

Product Overview

HIWIN provides the best solution for high precision positioning platform.

New generation permanent magnet synchronous linear motor, the LMFP, is one of the two linear motor could reach 20,000 of peak force in European machine tool market. The LMFP exhibits excellent force density by implementing a special electromagnetic and heat dissipation design into water cooling system (same as previous generation LMFA).

In addition, one-piece encapsulated outer case achieves a better protection class than IP65. This makes the LMFP highly suitable for high contamination environments with cutting fluid, machine chips, or high amounts of dust.

If paired with precision water cooling system LMFC, double-layer dual loop water cooling design could achieve the best motor efficiency and surface temperature.



Specifications

	Symbol	Unit	LMFP24-F40	LMFP24-H40	LMFP31-Q10	LMFP31-Q20	LMFP32-Q20	LMFP32-Q40
Continuous force	Fc	N	874	874	413	413	827	827
Continuous current	Ic	A(rms)	5.7	8.6	4.1	8.2	8.2	16.5
Continuous force [WC]	Fc[WC]	N	1747	1747	827	827	1653	1653
Continuous current [WC]	Ic[WC]	A (rms)	11.4	17.2	8.2	16.5	16.5	32.9
Peak force [1s]	Fp	N	3477	3477	1797	1797	3593	3593
Peak current [1s]	Ip	A [rms]	35.3	53.2	25.6	51.2	51.2	102.4
Force constant	Kf	N/A (rms)	153.6	101.8	100.3	50.2	100.3	50.2
Attraction force	Fa	N	4583	4583	3121	3121	6243	6243
Maximum winding temperature	Tmax	°C	120	120	120	120	120	120
Electrical time constant	Ke	ms	8.1	7.9	12	12	12	10.8
Resistance (line to line, 25°C)	R25	Ω	7.1	3.2	3.6	0.9	1.8	0.5
Resistance (line to line, 120°C)	R120	Ω	9.7	4.4	4.9	1.2	2.5	0.7
Inductance (line to line)	L	mH	57.6	25.3	43.2	10.8	21.6	5.4
Pole pair pitch	2τ	mm	30	30	46	46	46	46
Back emf constant (line to line)	Kv	Vrms/(m/s)	88.7	58.8	57.9	29	57.9	29
Motor constant [25°C]	Km	N/√W	47	46.4	43.3	43.3	61.4	57.9
Thermal resistance	Rth	°C/W	0.2	0.19	0.77	0.78	0.38	0.33
Thermal resistance [WC]	Rth[WC]	°C/W	0.05	0.05	0.19	0.19	0.09	0.08
Thermal time constant	Tth	s	150	150	150	150	150	150
Minimum flow rate	-	L/min	4	4	4	4	5.2	5.2
Temperature of cooling water	-	°C	20	20	20	20	20	20
Pressure drop	△P	bar	3.18	3.18	0.57	0.57	0.74	0.74
Thermal switch	-	-	1 x Pt1000 + 1 x [3 PTC-SNM 120 In Series]					
Maximum velocity at maximum force	V _{MAXFP}	m/s	0.7	1.3	2.4	5.1	2.4	5.1
Maximum electric power input	P _{EL,MAX}	W	20565	23200	9130	13883	18454	29334
Maximum dissipated heat output	Q _{D,EL,MAX}	W	1891	1953	494	490	1021	1137
Stall force [WC]	F ₀	N	1227	1220	574	584	1170	1153
Stall current [WC]	I ₀	A (rms)	8	12	5.7	11.6	11.6	23
Max. DC bus voltage	-	V	750					
Mass of forcer	Mf	kg	11	11	6.9	6.9	12.1	12.1
Unit mass of stator	Ms	kg/m	9.8	9.8	16.2	16.2	16.2	16.2
Length of forcer	Lf	mm	465	465	221	221	382	382
Width of stator	Ws	mm	118	118	134	134	134	134
Length of stator /Dimension N	Ls	mm	120mm/N=2, 180mm/N=3, 300mm/N=5		184mm/N=2, 276mm/N=3, 460mm/N=5			
Stator mounting distance	Ws1	mm	104	104	115	115	115	115
Total installation height	H	mm	50.5	50.5	64.1	64.1	64.1	64.1

Note :

1. WC: water cooling.
2. LMFP forcer is collocated with LMF stators.
3. Except dimensions, the electrical specification are in +/-10% of tolerance.
4. We reserve the right to change, please follow customer recognition drawings.

