27	31	36
	10	15	21	34	38	43	51
	12	17	24	39	44	49	58
	14	20	28	45	51	58	68
	17	24	35	57	64	72	85
	24	35	50	81	92	103	122
	41	59	85	138	156	175	207
	66	94	135	218	247	277	328
	97	139	200	324	366	411	486
	146	209	300	485	549	616	729
	195	279	400	647	732	822	972
	243	348	500	809	915	1027	1215
	292	418	600	971	1098	1232	1458
	389	557	800	1294	1464	1643	1944
	584	836	1200	1941	2197	2465	2916

equivalent aperture openings for comparable DOF:

APS-C	1,0	1,4	2,0	2,8	3,9	5,6	7,7	11	15
35mm	1,4	2,0	2,8	4,0	5,6	8,0	11	16	22
645	2,2	3,2	4,3	6,2	8,7	12	17	25	34