	Symbol	Unit	LMFP33-Q30	LMFP33-Q60	LMFP34-Q40	LMFP34-Q80	LMFP41-Q10	LMFP41-Q20
Continuous force	Fc	N	1240	1240	1653	1653	495	495
Continuous current	Ic	A(rms)	12.4	24.7	16.5	32.9	3.4	6.8
Continuous force [WC]	Fc[WC]	N	2480	2480	3307	3307	990	990
Continuous current [WC]	Ic[WC]	A (rms)	24.7	49.4	33	65.9	6.8	13.6
Peak force [1s]	Fp	N	5390	5390	7187	7187	2820	2820
Peak current [1s]	Ip	A [rms]	76.8	153.6	102.4	204.8	22.7	45.4
Force constant	Kf	N/A (rms)	100.3	50.2	100.3	50.2	145.7	72.9
Attraction force	Fa	N	9364	9364	12485	12485	4682	4682
Maximum winding temperature	Tmax	°C	120	120	120	120	120	120
Electrical time constant	Ke	ms	12	12	12	13.5	12.6	12.4
Resistance (line to line, 25°C)	R25	Ω	1.2	0.3	0.9	0.2	5.1	1.3
Resistance (line to line, 120°C)	R120	Ω	1.6	0.4	1.2	0.3	7	1.8
Inductance (line to line)	L	mH	14.4	3.6	10.8	2.7	64.5	16.1
Pole pair pitch	2τ	mm	46	46	46	46	46	46
Back emf constant (line to line)	Kv	Vrms/(m/s)	57.9	29	57.9	29	84.1	42.1
Motor constant [25°C]	Km	N/√W	74.5	74.8	86.2	91.7	52.6	52.1
Thermal resistance	Rth	°C/W	0.26	0.26	0.19	0.2	0.78	0.76
Thermal resistance [WC]	Rth[WC]	°C/W	0.06	0.06	0.05	0.05	0.2	0.19
Thermal time constant	Tth	s	150	150	150	150	150	150
Minimum flow rate	-	L/min	5.7	5.7	6.2	6.2	5.2	5.2
Temperature of cooling water	-	°C	20	20	20	20	20	20
Pressure drop	△P	bar	0.98	0.98	1.28	1.28	0.89	0.89
Thermal switch	-	-	1 x Pt1000 + 1 x [3 PTC-SNM 120 In Series]					
Maximum velocity at maximum force	V _{MAXFP}	m/s	2.4	5.1	2.4	5.1	1.7	3.7
Maximum electric power input	P _{EL,MAX}	W	27092	41645	36123	55528	10205	15999
Maximum dissipated heat output	Q _{D,EL,MAX}	W	1464	1464	1960	1954	486	499
Stall force [WC]	F ₀	N	1730	1737	2314	2316	699	692
Stall current [WC]	I ₀	A (rms)	17.3	34.6	23.1	46.1	4.8	9.5
Max. DC bus voltage	-	V	750					
Mass of forcer	Mf	kg	17.8	17.8	23.1	23.1	9.9	9.9
Unit mass of stator	Ms	kg/m	16.2	16.2	16.2	16.2	22.3	22.3
Length of forcer	Lf	mm	563	563	704	704	221	221
Width of stator	Ws	mm	134	134	134	134	180	180
Length of stator /Dimension N	Ls	mm	184mm/N=2, 276mm/N=3, 460mm/N=5					
Stator mounting distance	Ws1	mm	115	115	115	115	161	161
Total installation height	H	mm	64.1	64.1	64.1	64.1	66.1	66.1

	Symbol	Unit	LMFP42-Q20	LMFP42-Q40	LMFP43-Q30	LMFP43-Q60	LMFP44-Q40	LMFP44-Q80
Continuous force	Fc	N	990	990	1485	1485	1979	1979
Continuous current	Ic	A(rms)	6.8	13.6	10.2	20.4	13.6	27.1
Continuous force [WC]	Fc[WC]	N	1979	1979	2969	2969	3958	3958
Continuous current [WC]	Ic[WC]	A (rms)	13.6	27.1	20.4	40.7	27.2	54.3
Peak force [1s]	Fp	N	5640	5640	8460	8460	11280	11280
Peak current [1s]	Ip	A [rms]	45.5	90.9	68.2	136.4	90.9	181.8
Force constant	Kf	N/A (rms)	145.7	72.9	145.7	72.9	145.7	72.9
Attraction force	Fa	N	9363	9363	14045	14045	18727	18727
Maximum winding temperature	Tmax	°C	120	120	120	120	120	120
Electrical time constant	Ke	ms	12.4	13.5	12.6	13.5	12.4	13.3
Resistance (line to line, 25°C)	R25	Ω	2.6	0.6	1.7	0.4	1.3	0.3
Resistance (line to line, 120°C)	R120	Ω	3.6	0.8	2.3	0.5	1.8	0.4
Inductance (line to line)	L	mH	32.3	8.1	21.5	5.4	16.1	4
Pole pair pitch	2τ	mm	46	46	46	46	46	46
Back emf constant (line to line)	Kv	Vrms/(m/s)	84.1	42.1	84.1	42.1	84.1	42.1
Motor constant [25°C]	Km	N/√W	73.7	76.7	91.2	94	104.2	108.9
Thermal resistance	Rth	°C/W	0.38	0.43	0.26	0.3	0.19	0.22
Thermal resistance [WC]	Rth[WC]	°C/W	0.1	0.11	0.07	0.08	0.05	0.05
Thermal time constant	Tth	s	150	150	150	150	150	150
Minimum flow rate	-	L/min	5.2	5.2	5.7	5.7	6.2	6.2
Temperature of cooling water	-	°C	20	20	20	20	20	20
Pressure drop	△P	bar	1.17	1.17	1.45	1.45	1.8	1.8
Thermal switch	-	-	1 x Pt1000 + 1 x [3 PTC-SNM 120 In Series]					
Maximum velocity at maximum force	V _{MAXFP}	m/s	1.7	3.7	1.7	3.7	1.7	3.7
Maximum electric power input	P _{EL,MAX}	W	20767	30783	30429	45256	41486	61567
Maximum dissipated heat output	Q _{D,EL,MAX}	W	999	881	1436	1242	1998	1769
Stall force [WC]	F ₀	N	1383	1383	2082	2075	2765	2775
Stall current [WC]	I ₀	A (rms)	9.5	19	14.3	28.5	19	38
Max. DC bus voltage	-	V	750					
Mass of forcer	Mf	kg	16.7	16.7	25	25	29.8	29.8
Unit mass of stator	Ms	kg/m	22.3	22.3	22.3	22.3	22.3	22.3
Length of forcer	Lf	mm	382	382	543	543	704	704
Width of stator	Ws	mm	180	180	180	180	180	180
Length of stator /Dimension N	Ls	mm	184mm/N=2, 276mm/N=3, 460mm/N=5					
Stator mounting distance	Ws1	mm	161	161	161	161	161	161
Total installation height	H	mm	66.1	66.1	66.1	66.1	66.1	66.1

Product Description

LMFP Order Code of Primary Part (Forcer)

Series	Type	Width of forcer	Length of forcer	Wiring Code
LM	FP	3	2	- □□□
Linear motor	Linear motor type	2 : 126mm 3 : 141mm 4 : 188mm 5 : 248mm 6 : 342mm	LMFP 2 Series 4 : 465 mm LMFP 3-6 Series 1 : 221 mm 2 : 382 mm 3 : 543 mm 4 : 704 mm	

LMFP Order Code of Magnet Track (Stator)

Series	Width of Stator	Model	Length of Stator	Magnet Package
LMF	0	S	1	E
	0 : 58 mm 1 : 88 mm 2 : 118 mm 3 : 134 mm 4 : 180 mm 5 : 240 mm 6 : 334 mm	S : Standard C : Custom	LMF0-2 Series 1 : 120 mm 2 : 180 mm 3 : 300 mm LMF3-5 Series 1 : 184mm 2 : 276mm 3 : 460mm LMF6 Series 1 : 184mm	E: Epoxy None: Cover plate



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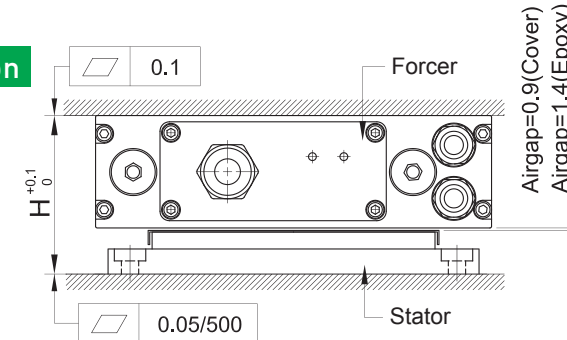
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	Symbol	Unit	LMFP52-Q20	LMFP52-Q40	LMFP53-Q30	LMFP53-Q60	LMFP54-Q40	LMFP54-Q80	
Continuous force	Fc	N	1422	1422	2133	2133	2844	2844	
Continuous current	Ic	A[rms]	7.4	14.8	11.1	22.2	14.8	29.6	
Continuous force [WC]	Fc[WC]	N	2844	2844	4266	4266	5688	5688	
Continuous current [WC]	Ic[WC]	A [rms]	14.8	29.6	22.2	44.4	29.6	59.2	
Peak force (1s)	Fp	N	7000	7000	10500	10500	14000	14000	
Peak current (1s)	Ip	A [rms]	46.3	92.7	69.5	139	92.7	185.3	
Force constant	Kf	N/A [rms]	192.3	96.1	192.3	96.1	192.3	96.1	
Attraction force	Fa	N	12467	12467	18700	18700	24933	24933	
Maximum winding temperature	Tmax	°C	120	120	120	120	120	120	
Electrical time constant	Ke	ms	12.6	13.4	12.4	12	12.6	13.5	
Resistance (line to line, 25°C)	R25	Ω	3.4	0.8	2.3	0.6	1.7	0.4	
Resistance (line to line, 120°C)	R120	Ω	4.7	1.1	3.2	0.8	2.3	0.5	
Inductance (line to line)	L	mH	42.9	10.7	28.6	7.2	21.5	5.4	
Pole pair pitch	2τ	mm	46	46	46	46	46	46	
Back emf constant (line to line)	Kv	Vrms/[m/s]	111	55.5	111	55.5	111	55.5	
Motor constant (25°C)	Km	N/√W	85.1	87.7	103.5	101.3	120.3	124	
Thermal resistance	Rth	°C/W	0.25	0.26	0.16	0.16	0.13	0.14	
Thermal resistance [WC]	Rth[WC]	°C/W	0.06	0.07	0.04	0.04	0.03	0.04	
Thermal time constant	Tth	s	150	150	150	150	150	150	
Minimum flow rate	-	L/min	6.3	6.3	6.8	6.8	7.3	7.3	
Temperature of cooling water	-	°C	20	20	20	20	20	20	
Pressure drop	ΔP	bar	1.77	1.77	1.77	1.77	2.3	2.3	
Thermal switch	-	-	1 x Pt1000 + 1 x (3 PTC SNM 120 In Series)						-
Maximum velocity at maximum force	V _{MAXFP}	m/s	1.2	2.7	1.2	2.7	1.2	2.7	
Maximum electric power input	P _{ELMAX}	W	23513	33079	35785	51535	46447	63552	
Maximum dissipated heat output	Q _{PDJMAX}	W	1544	1446	2366	2366	3023	2628	
Stall force [WC]	F ₀	N	1998	1989	2979	2988	3978	3978	
Stall current [WC]	I ₀	A [rms]	10.4	20.7	15.5	31.1	20.7	41.4	
Max. DC bus voltage	-	V	750						-
Mass of forcer	Mf	kg	24.8	24.8	33.5	33.5	42.3	42.3	
Unit mass of stator	Ms	kg/m	25	25	25	25	25	25	
Length of forcer	Lf	mm	382	382	543	543	704	704	
Width of stator	Ws	mm	240	240	240	240	240	240	
Length of stator / Dimension N	Ls	mm	184mm/N=2, 276mm/N=3, 460mm/N=5						-
Stator mounting distance	Ws1	mm	111	111	111	111	111	111	
Total installation height	H	mm	64.1	64.1	64.1	64.1	64.1	64.1	

Product Dimension

LMFP

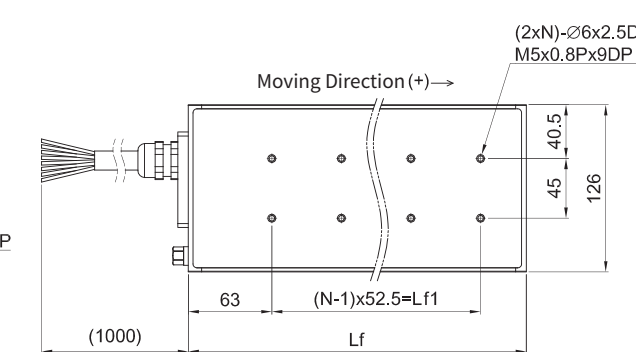
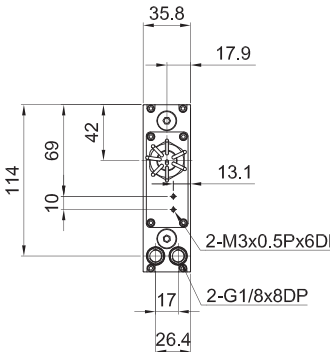
Installation Dimension



Type	H	Type	H
LMFP24	50.5	LMFP52	64.1
LMFP31	64.1	LMFP53	64.1
LMFP32	64.1	LMFP54	64.1
LMFP33	64.1	LMFP62	66.1
LMFP34	64.1	LMFP63	66.1
LMFP41	66.1	LMFP64	66.1
LMFP42	66.1		
LMFP43	66.1		
LMFP44	66.1		

LMFP2

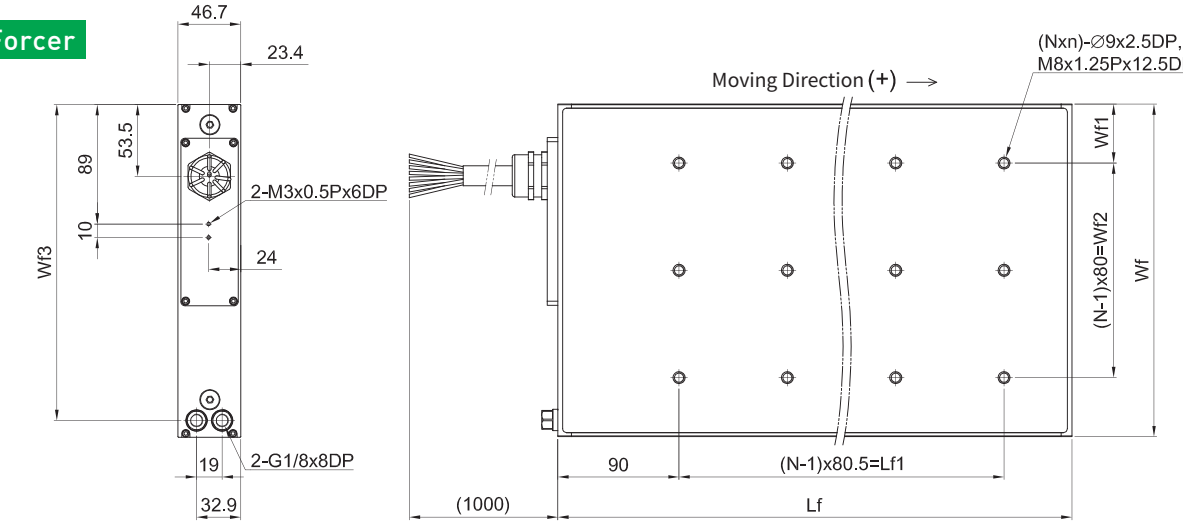
Dimension of Forcer



Type	Lf	Lf1	N
LMFP24-F40	465	367.5	8
LMFP24-H40	465	367.5	8

LMFP5,6

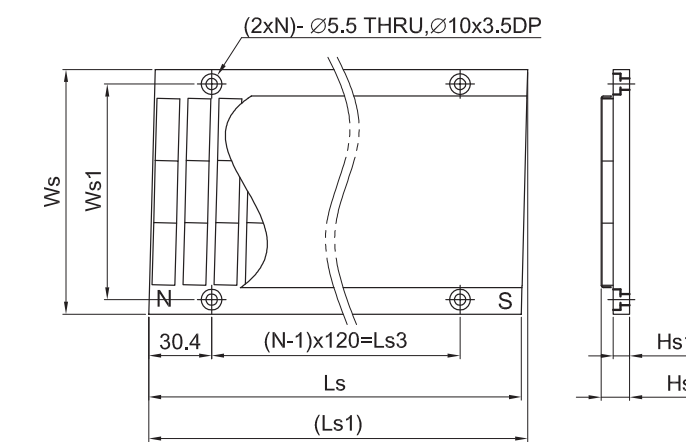
Dimension of Forcer



Type	Lf	Lf1	Wf	Wf1	Wf2	Wf3	N	n
LMFP52-Q20	382	241.5	248	44	160	235.5	3	4
LMFP52-Q40	382	241.5	248	44	160	235.5	3	4
LMFP53-Q30	543	402.5	248	44	160	235.5	3	6
LMFP53-Q60	543	402.5	248	44	160	235.5	3	6
LMFP54-Q40	704	563.5	248	44	160	235.5	3	8
LMFP54-Q80	704	563.5	248	44	160	235.5	3	8
LMFP62-Q20	382	241.5	342	51	240	329.5	4	4
LMFP62-Q40	382	241.5	342	51	240	329.5	4	4
LMFP63-Q30	543	402.5	342	51	240	329.5	4	6
LMFP63-Q60	543	402.5	342	51	240	329.5	4	6
LMFP64-Q40	704	563.5	342	51	240	329.5	4	8
LMFP64-Q80	704	563.5	342	51	240	329.5	4	8

LMF2

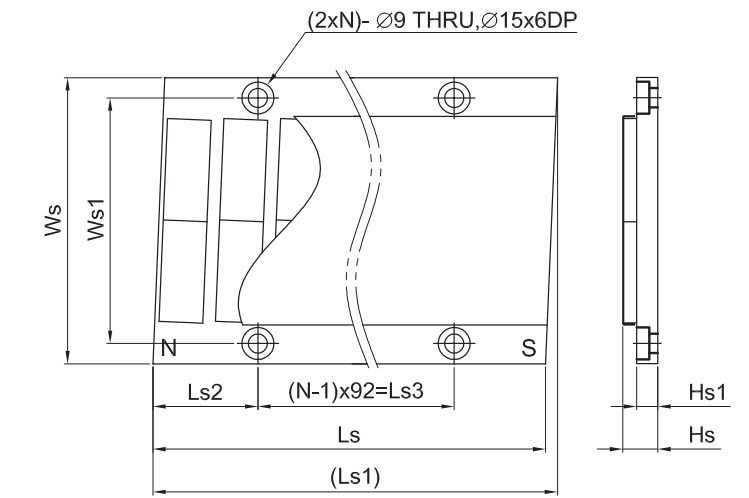
Dimension of Stator



Type	Ls	Ls1	Ls3	Hs	Hs1	Ws	Ws1	N
LMF2S1	120	123.09	60	13.8	7.9	118	104	2
LMF2S1E	120	123.09	60	13.3	7.7	118	104	2
LMF2S2	180	183.09	120	13.8	7.9	118	104	3
LMF2S2E	180	183.09	120	13.3	7.7	118	104	3
LMF2S3	300	303.09	240	13.8	7.9	118	104	5
LMF2S3E	300	303.09	240	13.3	7.7	118	104	5

LMF3,4

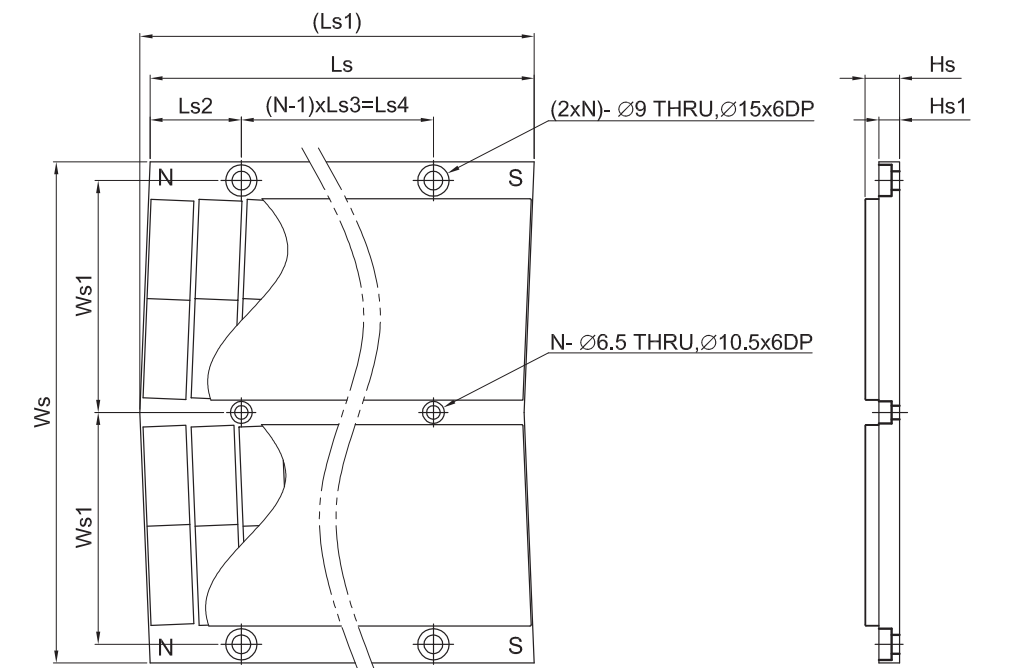
Dimension of Stator



Type	Ls	Ls1	Ls2	Ls3	Hs	Hs1	Ws	Ws1	N
LMF3S1	184	189.62	49.2	92	16.5	10	134	115	2
LMF3S1E	184	189.62	49.2	92	16	9.8	134	115	2
LMF3S2	276	281.62	49.2	184	16.5	10	134	115	3
LMF3S2E	276	281.62	49.2	184	16	9.8	134	115	3
LMF3S3	460	465.62	49.2	368	16.5	10	134	115	5
LMF3S3E	460	465.62	49.2	368	16	9.8	134	115	5
LMF4S1	184	189.03	48.9	92	18.5	12	180	161	2
LMF4S1E	184	189.03	48.9	92	18	11.8	180	161	2
LMF4S2	276	281.03	48.9	184	18.5	12	180	161	3
LMF4S2E	276	281.03	48.9	184	18	11.8	180	161	3
LMF4S3	460	465.03	48.9	368	18.5	12	180	161	5
LMF4S3E	460	465.03	48.9	368	18	11.8	180	161	5

LMF5,6

Dimension of Stator



Type	Ls	Ls1	Ls2	Ls3	Hs	Hs1	Ws	Ws1	N
LMF5S1E	184	188.89	43.7	92	16	9.8	240	111	2
LMF5S2E	276	280.89	43.7	92	16	9.8	240	111	3
LMF5S3E	460	464.89	43.7	92	16	9.8	240	111	5
LMF6S1E	184	188.66	20.97	46	18	11.8	334	158	4